

Conclusion: The evidence regarding the effectiveness of interventions to reduce C-spine imaging in adult ED patients with stable neck trauma is inconclusive. Given the national and international focus on improving appropriateness and reducing unnecessary imaging through campaigns such as Choosing Wisely®, additional interventional research in this field is warranted.

Keywords: diagnostic imaging, cervical spine, intervention

LO84

Computed tomography use for headache presentations to emergency departments in Alberta: regional, site and physician level variation

L. Krebs, MPP, MSc, C. Alexiu, BSc, C. Villa-Roel, MD, MSc, PhD, S.W. Kirkland, MSc, L. Gaudet, BSc, MSc, B.R. Holroyd, MD, MBA, M. Ospina, PhD, C. Pryce, BScN, MN, J. Bakal, PhD, S.E. Jelinski, PhD, DVM, B.H. Rowe, MD, MSc, University of Alberta, Edmonton, AB

Introduction: Headaches are a common emergency department (ED) presentation. Evidence demonstrates that computed tomography (CT) imaging varies significantly within and across sites. This study explored CT ordering and variation among headache presentations across Alberta EDs. **Methods:** Administrative health data for Alberta were obtained from the National Ambulatory Care Reporting System (NACRS) for all adult (>17 years) headache (ICD-10-CA: G44, G43, R51) ED visits from 2011-2015. Patients with a primary or secondary diagnosis code of headache were included. Exclusions were: sites without CT scanners, Canadian Triage and Acuity Scale score of 1, patients with trauma or external mechanism of injury (e.g., ICD-10-CA S,T,V,W,X,Y), or enhanced/contrast CTs. NACRS data were linked with Alberta Health Services' (AHS) diagnostic imaging data. Preliminary analysis on imaging variation at the zone, ED site, and physician level was completed using SAS (v.9.4). Physicians who saw less than an average of 10 headache patients per year were excluded. **Results:** Overall, 98,804 headache presentations were recorded (~20,000/year; 8.5% average annual increase) in 30 EDs. The average proportion of visits receiving CT was 25.1% with an average 6.2% increase per year. CT ordering varied across AHS zones (Variation [V]:23%; range:9.6-32.7%). Site ordering variation was more dramatic (V:45%; range:1.4-46.5%). The greatest variation was observed among physicians (V:84 %; range: 0.0-83.7%) with mean ordering proportion of 28.7%. **Conclusion:** From 2011-2015, headache presentations and CT imaging for these patients in the ED increased. Substantial variation in CT ordering exists at multiple levels in Alberta. Further exploration of CT appropriateness is urgently needed.

Keywords: diagnostic imaging, headache, emergency department

LO85

Substantial variation in CTPE ordering patterns and diagnostic yield in a large group of specialty-trained emergency physicians

E. Lang, MD, J. Andruchow, MD, MSc, D. Grigat, MA, G. Innes, MD, A. McRae, MD, University of Calgary, Calgary, AB

Introduction: Computerized tomography for pulmonary embolism (CTPE) has come under increased scrutiny with recommendations for evidence-based use found on Choosing Wisely lists in both Canada and the US. However practice variation in ordering patterns and diagnostic yield have not been well-reported for the Canadian context. Our objective was to investigate practice variation in CTPE ordering and rule-in rates within a large group of specialty-trained emergency physicians. **Methods:** We undertook an analysis of a computerized physician order entry database from four tertiary care EDs covering a 12-month period from August 1, 2016 to July 30, 2016 with 31 419 visits for potential

pulmonary embolism (PE) as determined by a previously validated algorithm based on presenting complaints. CTPE utilization and diagnostic yield were determined for 149 physicians who ordered at least 10 studies over that time period. Outcomes of interest included CT utilization as determined by electronic order entry and a confirmed diagnosis of PE based on ICD-10 coding of the emergency visit. Descriptive statistics using medians, IQR and 95% confidence intervals are reported. This study is approved through REB14-0650 and is a component of a larger cluster RCT to improve CTPE utilization. **Results:** During the study period 2670 CTPE studies were ordered for potential PE patients representing 8.5% of the total with relevant complaints. We observed a 10-fold variation in CTPE ordering among physicians with rates as low as 2.7% and as high as 25%. The median rate of CTPE ordering for potential PE was 8.8% with an IQR of 6.0% to 11.7%. A total of 4146 CTPE studies were ordered during the study period with physicians ordering an average of 28 CTPE studies each; range 10-90. In terms of diagnostic yield, 591/4146 studies, or 14.3% (95% CI 13.2-15.3%) were associated with a diagnosis of PE. Diagnostic yield per physician ranged from 0 to 50%, with a median of 13.5% and an IQR of 7.6% to 21.4%. **Conclusion:** In this large, robust administrative dataset from four Canadian urban EDs, threshold for CTPE ordering varies widely among physicians as does diagnostic yield. Efforts to improve appropriate utilization are justified with an eye to reducing unnecessary radiation, costs and incidental findings.

