Cardiac Electrophysiology Elective

Inova Fairfax Medical Campus
Internal Medicine Residency Program

Course Director: Dr. Brett Atwater

1. Educational Purpose and Goals

a. Expose residents to common cardiac electrophysiology problems seen in outpatient and inpatient settings; provide training and education in the specific aspects of electrophysiology that will be most relevant to the primary care practitioner.
b. Learn how to take a detailed history pertaining to complaints related to arrhythmia and conduction system disease
c. Perform and interpret a detailed physical exam in a patient with a suspected cardiac arrhythmia or conduction system disease.
d. Develop a rational diagnostic and therapeutic approach to problems in cardiac electrophysiology.
e. For PGY2/3 level residents, the elective will include both outpatient and inpatient experiences will be included as well as opportunities to observe in the invasive electrophysiology lab.

2. Principal Teaching/Learning Methods

a. *Supervised patient care*: PGY-3 level elective will include a combination of both inpatient and outpatient experiences in cardiac electrophysiology. Residents will perform initial cardiac electrophysiology consultations when requested by the attending faculty. The resident will formulate a hypothesis and a treatment plan and present it to the attending faculty. Both the resident and attending faculty will examine the patient and discuss the plan of care. Residents will continue to follow patients after the initial consultation. When time is spent in the outpatient clinic, a faculty cardiac electrophysiologist will supervise the resident, and residents will evaluate in the same fashion as above.
b. *Didactics/Small group sessions*
    i. Noon conference and grand rounds covering cardiology topics as applicable.
    ii. Faculty will provide instruction on core cardiac electrophysiology topics which will also include EKG readings and device interrogation, in addition to clinic- or ward-based didactics..
c. *Independent reading* – all residents are expected to read about patients they see in the hospital and office.

3. Educational Content

a. Patient/Disease mix – In both ambulatory and inpatient settings at Inova Fairfax Hospital, adult patients provide an ethnically diverse patient population with a broad array of common and rare diseases. Residents will see patients with arrhythmias, syncope, and conduction disease. Also, residents will learn indications for devices (pacemakers, ICD's) and diagnostic tests/procedures (tilt table testing, EP studies). Finally, residents will have the opportunity to participate in (when appropriate) and observe EP studies, device implantations, and tilt table tests. In the

outpatient setting, the focus will be the ambulatory care of patients with some of the above disorders. EKG interpretation will be emphasized on all patients.

b. Learning venues
    i. Inova Fairfax Hospital (PGY 3 residents)
    ii. Inova Medical Group cardiac electrophysiology Clinics
    iii. Inova EP lab
    iv. Inova cardiac diagnostics lab
c. Structure – The rotation is a two- or four-week long block. Residents will not be on call for this service, although they may be on disaster call for the program during this elective. There are no weekend duties. Residents will continue to attend their continuity clinic during this rotation. The course director or designee will orient the resident to the rotation at the beginning of the block and will review the specific schedule at that time. PGY2/3 residents will spend 1-2 half days/week in the clinic. There will always be at least 4.5 hours of teaching attending rounds or direct teaching and supervision by a cardiac electrophysiology faculty member per week, and usually these will be integrated with work rounds. Residents will never work more than 14 hours in a day and typically will work for approximately 10 hours per day, five days per week.

4. Principal Educational Materials

a. At the beginning of the rotation, the educational director will provide materials, including this curriculum, and a resource list.

5. Methods of Evaluation

a. Feedback will be given throughout the rotation as appropriate. At the end of the rotation, a designated faculty cardiac electrophysiology will complete an E-value web-based evaluation and review it with the resident.
b. The residents will also evaluate faculty and the rotation in an anonymous fashion (summarized quarterly in a composite form).
c. Pre-test and post-test to assist in curriculum and structure adjustment (in-training exam results will also be utilized for this purpose).
d. A nurse or manager from the hospital or clinic will be chosen to evaluate the resident (360 or multi-rater component) where applicable.

6. Resource List

a. Marriott's Practical Electrocardiography, 2019
b. Braunwald's Heart Disease: A Textbook of Cardiovascular Medicine, 2005
c. Up to Date

Learning Venues

1. Supervised patient care/Attending rounds/Attending review of cases in clinic/
2. Small group and Didactic sessions
3. Independent reading

Methods of Evaluation

A. Attending evaluation
B. Nurse of ancillary staff evaluation
C. Direct observation with feedback

Competency: Patient Care	**Learning Venues**	**Evaluation methods**
Work with the attending cardiac electrophysiologist and provide effective consultations to services that request them.	1	AC
Improve auscultation and physical examination skills. Correlate the examination of patients during consultation with the results from the echocardiography and catheterization lab.	1,2	AC
Effectively evaluate and manage patients with acute cardiac illness.	1,3	ABC
Effectively manage patients with undiagnosed syncope, including the appropriate use of diagnostic testing	1,3	AABC
Competency: Medical Knowledge	**Learning Venues**	**Evaluation Methods**
Articulate the patho-physiology, evaluation and management of atrial fibrillation, SVT, VT, conduction disease, sick sinus syndrome and syncope	1-3	ABC
Competency: Interpersonal and Communication Skills	**Learning Venues**	**Evaluation Methods**
Interact in an effective way with physicians and nurses participating in the care of patients requiring cardiac electrophysiology consultation and care	1	ABC
Be able to explain rationale of therapy (medicines and lifestyle alterations) to patients to promote adherence.	1,3	ABC
Show understanding of	1	AC

differing patient preferences in diagnostic evaluation and management of cardiac electrophysiology disorders		
Competency: Professionalism	**Learning Venues**	**Evaluation Methods**
Treat team members, primary care givers, and patients with respect	1	ABC
Actively engage in the academic process	1-3	AC
Attend and participate in all scheduled conferences	2,3	ACD
Competency: Practice Based Learning	**Learning Venues**	**Evaluation Methods**
Identify limitations of medical knowledge in evaluation and management of patients with cardiovascular disorders and use the medical literature, colleagues, ancillary staff, fellows, and attendings to address these gaps	1-3	AC
Competency: Systems-Based Practice	**Learning Venues**	**Evaluation Methods**
Understand barriers to optimal care for patients with cardiac electrophysiology disease	1	AC

Above are applicable to all levels of training.

Progressive management goals for Cardiovascular Medicine rotation:

PGY3

Senior Residents should be experts in the physical examination of the cardiovascular system, and be able to correlate exam findings with echo and cath data. They should be experts in the interpretation of more common finding on electrocardiograms, chest radiographs, and laboratory studies such as cardiac biomarkers, BNP levels, lipid profiles, and device derived data, and they should be able to independently interpret many less common findings. They should be experts in the diagnosis and management of common cardiac electrophysiology conditions including conduction disease, syncope atrial fibrillation, and malignant ventricular arrhythmias. They should additionally be able to independently diagnose and manage many less commonly encountered cardiovascular diseases.

Topics for independent reading:

1. Atrial fibrillation
2. Syncope
3. EKG interpretation
4. Interpreting device interrogations
5. Interpreting intracardiac EGMs