OR11

The role of GADD45B in serum induced premature senescence in Primary Glioblastoma cells.

Ritesh Kumar, Ian Lorimer
Division of Neurosurgery

Domain: Translational Research

Introduction: Glioblastoma (GBM) is the most common adult primary brain tumour. Despite full therapy, median survival is 14 months. Senescence, defined as growth arrest despite continued metabolic activity, has been found to be a powerful suppressor of tumorigenesis in Primary Glioblastoma (PriGO) cells. Serum induced senescence in PriGO cells was found to upregulate GADD45B, a protein involved in the cellular stress response. It has been shown to inhibit premature senescence in primary mouse embryonic fibroblasts induced by oxidative stress as well as induce differentiation in a variety of cell types. However, the role of GADD45B in PriGO cells in terms of senescence induction or differentiation is unknown and was investigated in this study.

Hypothesis: Inhibition of GADD45B can enhance serum induced senescence or differentiation in PriGO cells.

Methods: PriGO cells were harvested from human patients with GBM and cultured in serum free media. GADD45B was knocked down with two siRNA duplexes as confirmed with RT-PCR. Senescence was determined by SA-β-Gal assay and heterochromatin formation (PML bodies) by immunofluorescence. To test whether upregulation of GADD45B could alter the response of PriGO8A cells to serum, a doxycycline inducible GADD45B lentiviral system was developed. Differentiation along neuronal (TUJ1) and astrocytic (GFAP) lineages were determined by immunofluorescence. Results: GADD45B knock down did not show an increase in SAβGal activity and did not cause an increase in PML body detection. Doxycycline treatment resulted in an increase in GADD45B levels but failed to demonstrate a change in SAβGal positivity with serum treatment. GADD45B knockdown or overexpression did not induce differentiation in PriGO cells. Conclusions: GADD45B does not play a role in serum induced senescence or differentiation in PriGO cells. Future studies will aim to delineate the role of GADD45B upregulation in response to serum such as its effect on anti-apoptotic pathways.

Presenter: Dr. Ritesh Kumar

Presenter Contribution: I designed and conducted the experiments and performed the analysis.

OR12

Ottawa Classification for Symptomatic Acetabular Dysplasia: Assessment of Interobserver and Intra-observer Reliability

Kamal Bali, Kevin Smit, Mazen Ibrahim, Stephane Poitras, Geoffrey Wilkin, Etienne Belzile, Paul Beaule
Division of Orthopaedic Surgery

Domain: Clinical Research

Background: To overcome the shortcomings of classifying hip dysplasia based on just LCEA, Ottawa classification for adult acetabular dysplasia (OCAD) was proposed to classify symptomatic hips into three discrete prototypical patterns of hip instability; lateral/global, anterior, or posterior. The purpose of this study
was to assess the reliability of OCAD. Methods: 134 consecutive hips that underwent a periacetabular osteotomy were categorized using a validated software (Hip2Norm) into four categories of normal, lateral/global, anterior or posterior. Based on the prevalence of individual dysplasia and using KappaSize R package version 1.1, seventy-four cases were found to be necessary for reliability analysis: 44 dysplastic and 30 normal hips were randomly selected. Six blinded raters provided with a flowchart based on the OCAD then looked at the x-rays at two separate time points (minimum two weeks apart) to classify the hips using standard PACS measurements. Thereafter, a consensus meeting was held where a modified flow diagram was devised before a third reading by four raters using a separate set of 74 radiographs. Results: The overall intra-rater reliability amongst the raters for time 1 and time 2 ranged from moderate (κ=0.416) to almost perfect (κ=0.873). With respect to inter-rater reliability for time 1 and time 2, there was substantial agreement overall between all surgeons (time 1 κ=0.619; time 2 κ=0.623). Agreement for normal rating (time 1 κ=0.759; time 2 κ=0.785) and lateral rating category (time 1 κ=0.847; time 2 κ=0.862) was substantial to almost perfect. At time 1, both posterior and anterior rating categories had moderate agreement (posterior κ=0.557; anterior κ=0.438). At time 2, posterior and anterior rating categories had moderate (κ=0.506) and fair (κ=0.250) agreement respectively. At time 3, overall inter-rater reliability for normal and lateral ratings was substantial. Reliability across posterior and anterior ratings showed an increase in absolute value of kappa (posterior κ=0.579; anterior κ=0.521). Conclusion: OCAD provides a reliable way to identify three categories of acetabular dysplasia that are well-aligned with surgical management.

Presenter: Dr. Kamal Bali

Presenter Contribution: Designing the study, Reviewing all the radiographs and classifying hip dysplasia patients, Analysis, Manuscript preparation

OR13

Type of Anesthesia For Lower Extremity Arterial Revascularization Surgery: A Population-Based Comparative Effectiveness Study

Derek Roberts, Sudhir Nagpal, Dalibor Kubelik, Timothy Brandys, Henry Stelfox, Manoj Lalu, Alan Forster, Colin McCartney, Daniel McIsaac

Division of Vascular Surgery

Domain: Clinical Research

Introduction: Interventions to decrease adverse outcomes and resource use are required in the frequently older, frail, and comorbid patients indicated for lower extremity arterial revascularization surgery (endarterectomy or bypass). We hypothesized that the type of anesthesia (neuraxial or general) provided to these patients may represent one such intervention. Methods: We conducted a comparative effectiveness study in Ontario, Canada using linked, population-based health administrative data. We identified Ontario residents 18 years-of-age or older who underwent lower extremity arterial revascularization surgery. Multilevel, multivariable regression was used to determine the association between type of anesthesia and 30-day mortality, perioperative complications, length of stay (LoS), hospital readmissions, and health system costs. The association between 30-day mortality was also examined using propensity score and instrumental variable analyses that control for confounding by indication. Results: In total, we included 20,988 patients who underwent lower extremity arterial revascularization surgery, including 6,453 who received neuraxial and 14,535 who received general anesthesia. In multilevel, multivariate analyses, administration of neuraxial instead of general anesthesia was associated with a lower odds of 30-day mortality [odds ratio (OR)=0.68; 95% confidence interval (CI)=0.57-0.83]. This association remained consistent in propensity score and instrumental variable analyses. Multilevel, multivariable analyses also suggested that neuraxial anesthesia was associated with a lower odds of
perioperative complications (OR=0.73; 95% CI=0.63-0.85) and hospital readmissions (OR=0.92; 95% CI=0.83-0.98); a median 0.5 (95% CI=0.3-0.6) day shorter LoS; and a $2,819 (95% CI=$2,566-$3,089) 30-day cost savings to the Ontario health system. Conclusions: In this population-based, comparative effectiveness study, use of neuraxial instead of general anesthesia in patients undergoing lower extremity arterial revascularization surgery was associated with a lower odds of mortality, complications, and readmissions; a shorter LoS; and decreased costs to the health care system.

Presenter: Dr. Derek Roberts

Presenter Contribution: Primary Investigator and First Author. I conceived the idea for the study, conducted a background search of the literature to define the research question and design the study methodology, obtained the data, and analyzed the data with input from my primary research advisor. I also wrote the study protocol, which is available online and was posted online before we analyzed any study data (available on the Open Science Framework at https://osf.io/sy4xu/). I am currently writing the manuscript for submission for peer-review.

OR14

Thematic Analysis from Patient and Surgeon Focus Groups: Development of a Novel Acromioclavicular Joint Patient-Reported Outcome Measure

Saif Aldhuhoori, Mahmoud Almasri, J Pollock, Stuart G. Nicholls, Peter Lapner

Division of Orthopaedic Surgery

Domain: Clinical Research

Introduction: AC joint (ACJ) instability and osteoarthritis (OA) are common pathologies affecting the ACJ. General shoulder patient-reported outcome measures (PROMs) have been used to assess outcomes in ACJ instability or OA. These PROMs are not sensitive enough to detect small but clinically important differences in ACJ function. The limitation of current specific ACJ PROMs lies in the methodological approach used to generate them. The Delphi method was applied to patients and surgeons regarding ACJ pathology to ascertain a comprehensive representation of patients’ and surgeons’ perspectives. The objective of this study was to identify ACJ specific issues that patients and surgeons identified as important in relation to ACJ pathology.

Methods: A combination of focus groups used to explore perspectives on the research questions. A consecutive series of patients with ACJ pathology were invited to participate. Patient focus groups were stratified into ACJ instability or OA cohorts. Surgeons provided their clinical experiences with ACJ pathology. Transcripts underwent an open coding followed by condensation into themes. In all cases, themes were coded and tabulated by 2 separate examiners. Results: Five focus group discussions were conducted with a total of 16 patient participants. There were 10 patients and 6 patients in the ACJ instability and OA cohorts respectively. Two separate surgeon focus groups were conducted. The most common patient-expressed themes relevant to ACJ instability and OA were pain centered over the ACJ, night pain, activities limitation, difficulty carrying, range of motion limitation, irritation and mechanical symptoms. Surgeons pointed out two themes (scapulothoracic dyskinesis and scapular pain), which were not mentioned by patients. Conclusion: The study findings indicate important aspects to patients and surgeons are missing from existing PROMs. The next step will be a larger study to examine the importance of each of the identified issues. This will facilitate a better understanding of which items should be taken forward for consideration prior to formal development of a comprehensive measure.

Presenter: Dr. Saif Aldhuhoori
OR15

**Do Postoperative Infectious Adverse Events Influence Cancer Recurrence and Survival after Surgical Resection of Esophagogastric Cancers? Experience from a Canadian University Centre**

Stephen Gowing, Caitlin Anstee, Amanda Mattice, Maia Shen, Patrick James Villeneuve, Farid Shamji, Donna Maziak, Sebastien Gilbert, Sudhir Sundaresan, Lorenzo Ferri, Andrew JE Seely

Division of Thoracic Surgery

Domain: Clinical Research

Surgical resection of esophageal and gastric cancers is a critical component of multimodality curative intent therapy. We sought to evaluate if post-operative infectious adverse events (AEs) are associated with increased risk for earlier cancer recurrence and mortality. We retrospectively analyzed all patients who underwent surgical resection of esophageal or gastric cancers between 2008 and 2017 at a Canadian University Centre, who were undergoing prospective AE monitoring. Patients with metastatic disease discovered intra-operatively, R2 resections, patients experiencing in hospital mortality, gastrointestinal stromal tumors, neuroendocrine tumors and benign lesions were all excluded. Data are presented as median [interquartile range]. Log-Rank and Cox Regression analysis statistical tests were performed. Of the 315 patients analyzed (235 esophageal cancer and 80 gastric cancer), 183 (58%, 158 R0, 25 R1) patients experienced no complications or non-infectious complications; 132 (42%, 109 R0, 23 R1) patients experienced infectious complications. R0 patients in the non-infectious group demonstrated a disease-free survival (DFS) of 811 days [430-1427.5] compared to 478 days [242-1082] in the infectious group (p<0.001). In a similar manner, overall survival (OS) for R0 non-infectious patients was 952 days [548-1729] compared to 744 days [355-1265] (p<0.001). Regarding DFS, in multivariable analysis, pathological N stage, infectious complications and R1 resection were all strong predictors of recurrence (p<0.001). With respect to OS, R1 resection, infectious complications and final pathological stage all significantly influenced mortality (p<0.001). Post-operative infectious AEs occur commonly following surgical resection of esophagogastric tumors, and appear to increase the risk for early cancer recurrence and mortality. This highlights the imperative to not only reduce the incidence of infectious complications, and to investigate translational therapies to mitigate the potentially deleterious oncologic effects of infectious AEs.

Presenter: Dr. Stephen Gowing

Presenter Contribution: I formulated the clinical hypothesis, applied for ethics, completed the database, performed the statistical analysis and wrote the abstract.