Keywords: computerized tomography, Choosing Wisely, pulmonary embolism

LO86

Overutilization of computed tomography as a first-line investigation for patients presenting with suspected recurrent nephrolithiasis in the emergency department: a retrospective cohort study

J. Himelfarb, BSc, J.S. Lee, MD, MSc, D. Shelton, MD, University of Toronto, Toronto, ON

Introduction: Computed tomography (CT) has increasingly been used as a standard initial investigation for patients presenting to the Emergency Department (ED) with suspected nephrolithiasis. Compared to ultrasound, CT has increased system-level costs, ionizing radiation exposure and frequently does not alter management. For these reasons, Choosing Wisely (CW) recommends avoiding CT imaging of otherwise healthy patients younger than age 50 years presenting with symptoms of uncomplicated renal colic that have a known history of nephrolithiasis or ureterolithiasis. We aimed to evaluate the degree of utilization of CT imaging for this subgroup of patients in a tertiary care centre ED. **Methods:** A retrospective chart review was performed for all patients younger than 50 years who visited Sunnybrook Health Sciences Centre ED for six months between December 2015 and May 2016 with renal colic symptoms and a history of nephrolithiasis. Demographic data, relevant past medical history, clinical presentation, lab values, urology consultation, ED treatments administered, diagnostic imaging orders and dispositions were recorded for each eligible patient. **Results:** Out of 130 reviewed patient charts, 73 patients were identified with a previous history of nephrolithiasis and a presentation consistent with uncomplicated renal colic. 54 patients received ultrasound, KUB x-ray, or no imaging. The other 19 (26.0%) of these patients received an abdominal/pelvic CT with an indication of looking for renal or ureteral stones. Of the patients that received CT, none demonstrated significant findings warranting hospital admission or leading to identifiable changes in ED management. Five (26.3%) of these 19 patients had received a total of three to four CTs for renal colic during past Sunnybrook ED visits, while one had previously received 13 CTs. **Conclusion:** CT scans are often used as an initial diagnostic modality for suspected renal colic

despite a Choosing Wisely recommendation to restrict the use of CT scans in a target population and infrequent changes in management after obtaining a CT. These findings highlight the need for quality improvement strategies to decrease CT utilization in this patient population with suspected renal colic.

Keywords: renal colic, Choosing Wisely, computed tomography

LO87

Use of a clinical prediction rule would lead to more effective CTA utilization for urgent brain imaging of suspected TIA/mild stroke in the emergency department

K. Votova, M. Bibok, PhD, R. Balshaw, PhD, M. Penn, M.L. Lesperance, PhD, M. Nealis, BSc, B. Farrell, MD, A. Penn, MD, Island Health Authority, Victoria, BC

Introduction: Canadian stroke best practice guidelines recommend patients suspected of Acute Cerebrovascular Syndrome (ACVS) receive urgent brain imaging, preferably CTA. Yet, high requisition rates for non-ACVS patients overburdens limited radiological resources. We hypothesize that our clinical prediction rule (CPR) previously developed for diagnosis of ACVS in the emergency department (ED), and which incorporates Canadian guidelines, could improve CTA utilization.

Methods: Our data consists of records for 1978 ED-referred patients to our TIA clinic in Victoria, BC from 2015-2016. Clinic referral forms captured all data needed for the CPR. For patients who received CTA, orders were placed in the ED or at the TIA clinic upon arrival. We use McNemar's test to compare the sensitivity (sens) and specificity (spec) of our CPR vs. the baseline CTA orders for identifying ACVS. **Results:** Our sample (49.5% male, 60.6% ACVS) has a mean age of 70.9 ± 13.6 yrs. Clinicians ordered 1190 CTAs (baseline) for these patients (60%). Where CTA was ordered, 65% of patients ($n = 768$) were diagnosed as ACVS. To evaluate our CPR, predicted probabilities of ACVS were computed using the ED referral data. Those patients with probabilities greater than the decision threshold and presenting with at least one focal neurological deficit clinically symptomatic of ACVS were flagged as *would have received a CTA*. Our CPR would have ordered 1208 CTAs (vs. 1190 baseline). Where CTA would have been ordered, 74% of patients ($n = 893$) had an ACVS diagnosis. This is a significantly improved performance over baseline (sens 74.5% vs. 64.1%, $p < 0.001$; spec 59.6% vs. 45.9%, $p < 0.001$). Specifically, the CPR would have ordered an additional 18 CTAs over the 2-yr period, while simultaneously increasing the number of imaged-ACVS patients by 125 with imaging 107 fewer non-ACVS patients. **Conclusion:** Using ED physician referral data, our CPR demonstrates significantly higher sensitivity and specificity for CTA imaging of ACVS patients than baseline CTA utilization. Moreover, our CPR would assist ED physicians to apply and practice the Canadian stroke best practice guidelines. ED physician use of our CPR would increase the number of ACVS patients receiving CTA imaging before ED discharge (rather than later at TIA clinics), and ultimately reduce the burden of false-positives on radiological departments.

