

## Reversible Causes in Cardiovascular Collapse at the Emergency Department Using Ultrasonography (REVIVE-US)

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### Abstract

**Introduction:** Ultrasonographic evaluation of patients in cardiac arrest is currently not protocolised in the advanced cardiac life support (ACLS) algorithm. Potentially reversible causes may be identified using bedside ultrasonography that is ubiquitous in most emergency departments (EDs). This study aimed to evaluate the incidence of sonographically detectable reversible causes of cardiac arrest by incorporating an ultrasonography protocol into the ACLS algorithm. Secondary objectives include rates of survival to hospital admission, hospital discharge, and 30-day mortality. **Materials and Methods:** We conducted a prospective study using bedside ultrasonography to evaluate for potentially reversible causes in patients with cardiac arrest at the ED of National University Hospital, Singapore, regardless of the initial electrocardiogram rhythm. A standardised ultrasonography protocol was performed during the 10-second pulse check window. **Results:** Between June 2015 and April 2016, 104 patients were recruited, corresponding to 65% of all out-of-hospital cardiac arrest patients conveyed to the ED. Median age was 71 years (interquartile range, 55 to 80) and 71 (68.3%) patients were male. The most common rhythm on arrival was asystole (45.2%). Four (3.8%) patients had ultrasonographic findings suggestive of massive pulmonary embolism while 1 received intravenous thrombolysis and survived until discharge. Pericardial effusion without tamponade was detected in 4 (3.8%) patients and 6 (5.8%) patients had intra-abdominal free fluid. Twenty (19.2%) patients survived until admission, 2 of whom (1.9%) survived to discharge and beyond 30 days. **Conclusion:** Bedside ultrasonography can be safely incorporated into the ACLS protocol. Detection of any reversible causes may alter management and improve survival in selected patients.

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**Key words:** Advanced cardiac life support, Heart arrest, Hospital

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