Department of Medicine
Research Excellence and Discovery Day

34th Annual Residents' RESEARCH DAY

May 17, 2023

BRIGHTER WORLD

HEALTH SCIENCES
Department of Medicine

McMaster University

McMaster University
Faculty of Health Sciences

Department of Medicine
34th Annual
Residents' Research Day in Medicine

May 17, 2023

Director Resident Research
Darryl Leong

Special thanks to our judges

Scientific: M. Duong, M. Lanktree, N. Narula
Clinical: C. Kraeker, A. Montgomery
Subspecialty: C. Demers, P. Gross, K. Ng
Timekeepers: A. Aldarraji, G. Dallegrave Cavalli, S. Moshiri

Program

Poster Presentations - Morning

12:15 – 1:45 Resident Luncheon and
Internal Medicine Program Awards

2:00 – 4:00 Oral presentations

4:15 – 5:00 Poster viewing and hors d'oeuvres

5:00 – 5:30 Keynote address – Dr. Dawn Bowdish
"Finding Your Scientific Voice And Using It For The Greater Good"

5:30 – 6:00 Awards Ceremony
Research Day awards
2023 Grants announced
Faculty teaching awards
Faculty role recognitions

ORAL PRESENTATIONS

POSTERS - SCIENTIFIC

POSTERS - CLINICAL

Oral Presentations

1 – 7

1 - O Corticosteroids in Community-Acquired Bacterial Pneumonia: A Systematic Review, Pairwise and Dose Response Meta-Analysis

Background:
International guidelines provide heterogenous guidance on use of corticosteroids for community acquired pneumonia (CAP).

Methods:
We performed a systematic review of randomized controlled trials examining corticosteroids in hospitalized adult patients with suspected or probable CAP. We performed a pairwise and dose response meta-analysis using the restricted maximum likelihood (REML) heterogeneity estimator. We assessed the certainty of the evidence using GRADE methodology and the credibility of subgroups using the ICEMAN tool.

Results:
We identified 17 eligible studies that included 3,866 patients. Corticosteroids probably reduce mortality in more severe CAP (RR 0.64 [95% CI 0.44 to 0.93]; moderate certainty) with possibly no effect in less severe CAP (RR 1.08 [95% CI 0.83 to 1.42]; low certainty). We found a non-linear dose response relationship between corticosteroids and mortality, suggesting an optimal dose of approximately 6 mg of dexamethasone (or equivalent) for a duration of therapy of 7 days (RR 0.30 [95% 0.14 to 0.63]). Corticosteroids probably reduce the risk of requiring invasive mechanical ventilation (RR 0.49 [95% CI 0.32 to 76] and probably reduce intensive care unit (ICU) admission (RR 0.65 [95% CI 0.43 to 0.97]) (both moderate certainty). Corticosteroids may reduce the duration of hospitalization and ICU stay (both low certainty). Corticosteroids may increase the risk of hyperglycemia (RR 1.76 [95% CI 1.46 to 2.14]) (low certainty).

Conclusion
Moderate certainty evidence indicates that corticosteroids reduce mortality in patients with more severe CAP, the need for invasive mechanical ventilation and ICU admission.

Authors: Tyler Pitre, PGY3, Daniyal Abdali PGY4
Supervisor: Dr. B. Rochwerg

2 - O Reducing Inappropriate Oxygen Administration to Patients Admitted Under Medicine: A Quality Improvement Project

During COVID-19, hospitals have faced resource limitations while caring for increased patient volumes. One limitation is provision of supplemental oxygen, leading to consideration around reducing unnecessary oxygen usage.

The aim of this project was to reduce inappropriate oxygen administration by 50% among patients admitted under Medicine at St. Joseph's Healthcare Hamilton over 6 months (Jan-Jun 2022). We defined inappropriate oxygen use based on BMJ clinical practice guidelines (Siemieniuk et al., 2018): oxygen therapy started when patients had pulse oximetry demonstrating oxygen saturation greater than their lower targeted limit, or continued without down-titration in patients with oxygen saturation above their upper targeted limit.