PP11A

**Everyone is awesome: Analyzing letters of reference in a General Surgery residency selection process**

Towaij C, Raiche I, Younan J, Gawad N

Division of General Surgery
Introduction: Resident selection includes reviewing letters of reference (LORs). Given their inherently subjective nature, our ability to rely on LORs is unknown. The purpose of this study was to assess the frequency with which LORs use objective qualifiers to describe applicants and whether these terms might be representative of the applicant pool. Methods: A retrospective cohort analysis of all LORs submitted by Canadian Medical Graduates to the University of Ottawa General Surgery Program in 2018 was conducted. A database was created including demographics of applicants and referees. Objective qualifiers identified a priori were recorded (mentions of level, average, comparisons to residents, and percentages). Descriptive statistics were used to analyze the demographics of applicants and LORs, and frequency of use of objective qualifiers. Results: 343 LORs describing 114 applicants were analyzed. 82% (n=291) used objective qualifiers to describe applicants. Of these, 45% of LORs described applicants as functioning at a resident level, 21% as being the “best”, 55% as above average, and only 20% as being average. A global percentage was used in 28% of letters (n=97) and the average was 9%. Rankings of applicants called “best” in a LOR ranged from 2nd to 104th in our file review process. Conclusion: Most LORs use objective qualifiers, which are generally positive. It’s unclear whether the use of positive qualifiers is inflated, or whether the absence of a positive qualifier implies a negative impression of the applicant. As such, objective qualifiers alone should not be relied on when assessing LORs.

Presenter: Dr. Chelsea Towaij

PP12A

A pre-clerkship procedural curriculum for future Canadian medical education: A pilot study

Céline Sayed, Maria Merlano, Frank Battaglia, Meghan McConnell, Christopher Ramnanan, Robert Feibel, Nikhil Rastogi

Division of Other

Domain: Education Research

Introduction: Procedural skills training during pre-clerkship varies significantly across Canadian medical schools. Therefore, this project aimed to develop a novel curriculum to train 2nd-year medical students on procedural skills through a flipped-classroom, near-peer model of education. We predict that this will decrease student anxiety and increase confidence related to procedural skills performance. Methods: Through an online application form, 12 second year medical students out of 52 were randomly selected as the program group (PG), while the rest were treated as the control group (CG). All students were asked to complete State-Trait Anxiety Inventory and confidence questionnaires related to procedural skills before the start of the program. Over a 5-month period, students in the PG participated in 4 training sessions (suturing, IV insertion, airway management, local anesthesia) taught by physicians at the University of Ottawa Simulation Centre. The CG participated in the standard medical school curriculum where they may be exposed to theory in lectures, interest group workshops, and clinical observerships. Following training, questionnaires were repeated in both the PG and the CG. Results: There was a significant decrease in mean anxiety state within the PG pre- vs. post-program (2.48 to 1.74, p-value < 0.01). However, there was no change in anxiety within the CG (2.05 to 2.23, p-value=0.408). When assessing confidence, students who completed this program showed increased self-assessed knowledge and confidence in suturing (7.75 to 17.25, p-value <0.01), IV insertion (6.71 to 18.29, p-value <0.01), and local anesthesia (6.71 to 18.29, p-value <0.01), whereas the CG did not demonstrate any change in confidence in those three skills. Conclusions: This pilot study suggests that integration of a procedural skills training program
within Canadian medical school curricula in pre-clerkship has the potential to improve medical student anxiety and confidence. This may ease the transition into clerkship by providing a technical foundation that facilitates learning, but it can also positively impact patient care given continued practice on simulation technologies.

Presenter: Céline Sayed

Presenter Contribution: -Data analysis -Data Interpretation -Manuscript drafting & revisions

**PP13A**

**Comparing two approaches to residency application file review**

Julia Younan, Nada Gawad, Chelsea Towaij, Isabelle Raiche

Division of General Surgery

Domain: Education Research

Background: The residency selection process has become increasingly competitive, making selection more challenging. This study’s objective was to compare two approaches to file review: one focusing on applicant traits (i.e. leadership, communication, etc.), and the other on file elements (i.e. curriculum vitae, reference letters, etc.). Methods: Ten members of the University of Ottawa General Surgery Program file review committee were randomized into two groups, and evaluated 7 randomly selected Canadian applicant files. The first group scored files based on their elements, and the second group based on applicant traits. Feedback was collected regarding each scoring tool, the discrimination capacity of the tool was measured using variation in scores, and inter-rater reliability (IRR) was calculated for each tool using intra-class correlation (ICC) in a 2-way random-effects model. Results: Both tools identified same top- and bottom-ranked applicants, however discrepancies were noted for middle-ranked applicants. The score range for the three middle-ranked applicants was greater with the trait-based tool (6.43 vs. 3.80). The IRR for trait-based scoring was superior to element-based scoring (ICC = 0.82 vs. ICC = 0.55). The trait-based tool required only two raters to achieve an ICC ≥ 0.70. The main criticisms of the trait-based tool were difficulty finding certain traits within the file, and longer review time. Conclusions: Using a trait-based file review strategy can facilitate file review with good reliability compared to element-based. Improved identification of traits within the file can be facilitated by making their role in the review process explicit to applicants and referees.

Presenter: Dr. Julia Younan

Presenter Contribution: Collaborated in development of the methods. Conducted the study, data collection and analysis. Primary author for the project.

**PP14A**

**Functional durability of hemodialysis access**

Mark Rockley, Swapnil Hiremath, Prasad Jetty

Division of Vascular Surgery

Domain: Clinical Research
Introduction: The decision to perform hemodialysis (HD) via arteriovenous access (AV) using either a fistula (AVF) or graft (AVG) or central venous catheter (CVC) can be difficult for patients and practitioners. The characteristics and factors influencing the practical functional durability of HD access are not well described. We investigated the functional durability of HD access for patients on chronic HD. Methods: This retrospective cohort study identified all patients undergoing chronic HD for over 3 months in the Champlain NephroCare network between 2003-2018. Access site cumulative patency was defined as the functional duration of AV access site despite revisions, or CVC site despite exchange over guidewire. Survival analysis was performed with Cox regression with competing risk for transplants. Results: 7218 eligible dialysis access creations in 2721 patients were identified. AVF and AVG represented 1809 (25%) and 210 (3%) of all access sites. 93% of CVC, 81% of AVF, and 78% of AVG were ever used. After creation, revision or replacement was performed for 66% of CVC, 88% of AVF, and 94% of AVG (p<0.01). When used, median cumulative patency was 4.5 years for CVC, 6.2 years for AVF, and 3.5 years for AVG. Age interacted with probability of access site patency; AVF access performed better in patients younger than 53 years old, whereas CVC was superior over 53 years (p<0.01). When only considering access sites that were ever used, the threshold age increased to 71 years. Male gender (HR 1.1 p=0.02) and Indian or Pacific Islander ethnicity (HR 1.4 p=0.01 and HR 1.7 p<0.01) were associated with reduced patency. Adjusting for demographics, AVF was more durable than CVC (HR 0.74 p<0.01) while AVG performed worse (HR 1.57 p<0.01). Prior CVC access and lower vs upper arm placement were not associated with patency (HR 0.80 p=0.80 and HR 0.9 p=0.26 respectively). Conclusion: Most HD access is not durable for the full duration of HD requirement, which needs to be communicated with patients. While AVG consistently performed worse, age significantly affects the probability of sustained durability between AVF and CVC. Ethnicity and gender should also be considered.

Presenter: Dr. Mark Rockley

Presenter Contribution: Analytic plan, data cleaning and analysis, synthesis, and writing of manuscript / abstract.

PP15A

Smoking in Bariatric Surgery: A Systematic Review

Alexandra Chow, Amy Neville

Division of General Surgery

Domain: Clinical Research

Introduction. The prevalence of smoking among patients undergoing bariatric surgery has been reported to be as high as 40%. The effect of smoking in the perioperative period has been well studied in various other surgical procedures. The objective of this study is to review the existing literature examining: (1) the impact of smoking on postoperative morbidity and mortality after bariatric surgery, (2) the relationship between smoking and weight loss after bariatric surgery, and (3) the efficacy of smoking cessation in the perioperative period among bariatric surgery patients. Methods. A search of electronic databases including MEDLINE, EMBASE, and the Cochrane Library from 1946 to May 2018 was performed to identify relevant articles. Following an initial screen of 940 titles and abstracts, 540 full articles were reviewed. Results. Forty-four studies met criteria for analysis. Smoking within 1-year of bariatric surgery was found to be an independent risk factor for increased 30-day mortality as well as major postoperative complications, in particular thromboembolic events and pulmonary complications. Smoking was significantly associated with long-term complications including bone fracture and marginal ulceration. Smoking has little to no effect on weight loss following bariatric surgery with some studies reporting at most a 3% increased percentage excess weight loss. Smoking remains prevalent after bariatric surgery in up to 15% of patients and rates of smoking recidivism after bariatric surgery are high.
Conclusion. The findings of this review support stopping smoking at least 1-year prior to bariatric surgery, in contrast to current best practice guidelines which recommend only a minimum of 6-weeks of abstinence. Given the high rates of postoperative smoking and relapse, future investigation is needed on the implications of continued smoking on long-term outcomes for bariatric surgery patients.

Presenter: Dr. Alexandra Chow

Presenter Contribution: I conducted the systematic review including analysis of all abstracts and articles, qualitative and quantitative synthesis, and manuscript writing.

PP11B

THE FINANCIAL IMPLICATIONS OF TRAUMA PATIENTS AT A LEVEL 1 TRAUMA CENTER: A RETROSPECTIVE COHORT STUDY

Adam M. Fontebasso, Sonshire Figueira, Jacinthe Lampron, Maher M. Matar

Division of General Surgery

Domain: Clinical Research

Introduction: Traumatic injuries cause significant morbidity and mortality around the world and despite this trauma care has been traditionally underfunded. We sought to characterize the factors which correlate with high in-hospital costs for trauma patients cared for at a single Level 1 Trauma Center. This information would help support an economic needs assessment within this critical domain of healthcare. Methods: We retrospectively analyzed all patients admitted to the trauma service between the years of June 2013 and June 2018. A total of 2381 patients were identified. Demographic, clinical and costing data were tabulated for analysis. Statistical analysis was used to study total costing between patients on the basis of age, injury severity score (ISS) and Charlson Comorbidity Index score (CCI). We compared patients in the top and bottom 10th percentiles of expense to assess various characteristics including Hospital-patient One-year Mortality Risk (HOMR) score. Results: Within our cohort of 2381 identified patients, the mean +/- standard error of the mean (SEM) direct cost (CAD$) per patient was $17,746.23 +/- $633.65, mean indirect cost $5,961.65 +/- $204.34 and mean total cost was $23,707.88 +/- $837.52. The average acute length of stay in hospital was 11.2 days (range: 1-227 days). Direct, indirect and total cost was highly associated with ISS (ISS>15; P <1 x10^-35) and higher CCI (P<0.0001). Patients representing the top 10th percentile of total cost demonstrated increased HOMR scores at admission (P=1.9 x 10^-15). Conclusions: Cost analysis provides a glimpse of the funding requirements mandated by trauma centers caring for injured patients with a plethora of comorbidities. High ISS and CCI were correlated with higher hospital costs. HOMR scores were significantly higher between the top and bottom 10th percentile of cost. This demonstrates patient-specific characteristics which are associated with high in-hospital cost and help in development of healthcare costing strategies for traumatically injured patients.

Presenter: Dr. Adam Fontebasso

Presenter Contribution: Primary researcher, application to REB, data acquisition and analysis, first author.

