

Goals and Objectives

University of Florida

Cardiovascular Disease Fellowship



Goals and Objectives for University of Florida (UF) Cardiovascular (CV) Disease Fellowship:

The goals and objectives for the UF CV Disease Fellowship program are listed below. They are broken down by clinical or research training assignment.

In general, the fellow's schedule by year is as follows:

1st Year: 3-4 months of General Cardiology Consults at Shands Hospital*
 2-3 months of Inpatient Cardiology at Shands Hospital (including CCU)
 3 months of Cardiac Catheterization at Shands Hospital
 1-2 months of Echocardiography
 1-2 months of Electrophysiology (2 months needed for ACGME requirement)
 1-2 months of Heart Failure/Transplantation

2nd Year: 1 month of CV CT/MRI
 1-2 months of Echocardiography
 1-2 months of Heart Failure/Transplantation
 0-2 months of Nuclear
 1-3.5 months of Research
 1 month of VAMC Catheterization/VAMC Consults
 3-4 months at Leesburg Community Satellite Program

3rd Year: 1-2 months of CV CT/MRI
 2 months of Echocardiography
 1-3 months of Nuclear
 2-3 months of Cardiac Catheterization at VAMC**
 2-3 months of Consults at VAMC (including the VAMC CCU)
 2-3 months of specialized cardiology based on the fellows' interest (such as electrophysiology, heart failure/transplantation or interventional cardiology)

Furthermore, *all fellows* participate in one continuity clinic for ½ a day a week.

The clinical objectives and expectations vary more by assignment than year of fellowship. Of importance, some assignments are limited to upper level fellows given the increased level of training necessary to attain competence.

Expectations for procedures increase with training experience and are listed at the end of this document.

*Shands Hospital = Shands Teaching Hospital and Clinics, Inc.

**VAMC = Malcom Randall Veterans Affairs Medical Center

LEARNING OBJECTIVES IN THE FIRST YEAR

During the first year, fellows are exposed to the acute and chronic CV diseases, emphasizing accurate ambulatory and bedside clinical diagnosis, appropriate use of diagnostic studies and integration of all data into a well-communicated consultation, with sensitivity to the individual patient.

The order of clinical assignments is based primarily upon availability and the interests of the fellow. During this time, under the direct supervision of the faculty on each assignment, fellows will begin to acquire and develop skill in the diagnosis and treatment of CV disease, demonstrate their ability to gather, synthesize and organize information relating to their patients, as well as demonstrate their understanding of the pathophysiology of CV disease.

Beginning in the first year, and continuing throughout the training program, fellows will develop their ability to lead, teach, and learn from other members of the healthcare team, as well as hone their consultative skills in the performance and interpretation of diagnostic tests and procedures. Training will include instruction in the prevention, therapy and management of CV diseases as well as in the social, humanistic, moral and ethical aspects of CV disease. Fellows will demonstrate empathy for patients and their families by attention to pain control, patient comfort, family counseling, informed consent, as well as the ethical and legal principles involved with care and end of life decisions.

LEARNING OBJECTIVES IN SECOND YEAR

During the first year, fellows receive guidance in the selection of a research project. The fellows are asked to select a research mentor and decide on a potential research project.

At the beginning of the second year, fellows will begin their mentored research projects. Active participation in research will provide the fellow with experience in critical thinking, and in evaluating the cardiology literature. This experience is essential in providing a solid foundation in clinical CV medicine.

Most fellows will perform their research with a member of the CV Medicine faculty. Under some circumstances a fellow may train in a laboratory outside of the Division, but with a mentor within CV Medicine. Each request for training outside the Division must be approved by the Research Advisory Council and the Division Director.

A Ph.D. or M.Sc. in Clinical Investigation is offered in a joint program between the Schools of Medicine and Public Health incorporating didactic coursework and mentored research.

Also during the second year, the fellow will spend approximately three months in Leesburg, Florida. This assignment gives the experienced cardiology fellow the opportunity to apply the clinical skills gained as a first year fellow and function as a general cardiologist in the community with supervision of faculty.

During this assignment, the fellow will assist in the cardiac catheterization laboratory, perform in-patient consultations, participate in continuity clinic for 2 half-days a week and perform non-invasive stress tests including nuclear imaging. Furthermore, the fellow will get extensive exposure to peripheral vascular angiography and intervention.

LEARNING OBJECTIVES IN THIRD YEAR

Fellows will complete the clinical requirements of the program in the third year. They are expected to continue to refine their clinical skills and assume additional responsibilities in the management of patients with CV disease, obtain additional training and experience in the performance and applications of diagnostic and therapeutic procedures while under the direct supervision of a faculty member.

ACGME Competency-Based Education (*Applies to all clinical rotations*)

1. Medical knowledge (MK) is gained through clinical teaching, lectures, seminars and conferences including journal club and procedural workshops. The fellow should demonstrate an investigatory and analytic thinking approach to clinical situations and know and apply the basic and clinically supportive sciences appropriate for each subspecialty area of CV medicine.
2. Patient care (PC) must be compassionated, appropriate, and effective for treatment of patients with CV diseases. In addition, lifestyle modifications should be addressed for primary prevention. This competency can be gained through clinical teaching, lectures, seminars, conferences, workshops, and most importantly self directed learning through case-based scenarios or modules. The fellow should be able to communicate effectively and demonstrate caring and respectful behaviors when interacting with patients and their families. They should be able to gather essential and accurate information about their patients and make informed decisions about diagnostic and therapeutic interventions based on patient information, preferences, up-to-date scientific evidence, and clinical judgment. The fellows should develop and carry out patient management plans, counsel and educate patients and their families, and use information technology to support patient care decisions and patient education. They should be able to perform competently all medical and invasive procedures considered essential for CV medicine. In addition, patient education on primary prevention and maintenance of health is essential for effective CV management.
3. Practice-based learning and improvement (PBLI) should be performed on a daily basis and emphasized through lectures, seminars, conferences including journal club, quality improvement projects, research projects, and clinical teaching. The fellow should analyze practice experience and perform practice-based improvement by obtaining information about the population of patients that are being cared for. Also to use evidence-based medicine and knowledge gained from study designs and statistical methods for diagnostic and therapeutic care of their patients. In addition, fellows should facilitate the learning of students and other health care professionals.

