

Does point-of-care ultrasonography improve clinical outcomes in emergency department patients with undifferentiated hypotension?

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Article Type: Therapy

Ratings: Methods – 3/5 Usefulness – 2/5

Setting

Six EDs in North America and South Africa, between September 2012 and December 2016.

Subjects

Patients aged >18 years old presenting with undifferentiated hypotension (sustained systolic blood pressure of <100 mm Hg or shock index of >1). Exclusion criteria included pregnancy, cardiopulmonary resuscitation (CPR) or life support prior to screening, significant trauma within 24 hours, electrocardiogram (ECG) diagnostic of myocardial infarction, evident mechanism for shock, or vagal episode.

Intervention

Standardized POCUS protocol including cardiac (parasternal long axis, parasternal short axis, apical, and subcostal), lung (sliding and presence of effusion), and abdominal (focused assessment with sonography for trauma [FAST] and inferior vena cava) views.

Outcomes

Primary outcome was survival at 30 days or hospital discharge.

MAIN RESULTS

Two hundred seventy-three patients (of a planned 400) were randomized and the most common diagnosis was occult sepsis (52%). There was no significant difference in survival at either 30 days or hospital

INTRODUCTION

Background

Point-of-care ultrasound (POCUS) is commonly used in the management of hemodynamically unstable emergency department (ED) patients. Its effect on clinical outcomes has not been evaluated in a prospective randomized controlled trial.

Objectives

To compare patient outcomes following a standardized POCUS protocol, compared with usual care, in ED patients with undifferentiated hypotension.

METHODS

Design

Multicenter randomized controlled trial.

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discharge. Survival was 76.5% (95% confidence interval [CI] 68.4%–83.3%) in the POCUS group and 76.1% (95% CI 68%–83.1%) in the control group; the absolute risk reduction was 0.35% (95% CI –10.2% to 11.1%). There were also no significant differences in any of the secondary outcomes: median volume of fluid administered, hospital admission, inotrope administration, rate of computed tomography (CT) use, intensive care unit (ICU) admission, and length of stay. The study was stopped early because of slow recruitment and futility.

APPRAISAL

Strengths

- Randomised multicentre trial
- Good allocation concealment
- Baseline demographics and vital signs were similar between groups
- Few patients were lost to follow up
- Standardised POCUS protocol
- Patient oriented outcome
- Categories of shock and diagnoses established by independent blinded chart review

Limitations

- Convenience sample
- Exclusion of key diagnoses (ectopic pregnancy, cardiac ischemia, and trauma) may have diminished the beneficial effect of POCUS
- Study terminated early because of futility
- POCUS protocol did not include potentially helpful views (lung consolidation, hydronephrosis, biliary, and intestinal)
- The study was looking for a 10% reduction in mortality that is large for a diagnostic test
- Unclear how many patients with a “clear mechanism of shock” were excluded
- Low rate of diagnoses for which POCUS is helpful (abdominal aortic aneurysm, venous thromboembolism, left ventricular dysfunction, and cardiac tamponade)

CONTEXT

Previous single-centre studies suggest that POCUS may improve diagnostic accuracy and influence the management for patients in shock.¹ It has demonstrated utility in providing binary information for specific diagnoses such as abdominal aortic aneurysm, peritoneal free fluid, and cardiac tamponade. Furthermore, it is a commonly used ED bedside tool that can assist with the assessment and diagnosis of a patient in shock (cardiogenic, distributive, hypovolemic, or obstructive).² POCUS protocols for the evaluation of the ED patient with undifferentiated shock have been advocated by many experts and are now taught in many courses and residency programs.³

BOTTOM LINE

The results of this study suggest that the addition of a POCUS protocol to standard care does not translate into a survival benefit for ED patients with undifferentiated hypotension. This was an international randomized controlled trial of an important ED diagnostic test. However, there are several factors that limit the impact of these findings. For example, the exclusion of several diagnoses for which POCUS may be helpful (abdominal aortic aneurysm, myocardial infarction, ectopic pregnancy, and trauma). Despite the lack of benefit, we suggest there is no harm in using POCUS for the assessment of patients presenting with undifferentiated hypotension. Future study is required.

Keywords: Ultrasound, resuscitation

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