

**RESPONSIBILITIES OF CARDIOLOGY FELLOWS DURING
CARDIAC CATHETERIZATION LABORATORY (CCL) ROTATION**

NOTE: IT IS MANDATORY FOR FIRST AND SECOND YEAR FELLOWS TO ATTEND FRIDAY MORNING CATH CONFERENCE.

I. Responsibilities during cases:

- a. The fellow is responsible for assuring that the patient is ready to be called to the cardiac catheterization laboratory (CCL) and be moved into the room. The work-up should be complete, consents for catheterization and intervention should be signed, and all medical issues addressed (including the results of stress testing, echocardiograms, prior cardiac catheterizations and interventions, bypass anatomy, renal function status, anticoagulation, medications affecting cardiac catheterization, treatment for contrast allergy, etc.). This pertains to all patients brought to the CCL, including those for right-heart catheterizations. Potential problems should be discussed with the CCL attending assigned to the patient and with the referring physician before the patient is called to the CCL. The fellow must be physically present when the patient is called to the CCL in order to address any issues or problems; in general, this will be at 8:00 am. This will vary according to the conference schedule
- b. The fellow will learn to prepare the table and drape the patient, and set up the manifold according to CCL practice. The tech will prepare the table once the fellow is proficient at this. The attending must be present while the fellow obtains intravascular access. If the fellow cannot achieve intravascular needle positioning on 3 advances, the attending will take over. In emergency cases, the attending will gain access, at his/her discretion.
- c. The immediate management of the patient after the procedure is the fellow's responsibility, including writing post-catheterization orders and removal of all vascular sheaths and catheters. All first-year fellows will remove their own sheaths for the last procedure only to become proficient in this. Second-year fellows may request that a CCL staff remove the sheath(s) except in cases of: 1) critical aortic stenosis, 2) aortic insufficiency with > 100 mmHg pulse pressure differential, 3) critical left main stenosis. In general, the fellow should be available to assess and manage the patient if any problems arise, and the sheath removal from any unstable patient should be handled by the fellow. All vascular sheaths and catheters in patients returned to the nursing floors must be removed by the fellow. After 6:00 p.m., the on-call cath lab fellow will assume responsibility for the management of all access sites, including any remaining sheaths to be removed from interventional cases if there is no available nursing coverage. All patients should have an examination of the access site by the fellow within 24 hours of sheath removal, with documentation in the chart. Patients sent to the Medical Procedures Area should have the access site examined prior to discharge. Chest X-rays obtained after biopsy should be checked by the fellow prior to patient discharge.
- d. If a fellow participates in an interventional case, he/she will be responsible for the management of the sheath, IABP, Swan-Ganz catheter, etc. after the case. The medical management of post-interventional patients on 8200 will be signed over to the on-call CCU fellow at 6 pm.
- e. For emergency cases, the first year on-call fellow will evaluate the patient and discuss the case with the on-call attending. Emergency Department activates may activate CCL team directly for STEMI's that are clear candidates for interventional therapy or after discussion with the attending. First year fellow facilitates the transfer of the patient to the CCL, and obtains consent and manages the patient (including initiation of anti-platelet agents, anti-coagulation, pressor agents, etc.). The First year fellow will be responsible for activating the CCL team on patients not in the Emergency Department. The second year fellow will share responsibility in preparing the patient for cardiac catheterization, including accompanying

the patient during transport to the CCL. During the case, a scrub tech/nurse may also assist the attending for complex cases, but the fellow is expected to remain scrubbed and participate in the procedure and in the management of the patient. Following the case, the second year fellow will accompany all unstable patients (including all cases of acute myocardial infarction) to the CCU and be responsible for communicating the recommendations for patient management with the house staff. The second year fellow will be responsible for the management and eventual removal of all catheters, sheaths, and balloon pumps, with documentation in the medical record.

