Electrocardiograms and Education

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INTRODUCTION

The electrocardiogram (ECG) remains a widely used diagnostic tool for cardiovascular disease and emergencies. Despite its importance in both inpatient and ambulatory practice, medical students and residents report deficiencies in their interpretation abilities. This becomes critical to optimal patient care as house staff are often the first to analyze ECGs, sometimes several hours prior to an official attending read. Despite its clinical importance, teaching ECG interpretation remains a challenge for medical educators. The three most commonly employed methods for teaching ECG interpretation include workshops, lectures and self-directed learning modules. Newer strategies involve utilization of mnemonics for rapid pattern recognition and Internet resources.

Although medical educators strive for optimal instruction in ECG interpretation to maximize retention, few studies have been conducted to determine the effectiveness of the various ECG teaching modalities. Given the differing learning styles among medical students, it is unlikely that a “one-size-fits-all” approach will suffice. Individualization of teaching ECG interpretation may be necessary to achieve effective education. Here a brief overview of several studies investigating various approaches to teaching ECG interpretation is provided and, importantly, some of the new approaches that can be applied in future medical education are introduced.

ECG EDUCATION: TRADITIONAL VS. NONTRADITIONAL APPROACHES

ECG interpretation, a staple in the medical school curriculum, continues to be taught in various formats with mixed results in level of skill achieved by students. A randomized control trial examined the ability of 4th year medical students to correctly interpret ECGs after instruction in lecture-based, workshop and self-directed learning (SDL) formats. Lecture-based and workshop formats had significantly better outcomes as compared to SDL. When compared against each other, lecture-based and workshop formats were both similarly effective in level of ECG interpretation skill achieved. The type of assessment is also an important component in the process of teaching ECG interpretation. Summative assessments led to more correct ECG identification than formative assessments. While these studies favor a more traditional approach to teaching ECG interpretation, the evolving landscape of technology and medical education has allowed for new nontraditional modalities that can be incorporated to augment traditional education.

CONCLUSION

ECG interpretation remains an essential clinical tool of which all physicians must possess at least a basic level of skill. However, current literature demonstrates that medical students and residents possess suboptimal skills at ECG interpretation. At this point in time, the evidence indicates that lecture-based or workshop teaching formats with summative assessments provide the highest level of skill with ECG interpretation among medical students. In this new era of medical education emphasizing the individual learner, supplemental components of an ECG interpretation course may include SDL modules, novel modalities including a puzzle-based approach, e-learning via verified YouTube videos, or clever mnemonics for pattern recognition. While further studies are required to assess the optimal ECG teaching strategy among the general medical student population, it is necessary for the individual student to understand what techniques contribute best to
his own education and competency. I believe that medical education in the future will supplement a more standard lecture-based and workshop teaching sessions with SDL modules that allow the individual student to reinforce foundational knowledge with puzzle based approaches, e-learning or mnemonics most appropriate to the individual's learning style.

REFERENCES

FIGURE 1. Diagonal Line Lead Rule mnemonic of Sibbitt. The diagram demonstrates how to apply the Diagonal Line Lead Rule to an ECG.