Baseline data collection showed that 80% of patients receiving oxygen received it inappropriately at some point during the studied day. This decreased to approximately 50% with the initiation of this project, including the interviews for root cause analysis and the implementation of a visual aid, the first intervention. The second intervention, communication of ward-based "statistics" to unit managers biweekly for dissemination to nursing staff, did not lead to a sustained decrease in inappropriate oxygen use. The third intervention, implementation of a mandatory oxygen target order on the admission order set on Dovetale, led to a decrease in inappropriate oxygen administration to 21% over the final month of the 6-month study period. A sustainability assessment at 3 months post- study completion showed a return to 43% in this outcome measure.

In our local context, the implementation of a visual aid and mandatory oxygen order reduced inappropriate oxygen use by over 70% relative to baseline. Most importantly, it initiated a conversation among healthcare workers about strategies for, and importance of, reduction of inappropriate oxygen use.

Authors: Inna Berditchevskaia PGY3
Supervisor: Dr. A. Cheung

3 - O Anti-Epithelial Derived Cytokines for Severe Asthma: A Systematic Review and Meta-Analysis

Background:
Therapies directed against epithelial-derived cytokines, often referred to as alarmins, have been studied in large randomized trials, and reports suggest possible benefit for non–type 2 as well as type-2 severe asthma.

Methods:
We performed a systematic review of Medline, Embase, Cochrane Central Register of Controlled Trials, Medline In-Process, and Web of Science databases from inception to March 2022. We performed a random-effects pairwise meta-analysis of randomized controlled trials addressing anti-alarmin therapy in severe asthma. Results use relative risk (RR) values and 95%-confidence intervals (CIs). For continuous outcomes, we report mean difference (MD) values and 95% CIs. We define high eosinophils as ≥300 cells/μL and low eosinophils as <300cells/μL. We used Cochrane-endorsed RoB2.0 software to assess the risk of bias of trials, and we used the Grades of Recommendation Assessment, Development, and Evaluation (aka GRADE) framework to assess the certainty of the evidence.

Results:
We identified 12 randomized trials including 2391 patients. Anti-alarmins probably reduce annualized exacerbation rates in patients with high eosinophils (RR 0.33 [95% CI 0.28 to 0.38];moderate certainty). Anti-alarmins may reduce this rate in patients with low eosinophils (RR 0.59 [95% CI 0.38 to 0.90];low certainty). Anti-alarmins improve FEV1 in patients with high eosinophils (MD 218.5 mL [95% CI 160.2 to 276.7];high certainty). Anti-alarmin therapy probably does not improve FEV1 in patients with low eosinophils (MD 68.8 mL [95% CI 22.4 to 115.2]; moderate certainty). Anti-alarmins reduce blood eosinophils, total IgE, and fractional excretion of nitric oxide across studied subjects.

Conclusion:
Anti-alarmins are effective at improving lung function and probably reduce exacerbations in patients with severe asthma and blood eosinophils ≥300 cells/μL. The effect on patients with lower eosinophils is less certain.

Authors: Johnny Su PGY3, Tyler Pitre PGY3
Supervisor: Dr. T. Ho

4 - O Efficacy of Posterior Pericardiotomy in Reduction of Atrial Fibrillation After Cardiothoracic Surgery: A Systematic Review and Meta-Analysis of Randomized Controlled Trials

Atrial fibrillation is a well-known complication of cardiothoracic surgeries. Several randomized controlled trials (RCTs) have shown that posterior pericardiotomy is a promising method for reducing atrial fibrillation although the existing data remains controversial. In this study, we performed a systematic review and meta-analysis to investigate whether posterior pericardiotomy (PP) reduces post-operative atrial fibrillation. Secondary outcomes consisted of surgical re-exploration for tamponade or bleeding, pleural effusion requiring intervention, pericardial effusion, all-cause mortality, hospital length of stay, ICU length of stay, time on bypass, and cross clamp time.

