Electrophysiology - General Cardiology Rotation

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Objectives:

Through this rotation, we would like to familiarize the general cardiology fellows with consultative electrophysiology including device management, pharmacological and ablative therapies for arrhythmias, and syncope evaluation. The fellows are expected to be a key member of the team directly involved in patient management.

Specific learning objectives:

The goal of the rotation is for the fellow to gain proficiency in:

1. Become comfortable reading electrocardiograms.
2. Diagnosis and management of Supraventricular arrhythmias
3. Diagnosis and management of Ventricular arrhythmias
4. Learn the indications, risks, and benefits of EP ablation procedures
5. Understand the basics of a simple EP study and learn when an EP study is indicated
6. Perform and understand the utility of tilt table testing
7. Learn the indications for device implantation
8. Manage devices for troubleshooting, post-implantation, and temporary pacemakers
9. Become comfortable in dealing with EP emergencies including VT storm, atrial fibrillation with hemodynamic instability, device malfunctions, genetic syndromes (ie Brugada syndrome, LQTS)

Teaching strategies:

1. The EP service will consist of one EP teaching attending, one general cardiology fellow, and one EP nurse coordinator.
2. Structured attending rounds to allow detailed presentation of new patients, review of old patients, and a detailed, patient-oriented discussion and examination led by the attending.
3. When patient’s undergo electrophysiology tests or tilt table test, the fellow is expected to be present either during the case or after to review the findings
4. Electrocardiogram reading performed by the fellow will be reviewed with the attending.
5. Device interrogations will be performed at the bedside with the attending until the fellow is comfortable to do this independently.
6. Fellows are expected to review and implement appropriate guidelines for care and treatment of all EP problems. Formal guidelines from ACC, AHA, HRS, etc. are available from web-based resources in the McGoogan Library. Other web-based resources are excellent sources for self-study, and include Cardiosource, UpToDate, and MDConsult.

Attending Responsibilities:

1. The attending must see each patient.
2. Provide guidance on the indications, implications, complications, and limitations of noninvasive and invasive techniques.
3. Conduct daily rounds for the EP service. To the extent possible, these rounds should focus on teaching and education, rather than “work rounds”.
4. The attending is expected to make the EP Service activities a top priority and is encouraged to cancel other responsibilities including clinics and EP lab responsibilities.
5. The EP Service attending will meet with the fellows at the beginning of the rotation to verbally review the goals, objectives and responsibilities for the upcoming month.
6. The EP Service attending will meet with the fellows at the end of the monthly rotation to verbally review the fellow’s written evaluation and performance. The attending will also complete a formal evaluation of the fellow using New Innovations.

Fellow Responsibilities:

1. Will conduct daily inpatient rounds with the attending staff and team and will present and discuss patient’s hospital course and be actively involved in patient care.
2. Perform consults when requested by other services and admit patient’s to the service with EP specific problems. In addition, perform inpatient device interrogations when requested by other services.
3. Interact with EP nurse coordinator in a constructive manner
4. Participate in clinical decision making
5. Pre-read ECG’s on the MUSE system
Rotation Curriculum:

1st Month:

Patient Care

1. Obtain a history and physical exam for admissions or consults with particular concentration on history elements or physical exam findings that will impact the proper diagnosis and treatment of their arrhythmia syndrome.
2. Collect and interpret all documentation of rhythm abnormalities including inpatient holter monitors, ECG, EMS/ED rhythm strips, and outpatient monitoring to aid in diagnosis and management of the patient’s arrhythmia syndrome.
3. Differentiate when medical management versus invasive management is appropriate for various arrhythmias.
4. Describe the risks and benefits of basic procedures performed on the EP service (pacemaker/ICD/BIV implantation, EP study, Ablation for SVT, Ablation for Atrial fibrillation).
5. Perform basic device interrogations for patients who are POD #1 from device implant, for patients where the device interrogation will provide information that will guide the management plan for a consult, or when requested by other services as it will affect their treatment plan under supervision of the teaching attending.
6. Manage temporary pacemakers- ie check parameters daily and identify when the device is not functioning properly.
7. Recognize special situations in electrophysiology and how to manage them safely- ie WPW with atrial fibrillation, Wide complex tachycardia, Digoxin toxicity, Bradycardia induced TdP, VT storm, Pacing or ICD lead fracture, VF and Brugada’s syndrome.
8. Manage device complications from implant with teaching attending supervision.
9. Provide timely follow-up to the patient for any testing done during the evaluation.
10. Complete in the EHR the evaluation to include all of the above information.

