

Publication

Bedside prediction of increased filling pressure using acoustic electrocardiography

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BACKGROUND: Patients presenting with acute dyspnea are often a diagnostic dilemma. A bedside tool that accurately and rapidly identifies increased left ventricular (LV) filling pressure would be helpful. We evaluated acoustic electrocardiography for this purpose. **METHODS:** We pooled 3 cohorts of patients for this analysis. Inclusion criteria required acoustic electrocardiography and echocardiography within 4 hours of each other. Increased LV filling pressure was defined as a pseudonormal or restrictive filling pattern on echocardiography. Area under the receiver operating characteristic curve (AUC) assessed multivariable model accuracy. **RESULTS:** The median age of the 324 patients was 61 years (range, 19-90 years), 67% were male, and 82% had a history of heart failure. The final multivariable model included mean LV systolic time, S(3) score, maximum negative area of the P wave, and the QTc interval. The AUC was 0.83 (95% confidence interval, 0.78-0.88). Although B-type natriuretic peptide (BNP) was an independent predictor of estimated increased filling pressure when considered alone (odds ratio = 1.002, 95% confidence interval, 1.000-1.003, $P = .002$), when added to the acoustic model, it did not improve overall model accuracy. In the subset of patients with indeterminate BNP levels (100-500 pg/mL), the acoustic model was more accurate than BNP (AUC = 0.82 vs 0.71). **CONCLUSIONS:** Bedside acoustic electrocardiography predicted echocardiographic correlates of increased pressures with high accuracy. For patients with an indeterminate BNP level (100-500 pg/mL), the acoustic electrocardiography model was superior to BNP. Prospective model validation is warranted.

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