We searched MEDLINE, EMBASE, Web of Science, and the Cochrane Central Register of Controlled Trials (CENTRAL) for randomized controlled trials from inception to March 11, 2023. We also searched trial registries including the World Health Organization International Clinical Trials Registry Platform, ClinicalTrials.gov, and the EU Clinical Trials Register.

We analyzed 18 randomized controlled trials consisting of 3558 participants (1771 in the PP group and 1787 in the control group). A total of 13.3% (235/1771) and 25.2% (452/1787) of participants developed atrial fibrillation in the PP group and control group respectively. The incidence of atrial fibrillation (RR = 0.53, 95% CI 0.40-0.70, P < 0.0001), pericardial effusion (RR = 0.36, 95% CI 0.17-0.73, P = 0.005), and surgical re-exploration (RR = 0.61, 95% CI 0.41-0.91, P = 0.02) were significantly lower in the PP group. There was no difference in pleural effusion requiring intervention, all-cause mortality in hospital, hospital or ICU length of stay, time on bypass, and cross clamp time.

Overall, this meta-analysis supports that posterior pericardiotomy can be a safe and effective method for the prevention of post-operative atrial fibrillation after cardiac and thoracic surgery.

Authors: Xinxin Tang PGY2, Charlotte McEwen PGY2 Surgery, Omar Ibrahim PGY5 Cardiology, Daniel Lazzam PGY2
Supervisors: Drs. W. McIntyre & E. Belley-Côté

5 - O Techniques Improving Electrical Cardioversion Success for Patients with Atrial Fibrillation: A Systematic Review and Meta-Analysis

Background:
Electrical cardioversion is commonly used to restore sinus rhythm in patients with atrial fibrillation (AF), but procedural technique and clinical success vary. We sought to identify techniques associated with electrical cardioversion success for AF patients.

Methods and Results:
We searched MEDLINE, EMBASE, CENTRAL, and the grey literature from inception to October 2022. We abstracted data on initial and cumulative cardioversion success. We pooled data using random-effects models. From 15 207 citations, we identified 45 randomized trials and 16 observational studies. In randomized trials, biphasic when compared with monophasic waveforms resulted in higher rates of initial [16 trials, risk ratio (RR) 1.71, 95% CI 1.29–2.28] and cumulative success (18 trials, RR 1.10, 95% CI 1.04–1.16). Fixed, high-energy (≥200 J) shocks when compared with escalating energy resulted in a higher rate of initial success (four trials, RR 1.62, 95% CI 1.33–1.98). Manual pressure when compared with no pressure resulted in higher rates of initial (two trials, RR 2.19, 95% CI 1.21–3.95) and cumulative success (two trials, RR 1.19, 95% CI 1.06–1.34). Cardioversion success did not differ significantly for other interventions, including: anteroapical/lateral vs. antero-posterior positioned pads (initial: 11 trials, RR 1.16, 95% CI 0.97–1.39; cumulative: 14 trials, RR 1.01, 95% CI 0.96–1.06); rectilinear/pulsed biphasic vs. biphasic truncated exponential waveform (initial: four trials, RR 1.11, 95% CI 0.91–1.34; cumulative: four trials, RR 0.98, 95% CI 0.89–1.08) and cathodal vs. anodal configuration (cumulative: two trials, RR 0.99, 95% CI 0.92–1.07).

Conclusions:
Biphasic waveforms, high-energy shocks, and manual pressure increase the success of electrical cardioversion for AF. Other interventions, especially pad positioning, require further study.

Author: Stephanie Nguyen PGY1
Supervisors: Drs. W. McIntyre & E. Belley-Côté

6 - O Sex-based Differences in Response to Vedolizumab Therapy for Ulcerative Colitis: A Post-hoc Analysis of VARSITY and GEMINI-1 Study

Background: There are increasing data on sex-based differences in inflammatory bowel disease epidemiology, phenotype and outcomes. The purpose of this analysis is to characterize sex-based differences in response to vedolizumab in patients with ulcerative colitis (UC).