Medical Knowledge

1. Review the differential diagnosis of narrow complex SVT and identify findings on ECG/ambulatory monitoring that will be clues towards differentiating types of SVT.
2. Review the differential diagnosis of wide complex tachycardia with particular attention to diagnosis of ventricular tachycardia.
3. Know the indications for temporary pacing.
4. Know the indications for cardioversion.
5. Review device guidelines to learn up-to-date indications for device implantation.
6. Understand the utility of electrophysiologic testing.
7. Learn the genetic arrhythmia syndromes and common presentations.
8. Review the CHA2DS2-Vasc score for identifying stroke risk in patients with AF/flutter and compare this to their risk of bleeding (HAS-Bled).
9. Gain a complete knowledge of the pharmacology, pharmacokinetics, mechanisms of action and drug interactions of anti-arrhythmic drugs with a concentration on their toxicities

10. Review the indications for tilt testing and the diagnostic utility of tilt testing

**Practice-Based Learning Improvement**

1. Interpret ECG’s, holter monitors, outpatient monitors
2. Use the knowledge gained from study and testing to improve your patient management
3. Set goals of learning during the rotation and discuss with the attending at the beginning of the rotation and then completion
4. Critically read and evaluate current literature related to arrhythmias and device management

**Interpersonal and Communication Skills**

1. Communicate with the patient and family regarding the plan of care in a compassionate and informative manner
2. Work effectively as a team with the EP nurse coordinator and attending in managing patients
3. Communicate with the floor team and nursing staff the plan of care for the patient
4. Discuss consult requests in an appropriate manner with the requesting team
5. Provide a coherent and integrated presentation to the attending about your assessment and plans

**Professionalism**

1. Treat the patient, the patient’s family, and patient information in a professional manner at all times
2. Attend punctually daily EP rounds, prepared, having already pre-rounded
3. Complete all medical records in a timely fashion

**System-Based Learning**

1. When scheduling patients for procedures, ensure for a smooth transition by preparing the patient and the nursing staff accordingly prior to transport by having orders ready and consents obtained.
2. Use the EHR to document encounters and patient data and effectively provide communication to colleagues, clinic staff and referring medical personnel to minimize duplication, provide efficient care implementation and prevent miscommunications and errors
3. Appreciate the context in which the pertinent is being evaluated and appropriately utilize resources and recommendations that provide the optimal patient outcome.
2\textsuperscript{nd} Month:

(Changes from 1\textsuperscript{st} month underlined)

Patient Care

1. Obtain a history and physical exam for admissions or consults with particular concentration on history elements or physical exam findings that will impact the proper diagnosis and treatment of their arrhythmia syndrome.

2. Collect and interpret all documentation of rhythm abnormalities including inpatient holter monitors, ECG, EMS/ED rhythm strips, and outpatient monitoring to aid in diagnosis and management of the patient’s arrhythmia syndrome.

3. Differentiate when medical management versus invasive management is appropriate for various arrhythmias.

4. Describe the risks and benefits of ALL procedures performed on the EP service.

5. Perform basic device interrogations for patients who are POD #1 from device implant, for patients where the device interrogation will provide information that will guide the management plan for a consult, or when requested by other services as it will affect their treatment plan. Perform device troubleshooting under supervision of the attending.

6. Manage temporary pacemakers - ie check parameters daily and identify when the device is not functioning properly. Place a temporary device while in the EP lab or at bedside with the attending.

7. Recognize special situations in electrophysiology and how to manage them safely - ie WPW with atrial fibrillation, wide complex tachycardia, Digoxin toxicity, Bradycardia induced TdP, VT storm, Pacing or ICD lead fracture, VF and Brugada’s syndrome. Start the appropriate therapy to manage the situation accordingly.

8. Manage device complications from implant with teaching attending supervision.

9. Provide timely follow-up to the patient for any testing done during the evaluation.

10. Complete in the EHR the evaluation to include all of the above information.

Medical Knowledge

1. Know the differential diagnosis of narrow complex SVT and identify findings on ECG/ambulatory monitoring that will be clues towards differentiating types of SVT.

2. Know the differential diagnosis of wide complex tachycardia with particular attention to diagnosis of ventricular tachycardia.

