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Research Abstracts

ROCKY MOUNTAIN
Internal Medicine

BEST ORIGINAL RESEARCH

Factors associated with antihyperglycemic medication adjustment during hospitalization and resulting glycemic outcomes: A multi-centre cohort study

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Aims

To determine characteristics associated with changes to antihyperglycemic medications at hospital discharge and predictors of change in hemoglobin A1C (HbA1c) post-discharge.

Methods

We retrospectively analyzed electronic health record, laboratory and administrative data of patients from a multi-centre cohort admitted between 2016 and 2018. Our outcomes were antihyperglycemic medication change group (intensification, de-intensification, equivocal or no change) and net change in preadmission HbA1c at 3- or 6-months post-discharge. Patient demographics, pre-admission diabetes indicators, in-hospital glycemic indicators, and discharge characteristics were predictor variables. Bayesian cumulative ordinal logistic regression models were used to estimate the probability of medication change group. Variables that predicted a change in HbA1c were assessed using Bayesian linear regression models for each predictor, adjusted for baseline HbA1c.

Results

Two-hundred patients were included in the chart review. Younger age, fewer comorbidities, higher preadmission HbA1c, higher mean glucose during the first 48-hours and the admission, and lower percentage of in-target glucose values predicted antihyperglycemic medication intensification. Hypoglycemia, older age, and discharge with support were associated with

medication de-intensification. Preadmission HbA1c was the only variable associated with post-discharge HbA1c.

Conclusions

Predictors of medication change can inform quality improvement work to improve in-hospital diabetes medication titration.

BEST QUALITY IMPROVEMENT

Optimization of laboratory test utilization among medical inpatients

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Introduction

Repetitive routine lab testing is common in stable medical inpatients and rarely changes direction of care, but is associated with significant institutional resource utilization, unnecessary phlebotomy trauma, phlebotomy associated anemia, increased transfusion rates, and longer hospital stays. To reduce lab testing, our intervention was a combination of education around lab utilization/lab indication and multi-level social comparison to safely reduce routine inpatient laboratory tests.

Methods

This non-randomised controlled pre-intervention post-intervention study is an expansion of previous work from 2016-2018, wherein we generated an education bundle exploring indications for laboratory testing that included an online resource, pocket cards, and in person debrief/education sessions. This learning resource was dispensed to learners and staff physicians in medical teaching units (MTUs), and hospitalist wards, in all hospitals in our city. Learners received aggregate social comparison feedback, and staff physicians received individual comparison feedback (pre and post intervention). Our intervention is to be run between August and October 2020. Outcome measures include number

(and aggregate cost) of common labs ordered per-patient-day compared to the pre-intervention period. Safety endpoints include number of stat labs, critically abnormal lab tests, ICU transfers, and 30-day re-admission and mortality. Results/Anticipated

Results

In our initial study, our intervention was deployed to one MTU and there was a significant reduction in routine lab ordering after the intervention, compared to the control sites (incidence rate ratio = 0.89, 95% CI 0.79 to 1.00, $p=0.048$), with no increase in safety end-point events, and it was associated with a costs savings of C\$68 877 during the five month intervention. We are now deploying our intervention bundle to the remaining MTUs and hospitalist services in our city and we expect a similar reduction in lab testing, with associated cost savings, and hopefully no significant increase in safety end points.

Conclusion

In our pilot study, a combination of education and social comparison feedback led to a significant, but safe, reduction in lab utilization and we expect that we will observe similar trend as we deploy this intervention across the remaining MTUs and hospitalist wards in our city.

BEST CASE REPORT (TIE)

Bilateral non-thrombotic pulmonary embolism secondary to cyanoacrylate embolization of bleeding gastric varices

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American Association for the Study of Liver Diseases (AASLD) practice guidance suggests the use of esophageal variceal ligation (EVL) or cyanoacrylate injection as first line therapy in gastric variceal haemorrhage. Cyanoacrylate is a solution that polymerizes immediately on contact with blood, ensuring hemostasis. Pulmonary embolism has been reported to be a rare complication of sclerotherapy used in gastric varices, with incidence of embolization ranging from 0.5% to 4.3%.

A 51-year-old female with a known history of decompensated alcoholic cirrhosis presented with two-day history of coffee grounds emesis and frank hematemesis, with an initial haemoglobin of 33 g/L. Esophagogastroduodenoscopy (EGD) demonstrated prominent fundal varices with adherent clot. She subsequently underwent endoscopic ultrasound guided coil and cyanoacrylate embolization of gastric varices. Day 1 post embolization, she developed hypoxemic respiratory failure secondary to non-thrombotic pulmonary embolism (NTPE) of the cyanoacrylate glue.

Pulmonary embolism is a rare life-threatening known complication of cyanoacrylate glue sclerotherapy. Multiple international guidelines suggest management of gastric varices to be a controversial topic, where comparing endoscopic variceal ligation and cyanoacrylate glue embolization showed equal efficacy in controlling the haemorrhage, but much lower rebleeding rates with cyanoacrylate glue injection. Previously described risk factors for cyanoacrylate associated pulmonary embolism include: volume of glue injected, rate of injection, and size of gastric varices. NTPE is often a challenging imaging diagnosis, as the iodinated IV contrast administered routinely in CT pulmonary angiography may mask non-thrombotic material. Hence, alerting the radiologist to the possibility of an NTPE may allow for the acquisition of an unenhanced series of the chest prior to the enhanced series in a standard CTPA protocol, which may allow better visualization of radiopaque foreign materials, such as the glue.

Although rare, non-thrombotic pulmonary embolism is a fatal complication of cyanoacrylate glue sclerotherapy and hence should be on the differential diagnoses of patients who develop respiratory distress post embolization therapy.

A unique presentation of Guillain-Barre syndrome as a post-infectious complication of COVID-19

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Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is a novel respiratory pathogen, the complications and sequelae of which are still being established. Guillain-Barre syndrome (GBS) is an acute immune-mediated disease of the peripheral nervous system which has been associated with gastrointestinal and respiratory tract infections. GBS is now being reported as a rare neurological complication of severe COVID 19 infection.

In this clinical case report, we highlight an unusual case of GBS following a mild SARS-CoV-2 infection. A 65-year-old male presented to our emergency department (ED) with a 1 week history of lower extremities weakness, difficulty ambulating and paresthesia of the distal extremities. During his most recent visit to another ED, patient was diagnosed with vitamin D deficiency and sent home. Rapid worsening of symptoms prompted his presentation to the hospital. The patient had been diagnosed with COVID-19 approximately 3 weeks prior to presentation with fevers, chills, and muscle cramps treated with IV fluids. On examination, patient had an ataxic gait with diffuse areflexia in all extremities. MRI brain and spine showed no acute abnormalities. Cerebrospinal fluid analysis (CSF) was notable for albumin cytologic dissociation. Based on the clinical presentation and CSF analysis,

the patient was diagnosed with GBS most likely as a post-infectious immune-mediated complication of COVID-19. Causation was established due to lack of other possible inciting factors, such as neurotoxic agents, viral illnesses, or vaccinations. CSF PCR for SARS-CoV-2 was not performed due to almost universally negative results in prior case reports. During the hospital course, patient was treated with a 5-day course of intravenous immunoglobulin and methylprednisolone, resulting in moderate improvement of symptoms. Patient was able to walk on Day 3 of treatment. This case highlights the importance of prompt recognition and treatment of an unusual presentation of GBS in the setting of recent mild SARS-CoV-2 infection.

