

and 38 (20%) in the indeterminate group. The positive group had significantly better initial outcomes than the negative group: ROSC: 78% (95% CI 49-95%) vs 17% (11-25%); OR 17.70 (4.57-168.5; $p < 0.0001$) and SHA: 29% (8-58%) vs 7% (3-12%); OR 5.56 (1.45-21.28; $p = 0.022$), and then the combined negative and indeterminate groups: ROSC: 22% (16-29%), OR 12.93 (3.43-48.73; $p < 0.0001$; SHA: 8% (5-13%); OR 4.51 (1.25-16.27; $p = 0.033$). There was no difference between the positive group and either the negative or combined groups for final outcome of SHD: 0% (0-23%) vs 1% (0-5%); OR 1.83 (0.08-39.97; $p = 1.00$; and vs 1% (0-5%); OR 1.67 (0.08-33.96; $p = 1.00$). The negative group had worse initial outcomes than the combined positive and indeterminate groups: ROSC 17% (11-25%) vs. 50% (36-64%) OR 0.21 (0.10-0.42; $p < 0.0001$); SHA 6% (3-12%) vs. 8% (5-13%) OR 0.34 (0.13-0.92; $p = 0.0490$). There was no difference in SHD: 1% (0-5%) vs. 1% (0-5%) OR 0.77 (0.07-8.71; $p = 1.00$). **Conclusion:** Our results suggest that although finding positive cardiac activity on ECG (PEA) and also on PoCUS is associated with greater ROSC and SHA, it does not identify patients with a final outcome of SHD.

Keywords: point-of-care ultrasound (PoCUS), cardiac arrest, electrocardiogram (ECG)

LO041

Predicting the return of spontaneous circulation using near-infrared spectroscopy monitoring: a systematic review and meta-analysis

A. Cournoyer, MD, J. Chauny, MD, MSc, M. Iseppon, MD, A. Denault, MD, PhD, S. Cossette, PhD, E. Notebaert, MD, MSc; Université de Montréal, Montréal, QC

Introduction: Tissue oximetry using near-infrared spectroscopy (NIRS) is a non-invasive monitor of cerebral oxygenation. This new technology has been used during cardiac arrest because of its ability to give measures in low blood flow situations. The aim of this systematic review was to assess the evidence regarding the association between NIRS values and resuscitation outcomes in patients undergoing cardiopulmonary resuscitation. We hypothesized that higher NIRS values would be associated with better outcomes and that the strength of that association would differ depending on the timing of the NIRS measurements. **Methods:** This review was registered (Prospero CRD42015017380) and is reported as per the PRISMA guidelines. Medline, Embase and CENTRAL were searched from their inception to September 18th, 2015 using a specifically designed search strategy. Grey literature was also searched using Web of Science and Google Scholar. NIRS manufacturers and authors of included citations were contacted to inquire on unpublished results. Finally, the references of all retained articles were reviewed in search of additional relevant studies. Studies reporting NIRS monitoring in adults during cardiac arrest were eligible for inclusion. Case reports and case series of fewer than five patients were automatically excluded. Two reviewers assessed the quality of included articles and extracted the data. **Results:** Out of 3275 unique citations, 19 non-randomized observational studies (15 articles and four conference abstracts) were included in this review, for a total of 2436 patients. Six studies were evaluated at low risk of bias, nine at intermediate risk and four at high risk. We found a stronger association between the return of spontaneous circulation (ROSC) and the highest NIRS value measured during resuscitation (standard mean deviation (SMD) 3.46 (95%CI 2.31-4.62)) than between ROSC and the mean NIRS measures (SMD 1.33 (95%CI 0.92-1.74)) which was superior to the one between ROSC and initial measures (SMD 0.45 (95%CI 0.02-0.88)). **Conclusion:** Patients with good

outcomes have significantly higher NIRS value during resuscitation than their counterparts. The association between ROSC and NIRS measurements was influenced the timing of measurements during resuscitation.

Keywords: cardiopulmonary resuscitation, near-infrared spectroscopy, prognosis

LO042

Sonography in Hypotension and Cardiac Arrest (SHoC) - Hypotension: derivation of an evidence-based consensus algorithm for the integration of point of care ultrasound into resuscitation of hypotensive patients

P. Atkinson, MD^{1,2}, J. Bowra, MD^{1,3}, J. Milne, MD⁴, M. Lambert, MD¹, B. Jarman, MD¹, V. Noble, MD^{1,5}, H. Lamprecht, MD¹, D. Lewis, MD^{2,4}, T. Harris, MD¹, R. Gangahar, MD¹; *Advisory panel members*, M. Stander, MD¹, C. Muhr, MD¹, J. Connolly, MD¹, R. Gaspari, MD⁵, R. Kessler, MD⁵, C. Raio, MD⁵, P. Sierzenski, MD⁵, B. Hoffmann, MD⁵, C. Pham, MD⁴, M. Woo, MD⁴, P. Olszynski, MD⁴, R. Henneberry, MD⁴, O. Frenkel, MD⁴, J. Chenkin, MD⁴, G. Hall, MD⁴, L. Rang, MD⁴, M. Valois, MD⁴, C. Wurster, MD⁴, M. Tutschka, MD⁶, R. Arntfield, MD⁴, J. Fischer, MD^{4,6}, M. Tessaro, MD^{4,6}; ¹International Federation for Emergency Medicine, West Melbourne, VC; ²Dalhousie University, Saint John Regional Hospital, New Brunswick, Toronto, ON; ³Australasian College for Emergency Physicians, West Melbourne, VC; ⁴Canadian Association of Emergency Physicians/Canadian Emergency Ultrasound Society Ottawa, ON; ⁵American College of Emergency Medicine, Dallas, TX; and ⁶Critical Care/Pediatric Point of Care Ultrasound, Saint John Regional Hospital, New Brunswick, Toronto, ON

Introduction: Point of care ultrasound has become an established tool in the initial management of patients with undifferentiated hypotension. Current established protocols (RUSH, ACES, etc) were developed by expert user opinion, rather than objective, prospective data. We wished to use reported disease incidence to develop an informed approach to PoCUS in hypotension using a "4 F's" approach: Fluid; Form; Function; Filling. **Methods:** We summarized the incidence of PoCUS findings from an international multicentre RCT, and using a modified Delphi approach incorporating this data we obtained the input of 24 international experts associated with five professional organizations led by the International Federation of Emergency Medicine. The modified Delphi tool was developed to reach an international consensus on how to integrate PoCUS for hypotensive emergency department patients. **Results:** Rates of abnormal PoCUS findings from 151 patients with undifferentiated hypotension included left ventricular dynamic changes (43%), IVC abnormalities (27%), pericardial effusion (16%), and pleural fluid (8%). Abdominal pathology was rare (fluid 5%, AAA 2%). After two rounds of the survey, using majority consensus, agreement was reached on a SHoC-hypotension protocol comprising: **A. Core:** 1. Cardiac views (Sub-xiphoid and parasternal windows for pericardial *fluid*, cardiac *form* and ventricular *function*); 2. Lung views for pleural *fluid* and B-lines for *filling* status; and 3. IVC views for *filling* status; **B. Supplementary:** Additional cardiac views; and **C. Additional** views (when indicated) including peritoneal fluid, aorta, pelvic for IUP, and proximal leg veins for DVT. **Conclusion:** An international consensus process based on prospectively collected disease incidence has led to a proposed SHoC-hypotension PoCUS protocol comprising a stepwise clinical-indication based approach of Core, Supplementary and Additional PoCUS views.

Keywords: point-of-care ultrasound (PoCUS), shock, consensus