4. Systems-based practice (SBP) should be performed through awareness of health care system and its resources to provide optimal care for patients. This can be emphasized through clinical teaching, patient safety projects, systems-based approach to M&M, and other lectures and conferences. The fellow should know how types of medical practice and delivery systems differ from one another, including methods of controlling health care costs and allocating resources. The fellows should practice cost effective health care and resources allocation that do not compromise quality of care. They should be an advocate for quality patient care and partner with other health care providers.

5. Professionalism (PF) is an essential characteristic of a physician. Fellows should demonstrate respect, compassion and integrity with adherence to ethical principles and sensitivity to patients' culture, age, gender and disabilities. This should be emphasized through clinical teaching; case-based teaching, mentoring, role modeling, clinical vignettes, and ethics committee.

6. Interpersonal and communication skills (IPC) result in effective information exchange and teaming with patients, their families and professional associates. Fellows should create and sustain a therapeutic and ethically sound relationship with patients. They should use effective listening skills and elicit and provide information using effective nonverbal, explanatory, questioning, and writing skills. In addition, fellows must work effectively with others as a member or leader of a health care team. Interpersonal and communication skills can be developed and improved through clinical teaching, role modeling, case-based teaching, interactive workshops or seminars using role-plays, grand rounds, presenting lectures and conferences, writing abstracts, presenting a poster, and scholarly articles.

Learning Activities and Evaluation Methods

The General Cardiovascular Diseases Training Program provides learning opportunities in each competency domain and uses multiple assessment methods to evaluate and ensure fellow competence in each area.

Learning activities include:

- On-the-job learning of procedural skills in the cardiac catheterization laboratory
- Didactic lectures
- Various conferences
- Role-modeling and mentoring by faculty
- Discussion with faculty
- Review of procedural images with faculty
- Review of cardiac and vascular treatment device therapy with faculty
- Evaluation of patients in multiple settings
- Discussion with patients and families
- Interaction, discussion with other healthcare workers and teachers
- Extramural conferences and training courses
- Web-based curricula and educational tools

- Live case courses
- Medical simulation experiences/Procedural workshops
- Board review
- Literature review
- Fellows as teachers

Assessment/evaluation methods include:

- Direct observation by faculty (DO)
- 360° or Multisource Professional Feedback (360)
- Procedure Check Lists (PCL)
- Self evaluation forms and self-assessment tools (i.e. ACCSap, Board Review questions, web-based programs). (SE)
- Regular and timely feedback from program director including semiannual written evaluations. (PD)
- ABIM board exam (ABIM)
- Medical Simulation experiences. (Sim) [Note: No financial support is available for Medical Simulation resources to be obtained by UF Division of Cardiovascular Diseases or Shands Cath Lab, so these opportunities are not available on a day-to-day basis in our program. Participation in medical simulation exercises at outside courses and those provided by industry are encouraged.]
- Chart review of fellows' notes, reports and other documentation by faculty (Rev)
- Morbidity and Mortality Review/Quality Assurance Conference (MM)

Individual Rotations

General Goals, Objectives, and Competencies for the Cardiovascular Fellowship

- A. During the pre-procedural assessment and care of the patient, the fellow should strive to:
1. Assess and understand the indications and contraindications, and the potential benefits and risks, of procedures.
Competencies: MK, PC, PBLI
Evaluations: DO, 360, SE, Rev
 2. Assess and understand the suitability of the patient for the procedure.
Competencies: MK, PC, PBLI
Evaluations: DO, 360, SE, Rev
 3. Assess and understand the type of procedure indicated for the patient.
Competencies: MK, PC, PBLI
Evaluations: DO, 360, SE
 4. Assess and discuss the patient's perception of the procedure.
Competencies: PC, PF, PBLI, SBP, IPC
Evaluations: DO, 360, SE
 5. Plan the procedure including type of procedure, what information is to be gathered during the procedure, equipment, medications, potential complications, and anticipated post-procedural care.
Competencies: MK, PC, PBLI
Evaluations: DO, 360, SE, PCL
 6. Assess and understand the risks and benefits of the procedure and discuss them with the patient and family, and obtain informed consent.
Understand informed consent.
Competencies: MK, PC, PF
Evaluations: DO, 360, SE
 7. Understand normal and pathophysiologic findings.
Competencies: MK, PBLI
Evaluations: DO, SE, ABIM, PD
 8. Generate a thorough report regarding the procedure, results, and plan for the patient.
Competencies: MK, SBP, PC, IPC
Evaluations: Rev, SE

General Cardiology Consultations at Shands Hospital (3-4 months during 1st year)

Goals and Objectives:

The consult fellow will perform the initial CV disease evaluation in response to cardiology consultations requested by all in-patient services at Shands Hospital. In addition, the fellow will provide pre-operative CV evaluation for outpatients in need of evaluation prior to relatively urgent surgery.

The fellow will learn to deal effectively and professionally with patients, families, other medical personnel, as well as outside lay persons and potential patients who request to speak with a cardiologist.

As the cardiology consultant “on call”, the fellow will field all requests for assistance with CV problems and either bring to resolution or triage to the appropriate service.

In all these activities, the fellow will develop sufficient expertise to function independently as an effective consultant cardiologist.