Keywords: transient ischemic attack, computed tomography angiography, decision support

LO88

Bedside sonography performed by emergency physicians to detect acute appendicitis in the pediatric emergency department

M. Nicole, MD, J. Gravel, MD, MSc, M. Desjardins, MD, Hôpital du Sacré-Coeur de Montréal, Montréal, QC

Introduction: Previous studies have suggested that emergency physicians (EP) highly experienced in point-of-care ultrasound (POCUS)

have similar performance to formal ultrasound to identify appendicitis in children. The aim of this study was to evaluate the ability of EP with various levels of POCUS experience to detect appendicitis with POCUS among children visiting a pediatric ED. **Methods:** A prospective cohort study was conducted in an urban, tertiary care pediatric ED. Children aged 2 to 18 years old who presented to the ED with acute abdominal pain suggesting appendicitis were included. Patients were excluded if they had a history of appendectomy, hemodynamic instability requiring resuscitation, or were transferred with proven diagnosis of appendicitis. Participating EP had various levels of POCUS experience. Four of the 22 physicians were experienced in bowel sonography (EDU 2 level and higher) while the others were inexperienced in bowel sonography (EDU 1). All the participants received a 1-hour didactical and practical training session on appendix ultrasound. The treating physician performed all POCUS following initial physical exam, before further radiological evaluation. Final outcomes were determined by pathology and/or operative reports for surgical cases, and telephone follow-up at 3 weeks for those who did not have surgery. The primary analysis was a simple proportion for sensitivity and specificity for POCUS. Expecting a sensitivity of 80% based on previous studies, we calculated that a sample size of 50 cases would provide a 95%CI ranging from 66 to 90%. **Results:** We approached 140 patients, of which 121 accepted to participate and were recruited. After excluding 4 patients for missing POCUS data, 117 patients were included in the primary analysis, of which 51 (44%) had appendicitis. Twenty-two EP performed between 1 and 20 POCUS. The POCUS identified 27 out of 51 appendicitis for a sensitivity of 0.53 (95%CI 0.40-0.66). A negative POCUS was reported for 54 out of 66 patients without appendicitis (specificity of 0.82; 95% CI 0.71-0.89). **Conclusion:** This study shows limited sensitivity and specificity of POCUS when performed by EP with various level of experience for appendicitis in children. While showing lower sensitivity and specificity than previous studies, the inclusion of a large number of physicians solidifies the external validity of our conclusion.

Keywords: point-of-care ultrasound (POCUS), appendicitis, pediatrics

LO89

Factors associated with delay in trauma team activation and impact on patient outcomes

R. Connolly, MD, M. Woo, MD, J. Lampron, MD, J.J. Perry, MD, MSc, University of Ottawa, Department of Emergency Medicine, Ottawa, ON

Introduction: Trauma code activation is initiated by emergency physicians using physiologic and anatomic criteria, mechanism of injury and patient demographic factors in conjunction with data obtained from emergency medical service personnel. This enables rapid definitive treatment of trauma patients. Our objective was to identify factors associated with delayed trauma team activation. **Methods:** We conducted a health records review to supplement data from a regional trauma center database. We assessed consecutive cases from the trauma database from January 2008 to March 2014 including all cases in which a trauma code was activated by an emergency physician. We defined a delay in trauma code activation as a time greater than 30 minutes from time to arrival to trauma team activation. Data were collected in Microsoft Excel and analyzed in Statistical Analysis System (SAS). We conducted univariate analysis for factors potentially influencing trauma team activation and we subsequently used multiple logistic regression analysis models for delayed activation in relation to mortality, length of stay and time to operative management. **Results:** 1020 patients were screened from which 174 patients were excluded, as they were seen directly by the trauma team. 846 patients were included for