FMLH CARDIAC CATHETERIZATION LABORATORY ROTATION

Description of Rotation or Educational Experience
The Cardiac Catheterization Laboratory Rotation at FMLH is designed to allow the fellow to acquire the knowledge and skills necessary to provide optimal care for cardiac patients in the catheterization laboratory. There will be opportunity to learn appropriate triage of patients as well as to coordinate interdisciplinary and sub-specialty care. The fellow will be expected to develop their skills in clinical care, procedural skills, judgment, and teaching. The fellow will be expected to develop the skills necessary to be able to achieve independent operator status in invasive cardiology over the 3 year experience.

The fellow is responsible for the effective patient flow in the cath lab and interventional cardiology service during this month. This statement does not mean that one are required to scrub in on every case it is important that one familiarize yourself with every procedure coming through the laboratory so as to maximize your educational experience. This effort allows one to coordinate your efforts on the interventional service where you will learn about both pre- and post-cath lab management.

Critical operational elements of the rotation include.

1. Familiarization with all patients who have procedures in the cardiac catheterization laboratory. This efforts includes patients from outside providers and patients which have been performed on call in ones absence.
2. The fellow will provide a pre-catheterization/conscious sedation evaluation on outpatients coming to the laboratory as well as having the patients sign informed consent. The fellow having any concerns or questions regarding the informed consent process will communicate these issues to the attending physician prior to initiating the day’s work.
3. The fellow should scrub and take an active involvement in as many invasive and interventional procedures as possible. We expect one to discuss with faculty your understanding of your experience and your goals for the month so that we may further direct your technical education.
4. At the end of each procedure the fellow shares responsible for orders, communication with the housestaff (if necessary), and completion of the reports in the cases he/she physically participates. Reports should follow the standard format, be complete, and be finished within 24 hours of completing the cardiac catheterization.
5. At the end of the day all interventions should have a post cath check and a note left in the chart. This operation is to assess fluid status, hemodynamic stability, and any possible complications from the access site.
6. Patients on the interventional service will be signed out to the house officer and fellow on call on a daily basis. Patients on the interventional service will have discharge orders written before beginning your first case of the day.
ACADEMIC ASSIGNMENTS

One is expected to participate in all cardiology training sessions and communicate absences to the lab to the attending covering the laboratory at that time. Fellows are expected to participate in their weekly continuity clinic. It is the fellow’s responsibility to communicate the time away to the physicians who will be covering you during that time including the attending physicians. It is not the expectation that any fellow will leave a procedure without prior communication. It is the expectation that fellows benefit from outpatient and formal educational opportunities.

OPERATIONAL HINTS

1. Always review old films.
2. On outpatient, always review the last encounter with the referring cardiologist.
3. Ask questions, cardiac catheterization and invasive/interventional cardiology is a skill which is taught one-on-one to each successive generation of cardiology fellows. You should be sensitive to differences in technique, especially in that they demonstrate different concerns and approaches of which you need to be familiar with.
4. Discharge patients before the day begins.
5. Consent patients before the day begins.
6. Any patients who are in house should be seen the night before. Adequate pre-hydration and possibly Mucomyst should already be written on the chart, especially in the patients at risk for contrast nephropathy.
7. Enjoy the best part of cardiology.

Patient Care

Goal

Fellows must be able to provide patient care that is compassionate, appropriate, and effective for the treatment of health problems and the promotion of health. Fellows are expected to:

Competencies

- Gain clinical experience in the prevention, evaluation and management of patients with, but not limited to, the following: chronic coronary heart disease, congestive heart failure, arrhythmias, acute myocardial infarction and other acute ischemic syndromes, lipid disorders, hypertension, cardiomyopathy, valvular heart disease, pulmonary heart disease and pulmonary embolism, peripheral vascular disease, infections and inflammatory heart disease. The experience is focused on the
invasive evaluation and management of these patients.

- Gain clinical experience in the evaluation and management of both in and out
  patients with the following: adult congenital heart disease, pericardial disease,
  cardiovascular trauma.
- Gain clinical experience in the performance of the following: cardiac
  catheterization; insertion and management of temporary pacemakers, including
  transvenous and transcutaneous; pericardiocentesis; and the management of
  patients undergoing interventional procedures.
- Gain clinical experience in the management of: preoperative and postoperative
  patients; cardiac transplant patients; geriatric patients with cardiovascular disease.