Competencies

1. Bedside CV history and physical examination. (MK, PC, PF, IPC)
2. ECG interpretation consistent with level of training. (MK,PC,PBLI)
3. Correlation of physical exam with other diagnostic techniques (including echocardiograms, cardiac catheterization, radionuclide and other non-invasive imaging, such as CV CT and MRI). (MK, PC, IPC, PBLI)

Content and methods

1. ACC/AHA guidelines for pre-operative CV evaluation.
2. Daily review of echocardiograms and other imaging techniques on patients being seen by the consultation service.
3. Direct observation by the cardiology faculty of fellows’ CV physical examination skills.
4. Clinical and non-invasive assessment of prosthetic heart valves (tissue and mechanical).
5. Long-term management of post-CABG, post-PCI and post-MI patients with emphasis on details of “secondary prevention”.
6. Basics of “primary prevention” of atherosclerosis for those at risk.
7. Interpretation of ECGs (goal 100/week).

Supervision

All patients are also seen and examined by the cardiology faculty.

Evaluation Process
<ol style="list-style-type: none">1. Individual feedback of accuracy and completeness of patient histories. (DO)2. Direct observation by the cardiology faculty of fellows' CV physical examination skills. (DO)3. Review and critique with fellows their independent interpretation of diagnostic studies. (Rev)4. Review and critique with fellows their assessment and plans for patients on whom they have consulted. (DO, REV)5. Observe and provide feedback on how fellows interact with patients, families and other medical personnel. (360°, DO,SE)

Inpatient Cardiology (MCT Service) Coronary Care Unit (2-3 months during 1st year at Shands Hospital when this assignment is tied in with the general cardiology teaching service, 2-3 months during 3rd year at the VAMC, when this assignment is tied in with general cardiology consultations in the VAMC)

Goals and Objectives:

<p>Fellows will gain the knowledge, skills, and abilities to evaluate and manage patients in the CCU. They will also learn to communicate effectively with patients, their families as well as educating residents and medical students in the appropriate management and care of patients with CV disease processes.</p>
<p>Competencies</p>
<p>Fellows will gain the knowledge, skills, and abilities to:</p> <ol style="list-style-type: none"> 1. Educate and guide residents and medical students in appropriate methods of patient management. (MK,PC,PF,IPC,PBLI,SBP) 2. Educate and guide residents in procedures including Swan-Ganz catheterization, arterial line cannulation, temporary pacemaker insertion and cardioversion. (PC,IPC,MK) 3. Risk stratifies of post-myocardial infarction and unstable angina patients. (MK,PC,PBLI,SBP) 4. Identify risk factors for atherosclerosis. (MK, PBLI) 5. Participate actively in rounds.(MK,PC,PF,IPC) 6. Communicate actively with nursing staff, patients, and families. (PF,PC,IPC,SBP) 7. Management of intra-aortic balloon pumps: 1st year fellows manage IABPs under direct supervision of faculty; 2nd and 3rd year fellows are expected to manage IABPs more independently. Faculty is always available for consultation. (MK, PC, PF, IPC).
<p>Content and Methods</p>
<p>Evaluation and management of patients with the following diagnoses:</p> <ol style="list-style-type: none"> a. ST segment elevation myocardial infarction. b. Non ST segment elevation acute coronary syndrome. c. Decompensated heart failure. d. Ventricular and atrial tachyarrhythmias in critically ill patients. e. Acute valvular heart disease like mitral or aortic regurgitation. f. Cardiac tamponade. g. Acute aortic dissection. h. Symptomatic brady arrhythmias. i. Complications from procedures (TEE, cardiac catheterization, EP studies, etc.).

2. Proficiency in performance and interpretation of the following procedures:
 - a. Balloon catheterization of the pulmonary artery.
 - b. Arterial cannulation and catheterization.
 - c. Temporary pacemaker insertion, and cardioversion.
 - d. Management of IABP.
3. Guide and educate residents on appropriate patient management decisions.
4. Interpretation of ECGs (goal 100/week).

Supervision

1. The faculty cardiologists supervise all non-emergent cardioversions with fellows and residents at Shands Hospital and VAMC.
2. The faculty cardiologists supervise the majority of right heart catheterizations and temporary pacemaker placements performed in the CCU at Shands Hospital and the VAMC.

Evaluation Process

1. Each faculty member on service with a fellow evaluates and gives feedback to the fellow. (DO,REV)
2. Fellow competency is evaluated by the faculty via the following:
 - a. Rounds in A.M. and P.M., evaluating how well the fellow is able to recognize, evaluate and treat particular patients with the above listed diagnoses. (DO)
 - b. Constant contact throughout the day obtaining the fellows opinion on all cases that are admitted the CCU. (DO)
 - c. Feedback from residents as to the fellow's guidance and teaching abilities. (360°)
 - d. Feedback from nursing staff as to the fellow's ability to efficiently care for patients in the CCU. (360°)

Inpatient Cardiology at Shands Hospital (2-3 months during 1st year. This is the same fellow who covers the CCU at Shands Hospital)

Goals and Objectives:

The fellow will assist the residents in the care of the patients on the teaching service.

The fellow will learn to deal effectively and professionally with patients, families, other medical personnel, as well as outside lay persons and potential patients who request to speak with a cardiologist.

As the cardiologist on the inpatient service, the fellow will field all requests for assistance with CV problems and accept patients for transfer to Shands Hospital at the University of Florida when appropriate.

In all these activities, the fellow will develop sufficient expertise to function independently as an effective general cardiologist.

The fellow will participate actively on inpatient teaching rounds with the faculty cardiologist.