Methods: We conducted a post-hoc analysis using data from both the VARSITY and the GEMINI-1 study. Adults with active UC with Mayo score of 6-12 (total scores range from 0 to 12, with higher scores indicating more active disease) who received at least one dose of vedolizumab were included in the analysis. Means were compared using unpaired t-test, medians using Mood's median test, and categorical variables using chi-square test to determine if there is any sex-based difference in response. We looked at clinical remission as the primary outcome at week 52 defined as total Mayo score ≤ 2 and no subscore > 1 on any of the four Mayo scale components between males and females. Further analysis of week 6 clinical response subgroup have been done to further explore any statistically significant difference between males and females.

Results: 1,009 patients (58.6% males) were included in the analysis. No significant differences in the majority of baseline characteristics were observed [Fig. 1]. Vedolizumab trough levels were comparable at week, 14, 22, 30, 38, 52, and 68 between males and females [Fig. 2-3]. There was no statistically significant difference noted between males and females in clinical remission (56/194 (28.9%) vs 44/126 (34.9%), p=0.232) at week 14 and (171/592 (28.9%) vs 144/417 (34.5%), p=0.057) at week 52, endoscopic improvement (74/194 (38.1%) vs 50/126 (40.0%), p=0.958) at week 14 and (210/592 (35.5%) vs 164/417 (39.3%), p=0.212) at week 52, histo-endoscopic mucosal improvement (70/232 (30.2%) vs 40/105 (38.1%), =0.110) at week 14 and (35/112 (31.3%) vs 35/95 (36.8%), p=0.097) at week 52, or on any of the four Mayo scale components. However, it was noted that females had better endoscopic improvement rate at week 6 compared to males (140/398 (35.2%) vs 138/291 (47.4%), p=0.001) [see Fig.4]. The higher rate of week 6 endoscopic improvement in females could be partly attributed to less severe endoscopic burden within included females (Mayo 2 disease in 159/291 [54.6%] females vs. 152/398 [38.2%] males) and lower mean weight (64.6 kg vs. 79.4 kg).

Conclusion: Based on this post-hoc data analysis from the VARSITY and the GEMINI-1 study, we demonstrated that clinical response, remission, endoscopic improvement, and histo-endoscopic mucosal improvement are similar in male and female adults receiving vedolizumab with moderate to severe UC at week 52. Females were noted to have higher rates of endoscopic remission at week 6, but this may be partly attributable to lower endoscopic burden and lower mean body weight in females. Further studies are needed to further explore sex-based differences in response to therapies in IBD.

Authors: Zaki Alhashimalsayed PGY2
Supervisors: Dr. N. Narula

7 - O Hypoxic respiratory failure impact on ventilation and chest wall inspiratory muscle function in severe COPD patients

Background: Type 1 respiratory failure is hypoxia with arterial partial pressure of oxygen < 60mmHg without hypercapnia - commonly seen in patients in emergency with respiratory distress. To elucidate the impact of hypoxic respiratory failure in severe COPD, we examined ventilation and respiratory muscle function before, during and after period of sustained hypoxic desaturation.

Methods: Fine-wire EMG was implanted in inspiratory parasternal intercostal (PARA) muscles of severe COPD (N=7, FEV1 0.87L 32% pred). We measured airflow, oxygen saturation (SpO2), end-tidal CO2 (ETCO2) and PARA EMG activity during room air ventilation followed by moderate isocapnic hypoxia (~80% SpO2) lasting 20 minutes, and then room air recovery. We report 4 min resting room air (BASE), sustained hypoxia: 2 min after reaching SpO2 80% (PEAK) and final 4 min (PLATEAU), and then 4 min recovery room air (RECOVERY).

