Procedural Strategies:
When to do Ad Hoc PCI,
When to Stage Multi-Vessel PCI

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No Conflicts of Interest Relevant to this topic

Principle Investigator at Geisinger Medical Center for multi-center trials funded by

Astra-Zeneca    St Jude Medical
Boston Scientific Regado Biosciences
Abbott Vascular  Medinal LTD
Medinal          GlaxoSMithKline
Stentys Inc      Takeda Pharmaceuticals
In an emergency, the Scarecrow announced, “it is always a good thing to pause and reflect. Please excuse me while I pause and reflect.”

—The Marvelous Land of Oz, 1904
CORONARY ARTERY DISEASE

Clinical Decision Making

Ad Hoc Percutaneous Coronary Intervention: A Consensus Statement From the Society for Cardiovascular Angiography and Interventions

James C. Blankenship,1,2 MD, Osvaldo S. Gigliotti,3 MD, Dmitriy N. Feldman,4 MD, Timothy A. Mixon,5 MD, Rajan A.G. Patel,6 MD, Paul Sorajja,6 MD, Steven J. Yakubov,7 MD, and Charles E. Chambers,8 MD

Clinical Decision Making

Staging of Multivessel Percutaneous Coronary Interventions: An Expert Consensus Statement from the Society for Cardiovascular Angiography and Interventions

James C. Blankenship,1,2 MD, FSCAI, Issam D. Moussa,3 MD, FSCAI, Charles C. Chambers,4 MD, FSCAI, Emmanouil S. Brilakis,4 MD, FSCAI, Thomas A. Haldis,5 DO, Douglas A. Morrison,6 MD, FSCAI, and Gregory J. Dehmer,7 MD, FSCAI
Case # 1

Now What? PCI?
Case # 2
Case # 2

Now What? PCI?
Case # 3
Case # 3

GFR = 54

Contrast used = 200 cc
Case # 3

FFR = .74

GFR = 54

Contrast used = 200 cc

Now What? PCI?
Ad hoc PCI

Is it safe?
Is it cost effective?
When is it preferred?
When is it NOT appropriate?
What is required

Staging Multi-Vessel PCI

Is it safe?
Is it cost effective?
When is it preferred?
When is it NOT appropriate?
What is required
**Ad hoc PCI: Is it safe? - yes**

<table>
<thead>
<tr>
<th>Author (years enrolled)</th>
<th>No. patients (Ad hoc/delayed)</th>
<th>Angiographic success</th>
<th>Inpatient death</th>
<th>Procedural myocardial infarction</th>
<th>Emergent coronary bypass surgery</th>
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<td>Delayed (%)</td>
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</table>

*Statistical analyses involved multivariate analysis.

*Clinical success is reported since angiographic success was not available.

*P < 0.05.

NA = not available
Ad hoc PCI: Is it cost-effective? - yes

Ad hoc PCI vs cath and PCI at separate sessions

Ad hoc PCI reduces costs by 16-19%


Ad hoc PCI: When is it Preferred?

Primary PCI for STEMI
Acute Coronary Syndromes
Ad hoc PCI: When is it Preferred?

Primary PCI for STEMI
Acute Coronary Syndromes
Stable Ischemic Heart Disease?

When benefits >>> risks
When shared decision-making precedes cath
When hemodynamic significance of lesion is clear
When it is “appropriate” or “may be appropriate”
Ad hoc PCI: When is it NOT Appropriate?

- Inadequate informed consent process
- Complication of diagnostic cath (access site bleed, stroke)
- Indication for PCI is unclear (“rarely appropriate”)
  - e.g., LV function, valve disease assessment, viability
- Heart Team approach is needed
- PCI would require excessive contrast
- PCI would require excessive radiation
- CTO?
Ad hoc PCI: What is Required?

- Informed consent – appropriate for the lesions seen at cath
- Optimal hydration
- Pre-treatment with aspirin
Ad hoc PCI: What is Required?

Informed consent – appropriate for the lesions seen at cath
Optimal hydration
Pre-treatment with aspirin
Assessment of radiation dose
Ad hoc PCI: What is Required?

Informed consent – appropriate for the lesions seen at cath
Optimal hydration
Pre-treatment with aspirin
Assessment of radiation dose
Assessment of contrast dose and safe limits


Ad hoc PCI: What is Required?

Informed consent – appropriate for the lesions seen at cath
Optimal hydration
Pre-treatment with aspirin
Assessment of radiation dose
Assessment of contrast dose and safe limits
Adequate access site
Inferior epigastric artery

Sheath entry into artery
Institutional Outcomes Report
2015Q2

Geisinger Medical Center
937901
NCDR Tracks Metrics Affected by Decisions Regarding Ad Hoc PCI

<table>
<thead>
<tr>
<th>PCI in-hospital risk adjusted acute kidney injury (all patients)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>My Hospital</strong></td>
</tr>
<tr>
<td>8.46</td>
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</tbody>
</table>

Your hospital's PCI in-hospital risk adjusted AKI rate for all patients adjusted using the NCDR® risk adjustment model. [Detail Line:1960]
NCDR Tracks Metrics Affected by Decisions Regarding Ad Hoc PCI

Executive Summary

CathPCI Registry®
(937901) compared to Rolling Four Quarters (R4Q) for US Hospitals ending