Competencies

1. Bedside CV history and physical examination. (MK, IPC)
2. ECG interpretation consistent with level of training (goal 100/week). (MK,PCL)
3. Correlate physical exam with other cardiology diagnostic techniques (including echocardiograms, cardiac catheterizations, radionuclide and other non-invasive imaging, such as CV CT and MRI). (MK,PC,IPC, PBLI)

Content and Methods

1. ACC/AHA guidelines for pre-operative CV evaluation and for ACS.
2. Daily review of echocardiograms, catheterizations and other imaging techniques on patients on the inpatient service.
3. Direct observation by the faculty of fellow's CV physical examination.
4. Clinical and non-invasive assessment of prosthetic heart valves (tissue and mechanical).
5. Long-term management of post-CABG, post-PTCA and post-MI patients with emphasis on details of "secondary prevention".
6. Basics of "primary prevention" of atherosclerosis for those at risk.

Supervision

See CCU goals and objectives.

Evaluation Process
<ol style="list-style-type: none">1. Individual feedback of accuracy and completeness of patient histories.(DO, REV)2. Direct observation by the faculty of fellow's CV physical examination. (DO)3. Review and critique with fellows their independent interpretation of diagnostic studies. (REV)4. Evaluated by the residents on the service. (360°)5. Observation and feedback on how fellows interact with patients, families and other medical personnel.(360°,DO)

Cardiac Catheterization (3 months during 1st year at Shands Hospital, 2-3 months during 3rd year at VAMC)

Goals and Objectives:

Level 1

All fellows should have a clear understanding of the indications, limitations, complications and medical and surgical implications of the findings of cardiac catheterization and angiography, as well as a general understanding of related interventional procedures.

This includes an understanding of the pathophysiology of CV disease and the ability to interpret hemodynamic and angiographic data and to use these data to select cases for surgical and catheterization-based therapeutic procedures. *All fellows* must have a basic understanding of and formal training in radiation physics, radiation safety, fluoroscopy and radiological anatomy, as well as clinical CV physiology (e.g., pressure waveforms, shunt calculations, blood flow, resistance calculations).

Fellows will learn to perform pulmonary artery catheterization with flow-directed catheters by percutaneous (subclavian, femoral and internal jugular) routes. *All fellows* must be capable of performing temporary right ventricular pacemaker insertion and should have some experience performing right and left heart catheterization, including ventriculography and coronary angiography. In addition, they should learn to perform pericardiocentesis.

Competencies

1. Pre-cardiac catheterization evaluation and pre-procedure preparation. (MK, PC, PF, IPC, PBLI,SBP)
2. Ability to obtain informed consent for cardiac catheterization understanding the risks and benefits of invasive CV imaging. (MK, PC, PF,IPC,PBLI,SBP)
3. Arterial and venous vascular access emphasizing the femoral approach. (MK,PC)
4. Performance of right heart cardiac catheterization including proper data acquisition and interpretation. (MK,PC)
5. Performance of coronary artery angiography including interpretation of angiographic images. (MK,PC,PBLI)
6. Performance of ventriculography including measurement of pressures and calculation of ejection fraction. (MK,PC,PBLI)
7. Ability to calculate valve areas and severity of valvular regurgitation. (MK)
8. Performance of a saturation run and calculation of a shunt fraction. (MK)
9. Understand the mechanics of intra-aortic balloon counterpulsation. (MK)
10. Performance of pericardiocentesis. (MK,PC)
11. Placement of a temporary transvenous pacing wire.(MK,PC)

12. Post-cardiac catheterization management including assessment of access site complications. (MK,PC)
Content and Methods
<ol style="list-style-type: none"> 1. Textbooks including Baim and Grossman: Cardiac Catheterization, Angiography, and Intervention. 2. Performance of catheterization techniques by participation in procedures with faculty cardiologists. 3. Didactic lectures on calculation of valve area, shunt fraction, and ventricular function. 4. Weekly conferences discussing cardiac catheterization topics. 5. Intensive discussion by the faculty with the fellow after each case reviewing angiographic and hemodynamic findings. 6. Textbooks including Baim and Grossman: Cardiac Catheterization, Angiography, and Intervention. 7. Performance of catheterization techniques by participation in procedures with faculty cardiologists. 8. Didactic lectures on the calculation of valve areas, shunt fraction, interpretation of hemodynamics, as well as ventricular function. 9. Weekly conferences discussing cardiac catheterization topics. 10. Intensive discussion by the faculty with the fellow after each case reviewing angiographic and hemodynamic findings.
Supervision
<p>All aspects of procedures are supervised directly by the catheterization laboratory faculty who is scrubbed and assisting the fellow during procedures at Shands Hospital at the University of Florida.</p> <p>All aspects of procedures are performed with the faculty in the catheterization laboratory or immediately available for consultation at the VAMC. As noted above, only upper level fellows perform heart catheterizations at the VAMC.</p> <p>Interpretation and reporting of catheterization data is completed by the fellow following discussion and review of the case with the faculty.</p>
Evaluation Process
<p>Fellows are evaluated directly by the faculty supervising the procedures. (DO) Evaluation of procedural skills is reported to the fellows following each case in an oral manner and after each month on service (PCL). Concerns regarding a fellow's procedural skills are brought to the attention of the Director of the Catheterization Laboratory for more intensive discussion and instruction on an individualized basis (PD). Procedure logs are maintained and examined at the end of each month to track the number of procedures successfully completed. Complications related to cardiac catheterization are discussed at a quarterly meeting with all faculty and fellows present (MM). Interactions with patients,</p>

staff, as well as residents, faculty and other services are assessed through 360° evaluations, which are incorporated into semi annual reviews (PD).

Echocardiography (1-2 months during 1st year, 1-2 months during 2nd year and 2 months during 3rd year)

Goals and Objectives:

Fellows will gain a comprehensive knowledge of the following:

1. Left ventricular function, both global and regional at rest and during stress induced by exercise or pharmacological agents.
2. Valvular structure and function and echocardiographic methods to study cardiac morphology and function.
3. Doppler principles to measure intra-cardiac and intravascular blood flow velocity.
4. Performance and supervision of non-invasive stress testing.
5. Interpretation of ambulatory ECG (Holter) monitors.

