SCAI Quality Improvement Toolkit

Working on QUALITY, One Cath Lab at a Time
The SCAI Quality Improvement Toolkit was developed with support from Daiichi Sankyo and Lilly. The Society gratefully acknowledges this support, while taking sole responsibility for all content developed and disseminated through this effort.
“We have talked for a number of years about the need for interventionalists to “own” the QI process in the cath lab.

SCAI QIT offers a unique opportunity for SCAI members to demonstrate their commitment to improving quality of care and to reassure our patients that their expectations of receiving the highest quality of care in the cath lab are being met.

It’s time for you to get involved. It’s time for you to get to work.”

– Christopher J. White, MD, MSCAI
Outline

Defining Quality in the Cath Lab
Operator and Staff Requirements
Procedural Quality
2016 Cath Lab Best Practices
Facility and Environmental Issues
Care Coordination with Referring Physicians
Facility and Environmental Issues
Purpose
- To review the following facility/environmental issues related to daily CCL practice:
  - Infection Control
  - Radiation Safety
  - Equipment Maintenance
  - Information Storage and Inventory

Intended Audience
- CCL directors, hospital administrators, interventionalists, nurses, technologists, advanced practice providers, SCAI QIT Champions
Infection Control Overview

- All CCL should have sterile/infection control protocols in place
- Patient preparation
  - Electric clippers for removal of hair
  - Chlorhexidine-based prep to the skin
  - Sterile drapes
- Operators: appropriate hand washing, hospital-based scrub attire, sterile gown and gloves
- Masks, eye shield and protective caps (optional but required based on state/institutional policy)
- Universal precautions should be followed

Infection Control

Ancillary Personnel
- Wear scrub suits and gloves when within the sterile field. Cap, mask, eye protection are optional

High Risk Patients (for staff exposure)
- Screening for blood borne pathogens is not routinely performed
- Wearing two pairs of gloves reduces inner glove punctures by 60% (not proven to prevent transmission of hepatitis or HIV)
- Cap, mask, eye protection are encouraged

Skin Puncture or Laceration
- Report immediately
- Established protocol for the management of such event with CDC published guidelines available for guidance

Vaccination
- Vaccination for Hepatitis B virus is encouraged
Infection Control

- The CCL should be thoroughly cleaned once a day and spot-cleaned with trash removal between each case.
- The ventilation system should provide at least 20 air exchange/hr and be cleaned monthly.
- The doors to the CCL should be kept closed, except for essential personnel leaving or entering.
- Equipment near the entry site, such as foot switches, should be covered.
- Multi-dose vials should be avoided, unless used with an approved device to protect against backflow.
- Blood-contaminated drapes, gowns, gloves, and sponges should be discarded in containers labeled as health care waste. Needles and blades should be placed in puncture-proof containers.

Chambers CE et al. Infection control guidelines for the cath lab. CCI 2006;67:78-86
Radiation Safety

- Each facility must have a radiation safety program
- Documentation of radiation safety training must be provided
- Patient radiation dose must be monitored and recorded
  - Includes fluoroscopic time, total air kerma at the interventional reference point (IRP) $(K_{a,r}, \text{Gy})$ and/or air kerma area product $(P_{ka}, \text{Gycm}^2)$
  - Peak skin dose $(PSD, \text{Gy})$ should be included

Surveillance for:
- Total air kerma at the interventional reference point $(K_{a,r}) \geq 5 \text{ Gy}$ or air kerma area product $(P_{ka})=500 \text{ Gycm}^2$, and/or fluoroscopy $>60$ minutes

Chambers CE et al. Radiation Safety program for the Cardiac Catheterization Laboratory. CCI 2011;77(4):546-56.
Assessment of Patient Dose

- **Fluoroscopic Time** not a useful descriptor of patient dose

- **Total Air Kerma at the Interventional Reference Point** (Ka,r, Gy): X-ray energy delivered to air 15cm from isocenter
  - Required since 2006 for patient dose burden for deterministic skin effects

- **Air Kerma Area Product (PKA, Gy cm²)**: product of air kerma and x-ray field area. Estimates potential stochastic effects (radiation induced cancer)

