

The ‘SHOC-ED’ Patient’: Does Point of Care Ultrasonography Improve Diagnostic Accuracy in Emergency Department Patients with Undifferentiated Hypotension?

M Peach, P Atkinson, J Milne, L Diegelmann, H Lamprecht, M Stander, D Lussier, C Pham, R Henneberry, J Fraser, M Howlett, J Mekwan, B Ramrattan, J Middleton, N van Hoving, L Taylor, T Dahn, K MacSween, L Richardson, G Stoica, S Hunter, P Olszynski, D Lewis

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 for benefit in the management of hypotensive patients is limited. We compared the impact of adding a PoCUS protocol to standard care on diagnostic accuracy in undifferentiated hypotension.

Methods

We report a secondary analysis of data from a prospective randomized control study trial, performed at three North American and three Southern African sites. The primary outcome for the overall study was survival. Hypotensive patients (SBP < 100 mmHg or shock index > 1) 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 were analyzed using Fisher's two-tailed test. Our sample size was powered at 0.80 ($\alpha:0.05$) for a moderate effect size.

Results

273 patients were enrolled with follow-up fully completed for 270. Baseline comparisons confirmed effective randomization. There was no difference in baseline perceived shock category between the PoCUS (16/125; 12.8%) and control groups (8/127; 6.3%) (relative risk 0.492 (CI 0.218 to 1.11) $p = 0.0891$). There was no difference in final accuracy of category of shock with 92.1% accuracy in PoCUS group (117/127; 95% CI 86.0 to 95.8%; p value = 0.4011) and 93.4% (114/122; 95% CI 87.4 to 96.8%; p value = 0.1915) in the control group. There was no significant difference in the rate of change of diagnosis between the PoCUS (40/125; 32%) and control group (34/127; 26.8%) (relative risk 0.837 (CI 0.569 to 1.23); p value 0.4074); nor was there a difference in accuracy of diagnosis with a final accuracy of 65.8% (79/120; 95% CI 57.0 to 73.7%; p value = 0.2930) in the PoCUS group and 64.2% (79/123; 95% CI 55.4 to 72.2%; p value = 0.7946) in the control group. The most common type of shock, occurring in over half the patients in each arm was sepsis.

Conclusion

This analysis of a randomized control trial (RCT) to compare PoCUS to standard care for undifferentiated hypotensive ED patients found that the use of PoCUS did not change physicians' perceived shock category, or improve diagnostic accuracy for category of shock or diagnosis.