Chest Compression Interruptions Associated with Utilization of Focused Transthoracic Echocardiography during Cardiopulmonary Resuscitation in the Emergency Department

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Objectives: Determine whether focused transthoracic echocardiography (ECHO) use during cardiopulmonary resuscitation (CPR) increased the duration of interruptions of chest compressions in patients being treated for cardiac arrest.

Methods: This is a retrospective single center study, conducted in an urban community teaching ED with an annual census of 120,000. Eligible study subjects are adult patients in the ED who have sustained cardiac arrest. Exclusion criteria include traumatic cardiac arrest and age less than 18. All resuscitations were video recorded and were subsequently reviewed by 2 study investigators. Patients were divided into ECHO and non-ECHO groups based on video review. The utilization of ECHO depended on the individual physician's clinical judgment. The primary outcome is the no-flow ratio between the 2 groups. Secondary outcomes include the rate of return of spontaneous circulation (ROSC), survival to hospital discharge, and the timing of initiation and duration of the ECHO exam. The data was compared using independent t-test or Chi-square test.

Results: From January 2016 to March 2017, a total of 163 patients were included for analysis. ECHO was used in 105 cases (64.4%) during CPR. Patient characteristics were similar between the groups. No-flow ratios (0.16±0.09 vs. 0.12±0.08, p<0.001), and rate of ROSC (71.2% vs. 36.9%, p<0.0001), were significantly better in the non-ECHO group. There was no significant difference in survival rate (6.8% vs. 17.2%, p=0.42). The mean time to initiate and complete an ECHO exam was 491.55±248.81 seconds and 28.14±22.38 seconds individually.

Conclusion: ECHO during CPR significantly increases the no-flow state during resuscitation and is associated with a decreased rate of ROSC.