Title: Predictors of Impaired Reperfusion After Percutaneous Coronary Intervention In Patients With In-Hospital Acute Stent Thrombosis: Retrospective Analyses of 5-years Data

Category: Acute Coronary Syndromes, Myocardial Infarction, Thrombectomy and Vulnerable Plaque

Authors: Burak Acaer, Turkiye Yuksek Ihtisas Education And Research Hospital, Turkey; Orhan Maden, Turkiye Yuksek Ihtisas Education and Research Hospital, Turkey; Kevser Balci, Turkiye Yuksek Ihtisas Education and Research Hospital, Turkey; Sefa Unal, Turkiye Yuksek Ihtisas Education and Research Hospital, Turkey; Meryem Kara, Turkiye Yuksek Ihtisas Education and Research Hospital, Turkey; Hatice Selcuk, Turkiye Yuksek Ihtisas Education and Research Hospital, Turkey; Timur Selcuk, Turkiye Yuksek Ihtisas Education and Research Hospital, Turkey.

Background: It is known that clinical endpoints are poorer in patients with a post-PCI TIMI flow of <3 compared to patients with TIMI-3 flow, and morbidity and mortality rates are also higher in these patients with failed reperfusion. The aim of this study was to determine the risk factors of reperfusion failure in patients undergoing repeat percutaneous coronary intervention (PCI) for treatment of acute stent thrombosis (STh).

Methods: A total of 108 patients who underwent repeat PCI for the treatment of in-hospital acute STh were retrospectively analyzed. Among those cases, patients that presented with acute STh and underwent a repeat PCI for acute STh were identified. Failed reperfusion was defined as presence of thrombolysis in myocardial infarction (TIMI)<3 flow at the end of repeat PCI. Patients were divided into 2 groups according to success of the procedure (TIMI<3 vs. TIMI 3 flow).

Results: A total of 21 (25%) patients had thrombolysis in myocardial infarction (TIMI) flow <3 after repeat PCI. The median value of pain-to-balloon time was 40 minutes in the TIMI<3 group, it was 35 minutes in the TIMI=3 group (p=0.001), and first PCI-to-stent thrombosis time was also longer in the TIMI<3 group (10 hours vs. 2.5 hours, p=0.001). When patients were evaluated according to the PCI time, the percentage of the patients with TIMI<3 was significantly higher in the night period when compared to the daytime period (46.4% vs. 17.5%, p=0.001). In the multivariable logistic regression analysis, stent length (OR=1.18, 95% CI 1.008-1.38) and pain to balloon time (OR=1.28, 95% CI 1.06-1.54) were the only independent predictors of failed reperfusion.

Conclusion: PCI failure is high in patients with acute STh. Baseline stent length and pain-to-balloon time are associated with increased failure rates. Those indicators may be used to predict the success of the procedure, and to develop strategies for improved outcomes. Moreover, TIMI flow grade showed a circadian variation.

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Burak Acaer: This author has nothing to disclose.
Orhan Maden: This author has nothing to disclose.
Kevser Balci: This author has nothing to disclose.
Sefa Unal: This author has nothing to disclose.
Mustafa Balci: This author has nothing to disclose.
Meryem Kara: This author has nothing to disclose.
Hatice Selcuk: This author has nothing to disclose.
Timur Selcuk: This author has nothing to disclose.
Conclusion: The ACC/AHA and ESC guidelines for NSTE-ACS contain a similar number of recommendations. COR distribution was similar in the two guidelines, whereas LOE differed with the ACC/AHA guidelines containing more LOE: B recommendations and the ESC guidelines more LOE: A recommendations.

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Michele Roesle: This author has nothing to disclose.
Bavana Rangan: This author has nothing to disclose.
Subhash Banerjee: 9 Intellectual Property in HygeiaTel, 4 Ownership in MDCARE Global (spouse), 5 Consultant/Speaker honoraria from...
Title: Reduction of significant thrombus burden STEMI complications by micro-meshed stent implantation by radial approach

Authors: Luis Enrique Berumen Dominguez, Hospital Central Militar, Mexico; Hugo Gutierrez Leonard, Hospital Central Militar, Mexico; Miguel Angel Ramirez Aldaraca, Hospital Central Militar, Mexico; Ricardo Aguilar Oliva, Hospital Central Militar, Mexico

Background: Objective:

a) Reduce distal microembolization.
b) Avoid the No Reflow phenomenon.
c) Achieve radial access in order to reduce bleeding or hematomas

Methods: Material: 62 patients were treated, 38 men and 24 women, aged between 45 and 72 years old, from March 2013 to September 2015, all with less than 10 hours earlier of (AMI-ST), 34 anterior and 28 post-inferior.

Methods: A right radial approach was practiced in all patients, all were medicated with 600 mg of clopidogrel, 300 mg of acetylsalicylic acid and 7 to 10 IU/kg body weight of unfractionated heparin. By the usual technique of PCI, the lesion was crossed with a 0.014” guide. In 46 patients, crossing the guide allowed visualization of the lesion. These patients were directly implanted with a Micro-mesh stent (MGuard). The remaining patients underwent a balloon angioplasty of 1.5x15 mm with the intention to properly identify the injury, to assess the amount of thrombus and prevent the distal microembolism. Later, micro-meshed stents MGuard were implanted also. A control angiography was performed to assess vessel patency and identify condition of microcirculation.

Results: Adequately implement of stent was achieved in all patients. There was the need to predilate again with a larger balloon because of the inability to advance the stent appropriately in 5 patients, given their high profile. In 57 patients, a TIMI 3 flow was obtained and 5 presented TIMI 2 flow. TMP flow was 3 out of 52 patients and TMP 2 in 10 patients. None of them presented the No Reflow phenomenon

Conclusion: The implantation of a micro-mesh stent (MGuard), avoids distal microembolism in AMI-ST patients, with significant thrombus burden and thus the phenomenon of No Reflow is avoided, significantly improving the clinical course of patients. The profile of the stent is larger so in some cases we have to predilate

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Luis Enrique Berumen Dominguez: This author has nothing to disclose.
Hugo Gutierrez Leonard: This author has nothing to disclose.
Miguel Angel Ramirez Aldaraca: This author has nothing to disclose.
Ricardo Aguilar Oliva: This author has nothing to disclose.

Title: ETHNIC DIFFERENCES IN EXTENT OF CORONARY ARTERY DISEASE IN PATIENTS PRESENTING WITH ACUTE ST-SEGMENT ELEVATION MYOCARDIAL INFARCTION

Category: Acute Coronary Syndromes, Myocardial Infarction, Thrombectomy and Vulnerable Plaque

Authors: Sindu Chandran, The wright center for graduate medical education, United States; Neha Pancholy, Jefferson Medical College of Thomas Jefferson University, United States; Keyur Mavani, The wright center for graduate medical education, United States; Sanjay Shah, Apex Heart Institute, India; Tejas Patel, Apex Heart Institute, India; Samir Pancholy, The wright center for graduate medical education, United States

Background: Coronary artery disease (CAD) in the Indian subcontinent is increasing in prevalence. Data comparing angiographic extent of CAD and other characteristics of ST-segment elevation myocardial infarction (STEMI) patients of Indian ethnicity and caucasians are not available.

Methods: Patients presenting with STEMI undergoing primary PCI at a tertiary care center in US and in India between 2011 and 2013 were analyzed retrospectively. Demographic data were collected. Coronary angiograms were reviewed and SYNTAX score was calculated in a standard fashion. Univariate analyses were performed to identify differences between the 2 ethnic groups. Multivariable analysis using linear regression was performed to evaluate the effect of ethnicity on SYNTAX score.

Results: A total of 814 patients met inclusion criteria, 348 caucasians and 466 Indians. Indian patients were younger (57 ± 11 vs 61 ± 13 years, P = 0.0005), more likely to be male (87% vs 71%, P = 0.0005), diabetics (31% vs 25%, P = 0.006) and less likely to be hypertensive (45% vs 59%, P = 0.005). Indian patients were more likely to have STEMI as their first manifestation of vascular disease (95% vs 78%, P = 0.0005). Indian ethnicity patients had a significantly higher SYNTAX score compared to caucasian ethnicity patients (15 ± 9 vs 11 ± 7, P = 0.0005). SYNTAX score was significantly associated with age, history of diabetes mellitus, ethnicity and previous vascular disease (history of revascularization, cerebrovascular events or peripheral disease). Multivariable analysis using linear regression identified age (t = 5.1, P = 0.0005) and Indian ethnicity (t = 6.6, P = 0.0005) as significant independent predictors of SYNTAX score.

Conclusion: STEMI patients of Indian Ethnicity have significantly more extensive angiographic CAD compared to caucasians. STEMI is more frequently an index presentation of vascular disease in Indian patients, and manifests at a younger age.

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Sanjay Shah: This author has nothing to disclose.
Tejas Patel: This author has nothing to disclose.
Samir Pancholy: 8 Terumo

Title: Safety and efficacy of aspiration thrombectomy during primary PCI. A Meta-analysis of large Randomized Controlled Trials

Category: Acute Coronary Syndromes, Myocardial Infarction, Thrombectomy and Vulnerable Plaque

Authors: Konstantinos Marmagkiolis, University of Missouri Columbia, United States; Abdul Hakeem, University of Arkansas for Medical Sciences, United States; Dmitriy Feldman, New York Presbyterian/Weill Cornell Medical College, United States; Mehmet Cilingiroglu, University Of Arkansas, United States; Konstantinos Charitakis, University of Texas Health Science Center at Houston, United States

Catheterization and Cardiovascular Interventions DOI 10.1002/ccd. Published on behalf of The Society for Cardiovascular Angiography and Interventions (SCAI).
**Background:** Recent randomized controlled trials (RCTs) have questioned the clinical efficacy and safety of routine aspiration thrombectomy (AT) during primary PCI.

**Methods:** We performed a meta-analysis of the larger (>150 patients) RCTs which compared aspiration thrombectomy with primary PCI alone. Our procedural end-points were Myocardial Blush Grade (MBG) of 0 or 1 and ST segment resolution (STR) of >50%. Mid-term end-points were mortality, reinfarction, target vessel revascularization and stroke >30 days after the procedure.

**Results:** We identified 11 large RCTs with 10,309 patients randomized to AT and 10,296 to routine strategy (RT). While AT was associated with significantly improved myocardial perfusion as demonstrated by MBG score (OR:0.69 [0.49-1.41]; p=0.01), there was no difference in the rates of ST segment resolution >50% (OR:1.06 [0.81-1.38]; p=0.81) between groups. In the 30 day outcomes there were no differences in mortality (OR:0.89 [0.76-1.05]; p=0.76), reinfarction (OR:0.9 [0.71-1.15]; p=0.47), TVR (OR:1.06 [0.81-1.38]; p=0.67) and stroke rates (OR:1.49 [0.86-2.58]; p=0.29).
Conclusion: Our meta-analysis of 20,605 patients who participated in large RCTs demonstrate improved MBG scores with aspiration thrombectomy compared to PCI alone, but no differences in STR >50%, mortality, reinfarction, TVR and stroke rates at 30 days. Our study supports the latest ACC/AHA/SCAI document to recommend against the routine use of aspiration thrombectomy during primary PCI.

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Konstantinos Charitakis: This author has nothing to disclose.

A-026

Title: Efficacy of Intracoronary Eptifibatide during Primary Percutaneous Coronary Intervention in Early versus Late Presenters with ST-segment elevation myocardial infarction: A Pilot Trial.

Category: Acute Coronary Syndromes, Myocardial Infarction, Thrombectomy and Vulnerable Plaque

Authors: Ayman Elbadawi, rochester general hospital, United States; Odunayo Olorunfemi, rochester general hospital, United States; Ahmed Abuzeid, Jefferson Medical College, United States; Marwan Saad, seton hall university, United States

Background: The benefit of routine use of intracoronary glycoprotein IIb-IIIa inhibitors in primary percutaneous coronary intervention (PCI) for patients with STEMI, and whether there is a time frame for this benefit is still debatable. We sought to evaluate the role of intracoronary eptifibatide in primary PCI in early versus late ST-segment elevation myocardial infarction (STEMI) presenters.

Methods: This study included 36 patients presenting with STEMI who were divided to 3 groups; Early presenters group (n=12) included patients presenting within 3 hours from onset of chest pain managed by primary PCI + intracoronary eptifibatide, Late presenters group (n=12) included patients presenting 3-12 hours from onset of chest pain managed by primary PCI + intracoronary eptifibatide, and control group (n=12) managed by conventional primary PCI. Primary end points were post-PCI Thrombolysis In Myocardial Infarction (TIMI) flow grade, myocardial blush grade (MBG) and corrected TIMI frame count (cTFC) in the culprit vessel. Secondary end points included ST-segment resolution index (STR) and peak Creatine Kinase-Myocardial Band (CKMB).

Results: Control group was significantly less likely to achieve MBG ≥2 when compared to the Early or Late Presenters groups (p=0.011). However, there was no difference between the 3 groups in the TIMI3 achievement (p=0.091). Early presenters group had significantly lower cTFC rates compared to Later Presenters and control groups (17.8 ± 1.6 vs. 21.2 ± 3.8 vs. 28.6 ± 6.0 respectively, p<0.001). Peak CKMB was significantly lower in Early Presenters compared to Late Presenters and control groups (216.3 ± 91.0 vs. 222.9 ± 61.1 vs. 391.7 ± 258.2 respectively, p=0.018). However, there was no significant difference in the STR index between the 3 groups (p=0.226).

Conclusion: Local intracoronary eptifibatide infusion using a perfusion catheter might reduce thrombus burden and improve microvascular perfusion in STEMI patients undergoing primary PCI. This benefit is more pronounced when used in patients presenting within 3 hours of onset of chest pain.

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A-027

Title: Impact of Remote Ischemic Post-conditioning during Primary Percutaneous Coronary Intervention on Left Ventricular Remodeling after Anterior Wall ST-segment Elevation Myocardial Infarction: A Randomized Controlled Trial

Category: Acute Coronary Syndromes, Myocardial Infarction, Thrombectomy and Vulnerable Plaque

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Background: Reperfusion injury during pPCI adversely affects the final infarct size after STEMI. Few studies showed role for RIPostC in reducing reperfusion injury, however its impact on LV remodeling was never studied. We sought to determine efficacy and safety of remote ischemic post-conditioning (RIPostC) in improving left ventricular (LV) remodeling and cardiovascular outcomes during primary percutaneous coronary intervention (pPCI) in patients with anterior wall ST segment elevation myocardial infarction (STEMI).

Methods: 60 patients with anterior wall STEMI were randomized to pPCI + RIPostC (n=30) or conventional pPCI (n=30). The RIPostC protocol consisted of alternating ischemia/reperfusion performed by cuff inflation/deflation of the lower limb just after restoration of flow in the culprit vessel. Primary efficacy endpoints included assessment of LV remodeling and LV ejection fraction (LVEF) after pPCI, and at 6 months follow up using 2D transthoracic echocardiography. Secondary efficacy endpoints included infarct size assessed by peak CKMB, ST-segment resolution (STR) >70%, Thrombolysis In Myocardial Infarction (TIMI) flow grade, and myocardial blush grade (MBG). Major adverse cardiac events (MACE) were assessed at 6 months. Safety outcome was the incidence of acute kidney injury (AKI) post-pPCI.

Results: At 6 months, there was no significant decrease in incidence of LV remodeling in RIPostC group compared with control group (30% vs 40%, p=0.42). Percentage of patients with improvement in LVEF was not different between RIPostC and control groups (50% vs 53%, p=0.79). Full STR was more in RIPostC group compared with control group (66.7% vs. 40%, p=0.04), with a trend towards less incidence of AKI in RIPostC group compared to control group (3.3% vs. 17.2%, p=0.08). Peak CKMB, TIMI flow, MBG and MACE at 6 months were not significantly different between both groups.

Conclusion: Our study failed to show reduction in LV remodeling with RIPostC protocol during pPCI for anterior wall STEMI; however, achieving better rates of full STR might suggest a potential benefit of this protocol. Our study proved RIPostC protocol to be safe, with potential protective mechanism against post-pPCI AKI.

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Marwan Saad: This author has nothing to disclose.

A-029

Title: Comparison of Factors Related to 30-day and 2-year Outcomes in Acute Myocardial Infarction Patients undergoing Percutaneous Coronary Intervention - a Multicenter Experience

Category: Acute Coronary Syndromes, Myocardial Infarction, Thrombectomy and Vulnerable Plaque

Catheterization and Cardiovascular Interventions DOI 10.1002/ccd. Published on behalf of The Society for Cardiovascular Angiography and Interventions (SCAI).
Authors: Vamshidhara Gade, California Pacific Medical Center, United States; Peter Hui, California Pacific Medical Center, United States; Jamal Brewster, California Pacific Medical Center, United States; Richard Shaw, California Pacific Medical Center, United States

Background: Recent studies have identified factors related to 30-day readmission and mortality in AMI patients undergoing PCI, but the relationship of these factors to longer-term survival is not well characterized. The purpose of this study was to compare 30-day and 2-year outcomes of AMI patients undergoing PCI.

Methods: A consecutive series of 5064 AMI patients undergoing PCI between 1/1/2011 and 12/31/2014 at 6 institutions was studied. Of these, 2319 presented with STEMI and 2745 had NSTEMI. Patients were followed using hospital EHR and the SSDI (mean followup 30 ± 1 months, range 1-56). (see Table)

Results: Death at 30-days occurred in 141 (2.8%) and unplanned readmission to the hospital occurred in 288 (5.9%). Factors significantly associated with 30-day readmission were: advanced age, DM, current dialysis, smoking, heart failure, prior cardiovascular disease, and dyslipidemia (see Table). In analysis of 30-day survival, initial STEMI presentation was significantly associated with survival. At the 2-year followup, STEMI presentation was no longer a significant factor, while other factors such as prior PCI, smoking, heart failure, prior cardiovascular disease, and dyslipidemia (see Table). In analysis of 30-day survival, initial STEMI presentation was significantly associated with survival. At the 2-year followup, STEMI presentation was no longer a significant factor, while other factors such as prior PCI, chronic lung disease and HTN were more strongly related to survival.

Conclusion: Presentation with STEMI is strongly associated with 30-day mortality, along with many other factors. Although many factors continue to influence mortality outcome 2 years after PCI, AMI presentation is not significantly associated with 2-year survival. This study confirms the need for closer followup of AMI patients in the initial post hospital discharge period and identifies the importance of other clinical factors in the longterm management of these PCI patients.

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Vamshidhara Gade: This author has nothing to disclose.
Peter Hui: This author has nothing to disclose.
Jamal Brewster: This author has nothing to disclose.
Richard Shaw: This author has nothing to disclose.

A-030

Title: Influences on Adoption of Radial Artery Access versus Femoral Artery Access in Acute Myocardial Infarction Patients undergoing Percutaneous Coronary Intervention and their Outcomes - a Multicenter Experience

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Richard Shaw: This author has nothing to disclose.

A-033
Title: In-Hospital Management and Outcomes in Acute Vasospastic Angina: Results from the National Inpatient Sample (NIS) Database
Category: Acute Coronary Syndromes, Myocardial Infarction, Thrombectomy and Vulnerable Plaque
Authors: Zubair Shah, The University Of Kansas Medical Center, United States; Reza Masoomi, The University Of Kansas Medical Center, United States; Dawn Buddhadeb, The University Of Kansas Medical Center, United States; Kamal Gupta, The University Of Kansas Medical Center, United States

Background: In-Hospital Management and Outcomes in Acute Vasospastic Angina: Results from the National Inpatient Sample (NIS) Database
Methods: We performed a secondary analysis of the NIS database (2008 to 2012) for patients with primary diagnosis of acute vasospastic angina (AVA). Various demographic and clinical parameters, including performance of cardiac catheterization and in-hospital mortality were analyzed. Since coronary angiography is required for the diagnosis of vasospastic angina, only patients admitted with primary diagnosis of acute vasospastic angina who underwent coronary angiography during the same hospitalization were included.

Results: A total of 10,997 patients were admitted with the primary diagnosis of AVA in the five years studied. A majority (65%) were Caucasians (African Americans [AA] 20%; other races 15%) and 63% were women. Mean age was 53 years (similar across races/genders). A steady increase in the number of patients admitted with a primary diagnosis of AVA was noted in the 5 years studied (1,766 patients in 2008 vs. 2,253 in 2012, a 27% increase; p trend=0.003). Overall, intra-aortic balloon pump (IABP) was used in 0.1% of patients, almost exclusively in women (0.15% vs. 0% in men; P=0.03). Incidence of Ventricular fibrillation/sudden cardiac death was 0.23% (females 0.28% vs. males 0.07%; African Americans [AA] 0.32% vs. Caucasians 0.19%; P=0.03 and 0.04 respectively). Surprisingly, the mean age of patients who had ventricular fibrillation/sudden cardiac death was lower than the overall group (44 years vs. 53 years, P=0.001). In-hospital mortality was 0.18% with a significant temporal trend for increasing mortality from 2008 to 2012 (0.14% to 0.23%, P=0.04). In-hospital mortality was higher in women compared with men (0.22% vs. 0.04%, P=0.02) and in AA patients compared with Caucasians and other races (0.24% vs. 0.19%; P=0.04).

Conclusion: There has been a steady increase in both the number of patients admitted with primary diagnosis of acute vasospastic angina and the associated mortality during same hospitalization from 2008 to 2012. Significant racial and gender differences were observed, including higher mortality in women and AA patients. These differences warrant further studies.

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Zubair Shah: This author has nothing to disclose.
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Dawn Buddhadeb: This author has nothing to disclose.
Kamal Gupta: This author has nothing to disclose.

A-034
Title: Chest Pain in Acute Coronary Syndrome Patients with Depression after Bypass Surgery
Category: Acute Coronary Syndromes, Myocardial Infarction, Thrombectomy and Vulnerable Plaque
Authors: Satya Gupta, Care Institute of Medical Sciences (CIMS), India; Parloop Bhatt, Care Institute of Medical Sciences (CIMS), India; Milan Chag, Care Institute of Medical Sciences (CIMS), India; Nairuti Trivedi, Care Institute of Medical Sciences (CIMS), India; Keyur Parikh, Care Institute of Medical Sciences (CIMS), India; Apurva Patel, Mount Sinai Beth Israel, United States; Roosha Parikh, Mount Sinai Beth Israel, United States; Parth Parikh, Cleveland Clinic Foundation, United States; Aditi Patel, Cleveland Clinic, United States; Jawahar Mehta, Arkansas Children’s Hospital, United States; Dhiren Shah, Care Institute of Medical Sciences (CIMS), India

Background: Chronic pain following cardiac surgery has been reported in 17% to 56% of patients. Prevalence of depression is high in coronary artery disease patients. Pain and depression hold neurological and psychosomatic association. Objective of the present study was to compare the prevalence of post-operative chronic pain following coronary artery bypass graft (CABG) in patients with and without depression.

Methods: A prospective consented cohort of 542 patients underwent CABG from June 2014 through June 2015 at a cardiology group practice institute. Prevalence of depression was assessed using MADRS (Montgomery-Asberg Depression Rating Scale) questionnaire by a clinical psychologist on admission. Guideline driven anesthetic and analgesic protocols were followed before, during and after surgery. Pain scores (numeric rating scale 0–10) were recorded during the first 7 post-operative days. Six months after cardiac surgery, 348 patients responded when contacted about presence of chronic thoracic pain and its possible impact on their daily lives by means of a questionnaire based on the numerical rating pain scale.

Results: Depression was present in 247 of 542 patients (46%); of which 83% of patients were males with a mean age of 57 years. During the first 7 post-operative days, there was no difference in pain perception between depressed and non-depressed patients (P=0.2853). However, at 6 months following surgery, the two groups differed significantly regarding prevalence of pain (P=0.001). In the depressed group, 29.3% (51 out of 174) patients experienced chronic thoracic pain as compared to 3.4% (6 out of 174) non-depressed patients. Depressed patients also experienced more frequent difficulties during their daily chores and occupational activity (P<0.05 vs. non-depressed patients).

Conclusion: Prevalence and severity of chronic pain after CABG was higher in depressed (vs. non-depressed) patients affecting their Quality of Life which could influence health care expenditures including referral to physician and increased use of medicines.

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Parth Parikh: This author has nothing to disclose.
Aditi Patel: This author has nothing to disclose.
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Dhiren Shah: This author has nothing to disclose.

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A-035

Title: Depression Adversely Affects Long Term Outcomes in Acute Coronary Syndrome Patients: A Real World Scenario

Category: Acute Coronary Syndromes, Myocardial Infarction, Thrombectomy and Vulnerable Plaque

Authors: Satya Gupta, Care Institute of Medical Sciences (CIMS), India; Parloop Bhatt, Care Institute of Medical Sciences (CIMS), India; Milan Chag, Care Institute of Medical Sciences (CIMS), India; Parth Parikh, Cleveland Clinic Foundation, United States; Roosha Parikh, Mount Sinai Beth Israel, United States; Aditi Nanavati, Care Institute of Medical Sciences (CIMS), India; Piyush Thakar, Care Institute of Medical Sciences (CIMS), India; Jawahar Mehta, Arkansas Children’s Hospital, United States; Keyur Parikh, Care Institute of Medical Sciences (CIMS), India

**Background**: Prevalence of depression and coronary heart disease is high in Indian population. This study presents association of depression and acute coronary syndrome (ACS), contributing factors and long term 4 year outcomes.

**Methods**: A total of 1648 ACS patients were enrolled at a cardiology group practice center from August 2010 through August 2011. Demographic and socioeconomic parameters were collected. Depression was assessed by Montgomery-Asberg Depression Rating Scale (MARDS) by a clinical psychologist. These patients were followed up to determine the clinical outcomes and Quality of Life (QoL) parameters as assessed by SF 36 Health Survey at 1 year, 3 years and 4 years.

**Results**: Of the total of 1648 patients, 39.8% (n=655) were depressed, with a MARDS score >6. Prevalence of depression was higher in patients with hypertension (62%), diabetes (36%), and female gender (52.9 vs. 36.5%). Low socioeconomic had a direct relationship (p<0.05) on the prevalence of depression. QoL in terms of physical functioning, emotional stability, social functioning, perception of pain and overall general health was poor (p<0.05) in depressed as compared to non-depressed patients. Mortality increased to two to three fold in depressed patients over time with higher rate of revascularization during first 12 months (Table -1).

**Conclusion**: Prevalence of depression is high in Indian ACS patients, influenced by socioeconomic parameters which stand responsible for poor long term outcomes.

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Table -1: Year Wise Clinical Outcomes

<table>
<thead>
<tr>
<th>Clinical Outcomes</th>
<th>1 Year Outcomes</th>
<th>3 Year Outcomes</th>
<th>4 Year Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Depression (n=655)</td>
<td>No Depression (n=916)</td>
<td>Depression (n=527)</td>
</tr>
<tr>
<td>Death (%)</td>
<td>4.80</td>
<td>1.70</td>
<td>7.50</td>
</tr>
<tr>
<td>Revascularization (%)</td>
<td>8.50</td>
<td>0.20</td>
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</tbody>
</table>

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A-047

Title: High Impact, High Risk: Percutaneous Coronary Intervention in Post-Cardiac Arrest Patients with ST-Elevation Myocardial Infarction

Category: Acute Coronary Syndromes, Myocardial Infarction, Thrombectomy and Vulnerable Plaque

Authors: David Kidwell, Texas A&M HSC College of Medicine/Baylor Scott & White Health, United States; Jinessh Shah, Texas A&M HSC College of Medicine/Baylor Scott & White Health, United States; Adam Farber, Texas A&M HSC College of Medicine/Baylor Scott & White Health, United States; Andrew Shakespeare, Texas A&M HSC College of Medicine/Baylor Scott & White Health, United States; Matthew Crowe, Texas A&M HSC College of Medicine/Baylor Scott & White Health, United States; Ryan Mack, Texas A&M HSC College of Medicine/Baylor Scott & White Health, United States; Kipp Slicker, Texas A&M HSC College of Medicine/Baylor Scott & White Health, United States; Margaret Streeker-McGrav, Texas A&M HSC College of Medicine/Baylor Scott & White Health, United States; Carl Tong, Texas A&M HSC College of Medicine/Baylor Scott & White Health, United States; Steven Costa, Texas A&M HSC College of Medicine/Baylor Scott & White Health, United States; Timothy Mixon, Texas A&M HSC College of Medicine/Baylor Scott & White Health, United States; Naoki Misumida, Mount Sinai Beth Israel, United States; Yumiko Kanei, Mount Sinai Beth Israel, United States; Kipp Slicker: This author has nothing to disclose.

Background: Cardiac arrest affects 450,000 people in the U.S. annually. Cardiac Resuscitation Centers accept patients for post-arrest care including percutaneous coronary intervention (PCI) and therapeutic hypothermia (TH). The impact of PCI and TH at our institution had not been previously assessed.

Methods: We set out to test whether PCI and TH in post-arrest patients with ST-elevation myocardial infarction (CA STEMI) would be associated with significant improvement in survival. A random sample of CA STEMIs was generated retrospectively with 53 patients meeting criteria over a period of 11 years (2004-2015). Use of PCI and survival to hospital discharge were recorded as well as age, gender, arrest rhythm, and culprit lesion artery. Data was compared to historical control using binomial test of proportions.

Results: Our group found that 94.3% of study patients went to angiography with all proceeding to PCI. Patients taken for PCI demonstrated 78% survival to discharge, significantly better than the 50% anticipated based on historical control (p = 0.0006) but similar to more recent published data of patients undergoing PCI post-arrest. Average patient age was 57 years, with 79% male and 28% diabetic. Ventricular tachycardia/fibrillation (VT/VF) was the presenting rhythm in 91% of patients with pulseless electrical activity/asystole (PEA) accounting for the remaining 9%. A trend toward increased mortality in PEA vs VT/VF arrests was observed (relative mortality 3:1). The left anterior descending was the culprit lesion artery in 40.5% of cases, the right coronary artery in 17%, and left main in 2%. The incidence of acute kidney injury in these patients was significantly greater than that found in non-CA STEMI post-PCI patients (p < 0.0001).

Conclusion: In our study 94.3% of CA STEMIs went to angiography with 78% survival to discharge. An aggressive revascularization approach was associated with statistically significant improvement in survival. A significantly increased relative complication rate (acute kidney injury) was also observed in these patients. Risk/benefit assessment is critical in an age of public reporting where mortality/complication rates may not always be appropriately risk-adjusted.

Disclosures:
David Kidwell: This author has nothing to disclose.
Jinessh Shah: This author has nothing to disclose.
Adam Farber: This author has nothing to disclose.
Andrew Shakespeare: This author has nothing to disclose.

A-048

Title: ST-segment Elevation Myocardial Infarction Code Activation by Emergency Medical Service Predicts Shorter Door-to-Balloon Time and Smaller Infarct Size.

Category: Acute Coronary Syndromes, Myocardial Infarction, Thrombectomy and Vulnerable Plaque

Authors: Akihiro Kobayashi, Mount Sinai Beth Israel, United States; Naoki Misumida, Mount Sinai Beth Israel, United States; Yumiko Kanei, Mount Sinai Beth Israel, United States; Matthew Crowe, Texas A&M HSC College of Medicine/Baylor Scott & White Health, United States; Carl Tong, Texas A&M HSC College of Medicine/Baylor Scott & White Health, United States; Jinesh Shah, Texas A&M HSC College of Medicine/Baylor Scott & White Health, United States; Adam Farber, Texas A&M HSC College of Medicine/Baylor Scott & White Health, United States; Naoki Misumida, Mount Sinai Beth Israel, United States; Yumiko Kanei, Mount Sinai Beth Israel, United States

Background: ST-segment Elevation Myocardial Infarction (STEMI) code activation by emergency medical service (EMS) results in shorter door-to-balloon (D2B) time in patients with STEMI. However, the clinical impacts of STEMI code activation by EMS on infarct size have not previously been evaluated. We hypothesize that STEMI code activation by EMS result in smaller infarct size in our cohort of patients with anterior wall STEMI.

Methods: We performed a retrospective analysis of 190 consecutive patients with first anterior wall STEMI who underwent primary percutaneous coronary intervention (PCI) from January 2007 to December 2013. Patients who developed cardiac arrest before arrival to emergency room were excluded. In addition, patients who were transferred from non-PCI capable hospitals were excluded. Patients were categorized as 1) EMS transport with STEMI code activation, 2) EMS transport without STEMI code activation, and 3) Walk-in. Baseline characteristics, D2B time, peak troponin I value, left ventricular ejection fraction (LVEF) were recorded. In addition, in-hospital and 1-year major adverse cardiac events (MACE) including death, recurrent myocardial infarction, and target vessel revascularization were recorded and compared between three groups.

Results: After excluding 42 patients who met pre-specified exclusion criteria, 148 patients were included in the final analysis (56 patients with EMS transport with STEMI code activation, 56 patients with EMS transport without STEMI code activation, 36 patients with walk-in). Patients with EMS transportation with STEMI code activation had a shorter D2B time (49 [35-62] min vs. 68 [48-90] min vs. 69 [62-98] min, p=0.001). Peak troponin I value was lower in patients with EMS transportation with STEMI code activation (49 [15-159] ng/ml vs. 121 [38-291] ng/ml vs. 62 [26-131] ng/ml, p=0.035). Patients with EMS transportation with STEMI code activation had a higher LVEF (40 [35-50] % vs. 35 [30-43] % vs. 40 [35-45] %, p=0.011). No statistically significant difference was observed in either in-hospital or 1-year MACE between the three groups.

Conclusion: STEMI code activation by EMS is associated with shorter D2B time and smaller infarct size in patients with anterior wall STEMI.

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Akihiro Kobayashi: This author has nothing to disclose.
Naoki Misumida: This author has nothing to disclose.
Yumiko Kanei: This author has nothing to disclose.

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A-053

**Title:** Rosuvastatin Decreased Whole-Blood Viscosity in Statin-naive Patients with Acute Coronary Syndrome: Another Pleiotropic Effect Evidence of Rosuvastatin

**Category:** Acute Coronary Syndromes, Myocardial Infarction, Thrombectomy and Vulnerable Plaque

**Authors:** Sang-Rok Lee, Chonbuk National University Hospital, Korea, South; Yi-Shik Kim, Chonbuk National University Hospital, Korea, South; Jei-Keon Chae, Chonbuk National University Hospital, Korea, South

**Background:** Wall shear stress contributes to atherosclerosis progression and plaque rupture. There were only a few limited studies for the statin as influence factor on whole blood viscosity (WBV) in acute coronary syndrome (ACS) patients. This study was to investigate the effect of rosuvastatin on WBV in ACS patients.

**Methods:** We prospectively enrolled 404 consecutive patients (mean age, 62.6 ± 10.7 years; 299 males; ST-segment elevation myocardial infarction, n = 109; non-ST-segment elevation myocardial infarction, n = 133; unstable angina n = 162). Patients were divided into two groups (group I: previously administered statins for at least 3 months, n = 117; group II, statin-naive patients, n = 287). Blood viscosities at shear rates of 1 s⁻¹ (diastolic blood viscosity; DBV) and 300 s⁻¹ (systolic blood viscosity; SBV) were measured with scanning capillary tube viscometer (Bio-Visco Inc., South Korea) at baseline and one month after rosuvastatin administration (17.3 ± 4.6 mg/day).

**Results:** Baseline WBV was significantly higher in group II [(SBV: group I vs group II, 41.8 ± 6.9mP vs 44.3 ± 7.4mP, p = 0.010), (DBV: 270.2 ± 69.0mP vs 298.0 ± 73.0mP, p = 0.006)]. WBV was significantly decreased after one month rosuvastatin administration only in group II (SBV: 42.0 ± 4.7mP, p = 0.013; DBV: 282.8 ± 55.0mP, p = 0.010) (table). However, the level of LDL cholesterol was not related to WBV changes in group II [(baseline SBV: R²=0.082, p=0.114; baseline DBV: R²=0.066, p=0.203), (one month SBV: R²=0.129, p=0.066; one month DBV: R²=0.121, p=0.086)], an > at baseline and one month after rosuvastatin administration (17.3 ± 4.6 mg/day).

**Conclusion:** Previous statin medication was an important determinant in lowering of WBV in ACS patients. Moreover, one month moderate intensity rosuvastatin decreased WBV significantly only in statin-naive ACS patients. Further research for clarification of our results and prognostic impact of WBV are needed. LDL cholesterol was not related to WBV changes in group II [(baseline SBV: R²=0.082, p=0.114; baseline DBV: R²=0.066, p=0.203), (one month SBV: R²=0.129, p=0.066; one month DBV: R²=0.121, p=0.086)], an > at baseline and one month after rosuvastatin administration (17.3 ± 4.6 mg/day).

**Disclosures:**
- Sang-Rok Lee: This author has nothing to disclose.
- Yi-Shik Kim: This author has nothing to disclose.
- Jei-Keon Chae: This author has nothing to disclose.

A-059

**Title:** Incidence and Outcome of Cardiogenic Shock Patients in a Pakistani Population

**Category:** Acute Coronary Syndromes, Myocardial Infarction, Thrombectomy and Vulnerable Plaque

**Authors:** Saima Mangi, Tabba Heart Institute, Karachi, Pakistan; Rehan Malik, Tabba Heart Institute, Karachi, Pakistan; Muhammad Shaker Lakhani, Tabba Heart Institute, Karachi, Pakistan; Asad Pathan, Tabba Heart Institute, Karachi, Pakistan

**Background:** Cardiogenic shock (CS) leads to high mortality in ACS (Acute Coronary Syndrome) patients, despite aggressive treatment. This study aims to explore the incidence, demographics, management and in-hospital outcome of patients presenting with CS at a developing country academic center.

**Methods:** Patients from over 2-year period with ACS and CS were selected from a single center ACS registry.

**Results:** Out of 5602 patients hospitalized with ACS, 255(4.5%) patients developed CS and were included. Mean age was 58.9 ± 12.2 years (>75 yrs, 6.7%) with 75.3% men. STEMI was the clinical presentation in 77.3% and NSTE-ACS in 22.7%. The comorbidities were diabetes 51%, hypertension 60%, smoking 20%, prior MI 16% and prior PCI or CABG in 14%. Mean creatinine was 1.26 with 2% on hemodialysis. Cardiac arrest in first 24 hours of hospitalization occurred in 39.2%. Streptokinase was administered in 31.8%, of which...
more than half were recanalized. Cardiac catheterization was performed in 75% and IABP placed in 6.7%. Single vessel disease in 40%, multi-vessel in 57%, and 3% had non-obstructive disease. Recanalization was performed in 63.5% (PCI 59%; CABG 7%). Among patients undergoing PCI, 84% achieved TIMI III flow. Overall in-hospital mortality was 47.5%. Mortality was higher in patients with cardiac arrest (66% vs. 35%), multi-vessel disease (49% vs. 30%), IABP placement (87.5% vs. 36%) and <TIMI III flow (68% vs. 39%) [p<0.05 for all]. Recanalized patients had lower mortality (40% vs. 60%, p<0.05), which was alike for PCI and CABG (40% vs. 43%). These patients were also younger (57 ± 12 vs. 62 ± 12 yrs), mostly male (80%), had lower creatinine (1.67 vs. 1.97), less cardiac arrest (33% vs. 49%), and more STEMI (90% vs. 56%) [p<0.05 for all].

Conclusion: Patients with cardiogenic shock continue to have higher mortality. Predictors of high mortality in patients with CS include cardiac arrest, multi-vessel disease and suboptimal TIMI flow post PCI. Recanalization has better outcome, although this may be related to patient selection.

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Saima Mangi: This author has nothing to disclose.
Rehan Malik: This author has nothing to disclose.
Muhammad Shakir Lakhani: This author has nothing to disclose.
Asad Pathan: This author has nothing to disclose.

A-003

Title: Incidence, Predictors and In-Hospital Mortality of Development of Acute Renal Failure Requiring Hemodialysis in Patients With ST-Segment Elevation Myocardial Infarction Undergoing Percutaneous coronary Interventions: Insights From NIS Database

Category: Acute Coronary Syndromes, Myocardial Infarction, Thrombectomy and Vulnerable Plaque

Authors: Reza Masoomi, The University Of Kansas Medical Center, United States; Zubair Shah, The University Of Kansas Medical Center, United States; Deepak K. Parashara, Kansas City Veteran Medical Center, United States; Buddhadeb Dawn, The University Of Kansas Medical Center, United States; Kamal Gupta, The University Of Kansas Medical Center, United States

Background: We sought to assess the predictors and effect of acute renal failure (ARF) requiring hemodialysis (HD) among patients with acute ST-segment elevation myocardial infarction (STEMI).

Methods: A secondary analysis of the national inpatient sample (NIS) database from 2008–2012 was conducted. All patients with a primary diagnosis of STEMI who underwent percutaneous intervention (PCI) were included. We then identified those who also had an associated diagnosis of ARF and underwent HD. Various demographic and clinical parameters were analyzed and compared between patients with and without ARF/HD.

Results: A total 982,345 patients were hospitalized with a primary diagnosis of STEMI, and 648,596 (66%) of those underwent PCI. 270 (0.04%) of the cohort developed ARF requiring HD during hospitalization. Patients who required HD were older (66.8 ± 12.3 vs. 61.2 ± 13, P<0.001). African Americans were more likely to develop ARF requiring HD in comparison with Caucasians (0.1% vs. 0.04%, P<0.001).

In-hospital mortality was significantly higher in patients with ARF requiring HD in comparison with the whole cohort (43.3% vs. 4.4%, P<0.001). Average total hospital cost ($372K±273K vs. $76K±64K, P<0.001) and length of stay (22.3 ± 14.9 vs. 3.8 ± 4.3 days, P<0.001) were significantly higher in ARF/HD group.

With multivariable regression analysis, the patient characteristics most strongly associated with development of ARF requiring HD were shock (odds ratio [OR]: 30.6; 95% confidence interval [CI]: 22.4 to 41.6); obesity (OR: 3.3; 95% CI: 2.4 to 4.4); African American race (OR: 1.1; 95% CI: 1.009 to 1.372); age (OR: 1.01; 95% CI: 1.003 to 1.023).

Surprisingly, hypertension and tobacco dependence were correlated inversely with incidence of ARF requiring HD (OR: 0.62; 95% CI: 0.44 to 0.86 and OR: 0.13; 95% CI: 0.09 to 0.19 respectively).

Conclusion: Of the patients with STEMI undergoing PCI, 0.04% experienced ARF requiring HD during same hospitalization. ARF/HD was strongly associated with in-hospital mortality. Although ARF requiring HD is infrequent in STEMI patients, it imposes a very high mortality burden in this group. The high incidence of shock in these patients clearly indicates a critically sick group of patients.

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Reza Masoomi: This author has nothing to disclose.
Zubair Shah: This author has nothing to disclose.
Deepak K. Parashara: This author has nothing to disclose.
Buddhadeb Dawn: This author has nothing to disclose.
Kamal Gupta: This author has nothing to disclose.

A-063

Title: Decreased Bleeding in Radial compared with Femoral Access for Percutaneous Coronary Interventions in Acute Coronary Syndromes

Category: Acute Coronary Syndromes, Myocardial Infarction, Thrombectomy and Vulnerable Plaque

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Background: Recent randomized control trials have shown reduced adverse bleeding outcomes with radial versus femoral access in patients undergoing PCI for ST segment elevation (STE) acute coronary syndromes (ACS), however this benefit remains unclear in a real-world population of both non-STE ACS and STE ACS patients.

Methods: A multicenter, retrospective study comparing transradial with transfemoral access in patients with ACS with or without STE in 8617 PCI procedures, between Jan 2011 to Jan 2015, in 5 large hospitals were analyzed for bleeding as a primary endpoint. Secondary outcomes were death, myocardial infarction, cardiogenic shock, heart failure, CVA stroke, temponade, new requirement for dialysis, other vascular complications, and RBC transfusion. In hospital outcomes defined by ACC-NCDR data definitions were used. Multivariate analysis were performed and adjusted with Bonferroni correction.

Results: 6507 patients were performed via femoral access and 2110 were performed via radial access in our study. Bleeding within 72 hours of the procedure was significantly higher in femoral approach in both unadjusted (p=0.007) and adjusted (p=0.047) analyses. The secondary outcomes were not significantly different apart from in-patient heart failure, which was higher with femoral approach.

Conclusion: The radial approach to PCI in patients with ACS is significantly safer than the femoral approach with respect to bleeding and blood transfusions. These adverse outcomes have been previously described to lead to an increased mortality, thus increasing the evidence supporting the radial approach.

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Perwaiz Meraj: This author has nothing to disclose.
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Rajiv Jauhar: This author has nothing to disclose.

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A-065

Title: Gender Based Differences in the Outcomes of Bivalirudin Versus Heparin In Patients Undergoing Percutaneous Coronary Interventions: Meta-Analysis Of Randomized Controlled Trials

Category: Acute Coronary Syndromes, Myocardial Infarction, Thrombectomy and Vulnerable Plaque

Authors: George Mina, Louisiana State University Health Science Center in Shreveport, United States; Tina Fiourozbakhsh, Louisiana State University Health Science Center in Shreveport, United States; Kalgi Modi, Louisiana State University Health Science Center in Shreveport, United States; Paari Dominic, Louisiana State University Health Science Center in Shreveport, United States

Background: Adverse outcomes after percutaneous coronary interventions (PCI) are reportedly different between men and women. We aimed to study by meta-analysis the interaction between gender and the efficacy and safety of bivalirudin versus heparin in patients undergoing PCI.

Methods: We searched Pubmed, Cochrane database and www.clinicaltrials.gov for randomized controlled trials (RCTs) that compared bivalirudin to heparin with or without glycoprotein IIb/IIIa inhibitors (GPI) in patients undergoing PCI. Studies were included if they reported at least one of the following outcomes separately in men and women: major bleeding; major adverse cardiovascular events (MACE); myocardial infarction (MI) and all-cause mortality at 30 days. Data was extracted as rates and/or risk estimates, and inverse variance method in a random effect model was used to pool odds ratio (OR) and 95% confidence intervals (CI).

Results: We included 9 trials with 33,224 patients. 25,214 patients were men and 8,010 patients were women. Overall, bivalirudin decreased the risk of major bleeding when compared to heparin ± GPI in both men (OR: 0.56, CI: 0.48-0.66, p<0.001) and women (OR: 0.58, CI: 0.48-0.7, p<0.001). In RCTs where GPI were either not permitted or used only as bailout, bivalirudin decreased the risk of major bleeding in men (OR: 0.69, CI: 0.51-0.94, p=0.02), but not in women (OR: 0.71, CI: 0.42-1.22, p=0.21). When compared to heparin ± GPI, men on bivalirudin had significantly higher risk of MI (OR: 1.19, CI: 1.03-1.37, p=0.015), a trend towards lower all-cause mortality (OR: 0.76, CI: 0.58-1.01, p=0.055) and similar risk of MACE (OR: 1.03, CI: 0.92-1.15, p=0.64). In women, on the other hand, there were no significant differences in the risks of MI, death or MACE between bivalirudin and heparin ± GPI.

Conclusion: Bivalirudin decreases the risk of major bleeding after PCI in both men and women when compared to heparin ± GPI. However, when compared to heparin alone, bivalirudin decreases major bleeding in men but not in women. Men have higher risk of MI with bivalirudin than with heparin ± GPI, but there is tendency for lower mortality likely due to lower major bleeding events.

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George Mina: This author has nothing to disclose.
Tina Fiourozbakhsh: This author has nothing to disclose.
Kalgi Modi: This author has nothing to disclose.
Paari Dominic: This author has nothing to disclose.

A-066

Title: Prognostic role of serial neutrophil gelatinase-associated lipocalin (NGAL) in patients of ST-segment elevation myocardial infarction with primary percutaneous coronary intervention

Category: Acute Coronary Syndromes, Myocardial Infarction, Thrombectomy and Vulnerable Plaque

Authors: Jae Youn Moon, CHA Bundang Medical Center, CHA University, Korea, South; Yeong- Min Lim, CHA Bundang Medical Catheterization and Cardiovascular Interventions DOI 10.1002/ccd.

Background: Neutrophil gelatinase-associated lipocalin (NGAL) have been studied to evaluate their role as an early predictor of acute kidney injury (AKI) and cardiovascular mortality, but there is no previous data about the serial changes of NGAL in ST-segment elevation myocardial infarction (STEMI) patients before and after primary percutaneous coronary intervention (pPCI). The purpose of this study is to evaluate prognostic value of serial neutrophil gelatinase-associated lipocalin (NGAL) in patients of STEMI with pPCI.

Methods: One hundred sixty nine consecutive patients who underwent pPCI for STEMI within 12 hours from the onset of symptoms were retrospectively enrolled in the study. All of this patients have a plasma NGAL record before (pre-NAGL) and 6 hour after (post-NAGL) pPCI. Primary end point was 1-month all-cause death including cardiac death. The predictive values of patient medical history, pre-NAGL, post-NAGL, NT-proBNP, and LV ejection fraction (LVEF) were evaluated.

Results: The mean level of pre-NAGL and post-NAGL were 109.2± 76.1 ng/mL and 93.3± 83.8 ng/mL. The 30-day mortality, the endpoint of this study, was occurred in 12 (7.1%) patients. For the changes of serial NGAL values, post-NAGL was decreased in 132 patients (79%). The patients who had an elevated post-NAGL level showed increased mortality compared to patients with decreased post-NAGL level. Multivariate analysis showed that post-NAGL (odds ratio (OR), 1.024; p=0.011), LVEF (OR, 0.927; p=0.033), old age (OR, 1.157; p=0.015) and smoking (OR, 0.20, p=0.042) were an independent predictor for 30-day mortality.

Conclusion: In a large percentage of cases, the plasma post-PCI NGAL levels were found to be decreasing compared to pre-PCI NGAL in patients with STEMI, even though administration of nephrotoxic contrast medium. Both pre- and post-PCI are good prognostic markers for 30-day mortality in patients with STEMI who are treated with pPCI. However, post-PCI NGAL level is a better predictive marker for a mortality at 30-day than pre-PCI NGAL.

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Jae Youn Moon: This author has nothing to disclose.
Yeong- Min Lim: This author has nothing to disclose.
Sang Hoon Kim: This author has nothing to disclose.
Daniel Min: This author has nothing to disclose.
Woo-In Yang: This author has nothing to disclose.
Won- Jang Kim: This author has nothing to disclose.
In- Jai Kim: This author has nothing to disclose.
Dong-Hoon Cha: This author has nothing to disclose.
Fauber, University Of Virginia, United States; Ellen. C. Keeley, University Of Virginia, United States

Background: Patients presenting with segment elevation myocardial infarction (STEMI) have the lowest mortality if they are revascularized early. We think time between vascular access and performing PCI (vascular access to first device time) is mainly the responsibility of the interventional operator. Some operators choose to image the non-culprit vessel first (perform diagnostic angiography) to exclude any significant stenosis and then image and intervene upon the culprit vessel. Our hypothesis is this approach may lengthen ischemic time.

Methods: Necessary data were collected from electronic medical records and cardiac catheterization lab imaging database. Patients were divided into two groups based on whether the culprit vessel was imaged first or not. If the non-culprit vessel was imaged before the intervention of the culprit vessel, those patients were still included in the non-culprit vessel first group, even if the culprit vessel was imaged first. The difference in access to balloon time between the two groups was calculated using independent T test.

Results: From June 1, 2009 to June 30, 2013, 335 patients presented with STEMI to our University hospital and underwent emergency coronary angiography. 142 patients underwent “culprit first” angiography and 193 underwent non-culprit “diagnostic first” angiography. Mean age was similar in both groups (59 ±/− 13 years). The majority (72%) was men, and 85% were Caucasians while 13% were African Americans. Of the patients referred, 65% were admitted through our emergency department while 35% were transferred from an outside hospital. Femoral access was used in more than 90% of cases. Mean vascular access-first device time was 10.5 minutes in culprit vessel first group and 15.1 minutes in the non-culprit (diagnostic first) group which was statistically significant (p<0.01, 95% CI, −6.75, −2.32). Out of 147 patients who had access to device time less than 10 minutes, 61.9% patients had their culprit vessel intervened first.

Conclusion: Imaging and intervening upon the culprit vessel first during primary PCI saves crucial time in re-establishing blood flow and decreases myocardial ischemic time. This approach should be evaluated in a prospective fashion.

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Vijajanesh Nagarajan: This author has nothing to disclose.
Luke Kohan: This author has nothing to disclose.
Nancy Fauber: This author has nothing to disclose.
Ellen C. Keeley: This author has nothing to disclose.

A-070

Title: Impact of postdischarge statin therapy on Korean patients with acute myocardial infarction undergoing percutaneous coronary intervention: a observational study using national health insurance claims data.

Category: Acute Coronary Syndromes, Myocardial Infarction, Thrombectomy and Vulnerable Plaque

Authors: Yong-Sun Noh, The Catholic University of Korea, Korea, South; Gyang-Min Park, The Catholic University of Korea, Korea, South; Dae Won Kim, The Catholic University of Korea, Korea, South; Sung Ho Her, The Catholic University of Korea, Korea, South; Jong-Bum Kwon, The Catholic University of Korea, Korea, South

Background: When taking the entire clinical practice into account, there are limited data to compare the clinical implications of postdischarge non-statin versus statin therapy in patients with acute myocardial infarction (AMI) undergoing percutaneous coronary intervention (PCI).

Methods: From national health insurance claims data in South Korea, 33,390 patients aged 18 years or older without known history of coronary artery disease, who underwent PCI as a diagnosis of AMI between 2009 and 2013, were enrolled. According to the postdischarge statin therapy, patients were categorized into non-statin (n=2,007) and statin (n=31,383) therapy groups. Clinical outcomes were compared between two groups using a weighted Cox proportional-hazards regression model with an inverse probability of treatment weighting.

Results: The average age of study participants was 62.1 years and 24,847 (74.4%) were men. Diabetes mellitus, hyperlipidemia, and hypertension were observed in 10,014 (30.0%), 7,012 (21.0%), and 13,602 (40.7%) patients, respectively. During the follow-up period (median, 2.4 years; interquartile range, 1.5–3.5), the adjusted incidence of all-cause death was significantly lower in the statin group (9.4% vs. 10.7%; p=0.02). In addition, there was a statistically significant difference in the recurrent coronary revascularization between two groups (aHR, 0.949; 95% CI: 0.818–1.101; p=0.488). The incidence rate of coronary artery disease related hospitalization was significantly lower in the statin group (aHR, 1.087; 95% CI: 1.015–1.063; p=0.017).

Conclusion: In South Korean patients with AMI undergoing PCI, postdischarge statin therapy provided clinical benefits over non-statin therapy.

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Gyang-Min Park: This author has nothing to disclose.
Dae Won Kim: This author has nothing to disclose.
Sung Ho Her: This author has nothing to disclose.
Jong-Bum Kwon: This author has nothing to disclose.

A-071

Title: Diastolic Wall Strain and Mortality in Patients Post ST Elevation Myocardial Infarction

Category: Acute Coronary Syndromes, Myocardial Infarction, Thrombectomy and Vulnerable Plaque

Authors: Chinnalumogu Nwakile, Albert Einstein Medical Center, United States; Vikas Bhalla, Albert Einstein Medical Center, United States; Edinrin Obasare, Albert Einstein Medical Center, United States; Mohammad Zabad, Albert Einstein Health system, United States; Mohammad Zabad, Albert Einstein health system, United States; Kene Mezue, Albert Einstein Medical Center, United States; Marvin Lu, Albert Einstein Medical Center, United States; Gregg Pressman, Albert Einstein Medical Center, United States; Vincent Figueredo, Albert Einstein Medical Center, United States; Eddie Mezue, Albert Einstein Medical Center, United States; Edinrin Obasare, Albert Einstein Medical Center, United States; Marvin Lu, Albert Einstein Medical Center, United States; Gregg Pressman, Albert Einstein Medical Center, United States

Background: Diastolic Wall Strain (DWS) is a preload-independent estimator of left ventricular (LV) stiffness. DWS correlates with systolic and diastolic indices of LV performance by speckle tracking echocardiography. This study investigates DWS as a predictor of mortality in patients with ST elevation myocardial infarction (STEMI).

Methods: Three hundred and ten consecutive patients had STEMI; mean age was 61 ±14 years, 61% were male, 66% African-American, 71% with hypertension, 35% with diabetes, 37% with hyperlipidemia, 25% with chronic kidney disease, and 49% smokers. 83% revascularized with PCI/CABG, EF = 0.45 ± 0.15. DWS was defined as (LV PWd − LV PWd)/LV PWd where LV PWd = left ventricular posterior wall thickness in systole and LV PWd = wall thickness in diastole.

Results: The AUC for DWS from the ROC curve was 0.63 (95% CI: 0.55–0.71). DWS cut off of 0.20 had the best sensitivity and specificity. One year mortality rate was 13.7% in patients with a DWS > 0.2 and 25.5% in those with a DWS ≤ 0.2 (p<0.01). Multivariate analysis using
Conclusion: DWS is an independent predictor of all-cause mortality in patients with STEMI. This measure is easily applied during routine echocardiography. Prospective studies are warranted to investigate use in patients with STEMI.

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Chinualumogu Nwakile: This author has nothing to disclose.
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Kene Mezue: This author has nothing to disclose.
Mohammad Zabad: This author has nothing to disclose.
Edinrin Obasare: This author has nothing to disclose.
Chinualumogu Nwakile: This author has nothing to disclose.

A-004

Title: Effect of pretreatment with P2Y12 receptor antagonists on mortality in patients undergoing PCI – A report from SCAAR

Category: Acute Coronary Syndromes, Myocardial Infarction, Thrombectomy and Vulnerable Plaque

Authors: Elmir Omerovic, Sahlgrenska University Hospital, Sweden

Background: Various studies suggested that pretreatment with P2Y12 receptor antagonist (P2Y12) before percutaneous coronary intervention (PCI) could reduce the rate of ischemic events in patients with acute coronary syndrome. However, it is not known whether pretreatment with P2Y12 reduce mortality in these patients. We investigated the effect of P2Y12 pretreatment on mortality in consecutive patient treated with PCI.

Methods: We used data from the SCAARRegister (Swedish Coronary Angiography and Angioplasty Registry) for the PCI procedures performed in Västra Götaland County in Sweden. The database contains information about all consecutive procedures performed at five PCI centers (~20% of all SCAAR data). All consecutive procedures performed between 2003 and 2015 for stable angina, UA/NSTEMI and STEMI were included in the analysis. The patients were divided into the two groups, P2Y12 pretreated and non-pretreated. We used instrumental variable analysis (for hidden selection bias) with propensity score to evaluate the effect of pretreatment on mortality at thirty-days and at one-year.

Disclosures: Elmir Omerovic: 5 AstraZeneca, 2 AstraZeneca

A-072

Title: Trends and Predictors of Acute Myocardial Infarction in HIV Population

Category: Acute Coronary Syndromes, Myocardial Infarction, Thrombectomy and Vulnerable Plaque

Authors: Bhavi Pandya, Staten Island University Hospital, United States; Achint Patel, Staten Island University Hospital, United States; Kirsten Lafferty, NOVA Southeastern Osteopathic School of medicine, United States; Viswajit Reddy, Staten Island University Hospital, United States; Nikhil Nalluri, Staten Island University Hospital, United States; Jordan Glaser, Staten Island University Hospital, United States; James Lafferty, Staten Island University Hospital, United States

Background: We aimed to find out the trends and predictors of cardiovascular disease in terms of acute myocardial infarction (AMI) in HIV population over last decade.

Methods: Data from the Nationwide Inpatient Sample (NIS) were analyzed for years 2002-2012. Hospitalizations with HIV positive status were identified using International Classification of Diseases, 9th Revision; Clinical Modification (ICD-9-CM) codes 042, V08 and AMI by ICD-9-CM code 410.xx. Cochran-Armitage trend test and multivariate regression were used to analyze temporal trends and the potential predictors for temporal changes over the years.

Results: A total of 2,584,548 HIV positive patients were hospitalized from 2002 to 2012. Of these, 32,216 (1.25%) admissions were due to AMI or developed AMI during hospitalization. Concurrent trend of AMI in HIV patients has increased from 0.9% in 2002 to 1.6% in 2012 (p < 0.0001). This trend increased annually by 6% (OR 1.05; [95% CI 1.04-1.07], p < 0.0001). Amongst HIV related hospitalizations, increasing age (OR 1.55; [95% CI 1.50-1.60], p < 0.0001), DM (OR 1.24; [95% CI 1.15-1.34], p < 0.0001), HTN (OR 2.14; [95% CI 2.00-2.30], p < 0.0001), CKD (OR 1.14; [95% CI 1.02-1.28], p = 0.019) has been shown to increase the risk of AMI, however African-American race (OR 0.49; [95% CI 0.46-0.53], p < 0.0001) and female (OR 0.64; [95% CI 0.60-0.70], p < 0.0001) had lower odd’s of developing AMI.

Conclusion: Incidence of AMI has been increasing in HIV population over the last decade, which can be possibly explained by increasing life expectancy and associated co-morbid conditions.

Disclosures: Bhavi Pandya: This author has nothing to disclose. Achint Patel: This author has nothing to disclose.
Among 756036 patients 54.99% were males, 60.63% were whites, with hypertension (56.2%) and Diabetes (31.92%) being the commonest co-morbidities. PCI utilization and Inhospital mortality in cardiac arrest patients are required to reduce the observed disparity.

**Conclusion**: There is significant disparity in utilization of PCI and Inhospital mortality amongst different SES groups. Strategies targeting people in low socioeconomic groups to promote access to effective PCI in cardiac arrest patients are required to reduce the observed disparity.

**Disclosures**:
- Nilay Patel: This author has nothing to disclose.
- Shilpkumar Arora: This author has nothing to disclose.
- Sidakpal Panaich: This author has nothing to disclose.
- Nileshkumar Patel: This author has nothing to disclose.
- Chirag Savani: This author has nothing to disclose.
- Apurva Badheka: This author has nothing to disclose.

**A-077**

**Title**: Clinical Outcomes With Bioresorbable Vascular Scaffold Versus Bioabsorbable and Durable Polymer-Based Drug-Eluting Stents: A Network Meta-Analysis

**Category**: Acute Coronary Syndromes, Myocardial Infarction, Thrombectomy and Vulnerable Plaque

**Authors**: Asim Rafique, UCLA Medical Center, United States; Olcay Aksoy, UCLA Medical Center, United States; Sanjum Sethi, UCLA Medical Center, United States; Jesse Currier, West Los Angeles VA Medical Center, United States; Ramin Ebrahimi, West Los Angeles VA Medical Center, United States; Marcella Calfon, UCLA Medical Center, United States; William Suh, UCLA Medical Center, United States; Ravi Dave, UCLA Medical Center, United States; Timothy Henry, Cedars-Sinai Heart Institute, United States; Jonathan Tobis, UCLA Medical Center, United States

**Background**: Recent studies have shown more stent thrombosis (ST) with bioresorbable vascular scaffold (BVS) versus durable polymer eluting stents (DP-DES); and previous studies have compared bioabsorbable polymer eluting stents (BP-DES) with durable-polymer drug-eluting stents (DES). We compared the clinical efficacy and safety of BVS vs. BP-DES and DP-DES.

**Methods**: Trials comparing BVS (absorb), BP-DES (Synergy, Nobi, Biomatrix, Costar, Excel, Nevo, Firehawk), and DP-DES (Xience, Resolute, Taxus, Cypher) were identified using MEDLINE. Demographic, stent characteristics, outcomes data was extracted. Target lesion failure (TLF) was defined as: cardiac death, target vessel myocardial infarction (MI) or clinically driven target lesion revascularization (TLR). Major adverse cardiovascular event (MACE) was defined as: death, MI, or target vessel revascularization (TVR). Network meta-analysis was performed using Bayesian methods.

**Conclusion**: There is significant disparity in utilization of PCI and Inhospital mortality amongst different SES groups. Strategies targeting people in low socioeconomic groups to promote access to effective PCI in cardiac arrest patients are required to reduce the observed disparity.

**Disclosures**:
- Nilay Patel: This author has nothing to disclose.
- Shilpkumar Arora: This author has nothing to disclose.
- Sidakpal Panaich: This author has nothing to disclose.
- Nileshkumar Patel: This author has nothing to disclose.
- Chirag Savani: This author has nothing to disclose.
- Apurva Badheka: This author has nothing to disclose.

**A-074**

**Title**: Healthcare disparity in patients receiving PCI in cardiac arrest patients according to socioeconomic status: A national perspective

**Category**: Acute Coronary Syndromes, Myocardial Infarction, Thrombectomy and Vulnerable Plaque

**Authors**: Nilay Patel, Rutgers Robert Wood Johnson Medical School/Saint Peter’s University Hospital, United States; Shilpkumar Arora, Mount Sinai St Luke’s - Roosevelt Hospital, United States; Sidakpal Panaich, Borgess Heart Institute, Borgess Medical Center, United States; Nileshkumar Patel, University Of Miami - Miller School Of Medicine/Jackson Memorial Hospital, United States; Chirag Savani, WESTCHESTER MEDICAL CENTER/NEW YORK MEDICAL COLLEGE, NY, United States; Abhishek Deshmukh, Division of Cardiovascular Diseases, Mayo Clinic, United States; Apurva Badheka, Everett Clinic, United States

**Background**: We aim to study difference in healthcare provided to patient with cardiac arrest according to socioeconomic status.

**Methods**: We used Nationwide Inpatient Sample from year 2008 to 2012, and identified patients with cardiac arrest using ICD 9 diagnosis code (427.5) as either primary or secondary code. PCIs were identified with ICD 9 procedural code (36.06,36.07,00.66). Median household income, available by zip code, was used as a proxy for a more direct measure of socioeconomic status (SES). Primary outcome was in hospital mortality. Hierarchical two level logistic regression were used to compare different SES based on household income for PCI utilization and in hospital mortality in cardiac arrest patients.

**Results**: Among 756036 patients 54.99% were males, 60.63% were whites, with hypertension (56.2%) and Diabetes (31.92%) being the commonest co-morbidities. PCI utilization and Inhospital mortality in cardiac arrest patient according to SES is described in Figure. Compared to patients in lowest income quartile(1st qtl), higher SES groups had significantly higher utilization of PCI (OR, 95% CI, P-value) (4th qtl: 1.23, 1.12 - 1.34, p <0.01; 3rd qtl: 1.20, 1.11 - 1.34, p<0.01 & 2nd qtl: 1.08, 1.01 - 1.17, p 0.03) and reduced Inhospital mortality (4th qtl: 0.93, 0.89 – 0.96, p <0.01; 3rd qtl: 0.91, 0.87 – 0.94, p<0.01 & 2nd qtl: 0.86, 0.82 – 0.89, p <0.01).

**Conclusion**: There is significant disparity in utilization of PCI and Inhospital mortality amongst different SES groups. Strategies targeting people in low socioeconomic groups to promote access to effective PCI in cardiac arrest patients are required to reduce the observed disparity.

**Disclosures**:
- Nilay Patel: This author has nothing to disclose.
- Shilpkumar Arora: This author has nothing to disclose.
- Sidakpal Panaich: This author has nothing to disclose.
- Nileshkumar Patel: This author has nothing to disclose.
- Chirag Savani: This author has nothing to disclose.
- Apurva Badheka: This author has nothing to disclose.
**Results:** One year outcomes were evaluated from 40 studies with 32,488 patients. ST was lower with BP-DES (0.70%, OR 0.51, 95% CI 0.29-0.90), and DP-DES (0.78%, OR 0.56, 95% CI 0.34-0.88) compared to BVS (1.35%) but similar for BP-DES vs. DP-DES. Recurrent MI was lower in BP-DES (2.8%, OR 0.74, 95% CI 0.29-0.90) and DP-DES groups (2.7%, OR 0.67, 95% CI 0.50-0.89) compared to BVS (4.2%). BP-DES and DP-DES showed a trend to lower TLF than BVS. Rates of TVR, TLR, death, and MACE were similar between stents (Figure).

**Conclusion:** BP-DES and DP-DES are associated with lower ST and recurrent MI compared to BVS but are similar between BP-DES and DP-DES. Other outcomes including death, TLF, MACE are comparable between various groups of stents.

**Disclosures:**
Asim Rafique: This author has nothing to disclose.
Olcay Aksoy: This author has nothing to disclose.
Sanjum Sethi: This author has nothing to disclose.
Jesse Currier: This author has nothing to disclose.
Ramin Ebrahimi: This author has nothing to disclose.
Marcella Calfon: This author has nothing to disclose.
William Suh: This author has nothing to disclose.
Ravi Dave: This author has nothing to disclose.
Timothy Henry: This author has nothing to disclose.
Jonathan Tobis: This author has nothing to disclose.

**A-084**

**Title:** Relative Efficacy and safety of P2Y12 inhibitors in NSTEMI: A Comprehensive Network Meta-Analysis of Randomized Trials

**Category:** Acute Coronary Syndromes, Myocardial Infarction, Thrombectomy and Vulnerable Plaque

**Authors:** Rahman Shah, Memphis VA Medical Center, United States; Agha Jamil Ahmed, Hutchison Clinic, United States; Chalak Berzingi, West Virginia University, United States; Goswami Rohan, West Virginia University, United States; Ramin Ebrahimi, Memorial VA Medical Center, United States; Marcella Calfon, University of Chicago, United States; William Suh, University of Chicago, United States; Ravi Dave, University of Chicago, United States; Timothy Henry, University of Chicago, United States; Jonathan Tobis, University of Chicago, United States.

Catheterization and Cardiovascular Interventions DOI 10.1002/ccd. Published on behalf of The Society for Cardiovascular Angiography and Interventions (SCAI).
**Fig 1: Efficacy and Safety comparison of various P2y12 Inhibitors**

**A: CV Mortality**
- Ticagrelor versus Placebo: O.R. (95% Cr.I.) = 0.71 (0.55 – 0.90)
- Ticagrelor versus Clopidogrel: O.R. (95% Cr.I.) = 0.77 (0.63 – 0.92)
- Ticagrelor versus Prasugrel: O.R. (95% Cr.I.) = 0.81 (0.64 – 1.02)
- Prasugrel versus Placebo: O.R. (95% Cr.I.) = 0.87 (0.71 – 1.08)
- Clopidogrel versus Placebo: O.R. (95% Cr.I.) = 0.92 (0.78 – 1.08)
- Prasugrel versus Clopidogrel: O.R. (95% Cr.I.) = 0.94 (0.82 – 1.09)

**B: MACE**
- Ticagrelor versus Placebo: O.R. (95% Cr.I.) = 0.65 (0.55 – 0.77)
- Prasugrel versus Placebo: O.R. (95% Cr.I.) = 0.71 (0.61 – 0.82)
- Clopidogrel versus Placebo: O.R. (95% Cr.I.) = 0.80 (0.71 – 0.89)
- Ticagrelor versus Clopidogrel: O.R. (95% Cr.I.) = 0.82 (0.73 – 0.92)
- Prasugrel versus Clopidogrel: O.R. (95% Cr.I.) = 0.89 (0.81 – 0.97)
- Ticagrelor versus Prasugrel: O.R. (95% Cr.I.) = 0.92 (0.79 – 1.07)

**C: Major Bleeding**
- Placebo versus Prasugrel: O.R. (95% Cr.I.) = 0.54 (0.39 – 0.73)
- Placebo versus Ticagrelor: O.R. (95% Cr.I.) = 0.68 (0.54 – 0.86)
- Placebo versus Clopidogrel: O.R. (95% Cr.I.) = 0.72 (0.59 – 0.88)
- Clopidogrel versus Prasugrel: O.R. (95% Cr.I.) = 0.75 (0.59 – 0.95)
- Ticagrelor versus Prasugrel: O.R. (95% Cr.I.) = 0.79 (0.61 – 1.03)
- Clopidogrel versus Ticagrelor: O.R. (95% Cr.I.) = 0.94 (0.84 – 1.06)
Background: A Class 1 indication for patients with NSTEMI is P2Y12 inhibitors, but no randomized controlled trial (RCT) directly compares typical P2Y12 inhibitors for safety and efficacy.

Methods: Relevant RCTs were included in a network meta-analysis using mixed treatment comparison models to compare efficacy and safety.

Results: We included data from 4 RCTs involving 42909 patients. Ticagrelor use associated with significantly improved cardiovascular mortality compared to clopidogrel, but non-significant trend compared to prasugrel (Fig. 1). Both ticagrelor and prasugrel improved MACEs rate over clopidogrel, but there was no difference between them. Prasugrel was associated with more bleeding than clopidogrel; there was no difference in bleeding risk between ticagrelor and clopidogrel (Fig. 1). In treatment ranking, ticagrelor was the most efficacious, and prasugrel was the least safe (Figs. 2 & 3).

Conclusion: For patient with NSTEMI, ticagrelor has the best net efficacy and safety profile among the oral P2Y12 inhibitors

Disclosures: Rahman Shah: This author has nothing to disclose. Agha Jamil Ahmed: This author has nothing to disclose. Chalak Berzingi: This author has nothing to disclose. Goswami Rohan: This author has nothing to disclose. Kodangudi Ramanathan: This author has nothing to disclose. John Jasper: This author has nothing to disclose. Abdul Rashid: This author has nothing to disclose. Kelly Rogers: This author has nothing to disclose.

A-056

Title: Presenting Symptoms of Patients with Spontaneous Coronary Artery Dissection

Category: Acute Coronary Syndromes, Myocardial Infarction, Thrombectomy and Vulnerable Plaque

Authors: Christina Luong, Cardiology, Vancouver General Hospital, University of British Columbia, Canada; Roshan Prakash, Cardiology, Vancouver General Hospital, University of British Columbia, Canada; Jacqueline Saw, Cardiology, Vancouver General Hospital, University of British Columbia, Canada.

Background: SCAD is an infrequent but important cause of acute coronary syndrome (ACS). However, the presenting symptoms of patients with SCAD have not been described and understanding these presenting features may improve SCAD diagnosis.

We sought to characterize the presenting symptoms of patients with spontaneous coronary artery dissection (SCAD).

Methods: We reviewed 219 patients who were admitted with SCAD, and who were prospectively followed at the Vancouver General Hospital SCAD clinic. Their presenting symptoms were obtained from detailed interviews and chart reviews.

Results: The most common presenting symptoms were chest pain (78%), dyspnea (45%), and palpitations (43%). The majority of patients presented with cardiac symptoms (80%).

Conclusion: The presenting symptoms of SCAD are primarily cardiac in nature, and understanding these symptoms may help in the early diagnosis and management of SCAD.
clinical histories and hospital admission documentation. Baseline characteristics, predisposing and precipitating conditions, angiographic findings, management strategies, in-hospital and long-term events were recorded prospectively.

Results: Of 219 patients with SCAD, 23 were excluded for incomplete documentation of presenting symptoms. The majority of the remaining 196 patients with SCAD were women (178/196; 90.8%). All presented with myocardial infarction (MI) and 23.9% had ST-segment elevation MI (STEMI). The most frequent presenting symptom was chest discomfort, experienced by 96% of SCAD patients. The chest discomfort was associated with radiation to the arm(s) (97/196; 49.5%), radiation to the neck (43/196; 22.1%), nausea or vomiting (46/196, 23.4%), diaphoresis (41/196, 20.9%), dyspnea (38/196, 19.3%), back pain (24/196, 12.2%), ventricular tachycardia (14/196; 7.1%), and cardiac arrest (2/196, 1.0%). In the absence of chest discomfort, 1.5% experienced back pain, 2.6% had arm discomfort, and 1.0% had neck pain, diaphoresis, or fatigue. The time from symptom onset to hospital presentation was approximately 1.10 ± 3.0 days. Non-STEMI patients had longer delay for coronary angiography compared with STEMI (2.0 ± 2.5 days vs. 0.8 ± 1.7 days, p=0.002) but had similar prevalence of unstable symptoms (30.9% vs. 44.7%, p=0.112) and long-term event rate.

Conclusion: Patients with SCAD presented most frequently with chest discomfort. The characterization of presenting symptoms was not associated with the type of MI or worse outcomes.

Disclosures:
Christina Luong: This author has nothing to disclose.
Roshan Prakash: This author has nothing to disclose.
Jacqueline Saw: This author has nothing to disclose.

A-086
Title: Gender differences of vasospastic angina provoked by the intracoronary ergonovine test in Korean patients: the clinical characteristics and the 24-month prognosis in the VA-KOREA registry.
Category: Acute Coronary Syndromes, Myocardial Infarction, Thrombectomy and Vulnerable Plaque
Authors: SANG HONG BAEK, The Catholic University of Korea, Korea, South: DONG IL SHIN, The Catholic University of Korea, Korea, South; IK JUN CHOI, The Catholic University of Korea, Korea, South; SANG HONG BAEK, The Catholic University of Korea, Korea, South

Background: Gender differences of vasospastic angina (VSA) still remain to be elucidated in Asian patients. Consequently, we aim to determine gender differences in the clinical and prognostic characteristics of Korean VSA patients using data-sets of the multicenter, prospective VA-KOREA (Vasospastic Angina in KOREA) registry.

Methods: A total of 2,726 Korean patients who underwent angiographic ergonovine provocation tests in 11 cardiovascular centers were consecutively registered. Among these patients, 626 VSA patients (23.0%, 456 male and 170 female patients) were included into this analysis. The positive result in the ergonovine provocation was defined as a total or subtotal (>90%) coronary occlusion accompanied by angina and/or ischemic electrocardiographic changes. The baseline clinical characteristics and the 24-month incidences of adverse events including new-onset arrhythmia, acute coronary syndrome (ACS), and cardiac death were compared between male and female VSA patients (mean follow up: 27.5 ± 15.6 months).

Results: Male patients demonstrated a higher incidence of current smoking (66.2% vs 12.4%, p<0.001) and a lower prevalence of known thyroid diseases (1.3% vs 6.5%, p<0.001). The baseline levels of blood pressures, fasting glucose, and triglyceride were also higher in male patients (all p<0.05). In the baseline coronary angiography (CAG), minimal atherosclerosis was found more frequently in male patients (42.3% vs 32.4%, p=0.023). The prescription rate of calcium channel blockers was very high in both groups (94.5% vs 97.1%, p=0.186), meanwhile aspirin (51.5% vs 41.2%, p=0.021) and statins (58.8% vs 49.4%, p=0.036) were more frequently prescribed in male patients. The 24-month incidences of new-onset arrhythmia and ACS were similar (2.9% vs 1.8%, 2.6% vs 3.5%, respectively, all p>0.05). However, cardiac death occurred in 4 male patients (0.9%) while there was no cardiac death in female patients. Current smoking (HR 2.608, p=0.017) and minimal atherosclerosis in the baseline CAG (HR 1.432, p=0.026) demonstrated a significant statistical impact on the adverse events.

Conclusion: Our results could indicate the importance of the gender-specific clinical investigation for Korean VSA patients.

Disclosures:
DONG IL SHIN: This author has nothing to disclose.
IK JUN CHOI: This author has nothing to disclose.
SANG HONG BAEK: This author has nothing to disclose.

A-090
Title: Significance of lactic acidosis at presentation on survival to discharge in patients presenting with ST-elevation myocardial infarction.
Category: Acute Coronary Syndromes, Myocardial Infarction, Thrombectomy and Vulnerable Plaque
Authors: Manoj Thangam, UTHSC-Houston Medical School, United States; Akhil Khosla, UTHSC-Houston Medical School, United States; Srujul Patel, University of Louisville School of Medicine, United States; Maria Cardenas-Turanzas, UTHSC-Houston Medical School, United States; Rosa Banuelos, UTHSC-Houston Medical School, United States; Prakash Balan, UTHSC-Houston Medical School, United States; James McCarthy, UTHSC-Houston Medical School, United States; Pratik Doshi, UTHSC-Houston Medical School, United States

Background: Lactate elevation has proven prognostic value in a variety of disease states. However, its role in myocardial infarctions is not yet established. The presence of hypotension at the onset of ST segment elevation (STEMI) is associated with worse outcomes. However, STE-MIs may result in systemic hypoperfusion without hypotension resulting in lactate elevation. Currently, there is little data evaluating the role of lactate values as prognostic indicator of survival to discharge in the setting of STEMI. In this study, we sought to evaluate the association between presenting lactate and survival to hospital discharge in patients presenting with STEMI.

Methods: A retrospective review of 455 patients presenting to our facility between December 2009 and July 2014 was performed. Pertinent demographics, presentation variables, outcome variables and lactate levels were collected by 2 independent abstractors. These patients were divided into presenting lactate ≤2 or >2. Multivariate analysis using lactate as a dichotomous variable with the outcome being survival to hospital discharge was performed.

Results: A total of 161 patients had a lactate level drawn at presentation, of which 74 patients had a presenting lactate ≤2 mmol/L. Both groups had similar baseline demographic except for statistically significant differences in dyslipidemia and shock at first medical contact between the two groups. Multivariate analysis accounting for age, race, smoking status, dyslipidemia, single vessel disease, and shock at first medical contact revealed a lactate level ≤ 2 mmol/L at presentation was an independent predictor of being discharged alive in patients presenting with STEMI within our population (OR = 8.9, 95% CI 2.65 – 29.92, p<0.0001). In addition, shock at first medical contact had a 75%

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A-092

Title: Rescue Percutaneous Coronary Intervention For Failed Thrombolytic Therapy in Thailand’s Largest University-Based Tertiary Care Hospital.

Category: Acute Coronary Syndromes, Myocardial Infarction, Thrombectomy and Vulnerable Plaque

Authors: Wiwun Tungsututra, Faculty of Medicine Siriraj Hospital, Thailand

Background: Due to limited resources, particularly in developing countries, many hospitals continue to give thrombolytic treatment in ST segment elevation myocardial infarction (STEMI) patients. Data are limited on the outcomes of rescue percutaneous coronary intervention (PCI) in developing countries.

Methods: This observational cohort study was conducted from June 1, 2008 to May 31, 2013. Consecutive STEMI patients who underwent emergency rescue PCI or primary PCI were included. Rescue PCI patients were compared with primary PCI patients.

Results: Three hundred and sixteen patients were enrolled, of which 72.5% were male. Mean age was 59.5 years and mean body weight was 66 kilograms. Rescue PCI and primary PCI was performed in 24 and 292 patients, respectively. Median time from symptom onset to emergency room arrival was 175 minutes and not statistically different between groups. Thirteen percent of patients were in cardiogenic shock upon arrival. Radial artery access was significantly more frequently used in the rescue PCI group. The rescue PCI group had a significantly higher proportion of initial TIMI grade 3 flow (rescue PCI 33.3% vs. primary PCI 13.4%; p=0.042). No significant differences were observed in final TIMI grade 3 between the groups (rescue PCI 87.5% vs. primary PCI 89.7%; p=0.77). Rate of platelet glycoprotein IIb/IIIa receptor blocker use was significantly higher in the primary PCI group (41.4% vs. 4.2%; p<0.001). There were no significant differences between groups for angiographic success rate (rescue PCI 83.3% vs. primary PCI 88.7%; p=0.229) or procedural success rate (rescue PCI 79.2% vs. primary PCI 85.6%; p=0.164). Forty-one patients (14%) in primary PCI group and two patients (8.3%) in rescue PCI group died during hospitalization (p=0.75). Hemorrhagic stroke occurred in 1 patient in each group. There were no significant differences in major bleeding or major vascular complications between groups.

Conclusion: The angiographic outcome and procedural success rates in patients who underwent rescue PCI were not significantly different from rates in patients who underwent primary PCI. Rescue PCI can be performed with favorable outcomes and should be considered in patients after failure of thrombolytic therapy.

Catheterization and Cardiovascular Interventions DOI 10.1002/ccd.

Disclosures: Wiwun Tungsututra: This author has nothing to disclose.

ADULT CONGENITAL

B-015

Title: Predictors of Permanent Pacemaker Implantation after Low-volume Alcohol Septal Ablation for Hypertrophic Obstructive Cardiomyopathy

Category: Adult Congenital

Authors: Michael Amponsah, Newark Beth Israel Medical Center, United States; Marc Cohen, Newark Beth Israel Medical Center, United States; Sherif Eltawansy, Newark Beth Israel Medical Center, United States; Marc Lindner, Newark Beth Israel Medical Center, United States; Chunguang Chen, Newark Beth Israel Medical Center, United States

Background: Conduction abnormalities occur after alcohol septal ablation (ASA) in patients (pts) with Hypertrophic Obstructive Cardiomyopathy (HOCM). Permanent pacemaker (PPM) rate ranges from 5% –33%. Pre- and post-ASA conduction abnormalities have previously been described as risk factors for PPM. These risk factors were based on studies in which ethanol volume ranged from 1.5cc –5cc. We sought to determine if the previously cited predictors of PPM placement were applicable to our single-center experience with pts who underwent ASA using a total ethanol volume of ≤3cc

Methods: We retrospectively analyzed 25 pts from 12/2009 to 9/2/2015. Hemodynamic data were obtained immediately pre- and post-procedure. Pt follow-up was up to 30 days. The two tailed unpaired student’s t statistical test was used

Results: PPM rate was 16% (4/25). Pre- ASA CHB rate was 32% (8/25). PPM rate among pts with peri- procedural CHB was 50% (4/8). Pre-ASA testing and provoking gradients; and post-ASA gradient reduction were higher in the PPM-free group. However, pre- and post-ASA QRS duration (QRSdur) were higher in the PPM group. In spite of ≤3cc of ethanol used, total ethanol volume used was higher in pts requiring PPM than PPM-free pts (1.5cc vs. 2.4cc, p=0.03)

Conclusion: In our pts treated with ≤3cc ethanol, previously described risk factors for PPM remain applicable. Further, in spite of ≤3cc used, total ethanol volume significantly correlated with the need for PPM.

Disclosures: Michael Amponsah: This author has nothing to disclose. Sherif Eltawansy: This author has nothing to disclose. Marc Lindner: This author has nothing to disclose. Chunguang Chen: This author has nothing to disclose.

O-002

Title: Transcatheter Pulmonary Valve Implantation: A systematic review and meta-analysis of observational studies

Category: Adult Congenital

Authors: Arka Chatterjee, University of Alabama at Birmingham, United States; Navkanbir S. Bajaj, University of Alabama at Birmingham, United States; Jeremy S. White, University of Alabama at Birmingham, United States; Marc G. Cribbs, University of Alabama at Birmingham, United States; William S. McMahon, Childrens of Alabama, United States; Mark A. Law, Childrens of Alabama, United States

Background: Conduction abnormalities occur after alcohol septal ablation (ASA) in patients (pts) with Hypertrophic Obstructive Cardiomyopathy (HOCM). Permanent pacemaker (PPM) rate ranges from 5% –33%. Pre- and post-ASA conduction abnormalities have previously been described as risk factors for PPM. These risk factors were based on studies in which ethanol volume ranged from 1.5cc –5cc. We sought to determine if the previously cited predictors of PPM placement were applicable to our single-center experience with pts who underwent ASA using a total ethanol volume of ≤3cc

Methods: We retrospectively analyzed 25 pts from 12/2009 to 9/2/2015. Hemodynamic data were obtained immediately pre- and post-procedure. Pt follow-up was up to 30 days. The two tailed unpaired student’s t statistical test was used

Results: PPM rate was 16% (4/25). Pre- ASA CHB rate was 32% (8/25). PPM rate among pts with peri- procedural CHB was 50% (4/8). Pre-ASA testing and provoking gradients; and post-ASA gradient reduction were higher in the PPM-free group. However, pre- and post-ASA QRS duration (QRSdur) were higher in the PPM group. In spite of ≤3cc of ethanol used, total ethanol volume used was higher in pts requiring PPM than PPM-free pts (1.5cc vs. 2.4cc, p=0.03)

Conclusion: In our pts treated with ≤3cc ethanol, previously described risk factors for PPM remain applicable. Further, in spite of ≤3cc used, total ethanol volume significantly correlated with the need for PPM.

Disclosures: Michael Amponsah: This author has nothing to disclose. Sherif Eltawansy: This author has nothing to disclose. Marc Lindner: This author has nothing to disclose. Chunguang Chen: This author has nothing to disclose.

O-002

Title: Transcatheter Pulmonary Valve Implantation: A systematic review and meta-analysis of observational studies

Category: Adult Congenital

Authors: Arka Chatterjee, University of Alabama at Birmingham, United States; Navkanbir S. Bajaj, University of Alabama at Birmingham, United States; Jeremy S. White, University of Alabama at Birmingham, United States; Marc G. Cribbs, University of Alabama at Birmingham, United States; William S. McMahon, Childrens of Alabama, United States; Mark A. Law, Childrens of Alabama, United States

Background: Conduction abnormalities occur after alcohol septal ablation (ASA) in patients (pts) with Hypertrophic Obstructive Cardiomyopathy (HOCM). Permanent pacemaker (PPM) rate ranges from 5% –33%. Pre- and post-ASA conduction abnormalities have previously been described as risk factors for PPM. These risk factors were based on studies in which ethanol volume ranged from 1.5cc –5cc. We sought to determine if the previously cited predictors of PPM placement were applicable to our single-center experience with pts who underwent ASA using a total ethanol volume of ≤3cc

Methods: We retrospectively analyzed 25 pts from 12/2009 to 9/2/2015. Hemodynamic data were obtained immediately pre- and post-procedure. Pt follow-up was up to 30 days. The two tailed unpaired student’s t statistical test was used

Results: PPM rate was 16% (4/25). Pre- ASA CHB rate was 32% (8/25). PPM rate among pts with peri- procedural CHB was 50% (4/8). Pre-ASA testing and provoking gradients; and post-ASA gradient reduction were higher in the PPM-free group. However, pre- and post-ASA QRS duration (QRSdur) were higher in the PPM group. In spite of ≤3cc of ethanol used, total ethanol volume used was higher in pts requiring PPM than PPM-free pts (1.5cc vs. 2.4cc, p=0.03)

Conclusion: In our pts treated with ≤3cc ethanol, previously described risk factors for PPM remain applicable. Further, in spite of ≤3cc used, total ethanol volume significantly correlated with the need for PPM.