Objectives: First Year Fellows

- Gain a better understanding of the basic physiology of cardiovascular diseases
  including but not limited to: chronic coronary heart disease, congestive heart
  failure, arrhythmias, acute myocardial infarction and other acute ischemic
  syndromes, lipid disorders, hypertension, cardiomyopathy, valvular heart disease,
  pulmonary heart disease and pulmonary embolism, peripheral vascular disease,
  infections and inflammatory heart disease, cardiovascular rehabilitation, adult
  congenital heart disease, pericardial diseases, and cardiovascular trauma.
- Master arterial and venous access.
- Gain familiarity with cardiac catheterization technique and devices.
- Understand the application of conscious sedation in patients with cardiovascular
  disease.
- Understand basics of routine cardiac catheterization monitoring.
- Placement of Swan-Ganz catheters, obtain and interpret data from catheter, all
  with direct supervision.
- Learn management of patients presenting with acute coronary syndromes and
  appropriate use of the catheterization laboratory for intervention when indicated.
- Learn indications and contraindications of elective cardioversion; use of
  temporary pacemakers, including transvenous and transcutaneous; and
  pericardiocentesis.
- Become familiar with therapeutic hypothermia in the setting of sudden cardiac
  death.
- Become familiar with indications for cardiac testing as it pertains to their patients
  including but not limited to cardiac catheterization (right and left).
- Become familiar with common presentations leading to admission in patients with
  adult congenital heart disease for percutaneous procedures.
- Master perioperative management of patients undergoing invasive procedures.
- Master the use of anticoagulants in patients undergoing coronary interventions.
- Become familiar with interventional cardiovascular techniques and the application
  of these techniques in a variety of clinical indications.

Objectives: Second and Third Year Fellows

- Master the basic physiology of cardiovascular diseases including but not limited
  to: chronic coronary heart disease, congestive heart failure, arrhythmias, acute
myocardial infarction and other acute ischemic syndromes, lipid disorders, hypertension, cardiomyopathy, valvular heart disease, pulmonary heart disease and pulmonary embolism, peripheral vascular disease, infections and inflammatory heart disease, cardiovascular rehabilitation, adult congenital heart disease, pericardial diseases, and cardiovascular trauma.

- Master arterial and venous access.
- Gain independence with cardiac catheterization technique and devices.
- Gain independence in the application of conscious sedation in patients with cardiovascular disease.
- Gain independence in routine cardiac catheterization monitoring.
- Gain independence in the placement of Swan-Ganz catheters, obtain and interpret data from catheter, all with direct supervision.
- Master the management of patients presenting with acute coronary syndromes and appropriate use of the catheterization laboratory for intervention when indicated.
- Master the indications and contraindications of elective cardioversion; use of temporary pacemakers, including transvenous and transcutaneous; and pericardiocentesis.
- Become familiar with therapeutic hypothermia in the setting of sudden cardiac death.
- Master the indications for cardiac testing as it pertains to their patients including but not limited to cardiac catheterization (right and left).
- Progress in understanding of common presentations leading to admission in patients with adult congenital heart disease for percutaneous procedures.
- Master perioperative management of patients undergoing invasive procedures.
- Master the use of anticoagulants in patients undergoing coronary interventions.
- Progress in understanding of interventional cardiovascular techniques and the application of these techniques in a variety of clinical indications.

**Medical Knowledge**

**Goal**
Fellows must demonstrate knowledge of established and evolving biomedical, clinical, epidemiological, and social-behavioral sciences, as well as the application of this knowledge to patient care. Fellows are expected to:

**Competencies**

- Enhance their knowledge of the following content areas: cardiovascular anatomy; cardiovascular physiology; cardiovascular metabolism; cardiovascular pharmacology, including drug metabolism, adverse effects, indications, the effects on aging, relative costs of therapy, and the effects of non-cardiovascular drugs upon cardiovascular function; cardiovascular pathology; genetic causes of cardiovascular disease.
- Enhance their knowledge in regards to prevention of cardiovascular disease, including: epidemiology and biostatistics; risk factors; lipid disorders.
- Become familiar with invasive diagnostic techniques, including: cardiac catheterization, coronary CT angiography, ICE, IVUS and the variety of ancillary hemodynamic evaluations in the catheterization laboratory.
### Objectives: First Year Fellows
- Understand the indications, contraindications, complications, and limitations of common cath lab procedures.
- Understand the indications for use of invasive diagnostic techniques.
- Become familiar with indications for therapeutic interventions as they pertain to their patients including but not limited to: percutaneous coronary intervention, temporary and permanent pacemaker placement, use of ICDs, and placement of intraaortic balloon pumps or other support devices (LVADs).
- Become familiar with the interpretation and management of arrhythmias, critical and non-critical, on telemetry.
- Understand the pharmacology, indications, and uses of common vasopressors, including but not limited to dobutamine, milrinone, dopamine, and phenylephrine.
- Understand the physiology of cardiogenic shock, respiratory failure, and failure of other major organ systems.