II. Assignment/Triage of cases:

- a. Each day, the on-call fellow for that evening will be designated as the "Charge Fellow". There will no longer be a "FOD" or "Fellow of the Day." The Charge Fellow will arrive at the CPC at 6:30 AM and stay until 7:00 AM to help with work-ups and insure each room has a potential first case. After returning from conference, the Charge Fellow will scrub with an attending. A nurse practitioner will be available to assist with add on patients after 7:00 (previously performed by the FOD). The nurse practitioner will enter orders only for attendings that do not have a fellow. When the cases for the next day have been logged (approximately 4 p.m.), the "Charge Fellow", with the triage nurse or the CCL nurse managers, will set the schedule for the following day and assign the work-ups to the other fellows. When possible, a given fellow should be assigned cases in a single room in order to perform the catheterization of the patient that he/she works up (the main exception being the first-year fellow). During the day the Charge Fellow will scrub with an attending after returning from conference.
- b. It is the responsibility of the fellow assigned the case to work-up the patient that evening such that the patient is fully ready for catheterization by the time the CCL is ready to call for the patient (generally, by 7:00 am). Any cases added after the scheduling office is closed, or on the weekend, will be the responsibility of the on-call fellow to work-up prior to the opening of the CCL the following morning.
- c. If there is an insufficient number of fellows, attendings will perform cases without a fellow. If the post-catheterization management of the patient requires the participation of a fellow (e.g., sheath removal in a complex patient or on the nursing floor), it will be the responsibility of the fellow who participated in the procedure to manage the patient. A nurse practitioner will be available to assist with post catheterization issues in the CPC holding area. However, each fellow is responsible for any patient they did a procedure on with attending back-up.

III. Didactic Sessions:

- a. The fellow will discuss the case with the attending prior to the cardiac catheterization, with emphasis on the indications for cardiac catheterization, the specific information to be derived from the procedure, and particular considerations for that patient (such as renal insufficiency, peripheral vascular disease, left ventricular function, problems with prior catheterizations, etc.). Prior angiograms should be reviewed prior to cardiac catheterization.
- b. Following the case, the fellow will review the results with the attending and participate in the generation of the preliminary report. This includes the interpretation of the hemodynamic tracings and of the angiograms, and developing recommendations based on the findings of the cardiac catheterization. Communication of the results and recommendations to the house staff will be the fellow's responsibility.
- c. The fellows will be assigned, on a rotating basis, to present cases for the Friday morning conferences. For the cardiac catheterization fellows' conferences, fellows will present at least 2 cases that illustrate certain aspects of anatomy, physiology, pathophysiology, or management, with literature reviews. The attending that performed the case should be notified of the discussion. The interventional fellow will

serve as a resource for the presentation and discussion of interventional cases. For the combined Cardiology/Cardiac Surgery conference, a single case will be presented. Attendance at these conferences will be mandatory, and will be recorded.

- d. Separate instructional hand-outs will be distributed detailing the appropriate work-up for patients, techniques for gaining vascular access, performance and interpretations of angiograms and hemodynamic tracings, intra-aortic balloon pump management, sheath removal, etc.
- e. Film review at 4:00 pm on Tuesday through Thursday lead by Dr. Bach.

IV Educational Goals of the CCL Rotation

- a. Understand the indications and contraindications of cardiac catheterization.
- b. Recognize the standard angiographic views.
- c. Understand the principles of x-ray generation and x-ray exposure.
- d. Understand normal coronary anatomy and recognize variants.
- e. Perform a standard cardiac catheterization including left ventriculography.
- f. Understand basic and advanced hemodynamic including:
 - 1. Gorlin formula
 - 2. Calculation of cardiac output with Fick equation.
 - 3. Calculation of shunt fraction.
 - 4. Recognition of restrictive and constrictive physiology.
 - 5. Interpretation of wall motion abnormalities.
 - 6. Recognition of regurgitant lesions.
- g. Manage complications of cardiac catheterization (dye reactions, dysrhythmias, groin complication, etc.).
- h. Interpret abnormal coronary anatomy. The fellows should be able to interpret the significance of coronary lesions. They also should be able to plan a management strategy for the patient with advanced coronary artery disease.
- i. Understand the indication for percutaneous revascularization.