Disclosures: Michael Amponsah: This author has nothing to disclose. Sherif Eltawansy: This author has nothing to disclose. Marc Lindner: This author has nothing to disclose. Chunguang Chen: This author has nothing to disclose.
Background: Transcatheter pulmonary valve implantation (TPVI) with the Melody valve is approved in the United States for dysfunctional right ventricular outflow tract (RVOT) conduits. Use of both the Melody valve and Edwards SAPIEN transcatheter heart valve (ES-THV) has been reported for RVOT conduits, native RVOT and as valve in valve procedures and boundaries are constantly being pushed for a more inclusive patient selection for these procedures. Hence we aimed to perform a systematic review and meta-analyses of observational studies to provide outcome data for a varied patient population.

Methods: A comprehensive search of the Medline and Scopus databases from inception through July 1, 2015 was conducted using pre-defined criteria. We included studies reporting implantation in at least 5 patients and a follow-up of 6 months or more. Meta-analyses were performed using fixed/random effects model as appropriate.

Results: In 18 eligible studies, TPVI was performed in 1016 patients with 1886.2 patient-years (PY) of follow-up. The adjusted rate of procedural success was 96.7% (95% confidence interval [CI]:95.1-97.7%); incidence of procedural complications was 8.8% (95% CI: 6.5-11.9%) with conduit rupture was the most common (crude rate 3.1%; n=32). Conversion to surgical repair was needed in 1.2% (n=12) of procedures with conduit rupture (n=7) which did not respond to transcatheter management being the most common cause. On follow up, pooled rate of death was 1.4/100 PY (95% CI: 0.9-2.1). Crude rate for total RVOT re-intervention was 9% (catheter based: 6.4%; surgical: 3.0%). Reported crude incidence of endocarditis after TPVI was 3.1%.

Conclusion: Our study suggests excellent short and medium term safety/efficacy outcomes for TPVI in patients with approved as well as off label use of either the Melody valve or ES-THV.

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Arka Chatterjee: This author has nothing to disclose.
Navkaranbir S. Bajaj: This author has nothing to disclose.
Jeremy S. White: This author has nothing to disclose.
Marc G. Cribbs: This author has nothing to disclose.
William S. McMahon: This author has nothing to disclose.
Mark A. Law: This author has nothing to disclose.

O-001

Title: Patient Selection Process for The Medtronic Native Transcatheter Pulmonary Valve Early Feasibility Study
Category: Adult Congenital

Authors: Matthew Gillespie, The Children’s Hospital of Philadelphia, United States; Brian McHenry, Medtronic Inc., United States; Emile Bacha, Children’s Hospital of New York, Columbia University Medical Center, United States; Peter Ewert, German Heart Center, Munich, Germany; Tal Geva, Children’s Hospital Boston, United States; Kan Hor, Nationwide Children’s Hospital, United States; Evan zahn, Cedars Sinai Medical Center, United States; Evan Zahn, Cedars Sinai Medical Center, United States; Lisa Bergersen, Children’s Hospital Boston, United States; Lee Benson, Hospital For Sick Children, Toronto, Canada; John Cheatham, Nationwide Children’s Hospital, United States

Background: The Medtronic native outflow tract Transcatheter Pulmonary Valve (nTPV) was developed for non-surgical pulmonary valve replacement (PVR) in non RV-PA conduit pts. The nTPV trial was the first study approved under the FDA Early Feasibility Study (EFS) guidance. Enrollment required that pt anatomy be precisely matched to the single-size nTPV implant. The rigorous selection process is described.

Methods: The nTPV EFS was a non-randomized, prospective, study carried out at 3 sites. All pts met standard indications for surgical PVR. A screening committee (SC) consisted of 3 implanting and 6 non-implanting physicians. If RV outflow tract (RVOT) evaluated from screen cMRI was within specified size constraints, dual-source CT was used to create RVOT perimeter plots (PP) and 3D-printed (3DP) models [Fig 1]. The SC reviewed the clinical history, RVOT PP, and trial 3DP nTPV implants. If the majority of the SC agreed that the nTPV met preset criteria for secure implantation, the pts moved forward to implant.

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Catheterization and Cardiovascular Interventions DOI 10.1002/ccd. Published on behalf of The Society for Cardiovascular Angiography and Interventions (SCAI).
Results: 270 pts underwent pre-screening cMRI, 66 were enrolled and received a CT scan (24%), 21 met criteria for implant (8%), and 20 underwent implant. Nineteen of 20 met criteria for implant success.

Conclusion: The Medtronic nTPV represents an emerging therapeutic option for pts with complex postoperative RVOT failure. The initial clinical evaluation of this technology was unique, and the highly variable anatomy of this population required careful screening to ensure acceptable device fit.

Disclosures:
Matthew Gillespie: 5 Medtronic
Brian McHenry: 3 Medtronic
Emile Bacha: This author has nothing to disclose.
Peter Ewert: This author has nothing to disclose.
Tal Geva: This author has nothing to disclose.
Kan Hor: 5 Medtronic
Evan Zahn: 5 Medtronic
Lisa Bergersen: This author has nothing to disclose.
Lee Benson: 5 Medtronic
John Cheatham: 5 Medtronic

**B-073**

**Title:** To assess the immediate and mid-term outcome of transcatheter closure (TCC) in patients with Coronary Cameral Fistula (CCF).

**Category:** Adult Congenital

**Authors:** Ankur Phatarpekar, KEM Hospital & Seth G S Medical College, India; Swapnil Mate, Seth G.S. Medical college and King Edward Memorial Hospital, India; Charan Lanjewar, KEM Hospital & Seth G S Medical College, India; Prafulla Kerkar, KEM Hospital & Seth G S Medical College, India

**Background:** Transcatheter closure of medium to large coronary-cameral fistulae is an established alternative to surgical closure, with the advantage to check online the compression of side branches and completeness of the procedure. There is scant data regarding the follow up angiography post TCC. We want to present clinical and angiographic follow up data of 8 patients underwent CCF-TCC in our institute from 2006 to 2015.

**Methods:** Coronary and fistula anatomy were defined by selective coronary angiography with or without temporary occlusion. Device closure of the fistula was performed at the most distal point accessible, often from the cameral side using an arteriovenous loop method.

**Results:** 8 patients (3 females and 5 males) aged 2-56 years (median 18 years) with CCF were selected for TCC. All of them were symptomatic in NYHA class II & none of them had associated cardiac defects or significant past medical history. In 4 patients the fistula was proximal and in rest 4, it was distally placed in the coronaries. Of 8 patients considered for TCC, occlusion devices were used in 7 patients and glue was used in 1 patient. 4 patients required more than one device for closure. Successful TCC with distal TIMI 3 flow was seen in all 4 patients with proximal fistula. In patients with distal fistula, 2 patients showed TIMI II flow post closure with mild residual shunt and one patient showed TIMI I flow immediate TCC. After a median follow up period of 2.5 years (range 1-60 months), all patients were asymptomatic except one with distal fistula showed recurrence of dyspnoea, 3 months post procedure. Follow up angiogram was done in all patients. The angiograms showed no shunt with TIMI III flow in 5 patients. The 2 patients with distal fistula who had TIMI II flow continued to have slow flow with mild residual shunting, which probably helped in keeping the coronary flow going. The patient with distal fistula who presented with symptoms showed complete occlusion.

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B-060

Title: Pregnancy in women with percutaneous pulmonary valve implantation

Category: Adult Congenital

Authors: Sophie Malekzadeh- Milani, Hôpital Necker Enfants Malades, France; Magalie Ladouceur, Hôpital Européen Georges Pompidou, France; Thomas Gaillard, Hôpital de la Salpêtrière, France; Djammal Khimoud, Hôpital Européen Georges Pompidou, France; Florence Pontneau, Hôpital Européen Georges Pompidou, France; Laurence Iserin, Hôpital Européen Georges Pompidou, France; jacky nizard, Hôpital de la Salpêtrière, France; Younes Boudjemline, Hôpital Necker Enfants Malades, France

Background: Pulmonary valve replacement (PVR) is indicated in adult patients with dysfunctional right ventricular outflow tract. There is little data on pregnancy following PVR, particularly after percutaneous pulmonary valve implantation (PPVI). The aim of this study was to analyze pregnancy outcome in these patients

Methods: Among 106 adult women with PVR followed in our center, 13 were pregnant. PPVI was performed in 7 of them, 6±2 years before pregnancy (Melody® valve). We retrospectively collected obstetric and cardiologic data.

Results: 7 patients with PPVI had 10 pregnancies at a mean age of 29±6 (ranged from 17 to 38). Five led to a delivery after 20 weeks gestation (WG), and 3 had an abortion. No miscarriage occurred. 3/5 pregnancies were delivered by cesarean section, for obstetrical indications. Obstetric complications occurred in 2/5 complete pregnancies: one severe preeclampsia leading to a premature birth at 30WG, and one spontaneous preterm labor at 35 WG. There was no small for gestational age neonates. The mean gestational age at birth was 36±3WG. No congenital heart disease was diagnosed in the newborns and there was no neonatal or fetal death. During complete pregnancies no maternal cardiac complication occurred. One patient died from endocarditis in the aftermath of an abortion. All patients were treated by aspirin throughout pregnancy and received antibiotic prophylaxis at delivery. The patient who died after abortion received antibiotics prophylaxis but had no aspirin. At median follow-up of 14 months, there was no change in the trans-pulmonary valve maximal gradient (31 vs 27 mmHg) and no pulmonary regurgitation.

Conclusion: This small first series of pregnancies with PPVI seems reassuring for the maternal and neonatal outcomes, except for the risk of infection, which needs careful monitoring by experienced teams.

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Magalie Ladouceur: This author has nothing to disclose.
Thomas Gaillard: This author has nothing to disclose.
Djammal Khimoud: This author has nothing to disclose.
Florence Pontneau: This author has nothing to disclose.
Laurence Iserin: This author has nothing to disclose.
Jacky Nizard: This author has nothing to disclose.
Younes Boudjemline: 5 Medtronic

B-065

Title: Utility of Transcranial Doppler Using Agitated Saline with versus without Blood for the Diagnosis of Cardiac Right-to-Left Shunt

Category: Adult Congenital

Authors: Mohammad Mojadidi, University of Florida College of Medicine, United States; Lili Zhang, Albert Einstein College of Medicine (Montefiore) Program, United States; Yashasvi Chugh, Albert Einstein College of Medicine (Jacobi) Program, United States; Ninel Hovnanians, Albert Einstein College of Medicine (Jacobi) Program, United States; Rubine Gevorgyan, David Geffen School of Medicine at UCLA, United States; Sanaullah Mojaddedi, University of Florida College of Medicine, United States; Parham Eshtehardi, Emory University, United States; Nariman Nezami, Yale New Haven Hospital/Yale University, United States; Muhammad Zaman, Crozer-Chester Medical Center, United States; Pedro Villalblanca, Albert Einstein College of Medicine (Montefiore) Program, United States; Jonathan Tobis, David Geffen School of Medicine at UCLA, United States

Background: Transcranial Doppler (TCD) with agitated saline has been shown to be an alternative for the detection of right-to-left shunts (RLS) with similar diagnostic accuracies as Transesophageal Echocardiography (TEE). It is hypothesized that the addition of blood to agitated saline increases the sensitivity TCD for the detection of RLS. The aim
of this meta-analysis was to determine whether agitated saline with blood increases the sensitivity of TCD for the detection of RLS compared to agitated saline alone and other contrast agents.

**Methods:** A systematic review of Medline, Cochrane, and Embase was done to look for all prospective studies assessing intracardial RLS using TCD compared with TEE as the reference; both tests were performed with a contrast agent and a maneuver to provoke RLS in all studies.

**Results:** A total of 27 studies (29 comparisons) with 1,968 patients met the inclusion criteria. Of 29 comparisons, 10 (35%) used echocardiogram contrast during TCD, 4 (14%) used a gelatin-based solution, 12 (41%) used agitated saline, and 3 (10%) utilized 2 different contrast agents. The addition of blood to agitated saline improved the sensitivity of TCD to 100% compared to agitated saline alone (96% sensitivity, \( p = 0.16 \)), Echovist (94% sensitivity, \( p = 0.044 \)) and gelatin-based solutions (93% sensitivity, \( p = 0.041 \)).

**Conclusion:** The addition of blood to agitated saline improves the sensitivity of TCD for the detection of RLS to 100% when compared to other conventional contrast agents; these findings support the addition of blood to agitated saline during TCD bubble studies.

**Disclosures:**

Mohammad Mojadedi: This author has nothing to disclose. Lili Zhang: This author has nothing to disclose. Yashavsi Chugh: This author has nothing to disclose. Nenil Hovnavanians: This author has nothing to disclose. Rubine Gevorgyan: This author has nothing to disclose. Sanaullah Mojadedi: This author has nothing to disclose. Parham Estehardi: This author has nothing to disclose. Nariman Nezami: This author has nothing to disclose. Muhammad Zaman: This author has nothing to disclose. Pedro Villalba: This author has nothing to disclose. Jonathan Tobis: 5 W.L. Gore, Inc., 5 St. Jude Medical Inc.

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**O-003**

**Title:** Transcatheter Pulmonary Valve Implantation in Patients Without Circumferential Right Ventricular Conduits: Selection Criteria and Outcomes

**Category:** Adult Congenital

**Authors:** Catherine E Tomasulo, Yale New Haven Hospital/Yale University, United States; Jeremy D Asnes, Yale New Haven Hospital/Yale University, United States; Robert W Elder, Yale New Haven Hospital/Yale University, United States; William E Hellenbrand, Yale New Haven Hospital/Yale University, United States; Robert W Elder: This author has nothing to disclose.

**Background:** Transcatheter pulmonary valve implantation (tcPVI) within patch-augmented or otherwise surgically modified RVOTs without a circumferential conduit (ncRVOT) obviated the need for surgical pulmonary valve implantation (sPVI) in 28/65 patients. Selection criteria and short and medium term outcomes were evaluated.

**Methods:** All ncRVOT patients that had sPVI or invasive evaluation for tcPVI from 5/11-2/16 were reviewed. For catheterized patients with pre-procedure MRI/CT datasets, minimum ncRVOT perimeter (MP) and minimum and maximum RVOT diameter at MP were derived. A “circumferential diameter” (CD) was calculated (MP/\( \pi \)). ncRVOT minimum balloon diameter (MBD) was assessed with compliant oversized balloons at low pressure. Echo mean gradient and valve insufficiency at latest follow-up were assessed.

**Results:** tcPVI was considered in 65 consecutive ncRVOT patients; 40 were deemed appropriate for catheterization (median 17.4yrs. [4.8–63]; median 55.9kg [16.8–118]). tcPVI was attempted when MBD was < intended tcPVI valve outer diameter (VOD), n=28 (70%); all Catheterization and Cardiovascular Interventions DOI 10.1002/ccd. Published on behalf of The Society for Cardiovascular Angiography and Interventions (SCAI).

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**ANGIOGENESIS, MYOGENESIS, CELL THERAPY AND GENE THERAPY**

**A-075**

**Title:** Final Results for THE ATHENA TRIALS: Autologous Adipose Derived Regenerative Cells (ADRCs) for Refractory Chronic Myocardial Ischemia with Left Ventricular (LV) Dysfunction

**Category:** Angiogenesis, Myogenesis, Cell Therapy and Gene Therapy

**Authors:** Timothy Henry, Cedars-Sinai Heart Institute, United States; Carl J. Pepine, University of Florida, United States; Jay H. Traverse, Minneapolis Heart Institute, United States; Charles R. Lambert, Florida Heart Institute, United States; Richard Schatz, Scripps Green Hospital, United States; Marco Costa, University Hospitals Case Medical Center/Case Western Reserve Univ, United States; Thomas J. Povsic, Duke Clinical Research Institute, United States; R. David Anderson, University of Florida, United States; Steven Kesten, Cytori Therapeutics, United States; Emerson C. Perin, Texas Heart Institute, United States

**Background:** Based on the Phase I PRECISE trial, the automated on-site cell processing and IM delivery of Autologous Adipose-Derived Regenerative Cells (ADRCs), shows promise for treatment of refractory ischemia pts.

**Methods:** Two prospective, randomized (2:1, active: placebo), double-blind, parallel group trials (ATHENA and ATHENA II, N=45 each) were designed to enroll pts on max med management with EF 20-45%; multi-vessel CAD not amenable to revasc, inducible ischemia, and CCS Angina Class II-IV and/or NYHA Class II-III. Pts underwent liposuction (<450 mL adipose), followed by cell processing (Celution® System, Cytori Therapeutics), and injection of ADRC [ATHENA: 20x10^6 cells, ATHENA 2: 40x10^6 cells] into viable myocardium.

**Results:** Enrollment was terminated prematurely due to 3 neurological events which prolonged trial enrollment but were not cell related. 31 pts were enrolled (17 ADRCs, 14 placebo), with mean age 65 + 8 yrs and baseline LVEF 31.6%. Changes from baseline to 6 months are shown in Table 1, with improvement trends for V02 max and symptoms. Several SF-36 domains were sig improved. At 1 year improvement in
A-061

Title: Effect Of Acetyl Salicylic Acid on Angiogenesis Through Assessment of Microvascular Density, VEGF-A, II-1, And PDGF-B Receptors on Mouse Myocardium that Undergo Hypobaric Hypoxia Exposure

Category: Angiogenesis, Myogenesis, Cell Therapy and Gene Therapy

Authors: Januar Wibawa Martha, Department of Cardiology and Vascular Medicine, Padjadjaran University, Indonesia

Background: Myocardial hypoxia may induce angiogenic response by activating proangiogenic mediators VEGF A and PDGF B, and proinflammatory mediator Interleukin 1. Angiogenic response may be hampered by several factors such as medications. Acetyl salicylic acid (ASA) has been used in oncology to reduce tumor growth by inhibiting angiogenesis. The study intended to assess the effect of acetyl salicylic acid on the angiogenesis in myocardial tissue which induced by hypobaric hypoxia exposure.

Methods: Experimental study with 2 interventions: hypobaric hypoxia exposure and acetyl salicylic acid administration. The study subjects were 32 Wistar rats, 18-20 weeks old, weighing 250-350 grams. Hypobaric hypoxia exposure was performed intermittently, 4 times 7 days apart, in a hypobaric chamber according to a protocol previously done. ASA dosage was 2 mg/kg for low dose and 10 mg/kg for high dose, which were given for 14 days. The subjects were divided into 4 groups: no intervention, hypobaric hypoxia only, hypobaric hypoxia + low dose ASA, hypobaric hypoxia + high dose ASA. Rats’ heart were extracted and examined for microvascular density with Hematoxylin Eosin and anti CD34 immunostaining, while expression of VEGF A, PDGF B and II-1 receptors by immunohistochemistry, assessed using histoscore. The study was conducted at Aerophysiology Lab Jakarta and Pathology Anatomy Lab at Faculty of Medicine Padjadjaran University Bandung, Indonesia

Results: There were significant differences in microvascular density both by HE (median 4 vs 2, p=0.021) and anti CD34 (median 3 vs 1, p=0.028), and VEGF A (median 10.5 vs 3, p=0.002) and II-1 (median 10.5 vs 3.5, p=0.004) receptors expressions between groups exposed by hypobaric hypoxia with and without ASA. There were differences in microvascular density using anti CD34 (median 3 vs 1, p=0.035) and VEGF A receptor expression (median 6 vs 2, p=0.022) between groups receiving hypobaric hypoxia exposure and either low or high dosage of ASA. Expression of PDGF-B receptors were not influenced by either hypobaric hypoxia or ASA

Conclusion: Administration of ASA may decrease angiogenic response of hypobaric hypoxia exposure. High dosage of ASA may reduce angiogenesis process stronger than low dosage of ASA.

Disclosures:
Januar Wibawa Martha: This author has nothing to disclose.

A-007

Title: Procedural success and clinical outcomes of TRYTON® and AXXESS™ dedicated bifurcation stents used in complex bifurcation lesions in unselected patients in a predominant radial centre.

Category: Complex PCI, Restenosis, Left Main & Multi-Vessel Intervention

Authors: Fairoz Belary Abdul, University Hospital of Wales, United Kingdom; Rabeya Khatun, University Hospital of Wales, United Arab Emirates; Swamendra Bandhoo, Royal Gwent Hospital, United Kingdom; Richard Anderson, University Hospital of Wales, United Kingdom; Tim Kinnaird, University Hospital of Wales, United Kingdom; Anirban Choudhury, University Hospital of Wales, United Kingdom

Background: Approximately 15% of percutaneous intervention involve coronary artery bifurcations (CBL). There is no consensus on the optimal strategy of treating CBL. Main branch (MB) stenting with provisional side branch (SB) stenting is the preferred approach but carries an increased risk of SB compromise. Dedicated bifurcation stents (eg. TRYTON & AXXESS) are designed to improve SB patency. TRYTON is a 6 French (F) compatible bare metal stent designed to treat the MB into SB without compromising the carina while Axxess is a 7 F compatible drug eluting stent with a biodegradable polymer.

Methods: Patients were identified via cardiac catheter laboratory registry(2009-15).We retrospectively evaluated the procedural information, outcome and morality data were obtained from the British Cardiac Intervention Society, hospital and Welsh demographic service databases respectively.

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Results: Seventy-six patients were treated with dedicated bifurcation stents (59 TRYTON and 17 AXXESS). The mean age was 67 years, 76% were men, 64% had stable angina, 36% were ACS and 13% had severe LVSD.

93% were done via the radial access using kit not greater than a conventional 6F sheath (6F guide, 7F guide with balloon tracking technique without any sheath in-situ or 7.5F sheathless guides). 84% of case had true bifurcation (Medina 1,1,1), median angle of 45 degrees, mean MB/ SB stent diameter was 3.5mm/3mm and 3mm/2.5mm for TRYTON and AXXESS respectively. Coronary intra imaging (OCT, IVUS) was used in 15%, FFR in 10% of cases and final kissing balloon done in 62% of cases. Procedural success was 97% in TRYTON group and 94% in AXXESS group with no access site complications.

At mean follow up of 9 months there were 3 (3.9%) deaths of which 1 (1.3%) was in-hospital death, 3 (3.9%) repeat revascularisations (2 in TRYTON for ISR and 1 for acute stent thrombosis in Axxess) all of which were re-vascularised and one major bleeding from undiagnosed aortic aneurysm. Overall MACCE was 9.2%.

Conclusion: This study demonstrates that dedicated bifurcation stents can be used successfully via the radial access. The medium term MACCE in unselected real life patients with the use of these dedicated bifurcation stents in a high volume tertiary centre is excellent.

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Fairoz Belary Abdul: This author has nothing to disclose.
Rabeya Khatun: This author has nothing to disclose.
Swamendra Bundhoo: This author has nothing to disclose.
Richard Anderson: This author has nothing to disclose.
Tim Kinnaird: This author has nothing to disclose.
Anirban Choudhury: This author has nothing to disclose.

A-012

Title: Impact of Crossing Strategy on Intermediate-Term Outcomes After Chronic Total Occlusion Percutaneous Coronary Intervention

Category: Complex PCI, Restenosis, Left Main & Multi-Vessel Intervention

Authors: Suwetha Amsavelu, VA North Texas Healthcare System and UT Southwestern Medical Center, United States; Georgios E Christakopoulos, VA North Texas Healthcare system and UT Southwestern Medical Center at Dallas, United States; Aris Karatasakis, VA North Texas Healthcare system and UT Southwestern Medical Center at Dallas, United States; Krishna Patel, VA North Texas Healthcare system and UT Southwestern Medical Center at Dallas, United States; Bavana V Rangan, VA North Texas Healthcare system and UT Southwestern Medical Center at Dallas, United States; Jeffrey Stetler, VA North Texas Healthcare system and UT Southwestern Medical Center at Dallas, United States; Michele Roesle, VA North Texas Healthcare system and UT Southwestern Medical Center at Dallas, United States; Eric Karatasakis, VA North Texas Healthcare system and UT Southwestern Medical Center at Dallas, United States; Subhash Banerjee, VA North Texas Healthcare system and UT Southwestern Medical Center at Dallas, United States; Emmanouil S Brilakis, VA North Texas Healthcare system and UT Southwestern Medical Center at Dallas, United States; Shuaib Abdullah, VA North Texas Healthcare system and UT Southwestern Medical Center at Dallas, United States; Jeffrey Stetler, VA North Texas Healthcare System, United States; Eric Resendes, VA North Texas Healthcare system and UT Southwestern Medical Center at Dallas, United States; Jerrold Grodin, VA North Texas Healthcare system and UT Southwestern Medical Center at Dallas, United States; Subhash Banerjee, VA North Texas Healthcare system and UT Southwestern Medical Center at Dallas, United States; Emmanouil S Brilakis, VA North Texas Healthcare system and UT Southwestern Medical Center at Dallas, United States; Shuaib Abdullah, VA North Texas Healthcare system and UT Southwestern Medical Center at Dallas, United States; Georgios E Christakopoulos, VA North Texas Healthcare System and University of Texas Southwestern Medical Ce, United States; William O’Neill, Henry Ford System and University of Texas Southwestern Medical Ce, United States; Barbara Danek, VA North Texas Healthcare System and University of Texas Southwestern Medical Ce, United States; Banava Rangan, VA North Texas Healthcare System and University of Texas Southwestern Medical Ce, United States; Shuaib Abdullah, VA North Texas Healthcare System and University of Texas Southwestern Medical Ce, United States; William O’Neill, Henry Ford System and University of Texas Southwestern Medical Ce, United States; Eric Resendes, VA North Texas Healthcare system and UT Southwestern Medical Center at Dallas, United States.

Background: There is ongoing controversy on the optimal crossing strategy selection for chronic total occlusion (CTO) percutaneous catheterization and Cardiovascular Interventions DOI 10.1002/ccd. Published on behalf of The Society for Cardiovascular Angiography and Interventions (SCAI).

coronary intervention (PCI), especially on the relative merits of antegrade dissection/re-entry and the retrograde approach.

Methods: We retrospectively examined the clinical outcomes of 173 consecutive patients who underwent successful CTO PCI at our institution between January 2012 and March 2015.

Results: Mean age was 65±8 years and 98% of the patients were men with high prevalence of diabetes (60%), prior coronary artery bypass graft surgery (31%) and prior PCI (54%). The successful CTO crossing strategy was antegrade wire escalation in 79 patients (45.5%), antegrade dissection/re-entry in 38 patients (33.5%), retrograde wire escalation in 11 patients (6.4%) and retrograde dissection and re-entry in 25 patients (14.5%). The retrograde approaches was more commonly used in lesions with interventional collaterals (p<0.0001), moderate/severe calcification (p=0.02), blunt stump (p=0.01) and a higher J-CTO score (p=0.0002). Specifically, the retrograde wire escalation was associated with a prior attempt to open the CTO (p<0.05), and the dissection and re-entry approaches for both antegrade and retrograde had a stronger correlation with bifurcation and the distal cap (p=0.004), higher CTO occlusion length (p<0.0001) and higher stent length (p<0.0001). Median follow-up was 11 months. The 12-month incidence of death, myocardial infarction, and target lesion revascularization was 2.5%, 4.9%, and 17.2%, respectively and was similar across intimal and subintimal crossing strategies.

Conclusion: Antegrade dissection/re-entry and retrograde approaches are frequently used during CTO PCI and were associated with similarly favorable intermediate-term outcomes as antegrade wire escalation.

Disclosures:
Suwetha Amsavelu: This author has nothing to disclose.
Georgios E Christakopoulos: This author has nothing to disclose.
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Jeffrey Stetler: This author has nothing to disclose.
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Subhash Banerjee: 9 Intellectual property in HygieiaTel, 4 Ownership in MDCARE Global (spouse), 9 consultant/speaker honoraria from Covi-dien and Medtronic, 2 Gilead and the Medicines Company.
Emmanouil S. Brilakis: 9 Spouse is employee of Medtronic, 2 InfraRedx, 9 Consulting/speaker honoraria from Abbott Vascular, Asahi, Boston Scientific, Elsevier, Somahltion, St Jude Medical, and Terumo.
Shuaib Abdullah: This author has nothing to disclose.

A-016

Title: Further validation of the hybrid algorithm for CTO PCI; difficult lesions, same success.

Category: Complex PCI, Restenosis, Left Main & Multi-Vessel Intervention

Authors: Mir Basir, Henry Ford Health System, United States; Aris Karatasakis, VA North Texas Healthcare System and University of Texas Southwestern Medical Ce, United States; Barbara Danek, VA North Texas Healthcare System and University of Texas Southwestern Medical Ce, United States; Banava Rangan, VA North Texas Healthcare System and University of Texas Southwestern Medical Ce, United States; Shuaib Abdullah, VA North Texas Healthcare System and University of Texas Southwestern Medical Ce, United States; William O’Neill, Henry Ford System and University of Texas Southwestern Medical Ce, United States; Emmanouil Brilakis, VA North Texas Healthcare System and University of Texas Southwestern Medical Ce, United States.
A-015

Title: Mechanical Hemodynamic Support in Chronic Total Occlusion Percutaneous Coronary Intervention: Insights from a Multicenter US Registry

Category: Complex PCI, Restenosis, Left Main & Multi-Vessel Intervention

Authors: Mir Basir, Henry Ford Health System, United States; William O’Neill, Henry Ford Health System, United States; Aris Karatasakis, University of Texas - Southwestern, United States; William Danek, University of Texas - Southwestern, United States; Dimitri Karmpaliotis, Columbia University, United States; Farouc Jaffer, Massachusetts General Hospital, United States; Jeffrey Moses, Columbia University, United States; John Bahadorani, UC San Diego/VA Medical Center, United States; Jeffrey Moses, Columbia University, United States; John Bahadorani, UC San Diego/VA Medical Center, United States; Ajay Kirnane, Columbia University, United States; Ziad Ali, Columbia University, United States; Antonio Bivona, Minneapolis VA Medical Center, United States; Subhash Banerjee, University Of Texas - Southwestern, United States; Khaldoon Alaswad, Henry Ford Health System, United States

Background: We sought to evaluate the clinical outcomes associated with the use of hemodynamic support devices in chronic total occlusion (CTO) percutaneous coronary intervention (PCI).

Methods: We examined the clinical and angiographic characteristics and outcomes of 1061 CTO PCI procedures performed between 2012 and 2015 at 9 experienced U.S. centers.

Results: Mean patient age was 66 ± 10.5 years and 85% were men. A hemodynamic support device was used in 53 procedures (5%): pre-procedure implantation in 73% and urgent during the procedure in 27%. As compared with patients in whom hemodynamic support was not used, patients who underwent CTO PCI with hemodynamic support were more likely to have prior coronary artery bypass graft surgery (48% vs. 33%; p=0.029), heart failure (41% vs 28%; p=0.048), and lower ejection fraction (35% vs 51%; p=0.001). Their occlusions had longer length (35mm vs. 28 mm; p<0.001), and were less likely to have a favorable distal landing zone (33% vs. 64%; p<0.001), but more likely to have moderate or severe calcification (86% vs. 53%; p<0.001), proximal cap ambiguity (51% vs. 29%; p<0.001), higher J-CTO score (3.3 vs. 2.6 ± 1.2; p<0.001) and Progress-CTO (1.6 ± 1.0 vs. 1.3 ± 1.0; p=0.015) score. Cases necessitating hemodynamic support had overall lower technical (80% vs 91%; p=0.011) and procedural (74% vs 90%; p<0.001) success, longer procedure (229 min vs. 123 min; p<0.001) and fluoroscopy (80 min vs. 42 min; p<0.001) time, higher air kerma radiation dose (4.2 GY vs. 3.2 GY; p=0.03), and higher rates of major in-hospital adverse cardiovascular events (MACE) (17.0% vs. 2.0%; p<0.001), largely due to the higher occurrence of myocardial infarction (7.6% vs. 0.8%, p=0.002) and tamponade requiring emergency pericardiocentesis (7.6% vs. 0.5%; p<0.001).

Conclusion: Hemodynamic support devices are currently used in 5% of patients undergoing CTO PCI. These patients have more complex clinical and lesion characteristics and lower success and higher complication rates as compared with patients in whom hemodynamic support devices were not used.

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Mir Basir: This author has nothing to disclose.
Barbara Danek: This author has nothing to disclose.
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Santiago Garcia: This author has nothing to disclose.
Bavna Rangan: This author has nothing to disclose.
Craig Thompson: This author has nothing to disclose.
Subhash Banerjee: This author has nothing to disclose.
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Balraj Singh: This author has nothing to disclose.
Hemang Panchal: This author has nothing to disclose.
Timir Paul: This author has nothing to disclose.

A-018
Title: Comparison of Mortality and Major Adverse Cardiovascular Events in Saphenous Vein Graft Intervention with Embolic Protection Device versus without Embolic Protection Device: A Meta-Analysis

Category: Complex PCI, Restenosis, Left Main & Multi-Vessel Intervention

Authors: Samit Bhatheja, East Tennessee State University, United States; Samit Bhatheja, East Tennessee State University, United States; Samit Bhatheja, East Tennessee State University, United States; Balraj Singh, East Tennessee State University, United States; Hemang Panchal, East Tennessee State University, United States; Timir Paul, East Tennessee State University, United States

Background: Current guidelines recommend use of distal embolic protection device (EPD) as class I indication for saphenous vein graft (SVG) intervention when feasible. Studies on use of EPD in this regard have shown conflicting results and a recent study from National Cardiovascular Data CathPCI Registry showed no benefits in using EPD during PCI to SVG. The objective of this meta-analysis is to compare all-cause mortality and major adverse cardiovascular events (MACE) in patients who underwent SVG intervention using EPD versus without EPD.

Methods: PubMed and the Cochrane Center Register of Controlled Trials were searched through October 2015. Eight studies (n=52,893) comparing SVG intervention performed with EPD (n=11,506) and without EPD (n=41,387) were included. Endpoints were all-cause mortality, MACE, peri-procedural myocardial infarction, target vessel revascularization and myocardial infarction up to three years following procedure. The odds ratio (OR) with 95% confidence interval (CI) was computed and p<0.05 was considered as a level of significance.

Results: The studies were heterogeneous for all cardiovascular outcomes except all cause mortality and target vessel revascularization. There was no significant difference in all-cause mortality, (OR: 1.05, CI: 1.0-1.1, p=0.67), MACE (OR: 0.82, CI: 0.55-1.22, p=0.33), peri-procedural myocardial infarction (OR: 1.59, CI: 0.14-17.44, p=0.71), target vessel revascularization (OR: 1.0, CI: 0.95-1.05, p=0.91), and myocardial infarction (OR: 0.80, CI: 0.52-1.23, p=0.30) up to 3 years following procedure.

Conclusion: The results of our meta-analysis of 52,893 patients suggest that routine use of EPD during SVG intervention may not improve all-cause mortality, MACE and myocardial infarction. Further randomized clinical trials are needed to evaluate long-term outcomes in routine use of EPD during SVG intervention.

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Samit Bhatheja: This author has nothing to disclose.
Samit Bhatheja: This author has nothing to disclose.
Samit Bhatheja: This author has nothing to disclose.

A-021
Title: Incidence and Predictors of Stent Thrombosis Up to 13 Years Following Drug-Eluting Stent Implantation in a Large Cohort of Patients Treated in Daily Clinical Practice

Category: Complex PCI, Restenosis, Left Main & Multi-Vessel Intervention

Authors: Ricardo Costa, Hospital do Coração, Brazil; Amanda Sousa, Hospital do Coração, Brazil; J. Ribamar Costa Jr., Hospital do Coração, Brazil; Adriana Moreira, Hospital do Coração, Brazil; Galo Maldonado, Hospital do Coração, Brazil; Manuel Cano, Hospital do Coração, Brazil; Cantidio Campos, Hospital do Coração, Brazil; Lucas Damiani, Hospital do Coração, Brazil; Alexandre Abizaid, Hospital do Coração, Brazil; J. Eduardo Sousa, Hospital do Coração, Brazil

Background: The occurrence of stent thrombosis (ST) after drug-eluting stents (DES) is considered a relatively rare event, especially with new or second generation devices; still, it is associated with high morbidity-mortality. Our objective was to report the incidence and predictors of very late ST (>1 year) in a large cohort of patients treated with DES in daily clinical practice undergoing very long-term follow-up (FU).

Methods: A total of 6141 patients undergoing elective, urgent or emergent percutaneous intervention with DES as default strategy were enrolled in the DESIRE Registry between May/02 and May/15 at a single institution in Brazil. Clinical FU was performed at 1 and 6 months, and yearly up to 13 years (95%). All eligible patients with minimum of 1 year FU were considered. ST was defined according to the Academic Research Consortium.

Results: Overall, mean age was 64.7 yrs, 32% had diabetes, 63% dyslipidemia, and 17% presented with recent myocardial infarction (<30 days). There were 1.6±0.8 lesions per patient and 1.8±1.0 DES implanted per patient (total=10713) - 52% first and 48% second generation DES. The cumulative incidence of any ST up to 12 years was 2.4%; very late ST presented 64%, and def./prob. ST >1 year represented 39%. The predictors of def./prob. ST >1 year were clinical presentation of recent MI <72 hours (HR 2.53, 95% confidence interval 0.98-6.56, p=0.056), saphenous vein graft (SVG) as target lesion (HR 3.09 [1.47-6.48], p=0.003), dyslipidemia (HR 2.03 [0.97-4.67], p=0.06), residual stenosis (per % as assessed by quantitative coronary angiography) (HR 1.05 [1.01-1.08], p=0.02), and solely implantation of second generation of second generation DES (protective factor) (HR 0.27 [0.08-0.91], p=0.03).

Conclusion: The occurrence of definite or probable ST after 1 year was relatively low, and associated with recent MI, SVG, dyslipidemia, stent underexpansion, and the use of first generation DES.

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Ricardo Costa: This author has nothing to disclose.
Amanda Sousa: This author has nothing to disclose.
J. Ribamar Costa Jr.: This author has nothing to disclose.
Adriana Moreira: This author has nothing to disclose.
Galo Maldonado: This author has nothing to disclose.
Manuel Cano: This author has nothing to disclose.
Cantidio Campos: This author has nothing to disclose.
Lucas Damiani: This author has nothing to disclose.
Alexandre Abizaid: This author has nothing to disclose.
J. Eduardo Sousa: This author has nothing to disclose.

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Title: Impact of lesion age on outcomes of chronic total occlusion percutaneous coronary intervention: insights from a multicenter US registry

Category: Complex PCI, Restenosis, Left Main & Multi-Vessel Intervention

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Background: We sought to determine the impact of lesion age on procedural methods and outcome for chronic total occlusion (CTO) percutaneous coronary intervention (PCI).

Methods: We examined the clinical and angiographic characteristics and outcomes of 394 CTO PCIs performed between 2012 and 2015 at 9 experienced US centers. Patients were stratified into two groups by mean lesion age (43 months).

Results: Mean patient age was 66 ± 10 years and 85.6% of the patients were men. Overall technical and procedural success were 90.1% and 87.5%, respectively. A major adverse cardiovascular event (MACE) occurred in 16 patients (4.1%). The mean lesion age was 43 ± 62 months. Older lesion age was associated with older patient age (68 ± 8 vs. 65 ± 10 years, p < 0.001), dyslipidemia (98.4% vs. 94.4%, p = 0.049), and prior coronary artery bypass grafting (61.0% vs. 37.4%, p < 0.001). Older lesion age was associated with greater lesion complexity (J-CTO score 3.1 ± 1.1 vs. 2.7 ± 1.3, p = 0.015 and moderate or severe calcification 75.2% vs. 56.5%, p < 0.001). Older lesions more often required use of the retrograde approach and antegrade dissection/re-entry (Figure 1). There was no difference in technical success (88.7% vs. 90.7%, p = 0.53), procedural success (87.9% vs. 87.4%, p = 0.88), or MACE (2.4% vs. 4.8%, p = 0.26) for older and less old occlusions.

Conclusion: Despite increased angiographic complexity and increased necessity for retrograde or antegrade dissection re-entry, older CTOs can be recanalized with high technical and procedural success and acceptable risk for MACE.

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A-025

Title: assessment of left ventricular function pre and post percutaneous coronary intervention to chronic total occlusion doppler tissue imaging.

Category: Complex PCI, Restenosis, Left Main & Multi-Vessel Intervention

Authors: wassam el din el shafey, menoufia university hospital, Egypt

Background: The rationale for the recanalization of a chronic total coronary occlusion is the possible improvement of left ventricular function through the recovery of hibernating myocardium. TDI can be used for assessment of both global and regional LV function with high temporal and spatial resolution.

Methods: 40 patients enrolled with CTO, 37 patients succeeded to complete the final follow up, 22 patients were without infarction in the territories of recanalized CTO vessel (group I), 15 patients with infarction in CTO territories of recanalized CTO vessel (group II). All were subjected to conventional echo Doppler and DTI examination. PW-DTI was used to assess velocity curves of basal and mid segments of LV walls. The following indices were measured Tp, Sv, E/0, A/0, E/0/A/0, Acc IVCtIVRT, IVCT and TEI index.

Results: After recanalization of CTO vessel by PCI non infarction group of patients showed highly significant improvement of LVEF% after 3 months follow up (P<0.001) while infarction group did not show any significant improvement (P>NS). In LAD, LCX and RCA subgroup on infarction patients showed reduction in LVESV, increased FS% and EF% after 3 months follow up, also there were improvement of TDI parameters in the form of increased E0 and ACC of IVC in all 3 subgroups and increased E0/A0 in LAD and LCX and increased in Peak velocity of IVC and reduction of AV and time to peak of IVC in both LAD and RCA, only S wave velocity increased in LAD subgroup after 3 months F.U. (<0.001) while infarction group did not show any significant improvement (P=NS). In LAD, LCX and RCA subgroup on infarction patients showed reduction in LVESV, increased FS% and EF% after 3 months follow up, also there were improvement of TDI parameters in the form of increased E0 and ACC of IVC in all 3 subgroups and increased E0/A0 in LAD and LCX and increased in Peak velocity of IVC and reduction of AV and time to peak of IVC in both LAD and RCA, only S wave velocity increased in LAD subgroup after 3 months F.U.

Conclusion: Patients with CTO, acceleration of IVC measured by PW-TDI can differentiate early improvement after successful recanalization of CTO vessel by PCI. Non infarction territories might recover at earlier stage than patients with evident MI.

Disclosures: wassam el din el shafey: This author has nothing to disclose.

A-028

Title: Usefulness of the Penetration Catheter Tornus for 102 Patients with Chronic Total Occlusion after Balloon Failure

Category: Complex PCI, Restenosis, Left Main & Multi-Vessel Intervention

Authors: Talantbek Batyraliev, Medical faculty of SANKO University, Turkey; Denis Fettser, City Clinical Hospital No.52, Russia; Igor Pershukov, "Educational scientific Medical Centre" of the Department of the President of RF, Russia; Alexander Vanyukov, City Clinical Hospital No.52, Russia; Jafar Ramazanov, "Educational scientific Medical Centre" of the Department of the President of RF, Russia; Boris Sidorenko, "Educational scientific Medical Centre" of the Department of the President of RF, Russia

Background: What shall we do in cases when a guidewire crosses the chronic total occlusions (CTO) but balloon catheter can not pass the site of the lesion? The penetration catheter Tornus has been developed especially for such cases when coronary artery is occluded and there are some difficulties with the balloon delivery to the site of the lesion. The aim of our study was to evaluate the efficacy and the safety of the penetration catheter Tornus for CTO revascularization.

Methods: In this study 102 consecutive patients with severe CTO have been included within the period of 2009 – 2013. We used the penetration catheter Tornus only for those patients in whom 1.25-1.5 mm balloon catheter could not be crossed through the lesion after a successful guidewire recanalization.

Results: The study population was mostly male (74.5%) with mean age 59.2±13.5 years. Diabetes mellitus was present in 30.4% of cases. 62 patients (60.7%) had hypercholesterinemia. Previous MI had 64.7% patients. CABG was performed previously in 9.8% of patients. The mean duration of CTO was 9.1±4.2 months and the mean length of occlusion was 39.2±17.4 mm. 66 (64.7%) patients had severe calcified CTO. The occluded vessel was the left anterior descending artery in 39.2%, the left circumflex artery in 14.7% and the right coronary artery in 46.1%. The Tornus was crossed successfully through the lesion by manual rotation in 82.4% of cases. In 18 (17.6%) patients with severe calcified CTO the penetration catheter failed to cross CTO entirely, but opened the artery well enough in 3 (2.9%) of these patients that allowed a successful passage with a balloon. In 3 cases the arteries were perforated and we inflated the balloons proximally to stop the leaks. So, the success rate of CTO recanalization and stenting was 85.3%. Complications had place in 5.9% of patients. No cases of death, CABG or Q wave MI were registered until the discharge of the patients.

Conclusion: Thus the use of the penetration catheter Tornus allowed to prepare CTO effectively for balloon dilatation and stenting. PCI with the penetration catheter is safe and effective, and the rate of complications in their use is at a low level for such complicated interventions.

Disclosures: Talantbek Batyraliev: This author has nothing to disclose. Denis Fettser: This author has nothing to disclose. Igor Pershukov: This author has nothing to disclose. Alexander Vanyukov: This author has nothing to disclose. Jafar Ramazanov: This author has nothing to disclose. Boris Sidorenko: This author has nothing to disclose.

A-031

Title: Short-term Outcomes using 8 French Radial Access for CTO PCI

Category: Complex PCI, Restenosis, Left Main & Multi-Vessel Intervention

Authors: Edward Gildeh, Henry Ford Hospital, United States; Mir Basir, Henry Ford Hospital, United States; Gerald Koenig, Henry Ford Hospital, United States; Mohammad Alqarqaz, Henry Ford Hospital, United States; Akshay Khandelwal, Henry Ford Hospital, United States; Michele Voelz, Henry Ford Hospital, United States; Henry Kim, Henry Ford Hospital, United States; William O’Neill, Henry Ford Hospital, United States; Khaldoon Alaswad, Henry Ford Hospital, United States

Background: What shall we do in cases when a guidewire crosses the chronic total occlusions (CTO) but balloon catheter can not pass the site of the lesion? The penetration catheter Tornus has been developed especially for such cases when coronary artery is occluded and there are some difficulties with the balloon delivery to the site of the lesion. The aim of our study was to evaluate the efficacy and the safety of the penetration catheter Tornus for CTO revascularization.

Methods: In this study 102 consecutive patients with severe CTO have been included within the period of 2009 – 2013. We used the penetration catheter Tornus only for those patients in whom 1.25-1.5 mm balloon catheter could not be crossed through the lesion after a successful guidewire recanalization.

Results: The study population was mostly male (74.5%) with mean age 59.2±13.5 years. Diabetes mellitus was present in 30.4% of cases. 62 patients (60.7%) had hypercholesterinemia. Previous MI had 64.7% patients. CABG was performed previously in 9.8% of patients. The mean duration of CTO was 9.1±4.2 months and the mean length of occlusion was 39.2±17.4 mm. 66 (64.7%) patients had severe calcified CTO. The occluded vessel was the left anterior descending artery in 39.2%, the left circumflex artery in 14.7% and the right coronary artery in 46.1%. The Tornus was crossed successfully through the lesion by manual rotation in 82.4% of cases. In 18 (17.6%) patients with severe calcified CTO the penetration catheter failed to cross CTO entirely, but opened the artery well enough in 3 (2.9%) of these patients that allowed a successful passage with a balloon. In 3 cases the arteries were perforated and we inflated the balloons proximally to stop the leaks. So, the success rate of CTO recanalization and stenting was 85.3%. Complications had place in 5.9% of patients. No cases of death, CABG or Q wave MI were registered until the discharge of the patients.

Conclusion: Thus the use of the penetration catheter Tornus allowed to prepare CTO effectively for balloon dilatation and stenting. PCI with the penetration catheter is safe and effective, and the rate of complications in their use is at a low level for such complicated interventions.

Disclosures: Talantbek Batyraliev: This author has nothing to disclose. Denis Fettser: This author has nothing to disclose. Igor Pershukov: This author has nothing to disclose. Alexander Vanyukov: This author has nothing to disclose. Jafar Ramazanov: This author has nothing to disclose. Boris Sidorenko: This author has nothing to disclose.
Background: The efficacy and safety of 8 French (Fr) transradial access in chronic total occlusion (CTO) percutaneous coronary intervention (PCI) is not well established. We sought to examine the short-term clinical outcomes of 8Fr transradial access in CTO PCI.

Methods: We analysed all CTO interventions between October 2014 and September 2015 performed in a single tertiary-care referral center. All patients who underwent CTO PCI using an 8Fr transradial sheath or sheath-less guide-catheter were included in the analysis. Patients were followed to hospital discharge. Thirty day follow up was performed with a telephone interview.

Results: Thirty-one CTO PCIs were performed in 29 patients. Patients were an average age of 67.9 years (+/- 8.9), 93% were male, 82.8% were white, 82.8% were current or former smokers, and 58.6% were diabetic. The CTO target vessel was the right coronary artery (65%), left anterior descending artery (19%) and left circumflex artery (16%). Most CTOs were categorized as very difficult as assessed by a J-CTO score of 3.3 (+/- 1.4). Bilateral 8Fr radial artery access was used in 90% of patients, while 10% had a combination of radial and femoral access. In total, 52 transradial accesses were obtained of which 11.5% were obtained using sheath-less guide-catheters. Overall technical and procedural success rates were 87% and 84%, respectively. One patient experienced a right coronary artery perforation with pericardial effusion requiring pericardiocentesis. There were no other major complications or deaths within 1-month follow-up. There were no major radial artery injuries in any patients; 20.6% of patients had mild bruising; and 30% of patients had minor symptoms, which included numbness, tingling, pain or swelling lasting less than one week. All patients preferred a transradial approach when compared with femoral.

Conclusion: 8Fr transradial access is well tolerated, with minimal symptoms of short duration with no major access site complications.

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Edward Gildeh: This author has nothing to disclose.
Mir Basir: This author has nothing to disclose.
Gerald Koenig: This author has nothing to disclose.
Mohammad Alqarqaz: This author has nothing to disclose.
Akshay Khandelwal: This author has nothing to disclose.
Michele Voeltz: This author has nothing to disclose.
Henry Kim: This author has nothing to disclose.
William O’Neill: 5 Edwards Lifesciences, 5 Medtronic
Khaldoon Alaswad: 5 Abbott Vascular, 5 Boston Scientific

A-036

Title: Sustained Long Term Safety Outcomes of “NEOVASC” Coronary Sinus Reducer in No-Option Patients of Refractory Angina: 10 Year Follow-up

Category: Complex PCI, Restenosis, Left Main & Multi-Vessel Intervention

Authors: Satya Gupta, Care Institute of Medical Sciences (CIMS), India; Parth Parikh, Cleveland Clinic Foundation, United States; Aditi Patel, Cleveland Clinic, United States; Apurva Patel, Mount Sinai Beth Israel, United States; Roosha Parikh, Mount Sinai Beth Israel, United States; Anish Chandarana, Care Institute of Medical Sciences (CIMS), India; Milan Chag, Care Institute of Medical Sciences (CIMS), India; Hemang Baxi, Care Institute of Medical Sciences (CIMS), India; Urmil Shah, Care Institute of Medical Sciences (CIMS), India; Keyur Parikh, Care Institute of Medical Sciences (CIMS), India

Background: Coronary Sinus (CS) Reducer™ has been designed to establish a permanent and controlled narrowing of the coronary venous system particularly the coronary sinus—the first pathway of cardiac venous drainage. We performed 10 year follow up study to assess sustainability of implanted CS reducer.

Methods: Fifteen patients with Coronary Artery Disease (CAD), severe angina and reversible ischemia were electively implanted with the Coronary Sinus CS(R)Reducer™ in 2005 worldwide at 3 sites. Of these Ten, 8 had Canadian Cardiovascular Society (CCS) class 3 while 2 had CCS class 4; 5 had single vessel disease, 4 had double vessel while 1 had triple vessel disease. The safety endpoints followed up at 10 years were hospitalization and mortality.

Results: Table 1 depicts baseline characteristic of enrolled patients. All ten patients responded to telephonic follow-up inferring no mortality. One patient was hospitalized due to non-cardiac pathology of anemia and diabetes co-morbidity.

Conclusion: Absence of mortality at 10 year follow-up among obstructive CAD patients implanted with the Coronary Sinus Reducer™, demonstrates long term safety and performance of the device post implantation.

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Satya Gupta: This author has nothing to disclose.
Parth Parikh: This author has nothing to disclose.
Aditi Patel: This author has nothing to disclose.
Apurva Patel: This author has nothing to disclose.
Roosha Parikh: This author has nothing to disclose.
Anish Chandarana: This author has nothing to disclose.
Milan Chag: This author has nothing to disclose.
Hemang Baxi: This author has nothing to disclose.
Urmil Shah: This author has nothing to disclose.
Keyur Parikh: This author has nothing to disclose.

Table 1. Baseline Clinical Characteristics of the Patients

<table>
<thead>
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<th>Characteristics</th>
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<td>Male</td>
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</tbody>
</table>

PCI= Percutaneous Coronary Intervention; S P= Status Post.
CTOs. As a result of concerns, community interventionalists are often hesitant to start new CTO programs.

**Methods:** All angiograms were prospectively reviewed to identify CTO in a vessel with diameter ≥2.5 mm that did not receive a patent coronary bypass graft between August 2014 and July 2015 for stable or unstable coronary syndromes. All identified CTO lesions were analyzed for appropriateness of revascularization using the 2013 AUC consensus document and classified as ‘Appropriate’, ‘May be appropriate’, ‘Rarely appropriate’ or ‘Unclassifiable’. Anatomic characteristics of every CTO lesion were assessed to determine proximal cap, distal cap, occlusion length and presence of interventional collaterals.

**Results:** Of 520 coronary angiograms reviewed, we identified 54 CTO lesions in 48 patients, a prevalence of 10.3%. Additional 15 lesions were included to total 69 lesions in 63 patients. Median age was 68 years, 41 were male. Two or more CTOs were identified in 6 (10%) patients. Revascularization was deemed ‘Appropriate’, ‘May be appropriate’, ‘Rarely appropriate’ or ‘Unclassifiable’ in 21 (30%), 22 (32%), 12 (17%) and 14 (20%) lesions, respectively. Anatomic characteristics were as follows: proximal cap non-ambiguous n=45 (65%), good distal cap n=36 (56%), lesion length <20 mm n=32 (46%), interventional collaterals present n=50 (72%).

**Conclusion:** CTOs are highly prevalent in community interventional practice. Despite the presence of many ‘Unclassifiable’ lesions, a substantial proportion of CTOs are either ‘Appropriate’ or ‘May be appropriate’ for revascularization by the AUC criteria.

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A-043

**Title:** Bradycardia During Rotational Atherectomy After Preemptive Treatment With Theophylline

**Category:** Complex PCI, Restenosis, Left Main & Multi-Vessel Intervention

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**Background:** Transient bradycardia due to high grade AV block is known to occur with rotational atherectomy (RA) of a dominant vessel. Potential mechanisms include distal embolization of particles or adenosine release during the procedure. A temporary transvenous pacemaker (TPM) was traditionally recommended to address this complication. Theophylline (TP) is an adenosine receptor antagonist and is used to prevent RA induced bradycardia and AV block, thus obviating the need for a TPM during RA. We retrospectively reviewed our RA procedures since 2009 to assess the efficacy and safety of this strategy.

**Methods:** From 2009-2013, all RA procedures performed at our institution were analyzed and grouped as either dominant or non-dominant vessel procedures. RA was used as a plaque-modifying tool utilizing small burrs through a 6 or 7 French guide. Dominant vessels received TP 100mg IV before starting RA. A temporary pacemaker was Catheterization and Cardiovascular Interventions DOI 10.1002/ccd. Published on behalf of The Society for Cardiovascular Angiography and Interventions (SCAI).
Background: The most common target vessel for chronic total occlusion (CTO) percutaneous coronary intervention (PCI) is the right coronary artery (RCA).

Methods: We examined the clinical and angiographic characteristics and outcomes of patients who underwent RCA CTO PCI between 2012 and 2015 at 11 US centers.

Results: The RCA was the CTO target vessel in 739 out of 1308 CTO PCIs (56%). Mean age was 65 years and 83% of the patients were men. Overall technical and procedural success were 90% and 88%, respectively. A major adverse cardiovascular event (MACE) occurred in 19 patients (2.6%). The most frequently utilized approach was antegrade wire escalation (AWE, 66% of procedures), followed by retrograde (50%) and antegrade dissection/re-entry (ADR, 40%). Technical success was most frequently achieved using AWE (38% of successful procedures) followed by retrograde (36%) and ADR (26%). There was no significant difference in technical success between RCA lesion segments (p=0.11). More than half (52%) of the lesions were located in the proximal RCA, and the retrograde approach accounted for 39% of the technical success achieved in such lesions (Figure). Compared with antegrade-only procedures, utilization of any retrograde approach was associated with lower technical (85% vs. 95%, p<0.001) and procedural (82% vs. 94%, p<0.001) success and a higher MACE rate (3.8% vs. 1.4%, p=0.037).

Conclusion: RCA CTOs represent the majority of CTO target lesions and can be treated with high success and acceptable complication rates, but require frequent use of the retrograde approach and antegrade dissection/re-entry.

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Robert Yeh: 9 Career Development Award (1K23HL118138) from the National Heart, Lung, and Blood Institute

A-044

Title: Impact of pre-procedural renal function on outcomes of chronic total occlusion percutaneous coronary intervention: insights from a multicenter US registry

Category: Complex PCI, Restenosis, Left Main & Multi-Vessel Intervention

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Abstracts

Figure. Successful crossing strategies among patients undergoing right coronary artery (RCA) chronic total occlusion percutaneous coronary intervention, classified according to RCA lesion segment.
Background: We sought to determine the impact of baseline renal function on the outcomes of chronic total occlusion (CTO) percutaneous coronary intervention (PCI).

Methods: We examined the clinical and angiographic characteristics and outcomes of 908 CTO PCIs performed between 2012 and 2015 at 11 US centers.

Results: Mean age was 66 ± 10 years and 86% of the patients were men. Mean baseline creatinine and mean estimated glomerular filtration rate (eGFR) were 1.2 ± 0.8 mg/dL and 73 ± 26 ml/min/1.73 m², respectively. Decreased renal function was associated with higher prevalence of dyslipidemia (p = 0.02), hypertension (p = 0.029), diabetes mellitus (p < 0.001), prior myocardial infarction (p = 0.01), prior PCI (p = 0.044) and heart failure (p < 0.001), as well as a higher degree of lesion calcification (p < 0.001) (Table). Decreased renal function was also associated with lower use of contrast (p = 0.001), except in patients undergoing dialysis. Overall technical and procedural success were 90% and 88%, respectively, and a major adverse cardiovascular event (MACE) occurred in 28 patients (3.1%). Renal function was not significantly associated with technical (p = 0.656) or procedural (p = 0.792) success or the incidence of MACE (p = 0.282).

Conclusion: Impaired renal function is common in patients undergoing CTO PCI. Although associated with higher clinical complexity and more lesion calcification, CTO PCI in patients with impaired renal function can be completed with lower contrast volume and high success rates, and without an increase in in-hospital MACE.

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Khaldoon Alaswad: 9 consulting fees from Terumo and Boston Scientific; consultant, no financial, Abbott Laboratories.
Dimitri Karmpaliotis: 9 speaker bureau, Abbott Vascular, Medtronic, and Boston Scientific
Methods: We examined the clinical and angiographic characteristics and outcomes of 1,021 CTO PCIs performed between 2012 and 2015 at 11 experienced US centers.

Results: Proximal cap ambiguity was present in approximately one third (31%) of target lesions and was associated with increased clinical and angiographic complexity (prior PCI: 70% vs. 62%, p=0.018; prior CABG: 43% vs. 33%, p=0.003; J-CTO score 3.3 ± 1.0 vs. 2.4 ± 1.2, p<0.001) and lower technical success (85% vs.93%, p<0.001) and procedural success (84% vs. 91%, p=0.001) success, but similar incidence of major adverse cardiac events (MACE; 3.2% vs. 2.9%, p=0.773). A retrograde approach was more commonly required among cases with proximal cap ambiguity (Figure), and was more likely to be the initial approach utilized (38% vs. 13%, p<0.001). Overall, the initial approach was less frequently successful in cases with cap ambiguity (44% vs. 59%, p<0.001). Proximal cap ambiguity was also associated with increased use of intravascular ultrasound (49% vs. 36%, p=0.001), contrast (281 ml vs. 250 ml, p<0.001) and air kerma radiation dose (4 Gy vs. 3 Gy, p<0.001), and longer procedure times (162 min vs. 119 min, p<0.001).

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Figure. Successful crossing strategies among patients undergoing chronic total occlusion percutaneous coronary intervention, classified according to the presence of proximal cap ambiguity.
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A-055

Title: Seesaw balloon-wire cutting technique is superior to Tornus catheter in balloon unceossable chronic total occlusions

Category: Complex PCI, Restenosis, Left Main & Multi-Vessel Intervention

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A background: Inability to advance a balloon is a well recognized cause leading to failure in recalibration of chronic total occlusions (CTOs) despite successfully passing a guidewire into the distal true lumen. To solve the problem, a few of techniques and devices have been introduced to facilitate balloon passage, especially the use of Tornus catheter. The purpose of this study was to evaluate the feasibility and safety of the a novel technique termed “Seesaw balloon-wire cutting” in comparison with Tornus catheter for balloon unceossable CTOs.

Methods: A total of 80 patients with balloon unceossable CTOs were enrolled in this study. Among them, 40 patients treated with “seesaw balloon-wire cutting” technique were consecutively investigated and 40 patients treated with Tornus catheter before were matched retrospectively. Success rates of device and procedure and complication rates were assessed. Device success was defined as successful passage of the Tornus catheter or one of the balloons of seesaw balloon-wire cutting system through the CTO lesion. Procedure success was defined by a final TIMI 3 flow and <30% residual stenosis. Major complications included death, Q-wave myocardial infarction or emergency bypass surgery. Minor complications were perforation, cardiac tamponade and long spiral dissection.

Results: Compared with the Tornus catheter, the device success rate was significantly higher with the “seesaw balloon wire cutting” technique (87.5% vs. 45.0%, P < 0.01), and the mean procedural time was much shorter. When Tornus catheter or “seesaw balloon-wire cutting” technique failed, a Rotablator or other techniques were used as a bail-out strategy. However, the procedural success rate was still higher with “seesaw balloon-wire cutting” technique than the Tornus catheter (92.5% vs. 77.5%, P < 0.01). There were no differences in complication rate between the two techniques.

Conclusion: The “seesaw balloon-wire cutting” technique is superior to the Tornus catheter in treating balloon unceossable CTOs.

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Danghui Sun: This author has nothing to disclose.
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Yue Li: This author has nothing to disclose.

A-057

Title: Long-term Clinical Outcome of Patients Receiving Beta Radiation Coronary Brachytherapy for In-Stent Restenosis after Deployment of One or More Layers of Drug-eluting Stents

Category: Complex PCI, Restenosis, Left Main & Multi-Vessel Intervention

Authors: Denis Malkov, Intermountain Medical Center, United States; Aaron Kelkoff, Intermountain Medical Center, United States; Medical University, China; Hongjun Wang, The First Affiliated Hospital of Harbin Medical University, China; Li Sheng, The First Affiliated Hospital of Harbin Medical University, China; Yongtai Gong, The First Affiliated Hospital of Harbin Medical University, China; Yongtai Gong, The First Affiliated Hospital of Harbin Medical University, China; Danghui Sun, The First Affiliated Hospital of Harbin Medical University, China; weimin Li, The First Affiliated Hospital of Harbin Medical University, China; Yue Li, The First Affiliated Hospital of Harbin Medical University, China

Methods: A total of 80 patients with balloon unceossable CTOs were enrolled in this study. Among them, 40 patients treated with “seesaw balloon-wire cutting” technique were consecutively investigated and 40 patients treated with Tornus catheter before were matched retrospectively. Success rates of device and procedure and complication rates were assessed. Device success was defined as successful passage of the Tornus catheter or one of the balloons of seesaw balloon-wire cutting system through the CTO lesion. Procedure success was defined by a final TIMI 3 flow and <30% residual stenosis. Major complications included death, Q-wave myocardial infarction or emergency bypass surgery. Minor complications were perforation, cardiac tamponade and long spiral dissection.

Results: Compared with the Tornus catheter, the device success rate was significantly higher with the “seesaw balloon wire cutting” technique (87.5% vs. 45.0%, P < 0.01), and the mean procedural time was much shorter. When Tornus catheter or “seesaw balloon-wire cutting” technique failed, a Rotablator or other techniques were used as a bail-out strategy. However, the procedural success rate was still higher with “seesaw balloon-wire cutting” technique than the Tornus catheter (92.5% vs. 77.5%, P < 0.01). There were no differences in complication rate between the two techniques.

Conclusion: The “seesaw balloon-wire cutting” technique is superior to the Tornus catheter in treating balloon unceossable CTOs.

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Li Sheng: This author has nothing to disclose.
Yongtai Gong: This author has nothing to disclose.
Danghui Sun: This author has nothing to disclose.
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Yue Li: This author has nothing to disclose.
Background: Prior to the advent of drug-eluting stents (DES), coronary brachytherapy was a common treatment for bare metal stent in-stent restenosis (ISR) in patients with coronary artery disease (CAD). With the use of DES, ISR is much less common, but still happens. Treatment is often performed by first placing another DES inside the initially deployed one. However, if ISR occurs repeatedly, rather than placing more DES, coronary brachytherapy has been proposed as an acceptable alternative therapy. However, the long-term outcome of such a treatment is not known. We hypothesized that coronary brachytherapy in patients with ISR after DES is safe and effective.

Methods: All patients between August 2004 and April 2015 at Intermountain Medical Center who underwent beta radiation coronary brachytherapy for treatment of ISR after DES placement were included in the study. Baseline clinical and procedural characteristics were collected, and patients were followed-up for MACE including repeat target vessel revascularization, myocardial infarction (MI) and cardiac or non-cardiac death.

Results: A total of 65 patients (age 65.5 ± 11.8 y, males = 60%, diabetes: 68%, hypertension: 98%, hyperlipidemia: 100%, post heart transplant: 5%, smokers: 38%, positive family history = 80%, stent layers (1 = 32%, 2 = 45%, 3 = 17%, 4 = 5%) were studied. All initial procedures were successful. Follow-up was 3.6 ± 3.15 (range = 0 to 10.8) years. Overall, 25 (38%) experienced 1 or more repeat target vessel revascularization procedure (repeat PCI = 15, repeat brachytherapy = 5, coronary bypass = 9). Other MACE events included MI = 18(27.7%), cardiac death = 6(9.2%) and non-cardiac death = 7(10.8%).

Conclusion: In this select group of high risk CAD patients with ISR after 1 or more DES, long-term success of coronary beta radiation brachytherapy was 62%. Only 13.8% ultimately required coronary bypass surgery. These findings justify the continued selective use of coronary brachytherapy after failed DES procedures.

A-062

Title: Impact of diabetes mellitus on acute outcomes of percutaneous coronary intervention in chronic total occlusions: insights from a US multicenter registry.

Category: Complex PCI, Restenosis, Left Main & Multi-Vessel Intervention

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Background: We sought to examine the impact of diabetes mellitus on procedural outcomes of patients who underwent chronic total occlusion (CTO) percutaneous coronary intervention (PCI).

Methods: We assessed the impact of diabetes mellitus on the outcomes of CTO PCI among 1308 patients who underwent 1333 procedures at 11 experienced US centers between 2012 and 2015.

Results: Mean age was 65.5 ± 10.16 years and 84.2% of the patients were men. Diabetes was present in 44.6% of the study population. As compared with non-diabetic patients, patients with diabetes were more likely to have prior coronary artery bypass graft surgery (38.1% vs 30.98%, p = 0.006), heart failure (34.9 vs 21.69 p = 0.0001), and peripheral arterial disease (18.9 vs 12.8 p = 0.002); they had higher body mass index (31.29 ± 6.39 vs 29.19 ± 5.7 p = 0.001), similar J-CTO score (2.59 ± 1.2 vs 2.52 ± 1.2 p = 0.82) and similar final successful crossing technique: antegrade wire escalation (45.6% vs 47.2% p = 0.66), retrograde (30.0% vs 27.7% p = 0.66) and antegrade dissection re-entry (24.0% vs 25.1% p = 0.66). Technical (90.5% vs 90.1%, p = 0.80) and procedural (89.3% vs 89.1%, p = 0.93) success was similar in the two groups, as was the incidence of major adverse cardiac events (2.02% vs 2.57%, p = 0.51). Mean contrast volume was lower in diabetic patients [250ml (200-375ml) vs 275ml (194-350ml) p = 0.02], but air kerma radiation dose was higher (3.24 [1.92-5.2] vs 3.77 [2.2-5.5] Gray p = 0.043).

Conclusion: In a contemporary cohort of patients undergoing CTO PCI, diabetes did not have significant association with the procedural success and complication rates, but was associated with lower contrast and higher radiation dose.

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A-006

Title: PCI versus medical therapy in patients presenting with ACS with previous history of CABG - Clinical outcomes from a single centre experience

Category: Complex PCI, Restenosis, Left Main & Multi-Vessel Intervention

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Catheterization and Cardiovascular Interventions DOI 10.1002/ccd.

Background: Patients with previous history of coronary artery bypass grafting (CABG) presenting an acute coronary syndrome (ACS) represent an increasing problem. Medical therapy or percutaneous coronary intervention (PCI) are the preferred treatment options but there is limited data available on the optimal treatment strategy in these post CABG patients. We report medium term clinical outcomes on ACS patients with previous CABG treated with PCI vs medical therapy.

Methods: We retrospectively collected clinical data on patients with a history of prior CABG who underwent coronary angiography after presenting with an ACS in a single centre between January 2008 and December 2012. Treatment allocation was at the physician’s discretion at the time of angiography. All STEMI subjects were excluded.

Results: 282 consecutive patients (Mean age 69.6 yrs 90% male) underwent coronary angiography after presenting with an ACS post CABG. 145 patients were treated medically and 137 with PCI. Patients assigned to medical therapy had a lower mean CCS angina class as compared to the PCI cohort at presentation (2.6 vs 3.15, p<0.002). Both groups were otherwise well matched for all other baseline demographics. Following treatment, the mean angina status decreased significantly in both groups at 1 year follow up (decreased to 1.56 in the medical group and 2.1 for the PCI group, p<0.05 for both, p=ns between groups). At 1 yr, 31% were re-hospitalised in the medical group compared to 14.6% in the PCI group (p=0.01) 17.9% experienced a further MI in the medical group compared to 9.5% in the PCI group (p=0.06). Overall 1 yr all cause death and MACE was high with 10% and 59% respectively in the medically treated group and in the PCI group 8.4 and 32% (p<0.05). Over a 3 yr follow up period, there was no difference in all cause mortality in either cohort (medical 16.5% vs. PCI 16.7% p=ns).

Conclusion: In patients presenting with an ACS after distant CABG there is a higher angina burden in those subsequently managed with PCI. Good symptom resolution is achieved with both therapy. There continues to be high MACE rates in both groups, lower MACE rates at 1yr with PCI but no mortality benefit at 3 yrs between treatment strategies seen in this clinician defined treatment allocation.

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Tim Kimmard: This author has nothing to disclose.
Richard Anderson: This author has nothing to disclose.

A-069

Title: Procedural Outcomes with Use of the Flash Ostial System in Aorto-coronary Ostial Lesions

Category: Complex PCI, Restenosis, Left Main & Multi-Vessel Intervention

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Richard Anderson: This author has nothing to disclose.

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Background: The Flash Ostial System (Ostial Corporation, Sunnyvale, CA) was designed to optimize implantation of aorto-ostial coronary stents by flaring the proximal stent struts against the aortic wall.

Methods: We retrospectively reviewed the medical record, coronary angiograms, and intravascular ultrasound images of 22 aorto-ostial percutaneous interventions performed at our institution between March and September 2015. The Flash Ostial system was used in 13 cases (59%).

Results: Mean age was 67 ± 8 years and all patients were men. The target vessel was the right coronary artery (59%), left main (27%), or a saphenous vein graft (14%); 59% of the lesions had moderate/severe calcification. The mean number of predilation balloons was 1.8 ± 0.5 mm and mean inflation pressure was 13.1 ± 4.0 atmospheres. Intravascular ultrasonography (available for 19 patients) revealed mean ostial minimum lumen cross-sectional area (MLA) of 9.2 ± 3.0 mm² and reference MLA of 8.5 ± 2.7 mm². The difference between ostial and reference MLA was higher in cases in which the Flash Ostial system was used vs. those where it was not (9.6 ± 5.5% vs. 4.0 ± 2.8%, p = 0.03, Figure).

All stent struts were well apposed. Technical success was 100%. One patient developed a left groin pseudoaneurysm treated with thrombin injection and one patient had a periprocedural myocardial infarction. Median contrast, fluoroscopy time, and procedure time were 235 mL, 33 and 118 minutes, respectively.

Conclusion: The Flash ostial system was successfully used in aorto-ostial stenting cases, resulting in larger ostial vessel MLA as compared with the reference segment.

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Michele Roesle: This author has nothing to disclose.
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A-005

Title: 24-month outcomes of double kissing crush versus provisional stenting technique for treatment of coronary bifurcation lesions (DKCRUSH – II): a multicenter randomized clinical trial

Category: Complex PCI, Restenosis, Left Main & Multi-Vessel Intervention

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Background: There is an ongoing debate regarding the optimal treatment for coronary bifurcation lesions via the percutaneous approach. DKCRUSH II trial showed that double kissing (DK) crush stenting technique appears to confer better clinical outcomes compared to provisional stenting (PS) at 12-month, however long term outcomes are lacking. We report here the 24-month outcomes.

Methods: From April 2007 to June 2009, 370 unselected patients with true coronary bifurcation lesions (Medina classification 1,1,1 and 0,1,1) from 7 centers were randomized 1:1 to either the DK crush stenting or PS group. The primary end point was the occurrence of major adverse cardiac events (MACE) at 24-month, which included cardiac death, myocardial infarction (MI) or target vessel revascularization (TVR). Rate of definite of probable stent thrombosis (ST) was the safety end point.

Results: Clinical follow up data at 24-month was available in 366 patients, 183 in each group. The two groups were well matched regarding baseline clinical variables and lesions characteristics. Majority had left anterior descending-diagonal artery bifurcation lesions (60.5% in the DK crush stenting group and 59.5% in the PS group, p=NS). The MACE, target lesion revascularization (TLR), TVR were 10.9%, 5.5%, 8.2% in the DK crush stenting group vs 19.7%, 14.2%, 16.4% in the PS group, respectively (p<0.05) (Figure 1). The rates of MI, cardiac death, or ST were similar between these groups.

Conclusion: DK crush stenting technique was associated with a persistent clinical benefit with significant decrease in MACE at 24-month when compared to PS while treating true coronary bifurcation lesions.

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A-080

Title: Clinical outcomes of the Non Slip Element (NSE) scoring balloon for treating fibrocalcific coronary lesions in real-world patients.

Category: Complex PCI, Restenosis, Left Main & Multi-Vessel Intervention

Authors: Masahiko Satoda, IMS Katsushika Heart Center, Japan; Kunito Shiiba, IMS Katsushika Heart Center, Japan; Tomonobu Okuno, IMS Katsushika Heart Center, Japan; Masayoshi Sakakibara, IMS Katsushika Heart Center, Japan

Background: The benefit of using a scoring balloon for fibrocalcific lesions are still to be evaluated in the modern drug-eluting stent (DES) era. We sought to evaluate the Non Slip Element (NSE) scoring balloon in a real world population for fibrocalcific lesions.

Methods: We identified 89 patients (94 lesions) with de novo fibrocalcific lesions, who underwent a lesion modification using the NSE prior to drug-eluting stents from January 2014 to October 2015. We performed a quantitative coronary angiography (QCA) analysis. We analyzed composite MACE (cardiac death, nonfatal myocardial infarction, TLR) as well as target vessel revascularization (TVR), and stent thrombosis at 30 days, and 9 months. This was a single-center study, and all the procedures were performed by a primary operator (MS).

Results: QCA analysis was shown in Table. Of the cases, 37.2% showed moderate to severe calcification, and 95.7% showed a B2/C lesion. Myocardial infarction was seen in 21.7% cases (ST-elevation myocardial infarction: 16.3%, non-ST elevation myocardial infarction: 5.4%). The procedural success rate was 97.9%. MACE at 30 days, 9 months was 1.06%, and 3.19%, respectively thus far. The TLR was 0% at 30 days, 2.08% at 9 months. Stent thrombosis or cardiac death was...
Title: Cardiac adverse events in saphenous vein graft revascularization: Emboshield Nav6 versus FilterWire EZ

Background: The utilization of embolic protection devices (EPDs) in percutaneous coronary intervention (PCI) of failed saphenous vein grafts (SVG) is an ACCF/AHA/SCAI Class I recommendation. Despite evidence-based support, EPDs remain underused. Technical limitations of the current FDA approved EPDs serves as barriers to device utilization.

Therefore, the purpose of our study was to retrospectively compare rates of major adverse cardiac events (MACE) following use of two EPDs in SVG-PCI: the FDA approved FilterWire EZ (Boston Scientific) and off-label use of Emboshield Nav6 (Boston Scientific).

Methods: There were total of 80 patient with 40 each who received Emboshield Nav6 and FilterWire EZ. Patients in the two treatment cohort were matched on age. Patients receiving PCI to native vessels in addition to SVG were excluded. Demographic, procedural and comorbidity characteristics were collected. The primary outcome of interest was MACE, defined as the composite of myocardial infarction, target vessel revascularization, emergency coronary artery bypass graft surgery and all cause death.

Results: Emboshield Nav6 and FilterWire EZ groups were not significantly different in demographics, co-morbidities, or indications for revascularization. Emboshield Nav6 trended towards, but failed to reach statistically higher rates of MACE compared to FilterWire EZ by (40.7% vs. 21.8%, P = 0.07) two years.

Conclusion: While the Emboshield Nav6 has demonstrated protection in peripheral revascularization interventions, the device associated with higher rates of adverse events in SVG-PCI.
A-093

Title: Interventional Therapy Of Bifurcation Lesions: A New Approach Using Drug-eluting Balloons For The Main Branch And/ Or For The Side Branch The DEBIFU Registry(Drug-eluting Balloons For The Treatment Of Bifurcation lesions)

Author: Hubertus von Korn, Hetzelstift, Germany; Victor Stefan, Hetzelstift, Germany; Ulrich Hink, Klinikum Frankfurt, Germany; Tomaso Gori, University Hospital Mainz, Germany; Kamalesh Chakraborty, Hetzelstift, Germany; Jan Hemker, Hetzelstift, Germany; Burkhard Hügel, Klinikum Neuwied, Germany; Björn Buchter, Klinikum Neuwied, Germany; Rainer Zotz, Klinukum Bitburg, Germany; Erik Friedrich, Klinikum Saarbröius, Germany; Thomas Minzel, University Hospital Mainz, Germany

Background: Using drug-eluting balloons for the treatment of bifurcation lesions without stenting provides a safe and efficient treatment option for bifurcation lesions.

Methods: We initiated a controlled prospective multicentric registry using drug-eluting balloons (DEB, Dior®, Eurocor Inc, Germany) for predilatation using a standard balloon and included all consecutive patients (pts) with bifurcation lesions. Stenting (preferably bare metal stenting after DEB) and final kissing in case of insufficient angiographic result were performed at the discretion of the operator. Endpoints were incidence of MACE during FU (9 months: death, TLR/TVR, thrombosis) and technical aspects (incidence of stenting).

Results: Results: basic data
We included 100 pts, the mean FU was 9.5 months. Looking for the baseline parameters, 79.0% were male, the mean age was 66.3 years, diabetes was present in 21.4%, an ACS was present in 35.7%. In 55.6% the LAD/SB, in 34.3% the circumflex/SB and in the 10.1% was affected. Most of the pts had 3-VD (46.5%), whereas 52.9% had 1- or 2-VD.

Results: procedural characteristics
Predilatation (MB) was done in 72.4% (SB 86.7%), a DEB for the MB was used in 28.6% (SB 71.4%). Stenting of the MB was done in 63.2% (DES 58.2%, BMS 5.1%) and stenting of the SB was performed in 12.2% (DES 11.2%, BMS 1.0%). Final kissing was done in 65.3%, mostly using two DEB (48.0%).

Results: FU data
MACE in hospital was seen in 6.1% (STEMI 2.0%, NSTEMI 1.0%, TLR 3.1%), during FU cardiac death in 2.6%, an ACS in 2.6%, CAGB 1.3%, TLR 0% and TVR 13.2%.

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Conclusion: DEB could be safely used for the treatment of bifurcation lesion with an optimal rate of TLR.

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Ulrich Hink: This author has nothing to disclose.
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Jan Hemker: This author has nothing to disclose.
Burkhard Hügel: This author has nothing to disclose.
Björn Buchter: This author has nothing to disclose.
Rainer Zotz: This author has nothing to disclose.
Erik Friedrich: This author has nothing to disclose.
Thomas Minzel: This author has nothing to disclose.

B-059

Title: Percutaneous Coronary Interventions And Contrast Induced Nephropathy – Clinical Outcomes And Risk Factors.

Category: Contrast Agents

Authors: ASHWIN LYSANDER, Mahatma Gandhi Medical College And Research Institute, India; ASHWIN LYSANDER, Mahatma Gandhi Medical College And Research Institute, India; ASHWIN LYSANDER, Mahatma Gandhi Medical College And Research Institute, India; ASHWIN LYSANDER, Mahatma Gandhi Medical College And Research Institute, India

Background: Contrast induced nephropathy (CIN) is a fairly common complication of percutaneous coronary interventions. CIN is defined as a 25% increase or an absolute rise of 0.5 mg/dl of serum creatinine from baseline within 48 hours of intravascular administration of a contrast agent. contrast induced nephropathy can lead to adverse in hospital outcomes and also increase the incidence of MACE.

Methods: This is a prospective outcomes study conducted in a tertiary care centre on patients undergoing angiography and angioplasty procedures. The study was conducted over a period of one year. Patients previously diagnosed as chronic kidney disease were excluded. All patients underwent renal function test prior to and at 24 and 48 hours after procedure. All patients received normal saline 500ml prior to and 1 litre after procedure at the rate of 100 ml per hour. Various parameters such as age, body weight, baseline renal parameters, blood sugars, amount and type of contrast agent used were analysed.

Results: A total of 578 patients were included in the study. 84 patients (14.53%) developed contrast induced nephropathy. The average amount of contrast agent used for coronary angiography and coronary angioplasty was 55 ml and 110 ml respectively. The amount of contrast agent used was higher in patients who developed CIN. Patients who developed CIN also had a higher incidence of diabetes mellitus (88% vs 69%) . The incidence of CIN was higher in patients with body weight less than 50kgs. All patients received low molecular non-ionic contrast agent. The incidence of hypotension and left ventricular dysfunction was more in the CIN group (61% vs 38%).

Conclusion: The risk factors for development of CIN is multifactorial. The non-modifiable risk factors for CIN were diabetes mellitus, low body weight and left ventricular dysfunction. The modifiable risk factors were hypotension, volume of contrast agent used, control of blood sugars and hydration status of the patients.
Disclosures:
ASHWIN LYSANDER: This author has nothing to disclose.
ASHWIN LYSANDER: This author has nothing to disclose.
ASHWIN LYSANDER: This author has nothing to disclose.
ASHWIN LYSANDER: This author has nothing to disclose.

B-076

Title: Validation of a Novel Method of Total Contrast Volume Determination During Invasive Angiography

Category: Contrast Agents

Authors: Anand Prasad, UT Health Science Center San Antonio, United States; Irma Scholler, UT Health Science Center San Antonio, United States; Gus Banda, UT Health Science Center San Antonio, United States; Steven Bailey, UT Health Science Center San Antonio, United States; Chris Mullin, UT Health Science Center San Antonio, United States

Background: Reduction of contrast volume (CV) during angiography remains a cornerstone of acute kidney injury (AKI) prevention. Quantification of total CV is often estimated and therefore may be inaccurate. Monitoring of CV use can provide operators with real time feedback which may help limit contrast dose. We describe validation of a novel electronically calibrated syringe (ECS) which is designed to detect and display shot by shot and total CV use on a monitor system. The ECS is compatible with existing manifold configurations and can also be used in conjunction with the AVERT contrast modulation system which reduces CV delivery during each injection.

Methods: 30 patients undergoing a coronary or peripheral angiogram were included. 10 using the ECS only and 20 using both the ECS and the AVERT system. Total CV used during each case was measured using a graduated cylinder (GC) and calculated as the difference between: 1) the CV in a new bottle of iodixanol, and 2) amount of CV left in the bottle and all tubing at end of case. The GC method was compared to ECS reported CV and to the physician’s blinded assessment of CV. Intraclass (ICC) and Pearson correlation coefficients (PCC) were used for analysis and the results displayed using Bland-Altman plots.

Results: 21 cases were diagnostic and 9 interventional. The ICC/PCC [CI] for the comparison of GC to ECS and physician estimate were 0.96/0.97 [0.94-0.99] and 0.89/0.90 [0.80-0.95], respectively, P=0.008. See Figure for Bland-Altman plots.

Conclusion: The novel ECS is accurate in determining total CV used during angiography and is superior in this regard to physician estimation of CV.

Disclosures:
Anand Prasad: 2 Osprey Medical
Irma Scholler: This author has nothing to disclose.
Gus Banda: This author has nothing to disclose.
Steven Bailey: 5 Osprey Medical
Chris Mullin: This author has nothing to disclose.

B-087

Title: Contrast Use in Relation to the Arterial Access Site Used for Percutaneous Coronary Intervention: An Updated Comprehensive Meta-analysis of Randomized Trials

Category: Contrast Agents

Authors: Rahman Shah, VA Hospital, United States; Abdul Rashid, Jackson Clinic, United States; M. Rehan Khan, VCU, United States; Chalak Berzingi, West Virginia University, United States; John Jasper, VA Hospital, United States; Kodangudi Ramanathan, University of Tennessee, United States

Background: Trans-radial access (TRA) for percutaneous coronary interventions (PCI) results in fewer bleeding and vascular complications than trans-femoral access (TFA). However, CathPCI Registry® data suggest that the frequency with which TRA-PCI is used in patients with lower glomerular filtration rates (GFRs) is lower than in patients with higher GFRs, possibly due to concerns related to the heightened contrast use from TRA compared with TFA. We have accordingly performed an updated, comprehensive meta-analysis of randomized controlled trials (RCTs) comparing the amount of contrast use between TRA and TFA.

Methods: We searched scientific databases and websites for relevant RCTs. We summarized the data as the weighted mean difference (WMD) of contrast use with a 95% confidence interval (CI). We used a random-effects model to analyze the data.
Results: Among 26 identified RCTs, only 15 reported the amount of contrast used, and of these, three reported the median, rather than the mean, volume. Thus, only 12 RCTs could be included in our analysis. There was no difference in the volume of contrast used during TRA-PCI compared to TFA-PCI (WMD: 0.99, 95% CI: −11.83 to 13.81, p=0.880). However, in these trials the majority of the TRA procedures were conducted by expert radial operators. During sensitivity analysis, the summary result did not change using a fixed model.

Conclusion: There was no significant difference between TRA-PCI and TFA-PCI in the amount of contrast medium used.

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Kodangudi Ramanathan: This author has nothing to disclose.

ENDOVASCULAR AND PERIPHERAL INTERVENTIONS (INCLUDING NEUROVASCULAR AND CAROTID)

C-010

Title: Aggressive de-bulking with directional atherectomy leads to improved long term outcomes for femoropopliteal in stent restenosis patients.

Category: Endovascular and Peripheral Interventions (Including Neurovascular and Carotid)

Authors: Sachin Kumar Amruthal Jain, Icahn School of Medicine at Mount Sinai, United States; Arthur Tarricone, Icahn School of Medicine at Mount Sinai, United States; Miguel Vasquez, Icahn School of Medicine at Mount Sinai, United States; Prakash Krishnan, Icahn School of Medicine at Mount Sinai, United States

Background: Nitinol stents have been shown to improve long term patencies in superficial femoral and popliteal artery lesions as compared to PTA. One year target lesion revascularization (TLR) rates for nitinol stents range from 12%-20% and approach 30% at two and three year post procedure. Femoropopliteal in-stent restenosis (FP-ISR) incidence is estimated to be between 19-37%. Current treatment modalities including Catheterization and Cardiovascular Interventions DOI 10.1002/ccd. Published on behalf of The Society for Cardiovascular Angiography and Interventions (SCAI).
Disclosures:
Mohammad Ansari: This author has nothing to disclose.
Daniel Garcia: This author has nothing to disclose.
Rhanderson Cardoso: This author has nothing to disclose.
Carmen Heaney: This author has nothing to disclose.
Larry Diaz-Sandoval: This author has nothing to disclose.
Fadi Saab: This author has nothing to disclose.
Jihad Mustapha: This author has nothing to disclose.

C-013

Title: Abdominal Aortic Endoluminal Grafts and Subsequent Abdominal Surgery Promote Extensive Deep Vein Thrombosis

Category: Endovascular and Peripheral Interventions (Including Neurovascular and Carotid)

Authors: Mohsen Sharifi, Arizona Cardiovascular Consultants & Vein Clinic, United States; Mohsen Sharifi, Arizona Cardiovascular Consultants & Vein Clinic, United States; Wisam Baqdunes, Arizona Cardiovascular Consultants & Vein Clinic, United States; Jeremy Berger, A.T. Still University, United States; Maryann Davies, A.T. Still University, United States; Rafael Rolon-Rivera, Arizona Cardiovascular Consultants & Vein Clinic, United States; Rafael Rolon-Rivera, Arizona Cardiovascular Consultants & Vein Clinic, United States; Nicole Mills, Arizona Cardiovascular Consultants & Vein Clinic, United States; Jose Jimenez-Cintron, Arizona Cardiovascular Consultants & Vein Clinic, United States; Marwan Oleiwi, Arizona Cardiovascular Consultants & Vein Clinic, United States

Background: Chronic mesenteric ischemia is prevalent in 5% of the US population, but it is still considered underdiagnosed entity with significant morbidity and mortality (up to 75%). Open surgical repair (OS) represents the gold standard for treatment of chronic symptomatic disease. Alternatively, endovascular therapy (EVT) has been shown to be feasible and safe. We sought to evaluate the clinical and procedural outcomes between the two treatment modalities through a meta-analysis of contemporary clinical studies.

