MetroWest Cardiac Catheterization Lab

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What is the size of your cath lab facility and number of staff members?

We have a two-room cardiac cath lab/EP suite. One room is primarily designated for cardiac catheterization procedures and the other is for EP or cath. We also have a holding area where we perform transesophageal echocardiograms (TEEs) and cardioversions. Our lab staff includes 11 full-time staff members, including 4 registered nurses (RNs), 2 radiologic technologists (RT[R]s), 1 cardiovascular technologist (CVT), 1 clinical coordinator, 1.5 nurse practitioners (NPs), 1 data coordinator, and 1 unit secretary, and a few per diem staff. Our staff tenure ranges from 1 to 35 years, and averages well over 10 years.

What procedures are performed in your cath lab?

We perform:

- Diagnostic left and right heart catheterization
- Percutaneous coronary intervention
- Instantaneous wave-free ratio (iFR), fractional flow reserve (FFR), intravascular ultrasound (IVUS)
- Intra-aortic balloon pump (IABP) insertion
- Pericardiocentesis
- Temporary pacemaker insertion
- Permanent pacemaker insertion
- Implantable cardioverter defibrillator (ICD) implantation
- Bi-ventricular permanent pacemaker (PPM)/ICD implantation
- Pacemaker/ICD generator changes
- Loop recorder implant/explant
- EP studies and ablations (atrial fibrillation, atrial flutter, supraventricular tachycardia [SVT], atrioventricular [AV] node)
- Cardioversions
- TEEs

We perform approximately 30 procedures per week.

Our peripheral vascular procedures are performed in the special procedures suite by vascular surgeons or interventional radiologists.

Does your cath lab perform primary angioplasty without surgical backup on site?

Yes, we perform primary PCI without onsite surgical backup. We have a close relationship with a major Boston hospital to serve as our off-site backup. Of note, we were a leading enroller in the renowned MASS COMM trial that concluded elective PCI without surgical backup was as safe as with the presence of surgical backup.

What is your percentage of normal diagnostic caths?

Thirty-two percent (32%) of our left heart catheterizations have either normal coronaries or <50% coronary atherosclerotic stenoses noted.

Do any of your physicians regularly gain access via the radial artery?

Yes, all of our physicians perform the radial approach. We use the right radial artery as our first line of access in all applicable patients. In 2018, 78% percent of our caths were done radially. Left radial access is used on patients with bypass grafts, including the left internal mammary artery.

Who manages your cath lab?

Kimberly Kelley, DNP, is the nursing director of acute care and critical care services. Jean Decourcey, RN, is the cath lab clinical coordinator.

Do you have cross-training? Who scrubs, who circulates and who monitors?

Yes. All of our RNs, RT(R)s, CVT, and NPs are cross trained to assist with both cath and EP procedures. Our nurse practitioner, RT(R), and CVT scrub in the cath cases. In the EP lab, the RT(R) and CVT scrub. The nurses circulate in the rooms and all RNs, RT(R)s, and CVT are trained to monitor.

Which personnel can operate the x-ray equipment (position the II, pan the table, change angles, step on the fluoro pedal) in your cath lab?

Radiologic technologists (RT[R]s) and approved staff that have completed radiation competency, which is performed annually. This is monitored by the state and through the hospital credentialing office.

How does your cath lab handle radiation protection for the physicians and staff?

Radiation use is measured and documented in all procedural reports. We use radiation shielding for all cases. We also use extension tubing for manifolds during radial cases to distance the physicians from the image intensifier. All cath lab staff and cardiologists wear badges to measure radiation exposure. All staff members have well-fitted lead aprons. Cardiologists and scrub personal wear lead goggles as well as radiation caps. All staff complete mandatory annual radiation in service and testing provided by F.X. Massé. All staff practice ALARA (as low as reasonably achievable).

What are some of the new equipment, devices and products recently introduced at your lab?

In March 2019, we began performing cryoablation procedures for the treatment of atrial fibrillation with the use of a new mapping system. We also have new IVUS and pressure wire equipment.

How does your lab communicate information to staff and physicians to stay organized and on top of change?

We have a weekly cardiac catheterization conference which is attended by multiple invasive and non invasive cardiologists, cardiac nurse practitioners, a Boston cardiothoracic surgeon, and cath lab staff where cases are presented and discussed. We also hold quarterly EP and cath peer review meetings. Semiannual door-to-balloon time committee meetings are held amongst the cardiologists, cath lab staff, and emergency department staff. There are semiannual meetings between cardiac cath directors and the cath lab director of our academic partner. We have monthly staff meetings, communication boards, regular daily interaction, and email. We also have quarterly combined cath conferences with two other academic medical centers located in Boston and Worcester. We also maintain a close relationship with the coding and billing department.

Who pulls the sheaths post procedure, both post intervention and diagnostic procedures?

Figure 1. The MetroWest Medical Center Cardiac Catheterization Lab Team.

Figure 2. One of the two cath labs at MetroWest Medical Center.

