

were interviewed via a think aloud protocol study. Six cases were constructed and video recorded as prompts to spur the clinicians to think aloud and describe their approach to the cases. Cases were designed to be slightly suggestive for pulmonary embolism or deep vein thrombosis, since these conditions are associated with CDRs. Using a constructivist grounded theory analysis, three investigators independently reviewed the transcripts from the interviews, meeting regularly to discuss emergent themes and subthemes until sufficiency was reached. Disagreements about themes were resolved by discussion and consensus. **Results:** Our analysis suggests that physicians engage in an iterative process when they are faced with undifferentiated chest pain and leg pain cases. After generating an original differential diagnosis, EPs engage in an iterative diagnostic process. They flip between hypothesis-driven data collection (e.g. history, physical exam, tests) and analysis of this data, and use this process to weigh probabilities of various diagnoses. EPs only apply CDRs once they are sufficiently suspicious of a diagnosis requiring guidance from a CDR and when they experience diagnostic uncertainty or wish to bolster their decision with evidence. **Conclusion:** EP cognition around diagnosis is a dynamic and iterative process, and may only peripherally integrate relevant CDRs if a threshold level of suspicion is met. Our findings may be useful for improving knowledge translation of CDRs and prevent diagnostic error. **Keywords:** clinical decision making, clinical decision rules, clinical reasoning

P018

Blocked practice outperforms random practice for learning resuscitative transesophageal echocardiography: a randomized controlled trial

J. Chenkin, MD, MEd, R. Brydges, PhD, T. Jelic, MD, E. Hockmann, MD, University of Toronto, Sunnybrook Health Sciences Centre, Toronto, ON

Introduction: Resuscitative clinician-performed transesophageal echocardiography (TEE) is a relatively new ultrasound application, however the optimal teaching methods have not been determined. Previous studies have demonstrated that random practice (RP), which increases the variability of training, may improve learning of procedural skills compared with blocked practice (BP). We compared RP and BP for teaching a resuscitative TEE protocol to emergency medicine residents using a simulator. **Methods:** We recruited emergency medicine residents with no prior TEE experience from a university-affiliated hospital. Participants completed a questionnaire and baseline skill assessment on a simulator, then were randomized to one of two groups. The BP group completed 10 repetitions of a fixed 5-view TEE sequence with instructor feedback, while the RP group completed 10 different random 5-view TEE sequences with feedback. Participants completed a simulation-based performance assessment immediately, and a transfer test consisting of a simulated patient encounter 1-2 weeks after training. Ultrasound images and transducer motion metrics were captured by the simulator for blinded analysis. Our primary outcome was the percentage of successful views on the transfer test, and secondary outcomes included participants confidence level, image quality, percentage of correct diagnoses, and efficiency of movement. We compared all scores using two-tailed, independent samples t-tests. **Results:** 22 participants completed the study (11 in the RP group, 11 in the BP group). There were no significant baseline differences between the groups. The BP group had a higher rate of successful views compared with the RP group on the transfer test (92.7% vs. 80.9%, $p=0.02$). While not statistically significant, the BP group had higher image quality on a 5-point scale (3.2 vs. 2.9, $p=0.09$), and fewer probe accelerations (297 vs. 403, $p=0.09$). The groups did not differ in rate of correct diagnoses (77.3%

vs. 72.7%, $p=0.73$), confidence level on a 10-point scale (6.2 vs. 6.2, $p=1.0$), or scan time (173 vs. 199 seconds, $p=0.28$). **Conclusion:** Emergency medicine residents randomized to BP had a higher success rate on a transfer test, compared to RP when learning resuscitative TEE using a simulator. We consider this pilot work that can inform future studies in both simulation and real clinical settings.

Keywords: transesophageal echocardiography, emergency ultrasound, medical education

P019

The path of least resistance: how computerized provider order entry can lead to (and reduce) wasteful practices

