Does point of care ultrasonography improve diagnostic accuracy in emergency department patients with undifferentiated hypotension?

The First Sonography in Hypotension and Cardiac Arrest in the Emergency Department (SHOC-ED1)
Study; an international randomized controlled trial.

INTRODUCTION

Point of care ultrasonography (PoCUS) is now an established tool in the initial management of hypotensive patients in the emergency department (ED). It has been shown to be helpful in ruling out certain shock etiologies, and improving diagnostic certainty, however evidence on its benefit in the management of hypotensive patients is limited.

METHODOLOGY

The study encompassed 4 North American and 3 Southern African sites. Screening at ED triage identified patients (SBP< 100 mmHg or shock index >1) who were randomized to either PoCUS or control groups. Scans were performed by PoCUS-trained physicians. Demographics, clinical details and findings were collected prospectively. Initial and secondary diagnoses were recorded at 0 and 60 minutes, with ultrasound performed in the PoCUS group prior to secondary assessment.

Final chart review was independent and blinded to initial impressions and PoCUS findings. Categorical data was analyzed using Fishers two-tailed test. Our sample size was powered at 0.80 (α:0.05) for a moderate effect size.

RESULTS

258 patients were enrolled with follow-up fully completed. Baseline comparisons confirmed effective randomization.

Did the use of PoCUS change the initial impression of category of shock?

Yes – the perceived category of shock changed more frequently in the PoCUS group.

PoCUS 20/127 (15.7%; 95% CI 2.51–17.8%) vs. control 7/125 (5.6%; 95% CI 2.51–17.8%); RR 2.81 (95% CI 1.23 to 6.42; p = 0.0134)

Was this perceived change in shock category in the right direction?

No – there was no significant difference in the rate of correct category of shock between the PoCUS group.

PoCUS (113/127; 93%) vs. control (113/122; 93%; RR 1.00 (95% CI 0.936 to 1.08; p = 1.00)

Did the use of PoCUS change the initial impression of diagnosis?

No – there was no difference in the frequency of changes of diagnosis between groups.

PoCUS 39/123 (31.7%; 95% CI -7.1–15.7%) vs. control 34/124 (27.4%, 95% CI -7.1–15.6%); RR 1.16 (95% CI 0.786 to 1.70; p = 0.4879)

Did the use of PoCUS improve accuracy of diagnosis?

No – there was no difference in the rate of correct diagnosis between the PoCUS group.

PoCUS 90/127 (70%) vs. control 86/122 (70%); RR 0.987 (95% CI 0.671 to 1.45; p =1.00)

CONCLUSION

This is the first RCT to compare PoCUS to standard care for undifferentiated hypotensive ED patients. We found that the use of PoCUS did change physicians’ perceived shock category, however PoCUS did not improve diagnostic accuracy for category of shock or diagnosis.