University of Pittsburgh School of Medicine

ECG Interpretation: Beyond Recognition Mini-Elective
Spring 2018

Course Dates:	February 6, 13, 20, 27 Tuesdays, 5:00-6:30 PM
Maximum Students:	15
Class Year:	MS2
Course Director:	Jason S. Chang, MD Assistant Professor of Emergency Medicine
Contact Information:	Jason S. Chang, MD changjs2@upmc.edu
Registration:	Betsy Nero, Office of Medical Education betsy@medschool.pitt.edu

Description:
Many medical students who look at an ECG today instinctively resort to pattern recognition when asked to identify an abnormal finding (e.g. "saw-tooth pattern" means atrial flutter; "rabbit ears" means a right bundle branch block). This is an ineffective means of ECG interpretation. Rote memorization of ECG patterns does little to promote an understanding of the basic pathophysiology behind arrhythmias and other abnormalities. The goal of this mini-elective is to present an interactive and in-depth examination of the electrical pathophysiology behind the patterns that are associated with common emergency arrhythmias and ECG abnormalities. Developing an understanding of these mechanisms will allow the student to interpret a variety of pathology simply by being able to explain the electrical activity and depolarization patterns within the myocardium.

Course Objectives:
1. Provide a review of the normal electrical depolarization patterns and the typical 12-lead ECG
2. Generate illustrative explanations of the electrical activity behind many individual ECG arrhythmias and abnormalities
3. Discuss several case presentations of emergency ECG abnormalities and management strategy based on a simple ECG
4. Predict and create ECG rhythms when presented with illustrative examples of abnormal electrical depolarization patterns

Regirements:
- Attendance at each session
- Completion of Cardiology block

Office of Medical Education

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Course Outline:
"ECG Interpretation - Beyond Recognition"

Course Director:
Jason S. Chang, MD
Assistant Professor of Emergency Medicine

Location:
Scaife Hall, Rooms 502 & 503

Week 1:
Standard 12-Lead ECG interpretation and approach to understanding a normal ECG

The first week of this course will review the standard ECG including reinforcement of the basic concepts behind the morphology behind a normal depolarization through the myocardium. This will include discussion of the anatomy of the heart, orientation of the electrical leads, pattern of depolarization from atrium to ventricle, and the anticipated normal ECG recordings. We will then introduce disturbances to the ECG rhythm when abnormal or ectopic depolarizations disrupt this regular sequence of events.

Week 2:
Supraventricular Arrhythmias and Conduction Abnormalities

After understanding a normal ECG, we will begin to discuss individual rhythm and conduction abnormalities originating from above the ventricle. The student will participate in illustrating the electrical mechanisms behind common atrial and AV nodal diseases while appreciating the central role the AV node plays in controlling and coordinating atrial to ventricular electrical communication, particularly when there is an abnormality within the AV nodal junction.

Week 3:
Ventricular Arrhythmias and Conduction Abnormalities; ST segment changes

The most deadly arrhythmias occur when they originate from within the ventricles. The student will be able to find parallels to atrial arrhythmias after discussing the mechanisms behind ventricular arrhythmias. This week will also explore some of the reasons behind basic ACLS guidelines and resuscitative measures for patients in cardiac arrest. Though not a primary objective of the course, ST segment changes will also be briefly discussed to introduce the concept of myocardial damage and its effect on the ECG.

Week 4:
ECG Case Reviews and Illustrative Application of Knowledge

Students will discuss several examples of ECG abnormalities framed by case presentations. We will reinforce the idea of interpreting an ECG without relying on pattern recognition and apply learning points presented in the previous weeks. Finally, the students will be challenged to create ECG rhythms based on pictorial illustrations of abnormal electrical activity. This will reverse the concept of ECG interpretation and instead force the trainee to understand how ECG patterns are created.