

Keywords: education, ultrasound, procedure

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The use of decision support tools in the implementation of the Prehospital Canadian Triage Acuity Score (Pre-CTAS)

K.E. Smith, BSc, MD, K. Lobay, DMD, MD, M. Bullard, MD; Royal Alexandra Hospital, Edmonton, AB

Introduction: The Prehospital Canadian Triage and Acuity Scale (Pre-CTAS) is based upon, and is consistent with, the CTAS (Canadian Triage and Acuity Scale). Paramedic-assigned Pre-CTAS scores using memory compared to Triage Nurse CTAS scores have previously demonstrated moderate inter-rater reliability. This is the first study to measure the effect of two different point-of-care decision support tools on the inter-rater reliability of paramedic assigned Pre-CTAS and Triage nurse CTAS scores. **Methods:** Paramedics were randomized to Pre-CTAS booklet or CTAS smartphone app during the one-year study period. Pre-CTAS scores assigned on arrival at hospital (AH) were compared with Triage Nurse CTAS scores and analyzed using Cohen's Kappa. Paramedics were then surveyed to assess the perceived utility and satisfaction with the decision support tools. **Results:** For 1663 patient transports, the weighted kappa score for Paramedic AH vs. Triage Nurse CTAS was fair at 0.38 (95% CI 0.35-0.41). For patients whose initial on-scene and AH Pre-CTAS scores did not change (n = 1405, 85%), Paramedic-Triage Nurse agreement was moderate at 0.43 (95% CI 0.39-0.46). The survey revealed that tools, when employed, helped assign scores; however accessing the additional resource was cumbersome or time consuming, and scores were occasionally assigned post clinical encounter. **Conclusion:** Point-of-care external decision support tools did not affect Pre-CTAS and ED CTAS agreement. These tools may add complexity or be perceived to add time to documentation within the delivery of clinical care if not implemented with adequate support. Future research needs to evaluate the impact of clinical decision support embedded within an electronic patient care record consistent with many ED information systems.

Keywords: Pre-CTAS, clinical decision support, paramedic

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Missed fractures on radiographs in a pediatric emergency department

J. E. Smith, MD, S. Tse, MD, N. Barrowman, PhD, A. Bilal, MD; Children's Hospital of Eastern Ontario, Ottawa, ON

Introduction: About 3-8% of fractures are missed in the adult emergency department (ED). No study has examined this in a pediatric ED. Such data is essential to quality improvement. We sought to determine the proportion of missed fractures on x-rays in a pediatric ED, the location of missed fractures and associated factors, and if missed fractures were clinically significant. **Methods:** We did a retrospective cohort study from Jan 1 to Dec 31, 2013 of 1000 pediatric patients with a fracture on x-ray in our academic pediatric ED. We randomly reviewed radiologist reports to find new fractures. A fracture was missed if identified by the radiologist but not the ED physician. Data was collected on patient, fracture, department and physician characteristics and change in management or complications. Descriptive statistics were used for clinical characteristics. The proportion of missed fractures was computed using the Wilson score method. Factors associated with missed fractures were investigated using chi-squared test. **Results:** Of 1000 x-rays, 19.4% (95% CI 17.0-22.0%) had at least one fracture missed. However, when possible fractures were removed for further analysis, 13.9% (95% CI 11.7-16.5%) were missed. The bones

most associated with missed fractures were pelvis (60%), carpal (50%), vertebra (42.9%), and patella (33.3%) ($p < 0.001$). However, these accounted for only 12.5% of missed fractures whereas ulna (31.3%), metatarsal (14.1%), phalynx of the hand (9.4%), and fibula (7.8%) accounted for the greatest number of missed fractures. The fracture types most associated with a missed fracture were styloid, Salter-Harris IV, Salter-Harris I, compression, avulsion and buckle ($p < 0.001$). The presence of multiple fractures was associated with missed fractures (35.0% vs 7.2%, $p < 0.001$) as was older age (11.2 vs 9.5 years, $p = 0.001$). Most missed fractures were not clinically significant (71.9%) but some required splinting or limitation of activities. One had decreased function at 2 months. **Conclusion:** Overall, the proportion of missed fractures is higher than in adults, stressing difficulties with reading pediatric x-rays. Most missed fractures were not of clinical significance. Carpal, patella, vertebra and pelvis fractures were particularly challenging but were also rare. Ulna, metatarsal, phalynx of the hand and fibula accounted for the greatest number of missed fractures. More education may help improve physician skills in recognizing these fractures.

Keywords: fracture, medical error, imaging

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The Ottawa Chest Pain Rule would increase stretcher capacity if implemented for cardiac chest pain patients

M. Sonntag, BSc, BSN, E. Lang, MD, University of Calgary, Calgary, AB

Introduction: Reducing the number of patients requiring cardiac monitoring would increase system capacity and improve emergency department (ED) patient flow. The Ottawa Chest Pain Rule helps physicians identify chest pain patients who do not require cardiac monitoring and is based on a 'normal or non-specific' ECG and being pain-free on initial physician assessment. Our objective was to measure the impact that the implementation of this decision rule would have on cardiac monitoring bed utilization in adult EDs in Calgary. **Methods:** A convenience sample of patients was prospectively obtained at each of the four Calgary adult emergency sites. All patients presenting with the Canadian Triage Acuity Scale chief complaint of "cardiac pain", or "chest pain with cardiac features" were captured for inclusion in the study. Real time interviews and survey assessments were conducted with the primary nurse and physician involved in each patient's care. **Results:** A total of 61 patients were captured by the study. Physicians identified cardiac as the primary rule-out pathology in 51% of these patients. The average Heart Score of all study patients was 4.2, and 30% of patients were ultimately admitted. Physicians believed that 39% of the 61 patients needed cardiac monitoring, while primary nurses believed that 59% needed monitoring. Of the 61 patients, 59% were triaged to areas providing cardiac monitoring. The application of the Ottawa Rule would have allowed 47% of patients triaged to cardiac monitoring to be taken off cardiac monitoring. This would translate to a total of greater than 74 hours saved or a reduction of 30% of the total cardiac monitored patient time. **Conclusion:** The Ottawa rule appears to be a low-risk emergency department flow intervention that has the potential to help reduce resource utilization in emergency departments. This change may result in increased emergency department capacity and improved overall patient flow. This simple rule based only on ECG findings and absence of chest pain can easily be applied and implemented without increasing physician workload or increasing risk to patients.

Keywords: cardiac monitoring, chest pain, clinical decision rule