Results: Minute ventilation (VI) increased briskly from BASE to PEAK (15.4 to 19.8, $p<0.01$), then decreased significantly to PLATEAU (19.8 to 16.9 L/min, $p<0.05$). Changes in VI were related to tidal volume and mean inspiratory flow ($p<0.05$), while respiratory rate did not differ with acute or sustained hypoxia. Peak PARA moving-average EMG showed a marked increase from BASE to PEAK ($p<0.01$) followed by significant decline in a time dependent manner with sustained hypoxia.

Conclusion: In severe COPD, hypoxic respiratory failure elicited a ventilatory pattern that is transient and fleeting with sustained hypoxia causing marked depression in ventilation. Significant recruitment of primary chest wall intercostal muscle was noted during acute hypoxia; however, these muscles were demoted in a temporal manner with sustained desaturation. Significant loss of ventilation and respiratory muscle derecruitment places patients at significant risk of respiratory deterioration with sustained hypoxia.

Authors: Michael Ji PGY2
Supervisor: Drs. A. McIvor & P. Easton

Poster Presentations

Scientific

1 – 23

1 - S Language Concordance Amongst Ontario Physicians and Patients

Background: The Canadian population has rich linguistic diversity. In Ontario, about 16% of the population reports speaking a language other than English or French predominantly at home. Patients with limited English proficiency are at risk of experiencing poor health outcomes. A potential solution is utilizing physicians who speak a non-English or French language. This study compares the languages spoken by the Ontario population with Ontario physicians.

Methods: We collected data from the 2021 Statistics Canada Census and The College of Physicians and Surgeons of Ontario database. Languages were compared with calculated absolute difference in prevalence and 95% confidence intervals on Microsoft Excel (Version 16.65).

Results: There were 10,300 of 30,492 (34%) physicians who reported speaking a non-English or French language and 2,231,710 of 14,099,790 (16%) people in Ontario who reported speaking a non-English or French language predominantly at home. There were 90 languages with a higher proportion spoken by the Ontario population than physicians. The top ten languages with the greatest absolute difference were identified. In order of the greatest absolute difference to least they are Tagalog (0.31% [0.24-0.38]), Dari (0.08% [0.056-0.113]), Somali (0.07%, [0.048-0.089]), Pennsylvania German (0.07% [0.05-0.052]), Assyrian Neo-Aramaic (0.05% [0.027-0.069]), Tigrigna (0.05% [0.032-0.061]), Chaldean Neo-Aramaic (0.04% [0.038-0.04]), Ilocano (0.04% [0.022-0.054]), Nepali (0.03% [0.014-0.053]), and Tibetan (0.03% [0.031-0.033]). Of the top ten most spoken languages in Ontario, Tagalog was the only language with a smaller proportion of Tagalog speaking physicians than the population. Meanwhile, of the 90 languages, 80 were spoken by the Ontario population but by zero physicians.

Conclusions: There are 90 languages spoken in Ontario that are underrepresented by practicing physicians. These results can help inform future health resource planning.

Authors: Sabrina Yeung PGY2
Supervisors: Dr. J. Neary

2 - S Mortality Among People Experiencing Homelessness in Hamilton

Background: Hamilton, Ontario has a homeless population last counted at 3,290 in 2020, though it is estimated that this number has increased with the major impact of COVID-19 on the housing crisis and shelter capacity. It has been repeatedly demonstrated that homelessness decreases life expectancy; however, despite this large homeless population, prior to this project, there has been no monitoring of ages, causes, or circumstances of death in this population in Hamilton.
Method: Starting in June 2021, we sought to answer this question by initiating a multipronged publicly-transparent mortality monitoring project for individuals who were homeless at the time of their death. Ongoing data collection is occurring from shelters and social service agencies via surveys available to their employees, and from Hamilton hospitals via data requests. Public de-identified data release is occurring every six months.
Results: There have been three sets of biannually-released data to date, which revealed a total of 56 deaths between June 2021 and November 2022. Mean age at time of death was 41y; overdose was the most common cause of death; and the majority of the individuals who died had been chronically homeless and identified as men. Numerous individuals had come in contact with the emergency department (12), were discharged from hospital (3), or were service-restricted from a shelter (10) in the month leading up to their deaths, which raise the possibility for intervention points to prevent premature mortality.
Conclusion: This information, along with other factors contributing to mortality, was and will continue to be shared publicly in order to be used by activists, journalists, and city officials, amongst others, to inform policy and push for changes that may reduce these numbers.