Methods: Systematic review of Pub Med, Chocrane and Embase databases was performed until November 2015 for all clinical studies that directly compared OS and EVT for chronic mesenteric ischemia. Primary endpoint was post-procedural mortality. Secondary endpoints included primary and secondary patency rates, as well as long-term survival. We used random effect analysis according to the Cochrane-Handbook of Systematic Reviews and RevMan 5.2 for statistical analysis.

Results: A total of 13 studies (12 retrospective and one prospective) provided a total of 7446 patients, divided in two groups: 4281 (EVT group) and 3165 (OS group). There was no difference in post procedural mortality (EVT: 3.4% vs. OS: 11.3%, p = 0.67). Primary (59% vs. 85%) and secondary patency rates (73% vs. 92%) were better in the OS group (p < 0.001) (Figure 1). There was no difference in long-term survival between EVT and OS (77% vs. 73%, p = 0.52).

Conclusion: Our analysis suggests that EVT and OS have comparable post-procedural mortality and long-term survival, although OS is associated with superior primary and secondary patency rates. Limitations include the retrospective nature of most of the included studies and the heterogeneity of definitions. Endovascular therapy might play a significant role in sicker patients particularly those requiring less invasive interventions. Further randomized studies are warranted.

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Daniel Garcia: This author has nothing to disclose.
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Fadi Saab: This author has nothing to disclose.
Jihad Mustapha: This author has nothing to disclose.

Abstracts S45

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C-015

Title: Assessing Mortality Risks in Coronary Artery Disease (CAD) and Peripheral Arterial Disease (PAD)

Category: Endovascular and Peripheral Interventions (Including Neurovascular and Carotid)

Authors: Isahb Barlas, Institute of Cardiovascular Excellence, United States; Asad Qamar, Institute of Cardiovascular Excellence, United States; Muhammad Sadique, Hillsborough Community College, United States; Mohammed Ali, Valencia Community College, United States; Taha Baig, Seminole State College, United States; Abbas Ali, medical research institute, United States

Background: Coronary artery disease and peripheral arterial disease account for significant mortality and morbidity in the industrialized world. Risk factor modification is the cornerstone of CAD and PAD therapies. We report a novel method of identifying risks amongst these patients to identify groups at risk and use a guideline driven approach to modify risk factors.

Methods: A list of 2,705 patients with histories of myocardial infarction was abstracted from an electronic medical record of a large multi-specialty practice in Central Florida. Dates of past stress tests amongst these patients were noted and a list of those who did not have stress tests in the last 16 months was compiled. Low density lipoprotein (LDL) levels were also compiled for these patients.

Results: The standard deviation of seven consecutive systolic blood pressure readings amongst a random sample of 150 patients from this list identified those at 1.5 times greater risk for mortality. Body mass index (BMI) and calf circumference measurements were available on 1,130 patients with PAD symptoms. Using random forest machine learning and data from the CDC NHANES dataset, a model predicting death in patients identified as being high risk amongst the sample of 150 CAD patients had an area under the curve of 0.87. Using this model, a list identified those at 1.5 times greater risk for mortality. Thus, healthcare professionals can use this model to pinpoint high-risk patients with high mortality chances in order to implement rigorous treatment.

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Isahb Barlas: This author has nothing to disclose.
Asad Qamar:
Muhammad Sadique:
Mohammed Ali:
Taha Baig:
Abbas Ali:

C-017

Title: Outcome of Life Star Stents in the Venous Circulation

Category: Endovascular and Peripheral Interventions (Including Neurovascular and Carotid)

Authors: Mohsen Sharifi, Arizona Cardiovascular Consultants & Vein Clinic, United States; Wisam Baqduunes, Arizona Cardiovascular Consultants & Vein Clinic, United States; Jeremy Berger, A.T. Still University, United States; Sameer Chaudhari, Newark Beth Israel Medical Center, United States; Nishant Sethi, Newark Beth Israel Medical Center, United States; Yassir Nawaz, Newark Beth Israel Medical Center, United States; Ahmed Seliem, Newark Beth Israel Medical Center, United States; Affan Farooq, Newark Beth Israel Medical Center, United States; Nishant Sethi, Newark Beth Israel Medical Center, United States; Marc Cohen, Newark Beth Israel Medical Center, United States; Madhu Salvaji, Newark Beth Israel Medical Center, United States; Sameer Chaudhari, Newark Beth Israel Medical Center, United States; Marwan Oleiwi, Arizona Cardiovascular Consultants & Vein Clinic, United States; Maryann Davies, A.T. Still University, United States; Rafael Rolon-Rivera, Arizona Cardiovascular Consultants & Vein Clinic, United States; Marwan Oleiwi, Arizona Cardiovascular Consultants & Vein Clinic, United States; Maryann Davies, A.T. Still University, United States; Madhu Salvaji, Newark Beth Israel Medical Center, United States; Sameer Chaudhari, Newark Beth Israel Medical Center, United States; Marwan Oleiwi, Arizona Cardiovascular Consultants & Vein Clinic, United States

Background: There is no FDA approved stent for the venous circulation. Off-label use of various stents has been previously reported. Life Star (Bard Inc. Tempe, AZ) is a nitinol stent which comes in relatively longer lengths of up to 120 mm. We report on the outcome of Lifestar stent in the treatment of venous stenosis during percutaneous endovascular intervention (PEVI) for acute deep vein stenosis (DVT).

Methods: A total of 116 Life Star stents were placed in 79 patients who had presented with acute severe proximal DVT plus venous stenosis. In 70 patients stenting followed 24 h of catheter-directed thrombolysis delivered through an infusion catheter at 1mg/h. In 70 patients the iliac venous system received a stent. After PEVI all patients went on a apixaban, rivaroxaban or edoxaban plus a minimum of 81 mg of aspirin. Aspirin was discontinued after 6 months. All patients underwent serial venous duplex assessment every 6 months for assessment of patency.

Results: The mean follow-up was 38 ± 5 months. In 65 patients indefinite anticoagulation was recommended. The mean stent size was 13 ± 0.3 X 140 ± 28 mm. No patient developed recurrent symptoms of DVT. In 3 patients the stent had become occluded at follow up. These were incidental findings and did not lead to symptoms. They were noted in the most caudal part of several long stents. Stent occlusion was diagnosed with venous duplex imaging.

Conclusion: Life Star stents can be safely and successfully used in the venous circulation. They are associated with a 97% (113/116) patency rate at over 3 years. Furthermore serial venous duplex imaging is a valuable tool for determination of venous patency.

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Mohsen Sharifi: This author has nothing to disclose.
Wism Baqduunes: This author has nothing to disclose.
Jeremy Berger: This author has nothing to disclose.
Maryann Davies: This author has nothing to disclose.
Rafael Rolon-Rivera: This author has nothing to disclose.
Marwan Oleiwi: This author has nothing to disclose.
Nicole Mills: This author has nothing to disclose.
Nicole Mills: This author has nothing to disclose.
Nicole Mills: This author has nothing to disclose.

C-025

Title: Lesion preparation employing nondebulking atherectomy reduces flow limiting dissections and bail out stenting for post Percutaneous Transluminal Angioplasty with Drug Coated Balloon of Superficial Femoral Artery

Category: Endovascular and Peripheral Interventions (Including Neurovascular and Carotid)

Authors: Sameer Chaudhari, Newark Beth Israel Medical Center, United States; Nishant Sethi, Newark Beth Israel Medical Center, United States; Yassir Nawaz, Newark Beth Israel Medical Center, United States; Ahmed Seliem, Newark Beth Israel Medical Center, United States; Affan Farooq, Newark Beth Israel Medical Center, United States; Nishant Sethi, Newark Beth Israel Medical Center, United States; Marc Cohen, Newark Beth Israel Medical Center, United States; Madhu Salvaji, Newark Beth Israel Medical Center, United States; John Shao, Newark Beth Israel Medical Center, United States; Najam Wasty, Newark Beth Israel Medical Center, United States

Background: The mean follow-up was 38 ± 5 months. In 65 patients indefinite anticoagulation was recommended. The mean stent size was 13 ± 0.3 X 140 ± 28 mm. No patient developed recurrent symptoms of DVT. In 3 patients the stent had become occluded at follow up. These were incidental findings and did not lead to symptoms. They were noted in the most caudal part of several long stents. Stent occlusion was diagnosed with venous duplex imaging.

Conclusion: Life Star stents can be safely and successfully used in the venous circulation. They are associated with a 97% (113/116) patency rate at over 3 years. Furthermore serial venous duplex imaging is a valuable tool for determination of venous patency.

Disclosures:
Mohsen Sharifi: This author has nothing to disclose.
Wism Baqduunes: This author has nothing to disclose.
Jeremy Berger: This author has nothing to disclose.
Maryann Davies: This author has nothing to disclose.
Rafael Rolon-Rivera: This author has nothing to disclose.
Marwan Oleiwi: This author has nothing to disclose.
Nicole Mills: This author has nothing to disclose.
Nicole Mills: This author has nothing to disclose.
Nicole Mills: This author has nothing to disclose.
Background: In the European Drug Coated Balloon (DCB) Percutaneous Transluminal Angioplasty (PTA) trials for treatment of Superficial Femoral Artery (SFA) disease, the incidence of bail out stent deployment to treat flow limiting dissections was high and was related to lesion length (7.6% for lesions up to 80mm, 30% for 81 to 150 mm, 35% for 151 to 250 mm and 40% over 251 mm). We hypothesized that lesion preparation and plaque modification employing a non debulking Laser or rotational atherectomy (Cardiovascular Systems, Inc CSI or Boston Scientific Jetstream Pathway), pre DCB PTA could reduce the incidence of flow limiting dissections requiring bail out stenting.

Methods: We retrospectively reviewed thirty three (n=33) consecutive cases of SFA intervention that were a combination of a plaque modifying atherectomy and DCB PTA performed at our institution between the dates of 01/2015 and 11/2015. We collected and analyzed all pertinent clinical and procedural data.

Results: There were 11 males (33.3%) and 22 females (66.7%) in our cohort. Mean age was 69 years, 49% were smokers (16/33), 73% were diabetics (24/33), and 15% had chronic kidney disease CKD (5/33). Incidence of flow limiting dissections requiring bail out stenting was as follows: lesions less than 80 mm (0/12 = 0%) 81 to 150 mm (1/16 = 6.25%), and 151 to 250 mm (0/5 = 0%) with overall incidence was 1/33 (3%).

Conclusion: 1) Lesion preparation with laser or rotational atherectomy prior to DCB PTA markedly reduces the incidence of flow limiting dissections requiring bail out stenting, especially notable in long calcified lesions.
2) Larger studies are needed to corroborate our findings.

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Sameer Chaudhari: This author has nothing to disclose.
Nishant Sethi: This author has nothing to disclose.
Yassir Nawaz: This author has nothing to disclose.
Ahmed Seliem: This author has nothing to disclose.
Affan Farooq: This author has nothing to disclose.
Nishant Sethi: This author has nothing to disclose.
Marc Cohen: This author has nothing to disclose.
John Shao: This author has nothing to disclose.
Najam Wasty: This author has nothing to disclose.

C-028

Title: Intra-arterial Vessel Wall Delivery of a Novel Nano-liposome Encapsulated Anti-restenosis Drug Formulation Using an Endoluminal Infusion Catheter

Category: Endovascular and Peripheral Interventions (Including Neurovascular and Carotid)

Authors: Van Crisco, Endoperfusion Solutions, United States; Arti Khana, Cook Medical, United States; Ashley Hancock, Endoperfusion Solutions, United States; Young Lee, Purdue University, United States; David Thompson, Purdue University, United States; Jaipal Singh, Endoperfusion Solutions, United States

Background: Drug coated balloon (DCB) therapy represents a promising adjunct procedure for the prevention of restenosis following peripheral artery disease endovascular intervention. DCB technology currently uses a crystalline form of paclitaxel that is deposited at the endoluminal surface of the arterial wall by direct apposition from the balloon, with an excipient for delivery. With the current technology only a fraction of the drug is transferred to the target vessel wall from the coated balloon, the majority of the delivered drug remains attached to the lumen and the kinetics of drug delivery to the vessel wall is highly variable. Particulate paclitaxel poses potential risk of thrombosis at the target site and downstream microvascular embolism. Furthermore, vascular toxicity due to indiscriminate effect of paclitaxel on smooth muscle and endothelial cells impairs vascular healing. Improvement in the deficiencies of current DCB technology would provide a better therapy and broaden the applications of drug delivery to a variety of diseased arterial beds.

Methods: Herein we describe a nano-liposome formulation of an anti-proliferative, anti-inflammatory and pro-endothelial drug formulation (EPS01) that is directly delivered to the arterial wall via an endoluminal infusion catheter (EIC). Drug EPS01 was encapsulated in ~100 nm nanoresin nanoposomes and then delivered to the peripheral arteries of a swine model via the EIC. Kinetics of intra-arterial drug delivery was quantified using liquid chromatography-mass spectrometry and the pattern of drug distribution in the artery was determined using two-photon confocal microscopy.

Results: Our data show a successful and highly consistent delivery of the nano-liposome drug formulation to the wall of the arterial vessel.

Conclusion: Our data suggests improvement in both drug delivery uniformity and location over the currently available DCB for prevention of restenosis. Furthermore, our EIC-drug system allows for tailored drug delivery to multiple arterial distributions.

Disclosures:
Van Crisco: 4 Endoperfusion Solutions
Arti Khana: This author has nothing to disclose.
Ashley Hancock: 4 Endoperfusion Solutions
Young Lee: This author has nothing to disclose.
David Thompson: This author has nothing to disclose.
Jaipal Singh: 4 Endoperfusion Solutions

C-030

Title: TEVAR For Complex Aortic Arch Aneurysms: Brachial-Femoral Wire Prolapse into the Ascending Aorta to Facilitate TEVAR Device Delivery

Category: Endovascular and Peripheral Interventions (Including Neurovascular and Carotid)

Authors: Steve DeBeer, Emory Heart & Vascular Center, United States; Ganesh Athappan, Temple Interventional Heart & Vascular Institute, United States; Corbin Muetterties, Temple Interventional Heart & Vascular Institute, United States; Grayson Wheatley, Temple Interventional Heart & Vascular Institute, United States

Background: Thoracic Endovascular Aneurysm Repair (TEVAR) for complex arch anatomy can be challenging due to anatomical factors. A novel method of facilitating TEVAR in a hostile, angulated aortic arch aneurysm is discussed.

Methods: A 65 year-old male with a 7cm distal aortic arch aneurysm was determined to be a candidate for TEVAR.

Results: Using standard transfemoral TEVAR techniques, a retrograde, stiff tip Lunderquist guidewire failed to straighten the angled arch anatomy and remained looped in the aneurysm sac. Subsequently, we converted to a right brachial-femoral wire (450cm) to facilitate delivery of the TEVAR device into Zone 1. Once the TEVAR delivery system was in place, we intentionally prolapsed the brachial-femoral wire, along with the nose cone of the delivery system, into the ascending aorta in order to maximize proximal TEVAR deployment.

A second TEVAR device was needed to treat a proximal Type I endoleak.

Conclusion: Prolapsing a brachial-femoral wire into the ascending aorta for hostile aortic arch TEVAR can facilitate successful proximal arch TEVAR deployment.

Catheterization and Cardiovascular Interventions DOI 10.1002/ccd. Published on behalf of The Society for Cardiovascular Angiography and Interventions (SCAI).
Disclosures:
Steve DeBeer: This author has nothing to disclose.
Ganesh Athappan: This author has nothing to disclose.
Corbin Muetterties: This author has nothing to disclose.
Grayson Wheatley: 5 Abbott Vascular, 5 TriVascular, 5 Lombard Medical, 5 Bolton Medical, 5 Medtronic

C-038

Title: Laser Atherectomy Combined with Drug-Coated Balloon Angioplasty for Treatment of Femoropopliteal Restenosis
Category: Endovascular and Peripheral Interventions (Including Neurovascular and Carotid)

Authors: T. Raymond Foley, University of Colorado Health Sciences Center, United States; Gagan D Singh, University of California, Davis Medical Center, United States; Stephen Waldo, University of Colorado Health Sciences Center, United States; John R Laird, University of California, Davis Medical Center, United States; Ehrin J Armstrong, University of Colorado Health Sciences Center, United States

Background: Restenosis following angioplasty or stenting in femoropopliteal (FP) arteries remains a limitation of endovascular therapy. Drug coated balloon (DCB) angioplasty for FP in-stent restenosis (ISR) has been associated with improved primary patency and reduced rates of target lesion revascularization (TLR) at 1 year. Laser atherectomy (LA) allows for debulking of thrombus and hyperplastic neointimal tissue and has been associated with improved outcomes when used for treatment of FP-ISR, but there is little data available on the outcomes of combined treatment with LA + DCB.

Methods: From January to October 2015, 19 limbs in 18 patients with PAD underwent combined DCB angioplasty and LA for the treatment of claudication (68.4%) or critical limb ischemia (31.5%) at 2 participating centers. Angiographic characteristics and procedural details were reviewed.

Results: In 19 limbs, a total of 24 lesions were treated. 17 lesions (71%) were treated for FP-ISR, while 5 were treated for non-stent restenosis. The mean baseline ABI was 0.74 ± 0.29. Mean lesion length was 112.3 ± 77.5 mm and mean vessel diameter was 5.5 ± 1.01 mm. Target vessels included the superficial femoral (67%), popliteal (25.), and common femoral arteries (8%). Procedural success rate was 100%. Rate of additional stent placement was 17%. Rate of complications including embolization, dissection or perforation was 0%.

Table 1. Baseline patient and lesion characteristics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>13 (72%)</td>
</tr>
<tr>
<td>Mean age (years)</td>
<td>60.7</td>
</tr>
<tr>
<td>Hypertension</td>
<td>16 (88.9%)</td>
</tr>
<tr>
<td>Hyperlipidemia</td>
<td>12 (66.7%)</td>
</tr>
<tr>
<td>Coronary artery disease</td>
<td>8 (44.4%)</td>
</tr>
<tr>
<td>Diabetes mellitus</td>
<td>6 (33.3%)</td>
</tr>
<tr>
<td>Cerebrovascular disease</td>
<td>1 (5.6%)</td>
</tr>
<tr>
<td>Renal insufficiency</td>
<td>6 (33.3%)</td>
</tr>
<tr>
<td>Previous tobacco use</td>
<td>16 (88.9%)</td>
</tr>
<tr>
<td>Current tobacco use</td>
<td>9 (50.0%)</td>
</tr>
<tr>
<td>Rutherford class</td>
<td></td>
</tr>
<tr>
<td>2-3</td>
<td>12 (66.7%)</td>
</tr>
<tr>
<td>4-6</td>
<td>6 (33.3%)</td>
</tr>
<tr>
<td>Baseline ABI</td>
<td>0.74 ± 0.29</td>
</tr>
<tr>
<td>In-Stent Restenosis</td>
<td>17 (70.8%)</td>
</tr>
<tr>
<td>Non-Stented Restenosis</td>
<td>5 (20.8%)</td>
</tr>
<tr>
<td>Mean lesion length (mm)</td>
<td>112.3 ± 77.5</td>
</tr>
<tr>
<td>Mean vessel diameter (mm)</td>
<td>5.5 ± 1.01</td>
</tr>
<tr>
<td>TASC-II Classification</td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>7 (29.2%)</td>
</tr>
<tr>
<td>B</td>
<td>6 (25.0%)</td>
</tr>
<tr>
<td>C</td>
<td>6 (25.0%)</td>
</tr>
<tr>
<td>D</td>
<td>5 (20.8%)</td>
</tr>
<tr>
<td>Bailout stenting</td>
<td>4 (16.7%)</td>
</tr>
<tr>
<td>Target Vessel</td>
<td></td>
</tr>
<tr>
<td>SFA</td>
<td>16 (66.7%)</td>
</tr>
<tr>
<td>Popliteal</td>
<td>6 (25.0%)</td>
</tr>
<tr>
<td>CFA</td>
<td>2 (8.3%)</td>
</tr>
</tbody>
</table>
**Conclusion:** LA appears to be a safe adjunctive therapy in DCB angioplasty for ISR and NSR of the CFA and FP arteries. In this cohort, the procedural success rate was 100% and no complications occurred. Long-term outcomes of patency and symptomatic improvement will be reported.

**Disclosures:**
T. Raymond Foley: This author has nothing to disclose.
Gagan D Singh: This author has nothing to disclose.
Ryan Cotter: This author has nothing to disclose.
Benjan Alvandi:
Stephen Waldo: This author has nothing to disclose.
John R Laird: 5 Boston Scientific
Ehrin J Armstrong: 5 Abbott, Medtronic, Spectranetics

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**Table C-037**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Orbital Atherectomy + Drug-Coated Balloon (N=40)</th>
<th>Drug-Coated Balloon Only (N=99)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lumen Location</td>
<td>3 (14)</td>
<td>3 (14)</td>
<td>0.9</td>
</tr>
<tr>
<td>MTA</td>
<td>24 (58)</td>
<td>34 (74)</td>
<td>0.09</td>
</tr>
<tr>
<td>Femoral</td>
<td>8 (20)</td>
<td>20 (40)</td>
<td>0.8</td>
</tr>
<tr>
<td>Infrapopliteal</td>
<td>2 (5)</td>
<td>2 (4)</td>
<td>0.9</td>
</tr>
<tr>
<td>TASC Class</td>
<td>A: 9 (15)</td>
<td>9 (15)</td>
<td>0.9</td>
</tr>
<tr>
<td>B: 22 (45)</td>
<td>31 (55)</td>
<td>0.9</td>
<td></td>
</tr>
<tr>
<td>C: 47 (24)</td>
<td>35 (32)</td>
<td>0.2</td>
<td></td>
</tr>
<tr>
<td>D: 6 (11)</td>
<td>9 (15)</td>
<td>0.9</td>
<td></td>
</tr>
<tr>
<td>Pre-Procedural ABI</td>
<td>0.70 ± 0.2</td>
<td>0.66 ± 0.3</td>
<td>0.5</td>
</tr>
<tr>
<td>Angioplasty</td>
<td>0.9 (12)</td>
<td>0.8 (16)</td>
<td>0.2</td>
</tr>
<tr>
<td>SFA and/or bifurcation</td>
<td>1 (20)</td>
<td>3 (15)</td>
<td>0.7</td>
</tr>
<tr>
<td>TASC classification</td>
<td>25 (75)</td>
<td>25 (75)</td>
<td>1.0</td>
</tr>
<tr>
<td>Access site</td>
<td>0 (0)</td>
<td>1 (1)</td>
<td>0.7</td>
</tr>
<tr>
<td>Admission</td>
<td>1 (5)</td>
<td>1 (5)</td>
<td>1.0</td>
</tr>
<tr>
<td>Moderate</td>
<td>3 (8)</td>
<td>2 (2)</td>
<td>0.6</td>
</tr>
<tr>
<td>Severe</td>
<td>30 (30)</td>
<td>44 (45)</td>
<td>0.2</td>
</tr>
<tr>
<td>Chronic total occlusion</td>
<td>11 (26)</td>
<td>30 (40)</td>
<td>0.2</td>
</tr>
<tr>
<td>Mean lesion length (mm)</td>
<td>156 ± 150</td>
<td>189 ± 150</td>
<td>0.5</td>
</tr>
<tr>
<td>Reference vessel diameter (mm)</td>
<td>5.8 ± 0.9</td>
<td>5.3 ± 1.3</td>
<td>0.1</td>
</tr>
<tr>
<td>Mean PAD</td>
<td>7 (10)</td>
<td>8 (11)</td>
<td>0.8</td>
</tr>
<tr>
<td>Mean SBP</td>
<td>85 (58)</td>
<td>85 (58)</td>
<td>0.9</td>
</tr>
<tr>
<td>Embolization</td>
<td>0 (0)</td>
<td>2 (4)</td>
<td>0.4</td>
</tr>
<tr>
<td>Distal</td>
<td>5 (11)</td>
<td>14 (14)</td>
<td>0.8</td>
</tr>
<tr>
<td>Patency</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>1.0</td>
</tr>
<tr>
<td>Procedural Success</td>
<td>22 (55)</td>
<td>30 (60)</td>
<td>0.8</td>
</tr>
</tbody>
</table>

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**Title:** Outcomes of Orbital Atherectomy Combined with Drug-Coated Balloon Angioplasty for Treatment of Femoropopliteal Disease

**Category:** Endovascular and Peripheral Interventions (Including Neurovascular and Carotid)

**Authors:** T. Raymond Foley, University of Colorado Health Sciences Center, United States; Ryan Cotter, University of Colorado Health Sciences Center, United States; Daniel D Nguyen, University of Colorado Health Sciences Center, United States; Stephen W Waldo, University of Colorado Health Sciences Center, United States; Ehrin J Armstrong, University of Colorado Health Sciences Center, United States
Background: Studies have demonstrated lower rates of neointimal proliferation and target lesion revascularization in patients with superficial femoral artery lesions treated with drug coated balloon (DCB) vs. standard balloon angioplasty. However, DCBs may be less effective in calcified lesions due to impaired penetration of paclitaxel into the vessel wall. Atherectomy may improve efficacy of DCB angioplasty in calcified lesions.

Methods: Between December 2014 and October 2015, 90 patients (139 lesions) were treated with DCB angioplasty for claudication or critical limb ischemia (CLI). Angiographic characteristics and procedural outcomes were reviewed for patients treated with vs. without adjunctive OA.

Results: Among 139 lesions, 28.7% (n=40) were treated with OA+DCB. Mean lesion length was 135 mm ± 100 for lesions treated with OA+DCB and 139 mm ± 100 for DCB only (p=0.9). 90% of lesions treated with OA+DCB were severely calcified vs. 44% in the DCB only group (p<0.001). Lesions treated with OA+DCB were more likely to be treated with scoring balloon angioplasty (88% vs. 35%, P<0.001) and less likely to require stenting (18% vs. 39%, P=0.01). Rates of embolization (0% in OA+DCB vs. 2% in DCB only, p=0.4), dissection (13% vs. 14%, p=0.8) and perforation (0%) did not differ significantly between groups.

Conclusion: In this single center analysis of patients undergoing DCB angioplasty for claudication or CLI, OA was most often used for the treatment of severely calcified lesions. These lesions were more likely to be treated with scoring balloons and less likely to require bail-out stenting. Long-term patency results will be presented after one-year follow-up.

Disclosures:
T. Raymond Foley: This author has nothing to disclose.
Ryan Cotter: This author has nothing to disclose.
Daniel D Nguyen: This author has nothing to disclose.
Stephen W Waldo: This author has nothing to disclose.
Ehrin J Armstrong: 5 Abbott, Medtronic, Spectranetics

C-039

Title: Characterization of Atherectomy Samples from Long Femoro-Popliteal Artery Occlusions and Correlation with Clinical Outcomes Using a Predictive Lesion Scoring System

Category: Endovascular and Peripheral Interventions (Including Neurovascular and Carotid)

Authors: Jon George, Albert Einstein Medical Center, United States; Vincent Varghese, Deborah Heart And Lung Center, United States; Buddhadev Dawn, The University Of Kansas Medical Center, United States; Zubair Shah, The University Of Kansas Medical Center, United States; Kamal Gupta, The University Of Kansas Medical Center, United States; Kamal Gupta, The University Of Kansas Medical Center, United States

Background: Chronic total occlusions (CTOs) and long lesions have been associated with higher reocclusion rates and need for repeat revascularization. While several studies have analyzed atherectomy samples, no study to date has focused on CTOs with correlation to clinical outcomes, which was the primary objective of this study.

Methods: 19 femoro-popliteal CTO lesions, including denovo (DN) and instent restenosis (ISR) lesions, were crossed intra-luminal using optical coherence tomography guidance (Ocelot). Atherectomy samples were excised (Turbohawk) and subjected to histopathological analysis. The compiled information was paired and correlated with clinical outcomes, as recorded at patient’s follow up (1, 3 or 6 month visit).

Results: 10/10 DN lesions had adventitial resection (up to 57% of total lesion area), and 8/10 DN lesions had thrombus (up to 34% of total lesion area). Of 19 CTO lesions, 10 DN (mean length 15.4 cm) and 9 ISR (mean length 22.1 cm) were successfully crossed, with no dissection or perforations. At follow-up, 70% DN lesions (7/10) and 89% (8/9) ISR lesions had TLR. Reviewing the histopathological analysis, there were three factors that contributed to restenosis: lesion length, adventitial resection, and presence of thrombus.

Conclusion: Pairing the histological analysis with clinical outcomes enabled the generation of a predictive lesion scoring system. There was a significant correlation (p<0.05) between lesion scores and TLR.

Disclosures:
Jon George: 5 Medtronic, 5 Avinger
Vincent Varghese: This author has nothing to disclose.
The rate of interventions and in-hospital mortality for different CLI groups are shown in the table below. The incidence of CLI presenting with ulceration or gangrene dropped in the time period studied (2008-2012).

CKD Patients with rest pain had lower rate of bypass (36.5% vs. 50.2%, \( p < 0.001 \)) than non-CKD patients. African Americans had a lower revascularization rate and a higher amputation rate compared with Caucasians (70.2% vs. 74.8%; 5.1% vs. 3.5%, \( p < 0.001 \)).

**Conclusion:** There are significant disparities in the management of CLI patients on the basis of ethnicity, gender, and patients’ risk factors. Patients with worse CLI grades had higher in-hospital mortality. Further studies are needed to identify the underlying reasons and the impact of these disparities.

**Disclosures:**
Reza Masoomi: This author has nothing to disclose.
Zubair Shah: This author has nothing to disclose.
Buddhadev Dawn: This author has nothing to disclose.
Kamal Gupta: This author has nothing to disclose.
Kamal Gupta: This author has nothing to disclose.
Kamal Gupta: This author has nothing to disclose.

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**C-053**

**Title:** Infrapopliteal Angioplasty: Are drug coated balloons the preferred choice?

**Category:** Endovascular and Peripheral Interventions (Including Neurovascular and Carotid)

**Authors:** Hemantha Koduri, Creighton University School of Medicine, United States; Arun Kanmanthareddy, Creighton University School of Medicine, United States; Alok Saurav, Creighton University School of Medicine, United States; Venkata Alla, Creighton University School of Medicine, United States; Claire Hunter, Creighton University School of Medicine, United States; Aryan Mooss, Creighton University School of Medicine, United States; Michael Del Core, Creighton University School of Medicine, United States

**Background:** Drug Coated Balloons (DCBs) have demonstrated improved clinical outcomes compared to balloon angioplasty (BA) in patients undergoing infringuinal angioplasty. However infrapopliteal disease was underrepresented in these trials. We performed a meta-
C-059

Title: Angiographic characterisation of the internal pudendal artery in male patients with erectile dysfunction: the CAPIDE study. Preliminary results.

Category: Endovascular and Peripheral Interventions (Including Neurovascular and Carotid)

Authors: María López-Benito, Complejo Asistencial Universitario de León, Spain; Armando Pérez de Prado, Complejo Asistencial Universitario de León, Spain; Miguel Angel Alonso, Complejo Asistencial Universitario de León, Spain; Carlos Cuellas, Complejo Asistencial Universitario de León, Spain; Rodrigo Estévez Loureiro, Complejo Asistencial Universitario de León, Spain; Felipe Fernández-Vázquez, Complejo Asistencial Universitario de León, Spain

Background: The prevalence of erectile dysfunction is high, with a deep impact in patients’ self-esteem and quality of life.

The aim of this study is to indentify, in patients with non-respondent to medical treatment ED, a vascular etiology (arterial, venous or mixed) and to evaluate the presence of stenosis of the internal pudendal arteries (IPAs) potentially treatable by means of a zotaralimus eluting stent.

Methods: An observational prospective study was designed, with ongoing recruitment of patients meeting the following inclusion criteria: males >18 years old, non-respondent to pharmacological treatment (with Phosphodiesterase 5 inhibitors) ED, data of vascular etiology (arterial, venous or mixed) in penile Doppler, and written informed consent. Patients with chronic renal disease with a glomerular filtration rate <30 mL/min or in whom selective catheterization of the IPAs could not be achieved were excluded. Through radial access with a 4F 140 cm length catheter, angiographies of both iliac arteries and IPAs and measurement of vessel diameters and percentage of stenosis were obtained.

Results: A total of 10 patients, median age 59 years old (IQ 44.8-63.5) have been included so far. In 50% of the patients, an isolated Catheterization and Cardiovascular Interventions DOI 10.1002/ccd. Published on behalf of The Society for Cardiovascular Angiography and Interventions (SCAI).

analysis of randomized controlled trials (RCTs) comparing DCB vs BA in patients with infrapopliteal peripheral vascular disease (IP-PVD).

Methods: PubMed, EBSCO and Google Scholar databases were electronically queried for RCTs comparing outcomes of DCB vs BA in patients with IP-PVD. We calculated risk ratios (RR) and 95% CIs using random-effects models for the outcomes of target lesion revascularization (TLR), patency rates (PR), major adverse events (MAE), death and Risk Difference (RD) for major amputations (MA). RevMan 5.3 was used for statistical analysis.

Results: Three RCT’s with a total of 462 patients met inclusion criteria. There is a statistically non-significant trend with a lower RR for TLR in the DCB vs BA group (RR 0.71; 95% CI: 0.42-1.20, p = 0.2). Similarly, there was a trend towards higher PR with the DCB group (RR 1.23; 95% CI: 0.8-1.88, p = 0.35). RD for MA was 0.01(95% CI: –0.05 – 0.06) P = 0.76, the RR for MAE was 0.87 (95% CI is 0.58-1.31, p = 0.5) and death was 1.36 (95% CI 0.74-2.51, p = 0.32) in the DCB vs BA, all non-significant. Refer to Table 1

Conclusion: In this meta-analysis DCBs showed a trend towards improved PR and decreased TLR vs BA. The lack of significance could be due to the small number of patients resulting in low statistical power.

Disclosures:

Hemantha Koduri: This author has nothing to disclose.

Arum Kannanahareddy: This author has nothing to disclose.

Alok Saurav: This author has nothing to disclose.

Venkata Alla: This author has nothing to disclose.

Claire Hunter: This author has nothing to disclose.

Aryan Moos: This author has nothing to disclose.

Michael Del Core: This author has nothing to disclose.

C-062

Title: Comparison of In-Hospital Outcomes and Complications between Transfemoral and Transapical Approaches for Patients Undergoing Transcatheter Aortic Valve Replacement in the United States: Analysis of 8,903 Procedures

Category: Endovascular and Peripheral Interventions (Including Neurovascular and Carotid)

Authors: Kasra Moazzami, Rutgers University, United States; Elena Dalmatova, Rutgers University, United States; Marc Klaploch, Rutgers University, United States; Justin Sambol, Rutgers University, United States; Alfonso H Waller, Rutgers University, United States

Background: Transcatheter aortic valve replacement (TAVR) has been developed as a novel therapeutic modality for patients with aortic stenosis. However, limited studies have compared the in-hospital outcomes and complications between the transfemoral and transapical TAVR approaches.

Methods: Using the nation’s largest hospitalization database, all patients who underwent TAVR through transfemoral or transapical approaches were identified between the years of 2011 and 2012. The International Classification of Diseases, Ninth Revision, Clinical Modification procedure codes were used to identify the study population. Endpoint outcomes included in-hospital mortality, procedural complications, length of stay, and cost of hospitalization.

Results: A total of 8,903 patients undergoing TAVR (7,362 transfemoral and 1,541 transapical) were identified. At baseline, patients receiving transfemoral TAVR were older (81.70 versus 78.67, P < 0.001) and more likely to be male (P = 0.02). The transfemoral TAVR group had higher rates of hypertension, ischemic heart disease, diabetes mellitus, congestive heart failure and chronic kidney disease than the transapical group. In contrast, patients undergoing the transapical approach had higher rates of peripheral vascular disease, atrial fibrillation and history of malignancy. Multivariate adjusted analysis did not reveal any significant differences between the groups regarding any of the clinically relevant end points including in-hospital mortality as well as vascular, cardiac, respiratory, neurological or infectious complications. Finally, while no significant differences existed between the transfemoral group...
and the transapical group with respect to hospitalization costs ($57,259 versus $56,814, P = 0.6), the mean length of stay was significantly higher among patients who received the transapical TAVR route compared to the group who underwent transfemoral TAVR (10 vs 8 days, P < 0.001).

Conclusion: In-hospital mortality, complication rates and cost of hospitalization do not differ between patients undergoing transfemoral or transapical TAVR procedures. The transapical approach is associated with longer length of hospital stays compared to transfemoral route.

Disclosures:
Kasra Mozzami: This author has nothing to disclose.
Elena Doltamova: This author has nothing to disclose.
Marc Klapholz: This author has nothing to disclose.
Justin Sambol: This author has nothing to disclose.
Alfonso H Waller: This author has nothing to disclose.

C-063

Title: Comparison of Subclavian artery angioplasty outcomes in patients with Takayasu's aortoarteritis and atherosclerosis

Category: Endovascular and Peripheral Interventions (Including Neurovascular and Carotid)

Authors: Hammad Momin, Ruby Hall Clinic, Grant Medical Foundation, India; CN Makale, Ruby Hall Clinic, Grant Medical Foundation, India; Sunil Sathe, Ruby Hall Clinic, Grant Medical Foundation, India; Manuel Durairaj, Ruby Hall Clinic, Grant Medical Foundation, India; purvez Grant, Ruby Hall Clinic, Grant Medical Foundation, India; Varun Nivergi, Ruby Hall Clinic, Grant Medical Foundation, India; Jai Bhalke, Ruby Hall Clinic, Grant Medical Foundation, India

Background: Takayasu’s disease is a form of large vessel granulomatous vasculitis. It is not uncommon in India. Due to obstruction of the main branches of the aorta, including the left common carotid artery, the brachiocephalic artery, and the left subclavian artery, Takayasu’s arteritis can present as pulseless upper extremities. Percutaneous transluminal angioplasty is one modality of treatment in such patients. In our study we have compared the outcomes of Subclavian stenting in patients of Takayasu’s aortoarteritis with atherosclerosis.

Methods: 38 subclavian artery angioplasties were performed in 38 consecutive patients with aortoarteritis (n=7) and atherosclerosis (n=31) between years 2000 and 2010. An arch aortogram followed by a selective subclavian artery angiogram was done to profile the site and extent of the lesion, its relation to the vertebral artery, and the distal circulation. Percutaneous transluminal angioplasty (PTA) was performed via the femoral route for 36 stenotic lesions and 3 total occlusions.

Results: PTA was successful in 32 (88.8%) stenotic lesions and 1 (33.3%) total occlusions. 2 patients (5.26%) had complications, that could be effectively managed nonsurgically. Compared with atherosclerosis, patients with aortoarteritis were younger with significant p value, more often female (71.42% vs 16.12%; P < 0.001), and diffuse involvement was seen more often (42.8% vs 3.2%; P < 0.001). Higher balloon inflation pressure was required to dilate the lesions of aortoarteritis ($130±4.6$ $\text{ATM}$ vs $5.5±1.0$ $\text{ATM}; p<0.001$). There were no neurological sequelae. On 3–48 months follow-up, restenosis was more often seen in patients with aortoarteritis, particularly in those with diffuse arterial narrowing. These lesions could be effectively redilated. Clinical symptoms showed marked improvement after successful angioplasty.

Conclusion: Subclavian PTA is safe and can be performed as effectively in aortoarteritis as in atherosclerosis, with good long-term results. Long-term follow-up shows that it provides good symptomatic relief.
C-074

Title: Real World Experience of Zilver PTX (ZPTX): A Single Center Review of Lesions Involving the Ostium of the Superficial Femoral Artery (OSFA)

Category: Endovascular and Peripheral Interventions (Including Neurovascular and Carotid)

Authors: John Phillips, OhioHealth Heart & Vascular Physicians, United States; Aaron Whipp, OhioHealth Riverside Methodist Hospital, United States; Melissa Troyan, OhioHealth Riverside Methodist Hospital, United States; Blake Reid, Purdue University, United States; Anna Falls, Medical University of Ohio, United States; Samer Sadaai, Medical University of Ohio, United States; Gary Ansel, OhioHealth Heart & Vascular Physicians, United States

Background: Stent approval trials, including ZPTX, in the superficial femoral artery (SFA) excluded lesions within 1 cm of the ostium. Currently no data set has specifically looked at the treatment of OSFA stents. We describe patency and target lesion revascularization (TLR) in patients (PTS) treated with ZPTX including OSFA in pre-procedural lengths ≤20 cm vs. >20 cm through 24 months.

Methods: 89 PTS treated from U.S. release of ZPTX to recall, and 77 survived to 1 year are included. Demographic, characteristics, and outcomes are described using frequencies and percentages. Duplex scans were completed in a certified lab with PTS not identified as having ZPTX. Demographic, characteristics, outcomes by OSFA, and length were examined using chi-square or Fisher’s exact tests for categorical variables, two-sample t-tests or Wilcoxon rank sum tests for continuous variables. Statistical significance was p < 0.05.

Results: Rutherford 2-6 were included with mean of 3.3. No differences were noted between groups. The mean lesion was 241.6 mm (SD: 115.6; median: 240; range 40.0-460.0) with 54.5% lesion >20cm. The mean lesion in the ≤20 cm cohort was 133.0 mm, while 332.0 mm in the >20 cm. Lesions >20 cm required greater ostial treatment (47.6%) compared to 22.9% of ≤20 cm.

Conclusion: This single center registry, is the first to report outcomes of ZPTX in OSFA. Prevalence of OSFA treatment is frequent in lesions >20 cm with a trend towards higher restenosis and TLR, though not statistically significant.

Disclosures:
John Phillips: 8 Cook Medical
Aaron Whipp: This author has nothing to disclose.
Melissa Troyan: This author has nothing to disclose.
Blake Reid: This author has nothing to disclose.
Anna Falls: This author has nothing to disclose.
Samer Sadaai: This author has nothing to disclose.
Gary Ansel: 9 Co-PI Zilver PTX Trial

C-073

Title: The Full Metal Jacket: A Single Center Review of Zilver PTX (ZPTX) for Treating Peripheral Arterial Disease (PAD) in the Superficial Femoral Artery (SFA) in TASC C and D lesions

Category: Endovascular and Peripheral Interventions (Including Neurovascular and Carotid)

Authors: John Phillips, OhioHealth Heart & Vascular Physicians, United States; Maurice Alston, Doctors Hospital, United States; Melissa Troyan, OhioHealth, United States; Anna Falls, Medical University of Ohio, United States; Aaron Whipp, Riverside Methodist Hospital, United States; Charles Botti, OhioHealth Heart & Vascular Physicians, United States; Michael Jolly, OhioHealth Heart & Vascular Physicians, United States; Mitchell Silver, OhioHealth Heart & Vascular Physicians, United States; Gary Ansel, OhioHealth Heart & Vascular Physicians, United States

Background: Food and Drug Administration approval for the ZPTX stent in treating PAD in the SFA, was predicated on superior rates of patency and reduction in revascularization when compared standard therapy, with an average trial lesion length of 6.3 cm. Outcomes data on longer and more complex TASC C and D lesions is limited. We describe and compare the patency and repeat procedure outcomes in patients treated with the ZPTX stent, with pre-procedural lesion lengths of ≤20 cm vs. >20 cm through 24 months post-procedure.

Methods: 89 patients (pts) were treated from release of ZPTX in the US to product recall, 77 survived to 1 year and were included. Demographic, characteristics, and outcomes were described using frequencies and percentages. Duplex follow up was completed in a certified lab and pts were de-identified. Comparisons were made by lesion length, ≤20 cm (N=35) vs. >20 cm (N=42), and were examined using chi-square or Fisher’s exact tests for categorical variables and two-sample

<table>
<thead>
<tr>
<th>Variable</th>
<th>Length ≤20 cm (n=35)</th>
<th>Length &gt;20 cm (n=42)</th>
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<td></td>
<td>Ostial Treatment (n=5)</td>
<td>Non-ostial Treatment (n=30)</td>
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<td>Restenosis &gt;50% ≤13 mo. n (%)</td>
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<td>Restenosis &gt;50% &gt;13 mo. n (%)</td>
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<td>TLR &gt;13 mo. n (%)</td>
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</table>

Catheterization and Cardiovascular Interventions DOI 10.1002/ccd.
Published on behalf of The Society for Cardiovascular Angiography and Interventions (SCAI).
t-tests or Wilcoxon rank sum tests for continuous variables. Statistical significance was set at \( p < 0.05 \).

**Results:** Rutherford class 2-6 were included with no difference between groups. Overall mean lesion length was 241.6 mm (SD: 115.6; median: 240; range 40.0-460.0) with 54.5% having lesion length of >20. The mean lesion length in the \( \leq 20 \) cm cohort was 133.0 mm (SD: 54.1), and 332.0 mm (SD: 62.4) in the >20 cm cohort. Lesions >20 cm required greater ostial treatment 47.6%, with 76.2% chronic total occlusions, compared to 14.3% and 22.9% respectively, of the \( \leq 20 \) cm lesions. There was no statistical difference in rates of restenosis at \( \leq 13 \) months, 18.5% vs. 41.2%, (p=0.058) and 24 months, 35.3% vs. 50.0%, (p=0.330) between the two groups. Retreatment at 13 months was statistically higher 2.9% vs. 23.8% (p=0.009), and not significant, but trended higher, at 24 months 8.6% vs. 22.0% (p=0.111). By 24 months 6 patients in the >20 cm cohort required surgical bypass with zero in the \( \leq 20 \) cm group, 0% vs. 14.6% (p=0.021).

**Conclusion:** This registry demonstrates that the use of Zilver PTX in lesions >20 cm shows increased but acceptable restenosis and target lesion revascularization at 13 and 24 months, without major adverse limb events.

**Disclosures:**
John Phillips: 8 Cook Medical
Maurice Alston: This author has nothing to disclose.
Melissa Troyan: This author has nothing to disclose.
Anna Falls: This author has nothing to disclose.
Aaron Whip: This author has nothing to disclose.
Charles Botti: 8 Cook Medical
Michael Jolly: 8 Cook Medical
Mitchell Silver: 8 Cook Medical
Gary Ansel: 9 Co-National PI for Zilver PTX RCT

**C-003**

**Title:** Novel Kidney Injury Biomarkers may Help Predict the Clinical Response to Renal Artery Stenting

**Category:** Endovascular and Peripheral Interventions (Including Neurovascular and Carotid)

**Authors:** Anand Prasad, UT Health Science Center San Antonio, United States; Joel Michalek, University of Texas Health Sciences Center at San Antonio, United States; Brian Hernandez, University of Texas Health Sciences Center at San Antonio, United States; Ravindra Mehta, UCSD Medical Center, United States; Ehtisham Mahmud, UCSD Medical Center, United States; Sotirios Tsimikas, UCSD Medical Center, United States; Manjusha Ilapakurti, UCSD Medical Center, United States; Travis Israel, UCSD Medical Center, United States; Peter McCullough, Baylor Heart and Vascular Hospital, Dallas, TX, United States

**Background:** Renal artery stenting remains a controversial therapy for patients with renal artery stenosis (RAS). Acute kidney injury (AKI) during stenting may play a role in mitigating the response to revascularization. We sought to evaluate whether novel urine levels of AKI biomarkers would be related to changes in blood pressure (BP) or renal function following stenting.

**Methods:** Patients with a unilateral RAS (\( \geq 60\% \)) undergoing stenting were included, 24hr ambulatory BP measurements were made at baseline and at 6 weeks following the procedure. Serum creatinine was measured at baseline, 48-72 hrs, and at 6 weeks. Urinary biomarkers were measured at baseline, at 2, 4, 12, and 24 hrs post stenting, and included: epidermal growth factor (EGF), neutrophil gelatinase associated lipocalin (NGAL), osteopontin, uromodulin, kidney injury molecule-1 (KIM-1), liver-type fatty acid binding protein (LFABP), and interleukin-18 (IL-18). The clinical variables and biomarkers were examined with respect to changes in BP and creatinine using multivariable regression models.

**Results:** The study included 21 patients. Mean age of 67.7 ± 9.4 yrs. eGFR: 55.2 ± 18.3 ml/min. The baseline % RAS was 72.0 ± 10.3. SBP at baseline was 147.7 ± 17.9 and 134.6 ± 13.6 mmHg at 6 weeks (\( P=0.019 \)). Antihypertensive medications were reduced at follow up (3.5 ± 1.1 vs. 3.0 ± 1.0, \( P=0.002 \)). Age and BMI inversely related to reduction in SBP (\( P=0.003, 0.002 \)). Baseline NGAL levels were inversely related to reduction in SBP and baseline KIM-1 was directly related to reduction in SBP (\( P=0.001 \)). Delta (Peak-Baseline) Uromodulin levels and KIM-1 levels were associated with change in serum creatinine at 48-72 hours (\( P=0.01, 0.04 \)). Baseline EGF was inversely associated with creatinine rise at 48-72 hours (\( P=0.009 \)). Age, BMI, baseline Osteopontin, and KIM1 levels were directly related to % increase in creatinine at 6 weeks, (\( P<0.05 \)).

**Conclusion:** Baseline NGAL and KIM-1 levels appear to be related to BP response post RAS stenting. Baseline and acute change in Osteopontin, KIM-1, EGF levels may be related to renal function post stenting. Further evaluation of the clinical utility of these renal injury biomarkers in the setting of RAS is needed.

**Disclosures:**
Anand Prasad: This author has nothing to disclose.
Joel Michalek: This author has nothing to disclose.
Brian Hernandez: This author has nothing to disclose.
Ravindra Mehta: This author has nothing to disclose.
Ehtisham Mahmud: This author has nothing to disclose.
Sotirios Tsimikas: This author has nothing to disclose.
Manjusha Ilapakurti: This author has nothing to disclose.
Travis Israel: This author has nothing to disclose.
Peter McCullough: This author has nothing to disclose.

**C-080**

**Title:** Outcomes of Concomitant Percutaneous Carotid and Coronary Revascularization: A National Inpatient Sample Based Study

**Category:** Endovascular and Peripheral Interventions (Including Neurovascular and Carotid)

**Authors:** Alok Saurav, CHI health Creighton University Medical Canter, United States; Arun Kamanth Reddy, CHI health Creighton University Medical Canter, United States; Aiman Smer, CHI health Creighton University Medical Canter, United States; Venkata Mahesh Alla, CHI health Creighton University Medical Canter, United States; Anand Prasad, UT Health Science Center San Antonio, United States; Brian Hernandez, University of Texas Health Sciences Center at San Antonio, United States; Ravindra Mehta, UCSD Medical Center, United States; Ehtisham Mahmud, UCSD Medical Center, United States; Sotirios Tsimikas, UCSD Medical Center, United States; Manjusha Ilapakurti, UCSD Medical Center, United States; Travis Israel, UCSD Medical Center, United States; Peter McCullough, Baylor Heart and Vascular Hospital, Dallas, TX, United States

**Background:** There is limited data on outcomes of concomitant percutaneous coronary intervention (PCI) & carotid stenting (CAS) for management of coexisting coronary & carotid stenosis in United States.

**Methods:** We queried National Inpatient Sample (NIS) database from 2005 through 2012 using ICD 9 codes to identify concomitant CAS (036.63) & PCI (36.06, 36.07) cases done during the same hospitalization and associated clinical & procedural outcomes. All estimates were appropriately weighted considering the complex sample design of Catheterization and Cardiovascular Interventions DOI 10.1002/ccd.

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the NIS database. Patients were further classified into same-day (group A) & staged (group B: PCI before CAS, group C: CAS before PCI) procedure groups.

**Results**: A total of 1155 (weighted) combined procedures took place in the United States during the study period. Mean age was 71.1 years, 41.4% were males, & 70.4% were whites. Mean Charlson comorbidity Index was lowest among group A (same day) as compared to groups B & C (1.67 vs 2.92 vs 2.41, respectively). Overall, the rate of in-hospital death (1.92%) & periprocedural stroke (1.25%) was low and was due to group B. Occurrence of cardiac complications (cardiac arrest, cardiopulmonary failure), pacemaker implantation, kidney injury & bleeding were lowest in the same day group (A) compared to staged (B & C) procedure groups (see table). Length of stay was considerably longer in the groups B & C compared to group A.
Conclusion: Concomitant PCI and CAS procedures are associated with acceptable procedural complications rate. Same day PCI & CAS procedure appears to have the best peri-procedure safety profile and shortest hospital stay.

Disclosures:
Alok Saurav: This author has nothing to disclose.
Arun Kanmantha Reddy: This author has nothing to disclose.
Aiman Smer: This author has nothing to disclose.
Saurabh Aggrawal: This author has nothing to disclose.
Venkata Mahesh Allia: This author has nothing to disclose.
Manu Kaushik: This author has nothing to disclose.
Michael White: This author has nothing to disclose.
Claire Hunter: This author has nothing to disclose.
Syed Mohiuddin: This author has nothing to disclose.
Michael DelCore: This author has nothing to disclose.

C-082

Title: Role of Preloading Aspirin and Clopidogrel for Endovascular Interventions in Peripheral Arterial Disease Patients

Category: Endovascular and Peripheral Interventions (Including Neurovascular and Carotid)

Authors: Aravinda Nanjundappa, West Virginia University, Charleston Division and CAMC, United States; Steven Stefano, CAMC Health Education and Research Institute, United States; Stephanie Thompson, CAMC Health Education and Research Institute, United States; Kuldeep Shah, West Virginia University, Charleston Division and CAMC, United States

Background: Patients who fail medical therapy for peripheral arterial disease (PAD) may benefit from endovascular revascularization. Preloading coronary artery disease patients prior to revascularization has shown to reduce risk of myocardial infarction, stroke and death.

Methods: A retrospective study of 250 patients who underwent lower extremity endovascular interventions and discharged on ASA and clopidogrel were included. The primary end points were stroke, myocardial infarction and death. The secondary endpoints were life threatening bleeding and blood transfusions.

Results:

Conclusion: Preloading PAD patients prior to revascularization did not show any benefit in reducing perioperative and 30 day adverse events. Preloading patients increased the incidence of life threatening bleeding and blood transfusions.

Disclosures:
Aravinda Nanjundappa: This author has nothing to disclose. Steven Stefano: This author has nothing to disclose. Stephanie Thompson: This author has nothing to disclose.
Kuldeep Shah: This author has nothing to disclose.

C-085

Title: Retrograde popliteal access interventions for chronic total superficial femoral artery occlusions.

Category: Endovascular and Peripheral Interventions (Including Neurovascular and Carotid)

Authors: Sanjiv Sharma, Bakersfield Heart Hospital, United States; Sanjiv Sharma, Central Cardiology Medical Clinic, United States; Brijesh Bhambi, Central Cardiology Medical Clinic, United States; Brijesh Bhambi, Bakersfield Heart Hospital, United States; Neil Bhambi, Bakersfield Heart Hospital, United States; Neil Bhambi, Central Cardiology Medical Clinic, United States; Rohan Sharma, Central Cardiology Medical Clinic, United States; Joel Lardizabal, Central Cardiology Medical Clinic, United States

Abstracts S57

Catheterization and Cardiovascular Interventions DOI 10.1002/ccd. Published on behalf of The Society for Cardiovascular Angiography and Interventions (SCAI).
Background: Percutaneous vascular intervention (PVI) of superficial femoral artery (SFA) chronic total occlusions (CTO) is routinely attempted via antegrade access from contralateral or ipsilateral femoral approach. This is sometimes unsuccessful since the proximal cap of the total occlusion is more fibrotic and calcified.

Methods: We performed retrograde popliteal access for PVI of SFA CTOs in 21 cases that had been attempted for intervention via antegrade access unsuccessfully. Popliteal artery access was obtained with fluoroscopic (n=14) or ultrasonographic guidance (n=6), using a micropuncture access needle with the patient in a prone position. In one case access was unsuccessful. A stiff angled Terumo guidewire with a Trailblazer catheter was used to cross the CTO. Recentry into the true lumen was confirmed by easy torqueability of the Terumo guidence wire proximal to the CTO. Then a 4 or 5 mm balloon was used to predilate the entire length of the CTO and angiography repeated. Stenting was reserved for bailout in the event of slow flow or flow limiting dissection. Arterial duplex US or CT angiography was done at 2 weeks to evaluate continued patency and at 4 months to evaluate for restenosis.

Results: In 16 cases brisk antegrade flow was reestablished and no additional intervention was necessary after plain balloon angioplasty. In 2 cases stenting of the focal dissection was carried out to maintain patency. In 2 cases the occlusion could not be crossed. Arterial duplex ultrasonography or CT angiography in 2 weeks showed continued patency of the vessel in 15 cases. The 3 cases where reocclusion occurred were successfully reopen again via antegrade contralateral femoral access. All patients with successful intervention had relief of their claudication symptoms and/or rapid healing of the slow or non-healing foot ulcer. Restenosis after 4 months occurred in 4 cases necessitating repeat intervention with Silverhawk atherectomy (n=3) or drug coated balloon (n=1).

Conclusion: Overall the success of the retrograde popliteal approach is in the order of 85%. It is a viable revascularization option when antegrade access from contralateral or ipsilateral femoral approach fails in chronic total superficial femoral artery occlusions.

Disclosures:
Sanjiv Sharma: 2 Astra Zeneca, 8 Eli Lilly, 8 Novartis, 8 Daiichi Sankyo
Sanjiv Sharma: 8 Daiichi Sankyo
Brijesh Bhambi: This author has nothing to disclose.
Brijesh Bhambi: This author has nothing to disclose.
Neil Bhambi: This author has nothing to disclose.
Neil Bhambi: This author has nothing to disclose.
Rohan Sharma: This author has nothing to disclose.
Joel Lardizabal: This author has nothing to disclose.

C-087

Title: Mid-term outcomes after infrapopliteal (IP) interventions in patients with critical limb ischemia (CLI) based on the new “TASC II classification of below-the-knee arteries.”

Category: Endovascular and Peripheral Interventions (Including Neurovascular and Carotid)

Authors: Gagan Singh, UC Davis Medical Center, United States; Ehrin Armstrong, UC Davis Medical Center, United States; Ehrin Armstrong, Denver VA Medical Center, United States; Justin Hildebrand, UC Davis Medical Center, United States; Stephen Waldo, Denver VA Medical Center, United States; Ray Foley, University Of Colorado Denver, United States; John Laird, UC Davis Medical Center, United States

Background: The predictive value of the new IP TASC II schema is uncertain and not based on clinical data. Clinical and procedural Catheterization and Cardiovascular Interventions DOI 10.1002/ccd.

Published on behalf of The Society for Cardiovascular Angiography and Interventions (SCAI). outcomes of IP interventions in CLI patients based on the new schema were analyzed.

Methods: A single center retrospective chart review was performed on CLI patients undergoing endovascular treatment from 2006 to 2013. Patient, procedural, angiographic, and outcomes were compared for the new TASC A/B vs. C/D classification for IP lesions.

Results: 95 patients had 138 IP TASC lesions classified. 52 patients (55%) had TASC A/B lesions while 43 (45%) had TASC C/D. Baseline demographics, tissue loss (95% vs 92%; p=0.3) and TBIs (0.25±0.13 vs 0.26±0.12, p=0.7) were similar between the two groups. TASC A/B lesions were shorter (48±25 vs 185±74 mm, p<0.0001), less severely stenosed (80±19 vs 97±9%, p<0.0001), larger vessel diameter (2.9±0.5 vs 2.5±0.5, p<0.0001), and less likely CTOs (24% vs 76%; p<0.001) when compared to the C/D group. Lesion success rates were higher in the A/B group (99% vs 78%, p<0.001) with higher 1yr primary patency in the A/B group (Figure 1). Procedural success was similar between the two groups 96% A/B vs 88% C/D, p=0.2 with no difference in 1yr amputation free survival (66% A/B vs 73% C/D, p=0.8).

Conclusion: TASC C/D lesions are associated with lower lesion success rates and lower primary patency compared to TASC A/B lesions, but similar 1yr amputation free survival. Further studies are needed to assess the association between TASC C/D infrapopliteal lesions and clinical outcomes.

Disclosures:
Gagan Singh: This author has nothing to disclose.
Ehrin Armstrong: This author has nothing to disclose.
Justin Hildebrand: This author has nothing to disclose.
Stephen Waldo: This author has nothing to disclose.
Ray Foley: This author has nothing to disclose.
John Laird: This author has nothing to disclose.

C-091

Title: Relationship Between Neutrophil-Lymphocyte Ratio and Severity of Lower Extremity Peripheral Artery Disease in Patients Undergoing Peripheral Angiography

Category: Endovascular and Peripheral Interventions (Including Neurovascular and Carotid)

Authors: Jacob Teperman, New York University School of Medicine, United States; Mallory P. Barnett, New York University School of Medicine, United States; David Carruthers, New York University School
of Medicine, United States; Michael Pillinger, New York University School of Medicine, United States; Steven P. Selidis, New York University School of Medicine, United States; Anvar Babaev, New York University School of Medicine, United States; Michael Attubato, New York University School of Medicine, United States; Cezar S. Staniloea, New York University School of Medicine, United States; Binita Shah, New York University School of Medicine, United States.

**Background:** Unlike for coronary artery disease, the association between neutrophil-lymphocyte ratio (NLR) and peripheral artery disease (PAD) has not been well established. The aim of this study was to determine the association between neutrophil-lymphocyte ratio and the severity of lower extremity peripheral artery disease.

**Methods:** A retrospective chart review analysis identified 928 patients referred for peripheral angiography at a tertiary care center between December 2012 and June 2015. NLR was assessed from routine pre-procedural hemograms with automated differentials and available in 733 (79%) patients. Outcomes of interest included extent of disease on peripheral angiography and target vessel revascularization. Median follow-up was 10.4 months. Odds ratio (OR) [95% confidence intervals] was assessed using a logistic regression model.

**Results:** There was a significant association between elevated NLR and the presence of severe multi-level PAD versus isolated suprapopliteal or isolated infrapopliteal disease (OR 1.42 [1.18-1.70], p<0.001). This association between NLR and severe multi-level PAD remained significant even after adjustment for age (OR 1.31 [1.09-1.58], p=0.004); age, sex, race, and body mass index (OR 1.27 [1.05-1.5], p=0.015); and age, sex, race, body mass index, hypertension, diabetes, coronary artery disease, and creatinine (OR 1.25 [1.03-1.53], p=0.024). In patients who underwent endovascular intervention (n=523), there was no significant difference in the rate of target vessel revascularization on follow-up across tertiles of NLR (1st tertile 14.8%, 2nd tertile 14.1%, 3rd tertile 20.1%; p=0.32).

**Conclusion:** In a contemporary cohort of patients undergoing peripheral angiography with possible endovascular intervention, elevated NLR was independently associated with severe multi-level PAD.

**Disclosures:**

Jacob Teperman: This author has nothing to disclose.

Mallory P. Barnett: This author has nothing to disclose.

David Carruthers: This author has nothing to disclose.

Michael Pillinger: This author has nothing to disclose.

Steven P. Selidis: This author has nothing to disclose.

Anvar Babaev: This author has nothing to disclose.

Michael Attubato: This author has nothing to disclose.

Cezar S. Staniloea: This author has nothing to disclose.

Binita Shah: This author has nothing to disclose.

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**C-026**

**Title:** Comparative Analysis of Patient Selection and Outcomes in Carotid Artery Stenting among Different Specialties

**Category:** Endovascular and Peripheral Interventions (Including Neurovascular and Carotid)

**Authors:** Fareed Moses Collado, Rush University Medical Center, United States; Enrique Campos, Rush University Medical Center, United States; Subeer Wadia, Rush University Medical Center, United States; Gaurav Sharma, Rush University Medical Center, United States; Youping Deng, Rush University Medical Center, United States; Yan Li, Rush University Medical Center, United States; R Jeffrey Snell, Rush University Medical Center, United States.

**Background:** Carotid artery stent (CAS) procedures are being performed by Interventional Cardiologists, Neurosurgeons, Neurologists, Interventional Radiologists (IR), and Vascular surgeons. Differences in patient selection and outcomes amongst these specialties have not been well characterized. Patient selection for CAS procedures is one of the limitations for these specialties for reimbursement.

**Methods:** We performed a single center retrospective comparative study on 247 patients who underwent CAS procedures from 2005 to 2013 at Rush University Medical Center. CAS procedures were most often performed by Neurosurgery and Neurology (n=144), followed by Interventional Cardiology (n=65) and by combined IR and Vascular Surgery (n=38). Patients at high risk were defined by having more than 70% carotid artery stenosis and presence of anatomic and/or clinical features used for inclusion in previous CAS high-risk trials. Chi-squared and Fisher’s Exact Test were used to compare demographic data. Multinomial logistic regression was used to calculate odds ratios on patient risk, symptom status, and outcomes.

**Results:** Compared to Interventional Cardiology, Neurosurgery and Neurology performed CAS procedures on high-risk patients less frequently (OR 0.475, CI 0.254-0.888, p<0.01) and on symptomatic patients more frequently (OR 3.769, CI 2.035-6.980, p<0.001). Patient selection characteristics between Interventional Cardiology and IR/Vascular Surgery were similar. No significant differences in the occurrence of stroke, myocardial infarction, and death were observed.

**Conclusion:** In this retrospective study of CAS procedures, significant differences exist in patient selection characteristics between specialties. Neurology and Neurosurgery treated lower risk patients who were more frequently symptomatic than Interventional Cardiology and Interventional Radiology/Vascular Surgery. Major adverse outcomes were similar, perhaps due to counter-balancing effects of risk and symptom status. Additional analysis of differences between specialties may help optimize the use of CAS by all providers. Our findings may also have implications for which specialists can perform CAS under current reimbursement limitations.

**Disclosures:**

Fareed Moses Collado: This author has nothing to disclose.

Enrique Campos: This author has nothing to disclose.

Subeer Wadia: This author has nothing to disclose.

Gaurav Sharma: This author has nothing to disclose.

Youping Deng: This author has nothing to disclose.

Yan Li: This author has nothing to disclose.

R Jeffrey Snell: This author has nothing to disclose.

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**C-005**

**Title:** First Clinical Experience with Targeted REnal Nerve Demodulation (TREND-1) using a Neurotropic Agent for the Treatment of Sympathetic Hypertension

**Category:** Endovascular and Peripheral Interventions (Including Neurovascular and Carotid)

**Authors:** MICHAEL Wholey, University of Texas Health Sciences Center at San Antonio, United States; HORST SIEVERT, CardioVascular Center Frankfurt, Frankfurt, Germany; Germany; Nicholas Kipshidze, Lenox Hill Hospital, United States; Vakhtang Kipiani, Center for Vascular and Heart Disease, Tbilisi, Georgia, Georgia.

**Background:** Aims: To evaluate the safety of a novel targeted neuro-modulatory treatment for sympathetic hypertension involving a one-time, local injection of neurotropic agents near renal nerves.

**Methods:** Seven patients suffering from uncontrolled hypertension per ESH-ESC guidelines were treated using a single dose of NW2013 (Northwind Medical, Inc. San Jose, California), a neurotropic Na+/K+ Catheterization and Cardiovascular Interventions DOI 10.1002/ccd. Published on behalf of The Society for Cardiovascular Angiography and Interventions (SCAI).
Neurovascular and Carotid disease (PAD): An alternative to femoral approach?

Authors: Albert Wu, Heart and Vascular Clinic of San Antonio, United States; WILLIAM WU, Heart and Vascular Clinic of San Antonio, United States; Subhash Banerjee, VA North Texas Healthcare System and UT Southwestern Medical Center at Dallas, United States; Atif Mohammad, VA North Texas Healthcare System and UT Southwestern Medical Center at Dallas, United States; HORST SIEVERT: This author has nothing to disclose.

Background: While women have similar prevalence of peripheral artery disease (PAD) as men, there are limited data on the outcomes in women following endovascular treatment.

Methods: We analyzed outcomes of 753 participants (317 women and 436 men) following endovascular intervention between 2005 and 2015 enrolled in the Excellence in Peripheral Arterial Disease (XLPAD) registry (NCT#01904851) with 12-month follow-up. The study excluded participants from Veterans Affairs hospitals. We examined the gender differences in all-cause death, repeat endovascular and surgical revascularization, and target limb amputation at 12 months. A mixed model with logit link was used to examine a gender difference in outcomes.

Results: At 12 month post-endovascular intervention, death (0.31%) and amputation (2.84%) rates were significantly lower in women than in men (death 3.67%, p = 0.009; amputation 7.57%, p = 0.046). There was no significant difference of surgical revascularization rate between women and men (Figure 1).

Conclusion: There are significant gender differences in 12-month clinical outcomes following endovascular intervention of PAD. Women have lower mortality and target limb amputation rates compared with men following endovascular treatment of PAD.

Disclosures: Hao Xu: This author has nothing to disclose.
HaeKyung Jeon-Slaughter: This author has nothing to disclose.
Atif Mohammad: This author has nothing to disclose.
Subhash Banerjee: This author has nothing to disclose.

C-096

Title: Gender Difference in Clinical Outcomes Following Endovascular Intervention for Peripheral Artery Disease

Category: Endovascular and Peripheral Interventions (Including Neurovascular and Carotid)

Authors: Hao Xu, VA North Texas Healthcare system and UT Southwestern Medical Center at Dallas, United States; HaeKyung Jeon-Slaughter, VA North Texas Healthcare system and UT Southwestern Medical Center at Dallas, United States; Atif Mohammad, VA North Texas Healthcare system and UT Southwestern Medical Center at Dallas, United States; Subhash Banerjee, VA North Texas Healthcare system and UT Southwestern Medical Center at Dallas, United States

Background: While women have similar prevalence of peripheral artery disease (PAD) as men, there are limited data on the outcomes in women following endovascular treatment.

Methods: We analyzed outcomes of 753 participants (317 women and 436 men) following endovascular intervention between 2005 and 2015 enrolled in the Excellence in Peripheral Arterial Disease (XLPAD) registry (NCT#01904851) with 12-month follow-up. The study excluded participants from Veterans Affairs hospitals. We examined the gender differences in all-cause death, repeat endovascular and surgical revascularization, and target limb amputation at 12 months. A mixed model with logit link was used to examine a gender difference in outcomes.

Results: At 12 month post-endovascular intervention, death (0.31%) and amputation (2.84%) rates were significantly lower in women than in men (death 3.67%, p = 0.009; amputation 7.57%, p = 0.046). However, repeat endovascular intervention rate was significantly higher in women (17.67%) than in men (13.53%, p = 0.046). There was no significant difference of surgical revascularization rate between women and men (Figure 1).

Conclusion: There are significant gender differences in 12-month clinical outcomes following endovascular intervention of PAD. Women have lower mortality and target limb amputation rates compared with men following endovascular treatment of PAD.

Disclosures: Hao Xu: This author has nothing to disclose.
HaeKyung Jeon-Slaughter: This author has nothing to disclose.
Atif Mohammad: This author has nothing to disclose.
Subhash Banerjee: This author has nothing to disclose.
Title: Right Atrial and Ventricular Function After Surgical and Percutaneous Closure of Atrial Septal Defect: A Strain Rate Imaging Study

**Background:** Two-dimensional (2D) strain analysis is a new tool to assess myocardial function. Strain and strain rate (SR) can quantify local myocardial function independent of the heart motion. The aim of this study was to compare the effects of surgical and device closure of atrial septal defects (ASD) on atrial and ventricular performance assessed by using strain and SR imaging.

**Methods:** In all, our study consisted of 45 patients: 15 patients after successful ASD device closure (ASD-D, atrial septal defect device closure group) aged 7.8 ± 4.3 years; 15 patients after successful ASD surgical closure (ASD-S, atrial septal defect surgical closure group) aged 7.5 ± 4.6 years and 15 healthy subjects of similar age distribution and characteristics as control group. All patients underwent ASD correction at least 6 months before the study. Peak right ventricular (RV) longitudinal strain, RV lateral and septal strain, peak atrial longitudinal strain (es) and SR during systole (SRs), SR during early RV filling (SRe) and late RV filling (SRa) were measured.

**Results:** In the ASD-D group there was no significant difference in both RA and RV deformation properties when compared with control subjects. In the ASD-S group the peak systolic strain and SR values were significantly reduced in RA and RV when compared with control and ASD-D groups.

**Conclusion:** Strain and SR imaging provide clinically acceptable a deep inspection on regional changes in atrial and ventricular function for patients with ASD. Our results showed that right atrial and ventricular regional performance assessed by 2D strain analysis is reduced after surgical closure, but not after transcatheter atrial septal defect closure. In contrast to surgery, transcatheter closure of atrial septal defect preserves atrial and right ventricular function.

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Denizhan Bagrul: This author has nothing to disclose.
Feyza Aysenur Pac: This author has nothing to disclose.
Ibrahim Ece: This author has nothing to disclose.
Serhat Koca: This author has nothing to disclose.
Mustafa Pac: This author has nothing to disclose.

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**Title:** The Impact of Hyperglycemia on Myocardial Scar Indices in Diabetic and Nondiabetic Patients With ST-Elevation Myocardial Infarction

**Abstracts S61**

**Authors:** Amirreza Solhpour, University of Texas Health Science Center at Houston, United States; Omar Hadidi, University of Texas Health Science Center at Houston, United States; Catalin Loghin, University of Texas Health Science Center at Houston, United States; Prakash Balan, University of Texas Health Science Center at Houston, United States; Salman Arain, University of Texas Health Science Center at Houston, United States; H. Vernon Anderson, University of Texas Health Science Center at Houston, United States; Richard Smalling, University of Texas Health Science Center at Houston, United States; Heinrich Taegtmeyer, University of Texas Health Science Center at Houston, United States.

**Conclusion:** Strain and SR imaging provide clinically acceptable a deep inspection on regional changes in atrial and ventricular function for patients with ASD. Our results showed that right atrial and ventricular regional performance assessed by 2D strain analysis is reduced after surgical closure, but not after transcatheter atrial septal defect closure. In contrast to surgery, transcatheter closure of atrial septal defect preserves atrial and right ventricular function.
Background: Hyperglycemia in ST-elevation myocardial infarction (STEMI) is related to adverse events. We examined the relationship between hyperglycemia and myocardial damage assessed by cardiac magnetic resonance imaging (CMR) in diabetics and non-diabetics with STEMI.

Methods: Consecutive 342 patients with first STEMI whose admission glucose levels were available were studied and divided into diabetic and non-diabetic patients. Each group was divided into 3 subgroups based on admission glucose level (Table). Demographic, clinical and angiographic data were compared between subgroups of both diabetics and non-diabetics. CMR was performed 3 to 5 days after STEMI for assessment of infarct size (IS) and microvascular obstruction (MVO).

Results: The 3 subgroups were well matched for age, cardiac risk factors, and ischemic time. In non-diabetic patients, both IS and MVO increased significantly across subgroups. In diabetic patients, normoglycemic and hyperglycemic patients had similar IS and MVO (p > 0.05), whereas patients with severe hyperglycemia had larger IS and MVO, compared to 2 other subgroups (Table).

Conclusion: In non-diabetic patients any level of hyperglycemia is associated with increased myocardial injury compared to normoglycemia. In contrast, in diabetic patients, only severe hyperglycemia is associated with increased myocardial injury.

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H. Vernon Anderson: This author has nothing to disclose.
Richard Smalling: This author has nothing to disclose.
Heinrich Taegtmeyer: This author has nothing to disclose.

C-060

Title: Geometry Matters: Degree of Circularity Predicts Aortic Regurgitation in First Generation Transcatheter Aortic Valve Replacement Valves: A comparison of the Sphericity Index and Eccentricity Index

Category: Imaging: CT, MR and Non-Invasive Imaging

Authors: Giorgio Medranda, Winthrop University Hospital, United States; Zack Williams, Winthrop University Hospital, United States; Paul Sapia, Winthrop University Hospital, United States; Kunal Brahmbhatt, Winthrop University Hospital, United States; Abdul Hafiz, Beth Israel Deaconess Medical Center, United States; Richard Schwartz, Winthrop University Hospital, United States; Kevin Marzo, Winthrop University Hospital, United States; Juan Gaztanaga, Winthrop University Hospital, United States; Beevash Ray, Winthrop University Hospital, United States; Rose Calixte, Winthrop University Hospital, United States; Stephen Green, Winthrop University Hospital, United States

Background: Aortic regurgitation (AR) is a known occurrence post transcatheter aortic valve replacement (TAVR), and has significant impact on morbidity and mortality. We have been evaluating our sphericity index (SI) and are now comparing it to the previous literature regarding the eccentricity index (EI) for predicting development of significant AR post-TAVR.

Methods: In this observational, retrospective study, we reviewed data on 350 TAVR patients at our institution from 2012-2015. Using multi detector computed tomography (MDCT), aortic annulus measurements were collected to calculate the SI and EI. SI was calculated by dividing the long diameter by the short diameter of the aortic annulus. EI was calculated and the patients dichotomized as described in the literature using pre-TAVR MDCTs. Pre-discharge transthoracic echocardiograms (TTEs) were used to determine degree of AR. Significant AR was Cathereterization and Cardiovascular Interventions DOI 10.1002/ccd. Published on behalf of The Society for Cardiovascular Angiography and Interventions (SCAI).

defined as moderate or severe AR. A receiver operating characteristic (ROC) curve was used to validate SI. We used the Youdin Index (d²) to determine the optimal cutoff point of SI. All analyses were done using SAS 9.4 ©.

Results: The 350 patients had a mean age of 83.3 ± 7.2 years, BMI was 27.3 ± 5.5 kg/m², 46.6% were male, and 92.3% were non-Hispanic White. Using Youdin Index the optimal SI cutoff was 1.33 and corresponds to the 75th percentile of deviation from a circle. There were 5.5% of patients with an SI of 1.33 or less who developed significant AR. In contrast, 22.4% of patients with an SI above 1.33 developed significant AR (p < 0.001). Sensitivity was 53% and specificity was 81%. When using the previously validated cutoff of 0.25 for EI, 5.4% of patients with an EI of 0.25 or less developed significant AR post-TAVR. In contrast, 23.6% of patients with an EI above 0.25 developed significant AR post-TAVR (p < 0.001). Sensitivity was 53% and specificity was 83%.

Conclusion: An SI above 1.33 predict AR and aid in risk stratification for intermediate risk patients prior to TAVR. An EI above 0.25 predict development of significant AR post-TAVR. Both SI and EI are predictive for the development of AR in first generation TAVR devices, with similar sensitivities and specificities. However, the SI is a more intuitive and direct calculation to predict significant AR.

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Abdul Hafiz: This author has nothing to disclose.
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Juan Gaztanaga: This author has nothing to disclose.
Beevash Ray: This author has nothing to disclose.
Rose Calixte: This author has nothing to disclose.
Stephen Green: This author has nothing to disclose.

C-088

Title: An Unusual Pattern of Myocardial Perfusion Defects Observed on SPECT-Myocardial Perfusion Imaging in a Patient with Hypereosinophilic Syndrome

Category: Imaging: CT, MR and Non-Invasive Imaging

Authors: Shailendra Singh, Hofstra North Shore-LIJ School of Medicine, United States; Loukas Boutis, Hofstra North Shore-LIJ School of Medicine, United States; Adam Auerbach, Hofstra North Shore-LIJ School of Medicine, United States; John Makaryus, Hofstra North Shore-LIJ School of Medicine, United States

Background: Hypereosinophilic Syndrome (HES) often presents a diagnostic challenge due to its nonspecific clinical presentation. The incidence of myocardial involvement of HES is estimated to be above 40% and as high as 84% in some series. The most common cardiac presentation of HES is the presence of endomyocardial fibrosis (EMF). While cardiac MR and echocardiography are most commonly used to evaluate patients with HES, we demonstrate the potential pitfalls of SPECT myocardial perfusion imaging (MPI) in patients with HES.

Methods: A 57-year-old woman with intermittent episodes of atypical chest pain was referred for pharmacologic rest-stress SPECT MPI using Tc-99m sestamibi prior to planned elective hip replacement. She had a documented history of peripheral hypereosinophilia in addition to a prior myocardial biopsy consistent with HES. Her transthoracic echocardiogram demonstrated normal left ventricular function. The patient had no symptoms during the stress test with no ECG changes and a normal hemodynamic response. Her perfusion images, however, showed large, moderate-to-severe defects in the inferior and lateral walls that...
were fixed but with hyperdynamic wall motion on gated imaging suggesting that the perfusion abnormalities were attributable to a process other than myocardial infarction. The defects did not correct with prone imaging and involved the lateral wall suggesting that diaphragmatic attenuation was not the likely culprit.

**Results:** As a result of the unusual perfusion findings, the patient’s physician referred her for cardiac catheterization prior to hip surgery. The catheterization revealed no significant coronary artery disease. In addition, a repeat echocardiogram revealed normal LV function and no regional wall motion abnormalities.

**Conclusion:** This case demonstrates the potential confounding effect of HES on the interpretation of routine myocardial perfusion imaging. While more investigation is needed to determine the causes of this unusual pattern of perfusion abnormalities (severely reduced perfusion with normal wall motion), this should prompt evaluation for EMF and HES in patients who have not been diagnosed with the disorder, and potentially more aggressive management of those patients with known HES.

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- Adam Auerbach: This author has nothing to disclose.
- John Makaryus: This author has nothing to disclose.
Leslie Tamura, Advocate Lutheran General Hospital, United States; Veit Sandfort, NIH, United States; Alan Brown, Advocate Lutheran General Hospital, United States; Mathew Budoff, Harbor UCLA Cardiology, United States

**Background:** The regional distribution of CAC improves CVD risk prediction. The association between common dyslipidemias (combined hyperlipidemia, [simple] hypercholesterolemia, dyslipidemia of metabolic syndrome [metS]), isolated low-density lipoprotein cholesterol, and isolated hypertriglyceridemia) compared with normolipidemia, and the regional distribution of CAC is underinvestigated.

**Methods:** 13,560 MESA (Multi-Ethnic Study of Atherosclerosis) participants, free of clinical CVD, were classified into 6 groups defined by specific low-density lipoprotein cholesterol, high-density lipoprotein cholesterol, or triglyceride cut points. Multivariate analysis evaluated the association with the number of calcified vessels after adjusting for CVD risk factors.

**Results:** Unadjusted analysis showed that all groups except for low-HDL had a statistically significant likelihood of having a higher number of affected coronary vessels as compared to the normolipidemia group (Table 1). Multivariate analysis adjusted for other risk factors showed that all groups except for hypertriglyceridemia had a statistically significant likelihood of having a higher number of affected coronary vessels (Table 2).

**Conclusion:** Our findings support previous studies that simple hypercholesterolemia, combined hyperlipidemia, and metS are associated with prevalent CAC. The distribution pattern of CAC provides different prognostic information. Our study is novel in that elucidating a relationship between the dyslipidemia types and CAC distribution. We also found low-HDL dyslipidemia is associated with increased CAC distribution, warranting further study.

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- Alan Brown: This author has nothing to disclose.
- Mathew Budoff: This author has nothing to disclose.

**INTRAVASCULAR IMAGING (IVUS/OCT/NIR/OTHER) AND PHYSIOLOGY (FFR/IFR/IMR/OTHER)**

**C-029**

**Title:** Near-Infrared Spectroscopy Imaging of Saphenous Vein Grafts: Insights from the Lipid CORE Plaque Association With Clinical Events Near-Infrared Spectroscopy (ORACLE-NIRS) Registry

**Category:** Intravascular Imaging (IVUS/OCT/NIR/Other) and Physiology (FFR/IFR/IMR/Other)

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**Background:** We sought to examine near-infrared spectroscopy (NIRS) imaging findings of aortocoronary saphenous vein grafts (SVGs).

**Methods:** We examined the clinical features and imaging findings of 40 patients who underwent NIRS imaging of SVGs at our institution between 2009-2015.

**Results:** Mean patient age was 67 ± 8 years and 98% were men, with high prevalence of diabetes mellitus (60%) and dyslipidemia (93%). Mean SVG age was 9 ± 7 years, mean total cholesterol was 148 ± 53 mg/dL, mean low density lipoprotein (LDL) cholesterol was 79 ± 37 mg/dL, mean high-density lipoprotein (HDL) cholesterol was 36 ± 13 mg/dL and mean triglyceride level was 178 ± 141 mg/dL. Mean SVG lipid core burden index (LCBI) was 63 ± 53 and mean maxLCBI was 240 ± 221. 18% of the patients had large SVG lipid core plaques (maxLCBI > 500). There was no significant association between LDL cholesterol, total cholesterol, or triglycerides and SVG LCBI or maxLCBI but higher HDL cholesterol tended to be associated with lower SVG maxLCBI (r = −0.368, p = 0.059). Older SVG age was associated with higher LCBI (r = 0.477, p = 0.002) (Figure 1) and a trend for higher maxLCBI (r = 0.327, p = 0.096). Percutaneous coronary...
intervention was performed in 67.5% of the study SVGs. Periprocedural myocardial infarction defined as post-procedural creatine kinase MB fraction (CK-MB) > 3 times the upper limit of normal occurred in one patient. An embolic protection device was used in 96% of SVG PCIs.

**Conclusion:** Older SVG age and lower HDL-cholesterol tend to be associated with higher SVG LCBI and maxLCBI and suggests that HDL cholesterol could be a modifiable factor for decreasing the risk of SVG atherosclerosis.

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**C-036**

**Title:** Atherosclerotic Plaque Motion Analysis: A Novel Software **Category:** Intravascular Imaging (IVUS/OCT/NIR/Other) and Physiology (FFR/iFR/IMR/Other) **Authors:** Perry Fisher, Mount Sinai Beth Israel, United States

**Background:** Atherosclerotic carotid bifurcation plaque rupture is a major cause of ischemic stroke. While much is known about the pathology of atherosclerotic plaques, the cause of plaque rupture is not entirely understood. It has been proposed that mechanical forces contribute to the phenomenon of plaque rupture or ulceration. These forces are produced by blood pressure oscillations, blood flow and blood vessel movement throughout the cardiac cycle. It has been suggested that asymptomatic plaques, which do not rupture, have all of their components moving in the same direction as they are influenced by mechanical forces. Conversely, plaques that tend to rupture display uncoordinated movement throughout the cardiac cycle. Therefore, discordant motion may be a determinant factor in symptomatology - a matter that this ongoing research aims to elucidate and a factor that may be able to predict risk.

**Methods:** Video loops of B-mode ultrasound images of 35 carotid bifurcation plaques were obtained (4 symptomatic and 31 asymptomatic) from patients with carotid bifurcation atherosclerosis. Video loops were classified visually as showing concordant or discordant motion. Concordant plaques were characterized by uniform orientation of motion throughout the cardiac cycle. Discordant plaques exhibited significant spread in motion orientation at different parts of the cardiac cycle, especially at systole.

**Results:** Using our software, we were able to differentiate between concordant and discordant plaques.

**Conclusion:** We developed a real-time motion analysis system that estimates velocities between consecutive video frames. For our purposes, we allow a 100msec time interval between the video frames used in the analysis. This approach allows us to analyze significant motions associated with a larger time interval. Over each video frame, we measure the spread of the motion orientation around the dominant orientation. For each video, we look at the spreads of the motion orientations for different motion magnitudes. Using these motion-spread measurements, we can quantify discordant movement. We are currently testing our approach on larger datasets in a multicenter study.

**Disclosures:**
Perry Fisher: This author has nothing to disclose.

**C-043**

**Title:** Optical Coherence Tomography Guided Excimer Laser Coronary Angioplasty for In-stent Restenosis after Drug Eluting Stent Implantation **Category:** Intravascular Imaging (IVUS/OCT/NIR/Other) and Physiology (FFR/iFR/IMR/Other) **Authors:** Sho Hashimoto, Sakurakai Takahashi Hospital, Japan

**Background:** Recently, excimer laser coronary angioplasty (ELCA) with angiographic or intra vascular ultrasound guidance failed to show its superiority over the conventional balloon angioplasty for treating in-stent restenosis (ISR). We evaluated the clinical significance of applying optical coherence tomography (OCT) in ELCA for the ISR.

**Methods:** Between April 2014 and January 2015, 17 consecutive patients (21 lesions) underwent ELCA under OCT guidance. OCT evaluation was conducted before, during, and after ablation with ELCA. Based on the OCT finding of ISR, the lesions were categorized into homogenous neointimal hyperplasia and non-homogenous groups. The first pass of ELCA was performed with a fluence of 45 mJ/mm2 and a repetition rate of 25 Hz. The maximum fluence used in the ablation was 60 mJ/mm2 and maximum repetition rate was 40 Hz. The endpoint of ELCA was determined at the operators discretion, mainly by 1) formation of any dissection, which may cause larger dissection, requiring stent implantation by further ablation, 2) exposure of any stent strut in the lesion, and 3) long ablation time (>10 min). After ELCA, additional balloon dilatation was performed with a scoring and drug coated balloon catheter. OCT was used to assess the pre- and post-procedural minimal lumen area (MLA) and stent area. TLR after 6 months was also evaluated in each group.

**Results:** The OCT findings revealed 6 homogenous and 15 non-homogenous type lesions. We found no difference in the pre-procedural MLA (1.21 ± 0.81 mm2 vs. 1.26 ± 0.57 mm2, P=0.809) and stent area (7.41 ± 1.86 mm2 vs. 8.31 ± 2.06 mm2, P=0.392) between the two groups. The post-procedural MLA in the homogenous group was significantly smaller than that in the non-homogenous group (3.14 ± 1.49 mm2 vs. 5.05 ± 1.59 mm2, P=0.0265). TLR after 6 months in the homogenous group was significantly more frequent than that in the non-homogenous group (33.3% vs. 13.3%, P=0.0307).

**Conclusion:** Effectiveness of ELCA for ISR may depend upon the type of tissue accumulated in the stent luminal area, which can be detected with OCT guidance.

**Disclosures:**
Sho Hashimoto: This author has nothing to disclose.

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C-046

Title: Postponing PCI Based on FFR in Patients Undergoing Cancer Therapy

Category: Intravascular Imaging (IVUS/OCT/NIR/Other) and Physiology (FFR/iFR/IMR/other)

Authors: Cezar Iliescu, MD Anderson Cancer Center, Cardiology, United States; Amir Solhpour, UTHSC-Houston Medical School, United States; Ezequiel Munoz, Central University of Venezuela, Venezuela; Gloria Iliescu, MD Anderson Cancer Center, Cardiology, United States; Kaveh Karimzad, MD Anderson Cancer Center, Cardiology, United States; Konstantinos Marmagkiolis, Citizens Memorial Hospital, Heart and Vascular Institute, United States

Background: It is common for cancer and coronary artery disease to coexist, as those diseases share common risk factors. It is unclear whether a fractional flow reserve (FFR) guided percutaneous coronary intervention approach plus medical therapy in addition to angiography improves care and outcomes in cancer patients with stable coronary artery disease.

