

## CARDIAC CATHETERIZATION LABORATORY

### Mission Statement

The directive of the Cardiac Catheterization Laboratory is to provide state-of-the-art invasive diagnostic and / or therapeutic procedures for patients with cardiovascular disease.

### Statement of Educational Goals

The curriculum is designed to promote six broad based goals based on the six ACGME core competencies:

- 1) Medical Knowledge: exposure by direct patient contact to a broad range of acute and chronic cardiovascular problems that present for invasive cardiac evaluation or management. Formal and informal didactic teaching sessions are used as well.
- 2) Patient Care: accurate, physiologically-reasoned diagnosis, in the cardiac catheterization laboratory as well as at the bedside prior to and after invasive testing; expert understanding of the need for invasive diagnostic testing and/or intervention, restrained by considerations of risk, benefit and cost; formulation of a management plan sensitively tailored to the unique medical and life circumstances of each patient. This plan must include rehabilitative and preventive measures.
- 3) Professionalism: effective, mutually satisfying communication with patients, families and other physicians and allied health care personnel. Working with other allied health care team professionals to provide patient focused care. This is especially important in the “surgical” atmosphere of the cardiac catheterization laboratory where a team approach is essential. Maintaining highest ethical standards and strict privacy when discussing patient case plans with other providers.
- 4) Interpersonal and Communication Skills: Effective communication with other non-cardiology physicians, nurses and allied professions in working with them to develop and institute a plan of care for patients undergoing invasive cardiac evaluation. Being able to explain the necessity of invasive cardiac evaluation clearly and concisely using verbal and written communication will be of paramount importance. In addition, since you are not the patient’s long-term primary physician, rapidly developing a rapport with patients and families in a limited time period through good listening and communication skills will be critically important.
- 5) Practice Based Learning: Using information technology, literature sources and other available resources to practice evidence based medicine based on sound medical principles, guidelines and best practices, while being still able to individualize this for a particular patient’s circumstances.
- 6) Systems Based Learning: during interaction with other medical services and providers during your rotation in the cardiac catheterization laboratory, it will be important to learn how their care delivery systems work, e.g. both inpatient (non-acute and acute care units, operating room), outpatient (ambulatory clinics), and non-invasive testing facilities. Understanding this will be critical to your ability to synthesize and implement an efficient invasive diagnostic care plan.

## General Statement of Objectives

The specific educational goals include: 1) understanding the indications, risks, and benefits of invasive diagnostic and therapeutic procedures in cardiovascular disease, 2) obtaining a basic understanding of radiation physics, radiation safety, radiologic cardiovascular anatomy, and clinical cardiovascular physiology, 3) using the data obtained from invasive procedures to select medical, catheter-based, or surgical treatment, 4) obtaining mechanical training in invasive diagnostic procedures. Specifically, fellows will learn to perform, and will become proficient in, temporary right ventricular pacemaker insertion, pericardiocentesis, right and left heart catheterization including coronary angiography and ventriculography.

The goals of this rotation will be achieved primarily by teaching using the case method. All procedures will be under the direct supervision of full-time faculty. All cases will be reviewed in an informal daily teaching conference. There is also a weekly formal Cardiac Catheterization Conference attended by all division personnel and each month this conference is combined with Cardiothoracic Surgery or Vascular Surgery / Radiology for additional insights into vascular pathophysiology. Additional education will be obtained through an introductory lecture series given by the Cardiology Division faculty.

The goals of this rotation do not include learning to perform percutaneous interventional therapeutic techniques, although third-year fellows will receive exposure in the performance of coronary angioplasty. Fellows who wish to learn interventional techniques must apply for and receive additional subspecialty training in interventional cardiology after meeting the objectives as outlined above for the general cardiology fellowship training program.

The faculty / staff members directly responsible for fellow education in the Cardiac Catheterization Laboratory are: Frederick S. Ling, M.D., Director, Christopher J. Cove, M.D., Assistant Director, M. James Doling, M.D., Craig R. Narins, M.D., and John P. Gassler, M.D.

