INTerventional Cardiology
(Dedicated Fellowship)

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Objectives

1. Management of patients in the emergency setting, intensive care units and outpatient setting.
2. Understanding the mechanism, indications, and contraindications of pharmacological treatments.
3. Understand the evaluation and management of ischemic heart disease and valvular disorders. This will include the acute presentation of myocardial infarction and unstable angina as well as follow-up long term care.
5. Management of mechanical complications related to percutaneous procedures.
7. Acquire the technical manipulation of multiple types of interventional devices.
8. Understand the basic pathophysiology and principles of coronary artery disease and valvular disease.
9. Make appropriate judgments and clinical decisions regarding the treatment of coronary artery disease, including acute and chronic coronary syndromes, as well as valvular heart disease.
10. Know the indications, risks and benefits of coronary angiography and percutaneous revascularization techniques, including angioplasty, stenting, atherectomy, embolic protections, rheolytic thrombectomy and intra-aortic balloon counterpulsation and become proficient in these procedures.
11. Know the indications, risks and benefits of temporary transvenous pacing.
12. Understand the indications for independently interpret and become proficient in the use of fractional flow reserve measurements and intravascular ultrasound.
13. Become familiar with the indications for and techniques of balloon valvuloplasty, alcohol septal ablation, and percutaneous closure of patent foramen oval (PFO) and atrial septal defect (ASD).
14. Understand the principles of coronary imaging including radiations safety, limitations of fluroscopic imaging and recording equipment.
15. Evaluate and independently care for patients with acute coronary
syndromes including acute myocardial infarction, chronic coronary artery disease, and valvular heart disease, with knowledge of the lastest proven pharmacologic as well mechanical interventions.

16. Understand and appropriately interpret clinical trial data regarding acute and chronic coronary syndromes and valvular heart disease with proper integration into patient care.

B. TEACHING STRATEGIES

1. The Cardiac Catheterization Laboratory (CCL) teaching service consists of several teaching attendings, at least one clinical cardiology fellow, and one interventional cardiology fellow.

2. On the CCL teaching service, one fellow is usually “scrubbed” with the teaching attending, so the “hands-on” aspect of the educational experience involves a direct one-on-one arrangement between the fellow and attending. This arrangement permits close interaction with the fellows and attending staff, and offers superb fellow experience and close attending supervision. As fellows demonstrate increasing competence with increasing experience, they will have more independence (see the description of fellow responsibilities by year of training in Section D below).

3. Although most of the technical aspects of cardiac catheterization are learned best in the CCL, most of the cognitive training takes place in several venues:
   a. Weekly interdisciplinary cardiac Case Management conference
   b. Journal club
   c. Self learning by study of ACC/AHA guidelines for cardiac catheterization, percutaneous revascularization, and cardiac surgery
   d. Self learning by study of the ACC Cath SAP

C. ATTENDING RESPONSIBILITIES

1. Teach the fellow the indications for procedures; selection of equipment and angiographic views; review findings; and discuss complications and patient follow-up.

2. Discuss cost effectiveness of various interventional strategies, quality assurance issues, safety, and effective documentation for medicolegal purposes.

3. An attending physician is required to be immediately available during all diagnostic procedures; the Interventional fellow will participate in the following teaching faculty cases:
   a. left heart catheterization
   b. selective coronary angiography
c. intracoronary thrombolytic therapy  
d. intraaortic balloon pump counterpulsation  
e. brachial arteriotomy/venotomy repair  
f. ventriculography, aortography, pulmonary angiography  
g. temporary pacemaker insertion  
h. right heart catheterization  
i. pericardiocentesis  

5. The Cath Lab Director (or surrogate) will meet with the Interventional fellow at the beginning of the year to verbally review the goals, objectives, and responsibilities for the upcoming year.

6. The Cath Lab Director (or surrogate) will meet with the Interventional fellow quarterly to verbally review the fellow’s written evaluation and performance. The attending will complete a formal evaluation of fellows’ performance using New Innovations.

D. FELLOW RESPONSIBILITIES

The interventional fellow is responsible for all aspects of care for patients admitted to the interventional service and of the care related to the procedure of those patients assigned to the primary cardiology service or other services. The fellow will discuss all aspects of the planned care for the patients with the appropriate faculty member and is expected to be on rounds twice daily with the attending which averages 3 to 4 patients per day. He/she will attend the daily catheterization conference. The fellow is required to actively participate in a research project. One day a week will be assigned for research time. Call is one week a month exclusively at the Nebraska Health System. The interventional fellow does not make rounds on the weekends. The interventional fellow will participate in the interventional clinic for one half day per week at the University of Nebraska Medical Center on Friday afternoons.

The interventional fellow will submit a list of interventional procedures monthly to the fellowship coordinator. The target number of procedures is between 300 to 400 cases per year. The fellow may be asked to reduce the number of clinical laboratory days if it appears that he-she is averaging more than this amount.