PP12B

Use of a skin bridge incision and prophylactic incisional negative pressure wound therapy associated with reduction in surgical site infections following inguinal lymph node dissection
Division of General Surgery

Domain: Clinical Research

Introduction: Surgical site infection (SSI) following ILND is common. Post-operative SSI is associated with decreased quality of life, significant health care resource utilization and delays to initiation of adjuvant oncology treatment. Modification to surgical technique to a two-incision technique with skin bridge (SB) from the traditional lazy-S (LS) incision, as well as utilization of prophylactic incisional negative pressure wound therapy (iNPWT) are theorized to reduce the risk of SSI following ILND. Methods: A single-centre, retrospective review of patients undergoing ILND pre and post-implementation of ILND bundle aimed at reducing the incidence of SSI between October 2013-January 2019 was performed. The bundle was implemented in September 2016 and involved a SB incision, running subcuticular skin closure, and prophylactic placement of a iNPWT. Prior to this point, a LS incision was used, with stapled skin closure, without iNPWT. Postoperative adverse events and health care resource utilization were compared between groups. Results: 34 ILND were performed in 33 patients over the study period (n=15 ILND pre-implementation and n=19 ILND post-implementation of bundle). The cohorts were similar across baseline demographics. Implementation of a bundle was associated with reduction in post-operative SSI (31.6% vs 73.3%, p=0.036), elimination of wound dehiscence (0 vs 33.3%, p=0.0108) and need for consultation with wound care specialists in hospital (0 vs 46.7%, p=0.001). Multivariable logistic regression controlling for smoking status demonstrated the bundle was associated with a 5.8 fold reduction in SSIs (OR: 0.173; 95% CI: 0.038-0.796, p=0.0243). Trends towards reduction in post-operative antibiotic prescription (43% vs 65%, p=0.223) and length of stay (2.4 vs 3.4 days, p=0.198) following implementation of the bundle were observed. Conclusion: Preliminary data demonstrating a reduction in SSIs following implementation of ILND bundle advocates for a change in practice from the LS to SB with placement of an iNPWT in ILND. Further research is needed to determine the utility of iNPWT following ILND in comparison to the use of SB incision alone.

Presenter: Dr. Giuseppe Frenda

Presenter Contribution: Project design and data collection

**PP13B**

**Use of subcutaneous low-suction drains for the prevention of wound-related complications in obese renal transplant recipients**


Division of Urology

Domain: Clinical Research

Introduction: Post-operative wound complications in the kidney transplant population are common and can include infection, hematoma, lymphocele, dehiscence, and hernia. The association between elevated body mass index (BMI) and wound complications has been well studied. Wound-related complications contribute to longer hospital stays, higher readmission rates and return trips to the emergency department. Intervention that reduce the risk of wound complications may mitigate postoperative morbidity. At our centre, surgeons begun using extra-fascial, low-suction (Jackson-Pratt) drains in patients with elevated BMI as a prophylactic strategy. We set out to determine whether the placement of these drains at the time of kidney transplantation was protective.
against wound-related complications. Methods: A retrospective chart review of all patients who underwent renal transplantation at The Ottawa Hospital between January 1, 2016 and January 20, 2018 was conducted. Patient demographics, type and severity of complications, and drain use were recorded. Univariate and multiple logistic regression analysis was performed to determine the relationship between drain use and wound complications. Results: A total of 295 patients were identified, with an average age of 55 years. Ninety-seven (33%) patients were obese or morbidly obese (BMI>30). Drains were used in 24 (39%) non-obese patients and 38 (61%) obese or morbidly obese patients. Wound complications were found in 33 (51%) obese patients, 13 (39%) of whom had drains. Univariate analysis identified drain use as a protective factor for wound complications (OR 0.41, 95% CI: 0.236, 0.708). Multiple regression analysis indicated no significant effect of drain use on wound complication rate, however, BMI and delayed graft function were independent risk factors for the development of wound complications (OR 1.09 and 2.99 respectively, p<0.05). Conclusions: We failed to demonstrate a convincing benefit to using superficial incisional drains in overweight and obese renal transplant recipients.

Presenter: Dr. Nick Paterson

Presenter Contribution: Project design, Data Analysis, Abstract/Manuscript preparation

PP14B

Analysis of search engine trends of men’s ten leading causes of death to assess public interest in men’s health topics in Canada.

Max Levitt, Luke Witherspoon, J. Stuart Oake

Division of Urology

Domain: Education Research

Introduction: Patient education and interest surrounding common causes of death is an essential aspect of men’s healthcare. Internet search engine data may provide an honest and data-rich representation of what health topics are currently capturing the interest of Canadians. In this study, we used Google Trend data to assess the 10 most common causes of death in men and assess how Canadian patients are investigating these topics online. Methods: We utilized Google Trends to assess search data regarding the ten Leading Causes of Death (LCOD) in men according to the CDC in 2015, as they were searched between 2014-2018 in Canada. Google Trends is an online service for analysis of all search queries of a term or topic. Interest in a subject is condensed into a search volume index (SVI). SVI trends can be reported based on either time or geographic region. SVIs are normalized values with the most popular time or geographic area being given a score of 100 out of 100, with all other variables related to this value. Results: Of the ten search queries assessed with the Google Trends, the top three geographic regions (Mean SVI ± Standard Deviation (SD)) that were searching these topics were Saskatchewan (85.3 ± 10.4), Newfoundland and Labrador (78.9 ± 29.9), and Ontario (75.2 ± 10.8). Interestingly, there was very little interest in the search query “Unexpected/Accidental Death” across Canada with only 5/13 provinces showing interest in this topic. Over our five-year study period the most commonly searched terms (Mean SVI ± (SD)) of the ten assessed were diabetes (80.1 ± 7.5), heart disease (66.2 ± 12.0), and Alzheimer’s disease (63.7 ± 14.1). Of these top three terms, searches about diabetes peaked in December 2015, heart disease searches peaked in February 2018, and Alzheimer’s disease searches peaked in January 2015. Conclusions: This study shows some of the first evidence that analysis of online activity can help guide insight into the real-time interest of the general public into topics in men’s health. Implications of this work include directing of educational materials and assistance in policy making guided by geographical interest in specific men’s health topics.

Presenter: Dr. Max Levitt
OR21

**Acute Kidney Injury is Associated with Worse Long-term Survival in Patients who Underwent Thoracic Aortic Surgery: A Propensity-matched Study**

Ming Hao Guo, Diem T Tran, David Glineur, Talal Al-Atassi, Munir Boodhwani

Division of Cardiac Surgery

Domain: Clinical Research

Introduction: Post-operative acute kidney injury (AKI) has been associated with worse in-hospital outcomes in cardiac surgery. However, the impact of AKI on short-term outcomes and long-term survival in thoracic aortic surgery has not been well-studied. Methods: From 2004 to 2018, 1151 consecutive patients underwent thoracic aortic surgery at a single center. AKI was defined according to the Acute Kidney Injury Network (AKIN) criteria as class I, II and III. Propensity scores for the development of AKI were determined by a non-parsimonious multivariable logistic regression model including pre-operative and intra-operative variables, and a greedy matching algorithm was used to create 1:1 propensity matched pairs. Outcomes included in-hospital mortality and morbidity; Kaplan-Meier curves were plotted for long-term survival. Results: The incidence of post-operative AKI in thoracic aortic surgery patients was 38.5%. Patients with postoperative AKI were more likely to be older, being female, hypertensive, diabetic, had previous cardiac surgery, required more urgent surgery and had a lower hemoglobin and creatinine clearance. They were also more likely to have undergone arch surgery, concomitant cardiac surgery, and deep hypothermic circulatory arrest. After propensity matching, the 303 matched pairs were similar in all pre-operative and intra-operative characteristics. Within the matched cohort, patients with AKI had higher in-hospital mortality (7.9% vs. 2.0%, p < 0.01), cerebrovascular events (10.9% vs. 5.9%, p = 0.03), prolonged ventilation (24.7% vs. 6.7%; p < 0.01), and length of ICU stay (7.5 days vs. 3.0 days, p < 0.01). The 10-year survival for patients without AKI was 92.4% as compared to 79.6% for patients with AKI (p < 0.01). There is no significant difference in 10-year survival between those without AKI and those with mild AKI (AKIN Class I); however, 10-year survival is worse for patients with AKIN Class II or III kidney injury (67.9% vs. 89.8%, p < 0.01). Conclusion: The development of moderate to severe AKI with AKIN Class II or III after thoracic aortic surgery is associated with worse in-hospital morbidity and mortality and long-term survival.

Presenter: Dr. Ming Hao Guo

Presenter Contribution: Generate hypothesis, data collection, data analysis

OR22

**Risk factors for emergency visits following urologic outpatient surgery**


Division of Urology

Domain: Quality Improvement Research
Introduction: Urologic surgeries have been previously identified as having high rates of readmission compared to other surgeries. This study aims to identify risk factors leading to presentation to the emergency department (ED) following urologic outpatient surgery. Methods: We examined all outpatient surgeries performed by urology, general surgery, thoracic surgery, and gynecology occurring at three hospitals within The Ottawa Hospital system between April 1, 2008, and February 28, 2018. We captured all ED visits within 90 days of the outpatient procedure. Surgical characteristics included hospital campus, procedure end time, and day/month/year of procedure. Patient characteristics assessed included age, sex, marital status, presence of primary care provider, socioeconomic status (SES), American Society of Anesthesiologists (ASA) score, and Elixhauser comorbidity index. Results: 55,681 outpatient procedures were performed by the four services assessed over our time period. 7447 ED visits within 90 days were identified (13.4% of total). Urological procedures accounted for 59.5% (n=4427) of the patients returning to the ED. Univariable analyses of individual variables found that increased age, male sex, low SES, increased ASA score, unmarried status, increased Elixhauser comorbidity index, and hospital campus were all associated with higher rates of ED visits (p<0.05). There did appear to be a significant difference in the rate of ED visits between year of procedure (p<0.0001) with a noted decreasing trend. Conclusions: ED visits following urologic outpatient procedures are common. This study identifies risk factors to identify patients that may benefit from additional education or support after outpatient urologic surgery to reduce ED care needs.

Presenter: Dr. Luke Witherspoon

Presenter Contribution: Luke Witherspoon is presenting on behalf of Christopher Langley. This presentation is not eligible for awards, but you may still submit feedback to the authors.

OR23

Optimal configuration for bypass of the LAD during bilateral internal thoracic artery grafting

Habib Jabagi, Anahita Malvea, Diem Tran, David Glineur, Fraser Rubens

Division of Cardiac Surgery

Domain: Clinical Research

Introduction: Coronary artery bypass graft (CABG) surgery is considered the most effective and durable approach to multi-vessel coronary revascularization primarily attributed to the excellent patency of the internal thoracic artery (ITA) to left anterior descending (LAD) artery graft. This success has led to the increased use of bilateral ITA (BITA). However, it is not clear whether the left ITA (LITA) or the right ITA (RITA) should be used for the LAD. Therefore, the objective of this study was to compare clinical outcomes between LITA-LAD and RITA-LAD configurations in BITA grafting. Methods: The primary outcome was need for percutaneous or surgical re-intervention of the LAD. Secondary outcomes included all-cause mortality and cardiac mortality. Cox proportional hazard and competing risk models were used with entropy weighting. Results: The studied cohort included 1527 BITA patients with LITA-LAD and 523 with RITA-LAD. The median follow-up was greater in the LITA-LAD group (6.5 years IQR[2.7, 11.3] vs 5.5 years[2.4, 9.2], p<0.001). Before entropy weighting, RITA-LAD patients were significantly older with more diabetes, peripheral vascular disease and left ventricular dysfunction and more urgent status (all with p<0.05). Cases with RITA-LAD were also more frequently performed off-pump (p<0.001). Predicted need for repeat revascularization of the LAD territory at 10 years was 2.8% in the LITA-LAD group and 1.8% in the RITA-LAD group. There was no difference in the need for LAD re-revascularization between groups (Subhazard HR [SHR] 0.686 95% CI [0.296, 1.589], p=0.38). There was no difference in long term all-cause mortality (HR 1.056 95%CI [0.677, 1.647], p=0.81). Adjusted survival at 10 years was 97.2% in the LITA-LAD group and 98.2% in the RITA-LAD group. There
was no difference in the risk of cardiac death (SHR 1.062 95%CI [0.502, 2.250], p=0.87). Conclusion: The use of either the LITA or the RITA for LAD grafting during BITA revascularization has no effect on long-term cardiac and all-cause mortality or need for repeat revascularization of the LAD territory. Cardiac surgeons should be confident in using a RITA-LAD bypass in their operative strategy.

Presenter: Dr. Habib Jabagi

Presenter Contribution: Along with Dr. Rubens, I made substantial contributions to the conception and design of this study. I acquired, analyzed, and interpreted the data in this study. I wrote the manuscript in anticipation of publication. I critically revised the study and manuscript for important intellectual content, and final approval along with the other authors.

OR24

Predicting risk of mortality in patients undergoing aortic surgeries: what are we missing?