Competencies

1. Assessment of cardiac function including left ventricular regional and global function as well as valvular morphology and function. (MK,DO, PC)
2. Performance and interpretation of echocardiograms (goal 15/week). (MK,DO,REV)
3. Supervision and interpretation of dobutamine stress echocardiograms and treadmill exercise tests (goal 10/week). (MK,DO)
4. Knowledge and familiarity with stress testing modalities to study the heart clinically.(MK,PC,PBLI,SBP)

Content and Methods

Intensive and direct corrections by faculty echocardiographer of previous interpretations and imaging by the fellow.

Fellows will perform at least 150 echocardiograms and interpret at least 300 echocardiograms by the end of fellowship (see procedure section) (PCL)

Fellows will perform at least 50 TEEs by the end of fellowship. The fellow is expected to be primary operator during their 3rd year of fellowship (see procedure section). (PCL)

Fellows will independently read ECGs, which are over-read by a faculty cardiologist. The faculty cardiologist gives direct feedback to the fellow. (PCL)

Performance of echocardiograms under the supervision of experienced sonographers. (PCL)

Evaluation Process

Since this assignment will be taken more than once in the course of training experience, it is expected that fellows will demonstrate increasing competence and skill in the interpretation of echocardiograms and ECGs (PCL). Feedback is given daily and with a formal end of assignment evaluation. (DO,REV)

By the end of first year, interpretations should need to be modified only slightly, basically for purposes of fine-tuning the assessment of function and valvular performance especially with transthoracic echocardiography. By the third year, assignments in the lab are particularly targeted at observing the fellow functioning in a more independent mode, providing feed back and teaching to residents, supervising stress tests, and performing TEEs without the need for significant faculty input.

Electrophysiology (1-2 months during 1st year)

Goals and Objectives:

Fellows on this assignment are expected to learn the evaluation and management of common arrhythmias including atrial fibrillation, ventricular tachycardia, PSVT, atrial tachycardia, atrial flutter, sudden cardiac death, and syncope. They will also learn the indications for pacemakers, implantable defibrillators, electrophysiology (EP) testing, catheter ablation, tilt table testing, and cardioversion.

Learning Activities

1. Arrhythmia consultation on the inpatient service.(MK,PC,PF,IPC)
2. Arrhythmia management.(MK,PC,IPC)
3. Performance of tilt table testing.(MK,PC,IPL,PBLI, PCL)
4. Performance of cardioversion (see procedure section). (MK,PC,PF,IPC,PBLI,SBP, PCL)
5. Interpretation of the results of EP testing.(MK,PC)
6. Indications and contraindications for anti-arrhythmic drug therapy. (MK,PC)
7. Programming of permanent pacemakers and ICDs. 1st year fellows initially interrogate pacemakers and ICDs under the direct supervision of faculty or an EP fellow. Upper level fellows are expected to interrogate pacemakers and ICDs more independently. Faculty cardiologists are always available for consultation. (MK,PC,IPC,PBLI)
8. Follow-up surveillance of pacemakers and ICDs. (MK,PC)
9. ECG interpretation. (MK,PC)
10. Assistance with placement of ICDs and pacemakers. Upper level fellows are allowed to perform these procedures as primary operator, if capable and desired. (MK,PC)

Content and Methods

1. Individual instruction at the bedside and EP lab with a faculty electrophysiologist and EP fellows.
2. Interrogation of pacemakers and ICDs of inpatients if necessary.
3. Monthly journal club with presentation of journal club article on selected EP topics.
4. Monthly conference on topics in EP.
5. Monthly ECG conference.
6. Inpatient EP consultations.
7. Weekly review of EP studies and arrhythmia diagnosis with EP faculty.

Supervision
The fellows will be supervised directly in the performance of tilt table tests, cardioversions, and device interrogations. All consultations will be personally evaluated and reviewed with the faculty cardiologist.
Evaluation Process
The entire EP faculty will evaluate the fellows at the end of each month with feedback provided during the assignment. They will be specifically evaluated on the assignment objectives listed above.(DO, REV,PCL)

Heart Failure/Transplantation (1-2 months during 1st year, 1-2 months during 2nd year)

Goals and Objectives:

Through active participation and care of patients admitted to this service, seen in clinic, and in consultation, the fellow will demonstrate:

1. An understanding of the causes of heart failure.
2. The appropriate evaluation and management of patients with cardiomyopathy.
3. An understanding of the pathophysiology of heart failure.
4. The treatment of patients with acute and chronic heart failure due to systolic and diastolic dysfunction.
5. Active participation in the care of patients undergoing heart transplantation.
6. An understanding of the indications and contraindications for heart transplantation.

Competencies

1. Right heart catheterization as performed in the catheterization laboratory. (MK,PC)
2. History and physical examination of patients with heart failure. (MK,PC,PF,IPC)
3. Basic endomyocardial biopsy.(MK,PC)
4. Cardiopulmonary exercise stress testing. (MK,PC)

Content and Methods

1. The content is learned through active participation on the clinical service.
2. Active participation in the medical review board meeting is expected.
3. Outside reading of appropriate ACC/AHA Guidelines is strongly encouraged.

Supervision

You are supervised by the faculty cardiologist in all circumstances including all cases in the catheterization lab.