J. Choi, MD, MPH, University Health Network, Toronto, ON

Introduction: Background Computerized provider order entry (CPOE) is rapidly becoming the mainstay in clinical care and has the potential to improve provider efficiency and accuracy. However, this hinges on careful planning and implementation. Poorly planned CPOE order sets can lead to undetected errors and waste. In our emergency department (ED), lactate dehydrogenase (LDH) was bundled into various blood work panels, but had little clinical value. Aim Statement This quality improvement initiative aimed to reduce unnecessary LDH testing in the ED. **Methods:** Methods A group of ED physicians reviewed CPOE blood work panels and uncoupled LDH in conditions where it was deemed not to provide any clinically useful information. We measured the daily number of LDH tests performed before and after its removal. We tracked the frequency of other serum tests as controls. We also analyzed the number of add-on LDH (i.e. to add LDH to samples already sent to the lab) as a balancing measure, since this can disrupt work flow and delay care. **Results:** Results Through this intervention, we reduced the number of LDH tests performed by 69%, from an average of 75.1 tests per day to 23.2 ($p<0.0005$). The baseline controls did not differ after the intervention (e.g. a complete blood count was performed 197.7 and 196.1 times per day pre- and post-intervention, respectively [$p=0.7663$]). There was less than 1 add-on LDH per day on average. This translates to a cost savings of \$33,340.65 at our institution. **Conclusion:** Conclusions CPOE care templates can be powerful in shaping behaviours and reducing variability. However, close oversight of these panels is necessary to prevent errors and waste.

Keywords: quality improvement and patient safety, computerized provider order entry, order sets

P020

Post-return of spontaneous circulation care and outcomes a single centre experience

M. D. Clemente, MD, K. Woolfrey, MD, K. Van Aarsen, MSc, M. Columbus, PhD, Division of Emergency Medicine, Western University, London, ON

Introduction: Out of hospital cardiac arrest (OHCA) continues to carry a very high mortality rate, with approximately 10% surviving to hospital discharge. In 2015, the American Heart Association release updated guidelines dictating best practices in post-return of spontaneous circulation (ROSC) care, advocating for more liberal utilization of emergent coronary angiography. We sought to determine if the post-ROSC care at our centre during our study period adhered to the previously published (2010) guidelines. **Methods:** We performed a retrospective analysis (Sept. 2011 - June 2015) of the Resuscitation Outcomes Consortium (ROC) database, which contains pre-hospital, hospital and outcomes data on adult, EMS-treated, non-traumatic OHCA. Patients under 18 years, with missing age data or with obvious non-cardiac causes of arrest were

excluded. Key variables included rates of post-ROSC emergent angiography, survival to hospital discharge and survival to hospital discharge with favourable neurologic outcome (modified Rankin score 2). **Results:** During the study period, there were a total of 997 OHCA; 86 met exclusion criteria. Of the 911 remaining patients, 557 (61.1%) were transported to a local ED. Of those transported to the ED, 262 (47.0%) achieved sustained ROSC, defined as survival to ED discharge. Of those who achieved sustained ROSC, median age was 65 years (IQR = 21.75), 66.8% were male. ECG interpretation data was available on 214 patients, of whom 56 had definite STEMI, and 135 had definite absence of STEMI. 37/56 (66.1%) definite STEMI patients received coronary angiography within 24 hours of presentation, as per AHA guidelines. 58/262 (22.1%) post-ROSC patients overall received coronary angiography within 24 hours of presentation to the ED. Of those 58 patients who received emergent angiography, 38 (65.5%) underwent percutaneous coronary intervention (PCI). No patients received fibrinolysis. Of post-ROSC patients who received emergent coronary angiography, 40/58 (69.0%) survived to hospital discharge and 37/58 (63.8%) survived with good neurologic outcome. In comparison, 55/204 (27.0%) who did not receive emergent angiography survived to hospital discharge and 18.8% survived with good neurologic outcome. **Conclusion:** Only 22.1% of patients with OHCA, and only 66.1% with ECG-proven STEMI underwent emergent coronary angiography post-ROSC. Further investigation into causes for delay or the withholding of emergent angiography is necessary.

Keywords: cardiac arrest, angiography

P021

Outcomes of out of hospital cardiac arrest in London, Ontario

M. D. Clemente, MD, K. Woolfrey, MD, K. Van Aarsen, MSc, M. Columbus, PhD, Division of Emergency Medicine, Western University, London, ON