Methods: Between September 2008 to February 2014, 1598 consecutive cancer patients underwent coronary angiography and all stenosis that were visible were assessed with FFR and were included in a registry. Patients in whom all stenosis had an FFR of more than 0.75 received medical therapy alone. Deaths from any cause, nonfatal myocardial infarction, or urgent revascularization within 1 year were recorded.

Results: FFR was measured in 55 patients, 66 vessels with the following distribution: left anterior descending 39 lesions, circumflex artery 10 lesion and right coronary artery 13 lesions and left main 4 lesions. Coronary interventions were deferred in 49% of patients based on FFR ≥0.75, while 20% of patients with intermediate lesions (50-70%) had flow limiting lesions. There was no delay in cancer care (chemotherapy, radiation or surgery) in medically managed patients. No urgent revascularization, NSTEMI or CV death noted, but there was a 25% mortality at one year, all cancer related (disease progression or cancer therapy related complications).

Conclusion: Coronary angiogram is suboptimal in assessing severity of CAD in cancer patients. Use of FFR guided PCI translates in fewer interventions and can facilitate cancer care.

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Amir Solhpour: This author has nothing to disclose.
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Gloria Iliescu: This author has nothing to disclose.
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Konstantinos Marmagkiolis: This author has nothing to disclose.

C-050

Title: High-Speed Optical Coherence Tomography with Prospective Electrocardiographic Triggering Enables Cardiac Motion-Free Three-Dimensional Intracoronary Imaging

Category: Intravascular Imaging (IVUS/OCT/NIR/Other) and Physiology (FFR/iFR/IMR/other)

Authors: Sun-Joo Jang, Korea Advanced Institute of Science and Technology, Korea, South; Hyun-Sang Park, Korea Advanced Institute of Science and Technology, Korea, South; Joon Woo Song, Korea University Guro Hospital, Korea, South; Tae Shik Kim, Korea Advanced Institute of Science and Technology, Korea, South; Joon Woo Song, Korea Advanced Institute of Science and Technology, Korea, South; Sung-Chul Cho, Korea Advanced Institute of Science and Technology, Korea, South; Hyun-Sang Park, Korea Advanced Institute of Science and Technology, Korea, South; Sunwon Kim, Korea University Guro Hospital, Korea, South; Sunwon Kim, Korea University Guro Hospital, Korea, South; Brett E. Bouma, Massachusetts General Hospital, United States; Brett E. Bouma, Massachusetts General Hospital, United States; Joon Won Kim, Korea University Guro Hospital, Korea, South; Joon Woo Song, Korea Advanced Institute of Science and Technology, Korea, South

Background: Recent advances in high-speed intravascular optical coherence tomography (OCT) have enabled visualization of three-dimensional (3D) microstructure of long coronary artery segments in vivo. However, imaging speeds remain insufficient to avoid detrimental cardiac motion artifacts in images, limiting the clinical utility of OCT.

Methods: We developed a high-speed intracoronary OCT system (frame rate: 500 frames/s, pullback speed: 100 mm/s) along with prospective electrocardiographic (ECG) triggering technology, which enabled volumetric imaging of long coronary segments within only a portion of a single cardiac cycle (70 mm pullback in 0.7 s) with minimal cardiac motion artifact. The non-uniform rotational distortion or non-uniform pullback distortion inherent in high speed imaging were corrected.

Results: The 3D reconstructions permitted detailed visualization of 3D architecture of the coronary arterial wall and fine structure of the implanted drug-eluting stent. The high-speed intracoronary OCT system also significantly reduced the amount of contrast dye required for flushing compared to conventional systems (14 ± 1 ml vs. 21 ± 2 ml, P=0.01). Automatic lumen segmentation revealed that the lumen area measurement was severely affected by the cardiac motion in the conventional speed imaging.

Conclusion: This study shows the ECG-triggered OCT imaging of long coronary artery segments within less than one cardiac cycle in vivo, revealing 3D coronary microstructure with minimal cardiac motion artifact. This novel imaging technique is readily translatable to the clinics.

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Joon Won Kim: This author has nothing to disclose.
Wang-Yuhl Oh: This author has nothing to disclose.
C-061

Title: Prevalence and Characteristics of Percutaneous Coronary Intervention in Fractional Flow Reserve-Determined Functionally Non-significant Coronary Lesions

Category: Intravascular Imaging (IVUS/OCT/NIR/Other) and Physiology (FFR/iFR/IMR/other)

Authors: Naoki Misumida, Mount Sinai Beth Israel, United States; Yumiko Kanei, Mount Sinai Beth Israel, United States

Background: Although fractional flow reserve (FFR) value >0.8 can reliably identify low-risk lesions, discrepancies between FFR values and results of other stress testing or severity of patients’ symptoms are occasionally encountered. Percutaneous coronary interventions (PCI) can be performed in FFR-determined functionally non-significant lesions because of various clinical reasons. We aimed to clarify the prevalence and characteristics of PCI in FFR-determined functionally non-significant lesions.

Methods: We retrospectively reviewed all patients who underwent coronary angiography and FFR measurement from January 2013 to September 2014. FFR value was obtained after intravenous adenosine infusion in all patients. A planned PCI was defined as PCI non-emergently performed within four weeks after the index coronary angiography. PCI in patients who failed initial medical management was not counted as a planned PCI. The decision regarding revascularization was made at the discretion of the treating cardiologist. Functionally non-significant lesion was defined as a lesion with FFR >0.8. Reasons for interventions were carefully investigated by chart review including stress test results.

Results: Five hundred patients and 639 lesions were included in the analysis. Among 639 lesions, 129 lesions had FFR <0.8 and 510 lesions had FFR value >0.8. Of the 510 lesions with FFR >0.8, 32 lesions in 32 patients (6% of the lesions with FFR >0.8) were treated with either ad-hoc PCI (21 lesions) or planned PCI (11 lesions). Among the 32 lesions, 23 lesions were left anterior descending, 6 were circumflex and 3 were right coronary artery. FFR values were 0.81 in 8 lesions, 0.82 in 12 lesions, 0.83 in 5 lesions and 0.84 in 3 lesions. The reasons for revascularization in FFR-determined functionally non-significant lesions included CCS class 3-4 angina (n=15), abnormal stress testing (n=8), ulcerated plaque (n=2), wall motion abnormality (n=2), troponin elevation (n=1) and unknown (n=4).

Conclusion: Either ad-hoc or planned PCI was performed in 6% of the lesions with FFR value >0.8. Most common reasons for revascularization in FFR-determined functionally non-significant lesions were severe angina and abnormal stress testing.

Disclosures: Naoki Misumida: This author has nothing to disclose. Yumiko Kanei: This author has nothing to disclose.

C-065

Title: Optical Coherence Tomography Demonstrates High Prevalence of Saphenous Vein Graft Thrombus in Stable Angina Patients.

Category: Intravascular Imaging (IVUS/OCT/NIR/Other) and Physiology (FFR/iFR/IMR/other)

Authors: Iwan Nyotowidjojo, University Of Arizona College Of Medicine, United States; Tam Truong, Southern Arizona VA Health
C-067

Title: Malondialdehye-Acetaldehyde (MAA) adducts predict plaque stability and associated risk of acute coronary artery events using intravascular ultrasound (IVUS).

Category: Intravascular Imaging (IVUS/OCT/NIR/Other) and Physiology (FFR/iFR/IMR/Other)

Authors: Edward O’Leary, University of Nebraska Medical Center, United States; Michael Duryee, University of Nebraska Medical Center, United States; Robert Garvin, University of Nebraska Medical Center, United States; Geoffrey Thiele, University of Nebraska Medical Center, United States; Daniel Anderson, University of Nebraska Medical Center, United States

Background: Cardiovascular disease is a devastating disease worldwide and both inflammation and modified macromolecules (lipoproteins) are known to contribute to these conditions. Recently, increased levels of circulating antibodies to Malondialdehye-acetaldehyde (MAA) adducted proteins have been shown to predict disease severity. While these circulating antibodies (potential biomarkers) help predict disease status and strongly suggest an immune process in the pathogenesis of this disease, there is currently no data linking these antibodies with the patency of the plaque. Therefore, it was the purpose of these studies to determine if these antibodies correlate with plaque composition using intravascular ultrasound (IVUS) results.

Methods: Patients presenting in the catheterization laboratory with either stable coronary syndrome (SCS) (N=6) or acute myocardial infarction (MI) (N=8) underwent IVUS as part of the standard of care. Serum was collected and tested for the presence of circulation IgM, IgG, and IgA MAA antibodies. Data from the IVUS procedure was collected on these patients including plaque burden (PB), % of necrotic core (NC), and minimal luminal area (MLA) and correlated to anti-MAA antibody concentrations.

Results: Circulating IgG anti-MAA antibodies were demonstrated to be significantly increased in the serum of MI (395 units) patients as compared to the serum of SCS patients (180 units) (P<0.01). Data from IVUS demonstrated that percent plaque burden (PB) and necrotic core (NC) were increased in the MI patients (PB 80.41, NC 39.31) compared to SCS patients (PB 64.68, NC 18.06) (P<0.05 for PB and P<0.001 for NC). Serum antibodies to IgG MAA correlated with NC (R=0.776, P<0.005) and PB (R=0.571, P<0.05) but not for MLA.

Conclusion: As previously shown, circulating IgG anti-MAA antibodies were increased in patients with acute MI as compared to stable coronary artery disease patients. These data strongly suggest that circulating IgG anti-MAA antibodies correlate well with the size and composition of the culprit lesion plaque in acute MI patients. MAA IgG may prove to be a diagnostic marker for acute MI.

Disclosures:
Edward O’Leary: This author has nothing to disclose.
Michael Duryee: This author has nothing to disclose.
Robert Garvin: This author has nothing to disclose.
Geoffrey Thiele: This author has nothing to disclose.
Daniel Anderson: This author has nothing to disclose.

C-077

Title: The Use of Instantaneous Wave-Free Ratio in a Real World Practice

Category: Intravascular Imaging (IVUS/OCT/NIR/Other) and Physiology (FFR/iFR/IMR/Other)

Authors: Madeeha Saeed, Mount Sinai Beth Israel, United States; Naoki Misumida, Mount Sinai Beth Israel, United States; Michael Ruissi, Mount Sinai Beth Israel, United States; John Fox, Mount Sinai Beth Israel, United States; Yumiko Kanei, Mount Sinai Beth Israel, United States

Background: The instantaneous wave-free ratio (iFR) is a coronary artery pressure index measured in the wave-free period of diastole in the absence of hyperemia. We aimed to evaluate the impact of iFR and fractional flow reserve (FFR) on revascularization in our current practice.

Methods: We reviewed 527 intermediate coronary lesions necessitating functional evaluation with iFR in patients referred for angiography between 2014-15. A hybrid protocol utilizing FFR in lesions with iFR between 0.86 to 0.93 was the standard approach. Revascularization was performed at the discretion of the operator.

Results: Of the 527 lesions, 54 had iFR <0.85 (Group 1), 204 had iFR between 0.86 to 0.93 (Group 2) and 269 had iFR >0.94 (Group 3).

In Group 1, 10 (19%) lesions were evaluated with FFR and a total of 51 (94%) were revascularized. In Group 2, 195 (96%) lesions had FFR and a total of 57 (28%) lesions were revascularized. In Group 3, 56 (21%) had FFR, and a total of 4 (1.5%) lesions were revascularized. Among the 268 lesions assessed with both iFR and FFR, there was a notable correlation between iFR and FFR. FFR was positive in 86%, 45%, and 2% in Groups 1, 2 and 3, respectively. Overall, the use of adenosine was deferred in 50% of the lesions.
Conclusion: In this single center, retrospective study, iFR and FFR use pattern highlights the recent shift in modern practice in assessment of intermediate coronary lesions. Overall, iFR is a useful tool in the clinical management of patients.

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Madeeha Saeed: This author has nothing to disclose.
Naoki Misumida: This author has nothing to disclose.
Michael Ruisi: This author has nothing to disclose.
John Fox: This author has nothing to disclose.
Yumiko Kane: This author has nothing to disclose.

C-081
Title: Comparison of Optical Coherence Tomography With Fractional Flow Reserve and Intravascular Ultrasound on Mortality and complications
Category: Intravascular Imaging (IVUS/OCT/NIR/Other) and Physiology (FFR/iFR/IMR/other)
Authors: Chirag Savani, New York Medical College, United States; Sabeeda Kadavath, Lincoln Medical and Mental Health Center, United States; Shilpkumar Arora, Mount Sinai St Luke’s - Roosevelt Hospital, United States; Nilay Patel, Saint Peter’s University Hospital, United States; Sidakpal Panaich, Borgess Heart Institute, Borgess Medical Center, United States; Abhishek Deshmukh, Mayo Clinic, United States; Apurva Badheka, The Everett Clinic, United States; Apurva Badheka, The Everett Clinic, United States

Background: Real world data regarding outcomes following Optical Coherence Tomography (OCT) use are lacking. The primary objective of our study was to evaluate inhospital outcomes of percutaneous interventions (PCI) guided by OCT vs. Intravascular Ultrasound (IVUS) vs. Fractional Flow Reserve (FFR) on hospital mortality, postprocedural complications in a nationwide patient population.

Methods: We queried the Healthcare Cost and Utilization Project’s Nationwide Inpatient Sample (NIS) between 2006-2011 using appropriate ICD9CM procedure codes. Hierarchical mixed effects logistic Models were generated to evaluate multivariate predictors of outcomes. The primary outcome was inhospital all cause mortality, and the secondary outcome was a composite of inhospital mortality & periprocedural complications.

Results: A total of 98904 (weighted N = 494520) procedures were identified of which 181 were OCT guided (OCT PCIs), 6529 utilized IVUS (IVUS PCIs) and 1725 utilized FFR (FFR PCIs). OCT did not show improvement in primary outcome (OR: 0.79, 95% CI 0.62-1.04, P Value 0.08) and secondary outcome (OR: 1.48, 95%CI 0.80-2.57, p value 0.16) as compared to angiographic guided PCI. IVUS PCIs associated with improve secondary outcome (OR: 0.62, 0.54-0.70, P < 0.001), but not associated with primary outcome. While FFR, associated with reduce primary outcome (OR:0.89, 0.83-0.97 < 0.001) and secondary outcome (OR:0.56, 0.40-0.77, P<0.001) compared to angiographic guided PCI. Older age, female, higher charlson score, STEMI, Hemodynamic support, Multi vessel PCI were associated with worse primary and secondary outcomes; while elective admission was associated with better secondary and private insurance was associated with better primary outcome.

Conclusion: No difference was observed in primary or secondary outcome with OCT use. FFR utilization during PCI is associated with lower rates of inhospital mortality and postprocedural complications.

Disclosures:
Chirag Savani: This author has nothing to disclose.
Sabeeda Kadavath: This author has nothing to disclose.
Shilpkumar Arora: This author has nothing to disclose.
Nilay Patel: This author has nothing to disclose.
C-083

Title: IVUS Guided versus Angiography-Guided drug-eluting stent placement in routine PCI: An updated meta-analysis of Randomized Controlled Clinical Trials

Category: Intravascular Imaging (IVUS/OCT/NIR/Other) and Physiology (FFR/iFR/IMR/other)

Authors: Kashif Shaikh, Sanford USD Medical Center, United States; Shawn Kelly, Sanford Heart Hospital, United States; Anas Fares, University Hospitals Case Medical Center/Case Western Reserve Univ, United States; Kalyan Potu, Sanford USD Medical Center, United States; Maheedhar Gedela, Sanford USD Medical Center, United States; Adam Stys, Sanford Heart Hospital, United States; Hiram Bezerra, Harrington Heart & Vascular Institute, University Hospitals, Case Medical Center, United States

Background: This meta-analysis sought to resolve the controversy regarding IVUS guided vs angiography guided placement of DES. Randomized controlled trials comparing the efficacy of the aforementioned stent placement technique remain inconclusive. Also, previous meta-analysis has suggested benefit from IVUS-Guided implantation. However, there remains an uncertainty as the information was derived mainly from observational studies and small randomized controlled clinical trials which were quite variable.

Methods: We conducted a meta-analysis of published randomized controlled clinical trials that compared IVUS-Guided to Angiography-Guided PCI with DES implantation in patients undergoing routine PCI. We identified four RCT on IVUS-guided drug-eluting stents. Observational studies and registries were not included.

Results: The IVUS-Guided group had significantly reduced Major adverse cardiac events (MACE) (odds ratio:0.58, 95% CI: 0.43-0.80;P=0.0007). The IVUS-guided group also had lower incidence of target lesion revascularization(TLR) (Odds ratio: 0.63, CI:0.41-0.97;P=0.04). Despite these findings, there was no significant difference in MI(odds ratio 0.62 (0.29-1.32;P=0.22), cardiac death (odds ratio:0.71(CI:0.28-1.76;P=0.35) between two groups or a difference in in-stent thrombosis between the two groups (odds ratio 0.88 (CI:0.33-2.29;P=0.79)

Conclusion: The IVUS guided cohort had significantly lower rates of MACE and TLR(Fig 1.2). However, there was no significant difference in MI, cardiac death or in-stent thrombosis among the two groups. Although earlier RCTs have demonstrated a trend towards reduced MACE, the differences were not statistically significant due to these studies being underpowered. The IVUS-XPL RCT published in 2015 was the largest of the RCTs analyzed and it alone showed significant reduction in MACE and TLR. This significantly influences the results of the meta-analysis.

Disclosures: Kashif Shaikh: This author has nothing to disclose. Shawn Kelly: This author has nothing to disclose. Anas Fares: This author has nothing to disclose. Kalyan Potu: This author has nothing to disclose. Maheedhar Gedela: Adam Stys: This author has nothing to disclose. Hiram Bezerra: This author has nothing to disclose.

C-089

Title: Comparison of Outcomes of Intravascular Ultrasound Guided Versus Angiographically Guided Stent Implantation: a Comprehensive Meta-Analysis of All Randomized Clinical Trials.

Category: Intravascular Imaging (IVUS/OCT/NIR/Other) and Physiology (FFR/iFR/IMR/other)

Authors: Armaghan Soomro, Staten Island University Hospital, United States; Tahir Khan, Staten Island University Hospital, United States; Yusra Ansari, Staten Island University Hospital, United States; Muhammad Rehan Raza, Staten Island University Hospital, United States; Zaka Khan, Staten Island University Hospital, United States; Thomas Vazzana, Staten Island University Hospital, United States; George Dangas, Mount Sinai Medical Center and the Cardiovascular Research Foundation, New York, United States

Background: Intravascular ultrasound (IVUS) guided stent implantation leads to better clinical outcomes but due to limited clinical evidence, standard of care remains to use angiography without IVUS for stenting coronary lesions. We conducted a meta-analysis of randomized controlled trials (RCTs) to assess the long term clinical outcomes of stent implantation with and without IVUS utilization.

Methods: A comprehensive literature search done using Medline identified 11 RCT’s reporting outcomes following drug eluting stent (DES) implantation using IVUS versus no IVUS guidance. The primary outcome of interest was major cardiovascular events (MACE). Secondary endpoints evaluated were all-cause death, target lesion revascularization (TLR) and stent thrombosis(ST). Odds ratio (OR) with corresponding 95% confidence intervals (CI) were calculated and pooled using either fixed or random effects model based on the degree of heterogeneity.

Results: This meta-analysis included 4525 patients (IVUS cohort = 2294 patients and angiography cohort = 2231 patients). Baseline characteristics were similar in both groups. IVUS guided stent implantation had significant reduction of MACE (OR 0.733, 95% CI (0.564, 0.954)) with moderate heterogeneity of 44%. TLR was significantly reduced in IVUS cohort (OR 0.556, 95% CI 0.437, 0.706) and there was no difference in all-cause mortality (OR 1.288, 95% CI 0.774, 2.14) or ST (OR 0.653, 95% CI 0.327, 1.304).

Conclusion: In comparison to conventional angiographic stent placement, IVUS guided DES deployment was associated with less MACE and TLR, but there was no difference in all-cause mortality and ST between the two groups.

Disclosures: Armaghan Soomro: This author has nothing to disclose. Tahir Khan: This author has nothing to disclose. Yusra Ansari: This author has nothing to disclose. Muhammad Rehan Raza: This author has nothing to disclose. Zaka Khan: This author has nothing to disclose. Thomas Vazzana: This author has nothing to disclose. James Lafferty: This author has nothing to disclose. George Dangas: This author has nothing to disclose.
C-045

Title: Distal Dicrotic Notch in the Coronary Artery. Is it a Function of Stenosis vs. Stiffness? A Computed Tomography and Angiography correlation study.

Category: Intravascular Imaging (IVUS/OCT/NIR/Other) and Physiology (FFR/iFR/IMR/other)

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Catheterization and Cardiovascular InterventionsDOI 10.1002/ccd. Published on behalf of The Society for Cardiovascular Angiography and Interventions (SCAI).
Background: A single small study (n=97) has suggested that absence of dicrotic notch (DN) in the coronary artery, distal to an intermediate stenosis, may indicate a significant stenosis, proven by an abnormal fractional flow reserve (FFR). This finding has neither been evaluated by other studies nor compared against other, more established, non hyperemic indices like Pd/Pa. It is unclear if DN is representative of coronary stenosis or coronary stiffness.

Methods: Of the 926 FFR measurements performed in a large tertiary care center over last 4 years, we included 405 measurements after excluding tracings with inadequate baseline data and absent aortic DN. Tracings with pre-adenosine measurement with 8 cardiac cycles were printed and distal dicrotic notch (DDN) was characterized visually into four types, i.e., full notch, partial notch, definite change in angle of descending limb at the end of systole, and absent DN, by two different observers. Operating test characteristics of DDN were measured against the criterion standard of FFR \(<0.8\) to detect significant ischemia. Coronary calcium score (CaSc), as a marker for coronary stiffness of the vessels, was evaluated by CT.

Results: Out of 405 patients, 52 had absent DDN. The mean FFR in those with absent DDN was significantly lower (0.79 versus 0.86; p = <0.0001) compared to those with a DDN. The receiver operating area under the curve (AUC) for predicting FFR <0.80 was 0.59 (p<0.0001) for DDN, as compared to 0.89 (p<0.0001) for baseline Pd/Pa. The sensitivity, specificity, PPV and NPV of DDN were 26%, 92%, 56%, 76%, respectively as compared to 79%, 82%, 63% and 91% for Pd/Pa <0.93. Those with absent DDN (n=5) had a much higher CaSc (897 vs. 463; p=0.11) than those with DDN (n=32). The AUC to predict absence of DDN by CaSc was 0.62. A CaSc of 82 or lower successfully ruled out an absent DDN.

Conclusion: While DDN is associated with an abnormal FFR, our data suggest meaningfully lower performance in prediction of an abnormal FFR as compared to Pd/Pa, indicating that Pd/Pa should be preferred over DDN in clinical practice. DDN appears to be partially explained by coronary stiffness. Further studies to define the relative role of stenosis vs stiffness in regression of DDN are underway.

Disclosures: Sharmeen Hussaini: This author has nothing to disclose. Rafath Ullahe: This author has nothing to disclose. Mirza M. Ahmad: This author has nothing to disclose. Mirza N. Ahmad: This author has nothing to disclose. Hasan Ifikhar: This author has nothing to disclose. Syed Haris Pir: This author has nothing to disclose. Muhammad Syed: This author has nothing to disclose. Mustafa Muhammad: This author has nothing to disclose. Suhail Aliqaband: This author has nothing to disclose. Anjana Gupta: This author has nothing to disclose. Steven Port: This author has nothing to disclose. Khawaja Ammar: This author has nothing to disclose.

C-093

Title: Geographic Analysis of Coronary Atherosclerosis in a Serial Intravascular Ultrasound Radiographic Study: Is the Hot Spot Hypothesis Related to Phenotypic Differences or a Function of Plaque Burden?

Category: Intravascular Imaging (IVUS/OCT/NIR/Other) and Physiology (FFR/IVR/IMR/other)

Authors: Ross Vimr, Loyola University Medical Center, United States; Tomas Kovainik, Motol University Hospital, Charles University, Prague, CZ, Czech Republic; Zhi Chen, The University of Iowa Hospitals and Clinics, United States; Richard Downe, The University of Iowa Hospitals and Clinics, United States; Andreas Wahle, The University of Colorado Denver/Anschutz Medical Campus and University of Iowa Hospitals and Clinics, United States; Milan Sonka, The University of Iowa Hospitals and Clinics, United States; John Lopez, Loyola University Medical Center, United States

Background: In ST-elevation myocardial infarction culprit lesions are more common in the proximal one-third of the artery. It is uncertain whether this is related to differences in plaque burden, phenotype distribution or lesion transformation along the vessel.

Methods: Thirty-two patients had baseline (B) angiography and Intravascular Ultrasound-Virtual Histology (IVUS-VH) in a nonculprit vessel and follow-up (F) imaging ≥8 months later. All imaged vessels contained > 20% plaque burden. Vessels at baseline and follow-up were analyzed via 3D Angiography/IVUS fusion and divided into proximal, middle and distal (P, M, D) 5mm segments for computational analysis. Segments were analyzed for plaque burden and presence of high-risk Thin Cap Fibroatheroma (TCFA) phenotype.

Results: 366 segments were analyzed in 32 vessels (18 RCA, 14 LAD+NCx). At baseline, plaque cross sectional area along the length of the vessel decreased in the LAD+NCx (r = -0.51, p <0.01) but not the RCA (r = -0.13, p=ns). At baseline and follow-up the percentage of segments with >40% plaque burden was greatest in the proximal vessel (P, M, D at B: 72 v 61 v 51% p=0.02; F: 69 v 59 v 51% p=0.01). At follow-up, 84 segments developed new TCFA, with a greater number in the proximal and mid vessel (P, M, D: 25 v 45 v 14), however new TCFA as a % of lesion type did not differ by location (P, M, D: 22 v 23 v 20% p=ns).

Conclusion: High-risk plaque phenotype transformation is not more likely to occur in the proximal coronary vessel, but occurs as a function of plaque burden and lesion density. Absolute plaque volume has a strong negative correlation with distance from the ostium in the LAD+NCx but not the RCA.

Disclosures: Ross Vimr: This author has nothing to disclose. Tomas Kovainik: This author has nothing to disclose. Zhi Chen: This author has nothing to disclose. Richard Downe: This author has nothing to disclose. Andreas Wahle: This author has nothing to disclose. Milan Sonka: This author has nothing to disclose. John Lopez: This author has nothing to disclose.
A-010

Title: Comparison of Percutaneous Coronary Intervention with Drug Eluting Stents and Coronary Artery Bypass Grafting in Octogenarians - A meta analysis.

Category: Left Main & Multi-Vessel Intervention

Authors: Mahboob Alam, Baylor College of Medicine, United States; Mahin Khan, King Edward Medical University, Pakistan; Waleed Kayani, Baylor College of Medicine, United States; Waqas Ahmad, Nishat Medical College, Pakistan; Hamzeh Iham, Baylor College of Medicine, United States; Alisa Thamwiwat, Baylor College of Medicine, United States; Ihab Hamzeh, Baylor College of Medicine, United States; Salim Virani, Baylor College of Medicine and Michael E. DeBakey Veterans Affairs Medical Center, United States; Hani Jneid, Baylor College of Medicine and Michael E. DeBakey Veterans Affairs Medical Center, United States; Nasser Lakkis, Baylor College of Medicine, United States

Background: Data comparing outcomes of Percutaneous Coronary Intervention (PCI) with Drug Eluting Stents (DES) and Coronary Artery Bypass Grafting (CABG) for unprotected left main coronary artery (LMCA) disease in the elderly (≥80 years) is scarce. This subset of population has not been studied in randomized clinical trials that form the basis for therapeutic guidelines/recommendations by major cardiovascular societies.

Methods: We performed aggregate data meta-analyses of short and long term clinical outcomes (all-cause mortality, nonfatal myocardial infarction, repeat revascularization, and major adverse cardiac and cerebrovascular events [MACCE]) in studies comparing PCI and CABG in octogenarians with unprotected LMCA disease. A comprehensive, time-unlimited literature search to October 1, 2015 identified 5 studies with a total of 1,099 patients. One study was excluded as it reported <50 patients in each arm. Final analysis included 4 studies (1,023 patients, CABG 498, PCI 525). Summary odds ratios (ORs) and 95% confidence intervals (CIs) were estimated using the random-effects model.

Results: There was no major difference in the baseline characteristics of the patients who underwent PCI or CABG. Mean age of the patients in CABG and PCI arms was 80.3 and 82.8 years respectively. At 30-days and intermediate term (12-36 months) follow-up, PCI with DES and CABG showed no difference in all cause mortality. PCI was associated with higher needs for repeat revascularization at intermediate term follow-up (odds ratio 6.41, 95% CI 3.39 – 12.13). There was no significant difference in the rates of MACCE, Stroke, Cardiac death and Non-fatal MI between the two groups. (Table 1)

Conclusion: In octogenarians with unprotected LMCA disease, coronary revascularization with PCI using drug eluting stents and CABG are comparable in terms of all-cause and cardiovascular mortality as well as safety endpoints (non-fatal MI, stroke, MACCE). PCI however is associated with increased rates of repeat revascularization at intermediate term follow-up.

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Mahboob Alam: This author has nothing to disclose.
Mahin Khan: This author has nothing to disclose.
Waleed Kayani: This author has nothing to disclose.
Waqas Ahmad: This author has nothing to disclose.
Hamzeh Iham: This author has nothing to disclose.
Alisa Thamwiwat: This author has nothing to disclose.
Ihab Hamzeh: This author has nothing to disclose.
Salim Virani: This author has nothing to disclose.
Hani Jneid: This author has nothing to disclose.
Nasser Lakkis: This author has nothing to disclose.

A-001

Title: Five Year Outcomes of Percutaneous Coronary Intervention vs. Coronary Artery Bypass Grafting in 5,349 patients with unprotected Left Main Coronary Artery Disease in the era of Drug eluting stents.

Category: Left Main & Multi-Vessel Intervention

Authors: Mahboob Alam, Baylor College of Medicine, United States; Mahin Khan, King Edward Medical University, United States; Nasser Lakkis: This author has nothing to disclose.

Results: There was no major difference in the baseline characteristics of the patients who underwent PCI or CABG. Mean age of the patients in CABG and PCI arms was 80.3 and 82.8 years respectively. At 30-days and intermediate term (12-36 months) follow-up, PCI with DES and CABG showed no difference in all cause mortality. PCI was associated with higher needs for repeat revascularization at intermediate term follow-up (odds ratio 6.41, 95% CI 3.39 – 12.13). There was no significant difference in the rates of MACCE, Stroke, Cardiac death and Non-fatal MI between the two groups. (Table 1)

Conclusion: In octogenarians with unprotected LMCA disease, coronary revascularization with PCI using drug eluting stents and CABG are comparable in terms of all-cause and cardiovascular mortality as well as safety endpoints (non-fatal MI, stroke, MACCE). PCI however is associated with increased rates of repeat revascularization at intermediate term follow-up.

Disclosures:
Mahboob Alam: This author has nothing to disclose.
Mahin Khan: This author has nothing to disclose.
Waleed Kayani: This author has nothing to disclose.
Waqas Ahmad: This author has nothing to disclose.
Hamzeh Iham: This author has nothing to disclose.
Alisa Thamwiwat: This author has nothing to disclose.
Ihab Hamzeh: This author has nothing to disclose.
Salim Virani: This author has nothing to disclose.
Hani Jneid: This author has nothing to disclose.
Nasser Lakkis: This author has nothing to disclose.
Background: Patients with unprotected left main coronary artery (LMCA) disease are increasingly treated with percutaneous coronary intervention (PCI) using drug-eluting stents (DES), but long term outcomes comparing PCI with coronary artery bypass grafting (CABG) remain scarce.

Methods: We performed aggregate data meta-analyses of clinical outcomes [all cause death; non-fatal myocardial infarction (MI); stroke; repeat revascularization; cardiac death and major adverse cardiac and cerebrovascular events (MACCE)] in studies comparing 5 year outcomes of PCI with DES vs. CABG in patients with LMCA disease. A comprehensive literature search (01/01/2003 to 10/01/2015) identified 7 studies (5,349 patients). Effect size for individual clinical outcomes were estimated using odds ratio (OR) with 95% Confidence Intervals using a random-effects model.

Results: At 5 years, PCI with DES was associated with equivalent cardiac (OR 0.91, 95% CI 0.54 – 1.53) and all cause mortality (OR 1.00, 95% CI 0.69—1.45), lower rates of stroke (OR 0.50, 95% CI 0.26–0.95) and higher rates of repeat revascularization (OR 3.95, 95% CI 1.96–5.06), MACCE showed a trend favoring CABG but did not reach statistical significance (OR 1.20, 95% CI 0.99-1.46). (Table 1).

Conclusion: At 5 years follow-up, PCI with DES is comparable to CABG in terms of all-cause and cardiac mortality, a higher risk of repeat revascularization and lower stroke risk after PCI when compared to CABG.

Disclosures: Mahboob Alam: This author has nothing to disclose. Mahin Khan: This author has nothing to disclose. Waleed Kayani: This author has nothing to disclose. Waqas Ahmad: This author has nothing to disclose. Salim Virani: This author has nothing to disclose. Hani Jneid: This author has nothing to disclose. Nasser Lakkis: This author has nothing to disclose.

A-040

Title: Characteristics and Outcomes of Patients Undergoing Primary Percutaneous Coronary Intervention for ST-Segment Elevation Myocardial Infarction Due to Unprotected Left Main Culprit Disease

Category: Left Main & Multi-Vessel Intervention

Authors: Nkechinyere Ijioma, Mayo Clinic, United States; Ryan Lennon, Mayo Clinic, United States; Ryan Lennon, Mayo Clinic, United States; Daniel Crusan, Mayo Clinic, United States; Shahyar Gharacholou, Mayo Clinic Health System - Franciscan Healthcare, United States

Background: ST-segment elevation myocardial infarction (STEMI) due to unprotected left main (ULM) coronary artery disease (CAD) is both uncommon (<1.0%) and unusual, as these acute presentations often result in sudden death prior to percutaneous coronary intervention (PCI). Furthermore, little information regarding outcomes beyond in-hospital events is described in the literature.

Methods: We reviewed all PCI procedures performed for STEMI patients at our institution from 1/1/2000 - 12/31/2014 and evaluated the characteristics and outcomes of patients undergoing emergency PCI for STEMI due to ULM CAD. We used means (±SD) and proportions to describe baseline patient and procedural characteristics. Kaplan-Meier methods were used to estimate 1-year events among those surviving to hospital discharge.

Results: Of 4,602 patients with STEMI, 37 patients had ULM STEMI and underwent 37 unique PCI procedures. The Table demonstrates baseline demographics and events. Patients often presented with shock requiring hemodynamic support and additional revascularization in addition to ULM PCI. One patient underwent surgical bypass and another received a left ventricular assist device. In-hospital mortality rate was high (35.1%), including high rates of bleeding (21.6%). Mortality risk was extended beyond the in-hospital period, with events accruing up to 1 year.

Conclusion: STEMI due to ULM CAD is rare, however, its occurrence is associated with high rates of shock, hemodynamic support device use, and often involves further PCI procedures other than the ULM. Patients surviving their initial hospitalization remain at increased risk of death within 1 year of PCI.

Disclosures: Nkechinyere Ijioma: This author has nothing to disclose. Ryan Lennon: This author has nothing to disclose. Daniel Crusan: This author has nothing to disclose. Shahyar Gharacholou: This author has nothing to disclose.
A-051

Title: Risk of contrast induced nephropathy with multi-vessel intervention in ST-elevation myocardial infarction and use of a common risk score to accurately identify the population at highest risk

Category: Left Main & Multi-Vessel Intervention

Authors: Saurav Chatterjee, St. Luke’s-Roosevelt Hospital Center, United States; Amartya Kundu, University of Massachusetts Medical School, United States; Partha Sardar, University of Utah Medical Center, United States

Background: Multi-vessel percutaneous coronary intervention (MV-PCI) in patients with multi-vessel disease (MVD) ST-elevation myocardial infarction (STEMI) at the time of initial hospitalization may be associated with a higher risk of contrast induced nephropathy (CIN). In order to assess the risk of CIN with MV-PCI, we performed an updated meta-analysis of randomized trials and evaluated the utility of a risk scoring system to predict this risk from a large administrative database.

Methods: We searched PubMed, the Cochrane Library, EMBASE, EBSCO, Web of Science and CINAHL databases from the inception through January 5th, 2016 for randomized studies comparing CIN rates with MV-PCI compared to infarct-related artery (IRA) only PCI. Random effects model was used to estimate risk ratio (RR) and respective 95% confidence intervals (CI). We investigated the Nationwide Inpatient Sample (NIS) to assess the ability of the Mehran risk score to predict the incidence of CIN in patients undergoing MV-PCI.

Results: Our analysis (4 studies, N=1,602) showed there was no difference in risk of CIN with MV-PCI (1.45%) compared with IRA-only (1.94%) [RR 0.73, 95% CI 0.34-1.57; p=0.57]. From 2009-2012, excluding cardiac arrest or cardiogenic shock, there were 11,454 MV-PCI and 157,011 single-vessel PCI (SVPCI) for STEMI patients in the NIS. The Mehran risk score accurately discriminated 73% of the patients who developed CIN in the MV-PCI cohort (c-statistic of 0.73, p=0.002 for the model).

Conclusion: Our results suggest MV-PCI in STEMI is not associated with a higher risk of CIN and the Mehran risk score accurately identifies to a modest degree, the population at higher risk for CIN.

Disclosures:
Saurav Chatterjee: This author has nothing to disclose.
Amartya Kundu: This author has nothing to disclose.
Partha Sardar: This author has nothing to disclose.

A-052

Title: Outcomes After Orbital Atherectomy of Severely Calcified Left Main Lesions: Analysis of the ORBIT II Study

Category: Left Main & Multi-Vessel Intervention

Authors: Michael Lee, UCLA Medical Center, United States; Evan Shlofmitz, North Shore University Hospital, United States; Richard Shlofmitz, St. Francis Hospital, United States; Sheila Sahni, UCLA Medical Center, United States; Brad Martinsen, Cardiovascular Systems Inc, United States; Jeffrey Chambers, Metropolitan Heart and Vascular Institute-Mercy Hospital, United States

Background: The ORBIT II trial reported excellent outcomes in patients with severely calcified coronary lesions treated with orbital atherectomy. Severe calcification of the left main artery represents a complex coronary lesion subset. This study evaluated the safety and efficacy of coronary orbital atherectomy to prepare severely calcified left main artery lesions for stent placement.

Methods: The ORBIT II trial was a prospective, multicenter clinical trial that enrolled 443 patients with severely calcified coronary lesions in the United States. The major adverse cardiac events (MACE) rate through 2-years post-procedure, defined by cardiac death, myocardial infarction (CK-MB >3x ULN with or without a new pathologic Q-wave) and target vessel revascularization, was compared in the left main and non-left main groups.

Results: Among the 443 patients, 10 patients underwent orbital atherectomy of the left main artery. Severe dissection, perforation, persistent slow flow, and persistent no reflow did not occur in the left main group. Abrupt closure occurred in one patient in the left main group. At 2 years, there was no significant difference in the 2-year MACE rate in the left main and non-left main groups and cardiac death was low in both groups (Figure). Myocardial infarction occurred within 30-days in both groups (10.0% vs. 9.7%, p=0.99).

Conclusion: Orbital atherectomy for patients with heavily calcified left main coronary artery lesions is safe and feasible. Further studies are needed.
A-079

Title: Hybrid Coronary Revascularization vs. Coronary Artery Bypass Grafting in Patients with Multivessel Coronary Artery Disease: Evidence from a Meta-Analysis

Category: Left Main & Multi-Vessel Intervention

Authors: PARTHA SARDAR, University Of Utah Hospitals And Clinics, United States; Amartya Kundu, University Of Massachusetts, United States; Saurav Chatterjee, St Luke’s roosvelt Medical Center, Mount Sinai, United States; Tilak Pasala, University Of Utah Hospitals And Clinics, United States; Theophilus Owan, University Of Utah Medical Center, United States; Debabrata Mukherjee, Texas Tech university, UMC hospital, EL Paso TX, United States

Background: Coronary Artery Bypass Grafting (CABG) is the treatment of choice for patients with multivessel coronary artery disease (CAD). However, CABG has certain limitations including risks of conventional surgery and unsatisfactory long-term patency of saphenous grafts. Hybrid Coronary Revascularization (HCR) involves a combination of surgical and percutaneous techniques, and may be used as an alternative to CABG in select group of patients. We performed a meta-analysis to evaluate the efficacy of HCR compared to CABG for treatment of multivessel CAD.

Methods: We searched PubMed, Cochrane Library, EMBASE, EBSCO, Web of Science, and CINAHL databases till November 15th, 2015 for studies that compared HCR with CABG for treatment of multivessel CAD. We calculated summary odds ratios (ORs) and 95% CIs with the random-effects model. The primary outcome of interest was the occurrence of major adverse cardiac events (MACE) defined as a composite of all cause mortality, myocardial infarction and stroke.

Results: 11 studies (1 randomized controlled trial and 10 observational studies) involving 3430 patients were included in the final analysis. The primary outcome with HCR and CABG was 3.2% and 4.6% respectively.

Disclosures:
Michael Lee: 5 Cardiovascular Systems Inc. (St. Paul, MN)
Evan Shlofmitz: This author has nothing to disclose.
Richard Shlofmitz: 5 Cardiovascular Systems Inc. (St. Paul, MN)
Sheila Sahni: This author has nothing to disclose.
Brad Martinsen: 3 Cardiovascular Systems Inc. (St. Paul, MN)
Jeffrey Chambers: 5 Cardiovascular Systems Inc. (St. Paul, MN)
Title: Near-term clinical results of unprotected left main (ULM) percutaneous coronary intervention (PCI) with an axial flow percutaneous left ventricular assist device (pLVAD) hemodynamic support

Category: Left Main & Multi-Vessel Intervention

Authors: TAPASYA MANDALAPU, Detroit Medical Center Heart Hospital, United States; NESTOR MERCADO, Detroit Medical Center Heart Hospital, United States; THEODORE SCHREIBER, Detroit Medical Center Heart Hospital, United States; CINDY GRINES, Detroit Medical Center Heart Hospital, United States; AMIR KAKI, Detroit Medical Center Heart Hospital, United States; TESFAYE TELILA, Detroit Medical Center Heart Hospital, United States; NESTOR MERCADO, Detroit Medical Center Heart Hospital, United States; WAH WAH HTUN, Detroit Medical Center Heart Hospital, United States; THEODORE SCHREIBER, Detroit Medical Center Heart Hospital, United States; Varun Kumar, New York Methodist Hospital, United States; Shilpkumar Arora, Mount Sinai St Luke’s - Roosevelt Hospital, United States; Eyal Herzog, Mount Sinai St Luke’s - Roosevelt Hospital, United States

Background: PCI is considered an alternative option for selected patients with ULM disease. The outcomes of ULM PCI with hemodynamic support with the Impella pLVAD have not been well defined.

We sought to assess the efficacy and safety of hemodynamic support with the Impella percutaneous left ventricular ventricular assist device (pLVAD) in patients undergoing unprotected left main (ULM) percutaneous coronary intervention (PCI).

Methods: Using the USPella registry, we evaluated the periprocedural characteristics and in-hospital clinical outcomes of non-Cardiogenic Shock (CS) patients undergoing ULM PCI with the Impella pLVAD.

Results: Between 08/2008 and 07/2015, 365 non-CS patients underwent PCI with hemodynamic support in a single center. Of these, 141 patients (38%) had ULM PCI with the Impella pLVAD. 106 (75%) patients were treated with the Impella 2.5 and 35 (25%) Impella CP, respectively. Patients were on average 69 ± 11 years of age, 47% had diabetes mellitus, 72% had NYHA class III or IV symptoms and 51% had CHF. Patients presented with a mean LVEF 35 ± 19%, an STS score for mortality of 4% and morbidity and mortality of 23%. The average duration of support was 2.3 ± 8.5 hours, 1.9 ± 0.7 lesions were attempted and 2.0 ± 0.9 stents were placed per patient. The composite of in-hospital MACCE occurred in 3 (2.1%) patients. The mortality rate at 30 days was 2%.

Conclusion: ULM PCI with hemodynamic support with the Impella pLVAD can be performed very safely and effectively in selected non-CS high-risk patients with complex coronary anatomy and an adverse clinical risk profile.

Disclosures: TAPASYA MANDALAPU: This author has nothing to disclose. NESTOR MERCADO: This author has nothing to disclose. GHASSAN KREYDI: This author has nothing to disclose. WAH WAH HTUN: This author has nothing to disclose. TESFAYE TELILA: This author has nothing to disclose. AMIR KAKI: This author has nothing to disclose. CINDY GRINES: This author has nothing to disclose. THEODORE SCHREIBER: This author has nothing to disclose.
### Subgroup analysis in overall population
- STEMI
- Shock
- Non Shock
- VFib/VTach
- PEA or asystole
- Age >=80
- Charlson score >=2
- VFib/VTach and STEMI
- VFib/VTach and no STEMI
- PEA or asystole and STEMI
- PEA or asystole and no STEMI

### Subgroup analysis in non shock patients only
- STEMI
- VFib/VTach
- PEA or asystole
- Age >=80
- Charlson score >=2
- VFib/VTach and STEMI
- VFib/VTach and no STEMI
- PEA or asystole and STEMI
- PEA or asystole and no STEMI

### Subgroup analysis in shock patients only
- STEMI
- VFib/VTach
- PEA or asystole
- Age >=80
- Charlson score >=2
- VFib/VTach and STEMI
- VFib/VTach and no STEMI
- PEA or asystole and STEMI
- PEA or asystole and no STEMI
Background: Assessment of PAD severity, as well as indication of intervention, is traditionally based upon the patient’s symptoms and parameters such as ankle-brachial index (ABI). This study looks at toe-brachial index (TBI) as a more accurate alternative to ABI, and examines the relationship of patient perception of symptoms to true severity of PAD.

Methods: Patients with known or suspected PAD were initially evaluated via the STRIDES method which includes: modified King Score, calf circumference (CC) using, six-minute walk distance (6MWD), time to claudication and TBI. The relationship of modified King Score to 6MWD, calf-circumference and TBI was examined, as well as the relationship between TBI and 6MWD.

Results: No significant differences were found between 6MWDs or TBIs as patients’ modified King Scores increased or decreased. Patients with lower King Score showed statistically significant decrease in CC compared to patients with higher King Score. Patients whose TBIs improved after 6MWD measurement had significantly lower 6MWD compared to patients whose TBIs did not improve. (Fig 1)

Conclusion: The TBI parameter is more valuable in evaluating severity of PAD than ABI or patient perceptions of symptoms. Modified King Scores showed that whether patients perceived great symptoms or few, there was no difference in the TBI or 6MWD and in fact a decrease in CC with decreased King Score. Furthermore, TBI is more specific for PAD severity than 6MWD, as patients with TBI improvement after exercise had significantly lower 6MWD perhaps due to involvement of other disease processes such as arthritis or COPD.

Disclosures:
Abbas Ali: This author has nothing to disclose.
Asad Qamar: This author has nothing to disclose.
Syed Ali: This author has nothing to disclose.
Riasat Ali: This author has nothing to disclose.
Muhammad Sadique: This author has nothing to disclose.
Mohammed Ali: This author has nothing to disclose.
Taha Baig: This author has nothing to disclose.
Asad Qamar:

Title: Remote Ischemic Pre-Conditioning And Coronary Interventions: A Meta Analysis Of Randomized Trials
Category: Miscellaneous
Authors: Muhammad Azzouz, Creighton University, United States; Abhilash Akinapelli, Creighton University, United States; Mohamed Ayan, Creighton University, United States; Manu Kaushik, Creighton University, United States; Michael Del Core, Creighton University, United States; Michael White, Creighton University, United States

Background: Remote Ischemic Pre-Conditioning (RIPC) therapy is an emerging technique that has been increasingly used in patients undergoing percutaneous coronary interventions. It has been proposed that RIPC has protective effects of different organs including the heart and the kidneys during such procedures. Recent data has been controversial about such effects. We, therefore, conducted a meta-analysis to further investigate those effects.

Methods: We searched PubMed, Cochrane Library and Web of Science databases for randomized studies comparing RICP versus standard measures or sham procedure in patients undergoing coronary interventions for acute or elective indications. We used the terms (Remote Ischemic Pre Conditioning, RIPC, coronary intervention, PCI) in our search. The outcomes assessed were median troponin elevation, Myocardial Infarction (MI), Acute Kidney Injury (AKI) and death. We conducted our meta-analysis using RevMan 5.3 software with random effects model. Visual inspection of the funnel plot showed publication bias. P value less than 0.05 was considered statistically significant.

Results: A total of 12 randomized studies with a total of 2302 patients (RICP arm:1159; Control arm: 1143) were included in the final analysis. The incidence of post procedural MI was lower in the RIPC arm (OR 0.65 [0.44-0.96], P=0.03). There was no statistically significant
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difference in the level of troponin elevation, AKI or death between both approaches.

Conclusion: Our meta-analysis showed that RIPC helped reducing the incidence of post procedural MI. There was no difference between RIPC and control group in regards to troponin elevation, AKI or death.

Disclosures:
Muhammad Azzouz: This author has nothing to disclose.
Abhilash Akinapelli: This author has nothing to disclose.
Mohamed Ayan: This author has nothing to disclose.
Manu Kaushik: This author has nothing to disclose.
Michael Del Core: This author has nothing to disclose.
Michael White: This author has nothing to disclose.

C-016

Title: Left Ventricular Ejection Fraction, History of Heart Failure, Renal Dysfunction, and Prior Myocardial Infarction Predict Mortality in Patients with Severe Renal Artery Stenosis

Category: Miscellaneous

Authors: Taylor Bazemore, Duke University Health System, United States; Taylor Bazemore, Duke University Health System, United States; Dane Meredith, UNC Healthcare Systems, United States; Anand Shah, UNC Healthcare Systems, United States; Joshua Dilley, UNC Healthcare Systems, United States; Joshua Dilley, UNC Healthcare Systems, United States; Joshua Dilley, UNC Healthcare Systems, United States; Joshua Dilley, UNC Healthcare Systems, United States; Joshua Dilley, UNC Healthcare Systems, United States; George Stouffer, UNC Healthcare Systems, United States

Background: Renal artery stenosis (RAS) is associated with high mortality, but factors predicting survival are not well understood. These factors are likely independent of the presence or severity of RAS, as three large, randomized trials recently found no survival benefit with renal artery revascularization.

Methods: Patients undergoing concurrent coronary and renal angiography in the UNC Cardiac Catheterization Laboratory between 2002 and 2013 were retrospectively identified; those with angiographically proven ≥ 70% stenosis in at least one renal artery were selected. Mortality was determined using the electronic medical record and the Social Security Death Index. A mortality prediction model was built using demographic features, medical history and laboratory values. Comparison was made with student t-test and chi-squared test. Logistic regression and likelihood ratio testing were used to identify variables that predicted mortality.

Results: 188 patients with ≥ 70% RAS were identified. The population had an average age of 67 ± 10 years, is 54% female, 20% African American and 70% smokers. Mortality was 47% (89 patients) during an average follow-up of 5.1 years. Demographic features and risk factors were similar in survivors and non-survivors, but patients who died had a greater number of severely stenosed (≥ 70%) coronary arteries, higher incidence of prior myocardial infarction (MI), prior heart failure (HF), lower left ventricular ejection fraction, higher body mass index, higher BUN, higher creatinine, and lower glomerular filtration rate (GFR). Survivors were more likely to have received a renal artery stent. In our mortality prediction model, multi-vascular coronary disease (1.9 vs. 1.5 vessels, p=0.014), HR (HR of 2.9 [1.6 – 5.6]), prior MI (2.6 [1.4 – 4.7]), and renal function predicted mortality. The risk associated with prior MI and HF were additive; mortality was 40%, 54% and 79%, respectively in patients with neither MI nor HF, either MI or history of HF or both MI and history of HF. GFR had a progressive inverse relationship with mortality.

Conclusion: Lower GFR, prior MI, and HF predicted mortality in patients with RAS. The relationship between GFR and mortality risk is progressive and pervasive, even with mild renal insufficiency.

Disclosures:
Taylor Bazemore: This author has nothing to disclose.
Dane Meredith: This author has nothing to disclose.

A-019

Title: Staff Exposure to X-ray during PCI: Randomized Comparison of Robotic vs Manual Procedures

Category: Miscellaneous

Authors: Paul Campbell, Carolinas Medical Center, United States; Patrick Tennis, Carolinas Medical Center, United States; Carla Biter, Carolinas Medical Center, United States; Katherine Tullis, Carolinas Medical Center - NorthEast, United States; Paul Campbell, Carolinas Medical Center - NorthEast, United States; Patrick Tennis, Carolinas Medical Center - NorthEast, United States; Carla Biter, Carolinas Medical Center - NorthEast, United States; Katherine Tullis, Carolinas Medical Center - NorthEast, United States; Paul Warren, Carolinas Medical Center - NorthEast, United States; Sophia Maksimenko, Carolinas Medical Center - NorthEast, United States; Thomas Soos, Carolinas Medical Center - NorthEast, United States; Janet Patterson, Carolinas Medical Center - NorthEast, United States; Michele Esposito, Carolinas Medical Center - NorthEast, United States

Background: In comparison to historical controls, robotic percutaneous coronary intervention (R-PCI) with the CorPath 200 was shown to significantly reduce physician radiation exposure. There is currently no data on laboratory staff radiation exposure in R-PCI. This study was conducted to evaluate the radiation exposure of cardiac catheterization laboratory staff and physicians.

Methods: This randomized single center study enrolled patients deemed appropriate for robotic PCI and excluded those with STEMI, cardiogenic shock, or requiring treatment of ≥ 2 lesions. Patients were randomly assigned manual or R-PCI groups. To measure radiation exposure, the physician and laboratory technicians wore Educational Direct Dosimeters. Other data collected included lesion number/complexity as well as total procedure and fluoroscopy times.

| A-019 | C-016 | S80 |
Results: A total of 30 patients were randomized to manual (N=15) and R-PCI (N=15); outcomes are summarized on Table 1. Tech radiation exposure in R-PCI was lower than manual (1.1 mSv to 1.3 mSv) although not statistically different (P=0.728). There was no significant difference (P>0.05) in lesion complexity, fluoroscopy time, or PCI time. R-PCI resulted in a highly significant reduction (P=0.015) in physician radiation exposure from a median of 9.1 μSv to 0.8 μSv.

Conclusion: These data indicate that use of R-PCI does not result in increased radiation exposure for cath laboratory staff. Further, this study showed a significant median reduction (91.2%) in physician radiation exposure. These data show that increased protection can be achieved without increasing procedure time.

Disclosures:
Paul Campbell: 2 Corindus Vascular Robotics
Patrick Tennis: This author has nothing to disclose.
Carla Bitler: This author has nothing to disclose.
Katherine Tullis: This author has nothing to disclose.
Paul Campbell: This author has nothing to disclose.
Patrick Tennis: This author has nothing to disclose.
Carla Bitler: This author has nothing to disclose.
Katherine Tullis: This author has nothing to disclose.
Paul Warren: This author has nothing to disclose.
Sophia Maksimenko: This author has nothing to disclose.
Thomas Soos:
Janet Patterson: This author has nothing to disclose.
Michele Esposito: This author has nothing to disclose.

C-023

Title: Associations between SYNTAX Score, Platelet reactivity and clinical outcomes: From the TRIAGE Study

Category: Miscellaneous

Authors: Jaya Chandrasekhar, Icahn School of Medicine at Mount Sinai, United States; Roxana Mehran, Icahn School of Medicine at Mount Sinai, United States; Annapoorna Kini, Mount Sinai Hospital New York, United States; Usman Baber, Mount Sinai Hospital New York, United States; Melissa Aquino, Icahn School of Medicine at Mount Sinai, United States; Melissa Aquino, Icahn School of Medicine at Mount Sinai, United States; Jennifer Yu, Icahn School of Medicine at Mount Sinai, United States; Richard Shlofmitz, St. Francis Hospital, United States; Carsten Skurk, Charite University, Germany; Bernhard Witzenbichler, Helios Klinikum Dachau, Germany; George Dangas, Mount Sinai Hospital New York, United States

Background: The association between angiographic risk as determined by SYNTAX score and platelet reactivity is not known. We sought to examine associations between SYNTAX score, high on treatment platelet reactivity (HTPR) and adverse events from the TRIAGE study.

Methods: TRIAGE was a prospective observational study of patients on clopidogrel undergoing platelet function testing prior to PCI. Based on this result as well as ischemic and bleeding risks patients were switching to prasugrel. We divided the patients with available SYNTAX scores in to terciles and examined the platelet reactivity and 1-year clinical outcomes. MACE was defined as a composite of death, myocardial infarction (MI) or stent thrombosis (ST).

Results: SYNTAX scores were available for 227/318 study patients with a mean age of 65.2 ± 9.9 years. Of these, 69 (30%) had low, 78 (34%) had intermediate and 80 (35%) had high SYNTAX scores. The mean SYNTAX score was 4.0 ± 1.4 in the SXlow, 9.4 ± 1.9 in the SXint and 21.7 ± 8.0 in the SXhigh groups. There were no significant differences between groups with respect to age, gender, baseline risks and calculated ischemic or bleeding risk scores. The mean platelet reactivity units (PRU) were non-significantly lower in the SXlow group (170.3 ± 98.0) compared with SXint (186.7 ± 106.7) and SXhigh (193.0 ± 92.0) groups (p=0.36). There was no significant trend in the incidence of PRU ≥208 and ≥230 across the groups.

Conclusion: In the TRIAGE study, the incidence of HTPR did not increase with increasing syntax score. Notwithstanding, 1-year incidence of MACE was highest in the SXhigh group.

Disclosures:
Jaya Chandrasekhar; This author has nothing to disclose.
Roxana Mehran: This author has nothing to disclose.
Usman Baber: This author has nothing to disclose.
Melissa Aquino: This author has nothing to disclose.
Jennifer Yu: This author has nothing to disclose.
Richard Shlofmitz: This author has nothing to disclose.
Carsten Skurk: This author has nothing to disclose.
Bernhard Witzenbichler: This author has nothing to disclose.
George Dangas: This author has nothing to disclose.

C-040

Title: Effect of Mono-therapy versus Combinational Therapy on Exercise Capacity of Pulmonary Arterial Hypertension Patients: Actual Care Data

Category: Miscellaneous

Authors: Satya Gupta, Care Institute of Medical Sciences (CIMS), India; Parloop Bhart, Care Institute of Medical Sciences (CIMS), India; Milan Chag, Care Institute of Medical Sciences (CIMS), India; Parth Parikh, Cleveland Clinic Foundation, United States; Aditi Patel, Cleveland Clinic, United States; Rooshna Pariikh, Mount Sinai Beth Israel, United States; Apurva Patel, Mount Sinai Beth Israel, United States; Aditi Nanavati, Care Institute of Medical Sciences (CIMS), India; Anish Chandarana, Care Institute of Medical Sciences (CIMS), India; Hemang Baxi, Care Institute of Medical Sciences (CIMS), India; Urmil Shah, Care Institute of Medical Sciences (CIMS), India; Dhiren Shah, Care Institute of Medical Sciences (CIMS), India; Keyur Parikh, Care Institute of Medical Sciences (CIMS), India

Background: Pulmonary arterial hypertension (PAH) is a rare, severely debilitating disease with high mortality. There are limited data. Catheterization and Cardiovascular Interventions DOI 10.1002/ccd. Published on behalf of The Society for Cardiovascular Angiography and Interventions (SCAI).
available on treatment patterns and burden of disease from conditions of actual care.

**Methods:** This analysis assesses the burden of disease for patients with PAH treated with mono-therapy and combination therapies excluding and including beta blockers, calcium channel blockers, digoxin, bosentan, and sildenafil at a cardiology centre from 2012-2014.

**Results:** Data were analyzed from 136 patients (mean age: 43.94 ± 16.62 years; females: n=73(54%)) receiving ≥1 of three PAH-specific treatment classes. Major proportion of patients belonged to age group 34-43 years (n=35). Patients on mono-therapy (n=47) sildenafil was the most effective (p<0.001). Dual therapy was prescribed in majority of patients (n=72; sildenafil and CCB p<0.001). Triple therapy (n=18, sildenafil, digoxin, bosentan/beta blocker p<0.001) had better clinical impact in comparison to single and double therapy (Table-1).

**Conclusion:** Combination therapy is preferred in PAH patients under actual care. The disease burden is substantial in young adults, more so in females with greater severity of disease requiring aggressive treatment, necessitating optimizing current therapy and including novel and innovative combination options.

**Disclosures:**
Satya Gupta: This author has nothing to disclose.
Parloop Bhatt: This author has nothing to disclose.
Milan Chag: This author has nothing to disclose.
Parth Parikh: This author has nothing to disclose.
Roosha Parikh: This author has nothing to disclose.
Aparna Patel: This author has nothing to disclose.
Aditi Patel: This author has nothing to disclose.
Anish Chandarana: This author has nothing to disclose.
Hemang Baxi: This author has nothing to disclose.
Urmil Shah: This author has nothing to disclose.
Dhiren Shah: This author has nothing to disclose.
Ajay Naik: This author has nothing to disclose.
Keyur Parikh: This author has nothing to disclose.

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**C-041**

**Title:** Temporal Trends in Young Indian Heart Failure Patients: A Ray of Hope

**Category:** Miscellaneous

**Authors:** Satya Gupta, Care Institute of Medical Sciences (CIMS), India; Parloop Bhatt, Care Institute of Medical Sciences (CIMS), India; Milan Chag, Care Institute of Medical Sciences (CIMS), India; Milan Chag, Care Institute of Medical Sciences (CIMS), India; Parth Parikh, Catheterization and Cardiovascular Interventions DOI 10.1002/ccd. Published on behalf of The Society for Cardiovascular Angiography and Interventions (SCAI).
reduced risk of hypertension, diabetes mellitus and obesity comorbidities in premature CAD cohort by 39% (RR = 0.3927, 95% CI [0.35-0.42]), 25% (RR = 0.3415, 95% CI [0.30-0.38]) and 47% (RR = 0.478, 95% CI [0.43-0.52]) respectively.

**Conclusion:** Although prevalence of HF is high in Young Western Indian patients; temporal trends appear to be improving with time.

**Disclosures:**
Satya Gupta: This author has nothing to disclose.
Parloop Bhatt: This author has nothing to disclose.
Milan Chag: This author has nothing to disclose.
Parth Parikh: This author has nothing to disclose.
Aditi Patel: This author has nothing to disclose.
Vatsal Chhaya: This author has nothing to disclose.
Anish Chandranan: This author has nothing to disclose.
Hemang Baxi: This author has nothing to disclose.
Urmil Shah: This author has nothing to disclose.
Dhiren Shah: This author has nothing to disclose.
Ajay Naik: This author has nothing to disclose.
Keyur Parikh: This author has nothing to disclose.

**A-038**

**Title:** Evaluation of a Robotically-Assisted System for Percutaneous Coronary Interventions (PCI) of Complex Coronary Lesions

**Category:** Miscellaneous

**Authors:** Jonathan Harrison, University of California, San Diego Sulpizio Cardiovascular Center, United States; Jesse Naghi, University of California, San Diego Sulpizio Cardiovascular Center, United States; Lawrence Ang, University of California, San Diego Sulpizio Cardiovascular Center, United States; Arturo Dominguez, University of California, San Diego Sulpizio Cardiovascular Center, United States; John Bahadorani, University of California, San Diego Sulpizio Cardiovascular Center, United States; Ryan Reeves, University of California, San Diego Sulpizio Cardiovascular Center, United States; Mitul Patel, University of California, San Diego Sulpizio Cardiovascular Center, United States; Ehtisham Mahmud, University of California, San Diego Sulpizio Cardiovascular Center, United States

**Background:** Robotic percutaneous coronary intervention (R-PCI) (CorPath 200, Corindus, Boston, MA) is safe and feasible for simple coronary lesions. This study was designed to determine the safety and feasibility of performing R-PCI for complex coronary lesions.

**Methods:** Consecutive R-PCI procedures performed over 18 months by a single operator were analyzed. Procedure time was defined as guidewire insertion to guide catheter disengagement. Technical success was the completion of the procedure robotically or with planned manual assistance and without a major adverse cardiac event (MACE). Clinical success was defined as completion of the PCI procedure without MACE.

**Results:** There were 108 R-PCI procedures performed (68 ± 11 yrs; 78.3% male; 55.6% diabetes mellitus, 20.4% chronic kidney disease, and 20.4% acute coronary syndrome) [Table].

**Conclusion:** This study shows that R-PCI is feasible (91.7% technical success, 99.1% clinical success) and safe (0.9% MACE) in patients with complex coronary disease (78.3% type B2/C; 50.3% LAD/LM).

**Disclosures:**
Jonathan Harrison: This author has nothing to disclose.
Jesse Naghi: This author has nothing to disclose.

**Table:**

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<tr>
<td>Technical Success</td>
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<td>Clinical Success</td>
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* MACE (SCAI): nonfatal myocardial infarction (CK-MB > 3X ULN and clinical symptoms), death, emergent CABG, or target vessel revascularization.
C-047

Title: Echocardiography and fluoroscopy-guided pericardiocentesis for cancer patients with cardiac tamponade and thrombocytopenia

Category: Miscellaneous

Authors: Cezar Iliescu, MD Anderson Cancer Center, Cardiology, United States; Tarif Khair, UTHSC-Houston Medical School, United States; Ezequiel Munoz, Central University of Venezuela, Venezuela; Gloria Iliescu, MD Anderson Cancer Center, Cardiology, United States; Jean Bernard Durand, MD Anderson Cancer Center, Cardiology, United States; Konstantinos Marmagkiolis, Citizens Memorial Hospital, Heart and Vascular Institute, United States

Background: Thrombocytopenia has been considered a relative contraindication to pericardiocentesis; limited data is available regarding the safety of the procedure in thrombocytopenic patients. The incidence of refractoriness to platelet transfusion varies from 15% to 25% in patients with blood disorders and cancer.

Methods: All cancer patients with thrombocytopenia (platelet count <100,000/µL) who underwent primary percutaneous pericardiocentesis for cardiac tamponade from May 2009 through October 2015 were identified through a search of the cardiac catheterization laboratory registry. Combined echocardiographic and fluoroscopic guidance was used to increase the safety of pericardiocentesis. Platelet transfusion was performed when blood products were available.

Results: We identified 60 pericardiocentesis procedures performed in 59 patients with platelet count <100,000/µL during the study period. The majority of patients (n=48; 81%) had hematological malignancies. Pericardiocentesis was performed using only echocardiographic guidance in 18 procedures (30%), only fluoroscopic guidance in 12 (20%), and combined echocardiographic and fluoroscopic guidance in 18 procedures (30%). In 15 procedures (25%), the platelet count was <20,000/µL (critical thrombocytopenia); in 24 procedures (40%), the platelet count was 20,000-50,000/µL; and in 21 procedures (35%), the platelet count was >50,000/µL. The mean (standard deviation) increase in platelet count after transfusion was 5800/µL (11900/µL). The small increase in platelet count was consistent with refractoriness to platelet transfusion. Thromboelastography (TEG) was obtained before 7 procedure and findings were normal in patients with platelet count >50,000/µL and can provide useful information. The major complication rate was 2%.

Conclusion: Despite the thrombocytopenia and relative refractoriness to platelet transfusion in this small group of patients, the rate of major complications was comparable to that reported in recent large series of echocardiography-guided pericardiocentesis in the general population. Platelet transfusion might not modify the overall risk of the procedure.

Disclosures:
Cezar Iliescu: This author has nothing to disclose.
Tarif Khair: This author has nothing to disclose.
Ezequiel Munoz: This author has nothing to disclose.
Gloria Iliescu: This author has nothing to disclose.
Jean Bernard Durand: This author has nothing to disclose.
Konstantinos Marmagkiolis: This author has nothing to disclose.

C-048

Title: Poor Correlation Between Pulmonary Artery Pressure Measured by Echocardiography and Right Heart Catheterization in Patients Being Evaluated for Dyspnea

Category: Miscellaneous

Authors: Jerald Insel, MD, FACC, FSCAI, LifeBridge Health, United States; Basha Behrman, Touro College, United States; Aliza Drabkin, LifeBridge Health, United States; Bluma Kruk, LifeBridge Health, United States; Yosef Schwob, LifeBridge Health, United States; Shana Insel, LifeBridge Health, United States

Background: A goal of echocardiography has been to provide an alternative to invasive right heart catheterization (RHC), the gold standard of care, performed with a pulmonary artery (PA) catheter to obtain the same measurements of right atrial (RA), right ventricular, PA, and left atrial filling pressure using a non-invasive technique, transthoracic echocardiography (TTE). This correlation has been greatly debated. In this study, we looked at mean PA pressures measured by both RHC as well as TTE to evaluate their correlation.

Methods: We looked at 100 consecutive patients undergoing workup for dyspnea in an attempt to clarify both the cardiac and pulmonary components. RHC was performed via brachial percutaneous technique with a 6 French catheter. Echo measurements were done by standard techniques using continuous wave Doppler measurements adding the RA pressures. The patients had varying common etiologies seen clinically of hypertension, diabetes mellitus, chronic obstructive pulmonary disease, left ventricular dysfunction, and coronary artery disease.

Results: In 60 patients, mean PA pressures measured by RHC were an average of 23 mmHg higher than mean PA pressure measured by echo. When measured with RHC, 53 patients had PA pressures >25 mmHg, with an average of 44 mmHg, and 7 patients had PA pressures <25 mmHg, averaging to 20.25 mmHg. 22 of the same patients measured by TTE had elevated PA pressures, and 38 patients had normal pressures. 40 patients had equivalent PA pressures within 10 mmHg when measured by both TTE and RHC.

Conclusion: RHC still remains the standard of care when measuring PA pressures. RHC has been shown to be accurate and very safe when done via the right brachial vein. Further studies that include a larger cohort of patients with a broad range of medical conditions are needed. This study demonstrates the lack of correlation between RHC and TTE when measuring mean PA pressures.

Disclosures:
Jerald Insel, MD, FACC, FSCAI: This author has nothing to disclose.
Basha Behrman: This author has nothing to disclose.
Aliza Drabkin: This author has nothing to disclose.
Bluma Kruk: This author has nothing to disclose.
Yosef Schwob: This author has nothing to disclose.
Shana Insel: This author has nothing to disclose.

C-049

Title: Safety of Femoral Versus Radial Access in a Low Volume Diagnostic Catheterization Lab

Category: Miscellaneous

Authors: Basha Behrman, Touro College, United States; Jerald Insel, MD, FACC, FSCAI, LifeBridge Health, United States

Background: We looked at the safety of left heart catheterization (LHC), comparing femoral and radial access in a purely diagnostic lab...
with a preponderance of patients undergoing both right and left heart catheterization in the diagnosis of the etiology and treatment of heart failure. This lab performs approximately 80% of all cases via femoral access and 20% of all cases with radial access.

Methods: We studied a total of 400 consecutive patients with LHC done via femoral access compared to 110 patients with LHC performed via radial access. All femoral access was attained with fluoroscopic guidance using MICROpuncture technique. In 95% of the patients, we used 5 French sheaths and guides. In the other 5%, we used 6 French sheaths and guides. The radial access was performed using 5 French sheath and guiding catheter. 90% of the radial artery cannulas were using the double wall access technique, while in 5% we used a single wall access.

Results: In 9 of the 110 radial cases, we were unable to complete the procedure. This was due to the inability to access the artery in 3 cases, and coronary spasm in 6 cases. There was one vascular perforation which sealed and resolved without complications by manipulation of the wire and catheter through that section of the vessel, completing the case. In the 400 cases of LHC via the femoral artery, all cases were completed without any major complications. There were no instances of vessel perforation or retroperitoneal hematoma when noted. Instances of hematoma greater than 2 centimeters were 2%. There were no cases where surgical intervention was needed. There were no cases of loss of distal pulse or vascular compromise. In 20% of cases, we used standard closure devices and in 80% we used manual closure.

Conclusion: In a purely diagnostic cardiac catheterization lab, using MICROpuncture technique and fluoroscopic guidance, we have shown the safety of the femoral approach to LHC. While it is clear that the radial approach to LHC is an excellent and safe method, our study shows the comparative safety and benefit of a femoral approach by experienced operators in a purely diagnostic cardiac catheterization lab treating and diagnosing patients with congestive heart failure.

Disclosures:
Basha Behrman: This author has nothing to disclose.
Jerald Insel, MD, FACC, FSCAI: This author has nothing to disclose.

A-041
Title: Left vs Right Radial Artery for Diagnostic and Interventional Coronary Procedures: A Meta Analysis of 15 studies and 8760 Subjects.
Category: Miscellaneous
Authors: Amar Jadhav, Mercy Hospital Springfield, United States; Emmanuel Ugarubga, Ohio State University Medical Center, United States; Jessica Birchem, Mercy Hospital Springfield, United States; Shang-Chiuin Lee, Mercy Hospital Springfield, United States

Background: Randomized and prospective trials have showed advantages of left radial over the right radial for diagnostic and interventional coronary procedures. However there is no universal consensus on the site of radial access. An advantage hypothesized for the left radial access is the more favorable vascular anatomy. This meta analysis was aimed to compare left with the right radial access for the diagnostic or interventional coronary procedures.

Methods: Electronic databases using pubmed, medline and google scholar were used to search literature till 2015. Published randomized and prospective studies comparing left and right radial approach for diagnostic and coronary intervention were included. In English 14 articles and 1 article in Chinese language were selected. Data was independently extracted by 2 investigators.

Results: This meta analysis included 15 randomized studies with a total of 8,760 subjects with 4319 in the right radial group and 4441 in the left radial group. Studies were heterogeneous with Q value of 55.6 and I² of 74.9%. Random effect model was used for the meta-analysis and alpha level set as 0.05. Mean fluoroscopy time was available in all 15 studies and the Mean Difference in fluoroscopy time between the left and right access was 0.21 minutes (95% CI 0.115-0.312). This was significant favoring a shorter duration for the left radial access. The procedure time was recorded in 12 studies and the mean difference was 0.089 (95% CI 0.051-0.229). Mean Volume of Contrast volume used in all 15 studies was available and the mean difference was 0.060 ml (95% CI was -0.007-0.126). Subgroup analysis showed statistical significant difference in angiography group in fluoroscopy time and contrast volume. Odd ratio of failed catheterization based on access point Right vs Left was 0.959 (95%CI was 0.741-1.242). Publication bias was low. Egger’s Regression intercept confirmed absence of statistically significant asymmetry of the funnel plot.

Conclusion: To conclude, our study shows left radial approach was associated with lesser fluoroscopic time and contrast volume as compared to the right radial approach. Failed cannulation rate for left radial was not significant compared to the right.

Disclosures:
Amar Jadhav: This author has nothing to disclose.
Emmanuel Ugarubga: This author has nothing to disclose.
Jessica Birchem: This author has nothing to disclose.
Shang-Chiuin Lee: This author has nothing to disclose.

A-042
Title: Reversal of Cardiogenic Shock with a Percutaneous Left Ventricular Assist Device (Impella®) vs Intra-Aortic Balloon Pump — A Single Center Experience
Category: Miscellaneous
Authors: Yong Ji, Loma Linda University Medical Center, United States; Hambik Tankazyan, Loma Linda University Medical Center, United States; Amar Desai, Loma Linda University Medical Center, United States; Haig Liiyan, Loma Linda University Medical Center, United States; David Hamilton, Loma Linda University Medical Center, United States; Ramin Assadi, Loma Linda University Medical Center, United States; Islam Abudayeh, Loma Linda University Medical Center, United States; kenneth Jutzy, Loma Linda University Medical Center, United States; Anthony Hilliard, Loma Linda University Medical Center, United States

Background: Historically the mortality attributable to cardiogenic shock (CS) is as high as 74%. The randomized SHOCK trial showed that with emergent revascularization, including use of intra-aortic balloon pump (IABP), patients with CS had a mortality of 50%. While the Impella® device has demonstrated improved hemodynamic parameters compared with IABP, data on outcomes and guidance of timing remains scarce. The current study investigates the efficacy of Impella® compared to the IABP, in a real-world setting, on improving outcomes in acutely ill patients with CS.

Methods: This study retrospectively reviewed 77 consecutive patients with CS, 32 patients supported with Impella® placement, and 45 patients with IABP at a large, tertiary-care university medical center. Multiple clinical variables and outcomes were examined including comorbidities, vasopressor requirement, respiratory failure, length of Catheterization and Cardiovascular Interventions DOI 10.1002/ccd. Published on behalf of The Society for Cardiovascular Angiography and Interventions (SCAI).
mechanical circulatory support, length of hospital stay, and mortality. T test and Z test were used for statistical analysis.

**Results:** There were no significant differences between patients with Impella® and IABP with respect to their age and gender. Most baseline co-morbidities were similar in both groups, except for a higher prevalence in hypertension and diabetes in our Impella® group. The population requiring hemodynamic support from Impella® were more likely to be intubated (90% vs 62%, p<0.006) and requiring multiple vasopressors (75% vs 58%, p<0.124). The average Impella® implant time was 3 days vs 2 days in patients with IABP (p<0.016). The post-device length of stay was greater in patients with Impella® (15 days vs 8 days, p<0.006). Lastly, survival was no different (71% vs 56%, p<0.174).

**Conclusion:** Our study analyzing real-world use of hemodynamic support devices demonstrated favorable outcomes with the Impella® device which has increasingly become a treatment option for CS. While not statistically significant, there was a trend towards improvement in outcomes for sicker patients with a higher incidence of acute respiratory failure and CS compared to historical controls. This cohort had an outcome similarly to the less sick patient population who received an IABP.

Disclosures:
Yong Ji: This author has nothing to disclose.
Hambik Tankazyan: This author has nothing to disclose.
Amar Desai: This author has nothing to disclose.
Haig Lafian: This author has nothing to disclose.
David Hamilton: This author has nothing to disclose.
Ramin Assadi: This author has nothing to disclose.
Islam Abudayyeh: This author has nothing to disclose.
Kenneth Juty: This author has nothing to disclose.
Anthony Hilliard: 8 Speakers bureau for Abiomed

**C-054**

**Title:** Pre-operative Statin Therapy for the Prevention of Atrial Fibrillation After Surgical Aortic Valve Replacement Decreases the Incidence of Post-operative Atrial Fibrillation

**Category:** Miscellaneous

**Authors:** Vahan Koshkaryan, Kaiser Permanente Los Angeles Medical Center, United States; Aaviti Hekimian, Kaiser Permanente Los Angeles Medical Center, United States; Richard Lee, Kaiser Permanente Los Angeles Medical Center, United States; Richard Lee, Kaiser Permanente Los Angeles Medical Center, United States; Richard Lee, Kaiser Permanente Los Angeles Medical Center, United States; Nigal Gupta, Kaiser Permanente Los Angeles Medical Center, United States; Ray Zadegan, Kaiser Permanente Los Angeles Medical Center, United States; Ray Zadegan, Kaiser Permanente Los Angeles Medical Center, United States; Levon Tantoushian, Kaiser Permanente Los Angeles Medical Center, United States; Somjot Brar, Kaiser Permanente Los Angeles Medical Center, United States

**Background:** Atrial fibrillation (AF) is the most common arrhythmia that occurs post-operatively in patients undergoing cardiac surgery and has significant associated morbidity. We sought to evaluate whether pre-operative statin use in patients undergoing isolated aortic valve surgery could reduce the incidence of post-operative AF.

**Methods:** Consecutive patients who underwent isolated aortic valve surgery from January 1, 2008 through June 30, 2011 were included. Statin users pre-operatively were compared to non-users to ascertain the incidence of post-operative AF during the index hospitalization. Logistic regression analysis was used to calculate unadjusted and adjusted odds ratios (OR) for statin users versus non-users for AF; the fully adjusted model included medical history, lab data, medication use, and operative details.

**Results:** The mean age was 65 years and 38% were female. Of the 444 patients who underwent isolated aortic valve replacement surgery, 274 were statin users and 170 were non-users. The incidence of post-operative AF during the index hospitalization was 42%, and was 39% in pre-operative statin users compared to 48% in statin non-users; the corresponding unadjusted OR was 0.68 (95% CI 0.46-0.99, P=0.048). The adjusted OR was 0.51 (95% CI 0.33-0.79, P=0.002).

Post-operative AF was associated with longer ICU level of care and

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Michael Ragosta: 9 Educational Grant

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length of hospitalization. In subjects not taking statins prior to surgery, post-operative statin therapy was not associated with a decrease in the incidence of AF.

**Conclusion**: In this cohort study of patients undergoing isolated aortic valve surgery, we found that pre-operative use of statins significantly reduced the odds of developing post-operative AF by as much as 49%.

**Disclosures**: Vahan Koshkaryan: This author has nothing to disclose. Avetis Hekimian: This author has nothing to disclose. Richard Lee: This author has nothing to disclose. Blanding Jones: This author has nothing to disclose. Raymond Chen: This author has nothing to disclose. Prakash Mansukhani: This author has nothing to disclose. Nigel Gupta: This author has nothing to disclose. Ray Zadegan: This author has nothing to disclose. Levon Tantoushian: This author has nothing to disclose. Somjot Brar: This author has nothing to disclose.

**A-050**

**Title**: Same-day discharge after coronary percutaneous intervention: Parameters we should be looking for.

**Category**: Miscellaneous

**Authors**: Christos Maniotis, Hellenic Red Cross Hospital of Athens, Greece; Maria Aggelaki, Hellenic Red Cross Hospital of Athens, Greece; Constantinos Andreou, Hellenic Red Cross Hospital of Athens, Greece; Zenon Kyriakides, Hellenic Red Cross Hospital of Athens, Greece; Michael Koutouzis, Hellenic Red Cross Hospital of Athens, Greece

**Background**: Same day discharge (SDD) after coronary percutaneous intervention (PCI) is becoming increasingly popular and patient’s selection criteria are being formulated. The aim of this study is to identify the parameters that actually may influence the operator’s decision for SDD.

**Methods**: A total of 822 cases that underwent PCI in our department in 2 years were evaluated, divided into the SDD group (77 patients, 10.7%) and the no-SDD group. We evaluated the parameters that might influence the operator’s decision for SDD by a logistic regression analysis.

**Results**: SDD was not preferred when PCI was performed for indication in acute coronary syndrome (OR=0.272, CI 0.170 - 0.442; p<0.001), when using femoral access (OR=0.257, CI 0.096- 0.689; p=0.007), when the patient’s residence area was more than 2 hours travel time away from hospital (OR=0.260, CI 0.131- 0.514; p<0.001) and when the time of the procedure during the day was after 13:00pm (OR=0.318, CI 0.158-0.641; p=0.001) . Moreover, as the volume of contrast used increases by 10 ml the odds for SDD drops by 10% (OR=0.902, CI 0.844-0.965; p=0.003)

**Conclusion**: Procedural and demographic details play a crucial role in patient selection for same day discharge post coronary percutaneous intervention.

**Disclosures**: Christos Maniotis: This author has nothing to disclose. Maria Aggelaki: This author has nothing to disclose. Constantinos Andreou: This author has nothing to disclose.

Zenon Kyriakides: This author has nothing to disclose. Michael Koutouzis: This author has nothing to disclose.

**C-057**

**Title**: Outcomes of Conservative versus Invasive Approach Pre-operatively After Abnormal Myocardial Perfusion Scan: A Randomized Veterans’ Pilot Study

**Category**: Miscellaneous

**Authors**: Faisal Latif, Oklahoma City VA Medical Center, United States; Siddharth Wayangankar, Cleveland Clinic Foundation, United States; Christopher Aston, University of Oklahoma Health Sciences Center, United States; Chadi Dib, University of Oklahoma Health Sciences Center, United States; Mazen Abu-Fadel, University of Oklahoma Health Sciences Center, United States; Pedro Lozano, Oklahoma City VA Medical Center, United States; J. Emilio Exaire, Oklahoma City VA Medical Center, United States; Munawar Ali, Oklahoma City VA Medical Center, United States; Arleen Ramirez-Jimenez, Oklahoma City VA Medical Center, United States; Udho Thadani, Oklahoma City VA Medical Center, United States

**Background**: The evidence of routine pre-operative coronary revascularization to reduce adverse events is conflicting. We aim to evaluate the benefit of acting on a positive pre-operative myocardial perfusion scan (MPS) by providing intensive medical treatment (IMT) vs. invasive strategy (IMT) when appropriate.

**Methods**: 50 patients from the Oklahoma City Veterans hospital with moderate -severely abnormal MPS were randomized to IMT (beta blocker [BB] titrated to heart rate of 60-70 BPM and statins as tolerated) vs. IMT prior to non-cardiac surgery. The composite endpoint of major cardiovascular events including death, peri-operative myocardial infarction, and stroke (MACCE) was evaluated at 1 month and 1 year post-surgery using an intention to treat analysis.

**Results**: 37 patients underwent planned non-cardiac surgery (14% high risk and 86% intermediate risk surgery). Baseline demographics and clinical features were similar. Mean age was 66±8 years, 98% were male. Mean pre-operative HR was 69±11, 80% of patients had a functional capacity ≤4 METS (Table 1A). Mean follow-up was similar between groups (430±151 days). MACCE at one month and one year post-surgery were not significantly different between groups (P=NS) (Table 1B, 1C). Albeit numerically higher in the IMT strategy, all-cause death, MI and stroke were not different between groups.

**Conclusion**: In our pilot study, acting on an abnormal MPS with IS in the future when compared to IMT. There is a numerical trend favoring IS. With the results of our pilot study, it seems to be safe and feasible to perform a larger study to further evaluate this hypothesis.

**Disclosures**: Faisal Latif: 8 Abbott Vascular Siddharth Wayangankar: This author has nothing to disclose. Christopher Aston: This author has nothing to disclose. Chadi Dib: This author has nothing to disclose. Pedro Lozano: This author has nothing to disclose. J. Emilio Exaire: This author has nothing to disclose. Munawar Ali: This author has nothing to disclose. Arleen Ramirez-Jimenez: This author has nothing to disclose. Udho Thadani: This author has nothing to disclose.
A-002

Title: Feasibility of Robotic Percutaneous Coronary Intervention in Extremely Complex Coronary Lesions

Category: Miscellaneous

Authors: Ehtisham Mahmud, University of California, San Diego Sulpizio Cardiovascular Center, United States; Jesse Naghi, University of California, San Diego Sulpizio Cardiovascular Center, United States; Jonathan Harrison, University of California, San Diego Sulpizio Cardiovascular Center, United States; Lawrence Ang, University of California, San Diego Sulpizio Cardiovascular Center, United States; Arturo Dominguez, University of California, San Diego Sulpizio Cardiovascular Center, United States; John Bahadorani, University of California, San Diego Sulpizio Cardiovascular Center, United States; Ethan Yalvac, University of California, San Diego Sulpizio Cardiovascular Center, United States; Mitul Patel, University of California, San Diego Sulpizio Cardiovascular Center, United States; Ryan Reeves, University of California, San Diego Sulpizio Cardiovascular Center, United States

Background: Robotic (R) assisted percutaneous coronary intervention (PCI) (CorPath 200, Corindus, Boston, MA) is safe and feasible for simple coronary lesions. Data regarding utilization of R-PCI in extremely complex lesions are lacking.

Methods: All consecutive PCI procedures performed robotically or manually (M) over 18 months by a single operator were included in a review. The primary outcomes were 30-day and 1-year post-surgery outcomes, including CV death + MI + Stroke, All-cause Death, MI, and Stroke. Continuous variables were compared using a Student t-test, while categorical variables were compared using a Chi-square test.

Results: A total of 50 consecutive PCI procedures were included in the study, with 26 procedures performed robotically (R) and 24 procedures performed manually (M). The baseline characteristics were comparable between the two groups. The 30-day outcomes showed no statistically significant differences between R-PCI and M-PCI. The 1-year outcomes also showed similar results.

Conclusion: Robotic PCI is feasible and safe for the treatment of extremely complex coronary lesions, with similar outcomes compared to manual PCI. Further studies are needed to evaluate the long-term outcomes and cost-effectiveness of robotic PCI.

Abstracts

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prospective registry. A lesion complexity score was calculated as the sum of all discrete lesions treated (Type A (1), B1 (2), B2 (3) and C (4)). The cumulative score for treated lesions was categorized as low (≤4), intermediate (4-6) or high (>6). Clinical, angiographic and procedural characteristics were compared amongst the extremely complex cohort, which was defined as combined intermediate and high groups. Clinical success was defined as completion of the PCI procedure without MACE (death, myocardial infarction or urgent revascularization).

**Results:** A total of 120 extremely complex PCI procedures (Age 68.2 ± 12.3 years, 82.5% male) were analyzed (39 R; 81 M). Baseline demographics were comparable except for greater presentation for angina in the R-PCI group (Table). Angiographic and procedural characteristics were similar between groups. Clinical success was high and comparable with both strategies (98.8% R vs. 97.5% M, p=0.64). In the extremely complex R-PCI group manual assistance or conversion occurred in 18% and 13% of procedures respectively.

**Conclusion:** Robotically assisted PCI is both feasible and safe in a cohort of patients with extreme lesion complexity. Comparable clinical outcomes to M-PCI were achievable with minimal manual assistance or conversion in the R-PCI group.

**Disclosures:**
Ehtisham Mahmud: 9 Corindus-Consultant and Clinical Research
Jesse Naghi: This author has nothing to disclose.
Jonathan Harrison: This author has nothing to disclose.
Lawrence Ang: This author has nothing to disclose.
Arturo Dominguez: This author has nothing to disclose.
John Bahadorani: This author has nothing to disclose.
Ethan Yalvac: This author has nothing to disclose.
Mitul Patel: This author has nothing to disclose.
Ryan Reeves: This author has nothing to disclose.