BEST VIRTUAL POSTER

Emergency department visits on Lunar New Year's Eve

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Background

Lunar New Year's Eve (LNYE) is celebrated by up to a billion people worldwide. LNYE influences patterns of disease and healthcare utilization in Asia, yet its influence on health in a North American context remains uncertain.

Methods

We performed a population-based retrospective cohort study of ED visits on LNYE in Vancouver, Canada, between 2014 and 2018. We hypothesized that fewer ED visits would occur on LNYE than on control evenings at the 5 case hospitals serving neighborhoods with a high proportion of residents reporting Asian ethnicity, but that no such effect would be observed at 6 control hospitals. The number of ED visits between 4:00 PM and 11:59 PM on LNYE was compared to the number of visits during identical time periods on control evenings one week earlier and one week later using negative binomial regression.

Results

At case hospitals, 1,321 ED visits occurred on LNYE (33.0 per hour) and 2,963 ED visits occurred on control evenings (37.0 per hour), corresponding to a significant decrease in all ED visits on LNYE (adjusted relative risk, 0.892; 95% CI, 0.835 – 0.951; $p < 0.001$). There was no difference in the number of ED visits on LNYE relative to control evenings at control hospitals (2,608 versus 5,225 visits; relative risk, 0.998; 95% CI, 0.950 – 1.049; $p = 0.940$).

Conclusion

Fewer emergency department visits may occur on Lunar New Year's Eve at hospitals serving neighborhoods with a high proportion of residents reporting Asian ethnicity. These findings highlight evolving cultural norms that might guide hospital staffing and resource allocation decisions.

BEST VIDEO PRESENTATION

Evaluation of competency-based education (CBE) methods applied to internal medicine resident handovers

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Background

Competency-Based Education (CBE) is increasingly being adopted as a framework for residency training. This study aimed to evaluate whether implementation of a CBE intervention results in a change in handover competence and achievement of resident learning goals.

Methods

This prospective cohort study focused on handover communication by senior internal medicine residents in their postgraduate year (PGY)-2 or PGY-3 level of training at the University of Saskatchewan over a 10-week period between January and March 2020. Handover processes were evaluated with pre- and post-intervention surveys and practice-based direct observation and feedback sessions. A pre-intervention survey determined residents' prior handover training and established their learning goals. Residents engaged in a direct observation and feedback session during Week 1 of their CTU block, then had an opportunity to practice and reflect on their learning during ongoing end-of-shift handovers. A repeat direct observation and feedback session occurred during the final week of their CTU blocks, with competency scores analysed using paired t-tests. A follow-up survey determined whether learning goals were met.

Results

Eight participants completed all aspects of the study for inclusion in data analysis. Mean overall competence score improved from baseline 6.000 (SD 0) to follow-up 7.375 (SD 0.484; $p = 0.0001$). There was no significant difference between ratings of PGY-2 and PGY-3 residents in their overall handover competence at baseline ($p = 0.489$) or at follow-up ($p = 0.244$). 100% of

respondents' individual learning goals were met as a result of the CBE intervention.

Conclusion

This CBE intervention involving self-assessment, setting learning goals and engaging in direct observation and feedback by faculty provided an effective educational approach to the development of practice-based skills in handover communication.

ORIGINAL RESEARCH

Extracorporeal membrane oxygenation (ECMO) in severe influenza infection: A case series

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Background

In 2018-19 alone, influenza infection accounted for 946 hospitalizations and 137 intensive care unit (ICU) admissions. Extracorporeal membrane oxygenation (ECMO) is generally reserved as rescue therapy for failed conventional ventilatory management for severe ARDS or cardiopulmonary support for advanced cardiogenic shock. The aim of this study was to review ECMO utility for severe influenza infection over a 6-year period at our quaternary care centre.

Methods

All influenza infection cases requiring ICU admission over 6 influenza seasons (2014-2020) were identified. The patients requiring ECMO were reviewed in detail. Baseline characteristics, disease severity, specific therapies, outcomes and health resource utilization data were collected.

Results

13 patients were cannulated for ECMO with severe influenza for a median of 13 days (range 3-34), all for veno-venous (V-V) support. The median age was 43 (range 21-61). Median BMI was 36.8 (range 19.9-41.0). Median APACHE II, SOFA scores, and P/F ratios at the time of admission were 25 (range 15-33), 12 (range 5-17), and 59 (range 35-86) respectively. All were infected with influenza A (92% H1N1pdm09, 8% untypable). The majority of infections (12; 92%) were community-acquired and, no patients were vaccinated 2 weeks prior to presentation, and all were treated with oseltamivir. Median ventilator days were 20 (range 3-59), all patients required vasopressor support, and 7 (54%) renal replacement therapy. Median ICU and hospital LOS were 20 and 29 days respectively. Six patients (46%) died within 30 days. The remaining 7 patients (54%) all survived to hospital discharge.

Conclusion

All infections were due to influenza A. Despite the association of influenza with cardiac events, no instances of cardiac mechanical circulatory support were identified. Patients were young, with elevated BMI, low P/F ratios and failed conventional ARDS therapies. VV ECMO outcomes were acceptable in this small cohort with very high acuity.

The impact of hyperthyroidism on bone microarchitecture and its changes with therapy among women

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Thyroid hormones play an important role in bone physiology. Hyperthyroidism drives high bone turnover and bone remodelling which is associated with net loss of bone mineral density (BMD). The gold standard of measuring BMD has long been Dual Energy X-ray Absorptiometry (DEXA). Notably, biochemical thyroid hormone normalization improves BMD towards normal, yet an increased risk of fractures remains lifelong.

Our primary objective was to utilize the newest 3-dimensional bone imaging technology, High Resolution peripheral Quantitative Computed Tomography (HR-pQCT), to study bone microarchitecture in actively hyperthyroid women to determine if bone remodelling is cortical, trabecular or both.

We enrolled 20 hyperthyroid women (age 20-76) with TSH suppression for > 3 month (TSH < 0.5, normal reference range: 0.5-4.49 mU/L) without secondary causes for bone loss. Their HR-pQCT scans of the radius were compared to age-matched scans of the normal female population. A subset of participants were scanned again after 6 months of TSH normalization to determine reversibility.

The observed data showed statistically significant difference between case and control group in defined parameters of bone microarchitecture including reduced cortical thickness (p-value < 0.05) regardless of hyperthyroidism etiology. Clear deviations from normal observed in volumetric bone density and cortical porosity, yet not to statistical significance. This highlights a unique alteration detected by QCT that would not be appreciated by DEXA. Repeat scan following successful treatment revealed some improvement in bone microarchitecture, but did not fully normalize microarchitectural elements.

Overall, unique microarchitectural changes were detected using the HR-pQCT imaging. Some changes in hyperthyroid patients are statistically different from normal controls, and while

not fully reversible on our timeline do trend towards normal. Our findings support the hypothesis that microarchitectural changes not previously appreciated using DEXA scan alone may explain the lifelong increased fracture risk noted in this population.

CANALISE-2: A prospective cohort study in peripheral artery disease (PAD) post-acute limb ischemia (ALI)

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Background

Peripheral artery disease (PAD) is an under-represented cardiovascular disease that affects over 200 million people worldwide. An acute limb ischemic (ALI) event is among the most severe prognostic factors for PAD outcomes, requiring urgent revascularization or amputation. Post-ALI, 1-year absolute risks of complications are high, including rehospitalization (61.5%), major acute limb event (MALE) (20%), major acute cardiac event (MACE) (3.7%), and death (8.3%). Optimal anti-thrombotic prophylaxis in PAD is unclear. CANALISE-2 is an ongoing prospective pilot study exploring current anti-thrombotic practice post-ALI.