## General Statement of Expectations of Fellows

First year fellows rotating through the Cardiac Catheterization Lab spend two months of their year in the lab. It is expected that the first year fellows will develop a strong foundation in the performance and interpretation of routine diagnostic catheterization procedures. First year fellows should develop the skills to evaluate patients appropriately prior to the catheterization procedure and perform this procedure under the close supervision of the attending physician in a careful and precise manner. It is also anticipated that the fellows will follow the patients after the procedure to assess for any potential complications and to assist in developing and executing appropriate treatment plans.

It is expected that each fellow will present a case once during each month of their cath rotations during the Wednesday AM cath conference. This case presentation should focus on actual cases from the cath lab with the intent to stimulate conversation and teaching points among those in attendance. The majority of the case presentation should be spent on the case—the goal is to allow for the interventional attendings to teach us the many aspects that might be considered during the presented case.

Second year fellows rotate through the Cardiac Catheterization Lab for one month. They are expected to further develop skills learned during the first year rotation in preparation for increased responsibilities during the third year.

Third year fellows rotating through the Cardiac Catheterization Lab spend three months of their year in the lab. They are expected to actively participate in the education of the first year fellows. It is anticipated that the third year fellows will hone their skills in evaluating patients prior to the procedures and be able to perform more complex and challenging diagnostic catheterizations. Additionally, third year fellows will be inserted into the call schedule for acute cases after hours. They will be on call, on average, one night per week and one weekend per month during their rotations.

It is anticipated that fellows will perform roughly 150 diagnostic catheterizations in three months, ultimately performing at least 300 procedures with primary-hands-on responsibilities during the fellowship. Fellows are responsible for tracking and documenting all procedures they perform in the lab. The computerized Cardiac Catheterization Laboratory database (Pronto) is available to track procedural volume for each fellow. Evaluations will be performed for all fellows halfway through their rotation by the Cardiac Catheterization Lab faculty to discuss strengths and weaknesses and to direct their educational efforts. A second evaluation will be done at the end of the rotation.

Reference List:

Baim DS, Grossman W, eds. Cardiac Catheterization, Angiography, and Intervention, Sixth edition. Baltimore: Lippincott, Williams & Wilkins, 2000.

Pepine CJ, Hill JA, Lambert CR, eds. Diagnostic and Therapeutic Cardiac Catheterization. Third Edition, Baltimore: Williams & Wilkins, 1998.

American College of Cardiology/American Heart Association Ad Hoc Task Force on Cardiac Catheterization. ACC/AHA guidelines for cardiac catheterization and cardiac catheterization laboratories. J Am Coll Cardiol 1991;18:1149-82.

American College of Cardiology/Society of Cardiac Angiography and Interventions Clinical Expert Consensus Document on Cardiac Catheterization Laboratory Standards. J Am Coll Cardiol 2001;37:2170-214.

Balter S. Radiation safety in the cardiac catheterization laboratory: operational radiation safety. Cathet Cardiovasc Intervent 1999; 47:347-53.

ACC Expert Consensus Document : Radiation Safety in the Practice of Cardiology. J Am Coll Cardiol 1998;892-913.

ACC Expert Consensus Document : Nonionic or Low-Osmolar Contrast Agents in Cardiovascular Procedures, Use of: Position Statement. J Am Coll Cardiol 1993; 21:269-73.

## Specific Procedures

Case Assignment and Pre and Post Cath Evaluation: The senior third year fellow or a Cath Lab nurse practitioner if a third year fellow is not rotating through the lab is primarily responsible for assignment of fellows to diagnostic cases in coordination with the Cath Lab charge nurse, with assignment of more complex and challenging cases to the senior fellows. It is expected that all fellows thoroughly evaluate, consent, and prepare all patients scheduled for cardiac catheterization. All inpatients should be seen on their hospital units, unless a patient is emergently transported to the laboratory because of a critical condition. The evaluation and management of all patients by fellows will be under the supervision of the invasive cardiology faculty.

