



Entrustable Professional Activities

Curricular Components Supporting EPA 3 for Pediatric Cardiology

Curricular Components That Support the Functions of EPA 3: Diagnosis and Management of Patients with Arrhythmias and Conduction Abnormalities

1. Obtaining essential information and testing
 - Evaluates young patient with syncope, palpitations, supraventricular arrhythmias, ventricular arrhythmias, atrioventricular conduction disturbances, and all forms of early postoperative arrhythmias
 - Demonstrates skill in risk assessment for sudden death in young patients having heritable disorders and in those with worrisome but nonspecific symptoms or laboratory findings
2. Knowing the underlying mechanisms of cardiac electrical conduction/rhythm generation and indications for electrocardiography (ECG), exercise testing, Holter monitoring, and event recording as well as knowing the basics of invasive EP
 - Knows the developmental changes in cardiac rates and rhythm with age
 - Knows the basic mechanism of arrhythmias
 - Knows the clinical presentation and mechanisms of supraventricular tachycardias
 - Knows the clinical presentation and mechanisms of ventricular tachycardias
 - Knows the clinical presentations and mechanisms of channelopathies and hereditary cardiomyopathies
 - Knows the clinical presentations of and mechanisms of bradycardia and atrioventricular block
 - Knows the clinical presentations and diagnoses of fetal arrhythmias
 - Knows the presentations and mechanisms of palpitations, syncope, and sudden cardiac death in the young
 - Knows the mechanisms and types of arrhythmias in CHD
 - Knows about pacing modes, basic pacemaker interrogation (including determining pacing and sensing thresholds), pacemaker or ICD types, and basic troubleshooting for pacemaker and implantable defibrillator therapy
 - Knows the indications for ECGs, ambulatory rhythm monitoring, and event monitoring
 - Knows the indications, limitations, and types of exercise testing
 - Demonstrates a working knowledge of the genetics of channelopathies and cardiomyopathies and the indications to order genetic testing
 - Demonstrates a general understanding of the indications and risks for nonpharmacologic electrophysiology (i.e., invasive EP), including knowledge of the physics of pacing, cardioversion, defibrillation, and therapeutic ablation of arrhythmia substrates
 - Knows the basic principles of mapping and catheter ablation
 - Knows the indications for arrhythmia surgery
3. Performing an (ECG), Holter monitoring, event recording, and exercise testing
 - Knows how to place ECG leads



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- Recognizes lead placement errors
 - Knows the difference between a 12 lead and 16 lead EKG
 - Knows how to place a Holter recording
 - Knows how to place an event recorder
 - Knows the technical aspects of supervising an exercise test
4. Interpreting ECGs, exercise testing, Holter monitoring, and event recording, along with clinical integration of basic invasive EP data and aligning with comprehensive differential diagnoses
- Interprets a 12 lead ECG
 - Recognizes ECG changes associated with metabolic and other organ system derangements
 - Interprets Holter recordings
 - Interprets event recordings
 - Interprets exercise testing
 - Understands the implications of basic intracardiac electrograms including interval measurements and integrates the interpretation into clinical management
 - Interprets postoperative arrhythmias
 - Integrates results of genetic testing for channelopathies in a general fashion
5. Treating electrical abnormalities and knowing when to consult EP experts
- Treats young patients with syncope, palpitations, supraventricular arrhythmias, ventricular arrhythmias, atrioventricular conduction disturbances, and all forms of early postoperative arrhythmias and knows when to refer to EP experts
 - Appropriately provides risk stratification for sports participation
 - Integrates basic science knowledge of pharmacology, cellular and anatomic electrophysiology, molecular and clinical genetics, and rudimentary physics to patient care
 - Demonstrates knowledge of invasive methods for discriminating and treating arrhythmias
 - Manages acute pacing strategies including the use of temporary transvenous pacing catheters, esophageal electrode catheters, and percutaneous surgical wires
 - Provides management and follow-up of temporary pacing systems and understands the indications, techniques, and associated risks of elective and emergent direct current cardioversion
 - Identifies when to consult a specialist with advanced training in complex rhythm and conduction abnormalities as described by the Pediatric and Congenital Electrophysiology Society (PACES) and the Heart Rhythm Society HRS.1 Advanced skills are listed below.2
6. Communicating the treatment options effectively to patients, families, referring physicians, and health care professionals



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- Explains test results and management options to patients/families, primary care providers, and other team members based on an individual's health literacy
- Engages patient, family, and team members in shared decision making

Problems that generally require consultation where the role of the generalist is to recognize, provide preliminary evaluation, and refer. This list depends greatly on context in which one practices. Those generalists practicing in areas where access to subspecialists is difficult will likely provide more of the care and may do so with telephone advice from a trusted subspecialist as needed.

- Patients with pacemakers or intracardiac defibrillators ICDs who require pacemaker or ICD programming
- Unstable patients with post-operative arrhythmias
- Patients with supraventricular tachycardia or ventricular tachycardia who require multiple drugs for antiarrhythmic therapy
- Patients who require diagnostic or therapeutic electrophysiologic studies

Curricular Components Authors

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References

1. Walsh EP, Bar-Cohen Y, Batra AS, et al. Recommendations for advanced fellowship training in clinical pediatric and congenital electrophysiology: a report from the Training and Credentialing Committee of the Pediatric and Congenital Electrophysiology Society. *Heart Rhythm* 2013; 10:775-81