Methods

30 patients were recruited (1.6/month) post-ALI intervention and stratified into two arms at discharge: 1) Full dose anticoagulant+/-aspirin (ASA), 2) Dual antiplatelet therapy, low-dose anticoagulant+ASA, or ASA alone. Patients were followed for 12 months and data on patient outcomes such as hospitalizations, interventions, major hemorrhages, MALE, MACE, and death were captured.

Results

Preliminary feasibility data show that data on outcomes was adequately captured via follow-up with a 10% loss to follow up. 50% of patients had no history of PAD and 80% were smokers. Post-intervention discharge anti-thrombotic practice was varied with anticoagulant+ASA (41%), anticoagulant alone (17%), and ASA alone (38%). At 12 months many patients were weaned off anticoagulants and were still varied with anticoagulant + ASA (14%), anticoagulant alone (0%), low-dose anticoagulant+ASA (43%), dual-antiplatelet (14%), and ASA alone (29%). At 6 months (n=18) there were 8 (44%) hospitalizations, 7 (39%) MALEs, 0 MACEs, 0 major bleeds, and 1 (6%) death.

Conclusions

Anti-thrombotic prescribing post-ALI varies greatly as the evidence is not clear, and evolves differently over the 12-month course with a high rate of complications. We report good feasibility in recruitment, data capture, and attrition at a single center. A large randomized multi-center trial is required to elucidate the optimal therapy, and this feasibility data will be helpful in building towards a multi-center registry.

Understanding approaches to psychosocial care within tertiary care diabetes centres in Canada: An environmental scan

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Background

Patients with diabetes who have psychosocial challenges are especially at-risk for poor diabetes self-management, and thereby to complications arising from poor glycemic control. Despite the Diabetes Canada Clinical Practice Guidelines' recommendations for diabetes centres to offer psychosocial services for the screening and support of patients with psychosocial barriers, the extent to which these recommendations have been implemented in centres across Canada is unknown.

Methods

Tertiary diabetes centres affiliated with academic institutions were invited to participate in our quantitative survey (n=40). Due to the different spectrum of psychosocial challenges faced by pediatric patients, only adult diabetes centres were surveyed. At each centre, a structured telephone interview was administered to a manager, as well as a social worker and psychologist (if employed at the centre) to inquire regarding the psychosocial services offered.

Results

27 diabetes centres (68%) completed at least one questionnaire. Participating diabetes centres varied considerably in capacity, employing from 3 to >50 diabetes educators and 0 to 20 endocrinologists. All centres provide care for patients with Type I and II diabetes, and approximately half serve patients with diabetes in pregnancy. Approximately four-fifths of centres report providing patients with access to psychosocial services, but only about half have a

dedicated, internal psychosocial team. Approximately one-third of all diabetes centres employ 0.1 or more full-time equivalent (FTE) of psychologists or mental health professionals and two-thirds employ 0.1 or more FTE of social workers or social service navigators. A vast majority of managers report that their staffing and funding model provides inadequate psychosocial support and that increased funding for psychosocial care is either somewhat of a priority or a high priority for their centre.

Conclusion

Diabetes centres across Canada struggle to offer adequate psychosocial services; greater funding and training for staff is required to uphold the Diabetes Canada Clinical Practice Guidelines.

The doctor will see you now...virtually: Complex Care Hub model of care providing home-based acute care that leverages virtual technology and community partnerships

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Background

Hospital at Home (HAH) programs reduce risk of morbidity, mortality and functional decline when compared to conventional hospitalization, and 19-62% cost reduction. Calgary's Complex Care Hub (CCH) is a HAH with intensive case management providing hospital-level care at home. CCH is one of the first HAH programs in Canada and is unique internationally for partnering General Internal Medicine, Transition Services and Community Paramedicine with a shared electronic medical record. During the COVID-19 pandemic, CCH partnered with a similar program, Edmonton Zone Virtual Hospital to incorporate remote patient monitoring and begin developing a provincial Virtual Hospital (VH) program.

Methods

Quantitative and qualitative data were used to assess quality of care using the Quadruple Aim as the conceptual framework to analyze: patient/family/provider experience, health outcomes, and cost.

Results

Between February 2018 and December 2019, 229 patients provided informed consent for the study (out of 242 patients) with a total 261 admissions. Average patient age was 71 years (range 19-101 years), and 59% were female. Approximately 2/3 were treated for

cardiopulmonary conditions. Acute care utilization was reduced through admission avoidance (59 admissions from ED and 37 community), early facilitated discharge (165 ward transfers). ED visits 90 days pre/post for admissions in the first 15 months were reduced by 28%. Approximately 75% of care (2,514 days) involved the acute program arm, providing substitutive hospital care. Patients reported improved health related quality of life and 98% (n=119) rated care from CCH staff as "good" or "excellent". Additionally, preliminary cost analyses show early evidence of cost avoidance.

Conclusion

CCH has achieved the Quadruple Aim as a safe and potentially cost-effective alternative to conventional hospitalization. It has also presented an opportunity during the COVID-19 pandemic to provide surge capacity, and physically distanced acute care, forming the basis for a provincial virtual hospital program.

Patterns of vitamin B12 testing in hospital

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Background

Vitamin B12 (B12) deficiency mimics symptoms of common disorders and disease processes. B12 is among many tests that are repeated in community laboratories at intervals that are excessive according to guidelines, which raises the possibility that B12 may also be overutilized in hospitals.

Objectives

To characterize the ordering frequency and patterns of B12 testing among inpatients, and to assess the appropriateness of repeat measurements and clinical utility of testing in hospital.

Methods

Patients aged ≥ 19 years who had ≥ 2 B12 tests in 2018 during admission(s) to St. Paul's Hospital (Vancouver, BC) were included in this study. Eligible patients were identified using the hospital laboratory database and underwent subsequent chart review. Patient demographics, risk factors for B12 deficiency, and information pertaining to B12 testing including frequency, testing intervals, lab values, and reason for testing were recorded.

Results

161 patients (101 male, 60 female) were included in this study who collectively had 487 B12 tests, of which 440 were performed during hospital admissions. Near half (44%) of patients had ≥ 3 inpatient tests (range 2-7). Patients had no identifiable risk

factors for B12 deficiency during 30% (91/308) of admissions. Common reasons for testing included workup of neuropsychiatric symptoms (184/440), cytopenias (168/440), and malnutrition (44/440). Biochemical deficiency was observed in 1.6% (7/440) of inpatient tests. Among repeat inpatient tests, 20% (58/291) and 27% (77/291) were ordered within 2 and 7 days of any previous test respectively. Between 50 to 83% of repeat inpatient tests were deemed unnecessary based on test intervals.

Conclusion

B12 tests are commonly repeated at inappropriately short intervals for inpatients, whereas biochemical deficiency is rarely seen. Testing for B12 deficiency should be pursued if there is high clinical suspicion based on prior lab results, risk factors, and absence of more likely alternative diagnoses.

Potentially inappropriate medication use in older adults (≥50 years) living with human immunodeficiency virus (HIV)

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Background

Older adults living with HIV (PWH) are at risk of polypharmacy due to comorbidities of aging and their associated treatments. Polypharmacy is associated with frailty, falls, cognitive impairment, medication non-adherence and increased mortality in older PWH. We aimed to characterize polypharmacy and potentially inappropriate medications (PIMs) in older PWH at the Southern Alberta Clinic (SAC) in Calgary, Canada.