Patient evaluation prior to the procedure will include obtaining a history, examination, and laboratories pertinent to the performance of the procedure. Pertinent history in addition to presenting illness, cardiac risk factors, allergies (especially to latex or vascular contrast), and medications, should include all prior cardiovascular history, such as obtaining prior records of invasive cardiac procedures and / or operative notes of cardiac or vascular bypass surgeries. General medical conditions pertinent to the procedure include prior neurologic events, diabetes mellitus requiring medication, renal dysfunction, or history of bleeding disorder or diathesis. Pertinent examination should include a complete cardiovascular examination with thorough assessment of peripheral pulses at the site used for vascular access, as well as airway and neurologic assessment prior to administration of conscious sedation. Pertinent laboratories include complete blood count, platelets, aPTT, INR, electrolytes, BUN, creatinine, and electrocardiogram.

Patient evaluation after the procedure will include assessment for any potential complications such as cardiac ischemia, congestive heart failure, renal dysfunction, bleeding, and vascular pathology at the vascular access site. Inpatients on the CCU, Cardiology Consult, CT Surgery, or other services will be seen daily until no invasive issues remain active. Inpatients on the Cardiac Catheterization Service will be followed daily until hospital discharge.

## Conferences

It is expected that fellows rotating through the Cardiac Catheterization Lab will attend the general Cardiology Division Conferences whenever clinical responsibilities allow. Cath fellows will be responsible for arranging and presenting cases at the Wednesday morning Cardiac Catheterization Conference. Although the Conference is mandatory for the fellows on the Cardiac Catheterization Lab rotation, it is expected that all fellows will attend Cardiac Catheterization Lab Conferences on a regular basis throughout the year. Monthly Cath Lab QA Meetings are also mandatory for Cath Lab fellows, but other fellows should also attend these throughout the year whenever possible even when they are not on the Cath Lab rotation.

### Vacation:

First-Year fellows may take one week of vacation during their cath lab rotations. Coverage by the cath lab PA/NP needs to be arranged for vacation taken, as the fellow and PA/NP may not take vacation at the same time. Refer to the specific cardiology fellow vacation policy for more specific information.

### On-Call Responsibilities

A call schedule is designed with a fellow on first call and a fellow on second call when a first year fellow is rotating through the Cath Lab. The first call fellow is responsible for handling any problems that may arise on Cath Lab patients. For patients needing emergency procedures, it is expected that the senior fellows will perform all of these emergency procedures with one of the full-time Cath Lab faculty members. When third year and interventional fellows are rotating through the Cath Lab, there will be no first and second call. Call responsibilities will be evenly divided amongst those fellows.

### Research Opportunities

The Cardiac Catheterization Laboratory is currently involved in multiple trials on a single center and multicenter basis. Fellows are invited to approach any of the full-time invasive faculty with potential research interests. Ongoing and prior studies for fellows have included database research, clinical outcomes assessment, assessment of interventional therapies using intravascular ultrasound and Doppler flow.

All facilities of the Cardiac Catheterization Laboratory are available to conduct clinical research. The Cardiac Catheterization Laboratories are all cineless and consists of three suites with all angiographic studies digitally acquired and centrally archived for easy review and analysis. A computerized reporting system (Pronto) designed by the Cardiology Division and compliant with ACC/NCDR standards databases all invasive procedures is also available. There are two full time research nurse study coordinators primarily involved with multicenter studies but also involved with individual research projects.

Credentials of Medical Staff

Frederick S. Ling, M.D.

Columbia College, B.A.  
New York University School of Medicine, M.D.  
Internal Medicine Residency, Beth Israel Hospital, Boston  
Cardiovascular Fellowship, Yale New Haven Hospital  
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