PATIENT CARE

1. Selection of the appropriate procedure and instruments for selected patients.

2. Performance of the critical technical manipulations used in diagnostic and therapeutic interventional cardiac catheterization and usage of balloon angioplasty, stents, and other interventional devices.
3. Use of adjunctive imaging techniques such as intravascular ultrasound, coronary flow reserve, and pressure measurement.
4. Documentation of participation in or primary operator experience in a minimum of 250 coronary interventions during the course of the fellowship in a procedure log. A single coronary intervention is defined as all coronary interventions performed during one hospitalization.
6. The role of emergency coronary bypass surgery in the management of complications of percutaneous intervention.

MEDICAL KNOWLEDGE

1. Understanding of the pathophysiology of vessel response to injury, coronary artery disease, peripheral vascular disease, and restenosis.
2. Knowledge of the indications, contraindications, risks, limitations, sensitivity, specificity, predictive accuracy, and appropriate techniques for evaluating patients with a variety of cardiac disease disorders.
3. Knowledge of the short- and long-term strengths and limitation of percutaneous versus surgical and medical therapy for a wide variety of clinical and anatomic situations related to cardiovascular disease.
4. Proficiency in the interpretation of coronary arteriograms, ventriculography, hemodynamics, intravascular ultrasound, and intracoronary pressure monitoring.

PRACTICE-BASED LEARNING

1. Participation in a research project on a topic relevant to interventional cardiology. This research project will provide the background for interpreting the future clinical trials and publications.
2. Proficiency in research study design, data management, biostatistical analysis, and medical informatics.
3. Critical evaluation of the interventional cardiology literature and research studies.
4. Application of evidence from scientific studies to the diagnosis, management, and treatment planning for his/her patients as well as to self-evaluation and improvement of patient practice patterns.
5. His/her ability to perform Practice-Based Learning and Improvement.

INTERPERSONAL & COMMUNICATION SKILLS

1. If no contraindications exist for the procedure, the fellow will explain the nature of the procedure to the patient in a way the patient can understand. An explanation of the risks/benefits should be given. Instructions should be given to the patient regarding oral intake, IV’s, voiding, etc.
2. Communicate with the patient and family to alleviate anxiety and fear and explain what measures will be utilized to alleviate pain, discomfort and anxiety.
3. Communicate with the attending about excessive patient concerns, unforeseen complications or anything out of the ordinary.
4. Communicate with catheterization lab holding room nurses, since they are most familiar with the patient's progress, before and after cardiac catheterization.
5. It is the fellow's responsibility who performed the catheterization to communicate with the inpatient team.

SYSTEM-BASED PRACTICE

1. Read, understand and implement ACC/AHA guidelines for cardiac catheterization, percutaneous coronary intervention and coronary artery bypass graft surgery.
2. Utilize various written and web-based resources to enhance self-study of cardiac catheterization including:
   a. Textbook of Cardiac Catheterization and Intervention (Baim & Grossman): basic principles of hemodynamics and angiography.
   c. ACC Catheterization SAP (CD-ROM): evidence-based approaches; all aspects of cardiac catheterization.

PROFESSIONALISM

1. All fellows assigned to the catheterization lab will be available between 7:00 a.m. and 4:00 p.m. or until all procedures and evaluations have been completed for the day.
2. Always maintain a positive and professional attitude toward the patients.
3. Maintain professional interactions with the nursing staff, technical staff and physicians.
4. Do your best to alleviate patient fear, anxiety and discomfort by thoughtful communication and use of appropriate conscious sedation.

E. EVALUATIONS

1. Each fellow will be evaluated on a quarterly basis, as follows (360° Evaluation):
   a. A formal evaluation will be completed by the Cath Lab attending(s) using New Innovations and the content of the evaluation will be
reviewed verbally with the fellow. **Any negative evaluations must be discussed face to face with the fellow and the Program Director must be notified.** A monthly evaluation will also be completed by the Nursing manager of the CCL.

1. The Interventional fellow will complete a formal evaluation of the Cath Lab attending(s) quarterly using New Innovations. This evaluation will be reviewed on an annual basis with the Program Director and Chief of Cardiology.
Interventional Cardiology
Monthly Curriculum

Month 1
1. Learn the indications, composition of angioplasty wires
2. Learn the indications for angioplasty guides
3. Learn about the type of angioplasty balloons
4. Learn indications, contraindications, method of deployment, complications of closure devices

Month 2
1. Learn type of stents
2. Begin passing angioplasty wires
3. Begin passing balloon

Month 3
1. Begin passing stents
2. Introduction to intravascular ultrasound and fractional flow reserve
3. Research update

Month 4
1. Brachy therapy
2. Drug eluting stents
3. Covered stents
4. Continue primary operator

Month 5
1. Rotational atherectomy
2. Directional atherectomy
3. Continue primary operator

Month 6
1. Distal protection devices
2. SVG graft cases
3. Research update

Month 7
1. Depressed LV function cases
2. Continue primary operator
Month 8

1. Continue primary operator

Month 9

1. Research update
2. Continue primary operator

Month 10

1. Continue primary operator

Month 11

1. Continue primary operator

Month 12

1. Research update
2. Continue primary operator