Methods

We obtained medication reconciliation data for 951 PWH ≥ 50 years as of February 1st, 2020. We defined polypharmacy as concurrent use of ≥5 non-antiretroviral medications (non-ART) and PIM categories based on the 2019 updated Beers criteria. Statistical analysis was performed using STATA. Chi-Square tests and Student's t-tests were used to calculate mean, standard deviation, range, and median number of PIMs by individual. We compared between-group differences for older (≥65 years) and younger (50-64-year) age groups, as well shorter (<10 years) and longer (≥10 years) duration of HIV infection.

Results

80% PWH were 50 - 64 years old (n=761/951), with a mean of 59 years. The mean duration of HIV diagnosis was 17.8 years (SD 8.7; range 0-38). The mean number of non-ART medications

was significantly greater in the older compared to the younger cohort (8.4 versus 6.7, respectively; p<0.001). Time since diagnosis was also associated with use of more of non-ART medications (6.9 vs 6.1, respectively; p=0.0168). The most frequently used PIMs were NSAIDs (24%), antidepressants (22%), opioids (19%), antiplatelets (14%), non-benzodiazepine sedative-hypnotics (12%), gabapentanoids (10%), benzodiazepines (10%), and antipsychotics (8%). 60% of older PWH were taking ≥1 PIM (558/951), with a mean of 1.6 PIMs per patient (range 0-11).

Conclusions

Older PWH were taking an average of 6.7 non-ART medications and 60% were taking ≥1 PIM. These results highlight the importance of patient-centered medication reconciliation strategies that take into account patient goals and frailty status.

Quality gaps in perioperative glycemic management in Calgary, Alberta: A cross-sectional study

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Background

Postoperative hyperglycemia, defined as blood glucose point-of-care testing (POCT) greater than 10.0 mmol/L, is associated with worse patient outcomes, including increased 30-day mortality. About 20% of patients undergoing surgery have known diabetes, and additionally, an estimated 10% of patients without known diabetes have postoperative hyperglycemia. We sought to understand current perioperative glycemic management at the Foothills Medical Center using a cross-sectional design in order to identify areas for improvement.

Methods

We used electronic health record data to estimate the proportion of patients with and without diabetes (defined using the Discharge Abstracts Database and previous HbA1c measurement) who (1) underwent HbA1c screening before surgery; (2) underwent POCT postoperatively; (3) had any hyperglycemia (POCT > 10.0 mmol/L), moderate (POCT 14.0-17.9 mmol/L) and severe (POCT > 18.0 mmol/L) hyperglycemia. Eligible patients were admitted to the Foothills Medical Centre for more than 24-hours after a surgery between April 2018-March 2019.

Results

Of the 7,633 eligible patients, 1,575 (20.6%) had a preoperative diagnosis of diabetes. Of the patients with diabetes, 43.1% (n=679)

did not have any POCT measurements in the 24-hours after a surgery. Of patients with diabetes who had at least one POCT measurement, 64.5% had at least one episode of hyperglycemia (n=578), with 14.8% and 4.5% having moderate and severe hyperglycemia, respectively. Nearly half of patients without known diabetes undergoing surgery did not have a HbA1c measured in the year before surgery (47.1%, n=3,592). Of these patients without HbA1c measurement, 30.8% had at least one episode of postoperative hyperglycemia.

Conclusions

Surgical patients with and without diabetes had high proportions of postoperative hyperglycemia. Low levers of preoperative screening for diabetes and subsequent monitoring for postoperative hyperglycemia may have led to underestimation of hyperglycemia.

Effect of pre-transplant malignancy on malignancy risk in lung transplant patients

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Introduction

More than one fifth of lung transplant recipients will be diagnosed with a post-transplant malignancy within 5 years of their transplant. As the average age at transplant has increased over recent years, more patients have had a previous history of malignancy prior to the need for lung transplantation. As a center that adheres to international guidelines regarding listing and pre-transplant malignancy (PreTM), we assess whether PreTM still increases the risk of developing a malignancy after lung transplant.

Methods

We conducted a single centre retrospective cohort study of patients undergoing lung transplant between January 2006 and December 2017, and identified patients who had a history of PreTM as well as patients who developed post-transplant malignancies (solid organ, cutaneous, post-transplant lymphoproliferative disorder (PTLD) and leukemia). We performed univariate logistic regression and Fisher's exact tests to assess for potential risk factors for post-transplant malignancy. We then used a Cox proportional hazards model to assess the risk of PreTM on the development of malignancy after lung transplant, adjusted for age at transplant, and biological sex.

Results

514 adult patients underwent lung transplantation at our centre during the study period. 29 of these patients had a history of

PreTM. Altogether, 110 patients developed post-transplant malignancy with a total of 331 cancer diagnoses. Patients with a previous cancer history had a Hazard Ratio (HR) of 3.02 (CI 1.69 to 5.43, p=0.000) for the development of a post-transplant malignancy. The HR increased to 3.44 (CI 1.90 to 6.22, p=0.000) for patients who developed post-transplant malignancies excluding PTLD and leukemia.

Conclusions

Lung transplant patients with a PreTM are more than three times more likely to develop a post-transplant malignancy than patients without a history of PreTM. This elevated risk highlights the importance of frequent surveillance of this post-lung transplant cohort.

Cardiogenic shock and cardiac arrest in STEMI: characteristics and outcomes in northern Saskatchewan

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Background

Despite significant improvements in timely reperfusion and circulatory support, the outcomes of ST-segment elevation myocardial infarction complicated with cardiac arrest (CA) and/or cardiogenic shock (CS) remain suboptimal. In order to leverage strategies aimed at advancing the care of these high-risk patients, an improved understanding of patient characteristics at a local systems-level is required.

Methods

We prospectively evaluated consecutive STEMI presentations at a single PCI network of care (Royal University Hospital, Saskatoon March 15/2019 – April 05/2020). Categorized by CA/CS+ vs. CA/CS- at presentation, we describe presenting characteristics, treatment patterns and all-cause mortality in-hospital and at 6-months. All-cause mortality was adjusted for differences in baseline GRACE risk and expressed as odds ratio (95% confidence interval).

Results

Of the 291 STEMI hospitalizations, 52 (17.9%) presented with CA/CS+ (CA [n=25/291, 8.6%]; CS [n= 39/291, 13.4%]). CA/CS+ compared with CA/CS- patients had a significantly shorter time from symptom onset to first medical contact, but otherwise comparable premorbid profile, distribution of the infarct territory, use of primary PCI as the reperfusion strategy, and the burden

of significant stenoses in the non infarct-related artery. CS/CA+ was associated with a significantly higher in-hospital all-cause mortality (25% vs. 1.3%, adjusted OR 15.5 [95% CI 4.3, 73.8]). Even in patients surviving to hospital discharge, CA/CS at presentation was associated with a significantly lower 6-month survival (63.1% vs. 95.8%, $p=0.001$). Analyses between location of first medical contact, their geographical relationship to the primary PCI center and in-hospital mortality are underway.

Conclusions

STEMI presentations in Northern Saskatchewan are frequently complicated by CA and CS; while this data is limited by the small number of outcome events, CA/CS associates with significantly higher risk of not only in-hospital, but also 6-month mortality in those surviving to discharge. Surprisingly, comparable baseline demographics are noted between those with/without CA and CS. Opportunities aimed at better characterizing this high-risk patient population, and improving acute care delivery in STEMI complicated by CA/CS are identified.