C-064

Title: Relationship between Electrocardiographic Finding and Clinical Presentation in Stress Cardiomyopathy

Category: Miscellaneous

Authors: Purushothaman Muthusamy, St Vincent Hospital, United States; Alan Davis, Grand Rapids Medical Education Partners, United States; Rishi Bajaj, St Vincent Hospital, United States; Bonnie Weiner, St Vincent Hospital, United States; Timothy Fritz, Frederik Meijer Heart & Vascular Institute, Spectrum Health, United States

Background: Despite the increasing emphasis of stress cardiomyopathy (SCM) as a differential diagnosis of chest pain, knowledge on its electrocardiographic (EKG) characteristics is limited. We describe the relationship between EKG and clinical presentation in a large series of SCM patients.

Methods: Retrospective analysis of 124 patients fulfilling Mayo Clinic diagnostic criteria for SCM from December 2004 through July 2011 was done. Admission 12 lead EKG and clinical presentation for patients with apical ballooning (ABS) and mid-ventricular ballooning syndrome (MVBS) were compared.

Results: Mean age of the SCM cohort was 65.6 ± 12.2 years (mean ± SD). Majority were females (91.9%). ABS (84.7%) was the most prevalent pattern. MVBS patients were younger than ABS (60.6 ± 9.1 vs. 66.5 ± 12.5, P = 0.026). The rate of presentations of chest pain (81.9% vs 73.7%, P = 0.05). Data shown below.

Conclusion: SCM patients present with diverse EKG patterns. Prominent T wave inversion was the most common presenting EKG abnormality. Chest pain was the major presentation in all the EKG abnormalities.

Disclosures: Purushothaman Muthusamy: This author has nothing to disclose.

A-068

Title: Does Robotic Percutaneous Coronary Intervention Lower Stent use Compared to the Manual Approach?

Category: Miscellaneous

Authors: Jesse Naghi, University of California, San Diego Sulpizio Cardiovascular Center, United States; Jonathan Harrison, University of California, San Diego Sulpizio Cardiovascular Center, United States; Lawrence Ang, University of California, San Diego Sulpizio Cardiovascular Center, United States; Arturo Domínguez, University of California, San Diego Sulpizio Cardiovascular Center, United States; John Bahadorani, University of California, San Diego Sulpizio Cardiovascular Center, United States; Song Cui, University of California, San Diego Sulpizio Cardiovascular Center, United States; Omid Behnamfar, University of California, San Diego, Sulpizio Cardiovascular Center, United States; Ryan Reeves, University of California, San Diego Sulpizio Cardiovascular Center, United States; Mitul Patel, University of California, San Diego Sulpizio Cardiovascular Center, United States; Ehtisham Mahmood, University of California, San Diego Sulpizio Cardiovascular Center, United States.

Background: Robotically assisted percutaneous coronary intervention (R-PCI) (CorPath 200, Corindus, Boston, MA) is safe and feasible for simple coronary lesions. It has been hypothesized that accurate lesion length determination robotically can lower stent use.

Methods: Stent utilization for R-PCI and manual (M-PCI) procedures performed consecutively over 18 months by a single operator was compared. Procedures ineligible for R-PCI (i.e. planned atherectomy, two stent strategy for bifurcation lesion, chronic total occlusion with retrograde guiding catheter) were excluded from analysis in the M-PCI group. A PCI lesion complexity score was calculated as the sum of all discrete lesions treated (Type A (1), B1 (2), B2 (3) and C (4)). The cumulative score for treated lesions was categorized as low (≤4), intermediate (5-6) and high (>6) PCI complexity.

Results: A total of 334 PCI procedures (108 R, 157 lesions; 226 M, 336 lesions) in 315 patients (Age 67.7 ± 11.8, 78% male) were analyzed. Baseline characteristics were comparable in both groups except for greater type B2/C lesions (78.3% vs. 68.8%, p = 0.027) in the R-PCI group. In the overall cohort similar stent use was observed (1.59 ± 0.79 R vs. 1.54 ± 0.75 M, p = 0.57). An analysis based on lesion complexity revealed similar findings (Figure).
Conclusion: Robotically assisted PCI is associated with similar stent use as compared to manual PCI regardless of lesion complexity.

Disclosures:
Jesse Naghi: This author has nothing to disclose.
Jonathan Harrison: This author has nothing to disclose.
Lawrence Ang: This author has nothing to disclose.
Arturo Dominguez: This author has nothing to disclose.
John Bahadorani: This author has nothing to disclose.
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Ehtisham Mahmud: 9 Corindus- Consultant and Clinical Research
Mitul Patel: This author has nothing to disclose.
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C-071
Title: Peri-procedural outcomes and long-term mortality of patients with and without chronic kidney disease undergoing percutaneous coronary intervention

Category: Miscellaneous

Authors: Agam Patel, New York Presbyterian/Weill Cornell Medical College, United States; Mohammed Ibrahim, New York Presbyterian/Weill Cornell Medical College, United States; Rajesh Swaminathan, New York Presbyterian/Weill Cornell Medical College, United States; Luke Kim, New York Presbyterian/Weill Cornell Medical College, United States; Dmitriy Feldman, New York Presbyterian/Weill Cornell Medical College, United States; Robert Minutello, New York Presbyterian/Weill Cornell Medical College, United States; S. Chiu Wong, New York Presbyterian/Weill Cornell Medical College, United States; Harsimran Singh, New York Presbyterian/Weill Cornell Medical College, United States

Background: Patients with advanced chronic kidney disease (CKD) are considered high risk when undergoing percutaneous coronary interventions (PCI); however, limited published data exist on long-term outcomes after PCI in comparison to patients without CKD.

Methods: Examining the Cornell Coronary Registry, we evaluated 6,478 patients who underwent elective or urgent PCI between 2009 and 2013. Patients were grouped into CKD stages by estimated glomerular filtration rate (eGFR) using the CKD-EPI equation.

Results: Patients grouped by CKD stages included: 1351 patients with eGFR >90 mL/min/1.73m² (stage 1), 2882 with eGFR 60-89 (stage 2), 1742 with eGFR 30-59 (stage 3), 191 with eGFR 15-29 (stage 4), and 312 with eGFR <15 or on dialysis (stage 5). Significant differences were found among groups in the incidence of post-procedural heart failure, stroke, new dialysis requirement, transfusions, and bleeding events (p<0.05). 5 year Kaplan-Meier overall survival among CKD stages 1-5 was as follows: 98.1% (CI 97.3%-98.9%), 95.5% (CI 95.8%-97.2%), 91.8% (CI 90.4%-93.1%), 82.5% (CI 76.5%-88.9%), 76.9% (CI 71.6%-82.5%), respectively (p<0.001 by Log-Rank test) (Figure 1). The hazard ratios of all-cause mortality for CKD stages 2-4 as compared to stage 1 by multivariate Cox regression analysis were as follows: 1.27 (CI 0.79-2.06, p=0.3), 1.93 (CI 1.18-3.18, p<0.01), 2.73 (CI 1.49-5.01, p=0.001), and 5.43 (CI 3.23-9.12, p<0.001), respectively.

Conclusion: Among patients undergoing PCI, lower GFR is significantly associated with progressively decreased long-term survival in real world practice.

Disclosures:
Agam Patel: This author has nothing to disclose.
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S. Chiu Wong: This author has nothing to disclose.
Harsimran Singh: This author has nothing to disclose.
Harsimran Singh: This author has nothing to disclose.

A-076
Title: Transcatheter Closure Compared to Surgical Ligation in Patients with Large Patent Ductus Arteriosus and Pulmonary Hypertension: A Three-Year Experience from Harapan Kita

Category: Miscellaneous

Authors: Radityo Prakoso, National Cardiovascular Center Harapan Kita, Jakarta, Indonesia; Radityo Prakoso, National Cardiovascular Center Harapan Kita, Jakarta, Indonesia; Rony Mario Candrasatria, National Cardiovascular Center Harapan Kita, Jakarta, Indonesia; Indriwanto Sakidjan Atmosudigdo, National Cardiovascular Center Harapan Kita, Jakarta, Indonesia; Poppy S Roe- biono, National Cardiovascular Center Harapan Kita, Jakarta, Indonesia; Yovi Kurniawati, National Cardiovascular Center Harapan Kita, Jakarta, Indonesia; Anna Ulfah Rahajoe, National Cardiovascular Center Harapan Kita, Jakarta, Indonesia; Ganesja Mulia Harimurti, National Cardiovascular Center Harapan Kita, Jakarta, Indonesia

Background: Patients with large patent ductus arteriosus (PDA) are considered a high-risk group when treated by surgical ligation due to the risk of pulmonary hypertension. However, transcatheter closure and surgical ligation have been shown to be associated with similar outcomes in the short term. This study aims to evaluate the long-term outcomes of transcatheter closure compared to surgical ligation in patients with large PDA and pulmonary hypertension.

Methods: This study included 266 patients with large PDA and pulmonary hypertension who underwent transcatheter closure or surgical ligation at Harapan Kita Hospital from January 2013 to November 2015. The inclusion criteria were patients with PDA diameter ≥5mm with recorded pulmonary hypertension. The exclusion criteria were patients with PDA <5mm or without pulmonary hypertension. The primary endpoint was freedom from mortality, and the secondary endpoints were freedom from heart failure, re-intervention, and major adverse events. The results were compared using the Log-Rank test and multivariate Cox regression analysis.

Results: The transcatheter closure group included 127 patients, and the surgical ligation group included 139 patients. The freedom from mortality at 3 years was 98.1% in the transcatheter closure group and 96.5% in the surgical ligation group (p=0.55). The freedom from heart failure at 3 years was 98.2% in the transcatheter closure group and 97.9% in the surgical ligation group (p=0.75). The freedom from re-intervention at 3 years was 98.7% in the transcatheter closure group and 97.9% in the surgical ligation group (p=0.55). The freedom from major adverse events at 3 years was 98.5% in the transcatheter closure group and 97.9% in the surgical ligation group (p=0.55).

Conclusion: Transcatheter closure is a safe and effective procedure for the treatment of large PDA and pulmonary hypertension, with similar long-term outcomes compared to surgical ligation. This study provides valuable information for the clinical decision-making process in patients with large PDA and pulmonary hypertension.

Disclosures:
Radityo Prakoso: This author has nothing to disclose.
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Results: Median age was 9 years old (11 months-47 years old) for group TC and 15 months old (2 months-22 years) (p = 0.001). Duct size was 8.0 (5.6-18) mm for Group TC and 8.0 (5-20) mm for group SC (p = 0.94); and mPAP was 48.6 ± 11.8 mmHg for Group TC and 36.1 (26-81) mmHg for Group SC respectively (p = 0.002). There were no cardiac death in both groups. During study, there was one case of device dislodge which underwent surgical ligation afterwards. No significant difference of acute procedure-related complications were observed in both groups (4.8% vs 14.8%, p = 0.16). Initial residual PDA before discharge were similar in both groups, 52% in Group TC and 30% in Group SC (p = 0.06). Upon follow up, the persistent residual PDA was 2.4% in Group TC and 22.2% in Group SC (p < 0.01). Length of stay in hospital was 3(2-7) days for Group TC and 6 (3-13) days for Group SC (p < 0.01).

Conclusion: In comparison to the established surgical closure, transcatheter closure in large PDA with pulmonary hypertension was associated with less persistent residual shunt and shorter hospital stay with comparable complications.

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Rony Mario Candrasatria: This author has nothing to disclose.
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Anna Ulfah Rahajoe: This author has nothing to disclose.
Ganesja Mulia Harimurti: This author has nothing to disclose.

C-004

Title: Survival and Neurological Recovery in Refractory Cardiac Arrest Patients treated with Extra Corporeal Cardiopulmonary Resuscitation versus Conventional Cardiopulmonary Resuscitation - a meta-analysis

Category: Miscellaneous

Authors: Waqas Qureshi, Wake Forest University Cardiology, United States; Usama Nasir, Wake Forest School of Medicine, United States; Wesley O’Neal, Wake Forest University Health Services, United States; Mouaz Al-Mallah, King Abdulaziz Cardiac Center, Saudi Arabia

Background: Survival post cardiac arrest remains abysmal. Extracorporeal cardiopulmonary resuscitation (ECPR) using extracorporeal membrane oxygenation (ECMO) has been recently examined as an alternative to conventional CPR in refractory cardiac arrest, however the results are conflicting. We performed meta-analysis to determine survival and neurological recovery in studies that examined both techniques.

Methods: MEDLINE, EMBASE, GoogleScholar, meeting abstracts, presentations and Cochrane central databases were searched from inception through December 2015, without language restrictions. For a study to be selected, it had to report the number of deaths in extracorporeal cardiopulmonary resuscitation (ECPR) and conventional CPR (CCPR).
Data were extracted by 1 author, and random checks were made by another author.

**Results**: A total of 8 studies were included in this meta-analysis. A total of individuals underwent 444 ECPR and 2146 had CCPR. There were 132 (45.8%) deaths in ECPR group compared to 1368 (83.1%) in CCPR group. Patients who had ECPR had 128% increased survival (pooled HR 2.28; 95% CI 1.69 – 3.06, p < 0.0001) and 81% increased chance of good neurological recovery (pooled HR 1.81; 95% CI 1.13 – 2.89, p = 0.01) compared with those who underwent CCPR (Figure 1).

**Conclusion**: Individuals with cardiac arrest who underwent ECPR had decreased risk of mortality and poor neurological recovery as compared to CCPR.

**Disclosures**: Waqas Qureshi: This author has nothing to disclose. Usama Nasir: This author has nothing to disclose. Wesley O’Neal: This author has nothing to disclose. Mouaz Al-Mallah: This author has nothing to disclose.

**A-078**

**Title**: Catheter angiography versus computed tomography angiography for the diagnosis of extracardiac fibromuscular dysplasia in patients with spontaneous coronary artery dissection

**Category**: Miscellaneous

**Authors**: Erin Rayner-Hartley, Cardiology, Vancouver General Hospital, University of British Columbia, Canada; Tony Verma, Cardiology, Vancouver General Hospital, University of British Columbia, Canada; Andrew Starovoytov, Cardiology, Vancouver General Hospital, University of British Columbia, Canada; Milad Heydari, Cardiology, Vancouver General Hospital, University of British Columbia, Canada; Jacqueline Saw, Cardiology, Vancouver General Hospital, University of British Columbia, Canada

**Background**: Spontaneous coronary artery dissection (SCAD) is an infrequent condition predominantly affecting young women, and has a strong association with fibromuscular dysplasia (FMD). Screening for incidental FMD in extracardiac arteries (renal, iliac, and cerebrovascular arteries) is routinely done in patients with SCAD. Comparison of noninvasive CT angiography to the gold-standard catheter angiography for diagnosing extracardiac FMD has not been performed.

**Methods**: We reviewed our cohort of non-atherosclerotic SCAD patients who were consented in our Vancouver General Hospital SCAD registries. For this study, we included patients who had undergone both CT angiography and catheter angiography for diagnosis of extracardiac FMD in the renal and/or iliac arteries. We retrospectively reviewed for the presence of FMD in both imaging modalities. The diagnosis of extracardiac FMD required multifocal (string-of-beads) appearance of the affected arteries. We compared the sensitivity, specificity, and predictive values of CT angiography versus the gold-standard catheter angiography for FMD diagnosis.

**Results**: We included 20 patients who underwent extracardiac FMD evaluation with both CT angiography and catheter angiography. Of these, assessments of the renal arteries were performed in all 20 patients, and assessments of the iliac arteries were performed in 10 of the 20 patients. Renal FMD was identified on catheter angiography in 9/20 patients, but was only identified on CT angiography in 1/20 patient. Iliac FMD was identified in 2/10 patients with catheter angiography, but not seen in any patient on CT angiography. Out of the 11/20 patients with extracardiac (renal or iliac) FMD identified on catheter angiography, only 1 of these patients was found to have FMD on CT angiography (sensitivity of 9.1%).

**Conclusion**: Although CT angiography is noninvasive, it was poorly sensitive in diagnosing renal or iliac FMD when compared to the gold-standard catheter angiography. Further prospective studies should be performed to confirm our findings.

**Disclosures**: Erin Rayner-Hartley: This author has nothing to disclose. Tony Verma: This author has nothing to disclose. Andrew Starovoytov: This author has nothing to disclose. Milad Heydari: This author has nothing to disclose. Jacqueline Saw: This author has nothing to disclose.

**A-081**

**Title**: The Utility of Ankle-Brachial Index (ABI) in Risk Stratifying Patients Undergoing Evaluation for Coronary Artery Disease (CAD)

**Category**: Miscellaneous

**Authors**: Falak Shah, Loyola University Medical Center, United States; Jessica Pillarella, Loyola University Medical Center, United States; Robert S. Dieter, Loyola University Medical Center, United States; Bruce E. Lewis, Loyola University Medical Center, United States; Ferdinand Leya, Loyola University Medical Center, United States; John J. Lopez, Loyola University Medical Center, United States; Conner O’Keefe, Aurora St.Lukes Medical Center, United States; Ivan V. Pacold, Loyola University Medical Center, United States; Lowell H. Steen, Jr., Loyola University Medical Center, United States; Amir Darki, Loyola University Medical Center, United States

**Background**: Although PAD, as demonstrated by ABIs, is associated with an elevated CV risk. Research in the utility of ABI testing to further risk stratify patients undergoing stress tests is limited. In such patients who have undergone coronary angiograms, we studied the relationship of ABIs with the severity of CAD, as measured by the SYNTAX score, and whether an abnormal ABI can further risk stratify indeterminate stress echocardiograms.

**Methods**: Patients who underwent an ABI and stress echocardiography followed by a coronary angiogram between January 2010 and December 2014 at Loyola University were reviewed. Among these patients, only those with diagnostic studies performed within a six year timespan were included. A retrospective analysis was conducted. Analysis included demographics, stress test parameters, ABIs and SYNTAX scores. The Student’s t-test and Fischer exact test were used with significance at p < 0.05. Logistic and multivariate regression analyses were performed using STATA 11.0.

**Results**: A total of 199 patients were studied (41% females, mean age 63). Group A (95 patients) included patients with abnormal and borderline ABIs (ABI = 1.00 and < 1.30). Baseline characteristics were similar between groups A and B, except for higher incidence of smoking and diabetes in group A. SYNTAX score was significantly higher in Group A (mean 24.3 +/5.3) vs B (mean 11.1 +/-4.2), p<0.05. Additionally, in the low to intermediate stress test cohort, patients in Group A (abnormal ABI) had approximately two times the incidence of obstructive CAD requiring revascularization as compared to Group B (normal ABI) after adjustment for age, gender, and CV risk factors (OR 1.9, 95% CI 1.7, 8.1).

**Conclusion**: PAD, as demonstrated by ABIs, is associated with an increased severity and complexity of CAD, as demonstrated by the SYNTAX score. ABIs, when combined with a stress echocardiogram, can help further risk stratify patients being evaluated for CAD.
C-097

Title: Frequency of non-obstructive coronary artery disease in patients undergoing elective coronary angiography and the appropriateness of the procedure

Category: Miscellaneous

Authors: Saba Aijaz, Tabba Heart Institute, Karachi, Pakistan, Pakistan; Asad Z. Pathan, Tabba Heart Institute, Karachi, Pakistan, Pakistan; Shakir Lakhani, Tabba Heart Institute, Karachi, Pakistan, Pakistan; Rehan Malik, Tabba Heart Institute, Karachi, Pakistan, Pakistan

Background: Left heart cath with coronary angiography (CA), the current gold standard test to diagnose coronary artery disease (CAD) is an invasive procedure, which is why it is frequently preceded by non-invasive stress testing (NIT). Appropriate use criteria (AUC) have also been developed to aid in judicious utilization of CA. Frequency of non-obstructive CAD (NOCAD) findings during CA is also a quality metric for CA. Our aim was to determine frequency of NOCAD in elective patients undergoing CA at a non-US hospital and to ascertain their appropriateness by applying the AUC for CA.

Methods: Single center study on consecutive patients coming for elective CA over a 3 year period. Acute coronary syndrome, known obstructive CAD (OCAD) or PCI/CABG, prior myocardial infarction or CA done as part of planned valve replacement surgery were excluded. NOCAD was defined as absence of >30% left main or >50% major epicardial vessel stenosis.

Results: Out of 8540 total patients, 1096 were included in analysis. 227 (20.7%) had NOCAD. Findings of diabetes, hypertension, smoking, family history of premature CAD, dyslipidemia and peripheral arterial disease were equally distributed between OCAD and NOCAD (p=NS). NOCAD were slightly younger (56.1 vs. 58 yrs, p<0.05), more females (35.2% vs. 15.8%, p-value < 0.001) and more likely to have no angina or atypical symptoms (50% vs. 22.5%, p<0.001). Overall 43.5% had no NIT performed prior to CA while stress test was performed less frequently in NOCAD vs. OCAD group (59% vs. 39.5%, p-value <0.001). Those with abnormal NIT, 97% had an intermediate to high-risk stress test result in OCAD as compared to 84% in NOCAD group (p-value <0.05). The AUC ranking NOCAD vs. OCAD was appropriate (76.7% vs. 75.6%, p=NS), uncertain (19.4% vs. 24.1%, p=NS) and inappropriate (4.0% vs. 0.3%, p-value < 0.001).

Conclusion: Discovering NOCAD on CA is not infrequent. There is a poor correlation between AUC for CA and presence of OCAD on cath, stressing upon need to further refine the criteria.

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Asad Z. Pathan: This author has nothing to disclose.
Shakir Lakhani: This author has nothing to disclose.
Rehan Malik: This author has nothing to disclose.

S94 Abstracts

Additional study of the association of PAD with CAD to help guide diagnosis and management of CV disease is warranted.

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Falak Shah: This author has nothing to disclose.
Jessica Pillarella: This author has nothing to disclose.
Robert S. Dieter: This author has nothing to disclose.
Bruce E. Lewis: This author has nothing to disclose.
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Lowell H. Steen, Jr.: This author has nothing to disclose.
Amir Darki: This author has nothing to disclose.

PEDIATRIC

B-009

Title: Intentional Stent Fractures in Children: Intermediate Term Follow Up

Category: Pediatric

Authors: Hitesh Agrawal, Baylor College of Medicine, Texas Children’s Hospital, United States; Athar Qureshi, Baylor College of Medicine, Texas Children’s Hospital, United States; Henri Justino, Baylor College of Medicine, Texas Children’s Hospital, United States

Background: Use of small diameter stents in young children and/or jailing of side branches pose significant challenges due to somatic growth. We sought to assess the capacity to induce longitudinal fractures in undersized stents to increase vessel diameter, and side cell fractures to enlarge stenotic jailed branches.

Methods: Retrospective review of patients (pts) who underwent attempted intentional stent fractures (ISF) from 01/06-12/15.

Results: 21 pts (19 male), median age 4.7 (1.1-47.8) yrs, weighing 14.9 (6.9-102) kg underwent attempted ISF in 27 vessels. All but 3 ISF attempts were performed by a single operator. Initial stent implant occurred at a median age of 1.3 (0.1-34.1) yrs, at the following sites: pulmonary arteries (8), pulmonary veins (8), RV-PA conduit (4), systemic veins (6), and aorta (1). Types of stents were “coronary” (13), pre-mounted Genesis (5), Genesis XD (n=2), Mega LD (2), Palmaz 4 series (2), and Palmaz 8 series (2), with initial stent diameters of 3.5-16 mm. Four patients had 2 completely overlapping stents, 1 had 3 overlapping stents and 4 had partial overlap at the stented segment. Using noncompliant balloons [Dorado (n=7), Atlas (10), Conquest (9) and Mustang (1)], longitudinal ISF was achieved in 17 and side cell expansion with strut fracture in 7 (diameter 5-20 mm, and pressure 12 to >30 atm). Three longitudinal ISF attempts were unsuccessful. Two pts had balloon rupture with no consequence. Side cell ISF permitted immediate stenting of stenotic jailed side branches in 2 pts. Re-stenting was immediate in 4 longitudinal ISF; 2 had bare metal stents and 2 developed pseudoaneurysms requiring covered stents (1 pulmonary artery, 1 conduit). At a median follow up of 3 yrs (1 wk – 9.3 yrs), 6 pts had 9 additional interventions for restenosis at site of longitudinal ISF: angioplasty (2), stenting (5), surgical stent flaring (1), conduit revision (1). There were no other late sequelae at ISF sites.

Conclusion: ISF can be induced safely using high-pressure balloons both longitudinally to expand undersized stents or through side cells to expand stenotic jailed branches. Longitudinal ISF may require covered stents due to immediate pseudoaneurysm formation and/or re-stenting due to late restenosis.

Disclosures:
Hitesh Agrawal: This author has nothing to disclose.
Athar Qureshi: This author has nothing to disclose.
Henri Justino: 6 Consultant for St Jude Medical, Medtronic and Johnson

B-008

Title: Transcatheter versus Surgical Interventions in children with Renovascular Hypertension

Category: Pediatric

Authors: Hitesh Agrawal, Texas Childrens Hospital, United States; Athar Qureshi, Texas Childrens Hospital, United States; Douglas B.金: This author has nothing to disclose.

Catheterization and Cardiovascular Interventions DOI 10.1002/ccd. Published on behalf of The Society for Cardiovascular Angiography and Interventions (SCAI).
Background: Renovascular hypertension (RVH) can be due to renal artery stenosis (RAS) and/or midaortic syndrome (MAS). Therapies including anti-hypertensive medications, balloon angioplasty, stents, and surgery are used in these patients. We sought to compare the outcomes of these therapies.

Methods: Retrospective chart review of patients (pts) treated for RVH from 1/91-12/15. Comparisons were made between different treatment groups using Kruskal-Wallis test, and each vascular lesion was regarded as one unit. Data are presented as median (range).

Results: 36 pts (13 males) were diagnosed with RVH at 8.7 (0.1-26.6) yrs. Vascular involvement ranged from MAS (5 pts), RAS (11), MAS with RAS (19), and RAS with thoracic coarctation (1). Each pt had a median of 2 (1-7) lesions treated. The first procedure at 8.7 (0.1-26.6) yrs was: balloon angioplasty (BA) (36 lesions), stenting (12), surgery (15) for the following lesions: renal (ostial n=30, distal 14), abdominal aorta (short segment 8, long segment 7), celiac artery (2) and iliac artery (1). Age at initial intervention was similar in all groups: 6.5(0.1-17) yrs for BA, 10.3(0.3-26.6) for stent, and 10.7 (0.1-20) for surgery, p= 0.12. Median time (days) to second intervention was 276 (BA), 4.3 (stenting), 709 (surgery), p=0.12. Age did not have statistical significant impact on time to re-intervention. Pts in initial BA group had these re-interventions: repeat BA (5), stenting (3), surgery (2). Re-interventions for initial stenting group were: BA (1), surgery (2). Re-interventions for initial surgery group were: BA (1), surgery (1). Vascular injuries requiring early intervention included tear (3), occlusion (1), or pseudoaneurysm (3), occurred with: BA (1), stenting (3) and surgery (3), leading to clinical consequences in 3 pts (all in initial surgery group). 4 pts died: 2 with congenital renal artery atresia and MAS, 1 with MAS and RAS and 1 with only MAS. Median follow up interval was 5.4 (0.04-35.2) yrs.

Conclusion: Individuals with RVH treated with transcatheter means were less likely to suffer major complications, but experienced shorter time interval to re-intervention.

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Athar Qureshi: This author has nothing to disclose.
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Henri Justino: 6 St Jude Medical, Medtronic, Janssen pharmaceutical

B-020

Title: Melody Valve Implant and Function in the Pulmonary Position: Does Having a Conduit Matter?
Category: Pediatric
Authors: Jeremy Asnes, Yale University School Of Medicine, United States; Catherine Tomasulo, Yale University School Of Medicine, United States; William Hellenbrand, Yale University School Of Medicine, United States

Background: The Medtronic Melody Transcatheter Pulmonary Valve (MTPV) was implanted within a variety of RVOT substrates including conduits (CNDT), bioprosthetic valves (BPV), and transannular patches (TAP). Substrate specific variations in implant procedure characteristics and short and medium term valve function were investigated.

Methods: All patients catheterized for RVOT MTPV implant from 5/11–12/15 were reviewed. Procedural data and echo mean gradient and valve insufficiency at latest follow-up were compared.

Results: 75 patients (median 59 Kg [16.8–161.3]; median 18.6yrs. [4.7–65.3]) were catheterized, 63 (84%) had successful MTPV implant - 18 TAP, 20 BPV, 25 CNDT. All attempted implants were successful. The procedure was aborted prior to valve implant in 12 (9 TAP, 3 CNDT); 2 coronary compression, 1 conduit tear (pre-PARCS), 9 landing zone too large. Peak-to-peak RVOT gradient in TAP was significantly less than in CNDT 15.4 vs 32.8mmHg (P<0.01) but there was no difference between TAP and BPV or BPV and CNDT. There was no significant difference in mean fluoroscopy time (TAP 35.5; BPV 30.8; CNDT 37.8 minutes), the number of additional procedures (pulmonary artery stenting, ASD closure), or complications between the groups. 5 CNDT patients had compassionate use of covered stents before aggressive angioplasty, 2 CNDT patients had RVOT tear treated by covered stent under PARCS protocol. 1 TAP patient had emergency use of covered stent. 8 patients experienced one or more other complications (vascular, pulmonary hemorrhage, transient arrhythmia, hematuria). None required intervention. There was no significant difference between the groups in follow up (overall median follow up 16 months [0–46], mean gradient (median 12mmHg [4–22]), or degree of insufficiency at latest follow up. Only one patient had > mild insufficiency (TAP group).

Conclusion: Implantation of MTPV in RVOT substrates other than CNDT is safe and does not adversely affect procedure associated radiation exposure or complication rates. Short and medium term valve function is excellent regardless of RVOT substrate with an overall maximum mean gradient of 22mmHg and only 1 patient having > mild insufficiency with a median of 16 months of follow up.

Disclosures:
Jeremy Asnes: This author has nothing to disclose.
Catherine Tomasulo: This author has nothing to disclose.
William Hellenbrand: 5 Medtronic

O-011

Title: Life-Threatening Airway Bleeding After Palliation of Univentricular Heart Disease: Acute and Mid-Term Outcomes Following Transcatheter Intervention
Category: Pediatric
Authors: Konstantin Averin, Cincinnati Children’s Hospital Medical Center, United States; Wendy Whiteside, Cincinnati Children’s Hospital Medical Center, United States; Dan Benscoter, Cincinnati Children’s Hospital Medical Center, United States; Jonathan Byrnes, Cincinnati Children’s Hospital Medical Center, United States; Russel Hirsch, Cincinnati Children’s Hospital Medical Center, United States; Bryan Goldstein, Cincinnati Children’s Hospital Medical Center, United States

Background: Life-threatening airway bleeding (hemoptyis) is a rare but serious complication of palliated univentricular congenital heart disease (CHD). Transcatheter embolization of arteriopulmonary collateral (APC) vessels is a standard therapy. Acute and mid-term outcomes following intervention have not been described.

Methods: Retrospective review of univentricular CHD patients who presented to a single CHD referral center with hemoptyis from 2004-2015.

Results: Twenty-three catheterizations were performed during 17 episodes of hemoptyis in 10 patients (40% male, mean 10.5±4.7 years old) during the study period. First hemoptyis episode occurred a mean of 6.4±3.5 years after Fontan completion and, in 2 patients, 5.1 and 9.7 years post superior cavopulmonary anastomosis. Primary ventricular morphology was left in 60%. Mean hemoglobin at presentation was 12.5±1.9 g/dL. Bronchoscopy was performed during 14 of 17 (82%) initial catheterization procedures to guide targeted APC embolization therapy; 59% of bleeds originated in the left lung. Transcatheter therapies included coil (74%), particle (13%) and plug (9%) embolization, and covered stent implant in the conduit artery supplying the APC (17%). Median hospital length of stay was 8.0 (IQR 4.0, 12.0) days;

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patients underwent 1.4 ± 0.6 catheterizations per episode. There were no procedural complications; 1 patient died 2 days after initial presentation. During a median follow-up of 3.8 (2.1, 8.6) years, 4 (40%) patients had at least 1 recurrent episode of hemoptysis (2 had >1 episodes), with a median interval of 9.8 (6.7, 67.9) months between first and second episodes. One patient underwent uncomplicated lobectomy for recurrent localized hemoptysis. Ninety percent of patients remain alive with univentricular circulation.

**Conclusion:** Despite the life-threatening nature of airway bleeding in univentricular CHD patients, a policy of transcatheter embolization therapy is safe and contributes to low morbidity and mortality at mid-term follow-up. Bronchoscopy at the time of catheterization is useful in identifying the source of bleeding to guide targeted intervention. Recurrent hemoptysis is common in this population.

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Wendy Whiteside: This author has nothing to disclose.
Dan Bengtson: This author has nothing to disclose.
Jonathan Byrnes: This author has nothing to disclose.
Russel Hirsch: This author has nothing to disclose.
Bryan Goldstein: This author has nothing to disclose.

**B-022**

**Title:** Correlation of Peak Systolic Pressure Gradient and Instantaneous Pressure Gradient in Valvar Aortic Stenosis During the Cardiac Cycle

**Authors:** Brian Boe, Nationwide Childrens, United States; Mark Norris, University of Michigan C.S. Mott Children’s Hospital Congenital Heart Center, United States; Jeffrey Zampi, University of Michigan C.S. Mott Children’s Hospital Congenital Heart Center, United States; Albert Rocchini, University of Michigan C.S. Mott Children’s Hospital Congenital Heart Center, United States; Gregory Ensing, University of Michigan C.S. Mott Children’s Hospital Congenital Heart Center, United States

**Background:** Non-invasive echocardiographic measurement of instantaneous pressure gradient (IPG) has limited correlation with cardiac catheterization derived peak systolic ejection gradient (PSEG) across the spectrum of disease severity for valvar aortic stenosis (AS). Therefore, we sought to compare PSEG to catheterization measured IPG throughout the cardiac cycle as a first step to finding a closer correlation between catheterization and echocardiographic assessments of AS.

**Methods:** Hemodynamic data from cardiac catheterizations performed over the past 5 years for patients with valvar AS were retrospectively reviewed. The IPG was compared to the PSEG during left ventricular (LV) ejection via simultaneous measurement of LV and ascending aortic pressures. Ejection times (ET) were standardized for all patients using the percentage of total LV ET. Pressure gradient measurements were compared using linear regression analysis.

**Results:** In the 22 patients who underwent catheterization at a median age of 13.7 years (interquartile range [IQR] 10.3-18.0) and median weight of 51.1 kg (IQR 34.2-71.6), the PSEG was 46.5 ± 12.6 mmHg (mean±SD). The IPG at 60% of ET (43.9 ± 11.8 mmHg) had the strongest correlation with the PSEG (Figure 1).

Linear regression analysis showed a strong correlation between IPG and PSEG at 60% ET ($R^2=0.85$) with an equation of PSEG = 1.01(IPG) ± 2.12.

**Conclusion:** Using catheter-based data, the PSEG for valvar AS can be accurately estimated using IPG at 60% of ET. This may allow for a more accurate estimation of PSEG with noninvasive assessment of IPG. Catheterization and Cardiovascular Interventions DOI 10.1002/ccd.

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Albert Rocchini: This author has nothing to disclose.
Gregory Ensing: This author has nothing to disclose.

**B-025**

**Title:** Cheatham-Platinum covered stent in aortic coarctation: 11-years single center experience and follow-up

**Authors:** gianfranco butera, IRCCS Policlinico San Donato, Italy; claudio bonanno, IRCCS Policlinico San Donato, Italy; luciane piazza, IRCCS Policlinico San Donato, Italy; luca giugno, IRCCS Policlinico San Donato, Italy; massimo chessa, IRCCS Policlinico San Donato, Italy; lovin nicusor, IRCCS Policlinico San Donato, Italy; mario carminati, IRCCS Policlinico San Donato, Italy

**Background:** Stent implantation is an effective therapy for aortic coarctation and recoarctation. However, in adolescents and adults, aortic wall rupture and dissection may occur, as well as aneurysm formation during follow-up. Covered stent implantation may provide protection from these potential complications.

**Methods:** From January 2003 to January 2014, 102 pts with native or post-operative aortic coarctation were treated. At procedure median age was 16.5 years (range from 6 to 68 years) and median weight was 58 Kg (range 22 to 110 kg). Median gradient before the treatment was 40 mmHg (range from 12 to 75 mmHg). Seventy-seven subjects had complex lesions (75.5%) while 25 patients had simple lesions (24.5%). Coarctation of the aorta was native in 74 pts (72.5%) and recoarctation in 28 pts (27.5%).

**Results:** Success rate was 93% (72.5% with a residual gradient <10 mmHg; 20.6% with a residual gradient between 10 and 20 mmHg). Mean coaractation gradient decreased from 39.7 to 5.7 mmHg (p=0.001). Mean coaractation segment diameter increased from 5 to 13 mm (P<0.0001). Incidence of early related-procedure adverse events was 8.8%. The main complications was the lesion of external iliac artery in two patients that were treated percutaneously. Other complications that we encountered were transient ischemia of left hand, transient femoral
artery spasm, hyponatremia and convulsion. Two exceptional cases with aortic rupture after bare stent implantation or redilatation were treated. In both cases, covered stent implantation was used as a rescue option. At a median follow-up of 43 months (range 12-144 months) reintervention occurred in 21 patients (20%). Independent predictors associated with reintervention at follow up included the presence of complex lesions (P 0.0054) and ratio proximal aorta/coarctation (OR 1.06; CI: 1.01 –1.11; P 0.009). Antihypertensive medication was needed in 29 subjects (while it was needed in 69 subjects pre-procedure).

Conclusion: Covered stent implantation for aortic coarctation is a safe and efficacious treatment. By using covered stent implantation the spectrum of patients treated has increased with lower rates of acute and late complications. Covered CP stents are rescue devices in case of aortic rupture.

Disclosures:
Gianfranco Butera: This author has nothing to disclose. Claudio Bonanno: This author has nothing to disclose. Luciane Piazza: This author has nothing to disclose. Luca Giugno: This author has nothing to disclose. Domenica Basile: This author has nothing to disclose.

B-026

Title: Changes in Pulmonary Artery Diameter with Restoration of Pulmonary Valve Competency via Transcatheter Pulmonary Valve Implantation

Category: Pediatric

Authors: Ryan Callahan, Children’s Hospital Boston, United States; Lisa Bergersen, Children’s Hospital Boston, United States; James Lock, Children’s Hospital Boston, United States; Audrey Marshall, Children’s Hospital Boston, United States

Background: Implant of transcatheter pulmonary valves in native outflow tracts depends on reliable measurement of outflow tract dimensions. Restoration of pulmonary competence may acutely alter these dimensions and result in device malposition.

Methods: Retrospective review of patients after transcatheter Meltronic Melody valve placement from 2007 to 2014 to treat at least moderate pulmonary regurgitation.

Results: We studied 46 patients. Most had tetralogy of Fallot (70%). Right ventricular outflow tract (RVOT) anatomy consisted of right ventricle (RV) to pulmonary artery (PA) conduits (n=26), bioprosthetic valves (n=13) and native RVOT (n=7). Baseline and post implantation (7.5 +/- 3 minutes post deployment) measurements were determined angiographically. The right pulmonary artery diameter increased (20 +/- 4 to 24 +/- 6 mm systole*, 16 +/- 4 to 21 +/- 6 mm diastole*); as did the left pulmonary artery (20 +/- 6 to 24 +/- 8 mm systole*, 16 +/- 5 to 21 +/- 7 diastole*). PA pressures increased from averages of 29.3/10.6 (17) to 29.8/15.1 (21) mmHg. Of interest, systolic PA diameter pre-implant correlated well with diastolic PA diameter post-implant (r = 0.9). Univariate analysis demonstrated change in PA diameter was not associated with age, gender, diagnosis, RVOT type, RV end diastolic volume, pressure or ejection fraction, pulmonary regurgitation fraction, mean PA pressure, or pulmonary vascular resistance. On follow up catheterization (median 2.1 years; range 1 to 5), combined central PA diameter decreased an average of 20% in 5 patients (systole: 20% +/- 13, diastole: 21% +/- 11) as compared to post intervention measurements. This late reduction in PA diameter was not associated with a similar reduction in PA pressure.

Conclusion: Acute pulmonary valve competency in patients with at least moderate pulmonary regurgitation can result in an immediate 20% increase in diameter of the PAS in systole and 30% increase in diastole. This acute change may have implications for device and patient selection. *P < 0.001

Disclosures:
Ryan Callahan: This author has nothing to disclose. Lisa Bergersen: This author has nothing to disclose. James Lock: This author has nothing to disclose. Audrey Marshall: This author has nothing to disclose.
Background: Children with idiopathic or post-surgical pulmonary vein stenosis (PVS) are at high risk of mortality. Despite aggressive surgical or transcatheter interventions, recurrence and progression of PVS is frequently encountered and may lead to right ventricular failure and death. Clinicians continue to seek effective treatment options for PVS.

Methods: We performed a retrospective study of all children undergoing catheter-based intervention for PVS between 1/1/2005 to 1/1/2016 at our institution. Mode of therapy (angioplasty (BA), bare-metal stenting (BMS) and drug-eluting stenting (DES)) was noted. Endpoints included need for pulmonary vein (PV) reintervention, need for surgery, and death following catheter-based PV intervention.

Results: Twenty-seven patients (pts) underwent cath for PVs at a mean age of 9.36 ± 8.88 months at first cath. Eight pts (30%) had single ventricle physiology. Nineteen pts (70%) had bilateral PVs. Eleven pts (41%) had total or partial anomalous pulmonary venous return, and 13 pts (48%) had PV surgery prior to cath. For the post-surgical patients, the mean interval from prior PV surgery to 1st cath was 55.5 days (range 38-84 days). At first cath PV intervention, 27 pts underwent intervention on 42 PVSs including 15 BA, 20 DES, and 7 BMS. Mean follow-up was 1.64 ± 2.31 yrs with a range of 2 days to 8.27 yrs. A total of 11 pts (40.7%) died at a mean of 49 days (range 2-195 days) after 1st cath intervention. Survival was 55% at 1 year post-cath intervention. Mortality was not associated with single ventricle (p = 0.24), bilateral PVs (p = 0.82), number of PVs affected (p = 0.58) or prior surgical PV intervention (p = 0.08). However, DES at 1st cath was associated with greater survival (p = 0.03) with 6-month survival of 77% for DES versus 34% for the BMS/BA combined cohort. Eight pts underwent 19 reinterventions including additional DES implantation (n=8), BMS implantation (n=2), stent re dilation (n=4), and PV surgery (n=5) for recurrent PVS.

Conclusion: Children with PVS continue to face high mortality. DES implantation at first catheter-based intervention appears to be associated with improved short-term survival. However, survivors have a high burden of PV reintervention.

Disclosures:
Melinda Cory: This author has nothing to disclose.
Dennis Kim: This author has nothing to disclose.
Christopher Petit: This author has nothing to disclose.

B-028

Title: Invasive Evaluation of Fontan Fenestration: An Open and Shut Case?

Category: Pediatric

Authors: Amy Dossey, Children’s Hospital Colorado, United States; Dennis Kim, Children’s Hospital Colorado, United States; Christopher Petit, Children’s Healthcare of Atlanta/Emory University, United States

Background: Strategy of Fontan fenestration closure varies widely by center. We sought to assess the consistency of our approach to this physiological conundrum.

Methods: Chart review of single ventricle patients with Fontan physiology undergoing cardiac catheterization for fenestration closure or creation between September 2000 and May 2015, performed. Demographics, saturation data, mean pulmonary artery pressure (MPAP), cardiac index (CI), pulmonary vascular resistance, and altitude Catheterization and Cardiovascular Interventions DOI 10.1002/ccd. Published on behalf of The Society for Cardiovascular Angiography and Interventions (SCAI).

were evaluated. Post-catheterization and long term follow-up evaluated. Statistical tests of difference applied.

Results: In total 83 catheterizations of 59 patients who underwent fenestration closure, 7 who underwent fenestration creation, and 18 evaluated with no intervention undertaken were included. Indication for catheterization was cyanosis in 84%. A minority underwent intervention for stroke, protein losing enteropathy, plastic bronchitis or hemodynamic instability. 9 patients underwent fenestration creation, re-creation after closure, or developed failing physiology following closure. Of those who underwent fenestration closure, those with adverse events were noted to have a higher MPAP (15mmHg) than those closed without complication (MPAP 12mmHg, p=0.04). Patients who underwent closure had lower MPAP (12mmHg) than those not closed (14mmHg, p=0.03). Patients who underwent closure had an average decline in CI of 23% with intervention, while those who underwent closure and later developed failing physiology had an average decline in CI of 36%, though not statistically significant. There was a decrease in CI with test occlusion in patients who were not closed (59%) compared to those who underwent closure (23%) [p=0.001].

Conclusion: Long term success of Fontan fenestration closure was identified by MPAP and net change in cardiac index with intervention. Patients with a MPAP >15 mmHg or a decline in CI > 36% tended toward a poor long-term outcome. In this experience we did not prove a difference in long term complications between those patients who underwent closure and those who did not. The incidence of need for re-fenestration after closure in this series indicates that our decision theory in this disease is imperfect.

Disclosures:
Amy Dossey: This author has nothing to disclose.
Amy Dossey: This author has nothing to disclose.
Michael Ross: This author has nothing to disclose.
Neil Wilson: This author has nothing to disclose.

B-030

Title: Short to Mid term follow up of the Atrio-Ventricular Node Function after Percutaneous Closure of Perimembranous Ventricular Septal Defects Using the Second Generation Amplatzer Vascular Occluders

Category: Pediatric

Authors: Makram R. Ebeid, University of Mississippi Medical Center, United States; Sarosh Bativala, University of Mississippi Medical Center, United States; Ahmad Charaf Eddine, University of Mississippi Medical Center, United States; Michael Ross, University of Mississippi Medical Center, United States; Mary B. Taylor, University of Mississippi Medical Center, United States

Background: Initial attempts at percutaneous closure of Perimembranous ventricular septal defects (Pm-VSDs) using the initial Pm-Amplatzer SVD device caused complete heart block in 3-5% of the patients (pts.) occurring usually in the first few months to a year post procedure. As result the clinical trial was abandoned. Transient or permanent bundle branch block was also reported. We previously reported our initial and very early experience with percutaneous closure of Pm-VSDs using the second generation Amplatzer Vascular plug (AVP II) and the second generation Amplatzer Duct occlude (ADO II). No heart block occurred in the initial period.

Methods: Since some incidence of heart block occurred with the first device beyond the initial period we examined our pts. who received ADO II or AVP II to close Pm-VSDs who had a follow up > 12 months. Pts. with follow up up < 11 months were excluded from this report.
B-031

Title: Multicenter off-label use of Nit Occlud coil in retrograde closure of small patent ductus arteriosus

Category: Pediatric

Authors: Amal El Sisi, Cairo University specialized pediatric hospital, Egypt; Keyhan Sayadpour Zanjani, Tehran University of Medical Sciences, Iran; Rodina Sobhy, Cairo University specialized pediatric hospital, Egypt; Keyhan Sayadpour Zanjani, Tehran University of Medical Sciences, Iran

Background: The Nit-Occlud coil (NOC) is a nitinol patent ductus arteriosus (PDA) occluder with a reverse cone shape, which is implanted antegrade using a controlled delivery. Off-label retrograde approach has never been reported.

We aim to assess the efficacy and safety of NOC to close small PDAs using the retrograde approach. The need for such modification is justified by the low cost of NOC and the non-availability of other symmetrical devices.

Methods: Between Jan 2013-Dec 2015, forty two patients with small PDAs less than 3 mm in two centers had attempts of retrograde closure by NOC.

The duct was crossed retrograde and the coil was delivered through the PFM end-hole catheter in the first center, and direct through the Judkins catheter in 20 cases in the second center in order to decrease fluoroscopy and procedure time. The median follow up time was 15 months (ranging from 1-49 months).

Results: The study included 25 (59%) females and 17 (41%) males with median age 1.5 years and median weight 9.75 kg. PDA was type A, C, D and E in 19, 13, 4, and 6 patients respectively. Median size of pulmonary and aortic end were 1 and 1.6 mm. NOC size 5x4 was used in 67% of patients. Procedure and fluoroscopy median times were 43 and 8 minutes.

The procedure was successful in thirty nine cases (93%). Complete closure in the same or following day was achieved in 38 patients (97%). There were no deaths or serious events. Three patients failed, One due to embolization and second due to coarctation and were retrieved and one due to failure to cross the PDA.

Conclusion: Retrograde closure of small PDAs using NOC is safe, effective and feasible. It offers an alternative to conventional retrograde designed devices.

Disclosures:
Amal El Sisi: This author has nothing to disclose.
Keyhan Sayadpour Zanjani: This author has nothing to disclose.

Rodina Sobhy: This author has nothing to disclose.
Keyhan Sayadpour Zanjani: This author has nothing to disclose.

Q-014

Title: Correlation of Transjugular Liver Biopsy in Fontan Patients with Magnetic Resonance Elastography & Cardiac hemodynamics

Category: Pediatric

Authors: Yudy Fonseca, Rady Children’s Hospital, University of California San Diego, United States; Gabrielle Vaughn, Rady Children’s Hospital, University of California San Diego, United States; Preeti Reshamwala, Children’s Healthcare of Atlanta/Emory University, United States; John Moore, Rady Children’s Hospital, University of California San Diego, United States; Robert Newbury, Rady Children’s Hospital, University of California San Diego, United States; Jerry Dwek, RADY CHILDREN’S HOSPITAL SAN DIEGO, CA, United States; Mark Abcede, RADY CHILDREN’S HOSPITAL SAN DIEGO, CA, United States; James Proudfoot, Rady Children’s Hospital, University of California San Diego, United States; Howaida El-Said, Rady Children’s Hospital, University of California San Diego, United States; John Moore, Rady Children’s Hospital, University of California San Diego, United States

Background: Liver damage in Fontan pts has been reported with some becoming irreversible. Liver biopsy is the gold standard to assess for liver damage, however fibrosis may follow a patchy distribution, which can lead to sampling error. Our aim is to correlate liver histology on transjugular liver biopsies (TJLB) to MR elastography (MRE) and cath hemodynamics.

Methods: Between 6/2014-10/2015, 48 Fontan pts underwent cardiac cath & TJLB. TJLB was obtained from segments 5/8 when possible; biopsy site was documented by angiography when different. Liver biopsy METAVIR score (F0-F4), MRE liver stiffness kPa, hemodynamic catheterization data, exercise stress test & lab data were reviewed. A blinded observer reported MRE stiffness of the TJLB site (MRES) & of the whole liver (MREW). Cohen’s kappa was used to assess agreement & Spearman’s correlation to assess relationship. We considered a difference of +/- 1 to indicate moderate agreement.

Results: Median age at cath was 16ys (range 8-24). TJLB was performed in all 48 pts. 16/48 pts had both TJLB & MRE, 12/16 also had an exercise stress test. METAVIR TJLB score, MRES and MREW mode was the same at 2 (range 0-4). There was moderate agreement between TJLB and both MRES and MREW with Cohen’s Kappa of **0.684** for both.

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0.471 & 0.552 respectively (p<0.001). There was strong agreement between MRES & MR EW 0.849 (p<0.001) indicating that the sample site was representative of the majority of the liver. There was no statistically significant relationship between the Fontan mean pressure (median 13mmHg, range 9-16) and the TJLB (Pearson’s r=0.082). Exercise VO2 max (median 28, range 22-35) showed a trend toward a negative relationship with TJLB (Spearman’s r=−0.158, p=0.643), but was statistically insignificant due to sample size.

Conclusion: Transjugular liver biopsy (TJLB) can be performed safely in Fontan patients. It has moderate agreement with MR elastography (MRE). When TJLB is performed in segments 5/8 it is representative of the majority of the liver. Fontan mean pressures are not necessarily indicative of degree of liver fibrosis. Exercise VO2 max is more promising as a predictor, however a larger sample volume is needed to prove or disprove that.

Disclosures:
Yudy Fonseca: This author has nothing to disclose.
Gabrielle Vaughn: This author has nothing to disclose.
Preeti Reshamwala: This author has nothing to disclose.
John Moore: This author has nothing to disclose.
Robert Newbury: This author has nothing to disclose.
Jerry Dwek: This author has nothing to disclose.
Mark Abcede: This author has nothing to disclose.
James Proudfoot: This author has nothing to disclose.
Howaida El-Said: This author has nothing to disclose.
John Moore: This author has nothing to disclose.

B-033

Title: Update on the Congenital Cardiovascular Interventional Consortium (CCISC): Native Coarctation of the Aorta, Which is better, Surgery, Balloon Angioplasty, or Stent?
Category: Pediatric

Authors: Rachel Pham, UConn Health Center, United States; Thomas Forbes, Children’s Hospital Of Michigan, United States; Darren Berman, Nationwide Children’s Hospital, United States; Jonathan Rome, Children’s Hospital of Philadelphia, United States; Dennis Kim, Children’s Hospital of Atlanta, United States; Thomas Zellers, outheastern Medical Center-Children’s Hospital of Dallas, United States

Background: Controversy remains regarding what the treatment of choice should be in children and adults presenting with native coarctation of the aorta (CoA). The CCISC-Coarctation study was started to evaluate acute, short-term, and intermediate outcomes in patients undergoing repair of native and recurrent CoA. This study focused on the acute, short-term, and intermediate follow-up of patients undergoing treatment of their native coarctation of the aorta.

Methods: Through the CCISC Coarctation Registry, pts were enrolled prospectively at time of intervention and for short/intermediate follow-up. Only pts with native CoA were included in the study with 41 institutions participating.

Results: A total of 624 pts underwent repair of their native Coa, 110 underwent surgical (Sur), 370 pts underwent stent treatment (ST), and 144 pts underwent balloon angioplasty (BA). The mean age of those undergoing ST was higher (16.4 +/- 10 years) versus Sur (9.4 +/- 8.7) and BA (9.0 +/- 8.0) groups respectively (P<0.001). Discharge upper to lower extremity blood pressures were similar between all three groups. Acute complications was higher in the Sur (19.3%) and BA (9.6%) versus ST (2%) groups (p<0.05). Planned re-intervention was significantly higher for the ST (23%) versus the BA (14%) and Sur (8%) groups (P=0.05) with no difference between the groups for unplanned re-intervention.

Conclusion: The ST group encountered significantly less acute complications and aortic wall aneurysm formation at short-term and intermediate follow-up in comparison to Sur and BA. Though planned re-interventions are higher with the ST group, unanticipated re-interventions were similar between the three groups.

Disclosures:
Rachel Pham: This author has nothing to disclose.
Thomas Forbes: This author has nothing to disclose.
Darren Berman: This author has nothing to disclose.
Jonathan Rome: This author has nothing to disclose.
Dennis Kim: This author has nothing to disclose.
Thomas Zellers: This author has nothing to disclose.

B-038

Title: Multiple different metal stents in the RVOT: is electrolysis a threat?
Category: Pediatric

Authors: Marc Gewillig, University Hospital Leuven, Belgium; Bjorn Cools, University Hospital Leuven, Belgium; Derize Boshoff, University Hospital Leuven, Belgium; Werner Badts, University Hospital Leuven, Belgium

Background: Different metals in close physical contact lead to electrolysis and corrosion; this may downsize the strength and durability of the stents. Lack of data did not to allow pre-stenting in several trials by FDA.

Methods: Stents used in the analysis: Cheatham-Platinum (Pl-Ir-Au), Andрастent (Co-Cr), Optimus (Co-Cr), Sapien (SS316L) SapienXt (Co-Cr), All tests performed in saline Phasmatyle AKE0324 at 37°C. Stereomicroscopic investigation was performed to type the corrosion as severity.
1/galvanic corrosion test: open circuit corrosion potential (OCP) determined against an Ag/AgCl reference electrode (exposed surface 1.5 cm²). The samples are coupled to each other. The galvanic zero resistance amperometry current and the mixed potential are measured for 1 hour after contact, 1, 2 and 4 weeks.
2/Exposition corrosion test couples Andрастent (Co-Cr) + CP stent (Pt-Ir-Au) and Optimus stent (Co-Cr) + CP stent (Pt-Ir-Au) were tested for 3 months. Round test samples with both stents folded in each other resulting in a direct galvanic connection. Visual and stereo microscopic investigation; weight decrease analysis (uniform corrosion rate).
3/Electrochemical cyclic polarization tests: measurement of the open circuit corrosion potential after an equilibration period of 16 hours; repeated measures for 3 months. A cyclic polarization gives a polarization scan: measured current in relation to the applied anodic and cathodic over-potential.

Results: 1/couples CP-Andрастent, Anda-Sapien and Anda-SapienXT have lowest galvanic corrosion rates (0.000001 mm/year), resulting in material loss of 10 µg/year. The couples CP-Sapien and CP-SapienXT have a higher corrosion rate (0.000003 mm/year) resulting in material losses of respectively 17 and 24 µg/year.
2/No signs of corrosion could be observed on both materials of the couple Andрастent + CP stent.
3/The calculated corrosion rate of expanded and non-expanded Andрастent based on Tafel slope analysis was estimated as ~0.00002 mm/year.

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Conclusion: The corrosion rate and material loss of all tested materials is extremely low. No mechanical integrity problems are expected: after 100 years only 0.3% of the initial diameter of the wires of a stent will be lost as a consequence of corrosion.

Disclosures:
Marc Gewillig: 8 Edwards, 8 Medtronic, 8 NUMED
Bjorn Cools: This author has nothing to disclose.
Derize Boshoff: This author has nothing to disclose.
Werner Budts: This author has nothing to disclose.

O-004

Title: Incidence of infective endocarditis in patients with bovine jugular vein valves compared to other valve types: a systematic review and meta-analysis

Category: Pediatric

Authors: Ashutosh Sharma, BC Children’s Hospital, Canada; Anita Cote, BC Children’s Hospital, Canada; Kevin Harris, BC Children’s Hospital, Canada

Background: Infective endocarditis (IE) is an important clinical problem for patients with congenital heart disease. Recent reports have suggested that the incidence of endocarditis may be higher in those who have undergone implantation of a bovine jugular vein (BJV) valve in the pulmonary position. However, the data from the interventionional and surgical literature have not yet been systematically evaluated. The purpose of this study is to determine whether the risk of infective endocarditis is increased in the presence of BJV valves compared with other valve types and whether there is a difference in IE incidence between surgical and catheter-based BJV valves.

Methods: Systematic literature searches were conducted using electronic databases (MEDLINE, EMBASE and CINAHL) and citations cross-referenced current to November 2015. Included studies met the following criteria: patients had undergone right ventricle to pulmonary artery (RV-PA) conduit or percutaneous pulmonary valve implantation; authors reported on the type of conduit/valve implanted, method of intervention (surgery or catheter-based), IE incidence, and follow-up time. Between-group (BJV, homograft, other) differences in IE incidence were assessed via Mann-Whitney U tests. IE incidence between catheter-based BJV and surgically implanted BJV were compared. Linear regression was used to assess the association between IE and follow-up time.

Results: A total of 71 studies were identified involving 11,916 patients. The incidence of IE was higher for BJV than homografts (6.3 vs. 1.0%, p<0.0001) or other valves (2.0%, p=0.0004). The incidence of IE increased over time in those with BJV (p=0.002) but not in homografts (p=0.11). For patients with BJV valves, the incidence of IE was not different between surgical and catheter-based valve implantation (p=0.83).

Conclusion: There is a higher incidence of endocarditis in BJV valves than other types of RV-PA conduits. There is no difference in the incidence of endocarditis between catheter-based bovine valves and surgically implanted bovine valves suggesting that the substrate for future infection is related to the tissue rather than the method of implantation.

Disclosures:
Ashutosh Sharma: This author has nothing to disclose.
Anita Cote: This author has nothing to disclose.
Kevin Harris: This author has nothing to disclose.

B-045

Title: The Nit-Occlud device and the immediate angiographic residual shunt during transcatheter closure of Patent Ductus Arteriosus (PDA)

Category: Pediatric

Authors: Gurumurthy Hiremath, University of Minnesota Children’s Hospital, United States; Katy Soule, University of Minnesota Children’s Hospital, United States; Andrea Pitl, University of Minnesota Children’s Hospital, United States; John Bass, University of Minnesota Children’s Hospital, United States

Background: The Nit-Occlud PDA device is a new coil-type device with a high degree of efficacy and safety. There are concerns about higher rates of immediate angiographic residual shunt with this device compared to others.

Disclosures:
Stuart Lilley: This author has nothing to disclose.
Neil Wilson: This author has nothing to disclose.
Anita Cote: This author has nothing to disclose.
Kevin Harris: This author has nothing to disclose.
Methods: Single center, retrospective chart review. 30 patients who underwent Nit-Occlud (N-O) PDA closure were compared with 34 PDAs closed with Amplatz Duct Occluder-1 (ADO1) and 25 with ‘Other Coils’ (OC).

Results: The 3 groups were similar in age, weight and procedure times. PDAs in OC group were smaller in diameter and more of ‘Type E’ than other groups. Except 2 technical failures in OC group due to coil embolisation, the procedure was successful in all others. 2 more patients in OC group needed a second device at follow up for a residual shunt.

Angiographic residual shunt was seen more often in the N-O group (70%) as compared to ADO1 (59%) and OC (26%), (P=0.005). At 4 hours, an echocardiographic residual shunt was seen in only 10% of N-O, 21% of ADO1 and 13% of OC group (P=0.07). Closure rates in N-O, ADO1 and OC at 2 and 6 months were 100/100%, 97/100% and 86/91% respectively (P=0.004). In N-O group, no significant correlation was seen between angiographic residual shunt and minimal-PDA diameter, device orientation with respect to PDA, the device-ductal angle and the number of loops in pulmonary artery (Figure 1).

Conclusion: Despite higher immediate angiographic residual shunt in the N-O group, echocardiographic closure rates are high at discharge and at 6 month follow-up. Angiographic residual shunt should not deter the use of Nit-Occlud device.

Disclosures:
Gurumurthy Hiremath: This author has nothing to disclose.
Katy Soule: This author has nothing to disclose.
Andrea Pitzl: This author has nothing to disclose.
John Bass: 5 ST JUDE, 5 BBRAUN

Title: Complete, Non-surgical, Trans-catheter Biventricular Repair of Pulmonary Atresia and Intact Ventricular Septum
Category: Pediatric
Authors: Whitnee Hogan, University of Utah, United States; Mary Hunt Martin, University of Utah, United States; Robert Gray, University of Utah, United States
**Background:** A select group of patients with Pulmonary Ateria with Intact Venticular Septum (PA/IVS) with favorable anatomy are able to undergo right ventricular decompression with radiofrequency (RF) perforation and valvuloplasty in infancy. These patients often require valve replacement later in life due to pulmonary insufficiency. Recent advancements in transcatheter valve technologies have allowed for non-surgical pulmonary valve placement in native right ventricular outflow tracts (RVOTs).

**Methods:** Retrospective review of patients with PA/IVS with no prior surgical interventions who underwent percutaneous pulmonary valve replacement (PPVR) with the Melody® valve.

**Results:** A total of 4 pts underwent RF perforation of their pulmonary valve in infancy, followed by PPVR with the Melody® valve between 2014-2015 (Table 1) without any additional surgical procedures. The mean age at valve implant was 6 yrs (range 4-11yrs). Percutaneous approach was utilized in all (2 femoral, 2 JI). All RVOTs were pre-stented. A 20mm Melody valve was placed in 1 pt and a 22mm Melody valve was placed in 3 pts. Following valve placement, shunting across the ASD became left to right and saturations increased to the high 90s, allowing device closure of the ASD in 2 patients.

**Conclusion:** Select patients with PA/IVS status-post right ventricular decompression with RF perforation and valvuloplasty in infancy may later be candidates for PPVR with a Melody® valve, followed by device occlusion of the atrial septal defect if needed. These patients are able to have a complete biventricular repair entirely in the catheterization laboratory and therefore avoid surgical intervention.

**Disclosures:**
Whitnee Hogan: This author has nothing to disclose.
Mary Hunt Martin: This author has nothing to disclose.
Robert Gray: This author has nothing to disclose.

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**B-053**

**Title:** Melody Valve Implantation Within Freestyle Stentless Porcine Aortic Heterograft

**Category:** Pediatric

**Authors:**
- James Kuo, Cook Childrens Med Ctr, United States
- Ashlea Feezel, UNTHSC. University of North Texas Health Science Center., United States

**Background:** The Melody transcatheter pulmonary valve has been implanted successfully worldwide since its first implant in 2000. The vast majority of these valves have been implanted in pulmonary homografts. In our institution, the most common valve used for pulmonary valve replacement is the Medtronic Freestyle stentless porcine aortic heterograft. We describe our experience implanting the Melody valve within the Freestyle heterograft.

**Methods:** Retrospective chart review was performed. Between June 2012 and June 2015, 28 patients underwent Melody valve implantation. Of these, 19 were placed within Freestyle heterografts. Echocardiograms were reviewed pre- and post-catheterization and at 6, 12, and 24 months following implantation. Cardiac magnetic resonance imaging (MRI) was performed pre-catheterization and 12 months post-catheterization.

**Results:** The mean age at time of procedure was 14.53 ± 5.58 years (range 7.48-29.52). The mean weight was 52.4 ± 24.24 kg (range 24.10-120). The most common indication for intervention was pulmonary stenosis. The mean Ensemble to native valve size ratio was 0.94 ± 0.08. Following pre-stent and Melody valve implantation, right ventricle-to-pulmonary artery gradient decreased from 38.1 ± 12.1 mmHg to 10 ± 4.75 mmHg (p < 0.001), and right ventricular pressure decreased from 61.7 ± 17.8 mmHg to 35.6 ± 10.2 mmHg (p < 0.001). Two minor procedural adverse events occurred (Ensemble balloon rupture and mild radiation skin burn). No conduit tears were observed. At median follow-up of 18 months (range 2-36 months), no patients had mean right ventricular outflow tract gradients >30 mmHg or worse than mild insufficiency. There has been statistically significant improvement in right ventricular volume and degree of pulmonary insufficiency on pre- and post-procedure cardiac MRI. No valve re-interventions have been necessary and no episodes of endocarditis have been observed.

**Conclusion:** The Melody valve can be implanted successfully within a stentless aortic heterograft with good short- and intermediate-term longevity.

**Disclosures:**
James Kuo: This author has nothing to disclose.
Ashlea Feezel: This author has nothing to disclose.

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**B-054**

**Title:** Novel, long-axis, in-plane ultrasound guided pericardiocentesis in infants and small children

**Category:** Pediatric

**Authors:**
- Mark Law, The University Of Alabama - Birmingham, United States
- Santiago Borasino, The University Of Alabama - Birmingham, United States
- William McMahon, The University Of Alabama - Birmingham, United States
- Jeffrey Alten, University of Alabama at Birmingham, United States
- Terri Feezel, UNTHSC. University of North Texas Health Science Center.

**Background:** Pericardial effusion can be a life threatening complication in children after cardiac surgery. Drainage with percutaneous Catheterization and Cardiovascular Interventions DOI 10.1002/ccd. Published on behalf of The Society for Cardiovascular Angiography and Interventions (SCAI).
pericardiocentesis is associated with rare, but serious complications. Limited data exists on the techniques and outcomes of pericardiocentesis in the pediatric population, especially in the early postoperative period. We describe our experience with a novel long-axis, in-plane, real-time ultrasound (US) technique for postoperative pericardial effusion drainage in small children.

Methods: From 11/13-12/15, charts of patients undergoing pericardiocentesis using long-axis technique were reviewed. Transducer (L12-5 linear, high density) is positioned over effusion and the 21 gauge, echobright needle is placed parallel with the center of the transducer. The needle is advanced in-line with US beam such that entire needle trajectory is followed continuously in real time until pericardial puncture occurs. (Image 1). Procedure outcome data is reported as median (range).

Results: 16 pericardiocenteses were performed in 14 patients using this technique. 10 were performed in children <6 kg; 14 within 30 days of cardiac surgery at a median post operative day 13 (5-99). Age was 4.0 months (0.4-124); weight 5.1 kg (2.5-42). All but one procedure required only a single attempt. 14 of 16 procedures had sub-xiphoid approach; 2 apical. Initial drainage was 9 cc/kg (4-27). 56% of effusions were serous, 25% chylous, and the remainder bloody. There were no reported complications.

Conclusion: This long-axis technique allows for easy and safe needle entry into the pericardial space for small children in the early postoperative period.

Disclosures:
Mark Law: This author has nothing to disclose.
Santiago Borasio: This author has nothing to disclose.
Jeffrey Allen: This author has nothing to disclose.
William McMahon: This author has nothing to disclose.
Jeffrey Allen: This author has nothing to disclose.

B-056

Title: Intervention on Blalock-Taussig Shunt Obstructions: Carotid versus Femoral Access
Category: Pediatric
Authors: Allen Ligon, Children’s Healthcare of Atlanta/Emory University, United States; Dennis Kim, Children’s Healthcare of Atlanta/Emory University, United States; Robert Vincent, Children’s Healthcare of Atlanta/Emory University, United States; Christopher Petit, Children’s Healthcare of Atlanta/Emory University, United States

Background: Catheter-based intervention on Blalock-Taussig shunts (BTS) is often performed in ill, hypoxemic infants. A timely and rapid catheterization and cardiovascular interventions DOI 10.1002/ccd. Published on behalf of The Society for Cardiovascular Angiography and Interventions (SCAI).

Establishment of BTS patency is therefore critical. We reviewed our experience intervening on BTS, comparing results between femoral arterial (FA) and carotid arterial (CA) approaches.

Methods: We reviewed all cases of catheter-intervention for BTS obstruction between 2012 and 2015. We sought to compare procedural success rates, procedural time, sheath time, time to arterial access, and time from access to stent implantation between FA and CA approaches.

Results: During the study period, 33 patients (22 FA, 11 CA) underwent BTS intervention. Median age at intervention was 0.3 years (range 0.01-0.91) and median weight 3.0kg (1.8-8.2). A 4F short sheath was used in all CA cases, and a 4F long sheath used in 21 FA cases, with a short sheath in 1 FA case. A single stent was used in 26 patients, with 5 patients having 2 stents, and 2 patients having 3 stents. BTS intervention was more successful from the CA approach (p<0.013). Among the FA cohort, BTS intervention was unsuccessful in 5 patients (22%), 4 of whom were converted to CA, while 1 patient underwent surgical revision. Among 11 CA patients, all had successful BTS stent (n=10) or angioplasty (n=1). Procedural time (p=0.02) was lower in the CA cohort. In addition, time to arterial access was lower in the CA cohort (4.5 minutes vs 9.0 minutes FA, p=0.01) and time to stent implantation was lower (8.5 minutes vs 21 minutes, p<0.01). Number of angiograms (p=0.61), stents (p=0.47), and fluoroscopy time (p=0.50) were equivalent between the CA and FA cohorts. All carotid patients underwent follow up CA ultrasound post-intervention and no stenosis or obstruction was noted in any CA patient.

Conclusion: While most centers utilize the femoral artery for BTS interventions, our approach has included the use of the CA as an alternative access site. The CA approach is associated with greater procedural success, shorter procedural time and shorter time to stent implantation. Operators should consider the route of access to the BTS deliberately, particularly when urgent BTS intervention is needed.

Disclosures:
Allen Ligon: This author has nothing to disclose.
Dennis Kim: This author has nothing to disclose.
Robert Vincent: This author has nothing to disclose.
Christopher Petit: This author has nothing to disclose.
Background: Abstract presentations of scientific information at meetings are important for disseminating new information. Publication of these studies should be the final goal, but minimal data exist documenting publication rates, especially for pediatric sub-specialty meetings. Goal of this study was to document the manuscript publication rate for pediatric cardiac catheterization abstracts and to determine if there were differences between abstracts that were published versus not published.

Methods: Pediatric cardiac catheterization abstracts presented at the 2010 and 2011 Society for Cardiovascular Angiography and Intervention (SCAI) and Pediatric and Adult Interventional Cardiac Symposium (PICS) Meetings were reviewed. Characteristics of the abstracts were noted. Medline/Pubmed search was performed using keywords, first author, and senior author criteria to determine publication in peer reviewed journals through November 2015. Fisher’s exact test or Chi-squared test were used for analysis.

Results: Of 320 total abstracts (107 SCAI, 213 PICS), 79 (25%) were given in oral form and 241 (75%) were poster presentations. Forty-five (14%) abstracts were prospective studies, 229 (72%) were retrospective studies, 42 (13%) were case reports, and 4 (1%) were uncategorized. Four abstracts were basic science studies and 316 were clinical studies. Abstract topics included: stents/valves in 63 (20%), device closure in 101 (32%), valvuloplasty/angioplasty in 28 (9%) adult congenital heart disease in 32 (10%), and unicaturated in 96 (30%). Total of 116 abstracts were subsequently published (36.3% publication rate) 2.6 years after presentation. There was a difference in publication rates between oral vs. poster presentations (54.4% vs. 30.3%, p < 0.001) and a trend for differences between prospective vs. retrospective studies vs. between oral vs. poster presentations (54.4% vs. 30.3%, p < 0.08). No other differences were noted between published vs. unpublished abstracts.

Conclusion: A pediatric cardiac catheterization abstract publication rate of 36.3% is comparable to previous published publication rates for other meetings that range from 27% to 47%. Oral presentation may predict higher likelihood for publication success.

Disclosures: Jeffrey Moore: This author has nothing to disclose.
Aimee Armstrong: This author has nothing to disclose.
Darren Berman: This author has nothing to disclose.
Brain Rivera: This author has nothing to disclose.
Carl Backes: This author has nothing to disclose.
Clifford Cua: This author has nothing to disclose.

O-006

Title: Safety of Post-Operative Catheterization Interventions at the Site of Surgery: An application of the CRISP Scoring System

Category: Pediatric

Authors: Katie Mowers, Washington University School of Medicine, United States; Toby Rockefeller, Washington University School of Medicine, United States; David Balzer, Washington University School of Medicine, United States; Shabana Shahanavaz, Washington University School of Medicine, United States

Background: Catheter based interventions in the early post-operative period are performed with caution due to concerns for increased procedural risk, particularly at the site of surgery. The recently published CRISP scoring system provides prospective risk stratification based on pre-procedural criterion. In an effort to refine the assessment of risk in patients undergoing post-operative cath interventions, we compared CRISP scores to actual adverse event rates.

Methods: Single center, retrospective review of patients undergoing catheterization interventions within 6 weeks of cardiac surgery between Jan 2004 and Dec 2014. Patients who underwent intervention at the site of recent cardiac surgery (group 1) were compared to patients who underwent procedures at other sites (group 2), and a CRISP score was calculated for all patients. Patients receiving only surveillance biopsies were excluded.

Results: Sixty-eight patients underwent 101 interventional procedures. Group 1 was comprised of 47 patients receiving 58 interventions, while Group 2 had 21 patients undergoing 30 interventions. Group 1 was comprised of significantly more single ventricles and was smaller/young. As expected, Group 1 had a significantly higher median CRISP score, but both were within Category 4. As predicted by the CRISP calculator, the rate of adverse events was similar between Groups.

Conclusion: Catheter based interventions in the early post-operative period can be done safely with no significant increase in risk when intervening at the site of surgery. The CRISP scoring system can be a valuable tool in pre-procedural counseling of high-risk post-operative patients.

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Disclosures:
Katie Mowers: This author has nothing to disclose.
Toby Rockefeller: This author has nothing to disclose.
David Balzer: This author has nothing to disclose.
Shahana Shahanavaz: This author has nothing to disclose.

B-068

Title: A Comparison of Anterograde Versus Retrograde Approaches for Neonatal Balloon Aortic Valvuloplasty

Category: Pediatric


Background: In neonates requiring balloon aortic valvuloplasty (BAV), both anterograde and retrograde approaches are feasible, and each confers theoretical advantages. In the modern era, a comparison of these two approaches is lacking.

Methods: A retrospective cohort study of all neonates (age <30 days) at a single center undergoing BAV from 9/00 to 7/14 was performed. Records were reviewed including pre- and post-intervention echos and catheterization data for efficacy and safety outcomes.

Results: 42 neonates underwent BAV, 11 via only an anterograde approach and 31 with a retrograde approach (including 4 with both approaches used). The majority of patients were male (76%) with unicuspid valves (53%), with no difference between groups. There was no difference in age or weight at intervention or procedural time. By both pre-intervention echo and catheterization, there were no differences based on approach in aortic valve gradient, degree of aortic insufficiency (AI), or degree of mitral insufficiency (MR). The aortic valve annulus was larger in patients with an anterograde approach (6.9 ± 0.9 v. 5.6 ± 1 mm by echo, p = 0.0004; and 7.2 ± 0.7 v. 6.1 ± 1 mm by cath, p = 0.006) although there was no difference in maximal balloon:annulus ratio used. Both approaches were equally efficacious in gradient reduction (44 ± 21 v. 45 ± 17 mmHg, p = 0.97) and there was no difference in post-intervention AI as assessed by both cath and echo. Two anterograde patients and 4 retrograde patients had an increase in MR grade after BAV (p=0.35). As expected, the retrograde approach required a larger arterial catheter (median 6 v. 3 French outer diameter, p = 0.002) and was associated with a higher rate of arterial thrombosis (61 v. 18%, p = 0.019) although there was no difference in maximal balloon:annulus ratio used. Both approaches were equally efficacious in gradient reduction (44 ± 21 v. 45 ± 17 mmHg, p = 0.97) and there was no difference in post-intervention AI as assessed by both cath and echo. Two anterograde patients and 4 retrograde patients had an increase in MR grade after BAV (p=0.35). As expected, the retrograde approach required a larger arterial catheter (median 6 v. 3 French outer diameter, p = 0.002) and was associated with a higher rate of arterial thrombosis (61 v. 18%, p = 0.014). Other procedural complications were rare and included 1 patient in the retrograde approach with SVT and 1 patient in the anterograde approach with ventricular fibrillation. There were no procedural mortalities.

Conclusion: Both anterograde and retrograde approaches to neonatal BAV appear to be equally efficacious with no observed difference in post-intervention AI and MR. The anterograde approach avoids the need for a larger arterial catheter and may reduce the risk of arterial thrombosis.

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Namrita Mozumdar: This author has nothing to disclose.
Edmund Burke: This author has nothing to disclose.
Melissa Schweizer: This author has nothing to disclose.
Matthew J. Gillespie: This author has nothing to disclose.
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Jonathan J. Rome: This author has nothing to disclose.
Andrew C. Glatz: This author has nothing to disclose.

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O-007

Title: Hybrid Strategy for Neonates with Ductal-dependent Septic Circulation at High Risk for Norwood

Category: Pediatric

Authors: Ugonna Nwankwo, The Children’s Hospital Of Pittsburgh, United States; Evonne Morell, The Children’s Hospital Of Pittsburgh, United States; Sara Trucco, The Children’s Hospital Of Pittsburgh, United States; Victor Morell, The Children’s Hospital Of Pittsburgh, United States; Jacqueline Kreutzer, The Children’s Hospital Of Pittsburgh, United States

Background: High risk (HR) patients with hypoplastic left heart syndrome (HLHS) or other cardiac lesions with ductal dependent systemic blood flow continue to be challenging to manage with potentially significant morbidity and mortality. We performed a retrospective study on our institution’s experience implementing a hybrid procedure (HP) strategy as initial palliation in HR patients with ductal-dependent systemic circulation.

Methods: From July 2004 to May 2008, 16 HR patients underwent primary Norwood procedure. After hybrid strategy implementation, all subsequent HR patients (n=24) underwent HP (May 2008 to November 2015). High risk was defined as low birth weight (<2.6 kg), prematurity, ventricular dysfunction, hemodynamic instability, multiple congenital anomalies and/or moderate-to-severe tricuspid regurgitation. Birth weight ranged from 1 kg to 4 kg. Hybrid stage I palliation consisted of bilateral branch pulmonary artery banding, direct main pulmonary artery access and stenting of the patent ductus arteriosus with or without balloon atrial septostomy.

Results: There was no difference in gestational age, age at procedure or hospital length of stay. The HP group had lower mean weight (2.55 kg vs 3.1 kg, p = 0.019) and more risk factors (1.71 vs. 1.25, p = 0.023); procedural mortality was 4%, interstate mortality was 16.7% and late mortality was 21% (1 post-transplant, 1 destination Hybrid, 1 post biventricular repair, 1 post Stage III). In the HR Norwood group, surgical mortality was 19%, interstate mortality was 31%, (all interstate I) and there were no late deaths. There was no difference in 1 year, 5 year or overall survival between the two groups (p = 0.306, 0.473 and 0.729 respectively), however patients < 2.6 kg had lower overall mortality in the HP group compared to the HR Norwood group (17% vs 75%, p = 0.022).

Conclusion: At our institution the HP has been performed in higher risk patients than historical Norwood patients. In this population, the HP appears to have lower early mortality than the Norwood procedure and offers a survival benefit in patients less than 2.6 kg. However, the long term attrition in this high risk population is ongoing regardless of early strategy.

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Ugonna Nwankwo: This author has nothing to disclose.
Evonne Morell: This author has nothing to disclose.
Sara Trucco: This author has nothing to disclose.
Victor Morell: This author has nothing to disclose.
Jacqueline Kreutzer: This author has nothing to disclose.

B-079

Title: Outcomes of coarctation of the aorta repair in children less than 5 years old: in both interventional and surgical approach

Category: Pediatric

Authors: Elisa Rhee, University of Texas Health Science Center at Houston, United States; John Breinholt III, University of Texas Health Science Center at Houston, United States

Background: Coarctation of the aorta (CoA) in neonates and infants primarily has two options for intervention – surgical repair and...
angioplasty. Prior studies have demonstrated superior outcomes with surgery. We aim to identify outcome differences in patients from surgery and catheterization groups.

Methods: Data from medical records of patients with CoA, who underwent primary surgery or angioplasty prior to 5 years of age between 2009 and 2015 were included.

Results: Fifty-three patients met inclusion criteria: ten patients had angioplasty (male: 50%) and 43 patients underwent surgery (male: 60%). Angioplasty patients were older at the time of procedure (median 103.5 days, IQR 31-279; p = 0.001) relative to surgery patients (median 13 days old, IQR 8-44). No significant difference was found in pre-operative and post-operative Doppler peak gradients or left ventricular fractional shortening (LVFS) between patients groups. Both groups had significant reduction in post-operative peak gradient across the aortic isthmus (median change 11.5 mmHg (IQR 2.9-32; p = 0.03) in angioplasty group; median change 13.0 mmHg (IQR 2.7-31; p = 0.0004) in the surgery group). However, neither group had a significant change in post-operative LVFS. There was no difference in re-coarctation requiring repeat intervention between groups (3 (30%) angioplasty patients and 10 (23.3%) surgery patients (p=0.7)). Notably, angioplasty patients had a shorter hospital stay (mean 2.5 days; IQR 1-21) compared with the surgery group (mean 21 days; IQR 12-45) (p = 0.003). There were no intra-procedural deaths, and 3 post-operative deaths, all in the surgery group (mortality 7%).

Conclusion: Patients who undergo surgery or angioplasty for coarctation as neonates and infants have a significant improvement in the peak pressure gradient, regardless of modality. Younger patients were more likely to undergo surgery, consistent with preferences developed from prior studies. Both modalities result in a similar rate of reintervention, but hospitalization is shorter with angioplasty. Catheterization may be reasonable in select neonates and infants; our findings suggest current practices and equipment evolution may have improved outcomes from those observed in earlier studies.

Disclosures:
Elisa Rhee: This author has nothing to disclose.
John Breinholt III: This author has nothing to disclose.

B-080
Title: Transcatheter Pulmonary Valve Insertion in Small (<16mm) Right Ventricle to Pulmonary Artery Conduits
Category: Pediatric
Authors: Jeremy Ringewald, St Joseph’s Children’s Hospital, United States

Background: Transcatheter pulmonary valve insertion (TPVI) has revolutionized the care of many divergent groups of congenital cardiac patients. Although the Melody valve is US FDA approved only for use in conduits >16mm at prior surgery, we have found some patients with smaller conduits also to be candidates for this procedure.

Methods: Retrospective single center review of all patients undergoing TPVI with a surgical history of conduit diameter of <16mm. Off-label use of the Melody valve was approved by the institutional IRB and informed consent/assent was obtained from all patients.

Results: Since 2011, 71 patients have undergone TPVI in our center. Six of those patients underwent TPVI despite a surgical history of a circumferential conduit <16mm diameter. 4/6 were male and their initial diagnoses were TOF variant (n=3), truncus (n=2), and post Ross (n=1). They had undergone 1 or 2 prior surgeries, all received homografts (4/6 pulmonary), and mean conduit diameter at prior surgery was 13mm (range 9-15). Indication for TPVI was PS in 3/6, mixed PS/PR in 2/6, PR in 1/6, and 3/6 were symptomatic. Mean age was 9.9 yrs (range 5.6-17.2) and mean weight was 35.4kg (range 19.2-75.9). 4/6 of the patient’s conduits had no or minimal calcification. At TPVI minimal conduit diameter improved from 10.9 ± 2.1 to 16.3 ± 1.6mm, RV to PA gradient fell from 40.5 ± 25.2 to 10.2 ± 4.1mmHg, and RV/FA ratio dropped from 0.84 ± 0.29 to 0.44 ± 0.07. Conduit preparation included high pressure balloons in 4/6 and bare metal stents were placed in all before TPVI. Fluoroscopy time was 37.8 ± 15.7min. There were no major AE’s. Mean follow-up is 17.5 months(range 6-43), mean Doppler gradient 11.3 ± 2.5mmHg, and no patient has more than trivial PR.

Conclusion: Occasional, often younger and smaller patients, with small conduits are candidates for TPVI with acceptable early results. Size of prior surgical conduit should not be the sole criteria utilized by the clinician in deciding what patients to send to surgery instead of considering TPVI. Lack of conduit calcification may be an important finding in this group. Valve functional assessment in medium term follow-up is necessary to validate this approach.

Disclosures:
Jeremy Ringewald: 5 B Braun

B-082
Title: Novel Physical Characteristics of the Amplatzer Vascular Plug Type IV and Potential for Expanded Use in Aortopulmonary Collateralization
Category: Pediatric
Authors: Michael Ross, Children’s Hospital Colorado, United States; Michael Ross, Children’s Hospital Colorado, United States; Derek Eilers, Children’s Hospital Colorado, United States; Rachel Fry, Children’s Hospital Colorado, United States; Neil Wilson, Children’s Hospital Colorado, United States; Neil Wilson, Children’s Hospital Colorado, United States

Background: Elimination of aortopulmonary collateralization is common interventional practice in single ventricle disease. The Amplatzer Vascular Plug Type IV (AVP IV) is increasingly used in this procedure. Length for diameter data is not available for these devices. Oversizing of the AVP IV may be beneficial in covering a longer length of vessel using fewer devices. We sought to evaluate device length vs. diameter and radial force vs. diameter of the AVP IV devices.

Methods: 4mm to 8mm AVP IV devices were measured in glass tubing with internal diameters ranging from 1mm to 8mm. Radial force was measured by constraining the devices to the desire diameters from 1mm to 7mm and measuring the force the device exerted to one of the constraining walls. This force vs. diameter relationship was evaluated for each device size.

Results: The devices range in size from 4mm to 8mm in diameter and in length from 12.4mm to 31.2mm. The 4mm device lengthened 3.44mm when unconstrained to 1mm diameter constrained (12.4mm to 15.8mm), while the 8mm AVP IV lengthened 14.74mm from unconstrained to 1mm diameter constrained (16.5mm to 31.2mm). Radial forces ranged from 0.13N to 1.13N. There appears to be a dynamic relationship of device size to radial force for any given diameter. Several forces measured suggest that the larger devices exert equal or less radial force than a smaller device within the same diameter constraint.

Conclusion: The AVP IV device has a reliable length for diameter relationship that can be utilized to select the best device IMA occlusion. A complex property of the AVP IV with regards to radial force for device size was found. This suggests that oversizing an AVP IV is safe and effective in some settings, potentially decreasing total devices used, cost, and overall procedure time.

Disclosures:
Michael Ross: This author has nothing to disclose.
Derek Eilers: This author has nothing to disclose.

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B-083

Title: Higher Hospital Charges for Surgical Versus Catheter Atrial Septal Defect Closure: Review of a United States National Database

Category: Pediatric

Authors: Jessica Sanchez, University Of Arizona College Of Medicine, United States

Background: Atrial septal defects (ASD) are among the most common congenital heart defects. As more ASDs are corrected by interventional catheterization instead of surgery, it is critical to compare the cost burden associated with each intervention.

Methods: Retrospective review of hospital discharge data from the Kids’ Inpatient Database from January 2009 through December 2012. The database collects discharge data on patients <21 years from 4,100 hospitals in the United States. The database was queried for patients with ICD-9 procedure codes for surgical (35.51 or 35.61) or catheter (35.52) ASD closure; those with other cardiac conditions and/or additional cardiac procedures were excluded. Age, length of stay (LOS) and total charges were compared between groups using t-test or Mann-Whitney U test, as appropriate.

Results: 791 patients (486 Surgical) were identified in the query. Comparison of Surgical ASD and Cath ASD groups are shown in the Table. Total charges and LOS were higher in Surgical ASD patients compared to Cath ASD patients.

Conclusion: In this review of a large national inpatient database, we found that hospital charges for surgical ASD closure are significantly higher than catheter ASD closure in the United States in the current era. Factors that likely contribute to this include longer LOS and resources needed for post-surgical recovery. Using “real-world” data, this is the first large study that demonstrates a substantial cost advantage for catheter ASD closure compared to surgical.

Table: Comparison of surgical and catheter ASD closure. Values shown as median (interquartile range) or mean ± standard deviation.

Disclosures:
Jessica Sanchez: This author has nothing to disclose.

O-010

Title: Transcatheter Closure Compared to Surgical Ligation of Patent Ductus Arteriosus in Extremely Premature Infants with Broncho-Pulmonary Dysplasia

Category: Pediatric

Authors: Ranjit Philip, University of Tennessee health Science Center Memphis TN, United States; Alejandro Arevalo, University of Tennessee health Science Center Memphis TN, United States; Shyam Sathanandam, University of Tennessee health Science Center Memphis TN, United States

Background: Children born prematurely often have a patent ductus arteriosus (PDA), which in association with broncho-pulmonary dysplasia (BPD) in these patients leads to early onset pulmonary hypertension (PHT). With the advent of smaller occlusion devices, transcatheter PDA closure in infants born prematurely can be performed. The objective of this study was to evaluate the hemodynamics and determine the effects of pulmonary vasodilatation and PDA closure in these patients.