Authors: Inna Berditchevskaia PGY3
Supervisors: Dr. C. Bodkin

3 - S Intracranial Giant Cell Arteritis: A Comprehensive Systematic Review

Background: Giant cell arteritis (GCA) is a large-vessel vasculitis predominantly affecting the aorta and supra-aortic vasculature including the external carotid arteries and temporal arteries. Intracranial vasculitis is a manifestation of GCA that is increasingly recognized in GCA. It has historically been associated with stroke, but its clinical significance is incompletely understood.(1,2,3) This comprehensive systematic review of the literature aims to identify all reported cases of intracranial GCA to provide an overview of the epidemiology, diagnosis, investigation, treatment, and prognosis of intracranial GCA.

Methods: This review is reported using the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) guidelines.(4) Publications were searched from MEDLINE, Embase and Pubmed (1976 to February 2023) to identify studies which reported cases of intracranial manifestations of GCA. Intracranial GCA vasculitis was confirmed by either tissue or imaging, involving intracranial segments of the vertebral and internal carotid arteries and all further intracranial vessels including ophthalmic and retinal arteries. Title and abstract screening, full-text screening, and data extraction of studies with intracranial GCA will be done in duplicate. Data analysis will include summary statistics of patient demographics, GCA diagnostic criteria, investigations used to confirm intracranial involvement, treatments, and patient outcomes.

Results: Of 1554 articles yielded from the search, 419 have been included for the full text screening. We aim to finish the full text screening and have preliminary results to present during the Resident Research Day from a subset of papers.

Conclusion: The results of this review will provide an overview of intracranial GCA to further characterize the disease, inform best treatment practices and improve patient outcomes. Preliminary conclusions are anticipated by the time of Resident Research Day.

Authors: Sagar Patel PGY2, Iva Okaj PGY1
Supervisor: Drs. N. Khalidi & M. Junek

4 - S Non-Invasive Ventilation and Dexmedetomidine in Critically Ill Adults: A Retrospective Cohort Study

Background: Non-invasive positive pressure ventilation (NIV) is a life-saving intervention for selected patients with acute respiratory failure (ARF), and is associated with shorter ICU length of stay and reduced mortality, compared to invasive mechanical ventilation (IMV). However, agitation and delirium are significant causes of NIV intolerance and failure. To date, there are no guideline recommendations with regards to use of sedation during NIV.

Objectives: To describe current practice including incidence and outcomes with respect to sedation utilization in patients undergoing NIV for acute respiratory failure, and to determine if sedatives are associated with reduced incidence of NIV failure.

Methods: We conducted a single site, retrospective cohort study of adult hospitalized patients at St Joseph's Healthcare Hamilton who were undergoing NIV for ARF in acute care settings, between January 2018 and April 2021. Descriptive statistics are summarized below.

Results: 372 patients who received NIV for ARF were included in the analysis. The average duration of NIV use was 0.96 days. Sedatives were utilized during NIV treatment in 21.5% of patients. A range of sedative medications were used, most commonly Ketamine (51.2%), and dexmedetomidine (11.3%), and only one patient receiving propofol (0.3%). The most common reasons for sedative use included patient discomfort (42%) and agitation (14%). NIV failure, necessitating intubation and IMV occurred in 34.7% of patients. Of these, 3% of intubations were related to NIV intolerance. Overall 28-day mortality was 30.4%.

Conclusions: Providing sedation during NIV to improve compliance is not widely accepted.