Inflammatory bowel disease among seniors in Saskatchewan

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Background

Inflammatory Bowel Disease (IBD) is a chronic inflammatory condition of the gastrointestinal tract and comprises two forms: Crohn's Disease (CD) and Ulcerative Colitis (UC). Canada has the highest incidence and prevalence rates in the world. Although IBD is typically diagnosed earlier in life, as the population ages there is an increasing number of 'elderly' patients with IBD. Additionally, new cases can be diagnosed later in life. We aim to determine if there are differences in disease characteristics and outcomes, and IBD-related health care utilization between elderly patients with IBD diagnosed at a young age compared to those diagnosed later in life.

Methods

A retrospective chart review of elderly (age ≥ 60 years) patients with IBD was conducted. Patients aged ≥ 60 years who were seen at the Saskatchewan Multidisciplinary IBD Clinic at the Royal University Hospital from 2012-2020 were included. Information on demographics, disease characteristics, and access to IBD-related health care was collected. Patients were divided in two groups according to age of diagnosis: <60 years and ≥ 60 years. Chi-squares and independent t-tests were used to compare the

groups. Logistic regression models were built to obtain odds ratios (OR) with their corresponding 95% confidence intervals (95% CI) and considering potential confounders.

Results

In total, 264 patients were included in the study; 210 (79.5%) diagnosed <60 and 54 (20.5%) ≥ 60 . The mean age of diagnosis was 47.21 (SD=16.18), [$<60=41.69$ (SD=13.25), $\geq 60=68.00$ (SD=6.264)]. As per table one, no difference between sex, type of IBD, or remission identified between groups. Patients diagnosed at ≥ 60 more likely to be on 5-ASA medications than those diagnosed at a younger age. Patients diagnosed ≥ 60 years were 2.05 (1.11-3.79, 95% CI) times more likely to be using 5-ASA therapy. Patients in clinical remission were 3.04 (95% CI, 1.65-5.61) times more likely to be using biologic therapy.

Conclusions

No differences were seen between sex, IBD type, and clinical remission at most recent visit between elderly patients with IBD diagnosed at a younger age compared to those diagnosed later in life. We identified a significant correlation between use of 5-ASA in patients diagnosed age ≥ 60 . In the same cohort, clinical remission was also linked to current use of biologics agents. On further analysis, with data stratification based on type of IBD, no statistically significant differences were identified. This may have been from low power within the stratified groups. Patients diagnosed later in life were less likely to have IBD-related hospitalization or surgery, likely a reflection of shorted disease history. Patients diagnosed at a younger age were more likely to not be on any IBD-related medications. Further study to assess this difference is needed. Do these patients have "burnt out disease" not requiring therapy, or are there barriers to accessing appropriate treatments in this patient group?

A population-based susceptible, infected, recovered simulation model of the spread of influenza like-illness in the homeless versus non-homeless population

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Background

This study's purpose is to examine the prevalence and characteristics of influenza-like illness (ILI) presentations

among people experiencing homelessness compared to the general population as well as to use the Susceptible, Infected, Recovered (SIR) simulation model parameters β and γ to model infectious interactivity, recovery rate, and population-level basic reproduction number (R_0).

Methods

Using administrative data from emergency department (ED) visits in Ontario, Canada from 2010 to 2017, an SIR model was used to calculate the R_0 for ILIs in both the general population and the population of homeless individuals.

Results

From 2010 to 2017, a total of 17,056 homeless and 85,553 non-homeless individuals presented with an ILI to an ED in Ontario. The estimated infectious interactivity (β) was lower while the recovery rate (γ) was longer for infected people experiencing homelessness. 7249 preventable infections were identified when the homeless population had the same SIR parameters (β , γ , R_0) as the non-homeless population.

Conclusions

Our results suggest that infections of ILI lead to more secondary cases in the homeless population. The dynamics of ILI spread amongst the homeless show how illnesses such as COVID-19 may be much more infectious in this population. These estimates indicate that current strategies of targeting β , by shutting down shelters, may not be the most effective.

Healthcare system factors affecting the overutilization of routine laboratory tests in medical inpatients

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Background

Repetitive overutilization of inpatient laboratory testing has been recognized as a practice which provides limited benefits for patients while increasing healthcare costs and causing other potential harms. The use of routine lab tests in Western countries has continued to rise over the past decade, prompting various interventions to address this issue to be investigated in recent years (improving physician education on appropriate testing practices, auditing/feedback on lab test use, integration of technology such as computerized EMRs).

Beyond the ordering practices of individual physicians and the characteristics of patients for whom tests are being ordered, there are likely factors pertaining to the healthcare system itself

which also affect the frequency of routine lab testing. Several of these system factors (frequency of handover between different attending physicians, differences in staff availability on weekends vs. weekdays, level of trainee experience) have already been shown to affect other healthcare outcomes including patient outcomes and rate of medical errors. Identifying the healthcare system factors driving the overutilization of lab testing could provide opportunities for the addition of systems-related changes to existing patient-factor and practitioner-factor associated interventions.

Methods

The adult tertiary care hospitals in Calgary use an electronic medical record (EMR) system for computerized order entry. Local data on lab test utilization were previously analyzed to identify the following six 'routine' lab tests that were the top contributors to expenditure: complete blood count, electrolytes (comprising sodium, potassium, chloride and CO_2), creatinine, urea, international normalized ratio and partial thromboplastin time. Multiple healthcare system factors were examined in relation to the frequency of routine lab test use on medical teaching units (MTUs). A catalogue of all hospital patient-days within our study period (January 2015 to December 2017) were sorted based on their Case Mix group (CMG+) classification as described by the CIHI. The 10 most common CMGs were included in our analysis. Data analysis consisted of a mixed-effect Poisson regression to model the primary outcome of total lab tests ordered per patient on the MTU, adjusting for patient baseline characteristics (age, sex, CMG+ group, Charlson comorbidity index, etc.) and length of stay.

Results

The top 10 CMGs represented 33% of all hospital patient-days within the study period. The median age of patients was 65, and 45% of patients were female. The frequency of routine lab tests ordered was found to be increased when: multiple physicians were involved in a patient's care (IRR 2.50, $p < 0.001$); the attending team consisted of a senior resident in addition to junior residents, as opposed to only junior residents (IRR 1.12, $p = 0.004$); and the patient was being cared for by a more experienced attending physician (IRR 1.04, $p = 0.013$). The number of routine lab tests ordered was slightly lower on weekends (IRR 0.98, $p = 0.009$) and decreased as more days had passed since the patient's admission (IRR 0.96 per day, $p < 0.001$).

Interpretation

The frequency of routine lab test ordering is highest during the initial days of a patient's admission. Factors relating to the number of physicians caring for a patient, MTU team composition, weekdays vs. weekends, and practitioner experience affected the

number of routine lab tests that were ordered. Further research is needed to elucidate the reasons these individual factors affect lab test use, and whether interventions can be successful in addressing these system factors to reduce overall lab test use.

QUALITY IMPROVEMENT

Telemedicine use by rounding hospitalists during COVID-19

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Background

During the COVID-19 pandemic, our hospitalist group was short staffed without sufficient notice as some physicians were tested to rule out COVID-19 infection. During this time, hospitalists could perform work but were quarantined at home for 2-4 days pending test results. We aimed to explore the suitability & feasibility of a telemedicine service line for our group & understand its limitations in a pilot study.

