THE FREE CLINIC RESEARCH COLLECTIVE

Assessing the Utility of Electrocardiogram (ECG) Use in the Free Clinic Setting

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Abstract: Electrocardiograms (ECGs) have been a staple in the assessment of chest pain for many years and have been determined to be the most useful bedside test to evaluate myocardial infarctions (MI) and other cardiac events. Populations at a greater risk of developing poor outcomes following cardiac events are often served by student-run free clinics. Many of these clinics may lack ECG machines potentially due to the cost of a machine. This review assesses the utility of ECG testing in the HOPES Clinic, a student-run free clinic in Norfolk, Virginia, and suggests beneficial value in exposing student volunteers to pre-hospital emergency decisions.

Introduction

In the workup of acute chest pain, the electrocardiogram (ECG) has been established to be the most useful bedside test to evaluate for MI.[1] Therefore, the ECG remains a valuable tool when assessing the need for emergent services. A population-based cohort study found a significant association between low socioeconomic status and decreased access to specialized cardiac services. [2] The same study found a significant effect between low socioeconomic status and increased mortality one year following acute myocardial infarction. An additional study found that the national use of pre-hospital ECG for diagnosis and treatment of MI remains low despite evidence that pre-hospital ECG is associated with a significantly shorter time to cardiac reperfusion and better patient outcomes.[3]

These findings suggest potential benefits from equipping clinics servicing lower income populations with ECGs for use in the setting of acute chest pain. Such ECG monitoring in student-run free clinics also provides student volunteers with valuable insight into pre-hospital cardiac workup. This review explores the use and success of ECG in HOPES general medicine clinic, a student-run free clinic at the Eastern Virginia Medical School (EVMS).

Methods

We completed a retrospective chart review that assessed all EVMS HOPES general medicine clinic patient charts between April 1, 2015 and July 31, 2015. All ECG tests performed during this study period were identified. The charts of patients who received ECG testing were assessed for documentation of symptoms warranting the test order, ECG interpretations, and appointment outcomes. All ECGs were performed by students on the HOPES Laboratory Team and interpreted by a licensed physician. All tests were performed using a 12-lead Welch Allyn CP 150 ECG Machine according to the established HOPES Laboratory Team ECG protocol.

Results

One hundred and seventeen patients were seen and seven ECGs were run and assessed during the study period at the EVMS HOPES general medicine student-run free clinic. All seven of these patients met the criteria for being a HOPES patient which are: lack of insurance, income below 200% of the poverty level, and Norfolk, Virginia resident.

Six ECGs were included in this assessment; one was excluded due to incomplete data documentation. Of the six ECGs run during the study period, three were run based on patient complaints of chest pain. Two ECGs were run based on complaints of palpitations. One ECG was run for complaints of syncopal episodes. Of the three tests run for patient complaints of chest pain, two exhibited abnormal ECG readings; however, all three tests resulted in a recommendation to seek emergent treatment. Of the two tests run for palpitations, both resulted in unremarkable ECG findings and no emergent treatment was recommended. In the single test run for syncopal complaints, the ECG findings were unremarkable and no emergent treatment was recommended.

Longitudinal metric data was unable to be obtained due to narrow study window and inconsistent patient follow up. Overall, six ECG tests were performed and analyzed during this review period. Of these, three tests resulted in a recommendation to seek emergent treatment.

Discussion

During the four-month review period, one hundred and seventeen patients were seen in the HOPES general medicine clinic, and ECG testing was performed seven times (6.0%), indicating that, while infrequent, situations do arise in the EVMS HOPES Clinic that warrant ECG use. Of the six ECGs examined, three resulted in a recommendation for emergent treatment. Therefore, ECG use at HOPES allowed the physicians to make more informed treatment recommendations, and allowed students to gain experience running ECGs and making decisions based on the results. While informative, this study is limited by a narrow study period and small sample size. Continued evaluation of outcomes after receiving an ECG at HOPES Clinic is needed to determine if ECG testing in this setting has any significant affect on the amount of Emergency Room visits. Future studies may also quantitatively address student volunteer benefit from exposure to ordering EKGs and making decisions based on the results through pre and post experience surveys.

Conclusions

Based on the results of our review, we feel ECG testing in the free clinic setting is valuable. Student volunteers receive the opportunity to perform valuable, hands-on ECG testing while learning about pre-hospital emergency decision-making. Patients may avoid an emergency room visit and associated costs and inconveniences by having their chest pain or other worrisome symptoms assessed at a free clinic. Overall, ECG use at HOPES has educated students and successfully and appropriately identified cases that required further medical evaluation. Whether this identification in the student-run free clinic setting has reduced emergency room visits for patients remains to be determined.

References

1. Chun AA, McGee SR. Bedside diagnosis of coronary artery disease: A systematic review. Am J Med 2004; 117:334–343.
2. Alter, DA, Naylor, CD, Austin, DP et al. Effectis of Socioeconomic Status on Access to Invasive Cardiac Procedures and on Mortality after Acute Myocardial Infarction. N Engl J Med 1999; 341:1359-1367
3. Curtis, JP, Portnay, EL, Wang, Y, et al. The Pre-Hospital Electrocardiogram and Time to Reperfusion in Patients with Acute Myocardial Infarction, 2000-2002. J Am Coll Cardiol. 2006;47(8):1544-1552.