Methods: Premature infants that had severe PHT, defined as a pulmonary artery systolic pressure (PAP) >50% of the systolic blood pressure (SBP), with severe BPD (ventilator and oxygen dependency) and a large PDA were evaluated over an 18 months’ period. Those with another level of left to right shunt were excluded from the study. All patients underwent cardiac catheterization. Hemodynamic assessment at baseline, followed by pulmonary vasodilator therapy with and without test occlusion of the PDA was performed.

Results: Sixteen patients born premature (25.4 ± 3.2 weeks’ gestation, birth weight = 756 ± 264 g), underwent cardiac catheterization at 98.6 ± 46 days of age, weighing 2 ± 0.48 Kg. At baseline ventilator support, the Qp:Qs was 1.5 ± 0.5, PAP was 74 ± 14% of SBP, and PVR was 3.94 ± 2 WU m⁻². With 100% Oxygen and inhaled nitric oxide, the Qp:Qs increased to 2.6 ± 1, PAP decreased to 54 ± 10% of SBP, and PVR decreased to 1.9 ± 1.2 WU m⁻². At this stage when the PDA was test occluded, the shunt was eliminated with further decrease in the PAP and PVR. Based on these findings, the PDA was closed in all patients. The median time for extubation was 17 days. At 3 months post procedure, 50% of the patients continued to have severe PHT on pulmonary vasodilator therapy. The growth velocity increased by 40% at 3 months compared prior to PDA closure. There was 1 mortality 105 days post procedure from complications of bronchiolitis.

Conclusion: Pulmonary vasodilator therapy for PHT increases the PDA shunt in premature infants which could worsen BPD. Therefore, closure of the PDA could be beneficial in the effective management of PHT and BPD in these patients. Transcatheter PDA closure can be accomplished during the time of the hemodynamic catheterization.

Disclosures:
Ranjit Philip: This author has nothing to disclose.
Rush Waller: This author has nothing to disclose.
Narendra DeReddy: This author has nothing to disclose.
Alejandro Arevalo: This author has nothing to disclose.
Shyam Sathanandam: This author has nothing to disclose.
Background: Children born prematurely often have a patent ductus arteriosus (PDA). In a symptomatic neonate, surgical ligation of the PDA is the standard when pharmacologic therapy fails. Transcatheter closure of the PDA in the extremely premature infant is a relatively new technique. The objective of this retrospective review was to compare outcomes of transcatheter closure to surgical ligation of the PDA in children <2.5 Kg who require positive pressure ventilation.

Methods: In this retrospective review, 23 premature infants that had transcatheter PDA closure were compared with 23 matched surgical patients. Matching was performed based on gestational age (GA), birth weight (BW), procedure weight (PW) and respiratory severity score (RSS). RSS was calculated as a product of the fractional inspired oxygen and mean airway pressure. The outcome variable was the time taken to return to pre-procedure RSS levels, a pulmonary artery systolic pressure >50% of the systolic blood pressure was considered as pulmonary hypertension (PHT). Factors predictive of a longer time to return to pre-procedure RSS were determined.

Results: Patients undergoing transcatheter PDA closure were well matched to the surgical control patients (GA = 26.2 ± 3.5 weeks vs. 27.4 ± 4.2 weeks; BW = 739 ± 324 vs. 806 ± 262; PA = 102.6 ± 50 vs. 94 ± 68 days and PW = 2.1 ± 0.68 vs. 1.89 ± 0.76 Kg). The median time to return to pre-procedure RSS level was significantly shorter in the percutaneous group; 18.4 hrs (IQR = 0–124) vs. 49.1 hrs (IQR = 20–241), P < 0.05. The median time for extubation was also significantly shorter for the transcatheter group; 17 vs. 32 days (P < 0.01). Presence of PHT was the only independent predictor for a longer time to return to pre-procedure RSS (OR = 6.9, 95% CI: 2.3–11.4, P < 0.001). One patient, weighing 1.06 Kg, developed left pulmonary artery stenosis immediately following device closure. The device was snared and retrieved. Two surgical patients developed severe chylothous effusions with one mortality.

Conclusion: PPV respiratory support can be weaned off faster in extremely premature infants that undergo transcatheter device closure of PDA compared to surgical ligations. Presence of PHT prolongs the need for PPV after transcatheter PDA closure.

Disclosures:
Ranjit Philip: This author has nothing to disclose.
Rush Waller: This author has nothing to disclose.
Alejandro Arevalo: This author has nothing to disclose.
Narendra DeReddy: This author has nothing to disclose.
Shyam Sathanandam: This author has nothing to disclose.

O-012
Title: Recanalization and rehabilitation of chronically occluded central veins in pediatric patients: changing the paradigm for chronic access needs and venous congestion
Category: Pediatric
Authors: Patrick Sullivan, Children’s Hospital Los Angeles, United States; Cheryl Takao, Children’s Hospital Los Angeles, United States; Frank Ing, Children’s Hospital Los Angeles, United States

Background: Central venous occlusion, which limits access and increases morbidity and mortality, is common in chronically ill pediatric pts and those with thrombophilia. We report results of recanalization of completely occluded central veins with angioplasty and stenting.

Methods: All pts undergoing intervention on occluded central veins at our institution from 4/2013-11/2015 were included. Catheterization and follow-up data were retrospectively reviewed.

Results: 45 veins in 17 pts underwent initial recanalization with angioplasty (14 veins) or stent implantation (31 veins, 56 stents) for limited access (10 pts), limb swelling (3 pts), SVC syndrome (2 pts), or pleural effusion (2 pts). Median age & wt were 5.7 yrs (55 d-20.6 yrs) and 18.4 kg (4-110 kg). Etiologies for occlusion were: cardiac surgery or ECMO support and chronic central lines (13), factor V Leiden (2), mediastinal lymphoma (1), and short gut with chronic central access (1). Veins included femoral/iliac (25), vena cavae (10), innominate (6), and subclavian/JJ (4). Of 26 veins imaged noninvasively prior to catheterization, only 14 (53.8%) were correctly identified as completely occluded. Following initial cath, mean vessel diameter was 5.3 ± 2.2 mm. 2 pts had contained vein perforations, but no major complications occurred. Of 7 patients with congestion, SVC syndrome, or effusions, 5 experienced improvement post-intervention.

13 pts (34 veins) underwent 25 re-catheterizations during a median follow-up of 68 d (6-867 d). Median time to initial follow-up was 61 d (6-434 d), 12 veins (35.3%) were re-occluded and required recanalization, 9 veins (26.4%) had in-stent restenosis and 13 (38.2%) were patent without restenosis. Reinterventions were performed on 26 (76.4%) veins, including 12 new stent implantations, 9 angioplasties for in-stent restenosis, and 5 angioplasties for somatic growth. After the most recent intervention, all vessels were patent and mean vessel diameter was 6.2 ± 2.9 mm.

Conclusion: Recanalization & rehabilitation of occluded central veins can preserve critical access sites and improve venous congestion symptoms in a variety of high-risk pediatric pts. Noninvasive imaging often fails to identify occluded veins. Reinterventions are common.

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Cheryl Takao: This author has nothing to disclose.
Frank Ing: This author has nothing to disclose.

B-091
Title: Reduction in radiation dose in a pediatric cardiac catheterization lab using Philips AlluraClarity X-ray system
Category: Pediatric
Authors: Patrick Sullivan, Children’s Hospital Los Angeles, United States; Harrison David, Children’s Hospital Los Angeles, United States; David Harrison, Children’s Hospital Los Angeles, United States; Sarah Badran, Children’s Hospital Los Angeles, United States; Takao Cheryl, Children’s Hospital Los Angeles, United States; Frank Ing, Children’s Hospital Los Angeles, United States

Background: Cardiac catheterization is a significant source of radiation exposure in children with congenital heart disease. AlluraClarity (Philips Healthcare; Best, The Netherlands) is a fluoroscopy hardware and software system designed to reduce radiation dose without compromising image quality, but its use in a pediatric catheterization lab has not been reported.

Methods: Dose area products (DAP, in mGy cm²) were compared in all patients catheterized using Philips Allura X-ray system and the AlluraClarity system over one year adjusting for BSA and total fluoroscopic time (TFT). An interventionalist blinded to the system rated the quality of 35 randomly selected studies from each system on various parameters on a scale of 1 (unacceptable) to 5 (flawless imaging).

Results: The 430 patients undergoing catheterization with Clarity were slightly larger than the 332 undergoing catheterization without Clarity (median BSA: 0.74 vs. 0.64 m², p=0.06), and median TFTs were similar (15.8 vs 16.1 minutes, p=0.37). Procedure types were evenly distributed between the groups. Median DAPs were 8,661 mGy cm² (range: 16,610-553 mGy cm²) without Clarity and 4,523 mGy cm² (range: 9,357,223 mGy cm²) with Clarity (p<0.001). There was a reduction in the median DAP in all procedure categories. After adjustment for BSA and TFT, using Clarity was associated with a 58% (95% CI: 33-74%)

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S110 Abstracts

52.0-63.4%, p<0.001) reduction in DAP for all procedures. There was an adjusted percent reduction in DAP for each procedure category ranging from 39.0% (95% CI: 25.6-50.1%, p<0.001) for cardiac biopsies with or without coronary angiography to 67.6% (95% CI: 51.2-72.8%, p<0.001) for device occlusions. Cohorts randomly selected for image quality evaluation from each system were similar in size (BSA pre-Clarity 0.57 vs. Clarity 0.57 m²). Mean overall imaging quality scores were similar with and without Clarity (4.3±0.8 vs. 4.4±0.6, p=0.62).

Conclusion: Use of the Philips AlluraClarity system was associated with a significant reduction in radiation dose without a reduction in subjective imaging quality in a pediatric cardiac catheterization lab. Use of Clarity did not impact the potential for accurate measurements required for a successful interventional procedure.

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Sarah Badran: This author has nothing to disclose.
Takao Cheryl: This author has nothing to disclose.
Frank Ing: This author has nothing to disclose.

B-092

Title: Real-Time Three Dimensional CT and MRI to guide interventions for Congenital Heart Disease and Acquired Pulmonary Vein Stenosis
Category: Pediatric
Authors: Patcharapong Suntharas, Cleveland Clinic Children’s Hospital, United States; Randolph Setser, Siemens Medical Solutions USA, Inc., United States; Sharon Bradley-Skelton, Cleveland Clinic Children’s Hospital, United States; Lourdes Prieto, Cleveland Clinic Children’s Hospital, United States

Background: Cardiac interventions in patients with congenital (CHD) and structural heart disease require complex catheter manipulation to access abnormal structures. Angiography in multiple projections and/or 3D angiography are necessary to perform these procedures. Current technology allows registration of the anatomy from 3D CT and/or MRI to be overlaid onto fluoroangiogram. We validate the feasibility and spatial accuracy of this technique to guide interventional procedures in patients with CHD and acquired pulmonary vein stenosis

Methods: Thirty patients (20 male, median age 49 (8-76) years with CHD or PVS scheduled for intervention from 12/12-8/15 were prospectively recruited. All cases were performed using biplane C-arm system (Artis zee, Siemens Healthcare). C-arm CT was acquired and registered with pre-procedural 3D images. Anatomic landmarks previously marked in pre-procedural images were then overlaid on live fluoroscopy to facilitate intra-procedural guidance. The accuracy of registration was determined by measuring the distance between overlay markers (typically a vessel outline) and the actual location of the structure. The clinical utility of the fluoroscopic overlay was evaluated as either “High”, “Medium” or “None” by the primary operator and supported by additional clinical rationale.

Results: Seventeen patients with CHD and 13 with PVS were enrolled. CT was available in 18, MRI in 12. Accuracy and benefit of 3D3D registration were not evaluated in 2 due to suboptimal images. Accuracy was 0-2 mm in 18 (64%), 2-4 mm in 3 (11%) and >4 mm in 7 (25%). Of the 7, 1 had only low-resolution MRA sequence available, 1 had CT with significant motion artifact, 2 young patients had images >6 months prior to intervention with significant somatic growth, and in 3 there was no clear explanation. 3D3D registration was highly beneficial in 18 (64%) patients and not beneficial in 7 (25%).

Conclusion: 3D3D registration for congenital and structural heart disease is feasible and can facilitate complex congenital and structural interventions. It may reduce procedure time, radiation and contrast dose. However, high quality images performed close to the procedure is required for better accuracy.

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Patcharapong Suntharos: This author has nothing to disclose.
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Lourdes Prieto: This author has nothing to disclose.

B-097

Title: Evaluation of Large Biodegradable Stents in Porcine Model of Aortic Coarctation
Category: Pediatric
Authors: Surendranath Reddy Veeram Reddy, University of Texas Southwestern Medical Center, United States; Jian Wang, University of Texas Southwestern Medical Center, United States; Tre Welch, University of Texas Southwestern Medical Center, United States; Matthew Riegel, University of Texas Southwestern Medical Center, United States; James Richardson, University of Texas Southwestern Medical Center, United States; Joseph Forbess, University of Texas Southwestern Medical Center, United States; Alan Nugent, University of Texas Southwestern Medical Center, United States

Background: Biodegradable stents (BDS) could impact management of congenital heart disease (CHD). Novel double opposing helical (DH) BDS made of Poly-L-Lactic Acid have the potential for use in CHD. Study aims were: 1. Create a model of coarctation of aorta (CoA) in a growing minipig. 2. Evaluate feasibility of large DH BDS implantation to treat CoA and 3. Assess short term vessel/stent patency and vessel inflammation.

Methods: Five newborn Yucatan minipigs (5-7 kgs) underwent surgical CoA creation with a pledgeted suture technique via left lateral thoracotomy. After 2 months, 10 and 12 mm diameter DH BDS were implanted to treat CoA. BDS were evaluated with angiography, intravascular ultrasound (IVUS) and histopathology at 2 months follow up.

Results: All 5 animals had CoA successfully created (angiography and IVUS) and survived the thoracotomy. Three DH BDS implantations were successful via femoral (2) and carotid (1) arterial access. Two animals died from vascular/bleeding complications at the stent implantation procedure. Unfortunately 1 survivor died within 24 hours from femoral access site bleeding complication. The 2 survivors at 2 months post BDS implantation showed good stent apposition on IVUS and angiography with luminal patency and mild neointimal proliferation. Histopathology showed complete endothelialization of stent material.

Conclusion: A technique of CoA creation is described in growing minipigs. Intervention with DH BDS with diameters up to 10-12mm is feasible but procedural risks need to be reduced. Further studies are needed to evaluate long-term stent performance and vessel appearance during/with degradation.

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**O-008**

**Title:** Successful hybrid valve sparing repair of TOF with intervention free follow up to 2 years

**Category:** Pediatric

**Authors:** Melissa K. Webb, University Of Texas - Southwestern, United States; Adrian K. Dyer, University Of Texas - Southwestern, United States; Tarique Hussain, University Of Texas - Southwestern, United States; Surendranath R. Veeram Reddy, University Of Texas - Southwestern, United States; Thomas M. Zellers, University Of Texas - Southwestern, United States; Alan W. Nugent, University Of Texas - Southwestern, United States; Joseph M. Forbess, University Of Texas - Southwestern, United States; V. Vivian Dimas, University Of Texas - Southwestern, United States

**Background:** Valve sparing repair (VSR) techniques for tetralogy of Fallot (TOF) are increasingly being used as long term effects of free pulmonary insufficiency following transannular patch (TAP) are being recognized. A hybrid approach with intraoperative pulmonary balloon valvuloplasty (IPBV) aims to minimize the total patient procedures. Previous studies showed short term technical success, however there was a high rate of reintervention within the first year of surgery. The study goal was to describe our experience with IPBV and to determine predictors of successful VSR using IPBV without conversion to TAP.

**Methods:** This is a retrospective study of all patients undergoing IPBV TOF repair at our institution from November 1, 2009 until November 1, 2015. A successful VSR with IPBV was defined as not requiring conversion to TAP at or within 30 days of operation.

**Results:** Forty-three patients underwent IPBV with 8 (19%) requiring TAP conversion. Seven conversions were performed at the time of attempted VSR and one 12 days later. Median pulmonary valve Z score (PV-Z) of the successful group was −1.82 (range −3.41 to 0) and of the TAP group was −3.03 (range −3.31 to −0.22). Median operation weight and balloon to annulus ratio (BAR) were not different between the two groups (IPBV 6.28 kg; TAP 5.86 kg and IPBV 123%; TAP 140%). Valve morphology, BAR, and weight at operation were not predictors of success. The primary predictor of success by multivariate analysis was PV-Z at preoperative transesophageal echocardiogram. Follow-up time was 1 month to 6 years. Of the 35 successful VSR using IPBV, there was 100% freedom from reintervention at 30 days and only 1 patient requiring intervention much later at 31 months. ROC curve analysis demonstrated that a PV-Z of 0 to −3.0 was 57% specific and 97% sensitive for procedural success without conversion to TAP within 30 days (AUC 0.871). PV-Z < −3.0 was unlikely to undergo successful VSR, however 2 patients with a PV-Z ≤ −3 underwent successful IPBV with VSR without TAP conversion.

**Conclusion:** This study demonstrates that successful VSR using IPBV can be performed with a low likelihood of conversion to TAP in patients with PV Z scores up to −3.0. There was a very low rate of long term reintervention in these patients.

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- Melissa K. Webb: This author has nothing to disclose.
- Adrian K. Dyer: This author has nothing to disclose.
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- Joseph M. Forbess: This author has nothing to disclose.
- V. Vivian Dimas: This author has nothing to disclose.

**O-005**

**Title:** Acute and Mid-term Outcomes of Transcatheter Pulmonary Valve Replacement for Treatment of Dysfunctional Left Ventricular Outflow Tract Conduits

**Category:** Pediatric

**Authors:** Wendy Whiteside, Cincinnati Children’s Hospital Medical Center, United States; Jamil Aboulhosn, University of California at Los Angeles, United States; Osamah Aldoss, University of Iowa Hospitals & Clinics, United States; Osamah Aldoss, University of Iowa Hospitals & Clinics, United States; V. Vivian Dimas, University of Texas - Southwestern, United States

**Abstract:** This study demonstrates that successful VSR using IPBV can be performed with a low likelihood of conversion to TAP in patients with PV Z scores up to −3.0. There was a very low rate of long term reintervention in these patients.
Background: Transcatheter pulmonary valve replacement (TPVR) is an established therapy for treatment of the dysfunctional right ventricular (RV) outflow tract conduit. TPVR in patients with a sub-pulmonary left ventricle (LV) and LV outflow tract (LVOT) conduit dysfunction has not been studied. Unique anatomic and physiologic aspects of this population may contribute to distinct risks and outcomes.


Results: Twenty-six patients with a dysfunctional LVOT conduit (median age 33.2 years (IQR 23.9, 41.8)) were evaluated with the intent to perform TPVR. Melody TPVR was successful in 22 patients (85%); in 4 patients, TPVR was aborted due to inability to advance the TPV to target implant location (n=2), concern for coronary artery compression (n=1) and inadequate conduit size for TPVR (n=1). Four serious adverse events occurred in 3 cases (11.5%) including pulmonary hemorrhage, hypotension requiring vasoactive support, conduit disruption requiring covered stent implant, and acute RV dysfunction associated with flash pulmonary edema. There were no procedural deaths. Following TPVR, the LVOT peak systolic ejection gradient decreased from a median of 35 to 17 mmHg (p<0.001); there was trivial or no pulmonary insufficiency in all but 2 patients, in whom it was mild. During a median follow-up of 1.0 year (IQR 0.4, 3.2), endocarditis (n=2), TPVR stent fracture (n=1) and non-TPVR related death (n=1) occurred. One TPV was re-dilated beyond the implant diameter for re-obstruction. Mean RV pressure decreased from a median of 43.0 to 22.8 mmHg (p<0.001). The primary endpoint included all major and minor bleeds (NACE: MACCE and major bleeding events). There were no procedural deaths.

Conclusion: Melody TPVR in the dysfunctional LVOT conduit provides similar procedural success and early outcomes when compared with TPVR for RVOT conduit dysfunction. Worsening systemic RV function and TR may develop following TPVR for LVOT conduit dysfunction.

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Results: 260 patients were enrolled: 123 randomized to UFH (88 femoral; 35 radial); 137 to bivalirudin (105 femoral; 32 radial). In-hospital and 30 days clinical outcomes by anticoagulation are shown in Fig.1 and by access site in Fig.2.

Conclusion: Among patients with stable CAD undergoing PCI on dual anti-platelet therapy, UFH was associated with a numerically lower rate of bleeding complications, while MACCE rates were higher in patients treated with bivalirudin. Radial access was associated with a numerically lower, but statistically insignificant, rate of bleeding complications when compared with femoral access.

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Allen Jeremias: This author has nothing to disclose.

A-022
Title: Heparin Versus Bivalirudin for Elective Percutaneous Coronary Intervention in a Community Cohort
Category: Pharmacotherapy
Authors: Matthew Czarny, Johns Hopkins University School of Medicine, United States; Chao-Wei Hwang, Johns Hopkins University School of Medicine, United States; Daniel Naiman, Johns Hopkins University, United States; Cynthia Lemmon, Johns Hopkins University School of Medicine, United States; Rani Hasan, Johns Hopkins University School of Medicine, United States; Thomas Wang, Washington Adventist Hospital, United States; Thomas Aversano, Johns Hopkins University School of Medicine, United States

Background: Safe and effective anticoagulation is critical to successful percutaneous coronary intervention (PCI), but the relative efficacy and safety of bivalirudin and heparin remain controversial.

Methods: We conducted a post-hoc propensity score-based inverse probability weighted analysis of patients who underwent non-staged elective PCI in the Cardiovascular Patient Outcomes Research Team Non-Primary PCI (CPORT-E) trial to compare outcomes in patients receiving bivalirudin to those receiving heparin.

Results: A total of 7897 patients were included in this study, of whom 57% received heparin and 43% received bivalirudin. Baseline characteristics were well-balanced after inverse probability weighting, including glycoprotein IIb/IIIa inhibitor use (35% for heparin, 36% for bivalirudin). The primary safety outcome of in-hospital bleeding requiring transfusion occurred in 0.9% of patients receiving bivalirudin and 1.9% of patients receiving heparin (relative risk [RR] 0.5, 95% confidence interval [CI] 0.3-0.7), but there was no difference at six weeks (1.9% for bivalirudin vs 2.6% for heparin, RR 0.7, 95% CI 0.5-1.1). The primary efficacy outcome of the composite of in-hospital death or MI occurred in 4.5% of patients receiving bivalirudin and 3.0% of patients receiving heparin (RR 1.5, 95% CI 1.1-2.1), a difference which persisted at 6 weeks (5.5% vs 3.9%, RR 1.4, 95% CI 1.1-1.9). Most MIs were peri-procedural. There were no differences in death, vascular access site complications, target vessel recanalization, coronary artery bypass grafting, or stroke at discharge or 6 weeks.

Conclusion: Anticoagulation with bivalirudin for PCI is associated with a decreased risk of bleeding and an increased risk of death or MI compared to heparin.

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Matthew Czarny: This author has nothing to disclose.
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Daniel Naiman: This author has nothing to disclose.
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Thomas Wang: This author has nothing to disclose.
Thomas Aversano: This author has nothing to disclose.

A-024
Title: Post-Peripheral Artery Intervention Medical Therapy: Impact of Operator Specialty and Antiplatelet Drug Use in the XLPAD Registry
Category: Pharmacotherapy
Authors: Swagata Das, VA North Texas Healthcare system and UT Southwestern Medical Center at Dallas, United States; Atif Mohammad, VA North Texas Healthcare system and UT Southwestern Medical Center at Dallas, United States; Haekyung Jeon-Slaughter, VA North Texas Healthcare system and UT Southwestern Medical Center at Dallas, United States; Denizen Kocak, VA North Texas Healthcare system and UT Southwestern Medical Center at Dallas, United States; Thomas Das, VA North Texas Healthcare system and UT Southwestern Medical Center at Dallas, United States; Kyle Planchard, VA North Texas Healthcare system
and UT Southwestern Medical Center at Dallas, United States; Andrew Shammas, VA North Texas Healthcare system and UT Southwestern Medical Center at Dallas, United States; Emmanouil Brilakis, VA North Texas Healthcare system and UT Southwestern Medical Center at Dallas, United States; Subhash Banerjee, VA North Texas Healthcare system and UT Southwestern Medical Center at Dallas, United States

**Background:** There are limited data on post-arterial revascularization therapy, associated clinical outcomes and treatment variations based on operator specialty: interventional cardiology (IC) and vascular surgery (VS).

**Methods:** We reviewed 365 patients data following PAI between June 2009–January 2015 enrolled in the XLPAD registry (NCT 01904851) registry at the Dallas VA Medical Center. Median follow-up 30 months (IQR: 12–36 months).

**Results:** Patients treated by IC were younger (63 ± 7y vs. 66 ± 8y; p = 0.01) and less likely to have critical limb ischemia (16.2% vs. 39%; p = 0.01), but had higher rates of coronary artery disease (60% vs. 41.5%; p = 0.05). Post-PAI by IC, patients received more antiplatelet drugs (APT; 97.5% vs. 94%; p = 0.08) and dual-antiplatelet therapy (DAPT; 82% vs. 66.5%; p = 0.01). Patients on APT and DAPT had 84% and 65% lower mortality rates than those who were not (APT; HR 0.16, 95% CI 0.05–0.47; p = 0.01; DAPT vs. no DAPT HR 0.35 95% CI 0.18–0.71; p < 0.05). Figure 1, and lower rates of a composite of myocardial infarction or death events by 67% and 61% (APT vs. no APT: HR 0.33, 95% CI 0.11–0.94; p = 0.03; DAPT vs. no DAPT HR 0.39 95% CI 0.21–0.72; p = 0.002). Median time to major adverse cardiac event was delayed by 60% in APT compared to no APT group and 48% in DAPT treated group compared to no DAPT groups (APT vs. no APT: HR 0.40, 95% CI 0.16–1.06; p = 0.05; DAPT vs. no DAPT: HR 0.52, 95% CI 0.31–0.89, p = 0.01).

**Conclusion:** These data indicate the importance of APT and DAPT post-PAI, prescription variations by operator specialty and reinforce the need for studies for optimal medical therapy following PAI.

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Swagata Das: This author has nothing to disclose.
Atif Mohammad: 5 medicure
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Thomas Das: This author has nothing to disclose.
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Andrew Shammas: This author has nothing to disclose.
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Subhash Banerjee: 4 Mdcare Global (spouse); intellectual property: HygeiaTel, 5 Research grants: Boston Scientific, Medicines Company; consultant/speaker honoraria: Gilead, St Jude, Cordis, Boehringer Ingeheim, Sanofi, Medtronic; ownership

Federal University of Sao Paulo - Brazil, Brazil; Francisco Fonseca, Federal University of Sao Paulo - Brazil, Brazil; Antonio Carvalho, Federal University of Sao Paulo - Brazil, Brazil; Gregg Stone, Columbia University Medical Center, United States; Adriano Caixeta, Federal University of Sao Paulo - Brazil, Brazil

**Background:** The novel P2Y12 receptor inhibitors ticagrelor and prasugrel provide stronger platelet inhibition than clopidogrel. However, pharmacodynamic comparison between ticagrelor vs. prasugrel in STEMI patients undergoing thrombolysis is unknown.

**Methods:** In the single-center SAMPA trial, 46 consecutive STEMI patients undergoing a pharmacoinvasive strategy (thrombolysis with tenecteplase followed by early coronary angiography) were randomized to either ticagrelor (n = 24) 180 mg loading followed by 90 mg twice a day, or prasugrel (n = 22) 60 mg loading followed by 10 mg/day. Ticagrelor and prasugrel were given before angiography. All patients were also treated with a 300 to 600 mg loading dose of clopidogrel at the time of thrombolysis. Platelet reactivity was assessed with the VerifyNow P2Y12 assay at 0, 2, 6 and 24 hours after randomization.

**Results:** Mean times from thrombolysis to prasugrel and ticagrelor administration were 12.1 ± 7.4 and 13.7 ± 7.2 hrs., respectively (p = 0.12). The Table show serial values of P2Y12 reaction unit (PRU) between the 2 groups over time. The mean and median values of PRU decreased significantly from baseline to 2 hours (all P < 0.001) and from 2 hours to 6 hours (all P < 0.001) in both groups. PRU values did not significantly differ between groups at any time period of the study.

**Conclusion:** In this randomized study, STEMI patients receiving ticagrelor and prasugrel after thrombolysis and before angiography did not achieve complete platelet inhibition for 6 hours. Ticagrelor and prasugrel demonstrated a similar extent of P2Y12 receptor inhibition within 24 hours after loading dose.

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Leonardo Guimaraes: This author has nothing to disclose.
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Gregg Stone: This author has nothing to disclose.
Adriano Caixeta: This author has nothing to disclose.

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**A-032**

**Title:** P2Y12 Receptor Inhibition With Prasugrel and Ticagrelor in STEMI Patients After Thrombolytic Therapy: Analysis from SAMPA Randomized Trial

**Category:** Pharmacotherapy

**Authors:** Leonardo Guimaraes, Federal University of Sao Paulo - Brazil, Brazil; Philippe Generaux, Hôpital du Sacré-Coeur de Montréal, Canada; Diego Silveira, Federal University of Sao Paulo - Brazil, Brazil; Felipe Falcão, Federal University of Sao Paulo - Brazil, Brazil; Cristiano Souza, Federal University of Sao Paulo - Brazil, Brazil; Antonio Eduardo Pesaro, Hospital Israelita Albert Einstein, Brazil; Claudia Alves, Catheterization and Cardiovascular Interventions DOI 10.1002/ccd.

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**A-039**

**Title:** Is Prasugrel Superior to Optimally Dosed Clopidogrel?

**Category:** Pharmacotherapy

**Authors:** William Hillegass, University of Alabama at Birmingham, United States; Brigitta Brott, University of Alabama at Birmingham, United States; Gary Cutter, University of Alabama at Birmingham, United States
Background: Dual antiplatelet therapy is essential to percutaneous coronary intervention (PCI) treatment of acute coronary syndrome (ACS) patients. TIMI 38 demonstrated prasugrel reduced cardiovascular death (CVD) and nonfatal myocardial infarction (nfMI) compared to a 300mg clopidogrel loading dose, hazard ratio (HR)=0.77 (95% confidence interval [CI], 0.67 to 0.88; p<0.001). CURRENT OASIS-7 (CO-7) demonstrated a 600mg clopidogrel loading dose reduced CVD and nfMI compared to 300mg, HR=0.86 (95% CI, 0.74 to 0.99; p=0.039). Whether prasugrel is superior to a 600mg loading dose of clopidogrel in ACS PCI is unknown.

Methods: Published and estimated individual patient data (eIPD) from CO-7 were used to generate a time to event model based on patient characteristics and assigned clopidogrel dose. The model was applied to published and eIPD from TIMI-38 with landmarking at 30 days to generate a simulated 600mg clopidogrel loading arm for TIMI-38. The models were verified to precisely reproduce the known outcomes of both trials.

Results: The analysis suggests prasugrel reduces cardiovascular death and nonfatal MI at one year by 1.2% (95% CI: [0.1, 2.2], p=0.039). Whether prasugrel is superior to a 600mg loading dose of clopidogrel in ACS PCI is unknown.

Conclusion: No trial compares clopidogrel 600mg loading dose to prasugrel. This indirect comparison suggests statistical and clinically meaningful improvement in outcomes with prasugrel compared to optimally dosed clopidogrel.

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William Hillegass: 9 Lilly-speakers bureau in past
Brigitta Brott: This author has nothing to disclose.
Gary Cutter: This author has nothing to disclose.

A-054

Title: Low-dose Ticagrelor Versus Clopidogrel in Chinese Patients with Stable Coronary Artery Disease: a Randomized, Single-blind, Crossover Clinical Study

Category: Pharmacotherapy

Authors: Meijiao He, The First Hospital of Harbin, China; Bin Liu, The First Affiliated Hospital of Harbin Medical University, China; Yujiao Pan, The First Affiliated Hospital of Harbin Medical University, China; Wanbin Zheng, the First Hospital of Harbin, China; Jing Shi, The First Affiliated Hospital of Harbin Medical University, China; Jing Shi, The First Affiliated Hospital of Harbin Medical University, China; Danghui Sun, The First Affiliated Hospital of Harbin Medical University, China; Shiqi Zhao, The First Affiliated Hospital of Harbin Medical University, China; Yue Li, The First Affiliated Hospital of Harbin Medical University, China

Background: Ticagrelor has been demonstrated to provide a more rapid and more powerful inhibition of platelet aggregation compared with clopidogrel in coronary artery disease (CAD) patients. Consistently, in our previous study, we observed that half-dose ticagrelor produced similar inhibitory effects on platelet aggregation as standard-dose ticagrelor and exerted significantly stronger effects than that in the clopidogrel in Chinese patients with non-ST-elevation ACS. Therefore, we performed this study to observe the efficacy of one-quarter dose ticagrelor in comparison to standard-dose clopidogrel in Chinese patients with stable CAD.

Methods: In a randomized, single-blind, crossover trial, 30 patients with stable CAD were randomized to one-quarter dose ticagrelor (22.5 mg BID for 7 days) or standard-dose clopidogrel (75 mg QD for 7 days). Following a 2-week washout period, patients switched regimens. Light transmission aggregometry (LTA) and VerifyNow assay were used to measure platelet function.

Results: The platelet aggregation rate (PAGR) was lower with ticagrelor than clopidogrel (17.70%±12.67% versus 27.63%±13.10%, P<0.05). The % inhibition levels in the ticagrelor groups exhibited significantly greater than that in the clopidogrel group (65.33%±21.31% versus 36.23%±23.01%, P<0.01). PRU values in the ticagrelor were dramatically lower than that in the clopidogrel group (P<0.01). High-platelet reactivity (HPR) (>208 PRU) was 0% with ticagrelor and 16.67% with clopidogrel.

Conclusion: 22.5 mg BID ticagrelor provided greater degree of platelet inhibition than clopidogrel in Chinese patients with stable CAD.

Disclosures:
Meijiao He: This author has nothing to disclose.
Bin Liu: This author has nothing to disclose.
Yujiao Pan: This author has nothing to disclose.
Wanbin Zheng: This author has nothing to disclose.
Jing Shi: This author has nothing to disclose.
Danghui Sun: This author has nothing to disclose.
Shiqi Zhao: This author has nothing to disclose.
Yue Li: This author has nothing to disclose.

A-064

Title: Heparin With Or Without Glycoprotein IIb/IIIa Inhibitors Is Non Inferior To Bivalirudin In Acute Coronary Syndrome Patients Undergoing Invasive Approach Through Radial Access: Meta-Analysis Of Randomized Controlled Trials.

Category: Pharmacotherapy

Authors: George Mina, Louisiana State University Health Science Center in Shreveport, United States; George Gobrial, Louisiana State University Health Science Center in Shreveport, United States; Kalgi Modi, Louisiana State University Health Science Center in Shreveport, United States; Paari Dominic, Louisiana State University Health Science Center in Shreveport, United States

Background: Randomized controlled trials (RCTs) show that bivalirudin decreases risk of major bleeding in patients with acute coronary syndromes (ACS) when compared to heparin and glycoprotein IIb/IIIa Catheterization and Cardiovascular Interventions DOI 10.1002/ccd. Published on behalf of The Society for Cardiovascular Angiography and Interventions (SCAI).
Methods: We searched Pubmed, Cochrane database and www.clinicaltrials.gov for RCTs that compared bivalirudin to heparin ± GPI in ACS patients undergoing invasive approach, and reported at least one of the following 30 day outcomes stratified by access site used: major bleeding; major adverse cardiovascular events (MACE); all-cause mortality; and net adverse clinical events (NACE). Pooled odds ratios (OR) and 95% confidence intervals (CI) were calculated from event rates using random effect models.

Results: We included 8 trials (27,504 patients). Radial access was used in 8,545 patients and femoral access in 18,959 patients. Compared to heparin ± GPI, there was significant reduction in the risk of major bleeding with bivalirudin in patients with femoral access (OR: 0.51, CI: 0.44-0.6, p<0.001), but not in patients with radial access (OR: 0.75, CI: 0.45-1.26, p = 0.28). There was no significant difference in MACE between bivalirudin and heparin ± GPI in femoral (OR: 1.03, CI: 0.93-1.14, p= 0.58) and radial access patients (OR: 1.07, CI: 0.89-1.3, p= 0.47). Likewise, there were no significant differences in the risk of all-cause mortality between the two anticoagulation regimens in femoral (OR: 0.96, CI: 0.75-1.24, p=0.78) and radial access patients (OR: 0.95, CI: 0.46-1.95, p=0.89). On the other hand, bivalirudin lowered NACE in femoral access patients (OR: 0.83, CI: 0.73-0.95, p=0.007) but not in radial access patients (OR: 0.88, CI: 0.73-1.06, p=0.18).

Conclusion: The bleeding lowering benefit of bivalirudin is reduced when radial access is used in ACS patients undergoing invasive approach. Therefore, heparin with or without GPI remains an acceptable alternative in those patients.

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George Mina: This author has nothing to disclose.
George Gobrial: This author has nothing to disclose.
Kalgi Modi: This author has nothing to disclose.
Paari Dominic: This author has nothing to disclose.

A-073
Title: Effect of Pretreatment with P2Y12 Inhibitors in Patients undergoing Percutaneous Coronary Intervention: A Network Meta-Analysis of Randomized Controlled Trials.
Category: Pharmacotherapy
Authors: Tilak Pasala, University of Utah, United States; Rama Dilip Gajulapalli, Cleveland Clinic, United States; Partha Sardar, University of Utah, United States; Navkaranbir S Bajaj, University of Alabama at Birmingham, United States; Anwar Tandar, University of Utah, United States; Theophilus Owan, University of Utah, United States; Frederick GP Welt, University of Utah, United States

Background: Thrombotic complications with percutaneous coronary intervention (PCI) are reduced by pretreatment with P2Y12 anti-platelets (AP). Newer APs with shorter onset of action have shown promise. We
did a network meta-analysis to compare the available APs used for pre-treatment during PCI.

Methods: We searched PubMed, The Cochrane Library, and meeting abstracts for randomized trials that compared pretreatment with anti-platelets (clopidogrel, prasugrel, ticagrelor, and cangrelor) for PCI. Endpoints (earliest available) included were: major bleeding (MB), death, major adverse cardiac events (MACE), and stent thrombosis (ST).

Results: We included 15 trials with 5 AP combinations (Figure 1A). Compared to clopidogrel, prasugrel and ticagrelor were associated with a lower odds of MACE (Figure 1B). The hierarchy for MACE (best to worst) was prasugrel, ticagrelor, cangrelor, clopidogrel and aspirin alone. Prasugrel and ticagrelor, but not cangrelor, were associated with a lower odds of death compared to clopidogrel (OR 0.61, 95% CI 0.41-0.91; OR 0.78, 95% CI 0.68-0.89; and OR 0.84, 95% CI 0.63-1.10 respectively). Prasugrel was ranked the best in reducing death (Figure 1C) and was the best option in the cluster ranking (MACE as marker of efficacy and MB as a marker of safety) (Figure 1D). All the newer APs had a lower incidence of myocardial infarction and ST compared to clopidogrel. Cangrelor had similar efficacy compared to prasugrel and ticagrelor.

Conclusion: Pretreatment with prasugrel and ticagrelor, compared to clopidogrel, reduced MACE and all-cause death in patients undergoing PCI. Cangrelor is no better than the newer oral antiplatelet agents.

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Tilak Pasala: This author has nothing to disclose.
Rama Dilip Gajulapalli: This author has nothing to disclose.
Partha Sardar: This author has nothing to disclose.
Anwar Tandar: This author has nothing to disclose.
Theophilus Owan: This author has nothing to disclose.
Frederick GP Welt: This author has nothing to disclose.

A-083
Title: Effect of Post-Primary Percutaneous Coronary Intervention Bivalirudin Infusion on Net adverse clinical events: An Updated Meta-Analysis of Randomized Controlled Trials
Category: Pharmacotherapy
Authors: Rahman shah, Veterans Affairs Medical Center, United States; John Jasper, VA Hospital, United States; Chalak Berzingi, West Virginia University, United States; Kodangudi Ramanathan, University of Tennessee, United States; Anthony Mattox, University of Tennessee health Science Center Memphis TN, United States; Abdul Rashid, Jackson Clinic, United States

Background: In primary percutaneous coronary intervention (PCI), the lower risk of bleeding with bivalirudin is counter-balanced by a greater risk of acute stent thrombosis (AST); thus yielding rates of net adverse clinical events (NACEs) similar to heparin. However, post-hoc analysis from clinical trials suggest that AST risk can be eliminated without compromising the beneficial effect on bleeding by continuing full-dose bivalirudin post-PCI. Thus, this strategy can also potentially decrease NACEs.

Methods: Three groups of patients, Biv-Full (post-PCI bivalirudin infusion at 1.75 mg/kg/h), Biv-Low (post-PCI infusion at 0.25 mg/kg/h), and Biv-No (no post-PCI infusion) were used for traditional meta-analysis using moderator analyses as well as network meta-analysis using mixed-treatment comparison models to compare the efficacy of various post-PCI bivalirudin doses on NACEs.

Results: Data from six trials and 16834 patients were analyzed. Only the Biv-Full group experienced lower NACEs rates than heparin-treated patients at 30 days (RR: 0.56, 95% CI: 0.39–0.79; p=0.001). Similarly, in mixed-treatment models, the Biv-Full group experienced lower rates of NACEs rates than those receiving any of three other anticoagulation strategies (Fig 2A). This strategy had a 99% probability of being ranked the best therapy (Fig 3A). At treatment ranking Biv-Full group was also the best therapy for cardiovascular mortality benefit (Fig 3B).
Conclusion: In primary PCI, continuing full-dose bivalirudin infusion 3-4 hours post-procedure decreases NACEs rate and possibly cardiovascular morality, compared to heparin.

Disclosures:
Rahman shah: This author has nothing to disclose.
John Jasper: This author has nothing to disclose.
Chalak Berzingi: This author has nothing to disclose.
Kodangudi Ramanathan: This author has nothing to disclose.
Anthony Mattox: This author has nothing to disclose.
Abdul Rashid: This author has nothing to disclose.

A-085
Title: Etiology, Location and Severity of Gastrointestinal Bleeding in Patients on Dual Antiplatelet Therapy
Category: Pharmacotherapy
Authors: Arslan Shaukat, The University Of Kansas Medical Center, United States; Salman Waheed, The University Of Kansas Medical Center, United States; Ethan Alexander, The University Of Kansas Medical Center, United States; Daniel Washko, The University Of Kansas Medical Center, United States; Buddhadeb Dawn, The University Of Kansas Medical Center, United States; Mojtaba Olyaee, The University Of Kansas Medical Center, United States; Kamal Gupta, The University Of Kansas Medical Center, United States

Background: While dual antiplatelet therapy (DAPT) is associated with increased risk of gastrointestinal bleeding (GIB), little is known about the specific etiologies, location and severity of bleeding. We aim to examine the etiology, location and severity of GIB in patients on DAPT.

Methods: We randomly identified 101 patients on DAPT between Jan 2007 and June 2015 with first documented episode of GIB since DAPT initiation, and who underwent EGD or colonoscopy. We excluded those on anticoagulants. The causes of GIB were presented as proportions. BARC bleeding type and absolute drop in hemoglobin were used as markers of GIB severity. T-test and χ² were used to compare severity by location of GIB (upper vs lower).

Results: Mean age was 69 years (60% males). 53 patients had upper and 48 had lower GIB. Peptic ulcer disease (PUD) was the most common cause of GIB, followed by diverticulosis, as shown in the figure. The average drop in hemoglobin was 2.7 g/dl with the highest decrease in those with AV malformations (4.0) followed by varices (3.5) and PUD (3.4). Overall, those with upper GIB had a greater drop in hemoglobin than those with lower GIB (3.04 vs. 2.5, p=0.01). In terms of BARC bleeding type, 49.1% with upper GIB had type 3 bleeding compared to 29.2% with lower GIB (p=0.03).

Conclusion: Upper and lower GIB is equally prevalent in patients on DAPT, with PUD and diverticulosis being the most common causes. Overall severity of bleeding is greater with upper than lower GIB with the highest bleeding from AV malformations, varices and PUD.

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Arslan Shaukat: This author has nothing to disclose.
Salman Waheed: This author has nothing to disclose.
Ethan Alexander: This author has nothing to disclose.
Daniel Washko: This author has nothing to disclose.
Buddhadeb Dawn: This author has nothing to disclose.
Mojtaba Olyaee: This author has nothing to disclose.
Kamal Gupta: This author has nothing to disclose.

QUALITY IMPROVEMENT
B-007
Title: Percutaneous Coronary Intervention Outcomes in America’s Safety Net - A study of NCDR
Category: Quality Improvement
Authors: Tushar Acharya, UCSF Fresno, United States; Kevin Kennedy, Saint Luke’s Mid America Heart Institute, United States; John A. Spertus, Mid America Heart Institute and University of Missouri-Kansas City, United States; Kevin F. Kennedy, UMKC Saint Luke Hospital Mid America Heart Institute, United States; John A. Spertus, UMKC Saint Luke Hospital Mid America Heart Institute, United States; H. Kiran K. Reddy, UCSF Fresno, United States; Amarbir Bhullar, UCSF Fresno, United States; Adam C. Salisbury, UMKC Saint Luke Hospital Mid America Heart Institute, United States; John A. Ambrose, UCSF Fresno, United States

Background: Safety-net hospitals (SNHs) treat a disproportionate share of uninsured and underinsured patients with unmeasured risk, limited health care access and poorer outcomes, including higher mortality.
Risk-adjusted percutaneous coronary intervention (PCI) outcomes of SNHs are unknown.

**Methods:** Using the NCDR CathPCI registry from 2009 to 2015, we analyzed 3,746,961 patients who underwent PCI at 282 SNHs (hospitals where ≥10% of PCI patients were uninsured) and 1,134 non-SNHs. The relationship between SNH status and risk-adjusted outcomes was assessed using multivariable logistic regression.

**Results:** SNHs were more likely to be lower volume, rural hospitals located in the southern states. Patients treated at SNHs were younger, more often non-white and smokers. These patients were more frequently admitted from the emergency department (48% vs 38%; P < 0.001), and were more likely to receive primary PCI for STEMI (20% vs 14%; P < 0.001) than patients at non-SNHs. Patients undergoing PCI at SNHs had higher risk-adjusted in-hospital mortality (OR 1.21; 95% CI 1.18-1.24; P < 0.001) and bleeding (OR 1.03; 95% CI 1.01-1.04; P < 0.001) rates, though absolute risk differences between groups were small (0.4% and 0.5%, respectively). Risk-adjusted acute kidney injury rates (OR 1.01; 95% CI 0.99-1.02; P = 0.41) were similar. Patients treated at SNHs had higher observed to expected (O/E) mortality risk (1.20 vs 0.99; P < 0.001) and similar O/E bleeding (1.09 vs 1.06; P = 0.157) and AKI (0.96 vs 0.93; P = 0.259) risk.

**Conclusion:** Despite treating a higher proportion of uninsured patients with more acute presentations, risk-adjusted PCI-related outcomes of SNHs are statistically higher but clinically similar to patients treated at non-SNHs. These findings are reassuring, indicating that America’s PCI safety net is intact. Discrepant O/E mortality ratio could represent mis-calibration of the model and warrants further study.

**Disclosures:**
Tushar Acharya: This author has nothing to disclose.
Kevin Kennedy: This author has nothing to disclose.
John A. Spertus: This author has nothing to disclose.
Kevin F. Kennedy: This author has nothing to disclose.
John A. Spertus: This author has nothing to disclose.
H. Kiran K. Reddy: This author has nothing to disclose.
Amarbir Bhullar: This author has nothing to disclose.
Adam C. Salisbury: This author has nothing to disclose.
John A. Ambrose: This author has nothing to disclose.

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**Title:** Percutaneous Coronary Intervention Registry One Year Audit Along With Comparison of NCDR Predicted and Observed Mortality in a Developing Country

**Category:** Quality Improvement

**Authors:** Saba Aijaz, Tabba Heart Institute, Karachi, Pakistan; Asad Z. Pathan, Tabba Heart Institute, Karachi, Pakistan; Rehan Malik, Tabba Heart Institute, Karachi, Pakistan; Shakir Lakhani, Tabba Heart Institute, Karachi, Pakistan; H. Kiran K. Reddy, Tabba Heart Institute, Karachi, Pakistan; John A. Spertus, Tabba Heart Institute, Karachi, Pakistan; Amarbir Bhullar, Tabba Heart Institute, Karachi, Pakistan; Adam C. Salisbury, Tabba Heart Institute, Karachi, Pakistan; John A. Ambrose, Tabba Heart Institute, Karachi, Pakistan

**Background:** A comprehensive Cath and Percutaneous coronary interventions (PCI) registry is maintained for over 03 years at our cardiac care facility. This abstract is based on one year audit of both elective and emergent PCIs done in our setup and compares actual mortality to predicted mortality from NCDR risk.

**Methods:** 1227 patients underwent PCI during one year. 379 (30.9%) were elective and 848 (68.1%) were emergent or salvage including 51 (4.1% of all PCIs) with cardiogenic shock. 82.2% were males. 53.8% had single vessel Coronary artery disease (CAD), 2.5% had left main CAD and rest were multi vessel CAD.

**Results:** Total 1671 lesions were treated most of which were Non High Non C (75.5%). PCI Success rate was 94.6%. Post PCI bleeding occurred in <1%, same admission CABG in 0.3% and Stent thrombosis in 1.3%. There were 43(3.5%) in hospital deaths overall (Table.1) Salvage PCIs had highest mortality (11/16, 68.8%) while elective PCIs had none. 1065 patients could be matched to scenarios in Appropriate use criteria (AUC) for PCI. 70.8% procedures were rated as appropriate, 28.9% as uncertain and 1.0% as inappropriate.

**Conclusion:** In this non-US single center registry, overall PCI mortality is higher than predicted by the NCDR PCI risk score particularly in the ACS patients. Majority of the PCI indications were appropriate by the AUC. There is variability in individual operator outcome in different risk category patients.

**Disclosures:**
Saba Aijaz: This author has nothing to disclose.
Asad Z. Pathan: This author has nothing to disclose.

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**Table 1 Observed versus predicted mortality of patients undergoing PCI.**

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<th>Overall</th>
<th>Individual Operator Results</th>
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<tr>
<td></td>
<td>Overall</td>
<td>Individual Operator Results</td>
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<tr>
<td></td>
<td></td>
<td>Actual N (%)</td>
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<tr>
<td>In Hospital Mortality</td>
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<td>43 (3.5)</td>
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<td>STEMI deaths</td>
<td>37 (8.0)</td>
<td>5.4</td>
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<tr>
<td>Presenting &lt;12Hrs of onset</td>
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<td>26 (11.8)</td>
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<td>• with shock</td>
<td>17 (51.5)</td>
<td>27.3</td>
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<tr>
<td>• without shock</td>
<td>9 (48)</td>
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<td>26 (50.9)</td>
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Catheterization and Cardiovascular Interventions DOI 10.1002/ccd. Published on behalf of The Society for Cardiovascular Angiography and Interventions (SCAI).
B-023

Title: Zero Percent Inappropriate Rates for Percutaneous Coronary Intervention are Achievable and Sustainable at One Year With a Multifaceted Quality Improvement Initiative

Category: Quality Improvement

Authors: Lyndon Box, West Valley Medical Center, United States; Robert Duerr, St. Lukes Cardiology Associates, United States; Karen Dey, St. Lukes Cardiology Associates, United States

Catheterization and Cardiovascular Interventions DOI 10.1002/ccd. Published on behalf of The Society for Cardiovascular Angiography and Interventions (SCAI).

Background: Appropriate Use Criteria Scores for percutaneous intervention (AUC-PCI) scores both a controversial and highly visible quality metric. Despite reservations, interventional cardiologists and hospitals are being judged on their scores. Effective strategies for improving AUC-PCI scores are needed.

Methods: We reviewed all cases identified as inappropriate by the NCDR Cath-PCI registry during the prior year. We then designed a multifaceted interventions targeting the root causes (table 1). The evaluated outcome metrics were percentage change for AUC scores, prior stress imaging, non-obstructive disease and PCI volume.

Results: From 2012 Quarter 2- 2013 Quarter 1 (2012Q2-2013Q1) the overall inappropriate PCI rate was 1.7%; for acute coronary syndrome (ACS) 1.05% and for Non-ACS 12.5%. The root causes were clinical practice patterns and documentation. Multiple interventions were implemented over 6 months. For 2014Q1-2014Q4 there were 0.0% inappropriate PCI. The PCI volume increased by 5.35%; stress testing increased by 5.1% and the rate of non-obstructive disease increased by 1.5%.

Conclusion: Our experience demonstrates that 0.0% inappropriate PCI rates are not only achievable, but can be sustained for one year. This requires a multifaceted approach addressing the multiple possible causes of inappropriate PCI in parallel. It also demonstrates that the performance improvement cycle with this type of intervention can be rapid as our results were achieved within months. Secondly, there was an increase in stress testing and PCI volume without a change in the rate of non-obstructive disease.

Disclosures:
Lyndon Box: This author has nothing to disclose.
Robert Duerr: This author has nothing to disclose.
Karen Dey: This author has nothing to disclose.
(4.1%), comprehension, 2 (2.7%), study-required follow up, 14 (19.2%),
wanted nothing new, 5 (6.8%), past experience, 3 (4.1%), uninterested,
23 (31.5%) or other, 6 (8.2%). During 592 of 859 consenting attempts
(68.9%), someone else was in the room at the time of consent. Among
those, the presence of someone else impacted the patient’s decision
to participate 49 times (8.3%; 1-convinced the patient not to participate;
48-convincing the patient to participate).

Conclusion: Disinterest in research, fear/anxiety and not wanting to
attend follow up visits were the primary deterrents for study participa-
The presence of someone else in the room at the time of consent
had little influence on a patient’s decision to decline participation. The
GMC cardiovascular research team has an effective system in place for
screening and approaching patients to consent for research with a 91.5%
participation rate.

Disclosures:
Brian Burgess: This author has nothing to disclose.
Paul Berry: This author has nothing to disclose.
Nicole Flaugh: This author has nothing to disclose.
Melissa Troup: This author has nothing to disclose.
Yvette Henry: This author has nothing to disclose.
Susan Kilbride: This author has nothing to disclose.

B-003
Title: Prospective Establishment of Radiation Dose Benchmarks
in Pediatric Cardiac Catheterization: A Multi-Center Study by
C3PO-QI
Category: Quality Improvement
Authors: Priscila Cevallos, Children’s Hospital, Boston, United
States; Aimee Armstrong, Nationwide Children’s Hospital, United
States; Andrew C Glatz, Children’s Hospital of Philadelphia, United
States; Bryan Goldstein, Cincinnati Children’s Hospital Medical Center,
United States; Todd Gudausky, Children’s Hospital of Wisconsin, United
States; Ryan Leahy, Kosair Children’s Hospital, United States; Chris
Petit, Children’s Healthcare of Atlanta, United States; Shabana Shahanavaz,
St. Louis Children’s Hospital, United States; Sara Trucco, The
Children’s Hospital Of Pittsburgh, United States; Lisa Bergersen, Child-
ren’s Hospital, Boston, United States

Background: Congenital Cardiac Catheterization Project on Out-
comes – Quality Improvement (C3PO-QI), a multi-center registry,
defined initial radiation dose benchmarks retrospectively across common
interventional procedures. These data facilitated a dose metric endorsed
by the American College of Cardiology in 2014. However, benchmarks
need to be adjusted periodically to account for improvements resulting
in reductions in radiation dose.

Methods: Data were collected prospectively from 9 C3PO-QI institu-
tions with complete dataset capture between 1/1/2014 and 6/30/2015. Radiation
was measured in total air kerma (mGy), dose area product
(DAP) (µGy*cm²) and fluoroscopy time (min), and reported by age
group as median, 75th and 95th percentile for the following 6 interventional
procedures: 1) atrial septal defect (ASD) closure; 2) aortic valvuloplasty
(AV); 3) treatment of coarctation of the aorta (COA); 4) patent ductus
arteriosus (PDA) closure; 5) pulmonary valvuloplasty (PV); and 6) trans-
catheter pulmonary valve (TPV) implantation.

Results: 1080 out of 11,393 unique cases in the registry were
recorded in an 18 month contemporary time interval. While radiation ex-
posure varied by age group, a linear correlation was not observed. Radio-
ation doses were lowest for PDA closure (age 1-4 yrs, mGy: median 57,
75th% 111, 95% 244; DAP: median 366, 75% 690, 95% 1520) and
highest in TPV implantation (age >15yrs, mGy: median 1917, 75% 3580, 95% 6811; DAP: median 18971, 75% 31434, 95% 67503).

Median radiation dose benchmarks decreased for all procedures com-
pared to those reported previously. The greatest decrease was seen in
TPV implantation (median reduced by 766 mGy and 8803 DAP). The
lowest exposure procedures, AV, PDA closure and PV, exhibited the
smallest decrease in radiation doses. These decreases in radiation expo-
sure were observed in this cohort without observed changes in median
fluoroscopy time.

Conclusion: This is the first prospective multi-center study to estab-
lish procedure-specific radiation dose benchmarks to reflect recent QI
efforts. These benchmarks can be applied to quality measurement among
institutions performing pediatric cardiac catheterization procedures for
congenital heart disease.

Disclosures:
Priscila Cevallos: This author has nothing to disclose.
Aimee Armstrong: This author has nothing to disclose.
Andrew C Glatz: This author has nothing to disclose.
Bryan Goldstein: This author has nothing to disclose.
Todd Gudausky: This author has nothing to disclose.
Ryan Leahy: This author has nothing to disclose.
Chris Petit: This author has nothing to disclose.
Shabana Shahanavaz: This author has nothing to disclose.
Sara Trucco: This author has nothing to disclose.
Lisa Bergersen: This author has nothing to disclose.

B-004
Title: Does predicting bleeding risk change utilization of bleeding
avoidance strategies?
Category: Quality Improvement
Authors: Jayasheel Eschol, University of Iowa Hospitals & Clinics,
United States; Jayasheel Eschol, University of Iowa Hospitals & Clinics,
United States; Saket Girotra, University of Iowa Hospitals & Clinics,
United States; Alyssa Haight, University of Iowa Hospitals & Clinics,
United States; Phillip Horwitz, University of Iowa Hospitals & Clinics,
United States

Background: Although bleeding after percutaneous coronary interven-
tion (PCI) is common and associated with worse outcomes, bleeding avoid-
ance strategies (BAS – radial access, use of bivalirudin) are paradoxically
used with greater frequency in low risk patients who are least likely to bene-
fit. We hypothesized that pre-procedural bleeding risk assessment will
improve appropriate use of BAS and reduce bleeding events.

Methods: We incorporated the NCDR CathPCI bleeding risk score
in our cath lab workflow on Mar 1, 2015. We compared clinical char-
acteristics, use of BAS, and bleeding events on all PCIs performed dur-
ing 15 months prior to, and 5 months after the implementation of
the tool.

Results: 692 patients were included in the pre- and 165 patients in
the post-implementation cohort. Post-implementation, the bleeding risk
tool was completed in 65% of cases. Details of the patient characteristics
and outcomes are in Table 1. Use of radial access increased from 48% to
61%, with the greatest increase in high-risk patients. In contrast there
was a significant reduction in the use of bivalirudin from 31% to 9%,
including among patients at high-risk of bleeding. Although patients
were at a higher risk of bleeding during the post-implementation period,
incidence of bleeding was similar.

Conclusion: Routine bleeding risk assessment improved the appropri-
ate use of BAS, reversing the risk-treatment paradox.

Disclosures:
Jayasheel Eschol: This author has nothing to disclose.
Jayasheel Eschol: This author has nothing to disclose.

Cardiovascular Interventions DOI 10.1002/ccd. Published on behalf of The Society for Cardiovascular Angiography and Interventions (SCAI).
Title: Validation of digital ankle-brachial index as a screening tool in symptomatic patients with peripheral arterial disease

Category: Quality Improvement

Authors: Deepakraj Gajanana, Albert Einstein Medical Center, United States; Subroto Acharjee, William Beaumond Hospital, United States; Vikas Bhalla, Albert Einstein Medical Center, United States; Pradhum Ram, Albert Einstein Medical Center, United States; Vincent Figueredo, Albert Einstein Medical Center, United States; D Lynn Morris, Albert Einstein Medical Center, United States; Sean Janzer, Albert Einstein Medical Center, United States; Jon George, Albert Einstein Medical Center, United States

Background: There is scarcity of data validating portable digital ankle-brachial index (ABI) with contrast angiography in peripheral arterial disease (PAD). The aim of this study was to provide an objective analysis of the relationship between digital ABI (dABI) and peripheral angiographic data.

Methods: Consecutive patients with symptoms of PAD between May 2014 to May 2015 at Einstein Medical Center, Philadelphia who were undergoing simultaneous dABI and peripheral angiography were evaluated. Patients with prior peripheral intervention were excluded. Measurements were made using the FloChec Digital ABI system (Bard) with a finger clamp placed initially on the patient finger, and subsequently on toes prior to the scheduled peripheral angiogram. ABI less than 0.92 was considered abnormal. Angiographic lesion greater than 50% was considered significant.

Results: The final cohort consisted of 51 patients. 102 limbs from same patients were included in the analysis. Mean age was 68.8 ± 9.5 years with 51% being male. African Americans comprised 68% of the cohort. Aorto-iliac accounted for 13% of the total lesions, while femoropopliteal comprised 55% and remainder 32% with diffuse multi-level disease. The prevalence of PAD was 75%. The Flochech digital ABI had a sensitivity of 84% and specificity of 48%. The positive predictive value was 84%. The area under the receiver operating characteristic (ROC) curve was 0.74(p=0.007). On multivariate analysis adjusted for diabetes, hypertension, coronary artery disease, smoking, Flochech digital ABI was still an independent predictor of PAD, Odds ratio 6.8(2.3-20.6, p=0.001).

Conclusion: PAD is still an underdiagnosed and undertreated entity. A portable, point-of-care digital ABI system can be used as a valuable, simple, cost-effective and reliable screening tool with high sensitivity and accuracy. To date, ours is the first study validating Flochech digital ABI with the gold standard angiographic data.

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Deepakraj Gajanana: This author has nothing to disclose.
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Sean Janzer: This author has nothing to disclose.
Jon George: This author has nothing to disclose.
B-041

Title: Inter-observer Variance in Appropriate Use Criteria Testing in Patients with Advanced Coronary Artery Disease

Category: Quality Improvement

Authors: Cyrus Hadadi, Geisinger Medical Center, United States; Kristen Forster, Geisinger Health System, United States; Kishore Harjai, Geisinger Wyoming Valley Medical Center, United States

Background: The American College of Cardiology Foundation and other cardiovascular societies have developed appropriate use criteria (AUC) to assist decision makers evaluating coronary revascularization. Key decision points reflect the importance of clinical presentation and angina severity. Different specialists may characterize identical patient presentations as different AUC scenarios. Only limited data on observer variability for AUC exist, and the guidelines in their current format may not be ready for widespread adoption as quality improvement tools.

Methods: In this ongoing single-center registry, we assessed chronic total occlusion (CTO) revascularization in a consecutive series of cases. From 8/2014 to 7/2015, 56 CTO lesions in 54 patients were included. All lesions were located in a vessel with diameter >2.5 mm without a patent bypass graft. Patient presentations were independently analyzed by 2 cardiologists. Prior to evaluating the 56 CTO lesions included in this study, the cardiologists had completed a separate training set of 10 lesions. Identified CTO lesions were evaluated using the 2013 AUC consensus document. Each cardiologist recorded clinical findings and final AUC assessment. Results were analyzed to evaluate determined clinical scenario and AUC concordance. Inter-observer variance was calculated as percent agreement, unweighted kappa and intra-class correlation coefficient (ICC).

Results: The inter-observer percent agreement of CTO revascularization appropriateness was 30%, which represents poor agreement (κ = 0.014; ICC = 0.069, p < 0.01). If appropriateness is stratified into 2 categories of “Appropriate” and “May be appropriate,” versus “Rarely appropriate” and “Unclassifiable,” percent agreement improves to 66%, which represents slight agreement (κ = 0.116; ICC = 0.118, p < 0.01).

Conclusion: In a substantial number of patients the application of AUC is observer-dependent. Differences of opinion regarding patient presentation and characteristics contributed to inter-observer disagreement regarding the appropriateness of CTO revascularization. The significance of these differences is important to explore as AUC are applied to an increasing number of clinical decisions.

Disclosures:
Cyrus Hadadi: This author has nothing to disclose.
Kristen Forster: This author has nothing to disclose.
Kishore Harjai: This author has nothing to disclose.

B-043

Title: Adherence to Radiation Safety in the Cardiac Catheterization Laboratory (CCL). How good are we? An observational study.

Category: Quality Improvement

Authors: Syed Ali Hamid, Christiana Care Health System, United States; Kyle Plusch, University of Delaware, United States; Andrea Hammond, University of Georgia, United States; Andrew Doorey, Christiana Care Health System, United States

Background: Fluoroscopy exposes personnel to harmful ionizing radiation in the catheterization lab. There has been increasing concern for malignancies, in particular intracranial tumors, in interventionalists. We sought to assess current compliance with accepted radiation safety techniques and to identify areas for minimizing radiation exposure for cath lab personnel.

Methods: An observational study was conducted by trained investigators in the cardiac catheterization lab. 13 interventional cardiologists were observed from June 2015 to August 2015 for a total of 101 cases. Data collected pertained to location of the image intensifier (LI) during image acquisition (whether touching the sterile field or otherwise being close to the patient as possible). Cranial angulations in which the LI was close to the patient’s face were excluded from analysis). Effective utilization of the ceiling mounted lead shield (defined as some part of the lead shield touching the patient’s body), the position of the LI during catheter exchanges, the performance of a step back while obtaining cine images, average fluoroscopy time, average Air Kerma (AK) and dose-area-product (DAP). The cath lab staff and interventionalists were aware that the nature of the study was to assess best practices for radiation protection.

Results: The LI was noted to be touching the patient in only 50% of cine/fluoro runs. The upper body lead shield was noted to be touching the patient only 64% of the time. 76.4% of catheter exchanges were performed in the anteroposterior position. A step back approach while acquiring cine capture was performed only 5.8% of the time. The average fluoro time was 11.5 min. Average AK and DAP were 585 mGy and 40912 mGycm2 respectively.

Conclusion: Simple methods to reduce radiation exposure to CCL staff members are often not used. Catheterization procedures are often complex with many physiologic and clinical parameters being monitored. Excessive radiation exposure is a ‘silent’ enemy and easy to overlook. It is imperative that all clinicians and staff in the CCL be trained to recognize and utilize all radiation safety equipment available to minimize ionizing radiation exposure, to reduce the possibility of adverse events that could result otherwise.

Disclosures:
Syed Ali Hamid: This author has nothing to disclose.
Kyle Plusch: This author has nothing to disclose.
Andrea Hammond: This author has nothing to disclose.
Andrew Doorey: This author has nothing to disclose.

B-047

Title: Utilizing mobile technology to improve communication-the EASE app

Category: Quality Improvement

Authors: Karen Iacono, The Heart Center at Arnold Palmer Hospital for Children, United States; Hamish Munro, The Heart Center at Arnold Palmer Hospital for Children, United States; Kevin de la Rosa, The Heart Center at Arnold Palmer Hospital for Children, United States; Nykanen David, The Heart Center at Arnold Palmer Hospital for Children, United States

Background: Parents of children are naturally very anxious during any operative procedure. We sought to utilize current smartphone technology to explore how this could be improved utilizing an application called EASE (Electronic Access to Surgical Events). This application updates families of patients undergoing cardiac interventions utilizing text, photo and video.

Methods: All parents of children undergoing cardiac catheterization were offered use of an application on their smart phone, or one provided to them during their child’s procedure to receive one way communication with the staff in the laboratory on the condition of their child via text message, video or photographs at a minimum of every 30 minutes. All parents who utilized the EASE Application during their child’s cardiac catheterization were surveyed after utilizing the application.

Catheterization and Cardiovascular Interventions DOI 10.1002/ccd. Published on behalf of The Society for Cardiovascular Angiography and Interventions (SCAI).
Results: The study cohort includes 118 patients that underwent cardio-vascular interventions and utilized the EASE application, 99% of the parents reported they would use this application if they themselves or their loved one required future medical procedures. 97% said the texts, photos and videos were appropriate, and 74% reported that the availability of EASE would influence their choice of hospital should they themselves, or a loved one require future surgery or intervention. 97% of all families surveyed felt they were more at EASE with the use of this application and found it superior to traditional ways of updating them during invasive procedures. Overall, the app was rated 9.9/10 for overall experience with the EASE application.

Conclusion: Families found that use of the EASE application during cardiac interventions is an effective and superior supplement to the use of traditional methods of communicating with families during invasive cardiac catheterizations.

Disclosures:
Karen Iacono: This author has nothing to disclose.
Hamish Munro: 4 EASE
Kevin de la Rosa: 4 EASE
Nykanen David: This author has nothing to disclose.

B-050

Title: Successful Implementation of an IVC Filter Retrieval Quality Initiative in the Non-trauma Population by a Cardiology-Based Group

Category: Quality Improvement

Authors: Michael Jolly, OhioHealth Heart & Vascular Physicians, United States; John Phillips, OhioHealth Heart & Vascular Physicians, United States; Charles Botti, OhioHealth Heart & Vascular Physicians, United States; Mitchell Silver, OhioHealth Heart & Vascular Physicians, United States; Raghu Kolluri, OhioHealth Heart & Vascular Physicians, United States; Jeanette Piper, OhioHealth Riverside Methodist Hospital, United States; Paula Burt, OhioHealth Riverside Methodist Hospital, United States; Katherine Love, OhioHealth Riverside Methodist Hospital, United States; Gary Ansel, OhioHealth Heart & Vascular Physicians, United States

Background: Inferior vena cava filter placement (IVCFP), both permanent and prophylactic, have proven useful but with suboptimal efficacy and increased long term complications due to poor retrieval rates (IVCFR). Low rates of IVCFR led the Federal Drug Administration to issue formal communications in 2010 and 2014 regarding physician responsibility. We report the one year results of a quality initiative to increase the rates of IVCFR by cardiologists with peripheral vascular training at our institution.

Methods: The cardiology and vascular team at our institution created a quality initiative for IVCFR early in 2014. This included the development of an informational patient contract, signed by the patient prior to IVCFP, development of a prospective registry for follow-up, automatic IVCFR scheduling, and a system for certified letter documentation for episodes of continued noncompliance regarding removal.

Results: 163 patients (pts) underwent removable IVCFP from 1/1/14 through 12/31/15. Three expired in the first year (2.1%), unrelated to filter placement. Filters were intentionally placed permanently in 16/163 (6.1%). IVCFR was attempted in 142 pts, successfully in 140 (98.6%), and unsuccessfully in two (1.4%). Therefore, of the 147 filters placed with the intention of later retrieval, 95% underwent successful IVCFR. One patient transferred care to another hospital system, and one remains noncompliant with follow-up. There were no complications during IVCFR.

Conclusion: Due to low retrieval rates and increased reports of complications, IVCFR has become an important topic. However, with physician commitment and strong institutional support, rates of IVCFR can be dramatically increased over current low nationwide levels in the non-trauma patient population.

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Michael Jolly: This author has nothing to disclose.
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Jeanette Piper: This author has nothing to disclose.
Paula Burt: This author has nothing to disclose.
Katherine Love: This author has nothing to disclose.
Gary Ansel: 9 Bard Medical - Advisory Board

B-072

Title: Regional Variation in Management and Outcomes of ST-Elevation Myocardial Infarction with Cardiogenic Shock across the United States

Category: Quality Improvement

Authors: Nileshkumar J Patel, University Of Miami - Miller School Of Medicine; Jason Hsu, University Of Miami Hospital; Badal Thakkar, Baylor Heart and Vascular Hospital; Dallas, TX, United States; Nileshkumar J Patel, University Of Miami Hospital; United States; California; United States; Abhishek Desmukh, Mayo Clinic; Rochester, MN, United States; Carlos Alfonso, University Of Miami School Of Medicine; United States; Mauricio Cohen, University Of Miami Miller School Of Medicine; United States; Gregg C. Fonarow, University Of California at Los Angeles, United States; Deepak Asti, Staten Island University Hospital, United States; Apurva O. Badheka, The Everett Clinic, United States; John Phillips, OhioHealth Heart & Vascular Physicians, United States; 4 EASE

Background: Previous studies have demonstrated a regional paradox (worse outcomes in regions with higher revascularization rates) in the outcomes of ST-elevation myocardial infarction (STEMI). The purpose of this study was to evaluate if such a regional difference in revascularization rates and paradox in outcomes exist for STEMI patients with cardiogenic shock (CS) (high-risk group).

Methods: The Nationwide Inpatient Sample (NIS) database was analyzed from 2001-2012 to identify all patients ≥40 years of age with a principal discharge diagnosis of STEMI who developed CS. All admissions were divided into 4 groups according to the region: Northeast (NE), Midwest (MW), South, and West. Multivariable hierarchical mixed effect models were used to identify differences in treatment choice [medical therapy, thrombolysis, percutaneous coronary intervention (PCI), and coronary artery bypass grafting (CABG)] and in-hospital mortality among the 4 regions.

Results: Out of 201,420 STEMI patients age ≥40 years who had CS (8.3% of all STEMI cases), 58.4% received PCI, 10.6% received CABG, 3.5% received thrombolysis, and 27.5% were treated medically. The revascularization rates in MW (PCI: 63.3%; CABG: 9.3%), South (PCI: 59.1%; CABG: 11.4%), and West (PCI: 58.7%; CABG: 10.8%) were significantly higher (p<0.001) compared with the NE (PCI: 50.3%; CABG: 10.5%). Overall risk-adjusted in-hospital mortality rates were lower in MW (OR 0.79; 95% CI: 0.67 – 0.94), South (OR 0.87; 95% CI: 0.74 – 1.02), and West (OR 0.76; 95% CI: 0.64 – 0.92), compared with NE. When stratified according to treatment choice, risk-adjusted

Disclosures:
John Phillips: This author has nothing to disclose.
Nileshkumar J Patel: 4 EASE
in-hospital mortality for PCI was higher in South (OR 1.19; 95% CI: 1.05-1.34) and West (OR 1.17; 95% CI: 1.03-1.33) compared with NE, and similarly, for CABG, it was higher in South (OR: 1.73; 95% CI: 1.12-2.65) compared with NE.

**Conclusion:** There are regional differences in the treatment choice and in-hospital mortality for STEMI patients with CS. In NE region, the revascularization rate is lower and the overall risk-adjusted in-hospital mortality is higher compared with the other regions, without evidence of a regional paradox.

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Nileshkumar J Patel: This author has nothing to disclose.
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Mauricio Cohen: 9 Honoraria: Abiomed, Accumed, Astra Zeneca, Medtronic, Merit Medical, Terumo Medical; Clinical Trial Enroller: Reprise III, Harmonie
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**B-075**

**Title:** Building a Vein Practice in Rural Academic Teaching Hospital from ground up: Important Role of SCAI Cardiovascular Professionals

**Category:** Quality Improvement

**Authors:** Arvind Venkateshwaran, University Of Texas Health Center Of Tyler, United States; Renee Killian, University Of Texas Health Center Of Tyler, United States; Emily Parker, University Of Texas Health Center Of Tyler, United States; Sridevi Pitta, University Of Texas Health Center Of Tyler, United States

**Background:** East Texas is historically a medically underserved region of Texas with a huge rural population and venous disease is often overlooked in the community. The ability to treat peripheral venous disease along with arterial disease led the hospital to establish a Vein Clinic within the cardiovascular division.

**Methods:** A team of three CardioVascular Professionals (CVP) worked closely with the interventional cardiologist to establish the business plan. The CVP team worked together with physicians, administration and clinical staff to identify referral mechanisms, and create the operational workflow for the clinic for consults and procedures (Fig). The team took best practices from SCAI QIT and modified it to apply for the Vein Clinic. A dashboard consisting of clinical and business indicators was created. The team used Lean Six Sigma principles to make the operations more efficient. Intervention cardiologist began screening
patients having symptoms of varicose veins, 6 months prior to the start date for the clinic.

**Results:** During the second quarter of 2015 after successful implementation, the clinic began performing RF-ablation procedures in an outpatient setting. Under six months since inception, the clinic achieved breakeven point by performing 77% of the forecasted procedures.

**Conclusion:** This initiative of integrating a vein practice into cardiovascular care demonstrates the important role played by SCAI-CVP in engaging as a whole team and working together to advance the services of the institution and giving distinct edge to cardiologists in providing comprehensive cardiovascular care.

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Arvind Venkateshwaran: This author has nothing to disclose.
Renee Killian: This author has nothing to disclose.
Emily Parker: This author has nothing to disclose.
Sridevi Pitta: This author has nothing to disclose.

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**B-081**

**Title:** Improving Regional Radiation Safety in the Cardiac Catheterization Laboratory - The Northern New England Experience

**Category:** Quality Improvement

**Authors:**
Alina Robert, Dartmouth Hitchcock Medical Center, United States; Yi-Ling Huang, Dartmouth Hitchcock Medical Center, United States; Peter Ver Lee, Eastern Maine Medical Center, United States; James Flynn, Catholic Medical Center, United States; Andrew Eisenhauer, Central Maine Medical Center, United States; Stacy Shelto-Smith, Concord Hospital, United States; David Butzel, Maine Medical Center, United States; Thomas Ryan, Maine Medical Center, United States; Prospero Gogo, Fletcher Allen Health Care, United States; David Malenka, Dartmouth Hitchcock Medical Center, United States

**Background:** Population exposure from medical radiation increased nearly six fold in the past decades, in part due to increased number and complexity of cardiovascular procedures. Single centers successfully implemented recommendations to reduce radiation exposure in the cardiac catheterization laboratories (CCLs). We aimed to improve radiation safety at the regional level by implementing uniform radiation safety practices in the Northern New England (NNE).

**Methods:** In October, 2013 we proposed a set of interventions to implement across the NNE: reporting similar radiation measurements, optimization of fluoroscopy settings, intra-procedure notification at high doses, patient notification of significant exposure, and development of a regional education program. We performed site visits, periodically contacted individual sites, reviewed imaging practices, analyzed radiation metrics, and provided updates at regional meetings.

**Results:** Significant variation in radiation safety practices and metrics exist among NNE CCLs (Fig 1). After two years all labs consistently measured and reported fluoroscopy time and air kerma, optimized fluoroscopy dose and frame rate to lowest possible settings, and implemented intra-procedure notifications. Work continues to adopt a patient notification letter for significant exposures and to develop a regional radiation safety education program.

**Conclusion:** Evidence based recommendations to improve radiation safety in the cardiac catheterization laboratory were successfully implemented across multiple institutions. We suggest that our experience can be duplicated at state and national levels.

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Alina Robert: This author has nothing to disclose.
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Peter Ver Lee: This author has nothing to disclose.
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**B-088**

**Title:** Trends in Utilization and Complications of Endomyocardial Biopsy in Non-Transplant Recipients: Results From The National Inpatient Sample (NIS) Database

**Category:** Quality Improvement

**Authors:** Zubair Shah, The University Of Kansas Medical Center, United States; Reza Masoomi, The University Of Kansas Medical Center, United States; Buddhadeb Dawn, The University Of Kansas Medical Center, United States; Kamal Gupta, The University Of Kansas Medical Center, United States

**Background:** We investigated recent trends in the performance of endomyocardial biopsy (EMB) and subsequent in-hospital major complications related to this procedure.

**Methods:** We performed an analysis of the NIS database (2008 to 2012) for patients who underwent EMB procedure. Various demographic parameters and complications related to this procedure were examined. We excluded patients with diagnosis of cardiac transplant. To identify
any true discrepancy, we adjusted for the total number of hospital admissions for heart failure among different age, gender and racial subgroups.

**Results:** There were a total of 24,110 patients (67.5% male) who underwent EMB (2008-2012) with no significant difference between the years of study. The majority (60%) were Caucasians (African Americans [AA] 23%; other races 17%). Mean age was 48 years (no difference between races/genres). Among patients who underwent EMB, 97% had heart failure as one of the discharge diagnosis. Despite adjustment for overall national heart failure admission rates, there was a significant disparity in EMB utilization, favoring men (1.6% vs. 0.70% in females, \(P=0.004\)), and younger age groups (1.8% in <60 years of age vs. 0.2% in \(\geq60\) years of age: \(P=0.003\)) respectively. After adjustment for the heart failure admissions, no disparity was noted among different racial groups. Incidences of myocardial perforation, pericardial tamponade and pneumothorax among patients undergoing EMB were 1.3%, 0.9% and 0.6%, respectively. No disparity in complication rates was noted among different gender and racial groups. However we did find a steady decrease in the incidence of myocardial perforation between the years of study with the incidence of myocardial perforation reaching \(<1\%\) in 2012 (1.5% in 2008 vs. 0.92% in 2012). A similar trend was observed in incidence of pericardial tamponade (1.2% in 2008 vs. 0.8% in 2012; \(P=0.03\)).

**Conclusion:** Significant gender and age group differences were observed in the utilization of EMB favoring men and younger age group (<60 years). A significant decrease in the incidence of major complications associated with EMB between the years of study was noted, with the incidence of myocardial perforation and pericardial tamponade reaching \(<1\%\) in year 2012.

**Disclosures:**
Zubair Shah: This author has nothing to disclose.
Reza Masoomi: This author has nothing to disclose.
Buddhadeb Dawn: This author has nothing to disclose.
Kamal Gupta: This author has nothing to disclose.

**B-090**

**Title:** Using Biomarkers to Improve Management of ACS: Effect of Online CME on Physician Performance

**Category:** Quality Improvement

**Authors:** Jelena Spyropoulos, Medscape Education, United States; Kelly Hanley, Medscape Education, United States

**Background:** Biomarkers, including cardiac troponin (cTn), are an important clinical tool for prognostic assessments in acute coronary syndrome (ACS). However, the availability of multiple cTn assays has created confusion and many clinicians have limited ability to effectively use biomarkers. This study’s objective was to determine if an online medical education (CME) activity improved performance of cardiologists related to the use of cTn in the management of ACS.

**Methods:** An online, text-based CME activity was developed on the application of cTn in ACS. The effects of education were assessed using a case-based linked pre-assessment/post-assessment design. For all questions combined, the McNemar’s chi-squared test was used to assess differences from pre- to post-assessment. P values are shown as a measure of significance; P values <.05 are statistically significant.

**Results:** The CME activity was associated with significant improvement for cardiologists related to integration of cTn into management of patients with ACS (\(N=391\), \(P<0.001\), \(V=0.35\)):

- 74% of cardiologists answered all 4 questions correctly post-assessment compared to 53% pre-assessment
- Average correct responses on post assessment were 81% compared to 64% pre-assessment
- 21% relative improvement in the ability to use the cTn assay to risk stratify a patient for NSTEMI (81% post-assessment vs 67% pre-assessment; \(P<0.001\))
- 49% relative improvement in the ability to use cTn to rule out acute MI 10 to 14 days after symptom occurrence (85% vs 57%; \(P=0.001\))
- 45% relative improvement in the selection of appropriate early invasive treatment based on a patient’s cTn-positive status, along with the clinical history (85% vs 59%, \(P<0.001\))

**Conclusion:** The statistically significant improvements observed as a result of participation in this online CME intervention demonstrate that effective internet-based education can deliver content in the context of clinical practice to promote effective knowledge transfer and performance change. At the same time, this assessment of cardiologists’ performance identified additional education gaps that support the need to develop additional CME activities on the application of biomarkers in ACS management.

**Disclosures:**
Jelena Spyropoulos: This author has nothing to disclose.
Kelly Hanley: This author has nothing to disclose.

**B-094**

**Title:** Appropriateness of use of bivalirudin in patients undergoing Percutaneous Coronary Catheterization using CRUSADE bleeding score: single center study

**Category:** Quality Improvement

**Authors:** Ramyashree Tummala, St. Vincent charity medical center, United States; Ronak Bhimani, St. Vincent charity medical center, United States; Anjan Gupta, St. Vincent charity medical center, United States

**Background:** Anticoagulants are used during Percutaneous coronary interventions (PCI). Randomized trials have demonstrated that Bivalirudin offers advantage over heparin in reducing bleeding risk. A bleeding risk score has been validated in previous studies to identify patients who have the biggest advantage in using Bivalirudin. We wanted to retrospectively study the patients who have undergone PCI in a community hospital and use the bleeding risk calculator to assess the appropriate cost effective use of Bivalirudin.

**Methods:** This pilot study was approved by St. Vincent Charity Medical Center Institutional review board. The cohort consisted of 100 patients who underwent PCI procedures between Oct 2014 and Oct 2015, whose bleeding risk was derived by using CRUSADE bleeding risk calculator to determine the appropriate use of angiomax. The score was developed using data from over 89,000 “real-world” patients enrolled in the CRUSADE Quality Improvement Initiative that presented with NSTEMI. It was validated in logistic regression model to identify eight independent predictors of in-hospital major bleeding (range 1-100 points).

It considers baseline patient characteristics (female sex, history of diabetes, peripheral vascular disease), admission clinical variables (heart rate, systolic blood pressure, signs of CHF), and admission laboratory values (hematocrit, calculated creatinine clearance).

**Results:** This score distinguished patients in the pilot cohort as high, moderate and low risk for bleeding after a PCI procedure. Among 100 patients who underwent PCI, 23 were high, 26 moderate, 27 low and 24 very low risk. 96 out of 100 patients received bivalirudin irrespective of Catheterization and Cardiovascular Interventions DOI 10.1002/ccd.
their bleeding risk score. Out of 4 patients who received heparin 2 were low risk, 1 was very low risk and 1 was moderate risk. Only 25% of patients who were identified as high risk got treated with bivalirudin appropriately.

**Conclusion:** Our study demonstrates the inappropriate use of Bivalirudin in patients at low to moderate risk of bleeding complications and thus increasing the overall costs of the procedure without significant benefits. We propose using the risk calculator in identifying patients who would obtain the maximum benefit from use of an expensive drug.

**Disclosures:**
Ramyashree Tummala: This author has nothing to disclose.
Ronak Bhumian: This author has nothing to disclose.
Anjan Gupta: This author has nothing to disclose.

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**B-101**

**Title:** Outcomes In Patients Who Do Not Undergo Cardiac Catheterization After Activation Of Cardiac Catheterization Laboratory For A Suspected STEMI (The OUTCAST study)

**Category:** Quality Improvement

**Authors:** Lane Zhang, Winthrop University Hospital, United States; Tony Mathews, Winthrop University Hospital, United States; Abdul Moiz Hafiz, Beth Israel Deaconess Medical Center/Harvard Medical School, United States; Rose Calixte, Winthrop University Hospital, United States; Stephen Green, Winthrop University Hospital, United States

**Background:** Rapid activation of a cardiac catheterization laboratory (CCL) is accepted standard-of-care treatment for ST-segment elevation myocardial infarction (STEMI). Past studies have assessed rates of cancelled CCL activations (cancel-activations) within PCI-capable hospitals, but no studies have analyzed the hospital course and outcomes of cancel-activation patients.

**Methods:** We retrospectively analyzed 268 consecutive emergent CCL activations by the emergency department for STEMI (2013-2014). Baseline demographics, in-hospital mortality, length of hospitalization (LOS), 30-day readmission rate, and discharge location were reviewed. We analyzed differences between cancel-activations and accepted CCL patients (true-activations).

**Results:** Of 268 CCL activations for STEMI, 51 (19%) were cancel-activations. Baseline characteristics were similar for age, sex, BMI, ejection fraction, dyslipidemia, diabetes, prior peripheral artery disease. Cancel-activation patients were more likely to be hypertensive, smokers, have prior coronary vascular disease, prior percutaneous coronary intervention and prior coronary artery bypass grafting.

Outcomes are presented in Table 1. Cancel-activation compared to true-activation patients had higher in-hospital mortality, longer LOS. There was no difference between readmission rates. True-activation patients were more likely to be discharged home as opposed to a long-term facility compared to cancel-activation patients.

**Conclusion:** Cancel-activations constitute a group of patients who have higher in-hospital mortality and longer LOS than patients emergently taken to the CCL.

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Lane Zhang: This author has nothing to disclose.
Tony Mathews: This author has nothing to disclose.
Abdul Moiz Hafiz: This author has nothing to disclose.
Rose Calixte: This author has nothing to disclose.
Stephen Green: This author has nothing to disclose.

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**C-006**

**Title:** Safety And Efficacy of a Device to Narrow the Coronary Sinus for the Treatment of Refractory Angina: A Single Center Real-World Experience

**Category:** Stents (including DES)

**Authors:** Masieh Abawi, UMC-Utrecht, Netherlands

**Background:** The coronary sinus Reducer is a recently introduced device to treat patients with severe anginal symptoms refractory to optimal medical therapy and not amenable for conventional revascularization. We aimed to assess the safety and efficacy of the Reducer in a real-world cohort of patients with refractory angina.

**Methods:** This is a single-center retrospective registry. Patients with severe anginal symptoms, objective evidence of myocardial ischemia using any adequate non-invasive modality and without options for conventional revascularization were regarded eligible for Reducer implantation.

**Results:** Of 236 patients, 198 (79.7%) were enrolled in the registry. The most common indications for Reducer implantation were stable angina (74.5%) and refractory angina (25.5%). The most common complications were pericardial effusion (2.8%), hemotorax (1.5%), and asymptomatic device migration (3.8%).

**Conclusion:** The safety and efficacy of the coronary sinus Reducer in a real-world cohort of patients with refractory angina is promising. Further studies are needed to confirm these findings in a larger population.
Results: Twenty-three patients (74% male, mean age 70 ± 8 years, 91.3% previous bypass surgery, 82.6% previous percutaneous intervention, 47.8% previous myocardial infarction, 52.2% diabetes mellitus) underwent Reducer implantation. The safety endpoint (successful implantation of the first device without device-related adverse events) was met in all patients. After a median follow-up of 9 [8-14] months the efficacy (any reduction in Canadian Cardiovascular Society (CCS) class and revascularization-free survival) was reached in 17 patients (74%): 8 patients (34.8%) improved by 1 CCS class, 7 (30.4%) by 2 CCS classes and 2 (8.7%) by 3 CCS classes. One patient died 4 months after implantation because of progressive heart failure (no association with Reducer implantation).

