Conventional electrocardiographic interpretation by non-cardiologist medical doctors: a need for improvement in the teaching techniques or a necessity for better learning skills?

Editorial

The 12-lead conventional electrocardiogram (ECG) is one of the more important diagnostic auxiliary methods prescribed to any patient that will undergo a surgical procedure. Since ECG is a simple, cheap, safe, reproducible, and reliable technique, it is still the most commonly used procedure to detect heart disease.[1–5] Although, most physicians think that they have good interpretation knowledge of the ECG tracings, interpreting adequately an ECG is not an easy task to perform. The adequate usefulness of the ECG is sometimes underestimated. If we think that with a simple piece of paper we can diagnose that a terrifying ventricular tachycardia originates in the outflow tract of the right ventricle, or in the apical left ventricle of a young patient, then we will not underestimate its value. Now, if we imagine that the same piece of ECG paper has given us not only the exact location of the origin of the arrhythmia but also the means to offer a definitive cure to the patient's illness, then we will place back the ECG to its high pedestal where it belongs.

Any clinical physician of any specialty who deals with clinical conditions and therapeutic decision-making in the ambulatory or hospital setting should have sufficient ECG knowledge to properly make an accurate diagnosis of a heart condition. Adequate knowledge should include the ability to interpret, define, recognize, and understand the basic pathophysiology of certain electrocardiographic abnormalities or patterns.[6–9]

For these reasons it is very interesting the paper published by Javier Higueras in this issue of this journal.[10] The authors evaluated the accuracy in the interpretation of electrocardiograms among residents and staff doctors and compared the usefulness of an intensive training course in ECG with a standard rotation in cardiology unit. They found that real ECG knowledge between doctors is poor.[10] The overall accuracy of ECG interpretation was low for both resident and staff physicians. This finding is worrisome and of particular interest given the fact that the ECGs were chosen as examples of diseases or conditions that any physician should have been able to recognize and properly diagnose. Residents obtained better results than staff at the beginning but at the end there were not statistic differences. Intensive courses were similar to classical teaching method.[10] These results demonstrate that very little is known about ECG interpretative skills of medical residents.[10–12] Moreover, many doctors are unaware of their limitations and believe that their ECG interpretation knowledge is good enough. However, several studies showed otherwise.[13–17] The results of these investigations highlight the fact that the current ECG interpretation knowledge is undoubtedly poor.

There are some attenuating causes that mitigate and could be responsible of these poor results. As the authors explained, no clinical

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information or automatic interpretation of ECG machine was provided to the physicians in order to avoid influencing the participant's interpretation of the ECG. Previous research has demonstrated a strong and consistent effect of clinical scenario on the accuracy of ECG interpretation and proper identification of heart conditions and ECG parameters by physicians at all levels of training, but especially for medical doctors with less experience.[18–21]

About a decade ago, we perform an ECG investigation to define the incidence of physicians in the different disciplines of medicine who can recognize a long QT interval when they see one.[21] Since little was known about the abilities of physicians to make such determination, we conducted the study to determine the percentage of physicians in different fields of medicine who can accurately measure the QT interval, calculate the QTc (the QT interval corrected for the heart rate), and identify a long QT interval. We presented the ECGs of two patients with Long QT Syndrome and two healthy females to 902 physicians (25 world-renowned QT experts, 106 arrhythmia specialists, 329 cardiologists, and 442 non-cardiologists) from 12 countries. They were asked to measure the QT, calculate the QTc, and determine whether the QT is normal or prolonged. We also found similar results as the ones found by Javier Higueras. Real ECG knowledge between doctors is poor. Most physicians in all fields of internal medicine, including many cardiologists and even some arrhythmia experts, cannot accurately calculate a QTc and cannot correctly identify a long QT when they see one. Once again, it is very clear that interpreting an ECG is not an easy task to perform. In order to become acquainted to proper ECG interpretation it is very important to have a good sense of pattern recognition. This is

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an essential component of ECG interpretation, and it is learned only through repeated exposure during the resident years. Such repeated exposure is especially important because of the need to visually recognize the many diagnostic variations of heart disease.

With this problem in the clinical horizon, several questions may come to our minds. Is practical experience lacking among residents? Are the residents teaching programs inadequate to reach a proper competency? Is there a weak path in the field of continuing medical education to fulfill the needs of the physicians? Is there a need for improvement in the teaching techniques or is there a necessity for better learning skills?

Strong efforts should be made at all levels of medical education to further improve our teaching techniques and methodology, as well as, to recognize that we ourselves have to concentrate endeavours to enhance our learning skills. It is a necessity to increase the awareness and the knowledge of the medical community about an adequate interpretation of the ECG in order to maintain a good level of excellence and competency in the medical field. We owe this level of accomplishment to our loyal patients, to the entire medical community and to our fellow human beings.

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