### Objectives: Second and Third Year Fellows
- Demonstrate mastery of the indications, contraindications, complications, and limitations of common cath lab procedures.
- Demonstrate mastery of the indications for use of invasive diagnostic techniques.
- Demonstrate mastery of the indications for therapeutic interventions as they pertain to their patients including but not limited to: percutaneous coronary intervention, temporary and permanent pacemaker placement, use of ICDs, and placement of intraaortic balloon pumps or other support devices (LVADs).
- Demonstrate mastery of the interpretation and management of arrhythmias, critical and non-critical, on telemetry.
- Understand the pharmacology, indications, and uses of common vasopressors, including but not limited to dobutamine, milrinone, dopamine, and phenylephrine.
- Demonstrate mastery of the understanding of the physiology of cardiogenic shock, respiratory failure, and failure of other major organ systems.

### Practice- Based Learning and Improvement

#### Goal
Fellows must demonstrate the ability to investigate and evaluate their care of patients, to appraise and assimilate scientific evidence, and to continuously improve patient care based on constant self-evaluation and life long learning. Fellows are expected to develop skills and habits to be able to:

#### Competencies
- Identify strengths, deficiencies and limits in one’s knowledge and expertise.
- Set learning and improvement goals.
- Incorporate formative evaluation feedback into daily practice.
- Locate, appraise and assimilate evidence from scientific studies related to their patients’ health problems.
- Use information technology to optimize learning.
- Participate in the education of patients, families, students, residents and other health professionals, as documented by evaluations of the fellow’s teaching abilities by faculty and/or learners.
Objectives: First Year Fellows
- Set learning and improvement goals in conjunction with the attending at the beginning of the month.
- Learn about the resources available including textbooks and the internet to implement optimal patient care.
- Share data and knowledge obtained from literature or internet searches with the team as teaching points.
- Receive verbal feedback routinely and utilize that feedback to optimize performance.

Objectives: Second and Third Year Fellows
- Set learning and improvement goals at the beginning of the month.
- Independently use available resources to quickly and efficiently obtain critical information vital to optimal patient care.
- Assist more junior fellows and residents in utilizing available resources to obtain information and scientific studies to share with the team.
- Use information obtained to effectively educate students, housestaff, patients, and their families.
- Receive verbal feedback and utilize routinely to optimize performance.

Systems Based Practice
Goal
Fellows must demonstrate an awareness of and responsiveness to the larger context and system of health care, as well as the ability to call effectively on other resources in the system to provide optimal health care. Fellows are expected to:

Competencies
- Work effectively in various health care delivery settings and systems relevant to cardiovascular medicine.
- Coordinate patient care within the health care system relevant to cardiovascular medicine.
- Incorporate considerations of cost awareness and risk-benefit analysis in patient care.
- Advocate for quality patient care and optimal patient care systems.
- Work in interprofessional teams to enhance patient safety and improve patient care quality.

Objectives: First Year Fellows
- Assist in coordinating care with in-hospital services in the cath lab and ancillary services to improve patient care and ensure safety.
- Assist in the communication between the team and consultants to improve the quality of patient care.

Objectives: Second and Third Year Fellows
- Coordinate care with in-hospital services to improve patient care and safety.
- Coordinate clear communication between the cath lab and external services and providers.
- Understand and participate in the continuous quality improvement process as it pertains to cardiac catheterization laboratory.
**Professionalism**

**Goal**
Fellows must demonstrate a commitment to carrying out professional responsibilities and an adherence to ethical principles. Fellows are expected to demonstrate:

**Competencies**
- Compassion, integrity, and respect for others.
- Responsiveness to patient needs that supersedes self-interest.
- Respect for patient privacy and autonomy.
- Accountability to patients, society, and the profession.
- Sensitivity and responsiveness to a diverse patient population, including but not limited to diversity in gender, age, culture, race, religion, disabilities, and sexual orientation.