Methods

We selected 4 rounding hospitalists to perform 10 telemedicine encounters each on admitted patients at Multicare Auburn Medical Center. The physicians were asked to situate themselves within our hospitalist office for the purposes of this pilot study. Each physician was partnered with a “telepresenter” who is also a hospitalist within our group. The telepresenter mobilized the 2-way audio-visual technology port into the patient room & assisted with performing a physical exam. Subsequently, we qualitatively interviewed all 4 rounding hospitalists individually & conducted a thematic analysis of the interviews to evaluate & understand their experience.

Results

Hospitalists were satisfied with their ability to evaluate & communicate with patients using telemedicine. They felt confident knowing that the physical exam was performed by a hospitalist colleague, a “telepresenter.” The 2-way audio-visual experience was seamless. As noted by our physicians, patients found the encounter to be positive & enjoyed continuity of care. Limitations include the rapid response & late call workflow for which back-up systems will need to be implemented.

Conclusion

Our hospitalists found Telemedicine use to be feasible, rapidly deployable, & cost effective for patient rounding. During the

current COVID-19 pandemic, planning ahead to use rapid innovative solutions such as Telemedicine in the hospitalist setting & exploring how to deploy them rapidly is worthwhile.

GIMRAC development, model of care, support of admission avoidance and decreased length of stay

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Hallway medicine has taken a forefront in Ontario Healthcare and is influencing patient care. The Conservative party is focused on increasing fiscal responsibility. Joseph Brant Hospital's General Internal Medicine Rapid Assessment Clinic (GIMRAC) was initiated in 2016 in an effort to decrease hallway medicine and assume that fiscal responsibility by having the right patient in the right place at the right time. Appropriate patients are referred from the Emergency department and Inpatient units and provided with a timely assessment by an internal medicine physician in a clinic setting close to home. The GIMRAC clinic has been instrumental in preventing hospital admissions and has allowed for improved quality and timely discharge from the emergency room department with prompt evaluation and investigations taken into the outpatient setting. Volumes have increased by greater than 350% to date.

Specialty medical care, collaboration between departments, and an intense focus on client centred care, have supported these numbers. The governance of an Ambulatory Care Steering Committee and consistent monitoring of metrics amongst staff, leadership, and finance, has provided the transparency and accountability needed to further grow. A review of community needs allows for proper alignment of care within the clinics. A realignment of resources and co-location of clinics, allows for visibility, cross training of staff, and collaboration of expert care.

The aim of this presentation is to inform conference attendees about the type of patient optimal for this model of care, challenges surrounding referrals, follow up, limited resource utilization, and barriers to further growth. Strategies related to the daily dynamics between frontline providers (ie., physicians, nurses, and hospital administration) will be outlined.

During the COVID pandemic GIMRAC has pioneered converting over 90% of its visits to a virtual platform, while maintaining pre pandemic volumes. Details of the shift to virtual care and the logistics around this care planning and staff adaptation will be discussed briefly.

Perioperative cardiac risk assessment in the Saskatoon Health District

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Cardiovascular complications are a leading cause of morbidity, prolonged hospitalization and deaths in perioperative patients (1). The 2016 Canadian Cardiovascular Society (CCS) guidelines recommend high risk patients undergoing non-cardiac surgery have preoperative brain natriuretic peptide testing (BNP) for cardiac risk stratification, and postoperative troponin and ECG in select patients.

This study examined the preoperative cardiac risk assessment patterns of general internists at Royal University Hospital (RUH) and St. Paul's Hospital (SPH) before and after the 2016 CCS guidelines. We hypothesize ordering preoperative BNP and postoperative troponins will increase at both hospitals following the publication of the CCS guidelines. We further hypothesize that adherence to the guidelines will be greater at the academic center (RUH) compared to the community site (SPH).

We conducted a retrospective study examining perioperative assessments before and after the publication of the CCS guidelines at both RUH and SPH. Charts were reviewed to determine cardiac risk. Primary outcome measures were ordering preoperative BNP and postoperative troponin in patients as indicated by the guidelines. Secondary outcomes included postoperative ECG monitoring and examination of the patient's baseline characteristics.

There was a statistically significant increase in preoperative BNP (1.10% vs. 9.40%, $p=0.009$) testing in the post-guideline period. There was a nonsignificant trend towards increased postoperative troponins monitoring (5.0% vs. 13.1%, $p=0.092$) during the post-guideline period. In multivariable regression analysis, patients at RUH were more likely to undergo preoperative BNP testing when indicated compared to patients at SPH (OR 26.7).

Our study demonstrates increased preoperative BNP and postoperative troponin testing following the publication of the 2016 CCS guidelines at both hospitals. However, both tests were recommended more frequently at the teaching site (RUH) compared to the community site (SPH). Future considerations could include the adoption of a consistent local practice guideline to ensure standardization across sites within Saskatoon.

Perceptions of code status

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Background

Code Status Discussions (CSD) are essential for patient-centred care. Residents are often responsible for conducting these conversations with patients upon admission. To ensure that these conversations are compatible with patient values and their clinical context, it is vital for residents to receive a comprehensive education in this area. Residents in the Internal Medicine program at the University of Saskatchewan do not currently receive formal training in CSDs. The purpose of this study is to examine the residents' perceptions of these discussions at the University of Saskatchewan's Internal Medicine program.

Methods

A survey was sent to the cohort. Out of 67, 49 residents responded (73%). The goal of the survey was to sample the residents for their understanding of a CSD. The survey was anonymous and consisted of multiple choice and written answers.

Results

Of 49 residents, only 22 had formal training in CSDs (45%). Three residents had neither formal nor informal training (6%). Twenty-five residents listed their ability for a CSD as "confident" (51%), while nineteen residents were only "somewhat" confident (39%). None of the residents were able to list all of the key components of a complete CSD, creating a discrepancy in residents' perceptions and their abilities. When asked to identify limitations of leading a CSD, lack of education was not mentioned, despite 27 residents (55%) having no formal training in this vital skill.

Conclusion

In teaching hospitals, most admissions and CSDs are done by residents. It is imperative to standardize and formally teach this vital skill to our doctors in training as evidenced by this pilot survey of Internal Medicine residents at the University of Saskatchewan. We present evidence of inequality in the true versus perceived competency in conducting CSDs and highlight the importance of this skill in the context of the growing complexity in medicine today.

Development of a multi-faceted quality improvement study to improve clinical assessments and communication with patients with limited English proficiency

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Background

Medical Interpretation Services (MIS) is the gold-standard, evidence-based tool that should be used during clinical assessments with patients who have limited English proficiency (LEP), to increase patient understanding of their disease processes and improve adherence to management plans, as well as reduce adverse outcomes such as missed diagnoses, increased use of acute care facilities, and potential confidentiality violations. Cost of MIS is covered by the provincial health authority, Alberta Health Services, however it is not consistently utilized across the province.

Aim

The aim of our project is to create a sustainable process that will activate on-demand MIS for any LEP patient to be utilized at every point of the patient journey, improving accuracy of clinical assessment and quality of patient communication.

Improvement/Innovation

This is a multi-faceted interventional study that applied quality improvement methodology to 1. Develop a system that will automatically activate the usage of remote MIS for any patient with LEP at each juncture of their healthcare journey; and 2. Disseminate multi-tiered educational and training sessions for GIM physicians and trainees, as well as allied health and support staff, on evidence-based recommendations on MIS when assessing and communicating with patients with LEP.