3. Know the indications for temporary pacing.

4. Know the indications for cardioversion.

5. Review device guidelines to learn up-to-date indications for device implantation.

6. Understand the utility of electrophysiologic testing, watch or participate in an EP study.

7. Review the genetic arrhythmia syndromes and common presentations.
8. Know the CHA2DS2-Vasc score for identifying stroke risk in patients with AF/flutter and compare this to their risk of bleeding (HAS-Bled)

9. Gain a complete knowledge of the pharmacology, pharmacokinetics, mechanisms of action and drug interactions of anti-arrhythmic drugs with a concentration on their toxicities

10. Review the indications for tilt testing and the diagnostic utility of tilt testing

Practice-Based Learning Improvement

1. Interpret ECG’s, holter monitors, outpatient monitors
2. Use the knowledge gained from study and testing to improve your patient management
3. Set goals of learning during the rotation and discuss with the attending at the beginning of the rotation and then completion
4. Critically read and evaluate current literature related to arrhythmias and device management

Interpersonal and Communication Skills

1. Communicate with the patient and family regarding the plan of care in a compassionate and informative manner
2. Work effectively as a team with the EP nurse coordinator and attending in managing patients
3. Communicate with the floor team and nursing staff the plan of care for the patient
4. Discuss consult requests in an appropriate manner with the requesting team
5. Provide a coherent and integrated presentation to the attending about your assessment and plans

Professionalism

1. Treat the patient, the patient’s family, and patient information in a professional manner at all times
2. Attend punctually daily EP rounds, prepared, having already pre-rounded
3. Complete all medical records in a timely fashion

System-Based Learning

1. When scheduling patients for procedures, ensure for a smooth transition by preparing the patient and the nursing staff accordingly prior to transport by having orders ready and consents obtained.
2. Use the EHR to document encounters and patient data and effectively provide communication to colleagues, clinic staff and referring medical personnel to minimize
duplication, provide efficient care implementation and prevent miscommunications and errors
3. Appreciate the context in which the pertinent is being evaluated and appropriately utilize resources and recommendations that provide the optimal patient outcome.

3rd Month:

(Changes from 2nd month underlined)

Patient Care

1. Obtain a history and physical exam for admissions or consults with particular concentration on history elements or physical exam findings that will impact the proper diagnosis and treatment of their arrhythmia syndrome
2. Collect and interpret all documentation of rhythm abnormalities including inpatient holter monitors, ECG, EMS/ED rhythm strips, and outpatient monitoring to aid in diagnosis and management of the patient’s arrhythmia syndrome.
3. Differentiate when medical management versus invasive management is appropriate for various arrhythmias and proceed with treating the patient as dictated by your assessment
4. Describe the risks and benefits of ALL procedures performed on the EP service
5. Perform advanced device interrogations and troubleshooting under supervision of the teaching attending
6. Manage temporary pacemakers- ie check parameters daily and identify when the device is not functioning properly. Place a temporary device while in the EP lab or at bedside with the attending
8. Manage device complications from implant with teaching attending supervision
9. Provide timely follow-up to the patient for any testing done during the evaluation
10. Complete in the EHR the evaluation to include all of the above information.

Medical Knowledge

1. Know the differential diagnosis of narrow complex SVT and Identify findings on ECG/ambulatory monitoring that will be clues towards differentiating types of SVT
2. Know the differential diagnosis of wide complex tachycardia with particular attention to diagnosis of ventricular tachycardia
3. Know the indications for temporary pacing
4. Know the indications for cardioversion
5. Know device guidelines to learn up-to-date indications for device implantation
6. Understand the utility of electrophysiologic testing, watch or participate in an EP study and be able to interpret basic intracardiac electrograms

7. Know the genetic arrhythmia syndromes and common presentations

8. Know the CHA2DS2-Vasc score for identifying stroke risk in patients with AF/flutter and compare this to their risk of bleeding (HAS-Bled)

9. Gain a complete knowledge of the pharmacology, pharmacokinetics, mechanisms of action and drug interactions of anti-arrhythmic drugs with a concentration on their toxicities

10. Review the indications for tilt testing and the diagnostic utility of tilt testing

Practice-Based Learning Improvement

1. Interpret ECG’s, holter monitors, outpatient monitors
2. Use the knowledge gained from study and testing to improve your patient management
3. Set goals of learning during the rotation and discuss with the attending at the beginning of the rotation and then completion
4. Critically read and evaluate current literature related to arrhythmias and device management

Interpersonal and Communication Skills

1. Communicate with the patient and family regarding the plan of care in a compassionate and informative manner.
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