Evaluation Process

You will be evaluated by the cardiology faculty in the catheterization laboratory regarding procedural skills (Procedure Checklist). You will be evaluated by the faculty on the heart failure service regarding clinical skills not related to the catheterization laboratory (DO). The faculty will evaluate what you do as you do it and provide immediate feedback through discussion (REV). Specifically, you will be evaluated on the following:

1. Your ability to perform right heart catheterization and knowledge of the indications and complications. Faculty will be present for the entire case and present questions before, during and after the case is completed. (PCL, DO)
2. Your understanding of the diagnosis, evaluation and management of patients with heart failure. The faculty will evaluate through discussion of cases and care of patients. (DO,REV)
3. Your understanding of the criteria for heart transplantation. Evaluation will be the same as number 2. (DO, REV)
4. Your demonstration of the values of professionalism including placing the needs of patients first, maintaining a commitment to scholarship, and helping colleagues. Throughout the course of the month the cardiology faculty will evaluate your professionalism.(DO, 360°)

CV CT/MRI (1 month during 2nd year, 1-2 months during 3rd year)

Goals and Objectives:

Fellows will be exposed to CV imaging utilizing computed tomography and magnetic resonance. It is anticipated that fellows will obtain level 1 competence in CV CT with standard rotations on the service. Level 1 or above competency in MRI will require a more intensive experience consistent with the COCATS guidelines.
Competencies
As a result of active participation on this service the fellow will be expected to demonstrate: 1. A knowledge of cardiac anatomy and physiology as it relates to CV CT and MR. (MK,PC) 2. An understanding of basic physics involved in CV CT and MRI. (MK) 3. An understanding of indications for CV CT and MRI method. (MK,PC,PF,IPC,PBLI,SBP) 4. An understanding of appropriate patient selection and preparation for scanning.(MK,PC) 5. Ability to interpret basic CV CT and MR scans.(MK,PC)
Content and Methods
Screening evaluation and medical management (as necessary) of patients referred for scanning: 1. Presence at the scanners when studies are being performed. 2. Post processing of CV CT and MR images. 3. Participation in daily reading of MR/CT scans with attending cardiologists and radiologists. 4. Participation in weekly tutorial on post processing software and hardware (chief technologist supervised). 5. Fellows will review (available in the CV imaging section reading room) the CV imaging curriculum learning modules at CVimaging.ufl.edu
Evaluation Process
Evaluation will be performed by the cardiology staff assigned to the imaging program (Drs. Hill, Kraft, Schmalfluss, and Cooper) with feedback from the radiology and pediatric cardiology attending staff as appropriate. Specifically the fellow will be evaluated on: 1. Level of active participation.(DO) 2. Knowledge of indications for the procedures. (DO,REV, PCL) 3. Professionalism.(DO, 360°) 4. Understanding of anatomy and physiology being demonstrated.(DO,REV) 5. Ability to post-process image data and image interpretation.(DO,REV)

Nuclear Cardiology (0-2 months during 2nd year, 1-3 months during 3rd year)

Goals and Objectives:

Provides fellows with an understanding of indications for specific nuclear cardiology tests, safe use of radionuclides, and basics of instrumentation and image processing.

The goal is to achieve competence in exercise testing and to gain the general training in nuclear cardiology needed for the practice of consultative cardiology. Fellows will also become experienced in methods of quality control, image interpretation, integration of risk factors, clinical symptoms and stress testing and appropriate application of the resultant diagnostic information for clinical management.

The overall objective of the required 2 months of nuclear cardiology is to provide the fellow with sufficient didactic and practical applied experience in all aspects of nuclear cardiology to be fully conversant in the field. The experience should be of sufficient breadth and depth that the fellow will gain a thorough understanding of how to integrate and use nuclear cardiology procedures in the care of patients.

Both single photon methodologies (planar and SPECT), as well as PET imaging methods will be included, although emphasis will be predominantly on single photon methodologies.

After completing the required two months of nuclear cardiology, fellows should be able to understand the following:

1. Indications and protocols for myocardial imaging techniques.
2. Physical characteristics, dosimetry, advantages and disadvantages of myocardial imaging agents.
3. Indications and contraindications for cardiac stress testing in nuclear cardiology.

Fellows will also:

1. Become proficient in safe performance and interpretation of stress results and incorporation of this information into interpretation of nuclear images.
2. Gain preliminary experience in interpretation of cardiac nuclear medicine scans (recognizes sections, understand technique of MUGA and PET, recognize major abnormalities, patterns of ischemia and infarction).
3. Learn how to choose the optimal stress test for a given patient and learn the importance of physical and pharmacological stress in nuclear cardiology.

Learning Activities

The emphasis of this assignment will be to gain experience with the following nuclear medicine procedures:

1. Standard nuclear cardiology procedures. (MK,PC)
 - a. Myocardial perfusion imaging.
 - i. Single photon emission computed tomography (SPECT) with technetium agents and thallium.

- ii. Planar with technetium agents and thallium.
- iii. ECG gating of perfusion images for assessment of global and regional ventricular function.
- iv. Imaging protocols.
- v. Stress protocols.
 - 1. Exercise stress.
 - 2. Pharmacologic stress.
- vi. Viability assessment including re-injection and delayed imaging of thallium and metabolic imaging where available.
- b. Equilibrium gated blood pool or “first pass” radionuclide angiography at rest and during exercise or pharmacologic stress.
- c. Qualitative and quantitative methods of image display and analysis.
- 2. Less commonly used nuclear cardiology procedures.(MK,PC)
 - a. Metabolic imaging using single photon and/or positron emitting radionuclides— notably FDG viability studies.
 - b. Myocardial infarct imaging.
 - c. Cardiac shunt studies.

There will also be exposure to basic technology of nuclear image acquisition, image processing, radiation safety and the relative efficacy/accuracy/ and cost efficacy of nuclear cardiology studies, especially relative to other competing methods of myocardial imaging. The following issues will be specifically covered in more detail.

Stress testing: Instruction in preparation and performance of pharmacological and exercise stress testing, timing of radiotracer injection, termination criteria, treatment of side effects, intervention in response to arrhythmia, collapse or coding. It is anticipated that fellows will complete 80 or more stress tests.