Post procedure, the cath lab staff, including cardiologists, pull the sheaths for both interventional and diagnostic procedures. Before someone can pull a sheath, they have to be proctored for 10 sheath pulls. Due to our high percent of radial access and almost ubiquitous use of closure devices for femoral access, we have very few manual arterial sheath pulls. Radial band compression devices are removed by trained nurses as per set protocols.

Where are patients prepped and recovered?

Patients are prepped and recovered primarily in the cardiovascular unit, a 13-bed unit designated for cardiac inpatients and outpatients. Radial access compression bands and femoral closure devices are placed in the cath lab by cardiologists with scrub staff assistance. Hemostasis is monitored immediately by cath lab staff and then the cardiac nurses monitor hemostasis until discharge.

How is inventory managed at your cath lab? Who handles the purchasing of equipment and supplies?

Inventory and purchasing of equipment and supplies is managed by our lead inventory RN. All staff is responsible for assisting in product counts.

Has your cath lab recently expanded in size and patient volume, or will it be in the near future?

Despite national trends in decline in cardiac procedure volume, over the past decade, we have experienced a slow, steady growth in diagnostic cardiac catheterization, PCI, and EP procedures.

Is your lab involved in clinical research?

We were a participating site for PreSERVE-AMI trial, investigating autologous stem-cell intracoronary infusion in patients with left ventricular dysfunction post-ST-elevation myocardial infarction.

Can you share your lab's average door-to-balloon (D2B) times and some of the ways employees at your facility have worked together to keep D2B times under the mandated 90 minutes?

Average door to balloon time for year 2018 was 57 minutes. We have been able to achieve remarkably low door-to-balloon times over the years, with multiple cases experiencing a door-to-balloon time of less than 10 minutes. We have a unique culture of being a relatively small hospital in the community setting where communication between EMS, emergency departments, interventional cardiologists, and cath lab staff is extremely efficient. The ED physicians and cardiologists work very well together and the movement of an acute MI patient through the system is remarkably unencumbered and rapid. The system has become even more efficient with the addition of the EKG LifeNet system (Physio-Control) several years ago. Of note, on three occasions we have had door-to-balloon times as low as 8 minutes!

To maintain D2B times under the goal of 90 minutes, we also have a data manager who reviews each of the STEMI patients' data within 24-48 hours of arrival and communicate all parameters to the appropriate parties. Some examples include times for EMS alert, ED time, first EKG time, heart team alerts, and device times. We are also associated with the American Heart Association's Mission: Lifeline and the American College of Cardiology's D2B Alliance.

Who transports the STEMI patient to the cath lab during regular and off hours?

During off hours, most of our STEMI cases come from the emergency department. The emergency department staff and interventional cardiologists are responsible for transporting the patient to the cath lab once the cath lab staff arrives. During regular hours, if available, cath lab staff will transport the patient to the cath lab with the assistance of ED nurses.

What do you do when the call team is already busy doing a procedure and a STEMI comes into the ED?

We have a second lab room that is often available for emergencies. If both rooms are occupied with elective cases in process, we will take the patient off the table with arterial access in place.

What measures has your cath lab implemented in order to cut or contain costs?

We have recently implemented a new inventory flow sheet that has helped us reduce product waste.

What quality control measures are practiced in your cath lab?

We hold cath lab quarterly peer review meetings. We are currently implementing a practice to record daily first procedure start times, in order to monitor and improve lab efficiency.

How do you determine contrast dose delivered to the patient during an angiographic procedure?

Contrast use is measured by circulating nurses and recorded in all cath procedures.

Are you tracking the incidence of contrast-induced acute kidney injury in patients?

Yes. We participate in the American College of Cardiology's National Cardiovascular Data Registry (ACC-NCDR) CathPCI registry and we compare our rates with national benchmarks quarterly. Internally, we review patients with a pre-procedure to post-procedure increase in creatinine of 25% at our peer-to-peer quarterly meeting.

How are you recording fluoroscopy times/dosages?

A log book is maintained for all fluoroscopy exams. The log contains a patient identifier, type, date of examination and operator, cine time, cumulative air kerma (CAK), and fluoro time. All final reports include CAK, fluoro time and dose area product (DAP).

What is the process that occurs if a patient receives a higher than normal amount of radiation exposure?

If a patient exceeds the action time or has CAK >2000, a further action called a "Fluoroscopy Exposure Report" is triggered. Completion of the report is faxed to the medical physicist's office for an assessment of skin dose. Data needed for this report includes the patient height, weight, total fluoro time, % of time spent in one skin area, cine time, # of spot films, % of time in magnified views, and a description of the case. Once the physicist confirms exposures of 200 rad or more, the primary care doctor of the patient is notified of possible skin effects that warrant follow-up. A copy is placed in the patient's medical record and the performing cardiologist is notified. Cases that exceed 200 rad skin dose are also reviewed by the facility's radiation safety committee.

Who documents medication administration during the case?

Figure 3. Bonita McKinnon.

The monitor records all medication administered during the case. The circulating nurse is responsible for verbalizing medications and doses for entry into the monitor.