Trinh Mai, Mark Rockley, Sandra Mekhaiel, Prasad Jetty

Division of Vascular Surgery

Domain: Clinical Research

Introduction: Risk prediction models identify patients at high risk of mortality following major vascular surgeries; however, these models primarily focus on non-modifiable patient characteristics. Our study assessed the effects of perioperative events in predicting 30-day mortality in patients undergoing elective aortic surgery.

Methods: All patients who underwent elective aortic surgeries between 2002 and 2016 were included in this retrospective cohort study. Data was collected on patient demographics, co-morbidities, and intra-operative. Matched-pairs using survivor-sampling with a 2:1 ratio was utilized based on gender, age, and procedure type. Risk estimation model scores (V-POSSUM, BAR, and GAS) were calculated and analyzed alongside perioperative factors and CLASSIC grade (classification for intra-operative adverse events). Multiple logistic regression with adjustments for covariates was used to assess the relationship between predictors and outcome.

Results: 2589 elective procedures were performed (open=57.6%, EVAR=41.9%, Hybrid=0.5%). Overall 30-day mortality was 1.8% (n=43). Intra-operative factors significantly predicted 30-day mortality, including surgery time (p=0.024), anesthesia time (p=0.003), proximal aortic clamp level (p<0.001), number of blood transfusions (p=0.009), and CLASSIC grade (p<0.001). The BAR risk model had reasonable ability (AUC=0.61) at predicting 30-day mortality. The other models (V-POSSUM, AUC=0.54; GAS, AUC=0.53) performed relatively poorly. A custom risk assessment model including preoperative factors (CRF, COPD, IDDM, and ASA score) demonstrated an AUC of 0.72; however, with the inclusion of intra-operative factors (surgery time, anesthesia time, clamp level, number of blood transfusions, and CLASSIC grade), the accuracy of the model greatly increased (AUC=0.94). Conclusion: Current risk prediction models underestimate the significance of intra-operative factors in predicting 30-day mortality in patients undergoing elective aortic surgeries. Recognizing intra-operative factors associated with adverse outcomes may allow for identification of high risk patients and aid in the provision of optimal post-operative care.

Presenter: Dr. Trinh Mai

Presenter Contribution: Data extraction, data analysis, writing

OR25

My On Call (MOC) Pager App: Practicing and assessing safe clinical decision-making
Nada Gawad, Heather McDonald, Fraser Rubens, Isabelle Raiche

Division of General Surgery

Domain: Education Research

Introduction: The steep learning curve when students transition to residents is particularly susceptible to increased medical errors, thus compromising patient safety. Clinical decision-making (CDM) skills are a major contributor to preparedness for residency and educators agree should be purposefully taught and tested. Despite this, little structured assessment of decision-making exists. This project presents the development and preliminary results of an innovative tool for CDM assessment. Methods: My On Call (MOC) Pager App is a simulated pager program designed by our team as a learning and assessment tool for senior medical students and junior residents to practice safe CDM as they transition between these roles. Learners are randomly “paged” by the app about a list of virtual patients and must integrate pertinent patient information efficiently to answer. Learners then receive a page-management question that further probes their CDM skills by asking them to consider the urgency and their level of confidence when determining the virtual patient’s needs. Results: The pilot app was successfully alpha-tested in 2016 and 2017 with 20 fourth year medical students at our institution. A mixed-effects model of 1,329 pages revealed a significant increase in the proportion of correctly-answered pages over a one week elective (p=0.04). Subjectively, students felt more comfortable managing patients and answering pages (p<0.001) and greatly enjoyed using the app, citing it as “an excellent learning tool” and an “innovative method of assessment” as they transitioned to residency. The app was then adapted for the National Cardiac Surgery Bootcamp for use by first-year residents, and recently rebuilt to support widespread national dissemination. Conclusions: The MOC Pager App provides an innovative approach to CDM assessment, with a unique real-time approach that integrates prioritization, time management, and efficiency with no risk to real patients. Preliminary results demonstrate feasible integration of the app into medical training, and positive user feedback. The rebuilt app will allow customizable and simultaneous use by multidisciplinary learners anywhere in the world.

Presenter: Dr. Nada Gawad

Presenter Contribution: Intellectual property of the innovation, data collection, data analysis, successful securement of grant funding, meeting with app developers to rebuild app, national presentations, manuscript writing and publication x2.

OR26

Evaluation of intrinsic hand musculature reinnervation following supercharge end-to-side anterior interosseous to ulnar motor nerve transfer

Linden K. Head, Zach Z. Zhang, Katie Hicks, Gerald Wolff, Kirsty U. Boyd

Division of Plastic Surgery

Domain: Clinical Research

INTRODUCTION: Supercharge end-to-side (SETS) anterior interosseous (AIN) to ulnar motor nerve transfer is commonly performed in our institution to augment intrinsic hand function. Following observations of recovery patterns, we hypothesized that despite its more distal innervation the first dorsal interosseous (FDI) recovers to a greater extent than the abductor digiti minimi (ADM). The objective of this work was to evaluate the clinical and electrodiagnostic pattern of reinnervation of intrinsic hand musculature following SETS AIN to ulnar motor nerve transfer. METHODS: A retrospective cohort of prospectively collected data included all patients who...
underwent a SETS AIN to ulnar motor nerve transfer (2011-2017). Two independent reviewers performed data collection. Reinnervation was assessed with two primary outcome measures: (i) clinically with serial Medical Research Council strength assessments and (ii) electrodiagnostically with serial motor amplitude measurements. Statistical analysis was performed using parametric and non-parametric statistics. RESULTS: Seventeen patients (65% male, mean age 56.9±13.3 years) were included with a mean follow-up of 16.7±8.5 months. Preoperatively, all patients demonstrated clinically significant weakness and electrodiagnostic evidence of denervation. Postoperatively, strength and motor amplitude increased significantly for both the FDI (p=0.002, p=0.046) and the ADM (p=0.044, p=0.020). Despite comparable preoperative strength (p=0.098), postoperatively FDI achieved significantly greater strength when compared to the ADM (p=0.023). CONCLUSIONS: In our practice, SETS AIN to ulnar motor nerve transfer is a beneficial procedure for patients presenting with proximal ulnar nerve pathology. Recovery of intrinsic muscle function differs between ADM and FDI, with better recovery observed in the more distally innervated FDI. Further work to elucidate the underlying physiologic and anatomic basis for this discrepancy is indicated.

Presenter: Dr. Linden K. Head

Presenter Contribution: Study design, study execution, data analysis, manuscript preparation.

PP21A

Diagnosis of Elevated Intracranial Pressure in Critically Ill Adults – A Systematic Review and Meta-Analysis

Shannon M. Fernando, Alexandre Tran, Wei Cheng, Bram Rochwerg, Monica Taljaard, Kwadwo Kyeremanteng, Shane W. English, Mypinder S. Sekhon, Donald EG Griesdale, Dar Dowlatshahi, Marek Czosnyka, Victoria A. McCredie, Eelco FM. Wijdicks, Saleh A. Almenawer, Kenji Inaba, Venkatakrishna Rajajee, Jeffrey J. Perry

Division of General Surgery

Domain: Clinical Research

INTRODUCTION: Elevated intracranial pressure (ICP) is a complication of primary brain injury. Invasive ICP monitoring is not available in all settings and is associated with important complications, and therefore clinicians often rely upon non-invasive diagnostics. We sought to summarize and compare the accuracy of physical examination, computed tomography (CT), sonography of the optic nerve sheath diameter (ONSD), and transcranial doppler pulsatility index (TCD-PI) for diagnosis of elevated ICP in critically ill patients.

METHODS: We searched six databases from inception through August 2018. We included English-language studies (observational and randomized controlled trials). Gold standard was ICP ≥ 20 mmHg using invasive ICP monitoring, or intraoperative diagnosis of raised ICP. Summary estimates were generated using a Hierarchical Summary Receiver Operating Characteristic model. RESULTS: We included 37 studies (4,768 patients). Of physical examination signs, pooled sensitivity and specificity for increased ICP were: mydriasis (28.2% [95% CI: 16.0-44.8], 85.9.0% [95% CI: 74.9-92.5]), posturing (54.3% [95% CI: 36.6-71.0], 63.6% [95% CI: 46.5-77.8]) and Glasgow Coma Scale (GCS) ≤ 8 (75.8% [95% CI: 62.4-85.5], 39.9% [95% CI: 26.9-54.5]). Among CT findings, compression of basal cisterns had 85.9% [95% CI: 58.0-96.4] sensitivity and 61.0% [95% CI: 29.1-85.6] specificity; any midline shift had 80.9% [95% CI: 64.3-90.9] sensitivity and 42.7% [95% CI: 24.0-63.7] specificity; and midline shift ≥ 10mm had 20.7% [95% CI: 13.0-31.3] sensitivity and 89.2% [95% CI: 77.5-95.2] specificity. Finally, pooled area under the ROC curve for ONSD sonography was 0.94 (95% CI: 0.91-0.96). TCD-PI had poor accuracy for detecting raised ICP. CONCLUSION: Absence of any one physical examination feature is not sufficient to rule-out elevated ICP. Significant midline shift may suggest elevated
ICP, but absence of shift cannot rule it out. ONSD sonography may have utility, but further studies are needed. Suspicion of elevated ICP may necessitate treatment and transfer, regardless of individual non-invasive tests.

Presenter: Dr. Alexandre Tran

Presenter Contribution: Study conception Methodology design Data extraction Manuscript creation and revision

**PP22A**

Passive versus active intraabdominal drainage following pancreatic resection: does a superior drainage system exist? A systematic review and meta-analysis

Lily Park, Laura Baker, Heather Smith, Alexandra Davis, Jad Abou-Khalil, Guillaume Martel, Fady Balaa, Kimberly A. Bertens

Division of General Surgery

Domain: Clinical Research

Introduction: Following pancreatic resections, controversy exists regarding the use of passive gravity (PG) versus closed suction (CS) drainage systems, and their impacts on the development of clinically relevant post-operative pancreatic fistula (CR-POPF). The objective of this systematic review was to compare the incidence of adverse events and resource utilization associated with PG and CS drainage following pancreatic resections. Methods: Medline, Embase, and Central databases were searched from inception to January 2019. Published studies comparing PG and CS drains following pancreatic resections were identified. The primary outcome was CR-POPF. Secondary outcomes included delayed gastric emptying (DGE), wound infections, post-pancreatectomy hemorrhage, hospital readmission, and mortality. Where appropriate, data was pooled using the random-effects model and reported as odds ratios (OR). Results: One randomized control trial (RCT) and four cohort studies involving 4351 patients were included. One study (n=181) reported a significant decrease in CR-POPF with CS, while remaining studies found no differences. Considerable inter-study variability was identified, namely in the model of drain employed, drain removal protocols, and the use of perioperative adjuncts to mitigate CR-POPF. Meta-analysis found no difference in the odds of developing CR-POPF between CS and PG systems (OR 0.62, p=0.21, i²=86%). Subgroup analysis (n=3 studies) for pancreaticoduodenectomy (PD) markedly reduced heterogeneity (OR 1.06, p=0.64, i²=0%) while subgroup analysis for distal pancreatectomy maintained high heterogeneity. PG was associated with decreased odds of DGE in PD (OR 1.29, p=0.04, i²=0%) and wound infection (OR 1.38, p=0.01, i²=0%). There were no differences between groups for other secondary outcomes. Conclusion: Current evidence suggests that the type of drainage system may not impact the risk of CR-POPF following pancreatic resection. However, high heterogeneity between studies limits the interpretation of results. Possible superiority of PG drains in decreasing DGE and wound infection merits further exploration. Higher quality RCTs are required to draw more robust conclusions.

Presenter: Lily Park

Presenter Contribution: Under the guidance of Dr. Bertens and Dr. Baker (PGY3) I wrote and registered our Prospero protocol. I helped screen all abstracts identified through our search strategy, as well as full text screening for study inclusion. I created the data extraction form and helped to collect and organize relevant data. I also conducted the data analyses and wrote the abstract.

**PP23A**
Symptomatic bowel complications in metastatic cancer patients: Comparison of surgical vs medical outcomes and development of a prediction model for successful surgical palliation.