Safety: Instruction in safe handling of radioisotopes, ALARA principles, administration, avoidance of contamination and ingestion, handling of spills and misadministration.

Interpretation: Instruction in image acquisition protocols, image manipulation and display, recognition of most frequent artifacts, patterns of ischemia and infarction.

Content and Methods

The following methodologies will be used in our education:

1. Didactic program
 - a. Lectures and self-study
 - b. Radiation safety
2. Interpretation of clinical cases
3. Hands-on experience
 - a. Clinical cases
 - b. Radiation safety
 - i. The greatest fraction of time will be spent gaining “hands on experience” with individual patients referred for nuclear cardiology studies. The full involvement of the fellow from patient interview to methodology selection, test performance, image processing and image interpretation will be the primary learning instrument. The fellow along with a faculty cardiologist will interpret all images. Primary assessment of images will be by the nuclear cardiology and nuclear medicine fellows, with staff review. In this way, the fellow must render firm decisions. Our lead nuclear medicine technologists will provide experience in technical aspects of nuclear medicine and experience in radiation safety will be by lecture and practical experience.

In addition to the readings and instruction by faculty, follow-up on patients evaluated with nuclear medicine methods will also be an important part of the training program. It is anticipated that a minimum of 80 clinical cases will be interpreted by the fellow with the nuclear medicine staff in the 2 month period; although our expectation is that closer to 200 cases will be evaluated.

Supervision

The nuclear cardiology studies are read with a faculty cardiologist.

Evaluation Process

Daily interaction with the faculty nuclear medicine cardiologist allows assessment of the fellow’s familiarity with nuclear medicine technical and radiation safety issues (DO). The daily read out sessions for the nuclear cardiology studies includes use of the Socratic method to assess the depth of the fellow’s understanding of nuclear cardiology, which will be reflected in the nuclear cardiology fellows’ evaluations.

The quality of training will also be monitored based on the fellows’ performance on the written board examinations (ABIM). The fellows will also evaluate the faculty (360°).

Research (7-8 months during 2nd year)

Goals and Objectives:

The supervision and evaluation process is individualized based on the specific research project. Every fellow has a mentor for supervision and guidance specific to the project.

1. Identify a research problem (or question), critically analyze previous literature and formulate a research proposal.
2. Understand the benefits of peer review and constructive criticism during all phases of research.
3. Learn research methodologies specific to the individual research plan.
4. Develop skills important in clear organization and presentation of research results
5. Understand strengths and weaknesses of basic, clinical, and health services research techniques.

Evaluation Process

The development of scholarly activity as a result of the research experience will be evaluated by peer review through abstract, and manuscript submission of findings to scientific meetings and publications.

General Cardiology Consultations at VAMC (3-4 months during 3rd year)

Goals and Objectives:

The consult fellow will be the initial physician to evaluate consultations requested by all in-patient services at the VAMC.

The fellow will learn to deal effectively and professionally with patients, families, other medical personnel, as well as outside lay persons and potential patients who request to speak with a cardiologist.

As the cardiology consultant, the fellow will field all requests for assistance with CV problems and either bring to resolution or triage to the appropriate service.

In all these activities, the fellow will develop sufficient expertise to function independently as an effective consultant cardiologist.

VA guidelines require that faculty cardiologist see the patient within 24 hours.

Competencies

1. Bedside CV history and physical examination. (MK,PC,PF, IPC)
2. Independent interpretation of treadmill exercise tests, Holter monitors and tilt table tests. All study reports are reviewed by a faculty cardiologist.(MK,PC)
3. Performance of transesophageal echocardiograms as primary operator.(MK,PC)
4. Correlation of physical exam with other cardiology diagnostic techniques (including echocardiograms, cardiac catheterizations, radionuclide and other non-invasive imaging [CV CT, MRI, etc.]). (MK,PC,PF,IPC,PBLI,SBP)
5. Placement of permanent transvenous pacemakers and transvenous ICDs as first or second operator depending on the level of fellow experience. (MK,PC)
6. Interrogation of pacemakers and ICDs of inpatients independently. A faculty cardiologist is available for consultation.(MK,PC)
7. Elective electrical cardioversion of atrial fibrillation. A faculty cardiologist is present for these procedures.(MK,PC,PF,IPC,PBLI,SBP)

<p>Content and Methods</p> <ol style="list-style-type: none"> 1. ACC/AHA guidelines for pre-operative CV evaluation. 2. Review ACC/AHA guideline on management of atrial fibrillation (probably the single most common reason for request for consultations). 3. Daily review of echocardiograms and other imaging techniques on patients being seen by the consultation service. 4. Direct observation by the faculty of fellow's CV physical examination. 5. Clinical and non-invasive assessment of prosthetic heart valves (tissue and mechanical). 6. Long-term management of post-CABG, post-PTCA and post-MI patients with emphasis on details of "secondary prevention". 7. Basics of "primary prevention" of atherosclerosis (see Preventive Cardiology curriculum).
<p>Supervision</p> <ol style="list-style-type: none"> 1. Holter monitors, stress tests and cardioversions are interpreted/performed with a faculty cardiologist immediately available for consultation. 2. TEEs are performed under the direct supervision of the cardiology faculty. The fellow is the primary operator. 3. Placement of pacemakers and ICDs are performed under the direct supervision of the faculty cardiologist. The fellow is the primary operator if he desires.
<p>Evaluation Process</p> <ol style="list-style-type: none"> 1. Individual feedback of accuracy and completeness of patient histories. (DO,REV) 2. Direct observation by the faculty of fellow's CV physical examination skills.(CO, PCL) 3. Review and critique of fellow's independent interpretation of diagnostic studies. (DO, PCL) 4. Review and critique of fellow's assessment and plans for patients on whom they have consulted.(DO,REV) 5. Observation feedback on how fellows interact with patients, families and other medical personnel. (360°,DO)

Leesburg Community Satellite Program (3-4 months during 2nd year)

Goals and Objectives:

The Leesburg assignment is limited to upper level fellows and provides the experienced CV fellow the opportunity to function as a general cardiologist in the community with supervision.