**Objectives: First Year Fellows**
- Be readily available to the catheterization laboratory.
- Learn to apply evidence based medicine to patient care.
- Show respect for patients and peers in daily interactions.

**Objectives: Second and Third Year Fellows**
- Independently prepare for the invasive evaluation of the patient.
- Practice sound evidence based medicine.
- Continue to treat patients and peers with the utmost respect.

**Interpersonal and Communication Skills**

**Goal**
Fellows must demonstrate interpersonal and communication skills that result in the effective exchange of information and teaming with patients, their families, and professional associates. Fellows are expected to:

**Competencies**
- Communicate effectively with patients and families across a broad range of socioeconomic and cultural backgrounds.
- Communicate effectively with physicians, other health professionals, and health related agencies.
- Work effectively as a member of leader of a health care team or other professional group.
- Maintain comprehensive, timely, and legible medical records.

**Objectives: First Year Fellows**
- Learn to communicate effectively with the faculty and other members of the patient care team.
- Learn to communicate effectively with patients and their family members.
- Learn to deliver bad news in an effective and compassionate fashion.

**Objectives: Second and Third Year Fellows**
- Communicate effectively with the faculty and other members of the patient care team.
- Communicate effectively with patients and their family members.
- Communicate difficult information in an effective and compassionate fashion.
## Teaching Methods
The primary teaching method will be through daily performance of invasive and interventional cardiology hand-in-hand with faculty. The fellow is expected to round with the attending physician on a daily basis. The fellow will be expected to practice sound evidence based medicine and will be given access to resources to be utilized to enhance this practice. Resources include citations of important literature and use of hospital and MCW-based information technology.

## Assessment Method (Fellows)
Fellows are given verbal feedback on their performance by the faculty throughout the rotation and in particular at the end of each 2 week block. Final evaluations by each attending will be based on the general ACGME competencies of patient care, medical knowledge, practice-based learning and improvement, interpersonal and communication skills, systems-based practice, and professionalism. A formal written evaluation will be entered by the faculty into New Innovations. It will then be reviewed and signed by the fellow.

Fellows are also evaluated through use of the 360 evaluation system, where feedback from cardiac catheterization laboratory staff and others can be used to assess and refine performance. Specifically communication, systems-based practice, and professionalism can be further assessed.
**Assessment Method (Program Evaluation)**
Fellows will assess the rotation overall as well as their attending physicians. These will be written evaluations which will be shared with the Chair of the Division as well as the Fellowship Program Director. Feedback from the fellows will allow for correction of any perceived deficiencies in learning opportunities on this rotation.

**Level of Supervision**
One faculty member is assigned to every procedure in the laboratory and a faculty member is assigned daily to the laboratory for education and supervision.

**Educational Resources**
The fellow will be expected to practice sound evidence based medicine and will be given access to resources to be utilized to enhance this practice. Resources include citations of important literature and use of hospital and MCW-based information technology.

**READING**
The fellow is expected to augment his/her clinical experience with vigorous review of the medical literature. This effort includes beginning with the initial review of the ACC cath SAP Program and a review of a general cardiac text and cardiac catheterization. Recommended texts include Baim’s, Grossman’s Cardiac Catheterization and Angiography 7th edition, or Cardiac Catheterization and Percutaneous Interventions by Patrick Kay, Manel Sabate, and Marco A. Costa. Topol’s textbook on Interventional Cardiology is also beneficial and was updated in 2007. Loscalzo’s Vascular Medicine has also been updated as Vascular Medicine: A Companion to Braunwald's Heart Disease by Mark A. Creager, Victor J. Dzau, Joseph Loscalzo; it is an excellent text and provides good background.

**CARDIAC CATHETERIZATION CONFERENCE**
Fellows during the cardiac catheterization conference are expected to bring at least three cases for case review to the conference when assigned. The fellow will have one 30 minute presentation during your month at cardiac catheterization conference. This schedule has been previously distributed. Once again, cardiac catheterization conference provides you an opportunity to demonstrate your concern for your education and the education of your colleagues. It is our expectation that you will have begun preparation for this presentation several weeks in advance and reviewed it with one of the invasive attending physicians prior to presentation. Again, a bibliography is extremely helpful to your colleagues as they prepare for board examinations.
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