Brittany Dingley, Heidi Li, Olivier Brandts-Longtin, Johanna Dobransky, Laura Baker, Adrian Bailey, Carolyn Nessim

Division of General Surgery

Domain: Clinical Research

INTRODUCTION: Selecting appropriate management for metastatic cancer complications is crucial in prolonging survival and maximizing quality of life. No studies have compared surgical vs medical management for bowel obstruction, bleeding or perforation in metastatic cancer patients with all types of primaries. A prediction model to identify patients who would benefit from palliative bowel surgery is needed. METHODS: A retrospective single-center study compared demographic, clinical and surgical variables/outcomes for patients managed medically or surgically, following presentation of malignant bowel obstruction (MBO) between 2008-2017. Mann-Whitney-U test was used to compare continuous variables; Fischer’s-exact test for dichotomous variables; Log-rank for survival curve comparison. In surgical group, logistic regression identified predictors of survival greater than 3 months following MBO surgery. RESULTS: Among 402 patients, 144(36%) were surgically managed and 258(64%) were medically managed. Surgical group had higher survival at 3 months [68.4%(95%CI:60.6-76.2) vs 34.9%(95%CI:28.8-41.0)] and 24 months [31.8%(95%CI:23.6-40.0) vs 8.7%(95%CI:4.78-12.6)](p< 0.001). Median survival for surgical group, 8 months(0-70), was longer than medical group, 1 month(0-87)(p< 0.001). Significant differences(p<0.05) between surgical/medical groups: survival, ascites, lymph nodes/soft tissue metastases, active treatment at acute presentation, discharge location. Significant predictors of dying within first three months: in surgical group, low albumin(p=0.036,OR:0.711) and diversion surgery(p=0.026,OR:28.822)(R2:0.612); in medical group, presence of peritoneal metastases(p=0.001,OR:4.262) and absence of active treatment at acute presentation(p=0.023,OR:0.506)(R2:0.295). CONCLUSIONS: Palliative bowel surgery may result in better short and long-term survival compared to medical management for patients presenting with metastatic cancer complications. Predictors of survival greater than 3 months following MBO surgery were combined to form a strong prediction model. We hope to develop and validate a simple clinical risk score to appropriately select patients for palliative surgery.

Presenter: Heidi Li

Presenter Contribution: I collected and helped analyzed data. I wrote the abstract and will be involved in manuscript writing.

PP24A

Implementation of a Standardized Protocol for the Closure and Care of Perineal Wounds associated with reduction in health care resource utilization and perineal wound complications following Abdominal Perineal Resection

Cahill, C., Baker, L., Rosenzveig, A., Fowler, A., Warraich, A., Moloo, H. Musselman, R., Raiche, I., Williams, L

Division of General Surgery

Domain: Clinical Research
Introduction: Impaired perineal wound healing is a major source of morbidity after abdominoperineal resection (APR). Rates of perineal wound complications after primary closure are reported as high as 37.6%. No standardized approach to the closure and care of these incisions has been published. The aim was to develop a standardized protocol for the management of primarily closed perineal wounds after APR and to assess its impact on perineal complication rates at The Ottawa Hospital. Methods: Using Comprehensive Unit-based Safety Program framework, an inter-professional team reviewed the literature, reached consensus using nominal group technique and developed a standardized perineal wound protocol. It included standards for pre- and intra-operative interventions, dressings, activity and post-discharge care. Perineal wound complications were compared pre- and post-implementation, using data from ACS NSQIP supplemented by retrospective chart review. Results: 29 patients underwent APR with primary closure prior to implementation of the protocol and were compared to 23 patients who underwent APR post-implementation. The groups were similar with respect to their demographics. The incidence of perineal wound infection in the pre-implementation group was 31.3% compared with 13.0% post-implementation (p=0.188). Implementation resulted in the reduction of wound specialist consultation both during admission (p=0.014) and at discharge (p=0.014). A non-statistically significant reduction in incidence of perineal wound dehiscence (p=0.064) was observed. The protocol eliminated the incidence of presentation to the emergency department (p=0.256) and readmission following discharge (p=0.497) for perineal wound complications. Conclusion: A standardized approach to management of primarily closed perineal wounds following APR was successfully developed, implemented and demonstrated statistically significant reduction in specialized nursing care as well as clinically meaningful reduction of perineal wound complications. Future directions include wider implementation of this protocol across multiple centres, with ongoing audit of incidence and sequelae of perineal wound complications.

Presenter: Dr. Alicia Rosenzveig

Presenter Contribution: Data collection, analysis, and write up

**PP21B**

**Correct usage of propensity score methodology in contemporary high-impact surgical literature**

Elysia Grose, Samuel Wilson, Jeffrey Barkun, Kimberly Bertens, Guillaume Martel, Fady Balaa, Jad Abou Khalil

Division of General Surgery

Domain: Quality Improvement Research

Introduction: Propensity score (PS) analysis is commonly used in observational trials to account for confounding when estimating the effects of interventions. Improper use and reporting of PS analysis can introduce bias and alter conclusions made. The aim of this study is to review the appropriate use and adequate reporting of PS methods in high impact surgical journals. Methods: We searched the 10 surgical journals with the highest impact factors to identify studies utilizing PS analysis from January 1st, 2016 to December 14th, 2018. We selected criteria for the proper conduct of PS analysis and systematically appraised the quality of reporting. Results: PS analysis was employed in 305 surgical studies published in high impact journals within the study period. PS matching was used in 83% (n=254) of studies, with a minority employing other techniques including PS weighting, PS stratification, and covariate adjustment using the PS. Among the articles assessed, 94% (n=286) of the studies included the variables used to generate the PS and 90% (n=273) included the type of regression model used to generate the PS. However, 78% (n=237) did not measure the predictive ability of their PS. In those studies using PS matching (n=254), 57% (n=146) of studies included less than half of their total sample size in their matched analysis. Furthermore, 21% (n=53) did not include the matching algorithm used to
generate the matched sample, 60% (n=152) used inappropriate statistical methods for a matched cohort and
39% (n=99) failed to perform an analysis of covariate balance between groups. Conclusion: This study
demonstrates that even in research published in high quality surgical journals, several studies using PS analysis
report their methods inadequately. Our work identifies the need for more rigorous reporting of PS methodology
in order to allow appropriate interpretation of results.

Presenter: Elysia Grose

Presenter Contribution: I have been extensively involved in this project from conception to completion. I
performed a literature review to better understand the use of propensity scores in surgical literature. I
 collaborated with our team and a librarian to develop the methodology for this project. Additionally, I searched
the top 10 surgical journals and gathered articles using propensity score analysis for inclusion in our study. I
also developed the data extraction form based on previous literature. Samuel Wilson (second author) and I
extracted data from 305 articles for this project. Furthermore, I wrote the abstract and am in the process of
preparing the manuscript for publication. In addition, I ensured each member of our research team was engaged
and kept updated throughout our project.

PP22B

Tumor Resectability and Recurrence following Endoscopic Endonasal Trans-sphenoidal Pituitary Adenoma Surgery: An Single Institution Experience

Mohammad Alshardan2 MD, Fahad Alkherayf2, MSc, MD, Andrea Lasso1 MSc, Sepideh Mohajeri3, Pourya Masoudian3, Andre Lamothe1, MD, Charles Agbi2, MD, Lisa Caulley1, MD, MSc, Fatmahalzahra Banaz1 MD, Shaun Kilty1 MD

Division of Neurosurgery

Domain: Clinical Research

Background: Pituitary tumors account for up to 15% of all intracranial tumors. The purpose of this study was to
evaluate our institutional results for pituitary adenoma surgery done using the endoscopic endonasal trans-
sphenoidal (EETS) approach. Study design: Retrospective cohort. Methods: Institutional REB approval was
attained for a retrospective review of all EETS cases for pituitary tumor resection since 2009. The hospital
database were completed by medical records personnel to identify cases of pituitary tumors resected using the
EETS approach. Patient characteristics, tumor type, endocrine data, operation characteristics were then extracted
from medical records pertaining to patient baseline characteristics. Preoperative MRI images were reviewed and
the SIPAP classification applied to the pituitary tumors. Postoperative results were extracted for the duration of
the follow-up period available for each patient. Results were analyzed using Chi2 test for categorical variables
and t test for continuous variables using STATA/IC. Results: Total of 202 cases were identified, 57% was
male. The mean age of the cohort was 56 years old. Functional tumors represent 29% of the cohort. Patients with a
suprasellar or parasellar SIPAP score of (0 or 1) had complete resection of their tumor in 66.6% of cases, 29% with a
suprasellar or parasellar SIPAP score ≥ 2 (RR 2.3CI1.58-3.39, p = 0.0005). When the tumor was completely
resected radiologically, the mean time to recurrence was not different for the SIPAP (0 or 1) group which was
27 months in comparison to 34 months for the group with a SIPAP score ≥ 2 (p = 0.13). Conclusions: In this
cohort, a lower preoperative MRI SIPAP score was associated with a greater chance for complete resection of
the adenoma indicating that less invasive tumors on preoperative imaging are more likely to get complete
resection. Further, despite a more advanced preoperative SIPAP score, tumors that can be completely resected do
not have a higher recurrence rate than less extensive or less invasive tumors. The results of our study can be used
to better inform patients about their expected outcomes of EETS based on the preoperative MRI SIPAP score of
their tumor.
PP23B

Intraoperative flash visual evoked potential recording and relationship to visual outcome

David A. Houlden, Chantal A. Turgeon, Nathaniel S. Amyot, Idara Edem, John Sinclair, Charles Agbi, Thomas Polis, Fahad Alkhereyf

Division of Neurosurgery

Domain: Clinical Research

Introduction: Neurosurgery performed along the visual pathway is associated with post-operative visual dysfunction. We aimed to determine the relationship between intraoperative flash visual evoked potential (FVEP) monitoring and visual function post-operatively. Methods: Intraoperative FVEPs were recorded from electrodes placed in the scalp overlying the visual cortex (Oz) after flashing red light stimulation delivered by Cadwell LED stimulating goggles in 58 patients with skull base lesions. Restrictive filtering (typically 10–100 Hz), optimal reject window settings, mastoid reference site, total intravenous anesthetic (TIVA), and stable retinal stimulation (ensured by concomitant electroretinogram [ERG] recording) were used to enhance FVEP reproducibility. Results: The relationship between FVEP amplitude change and visual outcome was determined from 116 eyes. One eye had a permanent intraoperative FVEP loss despite stable ERG, and this eye had new, severe postoperative visual dysfunction. Five eyes had transient significant FVEP change (>50% amplitude decrease that recovered by the end of surgery), but only one of those had a decrease in postoperative visual acuity. FVEP changes in all six eyes (one permanent FVEP loss plus five transient FVEP changes) were related to surgical manipulation. In each case the surgeon was promptly informed of the FVEP deterioration and took remedial action. The other eyes did not have FVEP changes, and none of those eyes had new postoperative visual deficits. Conclusions: Our FVEP findings relate to visual outcome with a sensitivity and specificity of 1.0. New methods for rapidly acquiring reproducible FVEP waveforms allowed for timely reporting of significant FVEP change, resulting in prompt surgical action. This may have accounted for the low postoperative visual deficit rate (1.7%) in this series.

Presenter: Dr. Idara Edem

Presenter Contribution: I was involved in the development of the project, data collection, data analysis, manuscript writing and revision for submission.