- **Peak Skin Dose (PSD, Gy)**: maximum dose received by any local area of patient skin
  - No established method to measure PSD
  - Can be estimated if air kerma and X-ray geometry are known
  - The Joint Commission Sentinel event, >15 Gy
Assessment of Risk
- Consider the obese patient
- Complex PCI/CTO
- Repeat procedures within 30-60 days
- Other radiation-related procedures

Informed Consent
- Should include the following issues:
  - Procedures use ionizing radiation
  - Physicians will deliver the dose necessary for the procedure
  - Although both short- and long-term risk is present with radiation exposure, this rarely results in significant short or long term injury
  - In complex cases, local tissue damage to the skin or even underlying layers may occur that may require additional follow up and treatment
Post Procedure Issues

- Document radiation dose with Fluoroscopic Time, and interventional reference point (IRP) Cumulative Air Kerma, and/or Cumulative Kerma Area Product (CKAP, Gycm2) in procedure report
  - Especially if IRP Cumulative Air Kerma (CAKIRP) doses ≥5 Gy

- Follow up is required by thirty days for IRP Cumulative Air Kerma (CAKIRP) of 5-10 Gy. Phone calls with an office visit as needed

- For IRP Cumulative Air Kerma (CAKIRP) >10 Gy, health physics should perform a detailed analysis
  - An office visit at < 4 weeks is recommended for examination of these patients
  - Hospital risk management should be contacted within 24 hrs if a calculated peak skin dose > 15 Gy

- Adverse Tissue Effects are best assessed by history and physical exam
  - Biopsy – only for uncertain diagnosis
  - Wound from the biopsy may result in a secondary injury potentially more severe than the radiation injury
Cath Lab Equipment

- Imaging equipment and archival storage
- Multichannel physiologic monitoring (minimum of 2 pressure and 3 ECG channels) with real-time and archived physiologic, hemodynamic and rhythm monitoring
- Inventory of disposable supplies
- Facilities performing PCIs must have an adequate inventory for the scope of services provided
- Emergency management equipment
- Documenting of preventive maintenance and testing of laboratory equipment.
  - For radiographic systems this includes but is not limited to
    a) image quality
    b) dynamic range
    c) modulation transfer function
    d) fluoroscopic spatial resolution
    e) fluoroscopic field of view size accuracy
    f) low contrast resolution
    g) record and fluoro mode automatic exposure control and maximum table-top exposure rate
- Documentation of the safe operation of infrequently-used equipment
Information Storage and Inventory

- Should link reporting system with the hospital information system.
- Linking inventory and billing creates a seamless interface to provide an accessible report, enhanced inventory management and can verify billing.
- Compliance with the 1996 Health Insurance Portability and Accountability Act (HIPAA) is required.
- Disaster recovery is essential to any archival storage system.
Resources & Support

- SCAI QI Committee Assistance: Info@scai.org

- SCAI QIT Updates: http://www.scai.org/QIT/default.aspx

- SCAI QIT Tip of the Month: http://www.scai.org/QITTtip/default.aspx
Acknowledgments

- SCAI President: James C. Blankenship, MD
- SCAI QI Committee Chair/Vice-Chair: Sunil V. Rao, MD and Kalon K. Ho, MD
- Original Authors (2011 QIT): Christopher J. White, MD; Sunil V. Rao, MD; Kalon K. Ho, MD; Skip Anderson, MD; Lyndon J. Box, MD; Charlie E. Chambers, MD; Kirk N. Garratt, MD; Srihari S. Naidu, MD; Steven J. Yakubov, MD; Suresh R. Mulukutla, MD; Henry S. Jennings, MD
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- 2016 QIT Update: Rajesh V. Swaminathan, MD; Jordan G. Safirstein, MD; Henry S. Jennings, MD; Jayant Bagai, MD; Craig J. Beavers, PharmD; Dmitriy N. Feldman, MD; Sunil V. Rao, MD

- 2016 Cath Lab Best Practices Expert Consensus Statement: Srihari S. Naidu, MD; Herbert D. Aronow, MD; Lyndon C. Box, MD; Peter L. Duffy, MD; Daniel M. Kolansky, MD; Joel M. Kupfer, MD; Faisal Latif, MD; Suresh R. Mulukutla, MD; Sunil V. Rao, MD; Rajesh V. Swaminathan, MD; and James C. Blankenship, MD

- SCAI Staff: Joel C. Harder, MBA