

to CT head completion was 6 hours 50 minutes (sd 7:20) leaving an average of 4 hours 52 minutes awaiting these results. Ultimately 86% of patients were referred to a consultant of which 92% were to Psychiatry. **Conclusion:** This study of CT head scans for bizarre behavior ED presentations showed that the CT results did not change the clinical management of the patient. Furthermore, awaiting these results prolonged ED length of stay and delayed patient disposition. A prospective trial of a clinical decision tool for ordering CT head scans in these patients is warranted.

**Keywords:** neuroimaging, medical clearance, emergency department

#### LO060

##### **Diagnostic and prognostic value of hydronephrosis in emergency department patients with acute renal colic**

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**Introduction:** Hydronephrosis is a marker of stone-related ureteral obstruction. Our objective was to assess the diagnostic and prognostic value of hydronephrosis in ED patients with renal colic. **Methods:** We used an administrative database to identify all renal colic patients seen in Calgary's four EDs in 2014. Research assistants reviewed imaging reports to identify proven ureteral stones, and to document hydronephrosis and stone size. Surgical interventions, ED and hospital visits within 60-days were collated from all regional hospitals. The primary outcome was sensitivity and specificity of hydronephrosis (moderate or severe) for detecting stones >5mm. We also assessed the association of hydronephrosis with index admission-intervention, and with outcomes at 7 and 60 days. **Results:** In 2014, 1828 patients had a confirmed ureteral stone plus assessment of hydronephrosis and stone size (1714 CT, 114 US). Hydronephrosis was absent, mild, moderate or severe in 15%, 47%, 34% and 4% of patients respectively. Median stone size was 4.0, 4.0, 5.0 and 7.0mm for patients in these categories. Mild, moderate and severe hydronephrosis were highly associated with admission (OR = 2.0, 4.6, 9.8;  $p < 0.001$ ) and index visit surgical intervention (OR = 2.1, 3.7, 6.0;  $p < 0.001$ ). The presence of moderate-severe hydronephrosis was 54.7% sensitive and 65.4% specific for stones > 5mm, with positive and negative predictive values of 51% and 74.2%. Of 1828 patients, 748 had an index visit surgical procedure and 1080 were discharged with medical management. In the latter group, hydronephrosis was absent, mild, moderate or severe in 20%, 50%, 27% and 3%. Corresponding median (IQR) stone size was 3.0, 4.0, 4.0 and 5.0mm. Of 1080 medically managed patients, 19% and 25% had an unscheduled ED revisit by 14 and 60 days, 9% and 10% were hospitalized by 7 and 60 days, and 13% had a rescue procedure within 60 days. In the medically managed group, degree of hydronephrosis had no statistical association with any outcomes at 7 or 60 days. **Conclusion:** Hydronephrosis has poor sensitivity, specificity and predictive value for stones > 5mm. Degree of hydronephrosis is highly associated with MD decisions for admission and intervention, but not associated with patient outcomes in the absence of these decisions. Despite poor diagnostic and prognostic performance, hydronephrosis is likely guiding critical early management decisions.

**Keywords:** hydronephrosis, renal colic, diagnosis

#### LO061

##### **Variation in emergency department use of computed tomography for investigation of acute aortic dissection**

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**Introduction:** Acute aortic dissection (AAD) is a life threatening condition making early diagnosis critical. Although 90% present with acute pain, the myriad of associated symptoms can make investigation and diagnosis a challenge. Our objectives were to assess emergency physician use of CT, yield of CT and ordering variation among physicians in patients presenting with pain for diagnosis of AAD. **Methods:** This historical cohort study of consecutive adult patients presenting to two tertiary academic care EDs over one calendar year included patients with a primary complaint of non-traumatic chest, back, abdominal or flank pain. Patients were excluded if clear diagnosis was made by basic investigations or exam. Primary outcome was rate of CT Thorax or Thorax/Abdomen ordered to rule out AAD as per clinical indication on diagnostic requisition. Secondary outcome was variation in CT ordering. Variation was measured with; Cochran q test for homogeneity, proportion of positive CT's (z-test) and mean CT's (t test) ordered between high (>5CT/yr) and low (<5CT/yr) test users. Sample size of 6 per group was calculated based on an expected delta in mean CT ordered of 5 and a within group SD of 3. **Results:** 31,201 patients presented with chest, abdominal, back, flank pain during the study period. 8,472 were excluded based on a diagnosis made by clinical exam or basic investigations. 22,776 were included (Mean 47years SD 18.5yrs 56.2% Female). Most common diagnoses; Chest pain NYD (23.3%), Abdominal pain NYD(20.8%), Lower back pain NYD(10.5%), Renal Colic (5.3%), ACS (2.9%). CT was ordered to rule out AAD in 175 (0.7%) (Mean 62 years SD 16.5, 50.6% Female). Only 4(2.3%) were found to have an AAD. There was significant variation (range 0.6-12% Q test  $P < 0.027$ ) between proportion of CT's ordered by physicians. Between high (Mean 7.9 n = 10 AAD = 2) and low test users (Mean 2.3 n = 41 AAD = 2), there was significant difference in mean number of CT's ordered ( $p < 0.001$ ) but no difference in number of AAD found ( $p < 0.2$ ). No AAD were missed. **Conclusion:** Current rate of imaging for aortic dissection is appropriately low but inefficient, with 98% of advanced imaging negative. There is significant variation in physician CT ordering (almost 20-fold) without an increase in diagnosis. These findings suggest great potential for more standardized and efficient use of CT for the diagnosis of AAD.