Authors: Laura Spatafora PGY3
Supervisor: Dr. K. Lewis

5 - S Development of a Process to Incorporate and Evaluate Professionalism Within a Core IM Program

Background: Professionalism is one of the CanMeds roles, and although more difficult to conceptualize, teach and evaluate than the other roles, it is equally important in residency education and formation of the professional identity of physicians. Previous research has shown that professionalism curriculums are most effective when they involve reflective practice rather than graded assessments. This project aims to develop a professionalism curriculum for an Internal Medicine (IM) residency training program at McMaster University in Hamilton.
Method: The curriculum is developed based on the Kern framework, a well-established method of developing curriculums. The literature was reviewed and a needs-based assessment was sent to key stakeholders in the Internal Medicine Program, including faculty, residents and hospital leadership. The response rate for this anonymous survey was 20%. Thematic analysis was carried out.
Results: Respondents defined professionalism as responsibility and integrity for a physician, focusing on concrete skills, and empathic bedside manner. However there was also concern that professionalism could be weaponized and was unable to be concretely defined. Overall, the curriculum at McMaster was viewed as adequate with room for improvement. Respondents were able to identify elements of structured and informal curriculum as well as assessments but many did not know how professionalism was taught or assessed. Based on survey responses, a curriculum proposal has been drafted including large group didactic sessions, small group case-based learning, engagement sessions targeting the hidden curriculum and a reflective activity within academic coach sessions.
Conclusion: The results of this needs assessment survey have allowed us to design a professionalism curriculum that specifically fits the needs of residents, faculty and hospital leadership in the McMaster IM Residency program.

Authors: Kelsey MacEachern PGY2
Supervisor: Dr. M. Panju

6 - S Comparison of in-person vs virtual rehabilitation in patient's outcome (including 6-minute walking test distance, CRQ) in patients with chronic obstructive pulmonary disease

Background:
Pulmonary rehabilitation has been identified as a standard and evidence-based measure in the chronic management of patients with COPD. To adopt the new changes and needs during the COVID-19 pandemic, the pulmonary rehabilitation program at St. Joseph's Hospital, Hamilton introduced a new virtual pulmonary rehabilitation. In this research study, we are looking at patient outcomes with the new virtual education to ensure that the benefits of the program have persisted despite recent pandemic-related challenges.

Methods:
In a retrospective review of records of patients who have completed in-person vs virtual (combining fully virtual group and group with virtual education and in person exercise) pulmonary rehabilitation at St. Joseph's Hospital, Hamilton, we compared the changes of patient outcomes (6MWTD and CRQ) pre and post change in program format.

Findings:
A total number of 155 were included in the study (89 in-person and 66 virtual/ hybrid). The comparison between the pre and post rehabilitation values among the in-person cohort showed statistically significant improvement in the 6MWTD of 43m and fatigue 0.82 point (p 0.001 and 0.001 respectively). Among the cohort who completed their rehabilitation virtually, the difference in the 6MWTD was 22m and CRQ fatigue 0.43 point which was statistically significant (P values 0.008 and 0.003 respectively).

Conclusion:
Both conventional and virtual (virtual only and hybrid) methods of delivering PR was able to provide improvements in some areas of patients' outcomes that have been maintained post pandemic. However, comparing them to the accepted minimum clinically important values (30m walk distance, 0.5 CRQ) shows that there are areas in the in-person and virtual pulmonary rehabilitation programs that need further improvement.

Authors: Nima Makhdami PGY2
Supervisors: Dr. N. Raghavan

7 - S Antipsychotics in the Treatment of Delirium in the ICU: A Systematic Review and Meta-Analysis

Background: Delirium is common among ICU patients which is associated with increased mortality, longer ICU stay, and long-term cognitive impairment. Antipsychotics are used frequently to manage delirium-related agitation and behaviours in hospital. To date, this is the first systematic review and meta-analysis of typical and atypical antipsychotic medications used for adult patients with delirium in the ICU.

Objectives: To evaluate and compare the safety and efficacy of antipsychotic drugs in managing delirium in the adult critical care population.

