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Utility of the electrocardiogram QT interval in predicting outcomes in patients presenting to the emergency department with chest pain

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Objectives: This study is sought to investigate whether prolongation of the heart rate-corrected QT (QTc) interval is an independent risk factor in predicting acute coronary syndrome (ACS) occurrence and all cause mortality in patients presenting with chest pain to the emergency department (ED).

Background: Prolongation of the QTc interval has been associated with ventricular arrhythmias and increased mortality risk for patients with ACS or known coronary artery disease (CAD). However, most population-based studies have shown no consistent association between QTc prolongation and mortality or occurrence of ACS in an asymptomatic population. The effect of QTc prolongation on clinical outcomes of patients who presented to the ED with chest pain is not known.

Methods: This study was conducted as a single center, retrospective chart review of 595 patients presenting with chest pain to the ED. The QTc interval on the electrocardiogram was determined during the baseline visit in the ED. Descriptive data was expressed as mean value ± SD. Patient groups were compared with and without QT prolongation with regards to each of the demographic variables using Student t-tests for quantitative variables and the Chi squared tests for categorical variables. Patients were followed up for 1 year for ACS or death. Proportional hazards model was used to calculate hazard ratios for occurrence of death or ACS within 1 year. Time to event for QTc low and high groups was examined using Kaplan Meier curves. Log rank p value was used to compare curves. Cut off value for QTc as a continuous variable was determined by using Xtile software (QTc=460 msec).

Results: The mean follow up time was 1 year from presenting to the ED with chest pain. Out of 595 charts reviewed, 86 charts were excluded: 44% due to absence of baseline ECG, 25% included those who had atrial fibrillation or heart blocks, and 26% percent had electrolyte abnormalities or use of drugs known to prolong QTc. Older age, hypertension, diabetes mellitus and hyperlipidemia were more common in the QTc high group. Patients in the QTc high group were more likely to have an event of ACS or death (HR 8.12 95% CI 4.00-16.72; $p<0.05$) even after adjusting for BMI, diabetes, hypertension, older age, hyperlipidemia and positive family history (HR 7.68 95% CI 3.57-16.61; $p<0.05$) within 1 year of follow up.

Conclusion: Abnormal QTc prolongation on the ECG at ED presentation with chest pain is an independent risk factor for occurrence of ACS and all cause mortality within 1 year of follow up. QTc measurement is a possible novel approach for risk stratification of patients presenting to the ED with chest pain.

Biography

Toni Anne de Venecia MD is a 2nd year internal medicine resident in Albert Einstein Medical Center Philadelphia. She graduated Magna Cum Laude from University of Santo Tomas, Philippines for her medical education. She is very interested in clinical research and clinical practice as well and has two published articles in AJM. She aspires to become a cardiologist someday.

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