**Keywords:** aortic dissection, imaging, variation

#### LO062

##### **Ultrasound-assisted distal radius fracture reduction**

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**Introduction:** Closed reduction of distal radius fractures (CRDRF) is a commonly performed emergency department (ED) procedure. The use of Point-of-care ultrasound (POCUS) to diagnose fractures and guide reduction has previously been described. The primary objective for this study was to determine if the addition of PoCUS to CRDRF changed the perception of successful initial reduction. This was measured by the rate of further reduction attempts based on POCUS following the initial clinical determination of achievement of best possible reduction. **Methods:** We performed a multicenter prospective cohort study, using a convenience sample of adult ED patients presenting with a distal radius fracture to 5 Canadian EDs. All study physicians underwent standardized PoCUS training for fractures. Standard clinically guided best possible fracture reduction was initially performed. PoCUS was then used to assess the reduction adequacy. Repeat reduction was performed if deemed indicated. A post-reduction radiograph was then performed. Clinician impression of reduction adequacy was scored on a 5 point Likert scale following the initial clinically guided reduction, and

following each POCUS scan and the post-reduction radiograph. **Results:** There were 131 patients with 132 distal radius fractures. Twelve cases were excluded prior to analysis. There was no significant difference in the assessment scores for reduction success by PoCUS vs. clinical assessment (Median scores 4 vs.4;  $p = 0.370$ ;) or in the odds ratio of successful reduction (0.89; 95% CI 0.46 to 1.72;  $p = 0.87$ ). Significantly fewer cases fell in the uncertain category with POCUS than with clinical assessment (12 vs 2;  $p = 0.008$ ). Repeat reduction was performed in 49 patients (41.2%). In this group, the odds ratio for adequate reduction assessment post-PoCUS to pre-PoCUS was 12.5 (95% CI 3.42 to 45.7;  $p < 0.0001$ ). There was no significant difference in the assessment of reduction by PoCUS vs. radiograph. **Conclusion:** PoCUS guided fracture reduction leads to repeat reduction attempts in approximately 40% of cases, and enhances certainty regarding reduction adequacy when clinical assessment is unclear.

