DAILY EXPOSURE TO ELECTROCARDIOGRAM (ECG)-RELATED PROBLEMS DURING CARDIOVASCULAR (CV) COURSE IMPROVED SECOND YEAR MEDICAL (M2) STUDENT CONFIDENCE AND PERFORMANCE IN ECG INTERPRETATION

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BACKGROUND

The ECG is used in diagnosis of heart disease and understanding the ECG has life-saving implications. Accurate interpretation of the ECG is a crucial skill for students to develop. However, numerous reports showed deficiencies in ECG interpretation in medical students and residents[1-3]. Comments from the 2013 and 2014 M2 students enrolled in the CV Unit at MCW had a constant thread that there was not enough time spent on teaching ECGs. MCW students had the feeling of being inadequately prepared and not confident in their ability to interpret ECGs.

OBJECTIVE

In 2015, the CV unit decided to address the concerns by offering students more exposure to ECG interpretation. The CV unit provided daily take-home ECG problems that students could do for extra credit.

STUDENT COMMENTS (BEFORE)

EKG lecture was very short and did not feel adequate for us to get a grasp of this major diagnostic tool. Should be an easier introduction lecture about EKG's. The EKG lecture was very difficult to understand and I believe that was due to the fact that there wasn't much time spent on reading normal, healthy EKG's. EKGs was a HUGE amount of material, especially for those of us with no idea about how to read an EKG at all.

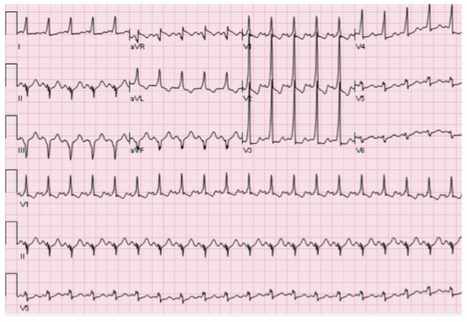
References:

1. RS. Jablonover, E. Lundberg, Y. Zhang, A. Stagnaro-Green, Competency in Electrocardiogram Interpretation Among Graduating Medical Students. Teaching and Learning in Medicine 26: 279, 2014.
2. G. Kopeć, W. Magoń, M. Hołda, P. Podolec, Competency in ECG Interpretation Among Medical Students, Med Sci Monit 21:3386, 2015.
3. A. Pourmand, M. Tanski, S. Davis, H. Shokoohi, R. Lucas, F. Zaver, Educational Technology Improves ECG Interpretation of Acute Myocardial Infarction among Medical Students and Emergency Medicine Residents, West J Emerg Med 16:133, 2015

APPROACH

1. **Introductory lectures on ECGs in class.**
2. **ECG-related problems posted to BrightSpace.**
3. **Multiple-choice format questions that first covered basic skills like determining heart rate and heart rhythm.**
4. **Number of questions/per day varied throughout the unit and tested more difficult concepts (example, identify left anterior fascicular block) as course progressed.**
5. **Students had until midnight to submit answers.**
6. **Students were told that the most important purpose of the ECG problems was to provide them with more experience in understanding difficult concepts. Many students worked in teams,**

EXAMPLE QUESTION



1. What is the heart rate?
   A. 120 bpm
   B. 130 bpm
   C. 140 bpm
   D. 150 bpm

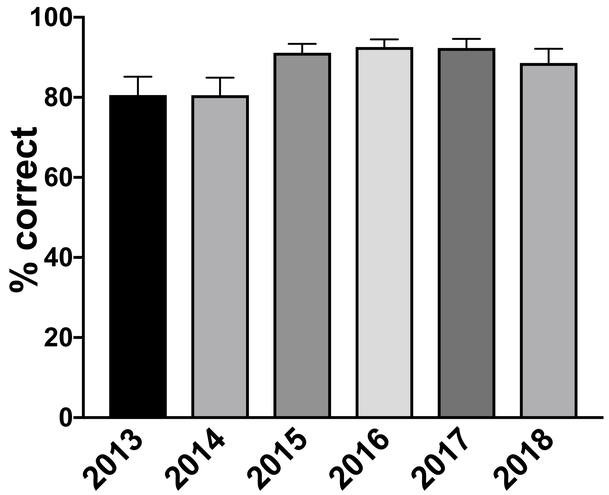
2. What is the QTc interval?
   A. 440 ms
   B.450 ms
   C. 460 ms
   D. 470 ms

3. What is the PR interval?
   A. 80 ms
   B. 100 ms
   C. 120 ms
   D. 140 ms

4. This patient presents with a regular narrow complex tachycardia with a QRS duration of 80 ms and a rate of 220 bpm. What is the most likely mechanism of tachycardia?
   A. Atrial fibrillation
   B. AV nodal reentrant tachycardia
   C. Orthodromic AV reciprocating tachycardia
   D. Antidromic AV reciprocating tachycardia

RESULTS

1. **~ 100% of students answered questions.**
2. **% correct ranged from 48.2% to 98.4% (2015) to 82.9% to 100% (2018).**
3. **There was an upward trend in exam scores suggesting that extra exposure to ECG interpretation was beneficial (see figure).**



STUDENT COMMENTS (AFTER)

I also enjoyed doing the EKG extra credit out of class time; it allowed me to focus, buckle down, and really try to understand the concepts behind it without the pressure of an ARS-style rapid response, EKG practices were very helpful, especially since we were able to collaborate.

CONCLUSION

The addition of take-home ECG problems in the CV Unit helped students feel more confident in ECG interpretation and this was reflected by student comments and better performance on ECG-related exam questions.