Conclusion: In this single center real-world experience, Reducer implantation was safe and demonstrated excellent clinical efficacy in the treatment of refractory angina at mid-term follow-up.

Disclosures:
Masieh Abawi: This author has nothing to disclose.

C-008

Title: Taxel-Eluting Versus Limus-Eluting Coronary Stents in Diabetes: A meta-analysis of randomized controlled trials.

Category: Stents (including DES)

Authors: Abdulah Alrifai, University of Miami Palm Beach Regional Campus, United States; Farid Abdelmalak, University of Miami Palm Beach Regional Campus, United States; Stephanie Hakimian, University of Miami Palm Beach Regional Campus, United States; Robert Chat, University of Miami Palm Beach Regional Campus, United States

Background: The choice of Taxel-Eluting stent (TES) vs Limus-Eluting stent (LES) is debatable in diabetic patients who are undergoing percutaneous coronary intervention (PCI). A meta-analysis of randomized controlled trials (RCTs) comparing (TES) vs. (LES) in diabetics was therefore performed.

Methods: A comprehensive evaluation of all eligible RCT’s was identified by systematically searching the electronic databases PubMed, Medline, EMBASE and Cochrane. A total of 28 studies were initially identified, of which 11 were ultimately included in the meta-analysis. The quality of the studies was assessed and graded by two reviewers independently. There were six outcomes of interest (mentioned below). The pooled relative risk (RR) and 95% confidence intervals (CI) were calculated from the original study data by using the Mantel-Haenszel method (fixed effects model). Statistical heterogeneity was assessed using a forest plot and inconsistency statistic (I-squared). If any heterogeneity existed (I-squared >50%), it was to be explored by subgroup analyses, meta-regression and sensitivity analyses.

Results: This meta-analysis included 11 RCT’s involving 7253 patients: 2934 who underwent TES placement and 4319 who underwent LES placement. A statistically significant benefit was noted for LES placement compared to TES placement in five of the six major outcomes of interest. This included 24% reduction in the target lesion revascularization (TLR) rate (RR: 0.76; 95% CI, 0.63, 0.91; p = 0.002), 19% reduction in target vessel revascularization (TVR) rate (RR: 0.81; 95% CI, 0.70,0.95; p = 0.011), 44% reduction rate of stent thrombosis (RR: 0.56; 95% CI, 0.38, 0.84; p = 0.004), 16% reduction in the rate of major adverse cardiac events (RR 0.84, 95% CI; 0.73, 0.95; p = 0.008) and 36% reduced risk of myocardial infarctions (RR: 0.64, 95% CI 0.51, 0.82; p = <0.001) In regards to mortality, no clear benefit for LES placement (compared to TES placement) was noted (RR: 1.04; 95% CI 0.86, 1.26; p = 0.674). Some degree of heterogeneity was detected in the TVR, TLR and MACE outcomes and that was further explored with subgroup analyses and meta-regression.

Conclusion: In patients with DM, Limus-Eluting stents appear to be more effective than Taxel-Eluting stents.

Disclosures:
Abdulah Alrifai: This author has nothing to disclose.
Farid Abdelmalak: This author has nothing to disclose.
Stephanie Hakimian: This author has nothing to disclose.
Robert Chat: This author has nothing to disclose.

C-009

Title: Early Performance of Absorb Everolimus-Eluting Bioresorbable Vascular Scaffold Versus Second Generation Metallic Drug Eluting Stents: A Meta-Analysis of Randomized Controlled Trials

Category: Stents (including DES)

Authors: Motaseem Alyamani, St. Michael’s Hospital, University Of Toronto, Canada; Ishba Syed, St. Michael’s Hospital, University Of Toronto, Canada; Anthony Wassef, St. Michael’s Hospital, University Of Toronto, Canada; John Graham, St. Michael’s Hospital, University Of Toronto, Canada; Christopher Buller, St. Michael’s Hospital, University Of Toronto, Canada; Asim Cheema, St. Michael’s Hospital, University Of Toronto, Canada; Akshay Bagai, St. Michael’s Hospital, University Of Toronto, Canada

Background: Late target-lesion failure (TLF) associated with metallic drug-eluting stents (DES) may be related in part to the permanency of the metallic frame in the coronary-vessel wall. Absorb Bioresorbable Vascular Scaffold (BVS) is designed to completely dissolve after providing early mechanical support and drug delivery, in an attempt to reduce late TLF.

Methods: We conducted a meta-analysis of randomized controlled trials (RCTs) comparing 1st generation BVS with current 2nd generation metallic-DES for treatment of native coronary artery disease for the outcomes of ischemia driven TLF and device thrombosis (DT) at 6-12 months. Summary odds ratios (OR) and 95% confidence intervals (CI) were calculated using a random effects model.

Results: Six RCTs comprising of 3,820 patients (mean age 62.2 years, 73.2% males) were included; 2,337 patients were assigned BVS and 1,481 patients were assigned metallic-DES. Clinical presentation was myocardial infarction in 264 (6.9%) patients. Mean target lesion length was 13.4mm and 2,499 (64.3%) lesions were AHA/ACC class B2/C. Dual antiplatelet use was similar in the two groups. Ischemia driven TLF rates were similar in the BVS and metallic-DES groups (2.8% vs. 2.5%; OR 1.20, 95%CI 0.79-1.83, p=0.40). DT rates were numerically, but not statistically higher with BVS (1.2% vs. 0.5%; OR 1.90, 95%CI 0.88-4.12, p=0.10) (Figure).

Conclusion: There is a trend towards higher rate of device thrombosis early after implantation of BVS. Follow-up data from these studies is warranted to further examine this signal for potential hazard and determine whether BVS reduces TLF in the long-term.

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Motaseem Alyamani: This author has nothing to disclose.
Ishba Syed: This author has nothing to disclose.
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Christopher Buller: This author has nothing to disclose.
Asim Cheema: This author has nothing to disclose.
Akshay Bagai: 9 speaker’s honoraria for Astra Zeneca.
C-014

Title: FFR guided PCI on long coronary lesions: 2-year clinical results

Category: Stents (including DES)

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Background: Despite improvements in drug-eluting stent (DES) technology, treatment strategies for long coronary artery lesions remain a controversial issue. The aim of our study was to evaluate the long term clinical results after FFR guided PCI on long coronary lesions.

Methods: A total of 74 consecutive patients with significant (mean FFR 0.61 ± 0.11) coronary artery lesions ≥30 mm in length (mean stent length 50.7 ± 14.6 mm) were included to the prospective study. The mean age was 67.8 ± 9.9 years, 73% of the patients were male, 21.6% had diabetes. All patients were treated with FFR guided PCI implanting new generation Biolimus, Everolimus or Zotarolimus eluting stents. The primary endpoint was target vessel revascularization (TVR) at 2 years. Secondary endpoints included major adverse cardiac events (MACE) at 2 years.

Results: 100% angiographic procedure success was achieved. The mean post procedural FFR was 0.88 ± 0.06, FFR > 0.8 was achieved in 89.2% of the patients. At 2-year follow-up, 6 (8.1%) of the patients had ischemia driven TVR, all within the first 12 months. There was no target vessel related acute coronary syndromes in the study group. At 2 years, the total MACE rate was 29.7% (see table).

Conclusion: In the high cardiovascular risk patients group with diffuse coronary artery disease and high prevalence of total MACE events, the incidence of TVR at 2 years after stenting long coronary lesions with new generation DES is acceptable, at a rate of 8.1%. All TVR were performed within the first 12 months after the index PCI.
Disclosures:
Arvydas Baranauskas: This author has nothing to disclose.
Vilhelmas Bajoras: This author has nothing to disclose.
Aleksandras Kibarskis: This author has nothing to disclose.
Valdas Biltis: This author has nothing to disclose.
Audrius Aidietis: This author has nothing to disclose.
Giedrius Davidiavicius: This author has nothing to disclose.

C-019

Title: Biodegradable polymer-based, ultra-thin, sirolimus-eluting coronary stents have favorable outcomes in unselected ‘real-world’ patients with coronary artery lesions irrespective of implanted stent size: The Size-FLEX registry

Category: Stents (including DES)

Authors: Prakash Chandwani, Heart and General Hospital, India; Sudheer Saxena, MAX Superspeciality hospital, India; Padmakumar Ramachandran, Kasturba Medical College & Hospital, India; Atul Abhyankar, Shree B.D. Mehta Mahavir Heart Institute, India; Puneet Verma, Prime Heart & Vascular institute, India; Manjinder Singh Sandhu, Artemis Hospital, India; Nikhil Parikh, S K Soni Hospital, India; Ashok Bhupali, Apple Hospitals and Research Institute, India; Sharad Jain, Apollo Hospitals International Limited, India; Jayesh Prajapati, Apple Hospitals and Research Institute, India; Jayesh Prajapati, Apollo Hospitals International Limited, India

Background: Size of the coronary vessel/stent plays an important role in the success of PCI. We aimed to assess PCI outcomes with different size of Supraflex, a CE-approved biodegradable polymer-based ultra-thin sirolimus-eluting coronary stent system (Sahajanand Medical Technologies Pvt. Ltd., India), in ‘real-world’ patients with significant coronary artery lesions.

Methods: In this retrospective singe-arm open-label multi-center registry, 995 consecutive patients who had received Supraflex sirolimus-eluting stents between July 2012 and May 2014 were screened and analyzed from the cath lab data of 9 centers in India. The primary endpoint was major adverse cardiac event (MACE), defined as a composite of cardiac death, MI, TLR, and TVR. The Academic Research Consortium (ARC)-defined stent thrombosis was determined as an additional safety endpoint. All outcomes were controlled with blinded endpoint adjudication. The impact of stent diameter was analyzed by comparing outcomes between patients who had received at least one <2.75 mm stents and those who had received >2.75 mm stents. Moreover, two separate subgroup analyses were conducted for patients who had received large-diameter (≥4 mm) stents and for patients who had received small-diameter (≤2.75 mm), long-length (≥40 mm) stents.

Results: Overall incidence of MACE was low. Of note, patients with small-diameter stents (n=351) exhibited non-significantly lower MACE rates than those with non-small-diameter stents (n=644) at 30-day (0.6% vs. 1.4%), 6-month (1.2% vs. 2.8%), and 1-year (2.9% vs. 4.1%) follow-up. The ARC-defined stent thrombosis at 1 year was 0.6% and 1.4% in patients with small-diameter and non-small-diameter stents respectively. In the subgroup of patients with large-diameter stents (n=46), the incidences of MACE at 1-year follow-up was 4.8%. In the subgroup of patients with small-diameter, long-length stents (n=84), the incidences of MACE at 1-year follow-up was 2.5%. The ARC-defined stent thrombosis was not reported in any patient from these subgroups.

Conclusion: Size of the implanted coronary stent may play insignificant role in PCI outcomes with Supraflex sirolimus-eluting stents in ‘real-world’ patients with significant coronary artery lesions.

Disclosures:
Prakash Chandwani: This author has nothing to disclose.
Sudheer Saxena: This author has nothing to disclose.
Padmakumar Ramachandran: This author has nothing to disclose.
Atul Abhyankar: This author has nothing to disclose.
Puneet Verma: This author has nothing to disclose.
Manjinder Singh Sandhu: This author has nothing to disclose.
Nikhil Parikh: This author has nothing to disclose.
Ashok Bhupali: This author has nothing to disclose.
Sharad Jain: This author has nothing to disclose.
Jayesh Prajapati: This author has nothing to disclose.

C-018

Title: Clinical outcomes in 995 unselected real-world patients treated with an ultra-thin biodegradable polymer-coated sirolimus-eluting stent: 12 months results from the FLEX-registry

Category: Stents (including DES)

Authors: Pedro A. Lemos, Heart Institute (InCor), University of Sao Paulo Medical School, Brazil; Prakash Chandwani, Heart and General Hospital, India; Sudheer Saxena, MAX Superspeciality hospital, India; Padmakumar Ramachandran, Kasturba Medical College & Hospital, India; Atul Abhyankar, Shree B.D. Mehta Mahavir Heart Institute, India; Carlos M. Campos, Heart Institute (InCor), University of Sao Paulo Medical School, Brazil; Julio Flavio Marchini, Heart Institute (InCor), University of Sao Paulo Medical School, Brazil; Michel Zanotti Galon, Heart Institute (InCor), University of Sao Paulo Medical School, Brazil; Puneet Verma, Prime Heart & Vascular Institute, India; Manjinder Singh Sandhu, Artemis Hospital, India; Nikhil Parikh, S K Soni Hospital, India; Ashok Bhupali, Apple Hospitals and Research Institute, India; Sharad Jain, Apollo Hospitals International Limited, India; Jayesh Prajapati, Apollo Hospitals International Limited, India

Background: Durable polymer-based drug-eluting stents (DES) have been reported to adversely affect the safety profile and are also suspected to cause serious long-term complications. The purpose of this registry was to evaluate clinical outcomes of an ultra-thin (60µm) biodegradable polymer-coated the Supraflex sirolimus-eluting stent (SES) for the treatment of coronary artery disease across a wide range of unselected patients treated in routine clinical practice, including those with
high-risk characteristics and complex lesions. The vascular response to the Supraflex SES was also evaluated in the present registry through optical coherence tomography (OCT) analysis.

**Methods:** We conducted a multicenter, single-arm, all-comers, observational registry of 995 patients (1242 lesions), who were treated with the Supraflex SES, between July-2013 and May-2014 at nine different centers in India. A total of 47 participants underwent OCT analysis at 6 months follow-up. The primary endpoint, rate of major adverse cardiac events (MACE) [defined as composite of cardiac death, myocardial infarction (MI), target lesion revascularization (TLR) and non-target lesion target vessel revascularization (non-TL TLR)], was analyzed during 12 months after the post-index procedure.

**Results:** In-hospital, 30 days and 6 months MACE rates were 0.4% (4/995), 1.1% (11/995) and 2.2% (22/986), respectively. At 12 months, the primary endpoint occurred in 36 (3.7%) of 980 patients, consisting of 18 (1.8%) cardiac deaths, 16 (1.6%) MI, 7 (0.7%) TLR, and 2 (0.2%) non-TL TLR. By OCT, in a subset of 47 patients, 1,227 cross-sections (9,309 struts) were analyzed at 6 months. Overall, a high percentage of struts were covered (98.1%) with a mean neointimal thickness of 0.13 ± 0.06 mm.

**Conclusion:** The FLEX-registry evaluated clinical outcomes in real-world and more complex cohorts and thereby provides evidence to the clinicians for safe and routine extended use of the Supraflex SES to a broader percutaneous coronary intervention population. Also, the Supraflex SES showed high percentage of stent strut coverage and good stent apposition during OCT follow-up.

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Pedro A. Lemos: This author has nothing to disclose.
Prakash Chandwani: This author has nothing to disclose.
Sudheer Saxena: This author has nothing to disclose.
Padmakumar Ramachandran: This author has nothing to disclose.
Atul Abhyankar: This author has nothing to disclose.
Carlos M. Campos: This author has nothing to disclose.
Julio Flavio Marchini: This author has nothing to disclose.
Micheli Zanotti Galon: This author has nothing to disclose.
Manjinder Singh Sandhu: This author has nothing to disclose.
Nikhil Parikh: This author has nothing to disclose.
Ashok Bhupali: This author has nothing to disclose.
Sharad Jain: This author has nothing to disclose.
Jayesh Prajapati: This author has nothing to disclose.
microcatheter was used in 18 lesions. Totally 38 Absorb BVS scaffolds were used in these 24 lesions and the mean number of Absorb BVS used per lesion was 1.7 ± 0.9. The mean diameter and length of individual Absorb BVS scaffold used were 2.9 ± 0.4 mm and 25.1 ± 4.6 mm respectively.

The median duration of follow up was 20 months (range: 8 to 30 months) in this study. Two patients were lost to follow up. No stent thrombosis was reported. Two patients with positive stress echocardiography at 9 months and 22 months after the index procedure demonstrated target lesion restenosis necessitating re-intervention.

The remaining 19 patients were asymptomatic without any major adverse clinical event during the entire follow up period. Stress echocardiography, stress myocardial perfusion imaging study and CT coronary angiography demonstrated patent scaffolds in these patients.

Conclusion: Treatment of coronary CTO lesions is possible with Absorb BVS giving excellent outcomes at short-term and long-term follow up.

Disclosures:
Babu Ezhumalai: This author has nothing to disclose.
Ashok Seth: 8 Abbott Vascular

C-033

Title: Outcomes of Rotational Atherectomy and Stenting of Severely Calcified Coronary Arteries with Absorb Bioresorbable Vascular Scaffolds

Category: Stents (including DES)

Authors: Babu Ezhumalai, FORTIS ESCORTS HEART INSTITUTE, India; Ashok Seth, FORTIS ESCORTS HEART INSTITUTE, India

Background: The performance of Absorb BVS (biodegradable vascular scaffold) in calcified coronary lesions is hitherto questioned in view of its thicker struts, larger profile, deliverability and limited expansion characteristics. Our objective is to study the utility and outcomes of rotational atherectomy and stenting of severely calcified coronary arteries using Absorb BVS.

Methods: Patients who underwent rotational atherectomy and stenting of severely calcified coronary arteries with Absorb BVS over a period of 2 years were included in this study. Rotational atherectomy of the target lesion was performed. Additional preparation of lesion was done with non-compliant balloon. Absorb BVS scaffold was deployed gradually at nominal pressure and then post-dilated at high pressure using non-compliant balloon. Guideliner, cutting balloon, OCT and IVUS imaging were utilised as and when required. Patients were followed up periodicaly until 3 years after the procedure. On follow up, stress testing and CT coronary angiography were done in these patients.

Results: 33 patients were included in this study. The mean size of rotaburr used was 1.5 ± 0.2 mm. The mean number of burrs used per patient is 1.2 ± 0.4. In this study, 64 Absorb BVS scaffolds were used in 33 patients. The mean diameter and length of Absorb BVS scaffold used were 3.1 ± 0.4 mm and 23.0 ± 5.3 mm respectively. The mean pressure of pre-dilation, deployment of scaffold and post-dilation were 19.1 ± 4.5 mmHg, 8.3 ± 1.1 mmHg and 23.9 ± 2.6 mmHg. The median duration of follow up was 25 months (range: 10 to 36 months). No stent thrombosis was reported. Two patients developed restenosis and were treated with further stent implantation. One patient had progression of another lesion in the target vessel needing further stent implantation. The remaining 30 patients were doing fine without any major adverse clinical events. Most importantly, there was no acute, subacute or late scaffold thrombosis or acute MI.

Conclusion: Rotational atherectomy and stenting of calcified coronary arteries with Absorb BVS is possible in patients giving excellent results at immediate-term, short-term and long-term.

Disclosures:
Babu Ezhumalai: This author has nothing to disclose.
Ashok Seth: 8 Abbott Vascular

C-034

Title: Stenting of Diffuse Coronary Lesions with Absorb Bioresorbable Vascular Scaffolds: Long-term Follow up

Category: Stents (including DES)

Authors: Babu Ezhumalai, FORTIS ESCORTS HEART INSTITUTE, India; Ashok Seth, FORTIS ESCORTS HEART INSTITUTE, India

Background: Our objective is to study the long-term outcomes of stenting of diffuse coronary lesions with Absorb BVS (biodegradable vascular scaffold).

Methods: In this study, diffuse lesion is defined as the long lesion requiring the overlap of at least 3 Absorb BVS. Patients who underwent coronary stenting of diffuse lesions with Absorb BVS over a period of 18 months were prospectively included in this study. Lesion was prepared adequately with non-compliant balloon and Absorb BVS scaffold was deployed gradually at nominal pressure. At least 3 Absorb BVS were deployed with minimal overlap in every diffuse lesion. Post-dilatation was done at high pressure using non-compliant balloon. Patients were followed up telephonically and/or clinically until 36 months after the procedure with stress testing, CT coronary angiography and OCT.

Results: 12 patients with 13 diffuse lesions were included in this study. Out of 13 lesions, 4 lesions were found in LAD, 8 lesions in RCA and 1 lesion in LCX. Totally 43 Absorb BVS scaffolds were used in these 13 lesions and the mean number of Absorb BVS used per lesion was 3.3 ± 0.8. The mean diameter and length of individual Absorb BVS scaffold used were 3 ± 0.4 mm and 24.4 ± 5.1 mm respectively. The mean length of overlapped scaffolds per lesion was 81.1 ± 23.5 mm. There were 6 calcified lesions and rotational atherectomy was done in 4 of these lesions. OCT and IVUS imaging were performed as and when required. There was no procedure related complication in the target lesion. The median duration of follow up was 31 months (range: 20 to 36 months) in this study. All patients were asymptomatic and no major adverse clinical event was reported during the entire follow up period. No stent thrombosis was reported. Conventional coronary angiography and OCT demonstrated patent scaffolds in one patient at 20 months follow up. Investigations performed until 36 months of follow up such as stress echocardiography, stress myocardial perfusion imaging study and CT coronary angiography demonstrated patent scaffolds.

Conclusion: Stenting of diffuse coronary lesions with Absorb BVS is possible giving excellent outcomes during the procedure and at long-term follow up.

Disclosures:
Babu Ezhumalai: This author has nothing to disclose.
Ashok Seth: 8 Abbott Vascular

C-032

Title: Two years follow up study of Absorb Bioresorbable Vascular Scaffolds in the Treatment of Ostial Coronary Lesions

Category: Stents (including DES)

Authors: Babu Ezhumalai, FORTIS ESCORTS HEART INSTITUTE, India; Ashok Seth, FORTIS ESCORTS HEART INSTITUTE, India

Background: It is well known that ostial coronary lesions are prone to develop restenosis. There is not much data on the use of Absorb BVS (biodegradable vascular scaffold) in treating ostial coronary lesions. Our

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The objective is to study the utility and outcomes of stenting of ostial coronary lesions with Absorb BVS.

**Methods:** In this study, patients who underwent PTCA of ostial lesions with Absorb BVS over a period of 24 months were included. After adequate preparation of lesion, Absorb BVS scaffold was deployed gradually at nominal pressure. Post-dilatation was done at high pressure using non-complaint balloon. Patients were followed up telephonically and/or clinically until 2 years after the procedure with stress testing and CT coronary angiography.

**Results:** There were 42 ostial lesion in the 38 patients included in this study. Out of 42 ostial lesions, 17 lesions were found in LAD, 15 lesions in RCA, 4 lesions in LCX, 4 lesions in OM and 2 lesions in intermediate. Overall 72 Absorb BVS scaffolds were used in these 42 lesions and the mean number of Absorb BVS used per lesion was 1.9 ± 1.1. The mean diameter and length of individual Absorb BVS scaffold used were 3.1 ± 0.4 mm and 23.9 ± 4.9 mm respectively. The mean pressure of deployment of BVS and post-dilatation were 8.5 ± 1.1 mm and 21.1 ± 2.4 mmHg respectively. Cutting balloon, rotational atherectomy, OCT and IVUS imaging were utilized as and when required. The median duration of follow up was 17.5 months (range: 6 to 25 months) in this study. One patient had unexplained death at 6 weeks after the procedure. Two patients were lost to follow up. Two patients who developed angina at 8 months and 12 months after the index procedure demonstrated target lesion restenosis necessitating re-intervention.

**Conclusion:** Stenting of ostial coronary lesions with Absorb BVS is possible giving excellent outcomes during the procedure and at long-term follow up.

**Disclosures:**
Babu Ezhumalai: This author has nothing to disclose.
Ashok Seth: 8 Abbott Vascular

**C-066**

**Title:** Comparison of Temporal Trends in Strut-Level Optical Coherence Tomography Evaluation of Durable Polymer Everolimus Eluting Stents and Everolimus Eluting Biodegradable Vascular Scaffolds: A Meta-Analysis

**Category:** Stents (including DES)

**Authors:** Iwan Nyotowidjojo, University Of Arizona College Of Medicine, United States; Justin Lee, University Of Arizona College Of Medicine, United States; Stefan Koester, University Of Arizona College Of Medicine, United States

**Background:** Bioresorbable vascular scaffolds (BVS) were developed to overcome long term drug eluting stent issues but randomized trials have yet to demonstrate clinical superiority. We sought to pool data from all studies with reported strut-level data in humans evaluated by optical coherence tomography (OCT) and compare the aggregate data of stent strut coverage on a longitudinal temporal timeline from initial implantation of durable polymer everolimus eluting stents (EES) and everolimus eluting biodegradable vascular scaffolds (BVS).

**Methods:** We conducted a systematic PRISMA search of studies reporting OCT stent strut coverage of BVS and EES in PubMed, Embase, Web of Science, and the Cochrane Central Register up to October 2015. Random-effects meta-analysis was performed to estimate percentage of uncovered struts at each stent-specific analyzed time point. A complementary log-log model with the assumption of a 100% uncovered rate at time 0 was fitted. The regression coefficient was calculated and compared using permutation statistics.

**Results:** Data from 2,147 patients with strut-level data on 715,294 struts were analyzed. The rate of strut coverage, reflected by the calculated regression coefficient was found to be lower in BVS compared to EES (0.588 vs 0.708, p<0.0001). This difference was present in the first 12 months.

**Conclusion:** Our data demonstrates lower rate of strut coverage in the first 12 months in BVS compared to EES. The clinical implication of this difference requires further study, especially in the setting of strut resorption for BVS, but our data provides insight into the vascular healing response in BVS patients.

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Iwan Nyotowidjojo: This author has nothing to disclose.
Justin Lee: This author has nothing to disclose.
Kwan Lee: 9 Honoraria from St. Jude Medical
Stefan Koester: This author has nothing to disclose.

**C-070**

**Title:** A propensity matched real-world evaluation of ultra-thin biodegradable polymer coated sirolimus-eluting stents in diabetic and non-diabetic patients with coronary artery disease: One-year clinical outcomes of the DiaFLEX registry

**Category:** Stents (including DES)

**Authors:** Jayesh Prajapati, Apollo Hospitals International Limited, India; Sharad Jain, Apollo Hospitals International Limited, India; Sudheer Saxena, MAX Superspeciality hospital, India; Prakash Chandwani, Heart and General Hospital, India; Padmakumar Ramachandran, Kasurba Medical College & Hospital, India; Atul Abhyankar, Shree B.D.

Catheterization and Cardiovascular Interventions DOI 10.1002/ccd. Published on behalf of The Society for Cardiovascular Angiography and Interventions (SCAI).
Background: In diabetic patients, the diffused, deep-rooted nature of coronary artery disease and quintessential anatomy of the coronary arteries involving small vessels and long lesions precipitate adverse outcomes associated with PCI. There has been continuous modification in the stent material, design, and architecture giving rise to iterations of drug-eluting stents, more safe and efficacious in complex cohort of patients with coronary artery disease. Thus, the main aim of the DiaFLEX registry is to assess safety and clinical performance of the Supraflex (Sahajanand Medical Technologies Pvt. Ltd., Surat, India), newer-generation sirolimus-eluting stents in diabetic patients with coronary artery disease.

Methods: It is a retrospective, single-arm, non-randomized, multicentre registry. The primary end-point was major adverse cardiac events (MACE), which is a composite of cardiac death, myocardial infarction, target lesion revascularization, and target vessel revascularization at 1-year follow-up. Stent thrombosis was also analyzed.

Results: Out of 995 consecutively enrolled patients, 231 patients had diabetes. The study outcomes were compared in 231 pairs using propensity score matching. At 1-year follow-up, MACE was found to be 2.6% in diabetes group and 5.3% in non-diabetes group (HR 0.49, 95% CI: 0.18-1.32, p = 0.16). In the diabetes group, stent thrombosis was found to be 0.4% as compared to 2.6% in non-diabetes group (HR 0.16, 95% CI: 0.02-1.37, p = 0.10).

Conclusion: Thus, the DiaFLEX registry delineates safety and excellent clinical performance of the Supraflex in diabetic patients with coronary artery disease.

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Jayesh Prajapati: This author has nothing to disclose.
Sharad Jain: This author has nothing to disclose.
Sudeer Saxena: This author has nothing to disclose.
Prakash Chandwani: This author has nothing to disclose.
Bhavesh Rana: This author has nothing to disclose.
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Puneet Verma: This author has nothing to disclose.
Nikhil Parikh: This author has nothing to disclose.
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Murali Babu Rao Rachapati: This author has nothing to disclose.
Michael Noronha: This author has nothing to disclose.
Srinivasa Rao Chinta: This author has nothing to disclose.
Mohanarjun Neelam: This author has nothing to disclose.

C-075

Title: Clinical outcomes following implantation of 44mm/48mm biodegradable polymer coated sirolimus-eluting stents in long coronary lesions: Results from the real-world FLEX-LONG study

Category: Stents (including DES)

Authors: Raghava Sarma Polavarapu, Lalitha Super Specialty Hospital, India; Vijaya Pamidimukkala, Lalitha Super Specialty Hospital, India; Anurag Polavarapu, Lalitha Super Specialty Hospital, India; Naren Polavarapu, Lalitha Super Specialty Hospital, India; Murali Babu Rao Rachapati, Lalitha Super Specialty Hospital, India; Michael Noronha, Lalitha Super Specialty Hospital, India; Srinivasa Rao Chinta, Lalitha Super Specialty Hospital, India; Mohanarjun Neelam, G, Lalitha Super Specialty Hospital, India

Background: Long coronary lesions are commonly encountered in routine clinical practice and often lead to use long or overlapping stents. Limited data are available on the safety and efficacy of long biodegradable polymer coated sirolimus-eluting stents (SES). The aim of this study was to assess clinical outcomes following implantation of the biodegradable polymer coated very long (44mm/48mm) Supraflex SES in real-world patients.

Methods: FLEX-LONG study was a retrospective, single-centre, observational study. We analyzed 6 months clinical outcomes of 67 patients who had undergone stenting using single 44mm/48mm long Supraflex SES (Sahajanand Medical Technologies Pvt. Ltd., Surat, India) in India between August-2014 and November-2014. Baseline clinical data and procedural outcomes were obtained by case-note review. The incidence of major adverse cardiac events (MACE), a composite of cardiac death, myocardial infarction (MI), target lesion revascularization (TLR) or target vessel revascularization (TVR), at 6 months follow-up was the primary endpoint of this study. Stent thrombosis according to Academic Resource Consortium was also analyzed as a safety endpoint.

Results: The mean age of the study population was 56.3 ± 9.9 years and 77.6% (52/67) were male. The study analyzed high risk patients, including 43.3% (29/67) of hypertensive patients, 40.3% (27/67) diabetic patients, and 19.4% (13/67) totally occluded lesions. The average stent length and diameter were 46.7 ± 1.9 mm and 3.5 ± 0.1 mm, respectively. In-hospital, 30 days and 6 months clinical follow-ups (100%) demonstrated absence of MACE (cardiac death, MI and TLR or TVR) and stent thrombosis. Long term follow-up of this study is ongoing and planned clinical follow-ups are at 12 and 24 months after the post index procedure.

Conclusion: The results of the FLEX-LONG study support the use of the Supraflex SES, 44mm/48mm, in the treatment of long coronary lesions. Additional large clinical studies with long-term clinical follow-up should be considered to confirm the promising early results.

Disclosures:
Raghava Sarma Polavarapu: This author has nothing to disclose.
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Murali Babu Rao Rachapati: This author has nothing to disclose.
Michael Noronha: This author has nothing to disclose.
Srinivasa Rao Chinta: This author has nothing to disclose.
Mohanarjun Neelam: This author has nothing to disclose.

VALVULAR INTERVENTIONS AND STRUCTURAL HEART DISEASE

B-006

Title: Percutaneous closure of a postoperative subannular aortic aneurysm via a novel transatrial approach

Category: Valvular Interventions and Structural Heart Disease

Authors: Sherien Abdelsalam, Aswan Heart Centre, Magdy Yacoub foundation, Egypt

Background: A 26-years-old male patient who had recently undergone an emergency aortic root replacement using a 29-mm St. Jude mechanical valved conduit after presenting with pulmonary oedema. Preoperative transesophageal echocardiography revealed a large right coronary sinus of Valsalva aneurysm extending into the membranous interventricular septum and severe eccentric aortic regurgitation. Figure (1) Preoperative TEE. Early postoperative echocardiography revealed a sac within the right atrium communicating with LV through a 6mm opening just below the aortic prosthesis.

Over the next few days the sac showed progressive enlargement, reaching 4.5 X 3.5 cm by the 14th postoperative day, with progressive obstruction of the right ventricular inflow. The findings were confirmed by contrast-enhanced computed tomography which was also able to Catheterization and Cardiovascular Interventions DOI 10.1002/ccd. Published on behalf of The Society for Cardiovascular Angiography and Interventions (SCAI).
determine the size of the neck as well as its precise relation to the aortic prosthesis (6 mm below the suture ring).

Methods: Transcatheter closure of the aneurysm’s neck was performed using a 10-8 Amplatzer duct occluder delivered via the right atrium after puncturing the aneurysm (using a BRK transseptal needle). Follow-up TTE and computed tomography after 3 months revealed thrombosis and shrinkage of the sac.

Results: Pseudoaneurysm is a common postoperative disorder after prosthetic aortic valve replacement. However, only a few investigators have reported the condition.

Conclusion: To our knowledge, this is the 1st report of the use of transatrial approach to close subannular aortic aneurysms in patient who had undergone aortic valve replacement with prosthetic valve.

Disclosures:
Sherien Abdelsalam: This author has nothing to disclose.

B-012

Title: Comparison of the American College of Cardiology/American Heart Association and the European Society of Cardiology Guidelines for the Management of Patients with Valvular Heart Disease

Category: Valvular Interventions and Structural Heart Disease

Authors: Aya Alame, VA North Texas Healthcare System And UT Southwestern Medical Center, United States; Aris Karatasakis, VA North Texas Healthcare System And UT Southwestern Medical Center, United States; Barbara Danek, VA North Texas Healthcare System And UT Southwestern Medical Center, United States; Judit Karacsonyi, VA North Texas Healthcare System And UT Southwestern Medical Center, United States; Hani Jneid, Baylor College of Medicine and Michael E. DeBakey Veterans Affair Medical Center, United States; Paul Sorajja, Abbott Northwestern Hospital, Minneapolis Heart Institute, United States; Erica Resendes, VA North Texas Healthcare System And UT Southwestern Medical Center, United States; Jose Roberto Martinez Parachini, VA North Texas Healthcare System And UT Southwestern Medical Center, United States; Pratik Kalsaria, VA North Texas Healthcare System And UT Southwestern Medical Center, United States; Michele Roesle, VA North Texas Healthcare System And UT Southwestern Medical Center, United States; Subhash Banerjee, VA North Texas Healthcare System And UT Southwestern Medical Center, United States; Emmanouil Brilakis, VA North Texas Healthcare System And UT Southwestern Medical Center, United States

Background: The American College of Cardiology/American Heart Association (ACC/AHA) and the European Society of Cardiology (ESC) have been developing guidelines to assist clinicians in making evidence-based decisions.

Methods: The current ACC/AHA and ESC guidelines for Valvular Heart Disease (VHD) that were last updated in 2014 and 2012, respectively, were compared to assess the number of recommendations based on Class of Recommendation (COR) and Level of Evidence (LOE).

Results: The ACC/AHA guidelines contained significantly more recommendations than the ESC guidelines (228 vs. 70, respectively). The recommendation class distribution of the ACC/AHA guidelines was 47.4% Class I (compared to 45.7% in the ESC guidelines, p=0.808), 46.5% Class II (compared to 54.3% in the ESC guidelines, p=0.254), and 6.1% Class III (compared to 0.0% in the ESC guidelines, p=0.034) (Figure 1). The LOE distribution among ACC/AHA guidelines was 3.1% LOE: A (compared to 0.0% in the ESC guidelines, p=0.138), 46.9% LOE: B (compared to 12.9% in the ESC guidelines, p<0.0001), and 50.0% LOE: C (compared to 87.1% in the ESC guidelines, p<0.0001).

Conclusion: Overall, the ACC/AHA guidelines for VHD contain significantly more recommendations as compared with the ESC guidelines. The distribution of the COR was similar in the two guidelines; however, the ACC/AHA guidelines included significantly more LOE B and significantly fewer LOE C recommendations.

Disclosures:
Aya Alame: This author has nothing to disclose.
Aris Karatasakis: This author has nothing to disclose.
Barbara Danek: This author has nothing to disclose.
The purpose of this study was to examine in a prospective fashion the impact of PVL closure on outcomes, quality of life, heart failure status and cardiac remodeling.

Method: All patients referred to our center for PVL closure between February 2013 and September 2015 were prospectively enrolled.

Results: 41 patients underwent transcatheter closure of paraprosthetic defects. The mean age of the cohort was 64 ± 13 years, 60% were male and 60% of patients underwent PVL closure for heart failure and 30% underwent closure based on heart failure and hemolysis. 17/41 (41%) of patients underwent closure of aortic PVL while 24/41 (59%) underwent mitral PVL closure. 35/41 (85%) of patients had successful PVL closure with < mild residual PVL post closure, 2 patients (4.9%) had persistent severe PVL, 3/41 (7.3%) had access site complications and the procedural and 30-day mortality rate was 0%. Following PVL closure there was a significant improvement in walking distance as assessed by the 6 minute walk test, 245m vs. 297m; \( p = 0.004 \), we also saw a significant improvement in quality of life (QOL) as assessed by the SF 12 questionnaire, improvement in physical and mental component scores; 30.2 vs. 41.8; \( p < 0.001 \) and 44.4 vs. 53.1; \( p = 0.004 \) respectively. Heart failure status assessed using the KCCQ questionnaire also revealed improvement in HF QOL, 66 to 97.6; \( p < 0.001 \). 8 patients underwent cardiac MRI pre- and post PVL closure and this revealed a non significant trend toward reduction of left ventricular volumes from baseline to follow up; LVEDV 151 ml to 135 ml; \( p = 0.21 \), LVESV 63 mls to 55 mls, \( p = 0.89 \) and a significant reduction in LA volumes 139 ml to 109 ml, \( p = 0.021 \).

Conclusion: PVL closure is associated with high success rates with minimal morbidity and mortality, there is objective improvement in heart failure status and quality of life and it may be associated with beneficial cardiac remodeling.
B-016

Title: DOUBLE SAVIOUR OF LIFE - Percutaneous Transluminal Mitral Commissurotomy (PTMC) in Pregnant Women with Symptomatic Mitral Stenosis

Category: Valvular Interventions and Structural Heart Disease

Authors: Prem Anandan, Sri Jayadeva Institute of Cardiovascular Sciences & Research, India; Sridhar Sastry, Sri Jayadeva Institute of Cardiovascular Sciences & Research, India; Prabhavathi Bhatt, Sri Jayadeva Institute of Cardiovascular Sciences & Research, India; Manjunath Cholenhally, Sri Jayadeva Institute of Cardiovascular Sciences & Research, India; Dhanalakshmi Chandrasekaran, Sri Jayadeva Institute of Cardiovascular Sciences & Research, India

Background: Rheumatic valvular heart diseases continues to be a big burden in developing countries. They complicate about 0.5-1.5% of pregnancies. Decompensation mainly occurs due to the hemodynamic changes of the circulation. Balloon mitral valvotomy or PTMC is an established non-surgical treatment of rheumatic mitral stenosis especially as a bail out in pregnant situations. The study aimed to assess the safety and efficacy of PTMC in symptomatic pregnant women with severe mitral stenosis and also its effect on child birth.

Methods: 66 pregnant patients were enrolled in this prospective study. Valve morphology was evaluated prior to the procedure by Trans thoracic echocardiogram. Mitral valve area (MVA), trans mitral valve gradient (MVG), and severity of mitral regurgitation (MR), Pulmonary artery pressure (PAP) were assessed before and 18-24 hour after the procedure. Valve morphology was evaluated prior to the procedure by Transluminal Mitral Commissurotomy (PTMC). Patients were followed for 6 months and neonates were monitored for any short term adverse effect of radiation.

Results:
1. Mean maternal age was 27.5 years and mean gestational age was 22.8 ± 6.4 weeks.
2. Mitral valve area increased from 0.72 ± 0.14 cm² to 1.42 ± 0.3 cm² (P = 0.006).
3. Mean gradient of mitral valve decreased from 16.5 ± 6.4 mmHg to 3.12 ± 1.36 mmHg (P = 0.002).
4. Pulmonary artery pressure decreased from 68.24 ± 17.9 to 43.15 ± 11.23 (P = 0.010).
5. No maternal death, abortion, intrauterine growth restriction was observed.

Conclusion: Our study shows a positive outcome for symptomatic pregnant patients with mitral stenosis after PTMC with minimal complication rates and with no clinical abnormalities associated to the use of radiation in neonates, hence termed “double savior of life”.

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Prem Anandan: This author has nothing to disclose.
Patel Shukkarbhai: This author has nothing to disclose.
Sridhar Sastry: This author has nothing to disclose.
Prabhavathi Bhatt: This author has nothing to disclose.
Manjunath Cholenhally: This author has nothing to disclose.
Dhanalakshmi Chandrasekaran: This author has nothing to disclose.

B-018

Title: A Systematic Review of Percutaneous Closure of Paravalvular Regurgitation After Transcatheter Aortic Valve Replacement

Category: Valvular Interventions and Structural Heart Disease

Percutaneous PVR closures had high success rate in selected patients in both BE and SE valves. The initial success rate was 88% (SE versus BE, 100% and 83%, respectively, p = 0.093). The main reason for procedural failure was unable to pass through the sheath into the leakage area. Median number of closure devices used were 1 (range 1-4) and did not differ between SE and BE (p = 0.81). Mean days for index procedure to PVR closure were 337 ± 379 days and there were no difference between SE and BE (401 ± 354 vs 303 ± 392 days, p = 0.59). Five PVR closure devices were implanted during the index procedure. There were 9 patients who had history of valve-in-valve and at least 7 patients had procedural success.

Conclusion: Percutaneous PVR closures had high success rate in selected patients in both BE and SE valves. The initial success rate, timing and number of closure devices were similar between BE and SE valves. The procedure was also feasible in patients with prior valve-in-valve procedure. However, prognosis remains fairly poor and preventative measure for PVR is expected in the next generation valves.

Disclosures:
Tomo Ando: This author has nothing to disclose.
Luis Afonso: This author has nothing to disclose.

B-019

Title: Iatrogenic Ventricular Septal Defect Following Transcatheter Aortic Valve Replacement: A Systematic Review

Category: Valvular Interventions and Structural Heart Disease

Authors: Tomo Ando, Mount Sinai Beth Israel, United States; Luís Afonso, Wayne State University - Detroit Medical Center, United States

Background: Ventricular septal defects (VSD) are rarely reported as a complication following transcatheter aortic valve replacement (TAVR). We sought to characterize the patients, clinical management, and outcomes, as well as the current state of knowledge regarding this rare phenomenon.

Methods: Relevant articles were identified by a systematic search of MEDLINE and EMBASE databases from January, 2002 to September, 2015. Additionally, the reference lists of each article were manually reviewed. Abstracts presented at conferences were not included. Also, reports including same institutions were excluded.

Results: Sixteen studies including 58 patients were included in the study. Majority of the studies were either case report or case series (15 studies) and two studies were cohort studies. There were 43 (74%) male. BE was used frequently than SE (71% versus 29%, respectively). Initial success rate was 88% (SE versus BE, 100% and 83%, respectively, p = 0.093). The main reason for procedural failure was unable to pass through the sheath into the leakage area. Median number of closure devices used were 1 (range 1-4) and did not differ between SE and BE (p = 0.81). Mean days for index procedure to PVR closure were 337 ± 379 days and there were no difference between SE and BE (401 ± 354 vs 303 ± 392 days, p = 0.59). Five PVR closure devices were implanted during the index procedure. There were 9 patients who had history of valve-in-valve and at least 7 patients had procedural success.

Conclusion: Percutaneous PVR closures had high success rate in selected patients in both BE and SE valves. The initial success rate, timing and number of closure devices were similar between BE and SE valves. The procedure was also feasible in patients with prior valve-in-valve procedure. However, prognosis remains fairly poor and preventative measure for PVR is expected in the next generation valves.

Disclosures:
Tomo Ando: This author has nothing to disclose.
Luis Afonso: This author has nothing to disclose.
Results: A total of 18 studies, including 20 patients, were identified. The median age was 83 years and 6 were male. Median Logistic EuroSCORE was 19.8 (range 11.7-33.8). Twelve were performed by transfemoral approach. Pre-dilation was performed in 12 patients and post-dilation in four. Balloon expandable valves were used in majority (84%) of cases. The clinical presentation varied from asymptomatic to progressive heart failure. The timing of the diagnosis also varied significantly from immediately post valve implantation to one year afterwards. There were two cases of Gerbode-type defect while the rest were interventricular defect. The location was mostly membranous or perimembranous (79%) and adjacent to the valve landing zone. A total of 7 interventions (1 open surgery and 6 percutaneous closure) were performed. Four patients died during the same hospital admission. 16 survived past discharge (range 12 days to 2 years).

Conclusion: VSD post-TAVR was seen more with balloon expandable valves and with pre-dilation or post-dilation. Percutaneous treatment of the VSD was preferred over open cardiac surgery given the surgical risk in this patient population. Some, but not all, patients survived VSD post TAVR and had a good prognosis for both patients group who had with or without VSD closure.

Disclosures:
Tomo Ando: This author has nothing to disclose.
Anthony Holmes: This author has nothing to disclose.
Cynthia Taub: This author has nothing to disclose.
David Slovut: This author has nothing to disclose.
Joseph DeRose: This author has nothing to disclose.

B-017

Title: Impact of Platelet Count on Bleeding and Mortality Following Transcatheter Aortic Valve Replacement

Category: Valvular Interventions and Structural Heart Disease

Authors: Tomo Ando, Mount Sinai Beth Israel, United States; Cynthia Taub, Albert Einstein College of Medicine Montefiore Medical Center, United States; David Slovut, Albert Einstein College of Medicine Montefiore Medical Center, United States

Background: The impact of platelet count (Plt) on mid-term outcomes following transcatheter aortic valve replacement (TAVR) has not been well studied.

Methods: Medical records at a single center were reviewed retrospectively. Primary endpoints were defined as combination of death from any cause and bleeding events during outpatient follow up after TAVR. Patients who had in-hospital mortality were excluded. Patients were categorized into two groups according to their baseline Plt, group 1 (Plt < 150 x 10^3/L) and group 2 (Plt ≥ 150 x 10^3/L). Plt was measured on either the day before the TAVR procedure or at an outpatient clinic before TAVR.

Results: A total of 103 patients met the inclusion criteria. Mean age was 82 ± 8 years old (Male, 49%). The primary endpoint occurred in 22 (21%) patients during the follow up (305 ± 263 days). Male was seen more in group 1 (79% vs 42%, p<0.01) but other characteristics were overall similar. Cox proportional hazards regression analysis, after adjusted for age, sex, on anti-coagulation at discharge, hemoglobin and Plt, Plt <150 x 10^3/L (HR 2.95, 95%CI 1.24-7.00, p=0.014), hemoglobin ≤ 10 g/dL (HR 3.31 95%CI 1.35-8.10, p=0.009) and anti-coagulation at discharge (HR 2.57, 95%CI 1.06-6.24, p=0.037) remained as independent predictors for the primary endpoint. Kaplan-Meier analysis showed that group 1 had worse prognosis (Log-rank p < 0.001) (Figure).

Conclusion: Low Plt, hemoglobin and on anti-coagulation at discharge were associated with bleeding and mortality after TAVR. These factors maybe useful in identifying high-risk patients and may help guide decision making of whether to have patients on anti-coagulation or not.

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Tomo Ando: This author has nothing to disclose.
Cynthia Taub: This author has nothing to disclose.
David Slovut: This author has nothing to disclose.

B-021

Title: The Impact of pre-existing and new onset atrial fibrillation in patients undergoing Transcatheter aortic valve replacement: A meta-analysis

Category: Valvular Interventions and Structural Heart Disease

Authors: anurag bajaj, The wright center of graduate medical education, United States; Samir Pancholy, The wright center for graduate medical education, United States; Parul Rathor, ZHENGZHOU UNIVERSITY, China; Ajinkya Sethi, St.Lukës cardiology associates, United States; Vishal Sehgal, University of Tennessee, United States; Nissi Suppogu, The wright center for graduate medical education, United States

Background: Atrial fibrillation (AF) frequently coexists in patients with aortic stenosis undergoing transcatheter aortic valve replacement (TAVR). The prognostic implications of pre-existing AF, and new onset AF (NOAF) in patients undergoing TAVR is unclear. We performed a meta-analysis to compare the clinical outcomes in patients undergoing TAVR with preexisting and new onset AF.

Methods: A systematic search of database, including, Medline, EMBASE and Cochrane was done by two independent reviewers to identify relevant studies. Studies were included which compared clinical outcomes in patients undergoing TAVR with and without pre-existing AF and NOAF. The primary outcomes were short term (in-hospital or 30 days) and long term (one year) mortality. The secondary outcomes were short term and long term cardiovascular events (CVE).

Results: We found twenty two studies, including 26,865 patients, which reported clinical outcomes relevant to our study, The prevalence of preexisting AF and NOAF was 33.5% and 10.3%. The 30 day
mortality was 9% in patients with preexisting AF and 7.2% in patients with sinus rhythm (SR). There was a slightly higher mortality in patients with preexisting AF compared to SR (odds ratio [OR], 1.25; 95% CI 1.05 to 1.48, I²=72%). The one year mortality was also significantly higher in patients with preexisting AF ([OR], 1.25; 95% CI 1.05 to 1.48, I²=72%). The short term and long term CVEs (stroke and TIAs) were similar in patients with preexisting AF and SR. The short term ([OR], 3.58; 95% CI 1.62 to 7.94, I²=73%) and long term mortality ([OR], 1.5; 95% CI 1.40 to 2.73, I²=33%) were also significantly higher in patients with NOAF compared to SR group. Similarly, the short term ([OR], 1.98; 95% CI 1.33 to 2.95, I²=0%) and long term CVEs ([OR], 1.4; 95% CI 1.04 to 2.34, I²=0%) were higher in NOAF group compared to SR.

Conclusion: Both Preexistent AF and NOAF are predictors of adverse events in patients undergoing TAVR. Preexisting AF should be a part of the risk stratification model in patients undergoing TAVR. Efforts should be made to prevent AF after the procedure to decrease adverse events.

Disclosures: Anurag Bajaj: This author has nothing to disclose. Samir Pancholy: This author has nothing to disclose. Parul Rathor: This author has nothing to disclose. Arjinder Sethi: This author has nothing to disclose. Vishal Sehgal: This author has nothing to disclose. Nissi Suppogu: This author has nothing to disclose.

B-001

Title: Staged versus concomitant PCI for CAD in patient undergoing TAVR: A meta-analysis

Category: Valvular Interventions and Structural Heart Disease

Authors: Anurag Bajaj, The wright center for graduate medical education, United States; Arjinder Sethi, St.Luke’s cardiology associates, United States; Parul Rathor, Zhengzhou University, United States; Samir Pancholy, The wright center for graduate medical education, United States.

Background: Significant coronary artery disease (CAD) is present in 40 to 75% of the patients undergoing Transcatheter aortic valve replacement (TAVR). Percutaneous coronary intervention (PCI) before TAVR has the potential to reduce the procedural risk of TAVR as well as the need for revascularization after TAVR; however, optimal timing of revascularization is uncertain in patients undergoing TAVR. We performed a meta-analysis to compare the outcomes of staged versus concomitant PCI in patients undergoing TAVR.

Methods: A systemic search of database, including, Medline, EMBASE and Cochrane was done by two independent reviewers to identify relevant studies. Studies were included comparing staged with concomitant PCI for significant CAD in patients undergoing TAVR for severe aortic stenosis. The primary end point was 30 day mortality and secondary end points were risk of acute kidney injury, life threatening bleeding events, fluoroscopy time and contrast volume.

Results: Four studies, including 209 patients were included in the analysis. Overall, 12% of the patient died at 30 days in staged PCI group and 13.2% died in the concomitant PCI group. There was no significant difference in mortality between the two groups (odds ratio [OR], 0.79; 95% CI 0.25 to 2.55, I²=23%). There was no difference in fluoroscopy time ([OR], 2.09; 95% CI 0.89 to 4.71, I²=80%) and risk of bleeding ([OR], 2.08; 95% CI 0.11 to 39.29, I²=76%) between the two groups. The risk of acute kidney injury ([OR], 0.14; 95% CI 0.02 to 0.93, I²=25%) and contrast agent volume ([OR], 0.83; 95% CI 0.17 to 0.48, I²=0%) were significantly higher in the concomitant PCI group as compared to staged PCI group.

Conclusion: There was no difference in short term mortality among staged versus concomitant PCI group in patients undergoing TAVR. Staged PCI may be a preferable option as compared to concomitant PCI group in patients with chronic kidney disease because of increased risk for acute kidney injury in the later group.

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B-027

Title: Chordae Tendineae Rupture in the United States: Trends, Outcomes, Costs and Surgical Interventions

Category: Valvular Interventions and Structural Heart Disease

Authors: Elena Dolomatova, Rutgers University, United States; Kasra Moazzami, Rutgers University, United States; James Maher, Rutgers University, United States; Marc Klapholz, Rutgers University, United States; Justin Sambol, Rutgers University, United States; Alfonso H. Waller, Rutgers University, United States.

Background: Limited data exists regarding the national trends in incidence, mortality, comorbidities, costs, predictors of mortality and trends in surgical interventions in patients with chordae tendineae rupture (CTR).

Methods: Patients who were diagnosed with CTR between 2000 and 2012 were identified in National (Nationwide) Inpatient Sample (NIS) registry. CTR was defined using validated International Classification of Diseases, Ninth Revision, Clinical Modification diagnosis (ICD-9-CM) codes. Patient demographics, severity of comorbidity index, proportion receiving mitral valve repair and replacement, cost and in-hospital mortality were analyzed. A hierarchical multivariable logistic regression model was used to investigate predictors of mortality in this patient population.

Results: A total of 37,287 (14,833 repair, 7780 replacement) CTR cases were identified. Overall, in hospital mortality in CTR decreased by 3% from 2000 to 2012 (p<0.001). From 2000 to 2012, the rate of valve repair increased from 27.2% to 46.4% (p<0.001) with concurrent decrease in the rate of valve replacement (from 27.8 to 17.7%, p<0.001). After multivariate adjustment, patients’ age (OR 1.04 95% CI 1.03-1.06, p<0.001), congestive heart failure (CHF) (OR=2.08 95% CI 1.19-3.64 p=0.01), myocardial infarction (MI) (OR=3.58, 95% CI 2.10-6.11, p<0.001), Deyo/Charlson comorbidity index (OR=1.23 95% CI 1.07-1.41, p<0.003) and use of intra aortic balloon pump (IABP) (OR=4.81 95%CI 2.71-8.55, p<0.001) were found to be independently associated with greater odds of mortality in these patients. Additionally, mitral valve replacement was significantly associated with higher costs of hospitalization (coefficient 15693 95%CI 12638-18749, p<0.001).

Conclusion: Mitral valve repair is associated with reduced inpatient mortality and costs compared with replacement. Substantial increase in the percentage of cases undergoing valve repair with concurrent decrease in cases undergoing replacement were observed. Increasing age and comorbidity index, history of CHF and MI, and use of IABP were identified as factors that could increase the risk of mortality in patients with chordae tendineae rupture.

Disclosures: Elena Dolomatova: This author has nothing to disclose. Kasra Moazzami: This author has nothing to disclose. James Maher: This author has nothing to disclose. Marc Klapholz: This author has nothing to disclose. Justin Sambol: This author has nothing to disclose. Alfonso H. Waller: This author has nothing to disclose.
B-029

Title: Comparison of Outcomes with Surgical Cutdown versus Percutaneous Transfemoral Transcatheter Aortic Valve Replacement

Category: Valvular Interventions and Structural Heart Disease

Authors: Brandon Drafts, Wake Forest University Cardiology, United States; Kunal Sangal, Wake Forest University Cardiology, United States; Michael Cammarata, Wake Forest University Cardiology, United States; Robert Applegate, Wake Forest University Cardiology, United States; Sanjay Gandhi, Wake Forest University Cardiology, United States; David Zhao, Wake Forest University Cardiology, United States

Background: There is limited data comparing transcatheter aortic valve replacement (TAVR) via transfemoral access by surgical cutdown (SC) versus percutaneous (PC) approaches.

Methods: 150 men and women aged 79.8 ± 10.2 years with severe aortic stenosis deemed high or extreme risk for surgery underwent TAVR via TF access. 63 had SC and 87 had PC approaches. 97% of subjects had a successful TAVR and were included in the final analysis. Strategies utilizing adjunctive endovascular ballooning to assist in achieving hemostasis were used when indicated. Valve Academic Research Consortium (VARC-2) outcomes were assessed at an average of 12.1 months after TAVR.

Results: Hospital length of stay post TAVR was shorter for the PC group compared to the SC group (4.2 ± 2.1 vs 7.2 ± 6.6 days; p < 0.001). There were 11/61 (18%) and 14/85 (16%; p = 0.53) any vascular events, and 2/61 (3%) and 2/85 (2%; p = 0.68) major vascular events in the SC and PC groups, respectively. There was no difference in all-cause mortality between the SC (14/61; 23%) and PC groups (17/85 (20%; p = 0.34). Adjunctive endovascular ballooning was used in 33/85 (39%) subjects in the PC group. There was no difference in any (4/33 (12%) vs 3/43 (7%; p = 0.84) or major vascular events (1/33 (3%) vs 1/43 (2%; p = 0.79) in these subjects compared to those who did not receive any adjunctive endovascular intervention, respectively. Conscious sedation was utilized in 39/146 subjects, and was associated with a shorter hospital length of stay compared to general anesthesia (3.7 ± 2.0 vs 6.1 ± 5.4 days; p < 0.001). There were no statistically significant univariate or multivariate predictors of any vascular event at 12 months.

Conclusion: For transfemoral TAVR, the percutaneous approach, when compared to the surgical cutdown approach, is associated with a shorter hospital length of stay with similar risk of vascular complications and all-cause mortality at 12 months. Adjunctive endovascular ballooning is a safe alternative method to assist in achieving hemostasis with the percutaneous approach. Conscious sedation, along with the percutaneous approach, may expedite hospital discharge and reduce cost.

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Brandon Drafts: This author has nothing to disclose.
Kunal Sangal: This author has nothing to disclose.
Michael Cammarata: This author has nothing to disclose.
Robert Applegate: This author has nothing to disclose.
Sanjay Gandhi: This author has nothing to disclose.
David Zhao: This author has nothing to disclose.

B-032

Title: Need for Permanent Pacemaker Implantation Post-Transcatheter Aortic Valve Replacement: Better Prediction of Postoperative Course and the Potential Benefits

Category: Valvular Interventions and Structural Heart Disease

Authors: Erica Fidone, Texas A&M HSC College of Medicine/Baylor Scott & White Health, United States; Justin Price, Texas A&M HSC College of Medicine/Baylor Scott & White Health, United States; David Kidwell, Texas A&M HSC College of Medicine/Baylor Scott & White Health, United States; Matthew Jepson, Texas A&M HSC College of Medicine/Baylor Scott & White Health, United States; Timothy Montalvo, Texas A&M HSC College of Medicine/Baylor Scott & White Health, United States; Dan Langsjoen, Texas A&M HSC College of Medicine/Baylor Scott & White Health, United States; Keith Suarez, Texas A&M HSC College of Medicine/Baylor Scott & White Health, United States; Bryant Curtis, Texas A&M HSC College of Medicine/Baylor Scott & White Health, United States; Greg Olsovsky, Texas A&M HSC College of Medicine/Baylor Scott & White Health, United States; Mark Lawrence, Texas A&M HSC College of Medicine/Baylor Scott & White Health, United States

Background: Cardiac conduction disorders are a frequent complicating factor of Transcatheter Aortic Valve Replacement (TAVR) with incidence of permanent pacemaker implantation (PPM) postoperatively reported at 18% to 49%. Our group set out to identify factors associated with need for PPM post-TAVR to ultimately better predict which patients will require PPM.

Methods: Patient charts were reviewed retrospectively for cardiac conduction disorders, valve implantation depth, need for temporary pacing post-TAVR, total length of stay and intensive care unit (ICU) length of stay. The frequency of PPM postoperatively was also recorded. Our group reviewed 121 TAVR patient charts with 81 meeting criteria. Univariate logistic regression was used to evaluate the association of cardiac conduction disorders with the probability of PPM. Kruskal-Wallis and Fisher’s exact tests were used to evaluate association of ICU and total length of stay and transvenous pacing with the probability of PPM, respectively. The threshold for significance was set at p = 0.025.

Results: Post-TAVR temporary pacing was required in 13.92% of patients and was significantly associated with need for PPM (p < 0.0001). PPM post-TAVR was required in 17.28% with a median time to PPM of 3.5 days. Patients with a preexisting right bundle branch block were 7.38 times more likely to require PPM (95% CI: 1.91-28.48, p = 0.0047). Patients with any level of atrioventricular (AV) block were 56.73 times more likely to require PPM (95% CI: 6.67-482.70, p = 0.0008). Implantation depth was not found to be associated with PPM in subgroup analysis. ICU and total length of stay did not differ significantly between patients requiring or not requiring PPM.

Conclusion: Patients appear to be at greatest risk for requiring PPM post-TAVR if they have RBBB, any level of AV block or require transvenous pacing postoperatively. RBBB, AV block and transvenous pacing were significantly associated with need for PPM (p = 0.0047, p = 0.0008, and p < 0.0001), respectively. Enhanced ability to predict need for PPM could reduce time to PPM post-TAVR in the future; therefore, our group plans to evaluate prospectively if reporting odds of progression to PPM to care teams leads to reduction in ICU and total length of stay.

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Erica Fidone: This author has nothing to disclose.
Justin Price: This author has nothing to disclose.
David Kidwell: This author has nothing to disclose.
Matthew Jepson: This author has nothing to disclose.
Timothy Montalvo: This author has nothing to disclose.
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Keith Suarez: This author has nothing to disclose.
Bryant Curtis: This author has nothing to disclose.
Greg Olsovsky: This author has nothing to disclose.
Mark Lawrence: This author has nothing to disclose.

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B-034

Title: Single Center TAVR Vascular Complication Rates Using Both Self-Expanding and Balloon Expandable Valves Via Transfemoral and Left Subclavian Access Routes

Category: Valvular Interventions and Structural Heart Disease

Authors: Jeffrey Fowler, UPMC Heart and Vascular Institute, United States; Thomas Gleason, UPMC Heart and Vascular Institute, United States; Joon Sup Lee, UPMC Heart and Vascular Institute, United States; Dustin Kliner, UPMC Heart and Vascular Institute, United States; Forozan Navid, UPMC Heart and Vascular Institute, United States; John Schindler, UPMC Heart and Vascular Institute, United States

Background: Major vascular complications (VC) with first generation TAVR systems are frequent and associated with higher one-year mortality. Innovations in technology have lowered the incidence of these complications however they remain the highest reported complication in transfemoral (TF) TAVR. At our center, we have a low threshold to implement a left subclavian artery access (LSCA) strategy when TF is not anatomically feasible. We reviewed the Valve Academic Research Consortium (VARC)-2 vascular complications following TF and LSCA access routes in our program since its inception.

Methods: Single-center series of VARC-2 VC in TAVR via TF or LSCA access sites

Results: From 2011-2015, 452 patients undergoing TAVR were reviewed, 365 (80.8%) via TF, and 87 (19.2%) via LSCA access route. Mean age is 82.4±10.1 years, with a mean Society of Thoracic Surgeons (STS) estimate for mortality of 8.31±4.4 and 10.1±5.9 for TF and LSCA access, respectively. VARC-2 major & minor VC is 3.1% (14 events) and 2.4% (11 events), respectively (Table 1). TF major VC is 2.5% (9 events) with 7 events related to aortic dissection, annulus rupture or left ventricle perforation, not access site. LSCA major VC rate, using both balloon expandable and self expanding valves, is 5.7% (5 events) with 2 events related to aortic dissection, annulus rupture or left ventricle perforation, not access site.

Conclusion: VC rates with TAVR continue to decline as technology matures. VC in this series, especially access-site related complications, are lower than previously reported and these findings support the use of TAVR using a combined TF/LSCA strategy in elderly, low-to-intermediate risk patients.

Table 1: VARC-2 Major & Minor Vascular Complications by Access Route

<table>
<thead>
<tr>
<th>Access Route</th>
<th>Total</th>
<th>TF</th>
<th>LSCA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Major Vascular Complication</td>
<td>452</td>
<td>365</td>
<td>87</td>
</tr>
<tr>
<td>Any aortic dissection, aortic rupture, annulus rupture, left ventricle perforation, or new apical aneurysm pseudo-aneurysm</td>
<td>9 (2.0%)</td>
<td>7 (1.9%)</td>
<td>2 (2.3%)</td>
</tr>
<tr>
<td>Access site or access-related vascular injury dissection, stenosis, perforation, rupture, arterio-venous fistula, pseudo-aneurysm, hematoma, arteriovenous injury, compartment syndrome, percutaneous closure device failure leading to death, life-threating or major bleeding, visceral ischemia, or neurological impairment</td>
<td>1 (0.2%)</td>
<td>0 (0.0%)</td>
<td>1 (0.0%)</td>
</tr>
<tr>
<td>Any new ipsilateral lower extremity ischemia documented by patient symptoms, physical exam, and/or decreased or absent blood flow on lower extremity angiography</td>
<td>4 (0.9%)</td>
<td>1 (0.3%)</td>
<td>3 (3.4%)</td>
</tr>
<tr>
<td>Minor Vascular Complication</td>
<td>11 (2.4%)</td>
<td>7 (1.9%)</td>
<td>4 (4.5%)</td>
</tr>
</tbody>
</table>

Disclosures: Jeffrey Fowler: This author has nothing to disclose. Thomas Gleason: This author has nothing to disclose. Joon Sup Lee: This author has nothing to disclose. Dustin Kliner: This author has nothing to disclose. Forozan Navid: This author has nothing to disclose. John Schindler: This author has nothing to disclose.

B-035

Title: Predictors of 1-year Clinical Outcomes following Percutaneous Balloon Aortic Valvuloplasty for Severe Aortic Stenosis

Category: Valvular Interventions and Structural Heart Disease

Authors: Deepakraj Gajanana, Albert Einstein Medical Center, United States; David Hsi, Deborah Heart & Lung Institute, United States; David Wheeler, Albert Einstein Medical Center, United States; Jon George, Albert Einstein Medical Center, United States

Background: Percutaneous balloon aortic valvuloplasty (PBAV) is a palliative therapeutic option for relief of severe aortic stenosis (AS) in patients that are poor surgical or transcatheter aortic valve replacement (TAVR) candidates or as a bridge to definitive therapy. The outcomes following PBAV are highly variable and no study to date has identified factors that correlate with outcomes. The purpose of this study was to identify clinical predictors at the time of the index procedures that can predict 1-year survival or need for repeat PBAV.

Methods: Demographic and procedural information of 505 PBAVs performed on 388 patients from January 1999 to December 2012 were reviewed. Patients were stratified by all cause mortality within 1 year of index PBAV and need for repeat PBAV within 1 year of index procedure. Predictors were statistically compared using Chi-square tests or Students’ t-test.

Results: Of the 388 patients analyzed, 145 (37.4%) expired within 1 year following the index procedure. Both the presence of CHF due to AS and the need for a pacer were statistically correlated with survival (p=0.001 and p=0.045 respectively). Patients who survived (22.9%) required a repeat PBAV within the first year (mean time to repeat PBAV=179 days). Higher rates of CHF (p=0.0035) were seen in the cohort of patients who required a repeat PBAV. Patients requiring repeat...
procedure within 1 year also had fewer number of balloon inflations (2.09 vs 2.54, p=0.07) during index procedure. Furthermore, as the number of inflations increased from 1-2 to 2+, the need for repeat PBAV decreased (18.5% to 10.3%, p=0.069) with no appreciable change in 1-year mortality (35.3% vs 37.1%, p=0.87).

Conclusion: PBAV provides a modest improvement in valve function and continues to be a safe and feasible option in experienced hands for select patients that are high risk for surgery or TAVR. The use of additional inflations during PBAV and ΔMG > 20 mmHg resulted in better long-term outcomes.

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Daniel Garcia: This author has nothing to disclose.
David Hsi: This author has nothing to disclose.
David Wheeler: This author has nothing to disclose.
Jon George: This author has nothing to disclose.

B-037

Title: Percutaneous pulmonary vein intervention for the treatment of symptomatic stenosis after pulmonary vein isolation
Category: Valvular Interventions and Structural Heart Disease
Authors: Daniel Garcia, Ochsner Heart And Vascular Institute, United States; Mohammad Ansari, Metro Health Heart and Vascular Institute, Metro Health Hospital - MSU, United States; Rhanderson Cardoso, University Of Miami - Miller School Of Medicine/Jackson Memorial Hospital, United States; Eric Horlick, University of Health Network, Canada

Background: Pulmonary vein radiofrequency ablation used for treatment of drug refractory atrial fibrillation can lead to pulmonary vein stenosis (PVS) (> 70% luminal stenosis). We aimed to evaluate the role of percutaneous intervention (PCI) including angioplasty and stenting for PVS treatment.

Methods: We searched Pub Med and Cochrane trough October 2015 for all the clinical data that used either angioplasty or stenting for treatment of symptomatic PVS. Primary outcome was a direct comparison of restenosis rate after angioplasty and stenting. Secondary endpoints were overall symptoms improvement and re-stenosis after PCI. We used random effect analysis according to the Cochrane-Handbook of Systematic Reviews and RevMan 5.2 for statistical analysis.

Results: Out of 140 articles, 6 clinical studies were included in the analysis. The pooled data provided a total of 116 patients and 191 stenotic vessels, 107 treated with angioplasty and 84 with stenting. We used three studies for primary endpoints and there was no difference in re-stenosis between stenting group and angioplasty (30% vs. 55%, p=1) (Figure 1). Total occurrence of re-stenosis was 48%. Almost all the patients (96%) became asymptomatic after procedure.

Conclusion: Percutaneous intervention of PVS leads to symptoms improvement and might be a feasible treatment option. Angioplasty and pulmonary vein stenting might offer similar results; hence randomized trials should be pursued.

Disclosures: Daniel Garcia: This author has nothing to disclose.
Mohammad Ansari: This author has nothing to disclose.
Rhanderson Cardoso: This author has nothing to disclose.
Eric Horlick: This author has nothing to disclose.

B-039

Title: Early Outcomes of Transcatheter Aortic Valve Replacement in Patients with Mixed Aortic Valve Stenosis: Results From a Single-Center Registry
Category: Valvular Interventions and Structural Heart Disease
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Background: Little is known regarding the clinical correlates and impact of severe aortic stenosis (AS) with concomitant aortic regurgitation (AR) in patients undergoing transcatheter aortic valve replacement (TAVR). We sought to investigate periprocedural and 30-day outcomes in patients with mixed aortic stenosis (MAS) undergoing TAVR.

Methods: All consecutive patients undergoing TAVR at our center (Mount Sinai Hospital, New York City, New York) between May 2012 to November 2015 have been included in the study cohort and retrospectively analyzed. Study population was categorized according to the presence of MAS (defined as the combination of severe AS and moderate or severe AR) and pure AS (PAS; defined as the combination of severe AS with none or mild AR). The median post-procedural follow-up time was 30 days.

Results: Out of 336 patients who underwent TAVR at our center, 53 (16%) had MAS. Of them, 48 (90.6%) had moderate AR and 5 (9.4%) had severe AR. Patients with MAS were younger, more commonly asymptomatic, in I or II NYHA class, but with higher prevalence of previous endocarditis and previous cardiac surgery. STS risk score was similar between MAS and PAS patients (8.0±5.1 vs. 9.2±5.9; p=0.24). Compared with patients with PAS, those with MAS had higher incidence of post-procedural moderate or severe peri-valvular AR (7.5% vs. 2.5%; p=0.03). Thirty-day outcomes are resumed in Figure 1. Patients with MAS had significantly higher rates of in-hospital readmission (13.2% vs. 6.4%; p=0.04), and numerically higher rates of stroke (3.8% vs. 1.8%; p=0.35) and all-cause death (9.4% vs. 6.4%; p=0.42).

Conclusion: Patients with MAS exhibited a different clinical profile compared with patients with PAS. MAS was associated with higher incidence of post-procedural perivalvular AR, 30-day in-hospital readmission and possibly stroke and death. Larger studies investigating short- and long-term outcomes in patients with this anatomical lesion subset undergoing TAVR are warranted.

Disclosures: Gennaro Giustino: This author has nothing to disclose.
Usman Baber: This author has nothing to disclose.
Melissa Aquino: This author has nothing to disclose.
George Dangas: 1 Moderate
Sandeep Basnet: This author has nothing to disclose.
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Prakash Krishnan: This author has nothing to disclose.
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Roxana Mehran: 1 Moderate
Annapoorna Kini: This author has nothing to disclose.
Samin Sharma: This author has nothing to disclose.

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Title: Simultaneous Transcatheter Aortic Valve Replacement and Percutaneous Coronary Intervention – A Retrospective Study Evaluating Mortality, Incidence of Acute Kidney Injury and Radiation Exposure

Category: Valvular Interventions and Structural Heart Disease
Authors: Alireza Heshmat, University of Texas Medical School at Houston, Division of Cardiology, United States; Michael Schechter, University of Texas Medical School at Houston, Division of Cardiology, United States; Alexander Postalian, University of Texas at Houston, United States; Alexander Postalian, University of Texas Medical School at Houston, Division of Cardiology, United States; Salman Arain, University of Texas Medical School at Houston, Division of Cardiology, United States; Tom Nguyen, University of Texas Health Science Center at Houston, United States; Tom Nguyen, University of Texas Medical School at Houston, Division of Cardiology, United States; Richard Smalling, University of Texas Medical School at Houston, Division of Cardiology, United States; Prakash Balan, University of Texas Medical School at Houston, Division of Cardiology, United States

Background: Transcatheter aortic valve replacement (TAVR) is an alternative technique to surgical aortic valve replacement (AVR) for patients with severe aortic stenosis. A subset of patients that undergo TAVR must also undergo percutaneous coronary intervention (PCI) if they have clinically significant coronary artery disease. This is not uncommon given the advanced age and comorbidities of this patient population. The optimal timing to perform PCI in patients that will undergo TAVR may affect clinical outcomes and overall healthcare system utilization. With this study, we aim to determine if there are differences in radiation exposure, contrast administration, change in creatinine, and intensive care unit length of stay when comparing patients that underwent simultaneous TAVR and PCI as opposed to those that underwent both procedures in a staged fashion.

Methods: This is a retrospective study that included thirty four patients who had undergone PCI within 30 days of TAVR. The population was separated into those who underwent simultaneous TAVR/PCI and those who had the procedures staged within 30 days. Twenty patients (age 80.7 ± 7.1) underwent TAVR and PCI simultaneously. Fourteen patients (age 81.2 ± 8.2) underwent TAVR and PCI within 30 days. The contrast volume, fluoroscopy time, and change in kidney function were analyzed.

Results: Patients who received simultaneous TAVR and PCI received more contrast volume (192.4ml±69.5 vs 102.1ml±36.5, p<0.001) and more fluoroscopy time (23.4min±11.6 vs 14min±6.5, p=0.004) during the TAVR procedure. There was no significant differences in the length of ICU stay (p=0.064), total length of stay (p=0.823), or change in kidney function at 48 hours (1.2 ± 0.4mg/dL vs 1.3mg/dL ±0.4, p=0.249) or at 72 hours (1.2mg/dL±0.5 vs 1.5mg/dL±0.8, p=0.328).

Conclusion: In this small subset of patients, simultaneous PCI and TAVR or staged within 30 days has comparable outcomes with the exception of contrast and fluoroscopy time. This study is a retrospective analysis that may have a selection bias based on patient’s chronic conditions. Larger, randomly selected trials will be needed to provide more substantial information.

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Memphis/Methodist Lebonheur, United States; Ellis Christian, University of Tennessee In Memphis/Methodist Lebonheur, United States; Saibal Kar, Cedars-Sinai Heart Institute, United States; Uzoma Ibebuogu, University of Tennessee In Memphis/Methodist Lebonheur, United States

**Background:** Due to abnormal valve geometry and the presumed risk for residual aortic regurgitation, patients with bicuspid aortic valves (BAV) have been contraindicated in many transcatheter aortic valve replacement (TAVR) trials resulting in very limited data with regards to the safety and efficacy of TAVR in this patient population.

**Methods:** Studies including case reports, case series and original articles published between 2002 and 2015 with regards to TAVR in patients with BAV were identified with a systematic electronic search using the PRISMA statement. Only studies reporting data on demographic and procedural characteristics, management and follow up outcomes were analyzed.

**Results:** A total of 23 publications describing 427 patients were identified. Most (58%) patients were men, with a mean age of 77.8 years and a mean logistic Euroscore of 17.9 ± 4.2%. A self-expanding valve was used in 61% of cases. The reported TAVR access site was 80% femoral, 10% transapical and 6% transaortic. The mean aortic valve gradient reduced from 50.7 ± 7.1 mmHg to 10.6 ± 3.3 mmHg. The mean aortic annular diameter and ascending aorta size were 22.8 ± 4.8 mm and 36.8 ± 6.1 mm respectively. Vascular complications including aortic dissection occurred in 12% while 21% had at least moderate paravalvular regurgitation. Permanent pacemaker implantation rate was 21.5%. In hospital stroke and mortality was 1.8% and 6.6% respectively. The 30-day and 1-year mortality were 7.1% and 15.5% respectively. Open-heart surgery was required in 2.7%.

**Conclusion:** TAVR in patients with BAV is associated with a high incidence of paravalvular regurgitation, vascular complications, pacemaker rate and 30-day mortality with a favorable 1-year mortality rate.

**Disclosures:**
Tamuoinemi Bob-Manuel: This author has nothing to disclose.
Mark Heckle: This author has nothing to disclose.
Oluwaseyi Bolorunduro: This author has nothing to disclose.

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**B-005**

**Title:** Safety and Efficacy of the Endovascular Left Atrial Appendage Exclusion Devices: A Systematic Review and Meta-analysis.

**Category:** Valvular Interventions and Structural Heart Disease

**Authors:** Arun Kanmanthareddy, Creighton University School of Medicine, United States; Avanija Buddam, Creighton University School of Medicine, United States; Dixitha Anugula, Creighton University School of Medicine, United States; Venkata Alla, Creighton University School of Medicine, United States; Scott Lilly, Ohio State University Medical Center, United States; Claire Hanter, Creighton University School of Medicine, United States; Aryan Mooss, Creighton University School of Medicine, United States; Michael White, Creighton University School of Medicine, United States; Michael Del Core, Creighton University School of Medicine, United States; Dennis Esterbrooks, Creighton University School of Medicine, United States; Manu Kaushik, Creighton University School of Medicine, United States; Madhu Reddy, The University Of Kansas Medical Center, United States; Dhanunjaya Lakkirreddy, The University Of Kansas Medical Center, United States

**Background:** Endovascular left atrial appendage (LAA) exclusion devices are emerging as an alternative to oral anticoagulation (OA) in atrial fibrillation (AF) patients with contraindication to OA.

**Methods:** We searched PubMed, EBSCO and Google Scholar databases to identify studies on endovascular LAA exclusion devices. Endpoints of procedural success, pericardial tamponade, device embolization, thrombus formation, stroke and death were collected from the included studies. Cumulative incidence rates per 100 procedures with 95% confidence intervals (CI) were calculated for the individual devices and overall group.

---

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Amplatzer Cardiac Plug</th>
<th>Watchman Device</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Procedural success</strong></td>
<td>97% (96-98)</td>
<td>93% (89-96)</td>
<td>96% (93-97)</td>
</tr>
<tr>
<td><strong>Device embolization</strong></td>
<td>2% (1-3)</td>
<td>1% (0-1)</td>
<td>1% (1-2)</td>
</tr>
<tr>
<td><strong>Tamponade</strong></td>
<td>2% (1-3)</td>
<td>2% (1-4)</td>
<td>2% (2-3)</td>
</tr>
<tr>
<td><strong>Thrombus</strong></td>
<td>4% (1-18)</td>
<td>1% (0-2)</td>
<td>2% (1-8)</td>
</tr>
<tr>
<td><strong>Stroke</strong></td>
<td>1% (1-3)</td>
<td>4% (1-8)</td>
<td>2% (1-4)</td>
</tr>
<tr>
<td><strong>Death</strong></td>
<td>2% (1-5)</td>
<td>5% (3-9)</td>
<td>4% (2-6)</td>
</tr>
</tbody>
</table>
Results: There were 4 studies on WATCHMAN device (n=1438) and 8 studies on Amplatzer cardiac plug (ACP) (n=634). These devices were successfully implanted in 96% (95% CI 93–96) of the subjects. Device embolization occurred in 1% (95% CI: 0 - 1) of the subjects with slightly higher incidence in the ACP group 2% (95% CI: 1 – 5). Tamponade events were similar in the two groups and the overall incidence was 2% (95% CI: 2-3). There was a higher incidence of thrombus formation in the ACP group 4% (95% CI 1-18). There was a slightly higher incidence of stroke in the WATCHMAN group (4%, 95% CI: 1-8) than the ACP group (1%, 95% CI: 1 – 3). Also the mortality was slightly lower in the ACP group 2% (95% CI: 1-5) compared to WATCHMAN group 5% (95% CI: 3-9).

Conclusion: Endovascular exclusion of the LAA can be successfully achieved in 96% of the patients but are associated with small risk of complications and death.

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Arun Kannanathareddy: This author has nothing to disclose.
Avaniya Buddhram: This author has nothing to disclose.
Dixitha Anugula: This author has nothing to disclose.
Venkata Alla: This author has nothing to disclose.
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Manu Kaushik: This author has nothing to disclose.
Madhu Reddy: This author has nothing to disclose.
Dhanunjaya Lakireddy: This author has nothing to disclose.

B-051
Title: Supersizing The Left Ventricular Outflow Tract: Optimal Balloon Sizing for Percutaneous Aortic Balloon Valvuloplasty Utilizing 2D Transthoracic Echocardiogram (TTE)
Authors: Janakkumar Kansagra, Henry Ford Hospital, United States; Dee Dee Wang, Henry Ford Hospital, United States; Marvin Eng, Henry Ford Hospital, United States; Haydar Ali, Henry Ford Hospital, United States; Heider Arjomand, Henry Ford Hospital, United States; Pradeep Yadav, Henry Ford Hospital, United States; Patrick Karabon, Henry Ford Hospital, United States; Adam Greenbaum, Henry Ford Hospital, United States; William O’Neill, Henry Ford Hospital, United States

Background: It is well-established that 2D Transthoracic Echocardiogram (TTE) undersizes the left ventricular outflow tract (LVOT) diameter and aortic annulus diameter compared to computed tomographic (CT) data. In patients without an available CT, there is no established conversion for operators to use in integrating 2D TTE LVOT diameters for balloon sizing of optimal percutaneous balloon aortic valvuloplasty (pBAV) results. This study examines if there is an optimal safe zone for upsizing 2D TTE LVOT diameters for maximal pBAV results.

Methods: 187 consecutive patients who underwent TAVR July 2014-August 2015 were retrospectively studied. 68 patients required pBAV prior to TAVR. Balloon area and sizing were derived from manufacturer diameters. All patients had 2D TTE prior to discharge. Optimal balloon area to CT aortic annulus ratio (BA/CTa) for maximal improvement in BAV gradients were derived by ROC curve analysis. Within this subgroup, the difference in balloon diameter size chosen was compared to 2D TTE LVOT diameters and examined for major adverse cardiac outcomes.

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Results: By ROC curve analysis, when CT is available pre BAV, a [balloon area]/[CT aortic annulus area] ratio (BA/CTa) of >0.85 resulted in greatest improvement of post BAV echocardiographic aortic valve parameters than a ratio ≤0.85 (p<0.01). In the BA/CTa > 0.85 group, the mean difference between balloon diameter and 2D TTE LVOT diameter was 2.8±1.3 mm. In the BA/CTa ≤0.85 group, the mean difference in balloon diameter to LVOT diameter was 1.37±1.3mm. Average Diameter difference between balloon and LVOT was larger by 1.5 mm in BA/CTa > 0.85 group (p<0.01). There were no major adverse cardiac events, specifically no aortic dissections or deaths. The degree of aortic insufficiency, if present, post BAV, did not vary significantly (p=0.5).

Conclusion: In the absence of an available pre-procedural CT, when using 2D transthoracic measured LVOT diameter for balloon diameters, this value may be safely upsized by 14.6% for maximal balloon size selection to enable optimal percutaneous balloon aortic valvuloplasty results without an associated increase in major adverse cardiovascular events.

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Janakkumar Kansagra: This author has nothing to disclose.
Dee Dee Wang: This author has nothing to disclose.
Marvin Eng: This author has nothing to disclose.
Haydar Ali: This author has nothing to disclose.
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Pradeep Yadav: This author has nothing to disclose.
Patrick Karabon: This author has nothing to disclose.
Adam Greenbaum: This author has nothing to disclose.
William O’Neill: This author has nothing to disclose.

B-052
Title: Do Unplanned Hospitalizations Before Transcatheter Aortic Valve Replacement Influence Outcomes?
Category: Valvular Interventions and Structural Heart Disease
Authors: Omar Kreidieh, University of Miami Palm Beach Regional Campus, United States; Jesus Pino, University of Miami Palm Beach Regional Campus, United States; Mistyann Miller, University of Miami Palm Beach Regional Campus, United States; Robert Chait, University of Miami Palm Beach Regional Campus, United States; Julio Mercado, University of Miami Palm Beach Regional Campus, United States; Lawrence Lovitz, University of Miami Palm Beach Regional Campus, United States; Marcus Nores, University of Miami Palm Beach Regional Campus, United States; Dixitha Anugula, University of Miami Palm Beach Regional Campus, United States; Marcus Nores, University of Miami Palm Beach Regional Campus, United States; Janakkumar Kansagra, Henry Ford Hospital, United States; Pradeep Yadav, Henry Ford Hospital, United States; William O’Neill, Henry Ford Hospital, United States; Heider Arjomand, Henry Ford Hospital, United States; Pradeep Yadav, Henry Ford Hospital, United States; Patrick Karabon, Henry Ford Hospital, United States; Adam Greenbaum, Henry Ford Hospital, United States; William O’Neill, Henry Ford Hospital, United States

Background: Selection of patients to undergo transcatheter aortic valve replacement (TAVR) includes a thorough evaluation of risk in order to balance benefit versus possible futility. Many clinicians consider recent hospitalizations relevant during decision-making, but the exact impact of such hospitalization on patient outcomes is unknown.

Methods: We conducted a retrospective chart review of patients who underwent TAVR at a single cardiovascular center. We identified patients who were hospitalized within a thirty-day period preceding the procedure (excluding hospitalization for scheduled TAVR workup). All data was analyzed using SPSS Statistics 22.

Results: There were 217 patients who underwent TAVR between July 2013 and August 2015. Follow-up data was available for all patients at one month and for eighty-five patients at one year. Thirty-five percent of patients were hospitalized within the 30-day period preceding TAVR procedure, with CHF being the most common cause. The population mean age was 85 ± 6 years, albumin was 3.4 ± 0.5 g/dl, ejection fraction was 51±17%, Society of Thoracic Surgeons’ (STS) risk score was 7.3 ± 4.1, and 102 patients were female. These baseline
characteristics were similar between hospitalization groups except for a slightly lower albumin in recently hospitalized patients. Mortality was similar between recently hospitalized and un-hospitalized patients: 5.2% VS 5.0% (p-value = 0.95) at one month and 19.2% VS 25.4% (p-value = 0.535) at one year. Length of stay was similar between groups: 7.9 ± 4.6 days VS 8.1 ± 4.2 days (p-value = 0.80) respectively. There was no difference in the incidence of total in-hospital adverse-events, bleeding events, stroke, or need for pacemaker.

**Conclusion:** At an experienced cardiovascular center, TAVR in recently hospitalized patients was found to be safe and had similar short-term and long-term outcomes compared to patients without preceding hospitalization.

**Disclosures:**
- Omar Kreidieh: This author has nothing to disclose.
- Jesus Pino: This author has nothing to disclose.
- Mistynn Miller: This author has nothing to disclose.
- Robert Chait: This author has nothing to disclose.
- Julio Mercado: This author has nothing to disclose.
- Lawrence Lovitz: This author has nothing to disclose.
- Marcus Nores: This author has nothing to disclose.

**B-055**

**Title:** Device-associated thrombus formation after left atrial appendage occlusion: A systematic review of events reported with the Watchman, the Amplatzer Cardiac Plug and the Amulet

**Category:** Valvular Interventions and Structural Heart Disease

**Authors:** Mathieu Lempereur, University Hospital Liège, Belgium; Victor Legrand, University Hospital Liège, Belgium; Christophe Martinez, University Hospital Liège, Belgium; Olivier Gach, University Hospital Liège, Belgium; Laurent Davin, University Hospital Liège, Belgium; Laurent Davin, University Hospital Liège, Belgium; Marie Moonen, University Hospital Liège, Belgium; Raluca Dulgheru, University Hospital Liège, Belgium; Adel Aminian, Centre Hospitalier Universitaire de Charleroi, Belgium

**Background:** Device-associated thrombosis (DAT) is known as a complication of left atrial appendage occlusion (LAAO) but has yet to be fully evaluated. This study aimed to provide a systematic review of DAT after LAAO with the Watchman, the Amplatzer Cardiac Plug (ACP) and the Amulet devices.

**Methods:** A comprehensive search of the PubMed database was conducted from January 1, 2008 to September 30, 2015. Studies reporting DAT events were included for the current analysis. All other studies reporting no case of DAT were also searched and used to assess the overall incidence of DAT.