**Keywords:** point-of-care ultrasound (PoCUS), fracture, reduction

#### LO063

##### Adverse events in a pediatric emergency department: a prospective, cohort study

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**Introduction:** Data regarding adverse events (AEs) (unintended harm to a patient related to health care provided) among children treated in the emergency department (ED) have not been collected despite identification of the setting and population as high risk. The objective of our study was to estimate the risk and type of AEs, as well as their preventability and severity, for children seen in a pediatric ED. **Methods:** This prospective cohort study examined outcomes of patients presenting to a paediatric ED. Research assistants (RA) recruited patients < 18 yrs old during 28 randomized 8-hr shifts (over 1 yr). Exclusion criteria included unavailability for follow-up and insurmountable language barrier. RAs collected demographics, medical history, ED course, and systems level data. A RA administered a structured telephone interview to all patients at day 7, 14, and 21 to identify flagged outcomes (such as repeat ED visits, worsening/new symptoms, etc). Admitted patients' health records were screened with a validated trigger tool. A RA created narrative summaries for patients with flagged outcomes/triggers. Three ED physicians independently reviewed summaries to determine if an AE occurred. Primary outcome was the proportion of patients with an AE within 3 weeks of their ED visit. **Results:** We enrolled 1367 (70.3%) of 1945 eligible patients. Median age was 4.3 yrs (range 2 months-17.95 yrs); 676 (49.5%) were female. Most ( $n = 1279$ ; 93.9%) were discharged. Top entrance complaints were fever ( $n = 206$ , 15.1%), cough ( $n = 135$ , 9.9%), and difficulty breathing ( $n = 108$ , 7.9%). Eight eighty (6.5%) patients were triaged as CTAS 1 or 2, 689 (50.6%) as CTAS 3, and 585 (42.9%) as CTAS 4 or 5. Only 44 (3.2%) were lost to follow-up. Flagged outcomes/triggers were identified for 498 (36.4%) patients. Thirty three (2.4%) patients suffered at least one AE within 3 weeks of ED visit; 30 (90.9%) AEs were related to ED care. Most AEs ( $n = 28$ ; 84.8%) were preventable. Management ( $n = 18$ , 54.5%) and diagnostic issues ( $n = 15$ , 45.5%) were the most common AE types. The most frequent clinical consequences were need for medical intervention ( $n = 15$ ; 45.5%) and another ED visit ( $n = 13$ , 39.4%). In univariate analysis, age ( $p = 0.005$ ) and weekday presentation ( $p = 0.02$ ) were associated with AEs. **Conclusion:** We found a lower risk of AEs than that reported among inpatient paediatric and adult ED studies utilizing similar methodology. A high proportion of AEs were preventable.

**Keywords:** pediatrics, adverse events, patient safety

#### LO064

##### Simulation in Canadian postgraduate emergency medicine training — a national survey

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**Introduction:** Simulation-based medical education (SBME) is an important training strategy in emergency medicine (EM) postgraduate programs yet the extent of its use is variable. This study sought to characterize the use of simulation in FRCP-EM residency programs across Canada. **Methods:** A national survey was administered to residents (PGY2-5) and program representatives (PR), either a program director or simulation lead at all Canadian FRCP-EM programs. Residents completed either paper or electronic versions of the survey, and PR surveys were conducted by telephone. **Results:** The resident and PR response rates were 60% (187/310) and 100% (16/16), respectively. All residency programs offer both manikin-based high fidelity and task trainer simulation modalities. Residents reported a median of 20 (range 0-150) hours participating in simulation training annually, spending a mean of 16% of time in situ, 55% in hospital-based simulation laboratories, and 29% in off-site locations. Only 52% of residents indicated that the time dedicated to simulation training met their training needs. All PRs reported having a formal simulation curriculum with a frequency of simulation sessions ranging from weekly to every 6 months. Only 3/16 (19%) of programs linked their simulation curriculum to their core teaching. Only 2/16 programs (13%) used simulation for resident assessment, though 15/16 (93%) PRs indicated they would be comfortable with simulation-based assessment. The most common PR identified barriers to administering simulation by were a lack of protected faculty time (75%) and a lack of faculty experience with simulation (56%). Both PRs and residents identified a desire for more simulation training in neonatal resuscitation, pediatric resuscitation, and obstetrical emergencies. Multidisciplinary involvement in simulations was strongly valued by both residents and PRs, with 76% of residents indicating that they would like greater multidisciplinary involvement. **Conclusion:** Among Canadian FRCP-EM residency programs, SBME is a frequently used training modality, however, there exists considerable variability in the structure, frequency and timing of simulation exposure for residents. Several common barriers were identified that impact SBME implementation. The transition to competency-based medical education will require a national, standardized approach to SBME that includes a unified strategy for training and assessment.

**Keywords:** simulation, education, emergency medicine

#### LO065

##### Reduced length of stay and adverse events using Bier block for forearm fracture reduction in the pediatric emergency department

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**Introduction:** Distal forearm fractures are one of the most common injuries presenting to the pediatric emergency department. Procedural sedation (PS) is commonly used to provide analgesia during fracture reduction, but requires a prolonged recovery period and can be associated with adverse respiratory events. Bier block (BB) regional anesthesia is a safe alternative to PS for fracture reduction analgesia. We sought to assess the impact of BB on length of stay (LOS) and adverse events following forearm fracture reduction compared to PS. **Methods:** We performed a retrospective study of patients aged 6 to 18 years, presenting with forearm fractures requiring closed reduction from June