Section III: PCI Appropriate Use Criteria (AUC) Metrics – These data are based upon the 2012 Appropriateness Criteria for Coronary Revascularization Focused Update (J Am Coll Cardiol 2012 59: 857-881) document developed by the ACC, Society for Cardiovascular Angiography and Interventions, Society of Thoracic Surgeons, American Heart Association, and other national societies. These metrics are designed to provide sites feedback on the appropriateness of percutaneous coronary intervention procedures at the hospital level. PCI AUC metrics are not appropriate for public/external reporting.

| 36 Patients WITHOUT Acute Coronary Syndrome: Proportion of evaluated PCI procedures that were inappropriate |
|--------------------------------------------------|-----------------|-----------------|-----------------|
| My Hospital                                      | US Hospitals 50th Pctl | US Hospitals 90th Pctl |
| 4.29%                                            | 13.12%           | 0.00%           |

Proportion of PCI procedures that were evaluated as "Inappropriate", among patients without ACS, meaning coronary revascularization is not generally acceptable and is not a reasonable approach for the indication and is unlikely to improve the patients' health outcomes or survival. [Detail Line:1587]
What Do the PCI Guidelines Say about Ad hoc PCI?

“Ad hoc PCI ….. presents special problems”

“The volume of contrast administered during diagnostic catheterization is an important factor when considering possible ad hoc PCI ”
2.1. Heart Team Approach to Revascularization Decisions: Recommendations

CLASS I

1. A Heart Team approach to revascularization is recommended in patients with unprotected left main or complex CAD (14–16). (Level of Evidence: C)
Ad hoc PCI

Is it safe?
Is it cost effective?
When is it preferred?
When is it NOT appropriate?
What is required

Staging Multi-Vessel PCI

Is it safe?
Is it cost effective?
When is it preferred?
When is it NOT appropriate?
What is required
Multi-Vessel PCI

40-50% of PCI patients have MV CAD

15-20% of PCI patients have MV PCI

3% of PCI patients have staged PCIs


Staging Multi-Vessel PCI: Is it Safe?

Yes, but data is scarce

Staging Multi-Vessel PCI: Is it Cost-Effective?

No data

Common sense: staging increases costs
Staging Multi-Vessel PCI:
When Is It Preferred?

Severe CKD
When you want to avoid the 2^{nd} vessel
When PCI of 1^{st} vessel is complicated
Contrast or radiation would be excessive
The 2\textsuperscript{nd} Stage

Is it Really Necessary?

If patient is asymptomatic and stable after Stage 1…

…… is Stage 2 indicated?
### Scenario AUC Say about MV PCI?

<table>
<thead>
<tr>
<th>Scenario #</th>
<th>Scenario</th>
<th>AUC Rating</th>
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<tbody>
<tr>
<td>7</td>
<td>7. STEMI with successful treatment of the culprit artery by primary PCI or fibrinolysis</td>
<td>I (2)</td>
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<tr>
<td></td>
<td>• Asymptomatic; no HF, no evidence of recurrent or provokable ischemia, or no unstable ventricular arrhythmias during index hospitalization</td>
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<td>• Normal LVEF</td>
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<td>• Revascularization of a non-infarct-related artery during index hospitalization</td>
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<tr>
<td>8</td>
<td>8. STEMI or NSTEMI and successful PCI of culprit artery during index hospitalization</td>
<td>A (8)</td>
</tr>
<tr>
<td></td>
<td>• Symptoms of recurrent myocardial ischemia and/or high-risk findings on noninvasive stress testing performed after index hospitalization</td>
<td></td>
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<td></td>
<td>• Revascularization of 1 additional coronary arteries</td>
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<td>12</td>
<td>12. UA/NSTEMI and high-risk features for short-term risk of death or nonfatal MI</td>
<td>A (9)</td>
</tr>
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<td></td>
<td>• Revascularization of multiple coronary arteries when the culprit artery cannot clearly be determined</td>
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<tr>
<td>13</td>
<td>13. Patients with acute myocardial infarction (STEMI or NSTEMI)</td>
<td>A (8)</td>
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<tr>
<td></td>
<td>• Evidence of cardiogenic shock</td>
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<tr>
<td></td>
<td>• Revascularization of 1 coronary arteries</td>
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</tbody>
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What Do the Guidelines Say about Staging MV PCI?

Class IIb
PCI of a noninfarct artery may be considered in selected patients with STEMI and multivessel disease who are hemodynamically stable, either at the time of primary PCI or as a planned staged procedure (11-24). (Level of Evidence: B-R)
PRAMI Trial

Figure 2. Kaplan-Meier Curves for the Primary Outcome.

The primary outcome was a composite of death from cardiac causes, non-fatal myocardial infarction, or refractory angina. The inset graph shows the same data on a larger scale. All patients in the trial underwent infarct-artery PCI immediately before randomization.

Odds Ratios of MACE:

Complete Revasc vs Culprit-only:  \( .32, P < 0.001 \)
Single stage CR vs Culprit-only:  \( .29, P < 0.001 \)
Staged CR vs Culprit–only:  \( .24, P < 0.001 \)
Single stage CR vs Staged CR:  \( .78, p = NS \)
Summary: Ad hoc PCI

Requirements:
- informed consent
- Safe diagnostic cath
- Clear indication of lesion significance
- On-the-spot decision making
- No need for Heart Team Approach
- Safe limits on contrast and radiation
- Shared decision-making
Summary: Single Stage MV PCI

Requirements:
Safe completion of 1st Stage
Clear indication of lesion significance
Safe limits on contrast and radiation
wisdom requires you to pause

know when to stop
wisdom requires you to pause

STOP
know when to stop

NOW YOU'VE GONE

TOO FAR
If you are in the red zone.....

...thanks for hanging in there.