Measures

The study has utilized the Model for Improvement and the Donabedian frameworks to define the problem, evaluate the baseline state, and generate targeted improvements. This study includes components of process change, education and multiple plan-do-study-act cycles that will be implemented initially within the largest academic teaching centre in Edmonton, Alberta with plans for subsequent spread.

Project Impact/Conclusion

We hope that our quality improvement project will establish a consistent streamlined approach and usage of MIS for LEP patients improving clinical assessment and patient-centered experience, as well as reducing adverse outcomes associated with barriers in communication.

Reducing surgical wait times for hip fracture patients

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Background

Canadian guidelines recommend hip fractures be repaired within 48 hours of hospital admission. Morbidity and mortality rates increase significantly in hip fracture patients not receiving timely surgery. We hypothesized that anticoagulation use, preoperative echocardiography, unstable medical conditions, and consultation delays are key barriers to timely hip fracture surgery.

Methods

We conducted a retrospective cohort study of patients with traumatic hip fractures. Patients over 18 years old admitted to RUH in Saskatoon between January 01, 2019 and December 31, 2019, with a traumatic hip fracture were included. Detailed chart review was conducted for patients who did not meet the 48-hour benchmark. We examined the potential factors contributing to prolonged surgery wait times: medications, comorbidities, medical stability, time for necessary consults to be completed, and preoperative investigations. Data was extracted from electronic medical records and analyzed using descriptive statistics, process control charts, and Pareto analysis.

Results

Five hundred patients had hip fracture surgery between January 01, 2019 and December 31, 2019. Mean age was 80 years and 327 (65.4%) of the patients were female. Mean ($\pm$ standard deviation) wait time from admission to start of surgery was 36 ($\pm$ 18) hours. Four hundred nineteen (83.8%) patients had reparative surgery within 48 hours. Using Pareto analysis, DOAC use (18/81 patients, 22.2%), warfarin use (12/81, 14.8%), and unstable medical conditions (22/81, 27.2%) stood out as key barriers to surgery. Wait time for patients on a DOAC was 66.2 ($\pm$ 4.3) hours; warfarin was 60.1 ($\pm$ 9.2) hours; patients with unstable medical conditions waited 71.4 (18.3) hours.

Conclusions

Based on our analysis, key barriers to timely hip fracture surgery include anticoagulation use and medical instability. These results suggest a role for developing a protocol for preoperative anticoagulation management to reduce unnecessary delays in hip fracture surgery.

CASE REPORTS

A case of mantle cell lymphoma presented as skin rash

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Mantle cell lymphoma (MCL) is a rare subtype of non-Hodgkin B-cell lymphoma that usually presents late in the clinical course with lymphocytosis or pancytopenia. Extra nodal involvement is predominantly in GI tract, kidney or rarely CNS. Cutaneous involvement is very rare and indicates widespread disease. Here we report an unusual case of MCL who presented with a skin rash.

A 72-year-old female with a medical history of chronic obstructive pulmonary disease, congestive heart failure and obstructive sleep apnea presented to the emergency department with skin rash, fever, dyspnea and productive cough. She also reported history of chills, nausea, headache, and fatigue. The rash started as multiple clear fluid filled bullae with a very thin roof over all extremities which later ruptured to leave skin ulcers and crusting. She also had secondary cellulitis in her right ankle and left thigh.

The patient was treated for cellulitis and COPD exacerbation while in the hospital. Initial blood work showed low hemoglobin with normal leukocytes and platelets count. Wound cultures were positive for *Staphylococcus aureus* and *Streptococcus*. Chest X-ray and chest computed tomography scan incidentally revealed axillary and supraclavicular adenopathy with intermediate size lymph nodes in the mediastinum and hilar regions. She also underwent lower extremity venous Doppler ultrasound and was found to have bilateral inguinal lymphadenopathy. These imaging findings prompted further investigation. Computed tomography of the abdomen and pelvis showed bilateral lymphadenopathy in the inferior retroperitoneum. Flow cytometry was unremarkable. Axillary lymph node biopsy was positive for mantle cell lymphoma. Atypical lymphocytes were positive for CD20, Cyclin D1 and Bcl-2. Her skin rash responded to Cephalexin and it was thought to be bullous impetigo, modified by altered immune function.

When the classical medical presentation proves non-classical: A case of Miller Fisher syndrome

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Miller Fisher Syndrome (MFS), is a rare variant of Guillain-Barré syndrome (GBS), classically characterized by ophthalmoplegia, ataxia and areflexia. Close to 70% of patients, however, only have one feature of this triad at first, with their chief presentation

initially being attributed to medical complications of their preceding viral illness. Moreover, unlike the cardinal feature of ascending weakness in GBS, deficits in MFS follow a descending distribution that can also be mistaken for acute, central nervous system aetiologies. Clinching this clinical diagnosis can hence prove to be challenging. Here, we present a case of a 46-year-old gentleman who presented to hospital with fevers, watery diarrhea and periodic diplopia. His past medical history is significant for alcohol use and obsessive-compulsive disorder that is well controlled on clomipramine. His visual symptoms were initially thought to be related to his hyponatremia of 114 mmol/L. Despite careful correction of his sodium, his diplopia worsened with progressive dilation of his left pupil and horizontal gaze nystagmus. CT and MRI head imaging were negative for suspected central causes such as strokes, aneurysms, and central pontine myelinolysis. He was subsequently treated with high dose thiamine for suspected Wernicke's encephalopathy as he became increasingly ataxic, which was then followed by truncal and extremity numbness. EMG demonstrated a prolonged H-reflex, consistent with a neuropathy. Workup for autoimmune, infectious, paraneoplastic causes were negative. Eventually, he had a lumbar puncture done that demonstrated albuminocytologic dissociation, securing a final diagnosis of MFS. After days of IVIG treatment, the advancement of his neurological symptoms halted. Unfortunately, despite six months of inpatient rehabilitation, he never recovered back to his previous baseline for this typically self-limiting syndrome. This case highlights the importance of considering MFS in the differential diagnosis for patients presenting with ophthalmoplegia, ataxia or areflexia, especially with a viral prodrome.

Atypical presentation of polyposis coli

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A 55-year-old male presented to the ED with weakness and watery diarrhea for two weeks, two to three times per day, even with decreased oral intake. The patient never had any pain with defecation, steatorrhea, or acholic stools. He had nausea without vomiting and decreased appetite. This was the first time that the patient experienced prolonged diarrhea. There was no family history of autoimmune diseases, inflammatory bowel disease, or any cancers. The patient routinely consumed 6-8 beers daily for several years. He denied having any other health conditions.

On exam, the patient's abdomen was soft, non-tender, non-distended. Bowel sounds were appreciated. The patient had severe

hypokalemia (1.6), hypomagnesemia, and hypocalcemia on admission. Infectious or inflammatory etiology was considered due to the patient's mild leukocytosis and CT showing wall thickening in the distal small bowel, cecum, and transverse colon. The patient was treated with Levaquin and metronidazole. Despite four days of antibiotic treatment, the patient continued to have 4-8 watery bowel movements a day. The patient was receiving oral potassium, magnesium, phosphorous repletion as needed as well as supplemental folate, thiamine, and B12 throughout his hospitalization. His original symptom of weakness and his appetite improved, but he still had persistent diarrhea and an inability to maintain normal electrolytes without replacement. Fecal fat testing did not suggest malabsorption and C. difficile was negative. A colonoscopy revealed multiple tubular adenomatous polyps from the rectum to the right colon. After a laparoscopic total colectomy with ileorectal anastomosis, the patient's symptoms resolved.