During this assignment, the fellow will assist in the cardiac catheterization laboratory, perform in-patient consultations, participate in continuity clinic for 2 half-days per week and perform non-invasive stress testing, including nuclear imaging.

Furthermore, the fellow will get extensive exposure to peripheral vascular angiography. Therefore, goals and objectives are identical to those outlined in each respective section.

Competencies

As outlined in the other sections (catheterization, continuity clinic, echo, nuclear cardiology and inpatient consultation)

Content and Methods

Performance of catheterization techniques is learned directly by participating in procedures with faculty cardiologists.

The fellow is expected to present a case each month to the members of the cardiology group.

Intensive discussion by the faculty with the fellow after each case, reviewing angiographic and hemodynamic findings

Supervision

All aspects of procedures (including vascular access) are directly supervised by the faculty cardiologist who is attending the catheterization laboratory during procedures. Interpretation and reporting of catheterization data is completed by the fellow following discussion and review with the faculty.

The fellow sees inpatient consultations initially and dictates consultation notes. Each case is then discussed with the faculty cardiologist, who subsequently sees the patient with the fellow.

The fellow performs stress testing independently with faculty cardiologist available for immediate consultation.

Evaluation Process

Fellows are evaluated directly by the faculty cardiologists supervising the procedures. Evaluation of procedural skills is reported to the fellows following each case in an oral manner and after each month on service. (DO, PCL, 360°)

Continuity Clinic (one half day per week for ALL fellows)

Goals and Objectives:

<p>Fellows are assigned to one faculty cardiologist for outpatient clinic experience. They are expected to become familiar and comfortable with the evaluation and management of patients with known or suspected CV disease. In addition, they will learn to manage the transition from inpatient/acute care to outpatient/chronic care of such patients; developing an on-going and in many cases, long-term relationship with the patient and family members.</p>
<p>Learning Activities</p>
<p>Fellows are expected to become competent in the evaluation and long-term management of patients with the following conditions:</p> <ol style="list-style-type: none">1. Possible CV symptoms such as chest pain, dyspnea, palpitations, and syncope.(MK,PC)2. Understand CV conditions such as coronary artery disease, congestive heart failure, valvular heart disease and arrhythmia. (MK,PC) <p>They will also be expected to demonstrate the ability to:</p> <ol style="list-style-type: none">1. Effectively communicate with patients and family members and other caregivers regarding appropriate patient care.(IPC,PF,PBLI,SBP)2. Develop an understanding of the systems and resources necessary to effectively care for patients in the outpatient setting. (IPC,PF,PBLI,SBP)
<p>Content and Methods</p>
<ol style="list-style-type: none">1. Direct patient care experience under the supervision and guidance of a faculty cardiologist.2. Informal teaching and case discussion with faculty cardiologists.3. Review of appropriate medical literature is encouraged or provided on a PRN basis.
<p>Supervision</p>
<ol style="list-style-type: none">1. Supervision is provided by the faculty cardiologist, who is in clinic at the same time as the fellow, and who is available for immediate consultation and evaluation as needed.2. All patients are seen by fellows and are evaluated by the supervising faculty cardiologist at each visit.3. Test results are reviewed directly, electronically or via printed reports, by the faculty cardiologist.

Evaluation Process

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| <ol style="list-style-type: none">1. Written evaluation of the fellows will be performed by the faculty cardiologist each year. (DO,REV, 360°)2. Faculty cardiologists will provide verbal feedback during each clinic session and formal evaluation (written) to fellows on a bi-annual basis, or more frequently, as needed. (DO) |
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Procedures Goals

Cumulative numbers of procedures expected by end of each year of fellowship.

Level I → Primary operator

Level II → 1st assistant

Level III → Dictate report only

PROCEDURE	1 st Year	2 nd Year	3 rd Year
Left Heart Catheterization			
Primary operator	25	75	200
1 st assistant	50	50	50
Right Heart Catheterization			
Primary Operator	10	10	50
1st Assistant	5	5	5
Endomyocardial Biopsy			
Primary Operator	0	0	0
1st Assistant	25	25	25
Pericardiocentesis			
Primary Operator	0	5	5
1st Assistant	5	5	5
IABP Placement			
Primary Operator	0	0	5
1st Assistant	5	5	5
Placement of Arterial Line			
Primary Operator	5	5	5
1st Assistant	2	2	2
Electrical Cardioversion			
Primary Operator	10	10	25
1st Assistant	5	5	5
Interrogation of Pacemakers and ICD's			
Primary Operator	10	10	20
1st Assistant	5	5	5
Placement of Temporary Pacemaker			
Primary Operator	5	5	10
1st Assistant	5	5	5
TEE			
Primary Operator	10	20	50
1st Assistant	10	10	10
Transthoracic Echocardiogram			

Primary Operator	50	50	150
1st Assistant	5	5	5
Placement of Permanent Transvenous Pacemakers			
Primary Operator	0	0	0
1st Assistant	5	5	5
Placement of AICDs			
Primary Operator	0	0	0
1st Assistant	5	5	5
Interpretation of ECGs			
Primary Operator	2000	2000	3500
1st Assistant	N/A	N/A	N/A
Interpretation of Holter Monitors			
Primary Operator	50	50	150
1st Assistant	N/A	N/A	N/A
Interpretation of Exercise Testing			
Primary Operator	50	100	200
1st Assistant	5	5	5