Suggested Reading:

- 1) Chapter on Cardiac Catheterization in Hurst (available on-line through Becker library, free to all at Washington University).
- 2) Course on cardiac catheterization on the SCAI.org website.
- 3) Grossman Cardiac Catheterization.

Competencies:

- **Patient Care:** The primary goal of this rotation is the understanding of the role of cardiac catheterization in the management of cardiac patients. This includes indications, contraindications, and risks of the procedure. The fellow will also understand how the procedure is performed in a safe and effective manner under the supervision of an attending.
- **Medical Knowledge:** As outlined above, the fellows are expected to learn cardiovascular anatomy, valvular anatomy, and hemodynamics associated with valvular and congenital disease.
- **Practice-based Learning:** The fellows must understand their limitations in the cardiac cath lab. They must accept feedback and they must track their complications.
- **Interpersonal and Communication Skills:** The fellows must learn to communicate with patients, their families, the technicians, nurses, and attendings. Communication is vital in this environment.
- **Professionalism:** In addition to the technical knowledge required to perform a cardiac catheterization, the interpersonal skills required to succeed in a procedural-based practice need to be acquired. The fellow must learn how to professionally interact with the patient pre- and post-procedure. In addition, the

fellow must learn how to perform a procedure where many technical and nursing staff are in the procedure room. The ability to interact in a professional and dignified fashion, despite the intense pressure associated with life and death procedures, is emphasized.

- **System-based Practices:** The fellows will learn to work effectively with the nurses and staff in the Cardiac Procedure Center. Furthermore, the fellow will need to interact with the staff on the medicine floors to assure the appropriate pre- and post-procedure care.
- **Teaching Methods:** The fellow will learn by performing the procedure in a closely monitored setting. However, the fellow is expected to read the Grossman textbook.

Evaluation Methods: The fellows will be evaluated monthly in *MyEvaluations.com*. In addition, 360 degree review by the nursing staff will be used to assess professionalism and communication skills.

Fellow Role and Responsibilities in Cath Lab Operations.

1. Charge Fellow: Arrive at 06:30 in the CPC to work up patients that have been added on from the night before that are potential first cases. Try to insure that each room has a first case in CPC by 7:30.
2. Attend all conferences
3. Arrive in the CPC following conference. **Do not scrub in on the first case which will be performed with the attending and a scrub tech.** Look at the board for the second patient. We will make every effort not to move cases assigned to an attending. You should expect to perform procedures on these patients. Our goal is for you to evaluate the second patient while the attending is completing the first procedure. This will allow the second patient to be moved into procedure room as soon as it is cleaned. It is possible that you may have already worked up the patient the night before.
4. All fellows need to be competent in preparing a table and scrubbing in a patient. Once this is accomplished, **the table will be prepared by a tech.** This will allow additional time for reviewing the results of the procedure. This should also allow the fellow to evaluate the next patient so that they can be moved into the room as soon as it is cleaned.
5. Assist attending with the procedure.
6. Following the procedure:
 - a. Complete a preliminary report with the help of the attending
 - b. Complete post cath orders
 - c. Complete evaluation of the next patient
 - d. The attending is responsible for talking with the family and communicating the results to the referring physician. They may occasionally, when appropriate, delegate this to the fellow.
7. "Charge Fellow" "On Call Fellow" Only:
 - a. Arrive in the CPC 06:30/work up add-ons and try to insure each room has a patient in the CPC by 7:30.
 - b. Complete all next day work ups called in by 18:00 without staying excessively late.
 - c. Leave list of "good first cases" taped to the board in the CPC holding area.
 - d. Order 2 iv's on patients that are high probability for intervention.
 - e. Complete pre-cath orders on inpatients including hydration protocol and dye allergy orders when appropriate.
8. All fellows need to be competent in sheath pulling and groin management. The first year fellow will pull the sheath on the last case of the day to gain experience with this. Fellows will pull sheaths on patients with critical aortic stenosis as well.