Are your physicians dictating their cath procedure reports or do they use a structured reporting tool?

Cardiologists use structured templates for completing dictations with voice recognition software. We currently use Dragon for voice recognition and ApolloLX (Lumedx's reporting system) for cath reports.

You mentioned that your lab participates in the ACC-NCDR CathPCI registry. Do you report to any other outside data collection registry?

Yes, we also are a part of the American Heart Association's Get with the Guidelines Coronary Artery Disease (GWTG-CAD) registry.

How are you populating the registry data records?

We currently have a data manager who is reponsible to input the data.

How does your cath lab compete for patients?

We remain at the front lines of community medicine for providing emergency interventional cardiac care to surrounding communities. Electively, referrals are made from our medical center physicians, regional physicians, and patients themselves.

How are new employees oriented and trained at your facility?

New employees complete hospital orientation and then complete a minimum of 8 weeks orientation in the cath and EP labs.

What continuing education opportunities are provided to staff members?

Staff members receive education through the hospital LearnShare online training modules and through attending conferences. We participate in the Medtronic Academy. St. Jude Medical/Abbott also provides us with bimonthly EP conferences.

How do you handle vendor visits to your lab?

Vendors are permitted in the lab to provide in-services after registering in Vendormate, with a one-hour timeframe on Thursdays only.

How is staff competency evaluated?

All staff have an annual review process. We have mandatory cath lab yearly competencies that include but are not limited to the IABP, radiation safety, EP mapping system, and fire safety.

Does your lab have a clinical ladder?

The clinical ladder is not specific to the lab, but the hospital offers a clinical ladder for all employees and they are encouraged to participate.

Do you require your clinical staff members to take the registry exam for the Registered Cardiovascular Invasive Specialist (RCIS)?

The cath lab does not specifically require the clinical staff to take the RCIS exam, but the hospital does offer a certification incentive if the employee wants to become certified. The hospital will pay the employee's initial certification for the exam in his or her specialty up to maximum of $250. Recertification will be reimbursed every two years up to a maximum of $250. Differential pay for each employee certified is $1.00 per hour.

What are some things you appreciate about your physical workspace?

Our cath and EP rooms are large and able to easily handle all of our equipment. The layout is conducive to our needs.

Is there a particular mix of credentials needed for each call team?

For each call team, there needs to be at least one RN and one member who can scrub (RT[R], CVT, or NP).

How does your lab schedule team members for call?

We currently have 9 staff members that take call. Our goal is for 4 members to cover each night and there is always a minimum of 3. Each month, a blank calendar is handed out and requests are made. Each staff member is required to take 2 nights of weekday call (Monday-Thursday 3:30pm-7:00am) and every third weekend (Friday 3:30pm-Monday 7:00am). If there are not at least 3 members signed up for a night, shifts are assigned by the clinical coordinator. We are fortunate to have a good mix of staff, including those who like extra call and those who prefer less.

Within what time period are call team members expected to arrive to the lab after being paged?

30 minutes.

Do you have flextime or multiple shifts?

Our shifts are 7:00-3:30pm and 7:30-4:00pm with flextime. During slow days, we flex down to minimal staffing requirements. Staff members also spend time on continuing education, cleaning the unit, and checking inventory.

Do staff members have any particular perks that you might like to share?

Free parking, competitive hourly call pay, sleep time for call in after midnight, and sponsored travel to yearly conferences are all current perks.

What trends have you seen in your procedures and/or patient population?

We have seen a large volume increase in patients with atrial fibrillation. This has increased our TEE/cardiovascular volume and we are predicting an increase in atrial fibrillation cryoablations in the years to come.

What is unique or innovative about your cath lab and staff?

We have a very small number of staff, but they are highly motivated and strive to provide outstanding care 24 hours a day, 365 days a year.

Is there a problem or challenge your lab has faced?

We are continually working to improve communication between physicians and staff members. At our quarterly meetings, communication efforts are a large topic.

What's special about your city or general regional area in comparison to the rest of the U.S.? How does it affect your "cath lab culture"?

Our cath lab is located in Framingham, Massachusetts. Framingham is the birthplace of the Framingham Heart Study. The heart study is an ongoing cardiovascular cohort study of residents of the city of Framingham, Massachusetts. The study began in 1948 with 5209 adult subjects from Framingham and is now on its third generation of participants. Many of our patients have a sense of pride knowing that they and their ancestors have participated in this seminal study.

Being in the Boston suburbs places us in competition with some of the most esteemed medical institutions in the country. However, we perpetually strive to deliver exceptional quality care with expert staff using state-of-the-art equipment and facilities. We aim to do all of this with the convenience of patients receiving their care in their neighborhood with a friendly and personal community hospital ambience.

A question from the American College of Cardiology's National Cardiovascular Data Registry:

How do you use the NCDR Outcome Reports to drive quality improvement initiatives at your facility?

NCDR outcome reports are reviewed quarterly by all cath lab physicians and our medical center's quality control department. When a metric rarely falls below the 50% percentile of the national benchmark, it is reviewed and steps are taken to improve immediately. ■

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