Polyposis coli that presents in later adulthood without a clear family history could be related to attenuated familial adenomatous polyposis (aFAP). Polyposis coli in addition to malnutrition from alcoholism may have precipitated the patient's stark hypokalemia and subsequent weakness, leading him to seek treatment early enough for preventative intervention.

An unusual cause of syncope or: What happens in vagus

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A 55 year-old man presented to the emergency department with an episode of syncope and a history of several days of pre-syncope. There were no obvious provoking factors or association with position change. He was on no medications. One month earlier he had undergone thyroplasty with silastic implantation for vocal cord palsy, with no complications. In 2005 and 2014 he had surgery for a left cerebellopontine angle (CPA) cyst which had caused facial weakness, dysphonia and dysphagia, with relief of symptoms. He was admitted under the Cardiology Service where he was found to have sinus bradycardia (heart rate 50 bpm); an echocardiogram was normal. An MRI brain scan showed a mass in the left cerebello-pontine angle; the left Vagus nerve was completely encased. The GIM consult service were asked to review the case and advised that the most likely cause of the syncope was due to interference with the vagus nerve. Subsequent neurosurgical debulking was done and the pathology confirmed a recurrent epidermoid cyst.

Epidermoid cysts account for 9% of CPA tumours and commonly involve cranial nerves VII and VIII with a minority involving the Vagus nerve. Involvement of the Vagus nerve by a malignant tumour (such as Schwannoma and paraganglioma) has been reported to cause syncope and postural hypotension but we have not found a report of this complication from an epidermoid cyst.

A review of the literature regarding this unusual cause of syncope will be presented.

Utility of anti-streptolysin o titer in culture-negative toxic shock syndrome

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Toxic shock syndrome (TSS) is a life-threatening disease mediated by superantigens produced by *Staphylococcus aureus* and Group A streptococci (GAS). The diagnosis requires a high degree of suspicion for early recognition. We present a case of culture-negative TSS where anti-Streptolysin O titer (ASOT) was used to diagnose Streptococcal TSS.

A 46-year-old male presented in shock after an arm laceration. His blood pressure was 83/44, heart rate 124, respiratory rate 30, temperature 36.8 degrees and oxygen saturations 96% on room air. Physical examination showed a painful erythematous rash on his left chest without crepitus. Initial labs showed a pH of 7.18, lactate of 8.3, elevated creatinine (610) and C-reactive protein (229), with normal ALT and CK. Necrotizing fasciitis was ruled out with surgical consultation. The patient received broad spectrum antibiotics and steroids; unfortunately, cultures were sent following antibiotic administration. He initially required vasopressors, mechanical ventilation, and renal replacement therapy. He developed thrombocytopenia, elevated liver enzymes, and a macular rash with bullae, followed by a desquamating rash. All cultures were negative. ASOT was elevated at 959 kU/L and the patient was diagnosed with presumed Streptococcal TSS. He was discharged home once medically stable.

GAS is a common pathogen that can cause minimal to life threatening disease, with sequelae that can include TSS. Clinical suspicion of TSS supports early recognition and management that may include debridement, appropriate antibiotic therapy, and intravenous immunoglobulin. A confirmed diagnosis requires a positive GAS culture; however, our patient was diagnosed using ASOT given his negative antibiotic-influenced cultures. ASOT has proved useful in diagnosing GAS infection sequelae including post-streptococcal glomerulonephritis and acute rheumatic fever; however, its diagnostic utility in TSS is not well described. Our

case highlights the use of ASOT in culture-negative TSS and may serve to support its use in expediting diagnosis and management.

Learning from a rare phenomenon: Spontaneous clearance of hepatitis c virus post-liver transplant

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Hepatitis C virus (HCV) can lead to chronic liver damage resulting in cirrhosis and hepatocellular carcinoma. Spontaneous clearance of HCV has been documented after an acute infection in 20-45% of individuals. However, spontaneously resolved chronic HCV following liver transplant is rare and has been documented only in a few case reports. The phenomenon of spontaneous clearance of chronic HCV occurs together with other meaningful events, which are typically associated with significant changes in the host immunity. We report three cases of spontaneous resolution of chronic HCV following liver transplantation (LT) and review of prior case reports. HCV treatment with direct-acting antivirals has an excellent cure rate but understanding the mechanisms behind this unusual event may provide clinicians with important insights with regards to timing and duration of treatment following transplant. Though the small number of cases prevents identification of predictors of clearance, however, some factors have emerged. For instance, viral load can be used to determine the duration of treatment; with shorter duration in those with low viral load. Median time to spontaneous HCV clearance was 11 months (IQR 3.6, 66 months); with almost half of the patients achieving spontaneous clearance within 6 months. Treatment could therefore be started after 6 months. This would provide an additional advantage of limiting drug-drug interactions early in the post-transplant setting. In conclusion, spontaneous resolution of chronic HCV following LT is a rare phenomenon and seems to be related to immunomodulatory effects. Learning from this rare event may be the first step to individualized medicine.

A pain in the neck: an unusual presentation of a retropharyngeal abscess complicated by mediastinitis and internal jugular vein thrombosis

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A previously healthy 35-year-old male presented to the hospital with five days of high-grade fever and mild posterior neck pain.

There were no meningeal signs and he denied a history of recent oropharyngeal infection or trauma. Initial contrast CT of the neck was unremarkable; however, a chest CT was notable for bilateral mediastinal and hilar lymphadenopathy. Two days later, blood cultures returned growing *Streptococcus anginosus* which prompted a repeat contrast CT of the neck showing a retropharyngeal abscess (RPA) with extension into the right carotid space and superior mediastinum. The abscess was immediately drained and debrided using a flexible laryngoscope and required multiple washouts. This failed to resolve the mediastinitis leading to development of an empyema. Ultimately, the patient required video-assisted thoracoscopic surgery with pulmonary decortication and a prolonged course of antibiotics. The case was further complicated by internal jugular vein thrombosis, which was managed with anticoagulation. The patient was discharged after an extended hospital course and at last follow-up appears to have recovered well.

Retropharyngeal abscesses are rarely seen in adults and the incidence in an immunocompetent adult without history of preceding trauma is unusual. This case illustrates the importance of having a high clinical suspicion for RPAs despite negative initial imaging. Neck pain out of proportion to oropharyngeal exam findings should also prompt a search for RPAs. In addition, *S. anginosus* bacteremia is associated with abscess formation particularly in the head and neck. Rapid diagnosis has a positive effect on mortality as these infections spread rapidly through the cervical fascia into the other compartments in the neck and thorax. The complication of descending cervical mediastinitis has a very high mortality rate, ranging from 14% to 50%.

Dermatomyositis as a presentation of small cell lung carcinoma

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We describe a case of a 79-year-old man with a 100-pack-year smoking history, presenting with two to three weeks of pruritic rash and proximal muscle weakness. Physical examination identified Gottron's papules, shawl sign, and heliotrope rash. Initial investigations were significant for an elevated creatine kinase. Given the suggestive exam and electromyography findings, he was diagnosed with dermatomyositis. Notably, a recent skin biopsy showed acute interface dermatitis, which could be associated with lupus erythematosus or dermatomyositis. CT scan revealed extensive mediastinal lymphadenopathy with a subpleural nodularity at the posterior right lung apex. A positron emission tomography scan showed intense uptake in the mediastinal nodes and liver dome. Biopsy via endobronchial