Do Combined Electrocardiogram Rhythm and Point of Care Ultrasound Findings Predict Outcome During Cardiac Arrest? The Second Sonography in Hypotension and Cardiac Arrest in the Emergency Department (SHOC-ED 2) Study.

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Introduction
Survival to hospital discharge is better for PEA than asystole in out-of-hospital cardiac arrest. Point of care ultrasound (PoCUS) is widely used in cardiac arrest, although not mandated by ACLS guidelines. This study examines if initial PoCUS findings combined with cardiac rhythm are predictive of outcomes including return of spontaneous circulation (ROSC), survival to hospital admission (SHA), and hospital discharge (SHD).

Methods
A database review was completed for patients arriving to a tertiary ED in asystole or PEA arrest from 2010 to 2014. Patients under 19y or with a previous DNR were excluded. Patients were grouped into those with cardiac activity on PoCUS and PEA on ECG (Positive group); those with no cardiac activity recorded on PoCUS and asystole on ECG (Negative group); and those with a mix of positive and negative findings (Indeterminate group). Data was analyzed for the frequency of ROSC, SHA, and SHD.

Results
186 patients met the study criteria, with 14 (8%) in the positive group, 134 (72%) in the negative group, and 38 (20%) in the indeterminate group. The positive group had significantly better initial outcomes than the negative group: ROSC: 78% (95% CI 49-95%) vs 17% (11-25%); OR 17.70 (4.57-168.5; p < 0.0001) and SHA: 29% (8-58%) vs 7% (3-12%); OR 5.56 (1.45-21.28; p = 0.022), and than the combined negative and indeterminate groups: ROSC: 22% (16-29%), OR 12.93 (3.43-48.73; p < 0.0001; SHA: 8% (5-13%); OR 4.51 (1.25-16.27; p = 0.033). There was no difference between the positive group and either the negative or combined groups for final outcome of SHD: 0% (0-23%) vs 1% (0-5%); OR 1.83 (0.08-39.97; p = 1.00; and vs 1% (0-5%); OR 1.67 (0.08-33.96; p = 1.00). The negative group had worse initial outcomes than the combined positive and indeterminate groups: ROSC 17% (11-25%) vs. 50% (36-64%) OR 0.21 (0.10-0.42; p < 0.0001); SHA 6% (3-12%) vs. 8% (5-13%) OR 0.34 (0.13-0.92; p = 0.0490). There was no difference in SHD: 1% (0-5%) vs. 1% (0-5%) OR 0.77 (0.07-8.71; p = 1.00).

Conclusion
Our results suggest that although finding positive cardiac activity on ECG (PEA) and also on PoCUS is associated with greater ROSC and SHA, it does not identify patients with a final outcome of SHD.