PP24B

Electrophysiological signature of tumoral tissue from frequency and time-frequency analysis of intraoperative electrocorticography during awake craniotomy

Diana Ghinda, Ben Lambert, Junfeng Lu, Jinsong Wu, Georg Northoff, Adam Sachs

Division of Neurosurgery

Domain: Translational Research
BACKGROUND: Glioma is a life-threatening brain tumor and the extent of resection is one of the strongest influences on the patients’ survival rate however the distinction between infiltrated and non-infiltrated tissue remains challenging. Understanding the underlying electrophysiological features might provide the details of the relationship between the lesion to be managed and the healthy brain. The purpose of this study was to analyze how cortical physiology is altered by the presence of glioma. METHODS: 17 patients undergoing an awake craniotomy for resection of a supratentorial glioma were included. Rest and task electrocorticography data was acquired intra-operatively prior to tumour resection. A sparse event-related design using 0.5 s auditory stimuli was used for the task data acquisition. In 7 patients the data was acquired during anesthesia and awake state. The grid was placed over the tumor and exposed surroundings and the anatomical location of each electrode was recorded using the neuronavigation system. The electrodes were classified into tumoral, healthy or peritumoral based on the macroscopically-detectable tumoral tissue and the data was analyzed offline. Tissue samples from the tumoral, peritumoral and normal tissue were equally analyzed with whole exome sequencing and RNA sequencing. RESULTS: The resting-state power-law exponent values of electrodes overlying the healthy tissue were found to have a lower value compared to peritumoral and tumoral tissue (p<0.01). The findings were replicated during the awake task period where the spectrum power difference between healthy and tumor tissue indicated a significant (p < 0.01) alpha band power difference. In patients that didn’t developed epilepsy, peritumoral tissue was found to share driver mutations with the tumoral tissue and a more divergent transcriptome was observed between peritumoral and normal samples suggesting that the peritumoral tissue has been destroyed in those patients. CONCLUSION: The current study portrays a distinct electrophysiological feature characterizing tumoral tissue which may provide a potential novel physiological marker in the future.

Presenter: Dr. Diana Ghinda

Presenter Contribution: Acquisition, analysis and interpretation of data

PP31A

Reconstruction of lower extremity defects using the serratus anterior free flap: A systematic review and retrospective cohort analysis

Aneesh Karir, Michael Stein, Sarah Shiga, Jing Zhang

Division of Plastic Surgery

Domain: Clinical Research

Introduction: The free serratus anterior muscle flap remains a first-line choice at our institution for lower extremity reconstruction. The objective of this study was to perform a systematic review evaluating postoperative outcomes of distal third leg reconstruction with the serratus flap and compare it with a retrospective review of cases at our institution. Methods: A systematic review of the literature was conducted using Pubmed, Embase, and Cochrane Library. Articles reporting reconstruction of lower extremity and foot defects using free serratus flaps in adults were included. A retrospective cohort study was performed to report outcomes and Lower Extremity Functional Scale (LEFS) scores for free serratus flaps from 2014 to 2018 at our institution. Results: Thirty-seven articles totaling 198 flaps were included: 125 (63%) serratus-only flaps and 73 (37%) chimeric flaps. The mean patient age was 40 years and the most common defect etiology was trauma in 54% of cases. The flap survival rate was 97% and the major and minor complication rates were 10% and 13%, respectively. There were no reports of scapular winging. Of the 9 cases included in our retrospective study, 7 (77%) were serratus-only flaps and 2 (22%) were chimeric flaps. The mean age was 33 and the most common defect etiology was chronic wound in 55% of cases. The flap survival rate was 100% and the major and minor complication rates were 0% and 44%, respectively. No losses of function at the donor site were noted. The flap
debulting revision rate was 0%. The average LEFS score was 58/80, indicating a favourable return to function postoperatively. The mean follow-up time was 18.4 months. There was no significant difference (p>0.05) between the results of the systematic review and the case series for the following characteristics: mean age, flap survival rate, and total, major, or minor complication rate. Conclusions: We provide the most robust evidence to date that serratus flap reconstruction is safe, effective, and associated with favourable functional outcomes for lower extremity defects. Its unique malleability, versatility, and ease of harvest make it uniquely suited to lower leg and foot reconstruction.

Presenter: Aneesh Karir

Presenter Contribution: REB, data collection, data analysis, abstract and manuscript writing.

**PP32A**

**Utilizing Upright and Supine Breast Measurements to Assess Breast Laxity in Preoperative Planning for Augmentation Mammoplasty: An Interim Analysis.**

Nicholas Cormier, Howard Silverman

Division of Plastic Surgery

Domain: Clinical Research

PURPOSE: Breast augmentation remains the most common aesthetic surgery performed by plastic surgeons. Implant selection and patient satisfaction are challenging to achieve in patients seeking breast enhancement who present with varying degrees of breast laxity and/or ptosis. Many systems for breast implant selection have been described, including sizing bras, three-dimensional imaging, and tissue-based measurements; however, these methods may not address the need for mastopexy with augmentation. We propose a dynamic assessment of breast measurements towards informing a system to assess breast laxity. METHOD: We present preliminary results from a prospective cohort analysis of consecutive patients undergoing primary augmentation mammoplasty. Upright and supine standard measurements (sternal notch-nipple, nipple-nipple, nipple-inframammary fold, base width) were recorded preoperatively by a single plastic surgeon. Preoperative upright and supine breast measurements were evaluated using MATLAB (MathWorks, Natick, MA, USA) and statistical analysis completed. RESULTS: Forty-nine patients were prospectively recruited and included in the interim analysis of preoperative upright and supine breast measurements. The sternal notch-nipple distance increased when upright (p<0.0001), while mean nipple-nipple distance increased in supine position (p<0.0001). Sternal notch to nipple angle increased in the supine position (p<0.0001). Nipple-IMF and breast base width measurements remained unchanged with position. Breast projection was calculated and modelled from nipple-IMF measurements. CONCLUSIONS: Upright and supine breast measurements can be utilized as an assessment of breast envelope laxity. Particularly, changes in sternal notch-nipple and nipple-nipple distance can help surgeons estimate preoperative breast laxity. These preliminary data aim to inform a measurement system to guide plastic surgeons with implant selection and need for mastopexy with augmentation.

Presenter: Dr. Nicholas Cormier

Presenter Contribution: Data collection, data analysis, abstract preparation

**PP33A**
Pelvic Reconstruction with the VRAM Flap: Does Preoperative CT Muscle-to-Pelvic Defect Ratio Affect Outcome?

Michael J. Stein, Kelly Harper, Blair Macdonald, Murray Allen, Sophocles Voineskos, Simon G. Frank

Division of Plastic Surgery

Domain: Clinical Research

PURPOSE: Pelvic reconstruction following abdominoperineal resection (APR)/pelvic exenteration (PEx) remains a significant challenge, with perineal wound complications occurring in up to 60% of patients. Pelvic reconstruction with a VRAM flap is now the gold standard, reducing complication rates by supplying well-vascularized tissue that obliterates the pelvic dead space. No study to date has investigated whether the degree of pelvis obliteration with muscle correlates with postoperative outcomes. The present study sought to investigate whether a preoperative CT-calculated ratio of rectus muscle to pelvic defect correlated with postoperative outcomes. METHODS: A retrospective review of patients reconstructed with a VRAM post APR/PEx was performed. The primary outcome was time to complete wound healing and secondary outcomes were minor and major complication rates. High-resolution CT and T2-MRI pelvic scans was used to calculate muscle-to-pelvis (M:P) volumes. Radiologic 3D-reconstruction of the ablative specimen incorporated tumor, organs and soft tissue resected. RESULTS: Thirty-two patients underwent VRAM pelvic reconstruction (25 APR, 7 PEx). Of these, 78% underwent preoperative chemoradiation and 69% were female. The average M:P ratio was 0.2, minor and major complication rates were 45% and 10%, and median time to complete wound healing was 67 days. Females had a significantly lower M:P ratio compared to males (median 0.2 vs 0.6, p=0.0038). Regression analyses demonstrate that smaller M:P ratios are associated with longer healing times. CONCLUSIONS: We demonstrate that the more commonly gynecoid pelvic girdle in females, in addition to a proportionally smaller rectus muscle, may result in a larger potential space for fluid collection following oncological resection. Furthermore, less obliteration of the pelvis with muscle resulted in longer healing times. These findings question whether a combination of flaps may offer a larger M:P ratio, increasing obliteration and vascularization of the pelvis and improving postoperative outcomes.

Presenter: Dr. Kelly Harper

Presenter Contribution: Kelly Harper (Radiology) is presenting on behalf of Michael Stein. This presentation is not eligible for awards, but you may still submit feedback to the authors.

PP34A

Fifteen Year Survivorship of 1719 Medial Oxford Unicompartmental Knee Replacements Performed at a Single Center: The Ottawa Hospital Experience

Jonathan Howatt, Geoff F. Dervin, Johanna Dobransky, Paul R. Kim and The Ottawa Arthroplasty Group

Division of Orthopaedic Surgery

Domain: Clinical Research

Purpose: From 2001 until 2016, 1719 primary Oxford medial unicompartmental knee (UKA) replacement procedures were completed at our center by a group of seven surgeons. We undertook this study to examine the long-term survivorship of the Oxford UKA looking at survivorship and reasons for failure. Methods: A retrospective consecutive case series review was completed, and revisions to total knee arthroplasty (TKA) and
all re-operations were identified. All reoperations and conversion to total knee replacement (TKA) specifically were considered as endpoints. Kaplan-Meier survival analysis was used to calculate the 15-year survivorship of the group overall. We specifically looked at age, gender, BMI, and surgeon caseload in addition to the reasons for failure. Differences in survivorship were compared for above variables using the log-rank (Mantel-Cox) test. A cox regression was performed to explore predictors of revision. Results: The 15-year survivorship for all reoperations was 89.9% and 90.2% for revision to TKA only. Considering all reoperations female survivorship of 88.1% was statistically significantly worse than the male group at 91.9% (p=0.014). Younger patients (<55yrs) had a significantly lower survivorship (86.7%) when compared to those >75yrs of age (93.0%) (p=0.045). There was a large range in surgical case-load by individual surgeons (range 17-570 knees). There were no statistically significant differences in age, BMI, or gender when comparing the individual surgeon groups. There was a large range in 15-year survivorship between individual surgeons (range 78.3% - 95.0%). Overall the most common reason for revision was due to wear of the unreplaced portion of the knee (lateral and/or patella-femoral joint) followed by aseptic loosening, polyethylene dislocation, infection or persistent pain. Conclusion: The 15-year survivorship results of the Oxford medial unicompartmental knee replacement at our center compares favourably to other published series and large registry data series. We found a reduction in survivorship in female patients and younger patients. There were also significant differences in survivorship based on the individual surgeon.

Presenter: Dr. Jonathan Howatt

Presenter Contribution: Chart review, primary author of abstract and working manuscript

PP35A

Single Center Experience with an Enhanced Prehabilitation Program for Total Hip Arthroplasty: A Pilot Stud

Brian P Chen, Stephane Poitras, Johanna Dobransky, Anthony Lentini, Paul E Beaule

Division of Orthopaedic Surgery

Domain: Clinical Research

Introduction: Total hip arthroplasty (THA) restores function and quality of life in patients with hip arthritis. However some patients suffer from prolonged recovery and subpar outcomes. The concept of prehabilitation lies in optimizing preoperative function in order to improve postoperative recovery and outcomes. In this paper, we report on a single center pilot study on a prehabilitation prior to THA for higher risk patients. Methods: A cohort of patients undergoing THA with either ASA ≥3 or timed-up-and-go time greater than ten seconds were recruited to participate in a prehabilitation program directed by a physiatrist that consists of exercise and nutrition components. The control group consisted of a historical cohort of patients matching the same criteria. The following outcome measured were analyzed: LOS, discharge destination, readmission, return to emergency department (ED), complications, and whether they were admitted to the postoperative short-term rehabilitation unit. Results: Among 25 patients recruited to the STEP program, 7 failed to complete any visit. In the intention to treat analysis, no differences were found in any of the outcomes. In the per protocol analysis, there were no differences in LOS, discharge destination, return to ED, or readmission. However those who completed at least one STEP visit had lower rates of complications compared to those who did not participate (p = 0.049). Conclusion: Participating in a prehabilitation program prior to THA decrease postoperative complications for high risk patients. Further research with larger sample size is warranted.