**Results:** A total of 30 studies described DAT events. Taking into account studies with no event of DAT reported, the overall incidence of DAT was 3.9%. The median time from procedure to diagnosis of DAT was 1.5 month (IQR: 0-2.9). Most cases were diagnosed with follow-up transoesophageal echocardiogram (TEE). The treatment consisted in low molecular weight (LMWH) in 45.5% of cases and oral anticoagulation (OAC) or other (IV Heparin, combined therapy...) in 54.5%. Thrombus resolution was achieved in 100% with LMWH and 89.5% with OAC. Treatment duration varied greatly with median treatment duration was 45 days (IQR: 14-135). Complications related to DAT consisted in neurologic events, including 2 TIA and 4 ischemic stroke. Risk factors for DAT were identified in a few cases.

**Conclusion:** DAT is a rare complication of percutaneous LAAO. It occurs mainly early after the procedure and is associated with a low rate of neurological complications. In the majority of cases, diagnosis is made during FU imaging with TEE. Anticoagulation treatment seems to be safe and highly effective. Further studies are needed to evaluate the optimal management of DAT.

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- Mathieu Lempereur: This author has nothing to disclose.
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- Christophe Martinez: This author has nothing to disclose.
- Olivier Gach: This author has nothing to disclose.
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- Laurent Davin: This author has nothing to disclose.
- Marie Moonen: This author has nothing to disclose.
- Raluca Dulgheru: This author has nothing to disclose.
- Adel Aminian: This author has nothing to disclose.

**B-058**

**Title:** Cerebral Embolic Protection Device (CEPD) designed with innovative Dynamic, Double-Edge Sealing for use during TAVR

**Category:** Valvular Interventions and Structural Heart Disease

**Authors:** John Webb, St. Paul’s Hospital, University of British Columbia, Canada; Michael Reardon, Methodist DeBakey Heart & Vascular Center, United States; Axel Linke, Heart Center, University of Leipzig, Germany; Colin Barker, Methodist DeBakey Heart & Vascular Center, United States; Howard Feldman, Mercy Regional Medical Center, United States; Robert Bersin, Swedish Heart & Vascular, United States; Ehrin Armstrong, Denver VA Medical Center, United States; Seph Fariabi, None, United States; Abe Zandi, None, United States; Eric Goslau, None, United States; Dave Nevrla, None, United States

**Background:** Clinical stroke during TAVR has been attributed to embolic events. Available CEPD have been introduced in the market with the intention to filter or deflect debris during TAVR. The concept of Dynamic, Double Edge sealing for CEPD was considered to achieve a greater outcome in clinical performance.

Sealing advantages, biomechanical stability and anchoring methods of available CEPD are reviewed. The review illustrates a distinction from existing filters against the Dynamic, Double Edge Sealing concept. Force based, continuous, double edge, redundant sealing against the aortic wall prevents unfiltered embolic edge flow. The sealing force is independent of blood pressure and artery wall movement.

The design is based on the principle that a dynamic pressure is required for sealing against the flexible and shape changing aortic wall at all times. The CEPD lateral, axial and longitudinal anchoring, is independent of the biomechanical changes of the arch during the cardiac output pressure cycle.

The CEPD structure anchors to the oblong aortic wall at all times as the protection filter spans all three great vessels. The CEPD simultaneously pushes against the wall while its position relative to the Great Vessels is unchanged. The CEPD is designed to not relinquish the seal at the aortic wall interface.

**Methods:** Limited sealing tests were performed in a validated pulsatile, anatomical flow model and swine model. Tests are retrospectively compared and verified by Finite Element Analysis.

**Results:** Successful *in vitro* and *in vivo* tests revealed a decrease in the number of “emboli” entering the three protected cerebral arteries. A force based device was also associated with a significant reduction in unfiltered debris flow around the edge of the device, effectively sealing off the cerebral arteries from procedure based emboli. Test data was compared with previously published CEPD test data. The quantity of blocked emboli with and without the filter found in the cerebral flow was significantly reduced.
Conclusion: Use of a unique force based CEPD designed for Dynamic, Double Edge Sealing significantly reduced the number of emboli entering the cerebral arteries of the models. Laboratory results confirmed the Finite Element Analysis.

Disclosures:
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B-062
Title: Impact of Paravalvular Regurgitation on Clinical Outcomes One Year After Transcatheter Aortic Valve Replacement
Category: Valvular Interventions and Structural Heart Disease
Authors: Rafael Meneguz-Moreno, Dante Pazzanese Institute of Cardiology, Brazil; Mayra Zumarraga, Dante Pazzanese Institute of Cardiology, Brazil; Antonio Castro-Filho, Dante Pazzanese Institute of Cardiology, Brazil; Auristela Ramos, Dante Pazzanese Institute of Cardiology, Brazil; Andrea Jeronimo, Dante Pazzanese Institute of Cardiology, Brazil; David Bihan, Dante Pazzanese Institute of Cardiology, Brazil; Rodrigo Barreto, Dante Pazzanese Institute of Cardiology, Brazil; Adriana Moreira, Dante Pazzanese Institute of Cardiology, Brazil; Dinytri Siqueira, Dante Pazzanese Institute of Cardiology, Brazil; Alexandre Abizaid, Dante Pazzanese Institute of Cardiology, Brazil; Amanda GMR Sousa, Dante Pazzanese Institute of Cardiology, Brazil; J Eduardo Sousa, Dante Pazzanese Institute of Cardiology, Brazil

Background: The impact of paravalvular regurgitation (PVR) following transcatheter aortic valve replacement (TAVR) remains uncertain. In this analysis, we sought to evaluate the impact of varying degrees of PVR on both mortality and re-hospitalization as a primary end-point one year after TAVR.

Methods: At two tertiary cardiologic centers 260 consecutive patients were submitted to TAVR with three different prostheses. Patients were analysed after stratifying by severity of post-implant PVR.

Results: PVR was graded as none/trace/mild in 92.0% (n=333) and moderate/severe in 7.1% (n=18). There were significant differences in baseline clinical and echocardiographic characteristics, such as higher levels of aortic calcification (22% vs. 6%, p=0.03), serum creatinine (1.53 ± 0.71 vs. 1.18 ± 0.43 mg/dL, p=0.014), and lower aortic valve area, (0.61 ± 0.12 vs. 0.69 ± 0.17 cm², p=0.05) and left ventricular (LV) ejection fraction (49.17 ± 14.79% vs. 58.82 ± 12.14%, p=0.009) on PVR group. As expected, during procedure, post-dilatation (p=0.025) and higher balloon diameter for this dilatation (p=0.043) were predictors of PVR. Type of prosthesis (p=0.336) and their size (p=0.522) did not influence PVR At 1-year all-cause mortality were similar in both groups (16.7% vs. 12%, p=0.081) as well as re-hospitalization (11.1% vs. 7.3%, p=0.915). At one year, there was no difference between both groups towards stroke, myocardial infarction and vascular complications. Furthermore, at 6 months there was no difference in New York Heart Association (NYHA) functional class III-IV (0% vs. 5.5%, p=0.857) whereas after one year, PVR group had worse dyspnea (46.7% vs. 21.4%, p=0.047). A multivariable analysis indicated that the presence of moderate/severe PVR was not associated with higher long-term mortality (HR: 0.76, 95% CI 0.27-2.13, p=0.864), re-hospitalization (HR: 1.08, 95% CI 0.25-4.69, 0.915), or even combined end-point (HR: 0.77, 95% CI 0.28-2.13, p=0.613).

Conclusion: Differences in baseline characteristics and during procedure may increase the risk of this PVR. Despite these differences, in this
sample, moderate/severe PVR did not predicted higher 1-year mortality or re-hospitalization.

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Rafael Meneguz-Moreno: This author has nothing to disclose.
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B-063

Title: Comparison of intracardiac echocardiography with transthoracic echocardiography during minimalist approach to implantation of transcatheter aortic valve.

Category: Valvular Interventions and Structural Heart Disease

Authors: Robert Merritt, Mercy Hospital Springfield, United States; Anoop Parameswaran, Mercy Hospital Springfield, United States; Debbie Horine, Mercy Hospital Springfield, United States

Background: We compared intracardiac echo (ICE) and transthoracic echocardiography (TTE) for the evaluation of paravalvular regurgitation (PVR) in patients undergoing conscious sedation TAVR.

Methods: 24 consecutive patients undergoing ICE and both intraprocedural (ipTTE) and post procedural (ppTTE) for TAVR were studied. Images were assessed for quality on a scale of 1 (excellent) to 4 (poor) based on leaflet and vena contracta visualization at the annulus. PVR was graded based on the Valve Academic Research Consortium 2 guidelines using the circumferential extent of the PVR jet (<10% = mild, 10-29% moderate and >30% severe).

Results: ICE image quality after the learning curve (15 cases) was 1.93 and was significantly superior to the image quality during the learning curve (3.67 for the initial 9 cases); p = 0.001.
The average TTE quality (ipTTE + ppTTE) for all 24 cases was 3.0 (fair), ppTTE image quality improved to 2.65 (fair to good). The quality between ipTTE and ppTTE was significant with p = 0.003 in favor of ppTTE for the assessment of PVR.

ICE imaging was statistically better than ipTTE for evaluation of PVR (p = 0.02). ICE quality for all 24 patients compared to ppTTE was not statistically different (ICE = 2.58; TTE at 2.65). After the learning curve, there was a trend towards improved quality that did not reach statistical significance; ICE N = 15; ppTTE N = 24 (p = 0.17).
ICE graded more studies as having moderate PVR (43%) compared to TTE (21%). Conversely PVR was graded as mild by ICE in 57% versus 79% by TTE.

During the study there were no ICE related adverse outcomes demonstrated for the 24 patients. In addition there were no pacemaker dislodgments during ICE catheter manipulation.

Conclusion: This study of ICE in the setting of “minimalist approach” to TAVR (conscious sedation without TEE) demonstrates the feasibility of using ICE as a primary imaging modality during TAVR. ICE demonstrated a reasonable learning curve. The ICE images showed a greater number of cases with moderate degrees of PVR compared to ppTTE.

ICE appears to be safe and effective for evaluating post implant PVR. Further study will be necessary to evaluate operator learning cost, and sensitivity of ICE as a modality for intraprocedural assessment of TAVR and prosthetic regurgitation.

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Robert Merritt: This author has nothing to disclose.
Anoop Parameswaran: This author has nothing to disclose.
Debbie Horine: This author has nothing to disclose.

B-064

Title: Neurological Outcomes and Mortality Associated with Transcather versus Surgical Aortic Valve Replacement: A Meta-Analysis of Studies

Category: Valvular Interventions and Structural Heart Disease

Authors: Mayank K Mittal, University of Missouri Columbia, United States; Jad Omran, University of Missouri Columbia, United States; Belal Firwana, University of Arkansas for Medical Sciences, United States; Poonam Velagapudi, University of Missouri Columbia, United States; Vishal Gupta, Borgess Heart Institute, Borgess Medical Center, United States; Arun Kumar, University of Missouri Columbia, United States; Arun Kumar, University of Missouri Columbia, United States; Kul Aggarwal, University of Missouri Columbia, United States; Kul Aggarwal, University of Missouri Columbia, United States

Background: Transcatheter aortic valve replacement (TAVR) has emerged as a promising alternative to Surgical AVR (SAVR). Nowadays, candidacy for TAVR is considered in patients who have a high-risk surgical profile. Nevertheless, neurological complications associated with TAVR may hamper the moment, and their true incidence compared to SAVR remains unknown.

Methods: MEDLINE, EMBASE and the Cochrane Central Register of Controlled Trials were queried till December 2015. Only studies comparing TAVR to SAVR were included. Two reviewers selected, appraised studies and extracted data using a pre-specified work sheet. Random effect meta-analysis methods was used to pool outcomes across studies. Heterogeneity of treatment effect among studies was assessed using I2 statistics. Publication bias was assessed using inspection of funnel plots. Primary endpoints were major stroke at 1 and 12 month. Secondary endpoints were transient ischemic attacks (TIA), any stroke (major and minor) and mortality at 1 and 12 months.

Results: A total of 4167 patients were included from five studies (3 RCTs, 1 cohort and 1 observational study) meeting the inclusion criteria and comparing TAVR to SAVR in patients undergoing AVR. No evidence of publication bias was detected. Compared to SAVR, TAVR had similar outcomes in terms of major stroke incidence at 1month (RR 1.30; 95% CI 0.74 to 2.29) and 12 months (RR 1.10; 95% CI 0.56 to 2.16). Outcomes were similar when compared in terms of TIA, any stroke and mortality at 12 months. 1 month mortality was lower in patients underwent TAVR (RR 0.7; 95% CI 0.5 to 0.96).

Conclusion: In patients undergoing AVR, both TAVR and SAVR had similar neurological outcomes at 1 and 12 months. One month mortality was lower in TAVR patients.

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Jad Omran: This author has nothing to disclose.
Belal Firwana: This author has nothing to disclose.
Poonam Velagapudi: This author has nothing to disclose.
Vishal Gupta: This author has nothing to disclose.
Background: Non reduction of Pulmonary artery pressure, following Balloon mitral valvuloplasty (BMV) in patients with pulmonary hypertension is not uncommon. It has been shown that in cases with mild PAH, the Pulmonary artery systolic pressure (PASP) and the pulmonary vascular resistance (PVR) decreased to normal or near normal levels immediately after a successful BMV. On the contrary, in patients with moderate or severe Pulmonary Hypertension (PH), despite greater absolute and relative reductions, PASP and PVR remained significantly elevated.

Persistent pulmonary artery Hypertension (PPAH), in the absence of mitral valve restenosis, may reflect reversible or fixed component, or a combination of both. The study was conducted to identify the baseline parameters which can predict PPAH and its outcome.

Methods: Clinical, echocardiographic, and hemodynamic data of 158 consecutive patients who underwent BMV in our institute from 2011 to 2012 were analyzed retrospectively. Data of 37 patients who had PPAH (defined by PASP of ≥40 mmHg at one year after BMV) were compared to the data of 121 patients who did not have PPAH.

BMV was performed using the antegrade trans-septal route by inoue balloon. Procedure success was defined as increase in MVA of at least 50% from the basal, or a final valve area of at least 1.5 cm² without significant Mitral regurgitation.

Results: Patients who had PPAH were older (40.1 ± 9.9 years vs. 29.4 ± 10.1; \( P < 0.001 \)). They had higher prevalence of atrial fibrillation (AF; 19.9% vs. 11.1%, \( P < 0.05 \)), moderate or severe pulmonary artery hypertension (PAH) defined as PASP more than 50 mmHg (43.5% vs. 33.8%, \( P = 0.001 \)). Those patients with PPAH had comparatively lower immediate postprocedural mitral valve area (MVA) (33.8% vs. 38 vs. 7.1%, \( P < 0.001 \)), and need for reinterventions (9.5% vs. 2.8%, \( P < 0.05 \)) were higher in the PPAH group.

Conclusion: Advanced age, decreased MVA, and mean pulmonary artery pressure (PAP) at baseline could predict PPAH. These patients have increased occurrence of restenosis. PPAH represents an advanced stage of rheumatic valve disease and poor prognosis and therefore require frequent followup.

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Jai Bhalkhe: This author has nothing to disclose.
B-070
Title: Incidence and Consequence of Concomitant Aortic Regurgitation in Patients Undergoing Transcatheter Aortic Valve Replacement for Aortic Stenosis

Category: Valvular Interventions and Structural Heart Disease

Authors: Tilak Pasala, University of Utah, United States; Anwar Tandar, University of Utah, United States; Elizabeth K. Dranow, University of Utah, United States; David Bull, University of Utah, United States; Frederick GP Welt, University of Utah, United States

Background: Transcatheter aortic valve replacement (TAVR) is approved for primary aortic stenosis (AS), however concomitant moderate to severe aortic regurgitation (AR) is frequently present and its procedural and clinical sequelae is unknown. We aimed to study the consequence of concomitant AR in patients undergoing TAVR for AS.

Methods: We studied 134 patients (mean age 79 ± 11 years, 43.3% female) who underwent TAVR at a tertiary center from August 2012 to June 2015. TAVR was performed transapically in 50 patients (37.3%) and 10 patients (7.5%) underwent valve-in-valve TAVR for bioprosthetic valve stenosis. Differences in procedural and clinical factors were grouped by the presence of moderate to severe AR and evaluated at baseline, 30-day, and 1-year follow up.

Results: 95 patients (71%) had at least mild AR while 33 patients (24.6%) had moderate to severe AR. Patients with moderate to severe AR prior to TAVR presented at an earlier age (74 ± 17 vs 80 ± 9 years, p = 0.006) but had a lower five-meter walk time (7.3 ± 2.4 vs 9.3 ± 3.5 secs, p = 0.02). Moderate to severe AR prior to TAVR was more frequent in bioprosthetic valves (60% vs 22%, p = 0.02). There were no significant differences in gender, NYHA class, STS score, ejection fraction, peak gradient, annular size (22 ± 3 vs 23 ± 3 mm, p = 0.26) between the groups. Post-procedure incidence of at least mild AR was 23.3% and moderate to severe AR was 3.1%. The presence of moderate to severe AR prior to TAVR was not associated with the presence of any degree of AR or paravalvular leak following TAVR. In fact, the incidence of post-procedure AR was numerically lower in the moderate to severe AR prior to TAVR group but was not statistically significant (16.1% vs 25.5%, p = 0.33). The post procedure mean gradient was similar (11 ± 6 vs 9 ± 4 mmHg, p = 0.07) between groups. The presence of moderate to severe AR prior to TAVR was not associated with post procedure NYHA class, new pacemaker rate, stroke or mortality (at 30-day or 1-year follow up).

Conclusion: Concomitant AR is frequent in patients undergoing TAVR for AS. The presence of moderate to severe AR prior to TAVR does not influence the sizing of the valve, incidence of AR, pacemaker rate, stroke or mortality following TAVR.

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Anwar Tandar: This author has nothing to disclose.
Elizabeth K. Dranow: This author has nothing to disclose.
David Bull: This author has nothing to disclose.
Frederick GP Welt: This author has nothing to disclose.

B-074
Title: Pre-operative albumin as a predictor of mortality in patient with severe aortic stenosis who are undergoing Transcatheter Aortic Valve Replacement

Category: Valvular Interventions and Structural Heart Disease

Authors: Jesus E Pino, University of Miami Palm Beach Regional Campus, United States; Omar Kreidieh, University of Miami Palm Beach Regional Campus, United States; Julio Mercado, University of Miami Palm Beach Regional Campus, United States; Mistyann-Blue Miller, University of Miami Palm Beach Regional Campus, United States; Robert Chait, University of Miami Palm Beach Regional Campus, United States; Lawrence Lovitz, University of Miami Palm Beach Regional Campus, United States

Background: Risk stratification is challenging for patients undergoing transcatheter aortic valve replacement (TAVR). Multiple risk scores have been suggested with controversial results and variability between TAVR cohorts. Recently, pre-procedure albumin levels were reported to be an independent predictor of 30-day and 1-year mortality following TAVR.

Catheterization and Cardiovascular Interventions DOI 10.1002/ccd. Published on behalf of The Society for Cardiovascular Angiography and Interventions (SCAI).
Objective
To evaluate the correlation between serum albumin levels and short term and long-term survival among patients with severe aortic stenosis

Methods: A retrospective chart review of patients who underwent TAVR between July 2013 and August 2015 in a single cardiovascular center was performed. The all-cause mortality rates at 30-day and 1-year follow-up TAVR were evaluated in both groups. Patients were classified according to their pre-procedural serum albumin levels: Low albumin (<3.5g/dl) and normal albumin (≥3.5 g/dl) as suggested by Koifman et al.

Results: A total of 217 patients underwent TAVR and pre-procedure albumin was available for 211. Follow up data was available for all patients at one month and 77 patients at one year. A hundred and two patients were female (48%). Albumin levels were low in 103 patient and normal in 108 patients. There was no statistical difference in gender (48 vs 51 female p>0.05), age (85 vs 86), Society of Thoracic Surgeons’ (STS) risk score (8.0 vs 7.1), ejection fraction (55.1%), average DLCO% (78.6 vs 83.4), type of valve, or surgical approach between the two groups (p>0.05). There was no difference in the 30 day mortality between the two groups (p>0.05). Similarly, there was no difference in one year mortality: 6/34 VS 7/43 in the low and high albumin groups respectively p>0.05.

Conclusion: In contrast to recent reports, our retrospective observational study demonstrates that albumin is a poor predictor for both short term and long term mortality among patients undergoing TAVR. Albumin can be easily affected for multiple factors including recent hospitalization prior to TAVR.

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Omar Kreidieh: This author has nothing to disclose.
Julio Mercado: This author has nothing to disclose.
Mistyann-Blue Miller: This author has nothing to disclose.
Robert Chait: This author has nothing to disclose.
Lawrence Lovitz: This author has nothing to disclose.

B-077
Title: Immediate Echocardiographic and Hemodynamic Outcome of Percutaneous Transvenous Mitral Commissurotomy in Elderly Bangladeshi Severe Symptomatic Mitral Stenosis Patients.

Category: Valvular Interventions and Structural Heart Disease

Authors: DR MD TOFIQUR RAHMAN, National Institute of Cardiovascular Diseases, Dhaka, Bangladesh, Bangladesh

Background: Rheumatic mitral stenosis is a very common problem in our population having an incidence of 54 percent among rheumatic heart disease with a female preponderance of 2:1. Percutaneous balloon mitral commissurotomy is appealing because the mechanism of valve dilation closely parallels the mechanism of surgical mitral commissurotomy.

Methods: A prospective study was done during the period of August 2003 to June 2014. Nine hundred and ninety (990) patients with rheumatic mitral stenosis who underwent PTMC were evaluated clinically, by echocardiography and by catheter during and after procedure. Out of 990 patients 50 patients aged ≥50 years (Group-1) and rest 930 patients aged <50 years (Group-2). In Group-1 There were 40 patients in New Catheterization and Cardiovascular Interventions DOI 10.1002/ccd. Published on behalf of The Society for Cardiovascular Angiography and Interventions (SCAI).

York Heart Association (NYHA) class III or IV; 20 patients had previous surgical commissurotomy, 40 had one or more comorbidities; 40 patients had fluoroscopically visible mitral valve (MV) calcification; and 30 had echocardiographic score >8.

Results: Mean age of the study population was 54.25±0.82 years in group-1 and 26.14±11.21 years in Group-2 . Most of the population are female, 70% in Group-1 and 78% in group-2. After PTMC mean mitral valve area increased from 0.80±0.11 cm² to 1.46±0.27 cm² as measured by echocardiography in group-1 and from 0.85±0.32 cm² to 1.81±0.33 cm² in group-2 . Mitral valve gradient reduced to 11.63±4.15 mm Hg from 32.46±0.93 mm Hg after PTMC in group-1 and 10.45±3.76 mm Hg from 26.64±0.12 mm Hg after PTMC in group-2 . Mean left atrial pressure as recorded by catheter before PTMC was 33.99±08.37 mm Hg while after PTMC it was 23.81±0.62.28 mm Hg in group-1 and in group – 2, 28.81±0.72.32 mm Hg before while after PTMC it was 21.76±0.51 mm Hg in group-2 . In Group-1 had higher NYHA class, higher atrial fibrillation, High Wilkins Echo score and higher commissural calcium score. There were one post procedural deaths. Pericardial tamponade occurred in three patients, thromboembolism in one, and transient atrioventricular block in one.

Conclusion: PTMC can be performed effectively and safely in selected patients ≥50 years old with good immediate result but result is inferior to young patients.

Disclosures: DR MD TOFIQUR RAHMAN: This author has nothing to disclose.

B-078
Title: Next Day TAVR Discharge: Are We There Yet?

Category: Valvular Interventions and Structural Heart Disease

Authors: Sulaiman Rathore, VaTech Carilion School of Medicine, United States; Yevgeniy Latyshev, VaTech Carilion School of Medicine, United States; Shree Emore, VaTech Carilion School of Medicine, United States; Carl Musser, VaTech Carilion School of Medicine, United States; Joseph Rowe, VaTech Carilion School of Medicine, United States; Jason Foerst, VaTech Carilion School of Medicine, United States

Background: We have minimized the approach to transfemoral transcatheter aortic valve replacement (TF-TAVR) by avoiding general anesthesia, Foley and central lines. Safety for discharge is based on lack of complications, early ambulation and family support. We aimed to evaluate the impact of a minimalist approach for elective TF-TAVR on the safety of next day discharge.

Methods: We retrospectively studied 96 patients who underwent TF-TAVR in last two years at our institution. Patients were classified into next day discharge (NDD, N= 21) and later discharge (LD, N=75). Baseline characteristics, frailty markers, complications and 30-day readmission rates were compared between the two groups.

Results: There was no age difference between the groups (NDD 81.7 ± 7.7 years and LD 80.1 ± 8.8 years, p=0.44). Mean length of stay was 3.4 days in LD group. In LD group 36 patients (36.5%) were discharged between 24 and 48 hours. Demographic differences between the two group were higher use of monitored anesthesia care (90 vs 36%, p=0.001), less fluoroscopy time (16.2 vs 22.5 min, p=0.008), balloon expandable valve (90 vs 56%, p=0.003), higher delta hemoglobin (1.1 vs 1.6, p=0.012) and more baseline pacemakers (33 vs 10%, p=0.04). There were no differences between groups in stroke, vascular complication, 30-day readmission and mortality. In regression analysis
monitored anesthesia care (p=0.002) was strongly associated with NDD.

**Conclusion:** Next day discharge after TF-TAVR is safe in selected patients. Prospective studies are required to develop prediction models for safe next day discharge.

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- Joseph Rowe: This author has nothing to disclose.
- Jason Foerst: 8 St Jude Medical, 8 Edwards Life Science

**B-085**

**Title:** Transapical Versus Endovascular transcatheter aortic valve replacement-An Analysis of the National Inpatient Sample Database

**Category:** Valvular Interventions and Structural Heart Disease

**Authors:** Partha Sardar, University Of Utah Hospitals And Clinics, United States; Saurav Chatterjee, St. Lukes Roosevelt Hospital, United States; Dhaval Kolte, Brown University/Rhode Island Hospital, United States; Amartya Kundu, University of Massachusetts Medical Center, United States; Ramez Nairooz, University Of Arkansas, United States; Jay Giri, Hospital of the University of Pennsylvania, United States; Debabrata Mukherjee, University of Texas, United States; Jay Giri, Hospital of the University of Pennsylvania, United States

**Background:** Transcatheter aortic valve replacement (TAVR) was approved in the United States in 2011 to treat aortic stenosis in patients who were deemed inoperable due to significant risk factors. We evaluated the in-hospital mortality, total costs related to hospitalization, and length of stay associated with transapical compared with endovascular (transfemoral + transaortic) transcatheter aortic valve replacement in 2012, using data from the National Inpatient Sample (NIS) database.

**Methods:** The NIS is the largest, publicly available, all-payer in-patient care database in the United States, including data on approximately 7 to 8 million discharges per year. Using data from the 2012 NIS version, in-hospital all-cause mortality, respective total costs related to hospitalization and mean length of stay were compared for patients with transapical and endovascular transcatheter aortic valve replacement.

**Results:** Among 1,528 patients with aortic stenosis treated with transapical TAVR (N=237) or endovascular TAVR (N=1291), 73 patients died during hospitalization. In-hospital all-cause mortality with transapical TAVR was 6.3% vs. 4.5% for endovascular TAVR (OR 1.43, 95% CI 0.79-2.57, p=0.29). Mean total hospitalization cost was similar for transapical TAVR ($225,640) compared with endovascular TAVR ($217,590) (p=0.41). Median length of stay was longer with transapical TAVR (9.8 days vs. 8.1 days, p<0.001).

**Conclusion:** In the first year after regulatory approval in the US, compared to endovascular TAVR, transapical TAVR procedure had comparable in-hospital mortality and hospitalization costs, but a significantly longer duration of hospitalization.

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- Partha Sardar: This author has nothing to disclose.
- Saurav Chatterjee: This author has nothing to disclose.
- Dhaval Kolte: This author has nothing to disclose.
- Amartya Kundu: This author has nothing to disclose.
- Ramez Nairooz: This author has nothing to disclose.
- Jay Giri: This author has nothing to disclose.
- Debabrata Mukherjee: This author has nothing to disclose.
- Jay Giri: This author has nothing to disclose.

**B-084**

**Title:** Transcatheter Versus Surgical Aortic Valve Replacement in Diabetic Patients: An Analysis of the National Inpatient Sample Database

**Category:** Valvular Interventions and Structural Heart Disease

**Authors:** Partha Sardar, University Of Utah Hospitals And Clinics, United States; Saurav Chatterjee, Mount Sinai St Luke’s - Roosevelt Catheterization and Cardiovascular Interventions DOI 10.1002/ccd. Published on behalf of The Society for Cardiovascular Angiography and Interventions (SCAI).
Hospital, United States; Amartya Kundu, University of Massachusetts Medical Center, United States; Ramez Nairooz, University of Arkansas for Medical Sciences, United States; Theophilus Owan, University Of Utah Hospitals And Clinics, United States; Anwar Tandar, University Of Utah Hospitals And Clinics, United States; Frederick G Welt, University Of Utah Hospitals And Clinics, United States

Background: We evaluated the in-hospital mortality, total costs related to hospitalization, and length of stay associated with Transcatheter aortic valve replacement (TAVR) compared with surgical aortic valve replacement (SAVR) in diabetic patients, using data from the National Inpatient Sample (NIS) database.

Methods: We used the 2012 version of NIS dataset. To adjust for multiple confounders, a propensity score adjusted models including demographic characteristics, and all components of the Charlson comorbidity index was also constructed to assess the outcomes with TAVR in comparison with SAVR in diabetes patients.

Results: Among 3,876 diabetic patients with aortic stenosis treated with TAVR (N=409) or SAVR (N=3,467), 109 patients died during hospitalization. TAVR was reserved largely for patients with a higher burden of co-morbidities. In-hospital all-cause mortality with TAVR was 3.2% vs. 2.8% for SAVR (OR 1.15, 95% CI 0.64-2.07, p<0.001). Similar results observed in the adjusted model (OR 0.85, 95% CI 0.43-1.66, p=0.63). In a propensity score-adjusted analysis, mean total hospitalization cost was higher with TAVR ($202,710 vs. $178,744, p<0.001). Median length of stay was shorter with TAVR (6.77 days vs. 8.92 days, p<0.001).

Conclusion: In the first year after regulatory approval in the US, TAVR performed in diabetic patients had comparable in-hospital mortality and a significantly reduced duration of hospitalization, but higher hospitalization costs, as compared with SAVR.

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Anwar Tandar: This author has nothing to disclose.
Theophilus Owan: This author has nothing to disclose.
Frederick G Welt: This author has nothing to disclose.

B-089
Title: Balloon Aortic Valvuloplasty in High-risk Patients with Aortic Stenosis and Severe Left Ventricular Dysfunction: The Role of Hemodynamic support with Impella
Category: Valvular Interventions and Structural Heart Disease
Authors: Vikas Singh, University Of Miami - Miller School Of Medicine/Jackson Memorial Hospital, United States; Rodrigo Mendirichaga, University Of Miami - Miller School Of Medicine/Jackson Memorial Hospital, United States; Amit Badiye, University Of Miami - Miller School Of Medicine/Jackson Memorial Hospital, United States; Claudia Martinez, University Of Miami - Miller School Of Medicine/Jackson Memorial Hospital, United States; William O'Neill, University Of Miami - Miller School Of Medicine/Jackson Memorial Hospital, United States; William O'Neill, Henry Ford Health System, United States; Carlos Alfonso, University Of Miami - Miller School Of Medicine/Jackson Memorial Hospital, United States; Carlos Alfonso, University Of Miami - Miller School Of Medicine/Jackson Memorial Hospital, United States

Background: Patients with severe aortic stenosis (AS) and left ventricular dysfunction are susceptible to hemodynamic decompensation due to limited myocardial reserve. We present the largest experience with the use of Impella during balloon aortic valvuloplasty (BAV) in high-risk patients.

Methods: This is a retrospective study of procedural and clinical outcomes in consecutive patients with severe symptomatic AS who underwent BAV supported by Impella at an academic center.

Results: A total of 33 patients underwent BAV with Impella support with n=18 requiring concomitant PCI. The mean age was 81.8±5 years (84.8% males), STS score: 13.7±5%, EF: 18.7±7.8% and AVA: 0.65±0.15cm². Impella was placed electively in majority (82%) of the cases (n=27) and emergently in 6 patients due to cardiac arrest (n=3 VT, n=1 VF and n=1 PEA) and refractory hypotension (n=1). The median duration of support was 60 minutes (interquartile range: 32.5; 563.5 minutes). Retrograde advancement of two catheters across the aortic valve for concomitant BAV was technically feasible in all cases. Placement of Impella consistently produced a reduction in LV end-diastolic pressure and an increase in arterial pressure in all patients. There were 2 intra-procedural deaths, 2 patients suffered minor vascular complications, 13 patients were bridged to transcatheter aortic valve replacement and 2 to conventional surgical aortic valve replacement. The overall mortality rates at 1, 6 and 12 months of follow-up were 27%, 36% and 39% respectively. The mortality rates at 1 year of follow-up were 26% vs 83% for elective vs emergency Impella supported procedures.

Conclusion: Our data suggests that Impella assisted BAV as a bridge to a definitive therapy is a safe procedure and is associated with favorable outcomes

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Rodrigo Mendirichaga: This author has nothing to disclose.
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William O'Neill: This author has nothing to disclose.
Carlos Alfonso: This author has nothing to disclose.
Carlos Alfonso: This author has nothing to disclose.
Mauricio Cohen: This author has nothing to disclose.

B-042
Title: High Creatinine is Associated with Increasing LVOT Ellipticity in Patients with Aortic Valve Stenosis
Category: Valvular Interventions and Structural Heart Disease
Authors: Affan Haleem, Winthrop-University Hospital, United States; Anjili Srivastava, Winthrop-University Hospital, United States; Jonathan Kahan, Winthrop University Hospital, United States; Kevin Marzo, Winthrop-University Hospital, United States; Juan Gaztanga, Winthrop-University Hospital, United States; Beevash Ray, Winthrop-University Hospital, United States

Background: Cardiac computed tomography (CCT) demonstrates that right ventricular outflow tract (RVOT) and left ventricular outflow tract (LVOT) are not perfectly circular. However, it is unclear as to which factors increase the degree of ellipticity of these orifices. RVOT and LVOT diameters are utilized by echocardiography for calculation of pulmonic and aortic valve areas, respectively. Recognizing factors that increase ellipticity can help identify patients in whom Aortic valve areas (AVA) will be underestimated on echocardiography.

Methods: We retrospectively reviewed cardiac computed tomography images obtained from 70 consecutive patients at a single academic medical center being evaluated for transcatheter aortic valve replacement (TAVR). Direct LVOT planimetry was performed on the CCT images to obtain short diameter and long diameter dimension. The
ellipticity index of the LVOT and RVOT was defined as 1/(short diameter/long diameter). We used linear regression analysis to look for patient characteristics that are associated with increased LVOT ellipticity Index.

**Results:** The mean age and valve area of the study’s cohort is 82.5 years and 0.72 cm², respectively. LVOT Ellipticity Index did not significantly correlate with patient’s age, BMI, aortic valve mean gradient, RVOT Ellipticity Index or aortic valve peak gradient. However, patient’s baseline creatinine positively correlated with LVOT ellipticity index (r = 0.26, p < 0.05) with nearly 13% of variability explained by creatinine level (Maximum $R^2$ = 23%).

**Conclusion:** Valvular ellipticity has significant clinical implications in patients undergoing valvular replacement. It has already been established that increased LVOTs can cause an underestimated valve area by echocardiography. This is the first time a clinical characteristic has been shown to be associated with increased LVOT ellipticity in aortic valve stenosis patients. Chronic kidney disease, as suggested by increased baseline creatinine, has previously been demonstrated to increase afterload, increase calcification and cause left ventricular hypertrophy. Future studies are needed to determine whether the increased ellipticity cause a clinically significant underestimation of AVA.

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- Jonathan Kahan: This author has nothing to disclose.
- Kevin Marzo: This author has nothing to disclose.
- Juan Gaztanaga: This author has nothing to disclose.
- Beevash Ray: This author has nothing to disclose.

**B-093**

**Title:** Safety of Rapid Ventricular Pacing During Transcatheter Aortic Valve Replacement in Patients with Severely Reduced Ejection Fraction

**Category:** Valvular Interventions and Structural Heart Disease

**Authors:** Mohammad Thawabi, Newark Beth Israel Medical Center, United States; Dhaval Chauhan, Newark Beth Israel Medical Center, United States; Bruce Haik, Newark Beth Israel Medical Center, United States; Mark Russo, Newark Beth Israel Medical Center, United States; Marc Cohen, Newark Beth Israel Medical Center, United States

**Background:** Transcatheter aortic valve replacement (TAVR) has emerged as an effective alternative to surgical replacement in high risk patients. Transcatheter deployment of the valves is done through a balloon- or self-expandable system, with the former requiring rapid ventricular pacing (RVP). The safety of RVP, in patients with severely reduced left ventricular ejection fraction (LVEF), is not clear.

**Methods:** 425 consecutive patients, who underwent balloon-expandable TAVR between May 2012 and April 2015, were retrospectively evaluated for their pre-procedural LVEF. Echocardiography was performed pre and immediately post valve deployment and at 30 day follow up. Device implantation success was defined as successful access, proper deployment of one device, and appropriate valve function without more than mild aortic regurgitation.

**Results:** 34 patients with pre-TAVR LVEF < 30% were identified. The patients were mostly males (65%), elderly (79 ± 9 years), and severely symptomatic (NYHA class III or IV). 27 patients had coronary artery disease (79%). The STS mortality score was 9 ± 5%. Pre-TAVR LVEF was 23 ± 5%, aortic valve area 0.6 ± 0.2 cm², and mean gradient 43 ± 10 mmHg. 28 patients (82%) had moderate-severe mitral regurgitation (MR).

**Conclusion:** Transapical approach was employed in 27% of patients. RVP at a rate of 160-200 beats/minute was done in all patients. Device implantation success was achieved in 33 patients (97%). Procedure-related death occurred in one patient. Immediately post valve deployment, LVEF improved in all patients (9% average increase) and MR improved in 9 patients (27%). Average length of stay 9 ± 6 days.

**By 30 days, 1 additional death occurred (30-day mortality 5.9%), 3 patients (9%) required permanent pace maker, and 1 patient (3%) had vascular access complications. No strokes or transient ischemic attacks occurred. 30 day follow up echocardiograms showed further LVEF improvement in 14 patients (41%, 5.2 ± 8% increase) with no change in the rest, and further MR improvement in 7 patients (21%).

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- Dhaval Chauhan: This author has nothing to disclose.
- Bruce Haik: This author has nothing to disclose.
- Mark Russo: This author has nothing to disclose.
- Marc Cohen: This author has nothing to disclose.

**B-095**

**Title:** Combined Mitral and Tricuspid Balloon Valvuloplasty in Rheumatic Valvular Heart Disease a single centre experience

**Category:** Valvular Interventions and Structural Heart Disease

**Authors:** SALIL VAIDYA, Ruby Hall Clinic, Grant Medical Foundation, India; C.N MAHKALE, Ruby Hall Clinic, Grant Medical Foundation, India; SUNEEL SATHYE, Ruby Hall Clinic, Grant Medical Foundation, India; purvez Grant, Ruby Hall Clinic, Grant Medical Foundation, India; M DURAIRAJ, Ruby Hall Clinic, Grant Medical Foundation, India

**Background:** Although combined mitral and tricuspid stenosis are rarely seen in patients with rheumatic heart disease, when both coexist together concurrent percutaneous balloon valvuloplasty can be an alternative to surgical treatment in suitable cases. We present the results of 54 patients with rheumatic tricuspid and mitral stenosis treated with concurrent percutaneous balloon valvuloplasty.

**Methods:** Out of 580 patients who underwent balloon mitral valvuloplasty at our centre between November 2010- November 2015, 54 cases (9.31%) underwent combined balloon mitral and tricuspid valvuloplasty. Out of 54 patients 40/41% were females and 14/25.9% were males with a mean age of 32 ± 6.2 years. All patients underwent percutaneous balloon mitral valvuloplasty using Inoue technique. In mitral position the average balloon size was 23-28 and a larger single Inoue balloon of 30mm was used for tricuspid valvuloplasty in 48 cases, however in other 6 patients double balloon technique was utilised. Patients were followed up for duration of 6 months to 2 years.

**Results:** Balloon dilatation reduced the trans mitral gradient from 18 ± 3.5 to 5.5 ± 0.89 (p < 0.05) and trans tricuspid gradient from 12.65 ± 2.67 to 3.67 ± 0.95 (p < 0.05) Mitral valve area increased from 0.76 ± 0.20 to 2.25 ± 0.65 cm² (p < 0.05). The procedure was well tolerated, with no significant increase in valvular regurgitation or left to right shunt across the atrial septum.

**Conclusion:** There was significant improvement in symptoms of right heart failure after Ballon tricuspid valvuloplasty. Diuretics use decreased significantly after the procedure. Majority of patients who required balloon tricuspid valvuloplasty had symptoms of right heart failure more because of tricuspid stenosis than mitral stenosis and had good symptomatic relief.

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Conclusion: It is concluded that combined dilatation of stenotic mitral and tricuspid valves is a safe and effective therapeutic option with favourable outcome and can emerge as an alternative to surgery in selected patients with multivalvular rheumatic heart disease.

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SALIL VAIDYA: This author has nothing to disclose.
C.N MAKHALE: This author has nothing to disclose.
SUNEEL SATHYE: This author has nothing to disclose.purvez
M DURAIRAJ: This author has nothing to disclose.

B-096

Title: Correlation of CoreValve Implantation ‘true cover index’ with Short and Mid-term Aortic Regurgitation.

Category: Valvular Interventions and Structural Heart Disease

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Background: Aortic regurgitation (AR) after TAVI has been demonstrated to be related with impaired long-term prognosis. ‘Cover index’ has been proposed to appraise the congruence between the aortic annulus and the device, with the assumption of not taking into account the actual device implantation depth. We investigated whether the annulus-prosthesis mismatch, as expressed with the ‘true cover index’ according to actual implantation depth, is correlated with AR after TAVI.

Methods: From June 2008 until June 2014, patients who had undergone TAVI with the self-expandable CoreValve device, were retrospectively studied. All available prosthetic sizes were scanned under a multislice CT and the precise diameter at 0.3mm intervals along each device was measured. Implantation depth was measured utilizing the final aortography after device delivery. The ‘true cover index’ was evaluated, as a ratio of: 100 X [(prosthesis true diameter at implantation depth – annulus diameter)/prosthesis true diameter at implantation depth]. AR was echocardiographically evaluated at discharge and at 30 days after TAVI and classified as impaired, if moderate or trivial if smaller index. Finally, after adjustment for age and impaired baseline EF, low ‘true cover index’ remained an independent predictor of one month impaired AR (OR: 0.850, CI: 0.730-0.990; p=0.037).

Conclusion: ‘True cover index’, expressing the real congruence between the aortic annulus and the device, based on its precise implantation depth, is strongly and independently correlated with the short and mid-term AR after CoreValve implantation. Hence, appropriate annular measurements and prosthesis sizing are critical to minimize paravalvular AR.

Disclosures:
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Evangelos Oikonomou: This author has nothing to disclose.
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B-098

Title: A Novel Approach to Percutaneous Removal of Large Tricuspid Valve Vegetations Using Suction Filtration and Venovenous Bypass: a Single Center Experience

Category: Valvular Interventions and Structural Heart Disease

Authors: Anthony Voelkel, University of Kentucky, United States; John Kotter, University of Kentucky, United States; Ahmed Abdel-Atif, University of Kentucky, United States; John Gurley, University of Kentucky, United States

Background: Tricuspid valve endocarditis (TVE) is associated with intravenous drug abuse, central venous catheters, and cardiac electronic devices. Surgery is poor option because the risk factors for bacteremia persist and reinfection of prosthetic material is common and medical therapy can be ineffective. It possible to remove large TVE vegetations percutaneously, thereby enabling successful antimicrobial eradication while avoiding the major disadvantages of valve surgery.

Methods: We retrospectively reviewed the records of 13 TVE patients who underwent percutaneous removal of large tricuspid valve (TV) vegetations between April 2013 and February 2015.

Results: The procedure was performed on 7 males and 6 females (Table 1). All patients survived the initial procedure and 11 survived the index hospitalization. Two patients died during the index hospitalization at 20 and 22 days post-procedure. One patient was discharged and completed a full 6 week course of outpatient antibiotic therapy but died 64 days post-procedure at home of unknown causes. Three patients proceeded to elective tricuspid valve replacement secondary to severe tricuspid regurgitation after completing antibiotic treatment of endocarditis.

Conclusion: Percutaneous debulking is a novel and safe alternative to open heart surgery for removal of large tricuspid valve vegetations and may be the preferred method of tricuspid valve debridement, especially for patients at high risk for reinfection of prosthetic valve material.

Disclosures:
Anthony Voelkel: This author has nothing to disclose.
John Kotter: This author has nothing to disclose.
Ahmed Abdel-Atif: This author has nothing to disclose.
John Gurley: This author has nothing to disclose.
Title: The Learning Curve for Transfemoral Transcatheter Aortic Valve Replacement, A REAL WORLD Analysis

Category: Valvular Interventions and Structural Heart Disease

Authors: Zack Williams, Winthrop University Hospital, United States; Giorgio Medranda, Winthrop University Hospital, United States; John Goncalves, Winthrop University Hospital, United States; Richard Schwartz, Winthrop University Hospital, United States; Kevin Marzo, Winthrop University Hospital, United States; Rose Calixte, Winthrop University Hospital, United States; Stephen Green, Winthrop University Hospital, United States

Background: TF-TAVR has been approved for use in the US after the PARTNER trials for aortic valve replacement in patients with aortic stenosis (AS). The learning curve has been analyzed in these first trial patients but has not been investigated in the community. Outcomes of interest are procedure time, adverse event, in hospital mortality following procedure, access method, contrast volume, fluro time.

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Methods: The first 100 patients were used to estimate the operators’ learning curve based on procedure time. We used three complementary methods: CUSUM analysis, penalized basis-splines regression, and generalized linear model with a lognormal assumption. We used the median procedure time as the expected completion time for the CUSUM analysis. The estimated learning plateau (the point where change in procedure time is minimal) for procedure time was used as a cutoff point to compare patients’ related outcomes and other procedural outcomes. Secondary outcomes are analyzed using Wilcoxon rank sum test and Fisher’s exact test. Results with p-value < 0.05 are considered statistically significant. All analyses were done using SAS 9.4.

Results: The median procedure time was 178.5 minutes. Based on generalized linear model, the increase in procedure time after 40 procedures vs. the last 20 procedure is not significant, indicating a point of mastery between 40 and 60 cases. Efficiency was attained after 40 TF-TAVRs and mastery after 60 TF-TAVRs. There were no significant improvements in clinical outcomes other than significant decrease in procedure time.

Conclusion: We analyzed the learning curve of one TAVR Team, at one institution that was not involved in the PARTNER Trial. These results may be more generalizable to other institutions with new TAVR programs. These results show the real world learning curve analysis for efficiency and mastery of one two-operator team, that may guide future efforts of TAVR operators and TAVR programs at non trial institutions.

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Richard Schwartz: This author has nothing to disclose.
Kevin Marzo: This author has nothing to disclose.
Rose Calixte: This author has nothing to disclose.
Stephen Green: This author has nothing to disclose.

B-100

Title: Predictors of Outcomes in Hemodialysis Patients Undergoing Transcatheter Aortic Valve Replacement
Category: Valvular Interventions and Structural Heart Disease

Authors: Pradeep Yadav, Henry Ford Hospital, United States; Janet Wyman, Henry Ford Hospital, United States; George Divine, Henry Ford Hospital, United States; Dee Dee Wang, Henry Ford Hospital, United States; Marvin Eng, Henry Ford Hospital, United States; Gaetano Paone, Henry Ford Hospital, United States; Adam Greenbaum, Henry Ford Hospital, United States; William O’Neill, Henry Ford Hospital, United States

Background: Hemodialysis patients were excluded from the pivotal Transcatheter Aortic Valve Replacement (TAVR) trials, however, they comprise around 5% of all the commercial TAVRs done in the United States. Observational and registry data have shown higher mortality in hemodialysis patients, but no data exists on predictors of survival or mortality in this population undergoing TAVR.

Methods: Retrospective analysis of all patients with hemodialysis who underwent TAVR at a high volume center. Variables collected in the TVT registry were collected and analyzed. Mortality was assessed by log rank tests, Kaplan-Meier estimates and hazard ratios from Cox regression.

Results: 18 patients, mean age 72.7 ± 9.1 years, 50% alive at one year (Kaplan Meier curve Figure 1A). Out of all the variables, there was a trend towards higher mortality in patients with higher discharge creatinine (HR=1.47 (per unit of Creatinine), p=0.071), blood transfusion prior to discharge (HR=3.47, p=0.079), or severe tricuspid regurgitation (HR=4.83, p=0.051 [log rank p=0.032]).

Conclusion: In hemodialysis patients undergoing TAVR, there is trend towards higher mortality in patients with higher discharge creatinine, pre discharge blood transfusion and severe tricuspid regurgitation. A larger sample size/national registry data is needed to confirm these findings. This will ultimately aid in optimal patient selection and close follow up of patients at risk of worse outcomes.

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Marvin Eng: This author has nothing to disclose.
Gaetano Paone: This author has nothing to disclose.
Adam Greenbaum: This author has nothing to disclose.
William O’Neill: This author has nothing to disclose.
B-102

**Title:** Short-Term Echocardiographic and Procedural Outcomes of Transcatheter Valve in Valve Implantation in the Tricuspid Position

**Category:** Valvular Interventions and Structural Heart Disease

**Authors:** Lucas Zier, Ucsf Department Of Cardiology, United States; Krishan Soni, Ucsf Department Of Cardiology, United States; Atif Qasim, Ucsf Department Of Cardiology, United States; Elyse Foster, Ucsf Department Of Cardiology, United States; VS Mahadevan, Ucsf Department Of Cardiology, United States

**Background:** Transcatheter bioprosthetic valve implantation within degenerated surgical bioprosthetic valves has been described as an alternative to repeat surgery. This treatment strategy has focused on failing valves within the aortic and mitral positions and there is limited data regarding transcatheter valve in valve (ViV) implantation in the tricuspid position.

**Methods:** Five patients (age 43-72) underwent transfemoral implantation of a balloon-expandable Edwards Sapien valve (29mm in 4, and 26mm in 1) within degenerated surgical bioprostheses. Indications for ViV implantation were mixed severe tricuspid stenosis and regurgitation (2), severe stenosis (2) and severe regurgitation (1). All patients were evaluated by a heart team and considered inoperable or high risk for redo surgery. Procedural and echocardiographic outcomes were analyzed.

**Results:** Implantation was successful in all patients. In stenotic lesions, mean valvular gradients were reduced from 13.8 ± 5.8 to 1.3 ± 1.5 mmHg (p = 0.024). Valvular regurgitation was reduced from grade 4 to 0 by color doppler. Four patients had no paravalvular regurgitation and one patient had mild paravalvular regurgitation. There were no major adverse events including death, emergent surgery, vascular complications or need for dialysis. On mean follow-up of 30 days all patients were alive and median NYHA class had decreased from 4 to 1.

Echocardiography revealed decreases in mean right atrial volume from 216 ml to 143 ml (p = 0.099) and estimated right atrial pressure from 15 to 8 mmHg (p = 0.035). TAPSE increased from a mean of 1.2 cm to 1.4 cm (p = 0.24) and RVOT velocity time integral from 14.8 cm to 15.2 cm (p = 0.86). No patients developed worsening paravalvular or intravalvular regurgitation or prosthesis migration.

**Conclusion:** Among high risk and inoperable patients with severe stenosis or regurgitation of tricuspid surgical bioprostheses, implantation of a balloon expandable transcatheter valve improves hemodynamics without significant procedural morbidity or mortality. In short-term follow up, patients exhibit improvement in heart failure symptoms and favorable evidence of cardiac remodeling without signs of prosthesis dysfunction.

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- Atif Qasim: This author has nothing to disclose.
- Elyse Foster: This author has nothing to disclose.
- VS Mahadevan: 5 Edwards Lifesciences

**VASCULAR ACCESS AND ARTERIAL CLOSURE DEVICES**

C-021

**Title:** Gaining a new skill with the risk of losing one; the effect of radial catheterization

**Category:** Vascular Access and Arterial Closure Devices

**Authors:** Oluwaseyi Bolorunduro, University of Tennessee health Science Center Memphis TN, United States; Yaser Cheema, University of Tennessee health Science Center Memphis TN, United States; Raza Askari, University of Tennessee health Science Center Memphis TN, United States; Tamunoemi Bob Manuel, University of Tennessee health Science Center Memphis TN, United States; Rami Khouzam, University of Tennessee health Science Center Memphis TN, United States

**Background:** The adoption of radial catheterization has been relatively slow in the United States (US). This study was conducted to assess the perceived comfort level of current cardiology fellows with radial catheterizations and thus project what the practice patterns in the US may be in the near future.

**Methods:** A 21-question survey on cardiology fellows’ preferred cardiac catheterization access site was conducted between April – June 2015. Data on access preference and perceived competency was analyzed based on the fellow’s level of training and whether they were trained at a University or Community hospital.

**Results:** A total of 101 responses were received out of a total of 250 invitations; 85 (34%) of these respondents completed all questions. Data was received from fellows from several fellowship programs nationwide. Of the 85 respondents with complete data, 22% were 1st year, 29% were 2nd year, 29% were 3rd year and 19% were interventional fellows. Most respondents (82%) were from University programs, 46.3% felt that their programs provided a balance of both radial and femoral training.

Many participating fellows (49%) had performed more than 100 catheterizations via the femoral access while 40% had similar numbers via radial access. In a case where either access site was acceptable only 10% of respondents indicated that they will prefer a femoral approach. The most common reason for preferring radial access (81%) was reduced risk of complications, while that for preferring femoral access was reduced duration of procedure (39%).

Irrespective of training year, most fellows appear to prefer radial over femoral access although senior fellows appeared to also be open to femoral access. (P=0.03). These findings did not differ by training site (University vs community programs)(P=0.921).

**Conclusion:** In 2015, US cardiology fellows appear to prefer radial over femoral access for cardiac catheterizations while it is exciting to notice the paradigm shift towards better radial access skills, we still need to emphasize the importance of the basic femoral skills; which will continue to be necessary to keep in the armamentarium of interventional cardiologists.

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C-022

**Title:** A sex-based analysis of the impact of arterial access site during PCI: Results from a large volume single center experience

**Category:** Vascular Access and Arterial Closure Devices

**Authors:** Jaya Chandrasekhar, Icahn School of Medicine at Mount Sinai, United States; Usman Baber, Icahn School of Medicine at Mount Sinai, United States; Melissa Aquino, Icahn School of Medicine at Mount Sinai, United States; Roxana Mehran, Icahn School of Medicine at Mount Sinai, United States; Jason Kovacic, Mount Sinai Hospital New York, United States; Pedro Moreno, Mount Sinai Hospital New York, United States; Jason Kovacic, Mount Sinai Hospital New York, United States; Hannah Levine, Icahn School of Medicine at Mount Sinai, United States; Prakash Krishnan, Mount Sinai Hospital New York, United States; George Dangas, Mount Sinai Hospital New York, United States; Samin Sharma, Mount Sinai Hospital New York, United States; Usman Baber, Icahn School of Medicine at Mount Sinai, United States; Jason Kovacic, Mount Sinai Hospital New York, United States; Hannah Levine, Icahn School of Medicine at Mount Sinai, United States; Prakash Krishnan, Mount Sinai Hospital New York, United States; George Dangas, Mount Sinai Hospital New York, United States; Samin Sharma, Mount Sinai Hospital New York, United States

Catheterization and Cardiovascular Interventions DOI 10.1002/ccd. Published on behalf of The Society for Cardiovascular Angiography and Interventions (SCAI).
Background: Compared to femoral access (FA), transradial access (TRA) reduces bleeding complications after percutaneous coronary intervention (PCI). As bleeding risk is higher in women versus men, the benefits of TRA may be enhanced in women undergoing PCI.

Methods: We conducted a single center retrospective observational study evaluating outcomes stratified by access site and sex. Prospectively recorded baseline and procedural variables were collected at the time of PCI. Outcomes data were assessed during follow up at 30 days and 1 year. Adjusted hazard ratios were generated using multivariable Cox proportional hazards regression.

Results: Between 1 January 2009 to 31 December 2013, 12787 patients underwent PCI, of which 32.7% were women. Among the women, 4.9% underwent TRA and 95.1% underwent FA PCI. Among the men, 3.0% underwent TRA and 97% underwent FA PCI. In general, patients undergoing TRA PCI were younger, with higher BMI, higher prevalence of peripheral vascular disease, but lower prevalence of prior MI, B2/C lesions and severe calcification. Men but not women undergoing TRA PCI had a higher proportion of diabetes, smoking history and anemia. In-hospital composite bleeding events were numerically lower with TRA vs. FA in women (1.5 vs 3.8%, p =0.08) and men (1.9% vs. 2.6%, p =0.3). At 1 year, the incidence of death with TRA vs. FA in women was 2.9% vs. 5.2% (adj. HR 0.85, 95% CI 0.37- 1.93); and in men was 4.9% vs. 3.5% (adj. HR 1.75, 95% CI 1.06-2.90). Testing for interaction between gender and access for 1 year death did not demonstrate significant effect modification, p =0.05.

Conclusion: In this single center analysis, TRA was used more often in women than in men. Irrespective of sex, TRA was not associated with significant reductions in post-procedure bleeding or 1-year death.

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C-024

Title: Crossover Rates in Transradial Catheterization - Are they really high?

Category: Vascular Access and Arterial Closure Devices

Authors: Marinos Charalambous, North Shore-LIJ Health System, United States; Savvas Constantinides, American Heart Institute, Cyprus; Elpidoforos Soteriades, American Heart Institute, Cyprus; Christos Christou, American Heart Institute, Cyprus

Background: Transradial approach (TrA) has now been established as the routine method for coronary angiography and percutaneous coronary intervention (PCI) in many centers around the world. However, many operators still consider TrA as being technically difficult, leading to access failure and high crossover rates to femoral access. Our aim was to examine how frequent is the need to crossover from radial to femoral access and assess if this is a significant limitation of the transradial approach.

Methods: We performed 2372 cardiac catheterizations between January 2010 and December 2013. In our center, we established TrA as the routine method for elective, urgent and emergency procedures (primary or rescue PCI). Baseline characteristics, procedural success rates and major complications were recorded.

Results: In 2165 cases (91.3% of all cases) the procedure was initiated and completed through transradial access. In 202 cases (8.5% of all cases) the procedure was initiated and completed through femoral access. Only in 5 cases (0.2% of all cases and 0.2% of all transradial cases) was there a need to crossover from radial to femoral access. In these 5 cases the procedure was successfully completed through right femoral access. Radial access was unsuccessful because of spasm (2 cases), radial loops (2 cases) and in one case the procedure could not be completed through the right radial artery because of a small accessory radial artery. In 2 additional cases there was a need to insert an IABP and femoral access was required in addition to radial access.

Conclusion: The majority (91.3%) of cases encountered in the cardiac catheterization lab can be successfully completed through radial access and in centers where transradial access is used as the primary method of access, the need to crossover from radial to femoral access is extremely low (0.2%). These data should encourage operators to adopt the transradial approach.

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Christos Christou: This author has nothing to disclose.

C-027

Title: Novel Strategy to Treat Radial Artery Spasm: The Combat Spasm Trial

Category: Vascular Access and Arterial Closure Devices

Authors: Carlos Collet, Cardiovascular Research Center Colombia, Colombia; Juan Corral, Angiografia de Colombia, Colombia; Ricardo Costa, Cardiovascular Research Center Sao Paulo, Brazil; Daniel Chamie, DANTE PAZZANESE INSTITUTE OF CARDIOLOGY, Brazil; Nestor Cruz, Angiografia de Colombia, Colombia; Oward Belzare, Angiografia de Colombia, Colombia; Alexander Abizaid, Instituto Dante Pazzanese da Cardiologia, Brazil

Background: Transradial approach for coronary interventions is associated with fewer vascular complications and improved outcomes especially in the acute patient setting. However, radial artery spasm (RAS) is a major limitation and the main cause of access site crossover. There is still controversy about the efficacy of intra-arterial administration of antispastic agents to reduce RAS and access site crossover. Therefore our objective was to determine the effectiveness of a novel strategy to treat RAS and avoid access site crossover.

Methods: Randomized, single center, open label trial comparing a novel strategy of pressure-mediated dilatation vs intra-arterial administration of a combination of nitroglycerin plus verapamil to treat RAS. We included patients with clinically significant and angiographic confirmation of RAS, and performed radial artery angiography before and after treatment. The primary objective was acute radial artery gain measure with quantitative radial artery angiography.

Results: Twenty patients were included, overall the mean age was 65.1 years, 29% were females and 17% were diabetics with no differences between the groups. Pre-treatment minimal luminal diameter (MLD) and radial artery stenosis were 1.1 mm and 39% mm in the pressure-
mediated group and 0.94 mm 44% in the nitroglycerin-verapamil group (p=NS). The primary endpoint of radial artery gain was significantly greater in the pressure-mediated dilatation group (0.8 mm vs. 0.03 mm, p<0.001) and post-treatment percent diameter stenosis was significantly lower in the pressure-mediated dilatation group (9.9% vs. 40.5%, p=0.03). Blood pressure significantly changed in the nitroglycerin plus verapamil compared to pressure-mediated dilatation group (ABP – 31.6 vs – 3.8 mmHg, p<0.001). There was one case of radial artery occlusion in the pressure-mediated dilatation group at follow-up.

**Conclusion:** This novel technique of pressure-mediated radial artery dilatation is superior to a pharmacologic antispastic approach for the treatment of RAS, with no concerns in hemodynamic parameters. Further studies should determine whether this strategy reduces site crossover due to RAS.

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Alexander Abizaid: This author has nothing to disclose.

C-031

**Title:** Radial artery diameter does not correlate with body mass index: A duplex ultrasound analysis of 1706 patients undergoing trans-radial catheterization at three experience radial centers

**Category:** Vascular Access and Arterial Closure Devices

**Authors:** Surya Dharma, National Cardiovascular Center Harapan Kita, Jakarta, Indonesia; Sasko Kedev, Department of Cardiology, Faculty of Medicine, University Clinic of Cardiology, Macedonia; Tejas Patel, Department of Cardiovascular Sciences, Apex Heart Institute, India; Sunil V Rao, Duke University Medical Center, United States; Olivier Bertrand, Laval University, Quebec Heart-Lung Institute, Canada; Ian C Gilchrist, Penn State Heart and Vascular Institute, United States

**Background:** We analyze the radial artery diameter and its relation with body mass index (BMI) in patients undergoing transradial catheterization.

**Methods:** A total of 1706 patients (539 women) undergoing transradial catheterization in three experiment radial centers were analyzed. Radial and ulnar artery diameter were measured by duplex ultrasound examination in one-third segment of the wrist, at one day after the procedure. Pearson correlation test was used to measure the correlation between continuous variables.

**Results:** The radial artery diameter was larger than the ulnar artery [median 2.8 mm (1.20-4.83 mm) vs. median 2.4 mm (1.20-4.0 mm), p<0.001]. Women had smaller radial and ulnar artery diameter as compared to men (2.65±0.47 mm vs. 2.84±0.57 mm, p<0.001) and 2.26±0.35 mm vs. 2.47±0.42 mm, p<0.001, respectively). There was no correlation between radial artery diameter and BMI in all patients (Pearson correlation=0.01 p=0.62 (2-sided)), but radial artery diameter had a strong linear correlation with ulnar artery diameter (Pearson correlation=0.52 p<0.001 (2-sided)). After adjustment with other clinical variables such as diabetes mellitus, gender and age, women were found to be associated with smaller radial artery diameter (<2.8 mm) (odds ratio 1.93; 95% confidence interval 1.45 - 2.57, p<0.001).

**Conclusion:** No linear relation was observed between radial artery diameter and BMI. Women were associated with smaller radial artery diameter. This study suggests that transradial catheterization can be performed without anthropometric consideration, but specific consideration should be made for women who may have smaller radial artery. In addition, since the diameter of radial artery is larger than the ulnar artery, radial artery should become the first alternative as an access site for catheterization through the arm.

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Ian C Gilchrist: This author has nothing to disclose.

C-044

**Title:** Early sheath removal after percutaneous coronary intervention using Assiut Femoral Compression Device is feasible and safe. Results of a randomized controlled trial

**Category:** Vascular Access and Arterial Closure Devices

**Authors:** Ayman K.M. Hassan, Assiut University Hospital, Egypt; Hosam Hasan-Ali, Assiut University Hospital, Egypt; Salwa Demetry, Assiut University Hospital, Egypt; Randa Refaat, Assiut University Hospital, Egypt; Ahmed Ali, Assiut University Hospital, Egypt

**Background:** This study was performed to evaluate the feasibility and safety of early sheath removal after PCI using a locally designed Assiut Femoral Compression Device (AFCD2) vs. manual compression (MC).

**Methods:** This was a randomized, controlled trial. We enrolled all patients undergoing PCI at Assiut University Hospitals from September, 2013 to December, 2013. At the end of PCI, the arterial hemostasis method was randomly assigned 1:1 to AFCD2 vs. MC. The sheaths were removed 2 h after PCI, instead of conventional 6 h, in the AFCD2 arm.

**Results:** The trial assigned 100 patients (mean age 57±9 years, 75% men) to AFCD2 (n=50) vs. MC (n=50). Both groups were comparable regarding baseline characteristics. Concerning the primary effectiveness end point, there was significantly shorter mean time-to-ambulation with AFCD2 (8.2±1.42 h) vs. MC (12.02±0.22 h; p<0.001). This was directly reflected on shorter time for hospital discharge eligibility in AFCD2 (11±1 h) vs. MC (15±1 h; p<0.001). As regards safety, none of our research population experienced major adverse events. The use of AFCD2 was associated with similar occurrence of minor complications, mainly ecchymosis and oozing, compared with MC.

**Conclusion:** Our results indicate that AFCD2 is a simple and effective alternative to MC for hemostasis following PCI. Early sheath removal 2 h post PCI is feasible, safe, and improves the patient’s comfort. As regards safety, none of our research population experienced major adverse events. The use of AFCD2 was associated with similar occurrence of minor complications, mainly ecchymosis and oozing, compared with MC.

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Salwa Demetry: This author has nothing to disclose.

Randa Refaat: This author has nothing to disclose.

Ahmed Ali: This author has nothing to disclose.
Background: One of the major limitations of the transradial approach is asymptomatic radial artery occlusion (RAO). Use of smaller size sheath, anticoagulants and adjusting the radial artery compression pressure to result in both hemostasis and maintained arterial flow (patent hemostasis) have shown to reduce the RAO rate. We opt to compare two radial compression hemostatic devices for its efficacy and safety.

Methods: Between Jan 2015 and August 2015, in a randomized, prospective, single center, blinded trial, 161 patients after transradial catheterization were randomly treated either with TR band (Terumo Corporation, NJ) or Safeguard Radial (Merit Medical Inc., South Jordan, UT). Institution wide protocol for anticoagulation use, patent hemostasis, shortest duration of compression application and universal use of 6 Fr slender sheath (Terumo Corporation) were observed. Twenty minutes after the device application discomfort related to device was recorded using universal pain assessment tool. Cardiology fellows evaluated radial artery patency using reverse Barbeau’s test and access site complications prior to discharge. A blinded research nurse assessed RAO at 30-days using reverse Barbeau’s test.

Results: Eighty-three patients were treated with TR band and 78 patients were treated with Safeguard. Demographic and procedural characteristics were similar in both groups as depicted in the table. Both the bands were equally efficient in achieving patent hemostasis (86% for TR Band vs. Safeguard Radial 85%; p value 0.52). Incidences of local complications (Table) and radial artery occlusion at 30 days were similar (1.2% for TR Band vs. 1.2% for Safeguard; p value 0.62). Patients in Safeguard group then the TR band group reported significantly lower discomfort (8.9% with Safeguard vs. 20% with TR Band; p value 0.04). Two patients in the Safeguard group were required additional TR band to treat >2cm hematoma. Overall very low RAO rate (1.2%) was
observed. Both the patients suffered RAO had hematoma >5 cm requiring prolonged compression.

**Conclusion:** With the evidence based contemporary transradial catheterization protocols the RAO rate is very low. The Safeguard Radial and TR Band are equally effective radial hemostatic devices.

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Kintur Sanghvi: 2 Merit Medical Inc., 8 Terumo Corporation

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<th>P-Value</th>
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<td>≥ 75</td>
<td>554 (18)</td>
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<td>Hospital Mortality, N (%)</td>
<td>10 (0.3)</td>
<td>6 (15.8)</td>
<td>&lt; 0.001</td>
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Background: Whereas transradial access reduces bleeding complications after percutaneous coronary intervention (PCI), the constellation of risk factors for non-access site bleeding may differ from those identified from prior studies evaluating patients treated primarily from the transfemoral approach.

Methods: We analyzed detailed clinical data from all transradial PCIs performed at our institution between 2011 and 2014 to identify factors associated with bleeding complications occurring within 72 hours of PCI or prior to discharge. Bleeding was defined according to the CathPCI NCDR registry standards and included any decline in hemoglobin >3g/dl, blood transfusion, or need for vascular injury repair. Categorical variables were summarized as frequencies and compared with Pearson Chi-square test and continuous variables as means compared with Independent-Samples T-Test.

Results: Bleeding occurred in 38 (1.2%) of 3210 patients. The table reveals that age, smaller stature, baseline anemia, peripheral arterial disease, cardiogenic shock, emergent presentation, IIb/IIia inhibitor use, left main coronary artery stenosis>50%, visible thrombus on angiography, and IABP use were associated with a higher bleeding rate. Patients not surviving to hospital discharge were far more likely to have experienced a bleeding event.

Conclusion: Advanced age, shock, and acute coronary thrombosis were associated with post-procedural bleeding following transradial PCI in keeping with prior studies whereas BMI and dialysis dependency were not. Validation from larger registries is anticipated.

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C-055
Title: A Comparison of Bleeding and Vascular Complications Between Radial and Femoral Access based on Femoral Access Technique: An analysis from the SAFE-PCI for Women Trial

Category: Vascular Access and Arterial Closure Devices
Authors: Linda M. Koshy, Duke University Medical Center, United States; Mitchell W. Krucoff, Duke University Medical Center, United States; Connie N. Hess, University Of Colorado Denver, United States; Ernest Mazzaferri Jr., Ohio State University Medical Center, United States; Sanjit S. Jolly, McMaster University, Canada; Alice Jacobs, Boston Medical Center, United States; C. Michael Gibson, Harvard Medical School, United States; Roxana Mehran, Mount Sinai Medical Center, United States; C. Michael Gibson, Harvard Medical School, United States; Sunil V. Rao, Duke University And Durham VAMC, United States; Ian C. Gilchrist, Penn State Heart and Vascular Institute, United States; Barinder Hansra, Duke University Medical Center, United States; Michael Gagnier, Harvard Medical School, United States

Background: Bleeding events and vascular complications after PCI are associated with adverse outcomes. While radial approach has been shown to reduce these complications compared with femoral access, whether the use of micropuncture, fluoroscopy, or ultrasound mitigates these differences is unknown.

Methods: We conducted a post-hoc analysis of women in the SAFE-PCI for Women Trial who underwent PCI that had method of access recorded (N=643). The primary endpoint of post-procedure bleeding or vascular complications occurring within 72 hours or at discharge was adjudicated by a clinical events committee and compared across three categories of access: radial, non-guided femoral and guided femoral (using fluoroscopy, micropuncture or ultrasound). Differences across the groups based on actual treatment received were determined using the Fisher’s exact test with significance set at a p-value <.05.

Results: Of the PCI population, 330 underwent radial access, 85 underwent non-guided femoral access, and 228 underwent guided femoral access. Baseline characteristics and medication use were similar across the groups. There was a statistically significant lower incidence of the primary endpoint between radial access and non-guided femoral access; however, there was no significant difference between radial approach and guided femoral access (Table).

Conclusion: This post-hoc analysis demonstrates that while radial access is superior to non-guided femoral access, guided femoral access appears to be associated with similar bleeding events or vascular complications as radial access.
C-056

Title: Pre-close technique of percutaneous closure for delayed hemostasis of large-bore femoral sheaths

Authors: Kusum Lata, Wayne State University - Detroit Medical Center, United States; Wah Wah Htun, Wayne State University - Detroit Medical Center, United States; Theodore Schreiber, Wayne State University - Detroit Medical Center, United States

Abstract: Transfer of percutaneous coronary intervention (PCI) reduces the risks of major vascular complications associated with femoral access. Despite this, less than 20% of PCI in the catheterization and Cardiovascular Interventions DOI 10.1002/ccd. Published on behalf of The Society for Cardiovascular Angiography and Interventions (SCAI).
United States are performed via TRA, in part due to steep learning curve associated with TRA.

Methods: We developed a novel high-fidelity cadaver-based radial access model for the training of TRA. Key elements of the model were 1) palpable and ultrasound visible radial “pulse” created by mechanical pump, 2) achievable “hemostasis” allowing repeated access, 3) true radial arterial anatomy. 35 general cardiology fellows trained on the model and were queried on their prior exposure to TRA, comfort performing TRA, post training self-assessment and utility of the TRA model. Trainees were also timed on three successive TRA attempts on the model.

Results: 60% of trainees had performed less than 5 TRA prior to this model. Comfort with routinely obtaining TRA improved from 54% to 85% after use of the model. Average time to access decreased from 42.9s ± 4.6s to 18.6s ± 2.9s after three TRA attempts on the model. 80% of fellows reported that they are more likely to use TRA in their practice after the training session.

Conclusion: After training on our novel TRA model, fellows demonstrated a significant improvement in TRA efficiency and endorsed increased likelihood of using TRA. Use of this true anatomy cadaveric model in cardiology training may promote competence prior to performing the procedure in patients and may promote the adoption of TRA in the United States.

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Tony Lu: This author has nothing to disclose.
Luís Gómez: This author has nothing to disclose.
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C-069

Title: Predictors of Failed Radial Artery Cannulation for Transradial Access: Insights from a Large International Registry

Category: Vascular Access and Arterial Closure Devices

Authors:
Neha Pancholy, Jefferson Medical College of Thomas Jefferson University, United States; Aman Patel, Apex Heart Institute, India; Biljana Zafirovska, University Clinic of Cardiology, Medical Faculty Skopje, Macedonia, Macedonia; Tejas Patel, Apex Heart Institute, India; Sasko Kedev, University Clinic of Cardiology, Medical Faculty Skopje, Macedonia, Macedonia; Samir Pancholy, The Wright Center for graduate medical education, United States

Background: Failure to cannulate radial artery lumen remains the most common reason for inability to use transradial access (TRA) for cardiovascular procedures. Predictors of failed radial artery cannulation (FC) are largely unknown.

Methods: Patients undergoing TRA from a large international registry were retrospectively analyzed. Demographic, and procedural variables were sampled. FC, access site crossover and characteristics of arterial anatomy as well as occurrence of spasm were recorded. Univariate predictors of FC and access site crossover were identified. Catheterization and Cardiovascular Interventions DOI 10.1002/ccd.

C-068

Title: DOES BARBEAU TEST VARY FROM HOUR TO HOUR? FINDINGS OF A PROSPECTIVE SERIAL EVALUATION OF HAND CIRCULATION

Category: Vascular Access and Arterial Closure Devices

Authors: Sandhya Reddy, The Wright center for graduate medical education, United States; Neha Pancholy, Jefferson Medical College of Thomas Jefferson University, United States; Tejas Patel, Apex Heart Institute, India; Samir Pancholy, The Wright center for graduate medical education, United States

Background: Presence or absence of macro-collateralized circulation in the hand has been used to select patients for transradial access (TRA) using Allen’s test or Barbeau's test. Recent evidence suggests lack of utility of such evaluation in predicting hand ischemia after TRA. Data on serial evaluation of Barbeau’s test pattern in a given upper extremity are not available.

Methods: Stable outpatients presenting to a cardiology clinic underwent Barbeau’s test using a plethysmograph in a standard fashion, results categorized as pattern A, B, C or D as previously described. Baseline test was performed on arrival and follow-up test was performed when the patient was ready to leave the clinic. Pattern A and B were categorized as “Low-risk” pattern and C and D were categorized as “High-risk” pattern. Demographic and morphologic variables were recorded. Baseline and follow-up test patterns were compared using McNemar’s test.

Results: 225 patients (450 upper extremities) with age 68 ± 19 years, BMI 30 ± 7, and 44% females were studied. 396 (88%) upper extremities had a “Low-risk” pattern and 54 (12%) had “High-risk” pattern at baseline. Follow-up evaluation was performed in all patients 50 ± 26 minutes later. On follow-up evaluation 414 (92%) had a low-risk pattern and 36 (8%) had a high risk pattern. A significant difference between
baseline and follow-up patterns was found with 18 patients with a “high-risk” pattern at baseline demonstrating a “low-risk” pattern at follow-up (McNemar’s P = 0.035). None of the patients with a “low-risk” pattern at baseline developed a “high-risk” pattern at follow-up.

**Conclusion:** Barbeau’s test results demonstrate significantvariability in the observed pattern over a short period of time. Many patients with a concerning pattern (C and D) demonstrate a benign pattern (A and B) on re-evaluation within the hour, corroborating presence of rapidly recruitable collateral circulation in most hands, and lack of utility of a single observation as a marker of upper extremity vascular status.

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Sandhya Reddy: This author has nothing to disclose.  
Neha Pancholy: This author has nothing to disclose.  
Tejas Patel: This author has nothing to disclose.  
Samir Pancholy: 8 Terumo

**C-076**

**Title:** Utilization of a Potassium Ferrate (KFeO₃) hemostatic disc (StatSeal™) to accelerate time to hemostasis in transradial cardiac procedures (TRA)  
**Category:** Vascular Access and Arterial Closure Devices

**Authors:** William Rollefson, Arkansas Heart Hospital, United States; Mehmet Cilingiroglu, Arkansas Heart Hospital, United States; david mego, Arkansas Heart Hospital, United States

**Background:** TRA is our preferred approach for coronary procedures, at 80–90% of cases. Lower complications rates, lower costs, and greater patient (P) satisfaction are cited for the rapid growth of TRA in the US. Hemostasis bands (HB) are used in most programs, with balloon inflation (BI) times of 3 - 4 hours. Serial deflation of HB Bands is typically managed by non-cath lab personnel. We report our initial experience using a Potassium Ferrate disc (StatSeal [SS]) in conjunction with our HB to evaluate change in BI time.

**Methods:** 51 Pts having TRA coronary angiography or PCI were treated with the SS disc. The disc is placed at the sheath entry site and secured with a small transparent dressing (eg Tegaderm). The HB is then positioned over the disk and inflated with 8cc as the sheath is removed. After 20’, the HB is deflated by 3cc and fully deflated after another 20’. If no complications are seen after 10-15’ of observation, the HB is removed. The dressing/disc remnant are left in place for 24 hrs; it falls off with washing. The SS reacts with blood to form a seal at the puncture site and sheath track, regardless of anticoagulation status.

**Results:** SS was successfully placed on all Ps. Mean time to 1st deflation was 21.9’ (15-30). Mean total time of BI was 40.3’ (30–57). 1 P experienced a Class I hemotema following full deflation, successfully treated by re-inflation. No bleeding or decrease in palpable pulse was observed.

**Conclusion:** 1) Incorporating SS into hemostasis management resulted in decreasing BI time to ~ 40’, with only 1 minor hemotema. 2) Incorporating SS into a hemostasis management protocol is simple to incorporate into hemostasis management and should facilitate earlier discharge. 3) With hemostasis management now able to be performed under the supervision of cath lab nursing personnel, complications that occur should be less serious as they will be ‘caught’ and treated earlier. 4) Pt complaints of discomfort/pain from the HB should decrease due to shorter HB times, resulting in improved patient satisfaction scores.

**Disclosures:**

William Rollefson: 5 terumo medical Mehmet Cilingiroglu: This author has nothing to disclose. david mego: 5 terumo medical

**C-084**

**Title:** Efficacy and Feasibility of Transradial Intervention for Left Main and Bifurcation Stenosis: A Single Center Retrospective Study  
**Category:** Vascular Access and Arterial Closure Devices

**Authors:** Rama Kantamneni Krishna, Eternal Heart Care Center and Research Institute, India; Prem Ratan, Eternal Heart Care Center and Research Institute, India; Hemant Chaturvedi, Eternal Heart Care Center and Research Institute, India; Ravinder Singh Rao, Eternal Heart Care Center and Research Institute, India; Rudradev Pandey, Eternal Heart Care Center and Research Institute, India; Sanjeev Sidana, Eternal Heart Care Center and Research Institute, India; Jitender Singh Makkar, Eternal Heart Care Center and Research Institute, India; Sanjeev Kumar Sharma, Eternal Heart Care Center and Research Institute, India

**Background:** Transradial intervention (TRI) is being used extensively and has been applied to more complex lesions in percutaneous coronary intervention. The efficacy and feasibility of TRI for Left main and Bifurcation lesions has not yet been determined. We have a radial first approach and wanted to review our experience with radial access for these types of complex percutaneous coronary interventions, especially the safety and the feasibility with our current techniques.

**Methods:** After institutional review board approval. We retrospectively reviewed records and analyzed 62 Left main and Bifurcation stenosis lesions in 60 patients in a single center between January 2014 and December 2015. Follow up included telephone conversations and outpatient records.

**Results:** We identified 62 Left main and Bifurcation stenosis lesions in 60 patients who underwent percutaneous coronary intervention via Transradial access. Common sheath and guide used were of 6 Fr and most common guiding catheter used was 6 Fr Extra backup (XB 3.5, Cordis corp). Fluoroscopy times were similar to other femoral access cases in our institution. Procedure success rates were 99% with TRI, and about 10% of patients needed a upgrade to 7 Fr sheath and guiding catheter and on rare occasion support of guideliner was utilized. Left anterior descending artery was the common vessel involved in bifurcation intervention. The average number of stents used were 1.41 +/- 0.9, average fluoroscopy time was 18.8 +/- 10.3 minutes and contrast volume was 120.3 +/- 54 ml. At 30 days follow-up, there were no major adverse cardiovascular events, including cardiac death, myocardial infarction, and need for target-vessel revascularization. None of the cases had immediate access-site complications. Access-site crossover from radial to femoral was needed in one case.

**Conclusion:** Most of the Left main and Bifurcation stenosis lesions can be treated with high success and low complication rates by TRI, occasional lesions may need higher size sheath and guiding catheter.

**Disclosures:**

Rama Kantamneni Krishna: This author has nothing to disclose. Prem Ratan: This author has nothing to disclose.  
Hemant Chaturvedi: This author has nothing to disclose.  
Ravinder Singh Rao: This author has nothing to disclose.  
Rudradev Pandey: This author has nothing to disclose.  
Sanjeev Sidana: This author has nothing to disclose.  
Jitender Singh Makkar: This author has nothing to disclose.  
Sanjeev Kumar Sharma: This author has nothing to disclose.

**C-078**

**Title:** Transradial Aortic Paravalvular Leak Closure  
**Category:** Vascular Access and Arterial Closure Devices

**Authors:** Kintur Sanghvi, Deborah Heart & Lung Center, United States; Jeff Stahl, Deborah Heart & Lung Center, United States; Allen Catheterization and Cardiovascular Interventions DOI 10.1002/ccd.  
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McGrew, Deborah Heart & Lung Center, United States; Richard Kovach, Deborah Heart & Lung Center, United States

**Background:** The incidence of paravalvular leak (PVL) has been noted from 2-10% in surgically replaced aortic valve. Endovascular closure of the PVL using vascular plugs has high clinical and procedural success in treating severe aortic regurgitation (AR) related to PVL. Femoral approach remained the access of choice while feasibility of radial access is unknown for the same procedure.

**Methods:** We retrospectively reviewed all the patients who underwent an attempt to treat aortic PVL closure at our institution between December 2012 and December 2015. Procedural characteristics, clinical characteristics and complication information were collected. Procedural success was defined as the ability to deploy a vascular plug from the intended access. Clinical success was defined as successfully reducing the severity of AR to a lesser degree (i.e.- from moderately-severe or severe to mild or moderate).

**Results:** Out of the nine patients attempted via femoral approach, eight had procedural and clinical success (Table). One patient who underwent initial femoral approach was switched over to radial approach due to inability to advance neither a 5 Fr 90cm sheath nor a guide catheter through the PVL in the posterior-lateral aortic annulus. Five patients (including the patient who crossed-over from an initial femoral approach) were attempted via a radial approach with all experiencing procedural and clinical success. Only one of 13 patients in this cohort whom suffered from a very large PVL did not have clinical success despite deploying 2 vascular plugs into the PVL defect. The procedural variables as well as frequency and choice of equipment are described in the table. Six patients had additional arterial access either to protect coronary ostia or to perform aortography. One patient in each group required two plugs to treat the PVL (Figure). The patient who crossed-over from a femoral to a radial access had a major hematoma at the femoral access site which is reported in both groups. No other procedure related complications were noted.

**Conclusion:** This is the first report of an alternate arterial access for aortic PVL closure. Radial approach is feasible with high procedural success using the traditional equipment for the aortic paravalvular leak closure.

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Kintur Sanghvi: This author has nothing to disclose.
Jeff Stahl: This author has nothing to disclose.
Allen McGrew: This author has nothing to disclose.
Richard Kovach: This author has nothing to disclose.

C-092

**Title:** Suggested Bony Landmarks For Safe Axillary Artery Access And Closure

**Category:** Vascular Access and Arterial Closure Devices

**Authors:** Mohammad Thawabi, Newark Beth Israel Medical Center, United States; Nishant Sethi, Newark Beth Israel Medical Center, United States; Sherif Eltawansy, Newark Beth Israel Medical Center, United States; Yassir Nawaz, Newark Beth Israel Medical Center, United States; Marc Cohen, Newark Beth Israel Medical Center, United States; Najam Wasty, Newark Beth Israel Medical Center, United States

**Background:** The Axillary artery (AA) is an alternative, large bore access site that can be utilized in the presence of hostile aortoiliac segments. Direct percutaneous AA puncture and closure without surgical cutdown might be fraught with brachial plexus injuries and vascular complications. Unlike the common femoral artery, no bony landmarks have been described to safely access and close the AA percutaneously.

**Methods:** We retrospectively reviewed 28 consecutive cases of totally direct, percutaneous AA access and closure. Keeping the arm abducted at 120 degrees, the AA was palpated and accessed entirely percutaneously. The puncture site was just medial to the border of the glenoid cavity, as identified under fluoroscopy in the anterior posterior projection, in all patients. Percutaneous vessel closure, using vascular closure devices (VCDs), was performed in 27 procedures. The patients were evaluated for vascular and neurological complications at the end of the procedure, 24 hours, and 30 days.

**Results:** 28 totally percutaneous AA punctures (23 left and 5 right) were performed over a period of 3 years. The AA was successfully cannulated in all patients. AA puncture size was 4-French (n= 1), 6-French (n= 25), and 13.5 French (n=2). Procedures performed were peripheral angioplasty of femoropopliteal territories (n=18), Impella placement (n=2), coronary and carotid angiography (n=4), abdominal aortography (n=3), and right subclavian angioplasty (n=1). VCDs included Angioseal (n=24), Perclose ProGlide (n=1) and “hybrid closure”, employing one Perclose and one Angioseal for the large bore punctures, (n=2). VCD success was achieved in all procedures. There were no neurological or vascular complications noted immediately, at 24 hours, or at 30 days.

**Conclusion:** Using the inferior border of the glenoid cavity as a bony landmark, the AA can be safely accessed and closed totally percutaneously without brachial plexus injuries or vascular complications.

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Mohammad Thawabi: This author has nothing to disclose.
Nishant Sethi: This author has nothing to disclose.
Sherif Eltawansy: This author has nothing to disclose.
Yassir Nawaz: This author has nothing to disclose.
Marc Cohen: This author has nothing to disclose.
Najam Wasty: This author has nothing to disclose.

C-094

**Title:** Pedal approach (PA) approaches the clinical safety as compared to femoral approach (FA) for treating peripheral arterial disease (PAD)

**Category:** Vascular Access and Arterial Closure Devices

**Authors:** Albert Wu, University of Texas Health Science Center of San Antonio, United States; Michael Wholey, University of Texas Health Sciences Center at San Antonio, United States; William Wu, Heart and Vascular Clinic of San Antonio, United States

**Background:** PA is becoming more popular for treating PAD patients. We presented our single center experiences with PA vs FA for PAD patients presented with critical limb ischemia (CLI).

**Methods:** A total of 456 cases with CLI were reviewed retrospectively between 2014-2015: FA cases were compared to PA cases in terms of immediate and 30-day procedure-related complications. The procedures involved included diagnostic and interventional procedures for infrapopliteal as well as femoropopliteal and Iliac arteries. All PA cases were performed with ultrasound guided technique.

**Results:** Of the 456 cases involving 355 patients, 198 cases underwent PA and 258 cases had traditional FA for PAD treatment. There were no statistical differences in the patients' clinical characteristics risk factors including diabetes, hypertension, hypercholesterolemia and other risk factors.
Total complications were recorded for PA (0 case, 0%) versus FA (18 cases, 7.1%) including pseudoaneurysms (0, 0% PA, 4, 1.6% FA), minor hematomas (0, 0% PA, 11, 4% FA), retroperitoneal bleeds (0, 0% PA, 1, 0.04% FA), blood transfusions (0, 0% PA, 1, 0.4% FA), major morbidity requiring hospitalization (0, 0% PA, 2, 0.7% FA). Patients from both the PA and FA access cases returned in 2-4 weeks follow up and limited ultrasound evaluations were performed of the extremities including pedal dorsalis and poster tibial arteries. For the follow up, there were no PA patients who had lost Doppler signal. Among the PA patient, 20 patient complained of local tenderness.

**Conclusion:** PA can be performed successfully and safely with much less access complications when compared with traditional FA routes. There are many benefits of PA access compared to FA in terms of technique and reduced costs (no closure device required).

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William Wu: This author has nothing to disclose.