Introduction: Out of hospital cardiac arrest (OHCA) continues to carry a very high mortality rate, with approximately 10% surviving to hospital discharge. We sought to determine if outcomes from out of hospital cardiac arrest (OHCA) at our centre were consistent with recently published North American outcomes data from the Resuscitation Outcomes Consortium (ROC). **Methods:** We performed a retrospective analysis (Sept 2011 June 2015) of the Resuscitation Outcomes Consortium (ROC) database, which contains pre-hospital, in-hospital and outcomes data on adult, EMS-treated, non-traumatic OHCA. Patients under 18 years, with missing age data or with obvious non-cardiac causes of arrest were excluded. **Results:** During the study period, there were a total of 997 OHCA; 86 met exclusion criteria. Of the 911 remaining patients, 557 (61.1%) were transported to a local ED. 92 (35.1%) were receiving ongoing CPR at the time of their presentation to the ED. Of those transported to the ED, 262 (47.0%) achieved sustained ROSC, defined as survival to ED discharge. A total of 95 patients survived to hospital discharge (36.3% of patients who achieved sustained ROSC, 17.1% of those who were transported to the ED, and 10.4% of the all OHCA). Of those who survived to hospital discharge who had neurologic outcome data, 90.5% had a modified Rankin score of 2. Initial presenting rhythm with EMS was ventricular fibrillation or pulseless ventricular tachycardia in 233 patients. Of these, 212 (91.0%) were transported to the ED, 134 (57.5%) achieved sustained ROSC, and 71 (30.5%) survived to hospital discharge. 54/60 (90.0%) of those with a documented neurologic exam had a favourable neurologic outcome. Initial presenting rhythm with EMS was PEA or asystole in 636 patients. Of these, 320 (50.3%) were transported to the ED, 115 (18.1%) achieved sustained ROSC, and 17 (2.7%) survived to hospital discharge. 9/10 (90%) of those with a documented neurologic exam had a favourable neurologic outcome. 358 of the arrests were

witnessed. Of these, 274 (76.5%) were transported to the ED, 150 (41.9%) achieved sustained ROSC, and 51 (15.9%) survived to hospital discharge. 47/53 (88.7%) of those with a documented neurologic exam had a favourable neurologic outcome. **Conclusion:** Outcomes from out of hospital cardiac arrest in London, Ontario are comparable to other sites across North America.

Keywords: cardiac arrest, survival outcomes

P022

The revised METRIQ score: an international, social-media based usability analysis of a quality evaluation instrument for medical education blogs

I. Colmers-Gray, MD, MSc, K. Krishnan, BSc, T. M. Chan, MD, MHPE, N. Trueger, MD, MPH, M. Paddock, DO MS, A. Grock, MD, F. Zaver, MD, B. Thoma, MD, MA, MSc, University of Alberta, Department of Emergency Medicine, Edmonton, AB

Introduction: Online medical education resources are widely used in emergency medicine (EM), but strategies to assess quality remain elusive. We previously derived the Medical Education Translational Resources: Impact and Quality (METRIQ) 8 instrument to evaluate quality in medical education blog posts. **Methods:** As part of a subsequent validation study (The METRIQ Blog Study), a mixed-methods usability analysis was performed to obtain user feedback on the quality assessment instrument in order to improve its clarity and reliability. Participants in the METRIQ Study were first asked to rate five blog posts using the METRIQ-8 Score. They then evaluated the METRIQ-8 instruments ease of use and likelihood of being recommended to others using a 7-point Likert scale and free text comments. Participants were also asked to flag and comment on items within the score that they felt were unclear. Global usability ratings were summarized using median scores or percent rated unclear. We used ANOVA to test associations between ease of use and demographic factors. A thematic analysis was performed on the comments. **Results:** 309 EM medical students, residents, and attendings completed the survey. Global ratings were generally very favorable (median 2 [IQR 2-3], with 7 being the lowest score) for ease of use and likelihood of recommendation, and did not vary by participants country of origin, frequency of blog use, or learner level. Participants stated that the score was structured, systematic, and straightforward. They found it useful for junior learners and for guiding blog creation. Four questions in the score (questions 2, 4, 5, and 7) were identified by 10% of subjects to be unclear. Thematic analysis of comments identified suggested four main themes for improving the score: adding clearer definitions with marking rubrics; shortening the 7-point scale; adding items evaluating blog post presentation and utility; and, rephrasing the wording of certain questions for clarity. **Conclusion:** A mixed methods usability analysis of the METRIQ-8 instrument for assessing blog quality was globally well received by EM medical students, residents, and attendings. Qualitative analyses revealed multiple areas to improve the instruments clarity and usability. The METRIQ score is a promising instrument for evaluating the quality of blogs; further development and testing is needed to improve its utility.

Keywords: blogs, score/tool, mixed methods study

P023

La valeur diagnostique du 'Score de détection de la dissection aortique' et du ratio neutrophiles sur lymphocytes pour le syndrome aortique aigu

A. Cournoyer, MD, V. Langlois-Carbonneau, MD, R. Daoust, MD, MSc, J. Chauny, MD, MSc, Université de Montréal, Hôpital du Sacré-Coeur de Montréal, Institut de Cardiologie de Montréal, Montréal, QC