Presenter: Dr. Brian Chen
The Ottawa Pelvic Fracture Protocol – A 5-year review of hemodynamically unstable pelvic fractures at the Ottawa Hospital

Andrew Adamczyk, Paul Gauthier, Jacinthe Lampron, Geoffrey Wilkin
Division of Orthopaedic Surgery

Domain: Clinical Research

Introduction: Hemodynamically unstable pelvic fractures are associated with high mortality rates. The Ottawa Hospital does not currently follow a pre-defined multidisciplinary protocol to treat these patients. Our goal was to evaluate institutional trends in treatment and mortality rates. Methods: A 5-year review (Jan 2008-Dec 2013) was performed to isolate patients presenting with associated unstable pelvic fractures in the emergency department (ED). Data on patient injury characteristics, management, and outcomes were extracted. Results: 383 patients (251M, 132F) presenting with a pelvic fracture following diagnostic imaging in ED were evaluated. Mean age of cohort was 50.6 years (range: 14–98). Of these, 49 (12.8%) were categorized as hemodynamically unstable based on the American College of Surgeons Committee on Trauma classification for hemorrhagic shock. When assessing ED management of these patients, 65.3% received a trauma code activation. Upon initial assessment, only 63.3% received an AP pelvis in the trauma bay prior to CT scan, which 95.9% received. Only 12.2% were wrapped in a pelvic sheet despite 30% showing injury pattern requiring one. When assessing further management, 12.5% received embolization for hemorrhagic control; and 42.2% underwent external fixation or open reduction internal fixation. The time from scene to ED for the unstable patients was significantly quicker than the stable patient (p=0.004) and comprised of younger patients with a significantly higher ISS score (p <0.001). The chief mechanism of injury was Road Traffic Collision: 39.1% of unstable patients, of which 12.2% died prior to discharge. Conclusion: Based on our current analysis, gaps and inconsistencies in assessment and treatment of these patients were identified, which warrants the implementation of an institutional specific protocol. Moving forward, we hope to assess the impact of the pelvic fracture protocol prospectively on patient management and associated outcomes.

Presenter: Dr. Andrew Adamczyk

Presenter Contribution: Designed the study, did all the data collection, and analyses

GlobalSurg 3: Quality and outcomes in cancer surgery globally: a prospective, international cohort study

GlobalSurg Collaborative
Division of General Surgery

Domain: Quality Improvement Research

Introduction: The GlobalSurg Collaborative was established to allow individuals from around the world to lead and participate in global research aimed at improving postoperative outcomes. Of the 15.2 million individuals
diagnosed with cancer in 2015, over 80% will need surgery. In tumors amenable to surgical resection, surgery often offers the best chance of cure, particularly in early-stage disease. It has been estimated that by 2030, 45 million surgical procedures for cancer will be required annually, yet fewer than 25% of these patients worldwide have access to safe, affordable, and timely surgery. While death rates from cancer are decreasing in high-income countries, the opposite has been demonstrated in low- and middle-income countries. The aim of this study is to determine the variation in quality of cancer surgery worldwide. Quality will be determined using measures covering infrastructure, care processes, and outcomes. Methods: This international, prospective, multi-centre cohort study included patients undergoing elective or emergency surgery for breast, gastric, or colorectal cancer anywhere in the world. The study time period was between April 1, 2018 to October 31, 2018 with 30-day follow-up postoperatively. As of January 21, 2019, data had been completed for 14,288 patients from 606 hospitals in 96 countries. Participating centres were stratified into high-income, middle-income, and low-income groups according to the UN’s Human Development Index. The primary outcome measure was 30-day mortality and complication rates after cancer surgery using the Clavien-Dindo classification. The secondary aim was to characterize infrastructure and care processes in the treatment of these cancers worldwide. Results: Canadian results will be included in this presentation. Conclusion: This will be a descriptive report as the national level data is not powered for analysis. The full international data will be analyzed and subsequently published in the coming year.

Presenter: Dr. Matthew Mosseler

Presenter Contribution: I enrolled, collected and submitted the Ottawa hospital's contribution to this international study

PP32B

Clinical practice patterns of immediate intravesical chemotherapy following transurethral resection of bladder tumor in Canada.

Hamidreza Abdi, Ali Dergham, Remington Winter, Neal Ernest Rowe

Division of Urology

Domain: Quality Improvement Research

Introduction: Current evidence supports the use of a single post-operative dose of intravesical chemotherapy following bladder tumor resection for non-muscle invasive bladder cancer (NMIBC). However, several studies have demonstrated a wide variation in the utilization of post-operative intravesical chemotherapy in various health jurisdictions around the globe. Our goal was to assess current practice patterns amongst urologists in the Canadian healthcare system with regard to postoperative chemotherapy instillation. Methods: Institutional review board approved our study. An electronic questionnaire was distributed to urologists across Canada via email in June 2018. An initial invitation to participate was followed by two reminder emails. Descriptive and comparative statistics were performed on the collected data. Results: 130 urologists completed our survey. The overall response rate was 17.6% and included urologists from all ten Canadian provinces. 43.1% of respondents work in academic setting and 22.3% were urologic oncology fellowship trained. 76.9% of respondents perform between 2 and 10 TURBT/month. The median years in practice was 10 years (IQR: 7.5-16.25 years). Eighty-one urologists (62.3%) send urine culture before TURBT. Forty-nine (37.9%) do not use intravesical chemotherapy post TURBT or have rarely used it, and only 4 (3.1%) use it in for all resections. Interestingly, respondents beyond 10 years in practice were less likely to administer intravesical chemotherapy (OR: 0.45, p = 0.028). Common reasons to not administer intravesical chemotherapy included logistical barriers (65.3%), side effects (48.9%), lack of access to agent (22.4%), and a perceived limitation of clinical evidence (22.4%). Sixty-nine (53%) of respondents believe that less than 10% of their patients receive intravesical chemotherapy post
TURBT. Conclusions: Immediate intravesical chemotherapy instillation following TURBT has been reasonably well accepted across Canada. However, if guideline adherence is a measure of healthcare quality, much needs to be done to eliminate logistical barriers to treatment and to address safety concerns regarding intravesical therapy.

Presenter: Dr. Hamidreza Abdi

Presenter Contribution: Study design, data collection, analysis, writing the manuscript

**PP33B**

**Improving the identification and treatment of pre-operative anemia in patients undergoing elective bowel resection.**

Joshua Greenberg, Richard W. Gilbert, Terry Zwiep, Donna Touchie, Elainna Saidenberg, Husein Moloo

Division of General Surgery

Domain: Quality Improvement Research

Robust evidence demonstrates 40-47% of surgical patients undergoing elective bowel resection have pre-operative anemia, a condition associated with significantly higher rates of post-operative death, heart attack, stroke, kidney failure, blood transfusion, infection, and prolonged length of hospital stay. Currently, our colorectal surgery division does not routinely screen or treat its patients for anemia pre-operatively. Our group attempted to analyze local data and current practice patterns to create a standardized approach to effectively identify and treat this subset of surgical patients to improve post-operative outcomes and reduce the overall costs of care. The results of a local clinical practice audit and costing analysis were shared with a carefully selected change team. The root causes of untreated pre-operative anemia were targeted for interventions by the team, including development and implementation of an evidence-based clinical practice algorithm. Outcomes, process, and balancing measures were tracked prospectively pre- and post-intervention. Following implementation of the anemia algorithm, run charts revealed a non-random increase (confirmed on statistical analysis) in both the percentage of patients screened pre-operatively (11.8 vs. 86%, p < 0.001), and the percentage of patients receiving treatment for pre-operative anemia (12.1 vs. 47.6% p = 0.023). Notable trends toward increased surgeon-reported familiarity with guidelines (0 vs. 100%), routine screening of patients for pre-operative anemia (25 vs. 100%), and use of the algorithm (14 vs. 95%) were also identified. There was no significant increase in surgeon self-reported time spent managing pre-operative anemia. The development of an evidence-based clinical practice guideline implemented through the input of a change team representative of all involved parties was effective at educating clinicians, improving standardization of pre-operative anemia management, and may contribute to improved post-operative outcomes and reduced overall costs of care for patients undergoing elective bowel resection.

Presenter: Dr. Richard Gilbert

Presenter Contribution: Data Collection, Data Analysis, Manuscript Preparation

**PP34B**

**Is it time to rethink how we page physicians? Understanding paging patterns in a tertiary care hospital.**

Division of Urology

Domain: Quality Improvement Research

Background: Frequent pages can disrupt workflow, interrupt patient care, and may contribute to physician burnout. We hypothesized that paging volumes likely followed consistent temporal trends, regardless of the medical or surgical service, reflecting systems based issues present in our hospitals. Methods: A retrospective review of the hospital paging systems for 4 services at The Ottawa Hospital was performed. Resident paging data from April 1 to July 31, 2018 were collected for orthopaedic surgery, general surgery, neurology, and neurosurgery. Trends in paging volume during the 4-month period were examined. Results: 25,797 pages were received by the 4 services, averaging 211 (± Standard Deviation (SD) 12) calls per day during the study period. 19,371 (75%) were calls from in-patient hospital units, while 6,426 (24%) were pages from the emergency room. The median interval between pages across all specialties was 22:30 minutes. Emergency room pages peaked between 16:30 and 20:00, while in-patient units peaked between 17:30 and 18:30. Interpretation: All specialties experienced frequent paging with similar patterns of marked increases at specific times. This study identifies areas for future study about what the factors are that contribute to the paging patterns observed.

Presenter: Dr. Christopher Langley

Presenter Contribution: Christopher Langley is presenting on behalf of Luke Witherspoon. This presentation is not eligible for awards, but you may still submit feedback to the authors.

**PP35B**

**Evaluation and harmonization of international database elements for adverse events monitoring following thoracic surgery: the pursuit of a common language**

Greg Sigler, Caitlin Anstee, Andrew JE Seely

Division of General Surgery

Domain: Quality Improvement Research

Introduction: Post-operative adverse events (AEs) are variably defined, yet a common language is paramount to collaboration. We sought to evaluate if the Canadian Association of Thoracic Surgeons (CATS) adverse events classification tool (based on the Ottawa Thoracic Morbidity & Mortality system) using 3 single-select lists and 1 optional multi-select list (i.e. system/AE/AE Clavien-Dindo grade/AE modifiers) could enable effective translation into other validated international AE classification systems. Methods: The AE definitions of the CATS system and those of the European Society of Thoracic Surgeons (ESTS), Society of Thoracic Surgeons (STS), Esophagectomy Complications Consensus Group (ECCG), and National Surgical Quality Improvement Program (NSQIP) were matched and compared. Results: The total number of AEs defined in the CATS, ESTS, STS, ECCG, and NSQIP classification systems were 65, 20, 56, 50, and 22, respectively. The degree to which AE data elements of the classification systems were harmonized with the CATS system were categorized as Perfect (i.e. exact wording), Good (i.e. nearly exact), or Non-Harmonized. The CATS data elements were harmonized (i.e. perfect or good) with 100%, 89%, 74%, and 73% for ESTS, STS, ECCG, and NSQIP, respectively. Additional definitions from the other classification systems that CATS has not defined were identified. In order to achieve near-complete
harmonization, the following changes to the CATS system would be required: addition of 1 classification system, 16 complications, and 4 complication modifiers. Conclusion: This paper provides a framework for discussion and advancement towards a harmonized approach for AE definition and recording following thoracic surgery. An AE classification system that utilizes 3 single-select lists and 1 optional multi-select list with the additional elements identified would enable universal AE data collection, with potential for broad international benchmarking.

Presenter: Dr. Greg Sigler

Presenter Contribution: I performed a comprehensive evaluation of the adverse events following thoracic surgery classification systems of five large international databases [Canadian Association for Thoracic Surgeons (CATS), European Society of Thoracic Surgeons (ESTS), Society of Thoracic Surgeons (STS), Esophagectomy Complications Consensus Group (ECCG), and National Surgical Quality Improvement Program (NSQIP)]. I then harmonized all of these definitions into a singular classification system to enable translation between databases.

