
Rotational Non-Invasive Guideline

Educational Purpose of the Rotation

Non-invasive rotations are both required and ongoing throughout the three-year training period. This rotation provides the sub-specialty fellow with exposure to a variety of cardiology and vascular testing modalities common to the practice of cardiology and vascular medicine. These testing modalities include electrocardiography, transthoracic and transesophageal echocardiography, exercise testing (treadmill and pharmacological), ambulatory electrocardiography (holter and event monitoring), ambulatory blood pressure monitoring, stress echocardiography and nuclear stress testing. This experience includes "hands on" training for the performance of echocardiography. It should be noted that aspects of these testing modalities are also addressed in other rotation guidelines such as the actual reading of the nuclear studies in the nuclear rotation as well as performance and interpretation of specialized echocardiography transesophageal echocardiography rotation.

Resources

Locations for this rotation include Michigan State University (MSU), and Sparrow Health System. These facilities provide cutting edge technology and modern facilities for a variety of testing modalities. By utilizing these facilities, all required diagnostic tests are available to the patient for more comprehensive diagnosis and management.

Referrals to this service occur via cardiologists (both MSU and private), primary care physicians, and other sub-specialty services. The patients consist of both genders, diverse ethnicity and socioeconomic backgrounds. The studies performed may include evaluations for chest pain, palpitations, syncope, ischemia, dyspnea, heart murmurs, congenital heart disease, hypertension, valvular disease, cardiomyopathy, restrictive physiology, family history of coronary artery disease, hyperlipidemia or other risk factor assessments. Also included in this population are those individuals undergoing screening for exercise programs, athletic participation, and cardiac rehabilitation.

Rotation Attendings

George Abela MD	Chad Link DO
Sonali Arora MD	Daryl Melvin MD
Appa Bandi MD	Richard Pinke DO
Thomas Brown DO	James Schafer MD
Nam Cho DO	Joni Summit DO
Joel Cohn MD	Ronald Voice MD
Christopher D'Haem DO	Mathew Wilcox DO
Gaurav Dhar MD	Peter Yoo MD
Carlos Fernandez DO	
Todd Hickox DO	

There is at least one and occasionally two sub-specialty fellows assigned to the non-invasive rotation during any given block.

Responsibilities

This is both a required and continuing rotation throughout the training program. Sub-specialty fellows rotate through this service on multiple occasions during the training period. During these rotation periods, fellows are expected to:

1. Participate in cardiovascular testing at MSU and Sparrow Health System (primarily vascular and nuclear testing).
2. Obtain the appropriate data from the medical record and patient history prior to testing in order to determine the indications for testing, safety of the requested testing, and the possible or probable outcome of the test.
3. Perform "hands on" echocardiographic studies with assistance from the technologist.
4. Be knowledgeable regarding appropriate contraindications and end points for testing.
5. Actively participate in the examination, monitoring, and reporting of the various test.
6. Present all relevant patient information and data to the attending physician.
7. Dictate and communicate test results to referring physicians, patients, patient families, and other consulting physicians as necessary in order to facilitate patient care.
8. Work effectively with all members of the health care team.
9. Prepare, present, and discuss cases during cardiology grand rounds and echocardiography conferences.
10. Review and be prepared to discuss relevant literature references.

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Objectives

As this is an ongoing rotation completed in phases during the course of the training program the expectation is that the sub-specialty fellow will progress through levels of competence in this area. By the conclusion of all rotations the sub-specialty fellow will:

1. Demonstrate proficiency and working knowledge related to the various cardiovascular testing modalities common to a general cardiology practice.
2. Demonstrate increased knowledge of indications, contraindications, probable outcomes, and procedural risks.
3. Demonstrate proficiency in requesting appropriate imaging modalities associated with stress testing.
4. Demonstrate proficiency in the performance of echocardiography.
5. Demonstrate competency in acquiring patient information critical to testing outcomes via the patient interview and review of the medical record prior to testing.
6. Recognize abnormal testing results and act accordingly.
7. Review and dictate results with the attending physician in a logical, timely, and concise manner.

Instructional Methods

Attending physicians participating in this rotation will:

1. Supervise and instruct the sub-specialty fellows in accordance with the supervision policy.
2. Provide an atmosphere allowing for responsible patient care while encouraging subspecialty fellows to assume more primary responsibility as their skills progress.
3. Provide sub-specialty fellows with ongoing feedback regarding the progression of their skills.
4. Provide structured teaching opportunities, including appropriate literature references citations for review and discussion.

Stress Echocardiography

Stress echocardiography is an important part of the non-invasive experience. The primary goal of this experience is to allow the sub-specialty fellow to participate in imaging modalities utilized in stress testing. The objectives of this experience include but are not limited to:

1. Demonstrate an increased understanding of the indications and contraindications for stress echocardiography.
2. Demonstrate an increased awareness of the risks and benefits associated with stress echocardiography.
3. Progression in the increasing ability to request the appropriate imaging modality for a given patient/pathology, including choosing between testing options (treadmill, bicycle, pharmacological), as well as imaging (echocardiography, nuclear).
4. Demonstrate an increased proficiency in interpretation of resting and exercise images in a comparative format.
5. Provide attending physicians with an appropriate pre-procedural work up, including a focused history and physical, and preliminary interpretation of the echocardiography images.
6. Actively participate in the interpretation and dictation of final reports, including both the electrocardiographic and echocardiographic portions of the examination.

Sub-specialty fellows are required and expected to participate in the stress echocardiography experience during the non-invasive rotation.

Transesophageal Echocardiography

The primary goal of the transesophageal echocardiography (TEE) experience is to provide sub-specialty fellows with the experience and exposure necessary to appropriately assess patients for the procedure, as well as assess their performance and interpretation of the test.

The first exposure to TEE occurs typically in the second year of the training program. Between the second and third years of training sub-specialty fellows participate in 3 to 4 rotations in this specialization, including experience with both the sedated and anesthetized patient in the operating room. The operating room experience is helpful to the sub-specialty fellow in perfecting their understanding and knowledge of the views. By the conclusion of this training the sub-specialty fellows will have successfully served as primary operator in at least 50 cases.

The goals/objectives of the transesophageal echocardiography training include but are not limited to:

1. Demonstrate an increased proficiency in the selection, insertion, and positioning of the TEE probe.
2. Demonstrate an increased awareness of the indications, risks, and possible outcomes of TEE.
3. Acquire the skills necessary for monitoring patients prior to, during, and following TEE procedures.

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4. Actively participate in the gathering of and interpretation of TEE data, including learning how to appropriately maneuver the probe, dictate reports, and review results.
5. Provide the attending physician with an appropriate pre-procedural work up, including a focused history and physical, and presentation of informed consent to the patient.

Sub-specialty fellows are required and expected to participate in the TEE training aspect of this program. Additionally, they are expected to present case studies with a focus on TEE during echocardiography conference.

Evaluation Process

At the conclusion of each rotation:

1. Attending physicians will summarize and accurately describe the sub-specialty fellow's performance on the provided evaluation form. The evaluator will discuss review this evaluation with the sub-specialty fellow and both will sign their acknowledgment and return the form to the program office for review and inclusion in the sub-specialty fellows overall bi-annual evaluation.
2. The sub-specialty fellow will summarize and accurately evaluate the faculty performance, technical training and overall rotation on the form provided and return it to the program office where it is tabulated and, to protect anonymity, destroyed after tabulation.

Readings: As assigned.

Schedule: Please refer to the master sub-specialty fellow schedule.