PP36B

Cost analysis of pre-operative HbA1C screening and glycemic control initiatives to reduce surgical site infection rates in breast reductions

John Shin, Gloria Rockwell

Division of Plastic Surgery

Domain: Quality Improvement Research

Introduction: While studies have demonstrated screening and managing hyperglycemia pre-operatively reduces surgical site infections (SSI), the benefits of screening all patients is uncertain. A recent hyperglycemia control initiative (HCI) for gynecologic oncology patients that included HbA1c screening and hyperglycemic management showed a 55% relative risk reduction (RRR) of SSIs but did not assess the program's cost. The goal of this study was to perform a cost analysis of HCI for breast reduction patients at the Ottawa hospital (TOH). Methods: A decision analytic tree model with 2 limbs, with or without HCI, was created. Data points for probabilities of outcomes-no, mild or moderate SSIs-were collected through a retrospective chart review of the National Surgery Quality Improvement Program on all breast reduction cases in 2017 at TOH. A comprehensive list of costs from the Ministry of Health (MoH) perspective for HCI and SSI treatment was collected. Results: In 2017, a total of 166 patients had breast reductions, with 17(10.2%) resulting in SSIs. Implementing HCI with a 55% RRR in these patients resulted in cost savings of $1.91 per patient to MoH and $40.55 per patient to society. The cost of HbA1c screening was $7.61 and to newly identify a prediabetic or diabetic was $39.03. The average cost to treat mild and moderate SSIs was $234.62 and $535.11 respectively. The average cost to treat mild and moderate SSIs with HCI in patients identified to have HbA1c 6-6.9% was $273.49 and $573.97 respectively, and HbA1c ≥7% was $456.94 and $757.42 respectively. Conclusions: A HCI demonstrates potential considerable reductions in SSIs and cost benefits for breast reductions. The quality of life improvement from the patients' perspective may further substantiate the cost benefits.

Presenter: John Shin

Presenter Contribution: First author

OR31
**Reducing surgical site infections in patients undergoing radical cystectomy using wound protection**

James Ross, Christopher Knee, Kristen McAlpine, Rodney H. Breau, Neal Rowe, Ilias Cagiannos, Christopher Morash, Lara Williams, Ranjeeta Mallick, Carl van Walraven, Luke T. Lavallée

Division of Urology

Domain: Quality Improvement Research

**INTRODUCTION:** Our institution implemented a surgical site infection (SSI) reduction strategy for patients undergoing radical cystectomy (RC). The intervention included use of a barrier wound protector (Alexis retractor), sterile closing tray, wound cleansing, and antibiotic impregnated dressings. The objective of this study was to evaluate the efficacy of the SSI reduction strategy and characterize risk factors for SSI.

**METHODS:** A historical cohort of all patients who underwent RC by four urologic oncologists at The Ottawa Hospital (TOH) from January 2016 to October 2018 was reviewed. Patient, tumor, and operative characteristics were collected. Inpatient and outpatient SSIs were identified until 30 days post-operative from the medical record. The SSI reduction strategy was implemented for all patients having RC after February 28th, 2018. Adjusted associations between patient, tumor, operative characteristics and the SSI reduction intervention with the risk of SSI was determined.

**RESULTS:** 117 patients underwent RC during the study period including 26 after institutional implementation of the SSI reduction strategy. The mean age was 70 years, 88 (75%) were male, and 51 (44%) received neobladders. Higher BMI, history of smoking, intra-operative transfusion, and diabetes were independently associated with increased risk of SSI (p < 0.05). Overall SSI risk was 24%. The risk of SSI was 28% prior to the intervention and 12% after. The SSI reduction strategy reduced the risk of SSI by 60% (RR 0.42; 95% CI 0.14-1.28; p=0.12)

**CONCLUSIONS:** The risk of SSI after radical cystectomy is high. The implementation of our SSI reduction strategy reduced the risk of SSI warranting further evaluation in other centers to improve patient care.

Presenter: Dr. James Ross

Presenter Contribution: Study design, data collection, abstract/manuscript development.

**OR32**

**Phlebotomy resulting in controlled hypovolemia to prevent blood loss in major hepatic resections (PRICE-1): a feasibility randomized controlled trial**

Laura Baker, Christopher Wherrett, Dean A. Fergusson, Elianna Saidenberg, Aklile Workneh, Sara Saeed, Kristen Gadbois, Robert Jee, Jason McVicar, Purnima Rao, Calvin Thompson, Patrick Wong, Jad Abou Khalil, Kimberly A. Bertens, Fady K. Balaa, Guillaume Martel

Division of General Surgery

Domain: Clinical Research

**Introduction:** Major liver resection remains associated with the potential for significant blood loss and transfusion. Observational data supports the use of intraoperative hypovolemic phlebotomy (HP), without volume replace, to decrease blood loss and transfusion. A feasibility randomized controlled trial (RCT) comparing HP to the standard of care was undertaken to inform a future multi-center trial. Methods: An RCT was carried out (June 2016-January 2018), comparing HP to the standard of care. Patients undergoing major
liver resection or posterior sectionectomy were eligible. Patients were randomized intraoperatively, prior to liver transection. The surgical team, nurses, and patient were blinded to the intervention. Feasibility and estimated blood loss (EBL) were co-primary outcomes. Secondary outcomes included safety, morbidity and mortality, physiologic parameters, and transfusion. Results: Sixty-two patients were randomized to HP (n=31) and control (n=31). The groups were evenly matched. Median EBL was 761 mL (451-1100) with HP and 872 mL (557-1248) with control (p=0.458). All feasibility endpoints were met: 89% of eligible patients consented, 3.1 patients/month were randomized, surgeon blinding was maintained (98%), and HP was successfully (mean phlebotomy 607 ± 167 mL). Blinded surgeon perception questionnaires revealed ease of resection favored the HP group in 52% vs 32% (p=0.0613). HP was correctly predicted in 65% of HP patients and incorrectly predicted in 32% of control patients (p=0.0110, accuracy 66%). Overall complication (HP 32% vs control 48%, p=0.196) and major complication (HP 32% vs control 48%, p=0.196) rates were comparable. No difference was noted in the proportion of patients receiving a blood transfusion. Conclusion: This trial has successfully met its feasibility endpoints, but did not identify a significant difference in estimated blood loss. Safety endpoints were comparable between HP and the standard of care. The success of this trial justifies pursuit of a multi-center trial (PRICE-2) powered to identify a difference in perioperative blood transfusion.

Presenter: Dr. Laura Baker

Presenter Contribution: Data analysis Manuscript preparation

**OR33**

**Validity of a model to predict the risk of atrial fibrillation after thoracic surgery**

Heather Smith, Heidi Li, Olivier Brandts-Longtin, Ching Yeung, Donna E Maziak, Sebastien Gilbert, Farid M Shamji, Patrick James Villeneuve, Sudhir Sundaresan, Rod Passman, Andrew JE Seely

Division of General Surgery

Domain: Clinical Research

Introduction: New onset post-operative atrial fibrillation (POAF) is the most frequent post-operative arrhythmia following major thoracic surgery with a reported incidence of 13-46%. Prophylaxis is recommended for consideration in high risk patients however, no method of risk assessment has been externally validated. We aimed to evaluate the external validity of a published clinical tool developed to predict POAF in patients undergoing non-cardiac thoracic surgery. The POAF prediction model developed by Passman stratifies patients’ risk of POAF using three clinical risk factors (sex, age and pre-operative resting heart rate). Methods: A retrospective cohort analysis of patients who underwent major non-cardiac thoracic surgery at a single institution between 2008-2017 was used for external validation. Results were compared to Passman’s derivation sample (published in 2005 based on 856 patients). The model calibration was assessed by comparing patients’ risk score of 0-6 with occurrence of POAF. Discrimination of the model was determined by calculating the concordance index. Results: In the 2054 patients undergoing major thoracic surgery, we observed a greater proportion of patients with hypertension compared with Passman’s sample (46.1 vs 29.4%, p=0.0002), and a lower proportion of lung resection, particularly pneumonectomy (6.1 vs 21%, p=0.0002). Despite the reduced incidence of POAF among patients in this study compared to Passman’s study (164(7.9%) vs 147(17.2%), p=0.014), the model was valid: it was well-calibrated, demonstrated by a positive correlation between risk scores and POAF incidence, and the model demonstrated moderate discrimination with a c-statistic of 0.62 (compared to 0.65-0.73 in Passman’s study). Conclusions: The incidence of POAF in this study was lower than the derivation study of this POAF prediction model, nevertheless, we found the model to be externally valid in predicting risk of POAF after non-cardiac thoracic surgery. This tool may be useful in identifying patients who will benefit from targeted prophylactic therapy.
How can patients with mobile hips and stiff lumbar spines be identified prior to total hip arthroplasty? – A Prospective, Diagnostic Cohort Study

Moritz M. Innmann, Christian Merle, Volker Ewerbeck, Philippe Phan, Paul E. Beaulé, George Grammatopoulos

Division of Orthopaedic Surgery

Domain: Clinical Research

Background Spinopelvic mobility has been reported to change little after total hip arthroplasty (THA) compared to preoperatively and affects functional cup orientation, while patients with reduced lumbar spine mobility are at higher risk of dislocation after THA.

Aims The aims of our study were to determine clinical and standing radiographic parameters predicting high hip and reduced lumbar spine mobility.

Method A cohort of 113 patients with end-stage hip osteoarthritis (OA) awaiting THA was prospectively studied. Clinical data and patient-reported outcome measures were available. Radiographic measurements were performed for the lumbar lordosis angle, sacral slope, pelvic tilt, pelvic-femoral angle and acetabular ante-inclination on lateral radiographs in standing, ‘relaxed-seated’ and ‘deep-seated’ position. A “hip user index” was calculated in order to quantify the percentage of sagittal hip and pelvic movement with respect to overall sagittal movement from the standing to deep-seated position. A multiple regression and ROC analysis was used to test for predictors of combined high hip and reduced lumbar spine mobility, represented by a high hip user index.

Results The mean ‘hip user index’ was 63±12% and ten patients (9%) were hip users, having an index of 80% or more. A higher hip user index could be predicted by (1) decreased clinical lumbar spine flexion (decreased change in the Schober’s test; coefficient: -2.6; p<0.01); (2) increased clinical hip flexion (coefficient: 0.1; p<0.01); (3) decreased radiographic standing lumbar lordosis (coefficient: -0.3; p<0.01) and (4) increased radiographic standing pelvic tilt (regression coefficient, 0.2; p=0.04) (R²=0.45). A standing pelvic tilt of ≥18.5° was the only predictor for being a hip user with a sensitivity of 90% and specificity of 71%. Conclusion Patients awaiting THA and having combined high hip and reduced lumbar spine mobility, can be screened for with lateral standing radiographs of the spinopelvic complex.

Novel cooling device for kidney transplant surgery


Division of Urology

Domain: Translational Research
Introduction: In renal transplantation, warm ischemia time (WIT) describes the period of ischemia beginning with removal of the organ from ice and concluding at reperfusion. Metabolic activity in cooled kidneys is minimal at 5°C and resumes above 15°C, a temperature reached after only 15 min of WIT; we set out to develop a novel device to maintain allograft temperatures ≤ 5°C, thereby limiting ischemic damage during transplantation. Methods: 3/16” aluminum tubing was organized in a serpentine pattern to create a malleable, form-fitting renal allograft cooling jacket. Coolant comprised 4°C saline solution flowing at 240 mL/min. Adult porcine kidneys (n = 4 per arm) (175 g, 13x7x3 cm LxWxH) were used to test the device. Kidneys were placed at 24°C ambient temperature; surface and core temperatures were monitored using implanted thermocouples. Device usability was tested by anastomosing porcine kidney vessels to GORE-TEX® vascular grafts with the cooling jacket in place in a simulated ex-vivo operative field. Results: Our cooling jacket is mouldable to any size human kidney. The device resulted in mean surface and core temperatures at 60 min of (mean ± standard deviation (SD)) 5.8±0.6°C and 5.4±0.5°C respectively, significantly less than those of the control, 16.6±1.4°C and 16.6±1.2°C (p<0.00001 in both), respectively. Moreover, our device mitigated surface temperature increases (2.4±1.3°C vs. 12.9±0.9°C) and core temperature increases (2.8±1.7°C vs. 14.1±1.5°C) at 60 min (p<0.00001). Ex-vivo anastomotic testing was not inhibited or delayed by our device. Conclusion: WIT is associated with many adverse outcomes. We developed a novel, easy to use, aluminum cooling jacket that mitigated temperature increase, and maintained renal temperatures below metabolically-active levels.

Presenter: Dr. Thomas Skinner

Presenter Contribution: I carried out all aspects of this project. The invention was solely my idea. I devised the concept, reviewed background literature, designed the device and created the study design. All experimental steps were carried out by myself, (in conjunction with the other authors).