Methods: MEDLINE, EMBASE, and Cochrane Library were searched from inception to November 2022. Randomized Controlled Trials (RCTs) of adult patients with delirium during admission to the ICU comparing the use of antipsychotic medication to usual care or placebo were selected for data extraction after title, abstract, and full text screening. Risk of bias was assessed using the Cochrane risk of bias tool 2.0. Meta-analyses were performed using a random-effects model. Heterogeneity was assessed using Chi 2 and I 2 tests. We used trial sequential analysis (TSA) to determine if the required information size to reach firm conclusions was met. Quality of evidence was reported using the GRADE approach.

Results: Five trials with a total of 2,183 patients were included. Antipsychotic agents used across studies were haloperidol, quetiapine, and ziprasidone. There were no differences in delirium free days, duration of invasive mechanical ventilation, ICU LOS, hospital LOS, 28-day mortality, mortality at longest follow up, and adverse events among patients who received antipsychotics. The TSA was inconclusive for all outcomes.

Conclusion: Current evidence does not suggest that antipsychotic medications, when compared to usual treatments, reduce duration of delirium in adult patients with critical illness, however more studies are needed.

Authors: Laura Spatafora PGY3
Supervisors: Dr. K. Lewis

8 - S The Lookback Project - A Review of New HIV Diagnoses in Hamilton

Objectives:
In the last decade, despite increasing awareness of PrEP and other preventative strategies, new HIV diagnoses in Ontario have remained relatively stable. There is an absence of public health data around the characteristics of these new diagnoses, and where they may have been failed by public health strategies. We thus conducted a chart review of all new HIV diagnoses at the Hamilton SIS Clinic.

Methods:
Study data was composed of the 185 new referrals to the SIS Clinic from 2018-2020; of these, 70 represented true new HIV diagnoses, whereas 81 were previously known diagnoses. Data including reasons for HIV testing, HIV risk factors, prior use of PEP and/or PrEP, and whether PrEP had been previously offered was extracted from patient charts, as well as initial CD4 count, viral load, and both prior and concurrent STI testing.

Results:
None of the 70 new HIV diagnoses were offered PrEP, despite it being a widely available and effective intervention. This was the case even among those individuals with prior public health contact for STI testing and treatment. Among these diagnoses, those being tested for routine health screening had significantly lower viral loads and higher CD4 counts.

Conclusions:
Our results demonstrate the ongoing need for physicians and other healthcare providers to expand their awareness and provision of PrEP to at-risk communities, especially given pre-existing opportunities during healthcare contact. They also demonstrate the effectiveness of routine health screenings of high-risk populations, especially MSM, in preventing advanced disease. Future directions may include focus groups of individuals recently diagnosed with HIV in order to further characterize missed opportunities for PrEP initiation.

Authors: Daniel Lazzam PGY2
Supervisor: Dr. K. Woodward

9 - S Evaluation of a Student-Older Adult Telephone Befriending Program to Reduce Social Isolation during the COVID-19 Pandemic

Background: Social isolation and loneliness are associated with many adverse health outcomes. The COVID-19 pandemic has increased its prevalence and disproportionately affected older adults. Since telephone befriending was a potentially feasible and safe intervention during the pandemic, the McMaster Phone-a-Friend Program (PFP) was established with the goal of reducing social isolation among older adults through weekly calls. This study aimed to evaluate the effectiveness of the program in reducing social isolation and determine its long-term feasibility.

Methods: Community-dwelling older adults in Ontario, Canada were matched to trained university student volunteers, who provided social interaction through weekly telephone calls. Two main referral sources were used to identify participants, including older adults referred by their primary care provider at risk for social isolation, and older adults referred for multi-modal frailty rehabilitation, where telephone befriending was a component intervention. Older adults completing ≥ 4 calls were contacted to participate in a telephone survey to provide feedback of the program.

Results: Of the 120 active participants in August 2021, 60 participated in our survey. The mean number of calls completed upon survey completion was 8.3. The mean age of participants was 75.6 years and 71.7% (n=43) identified as female. Furthermore, 58.3% (n=35) of the participants agreed or strongly agreed that they felt less lonely after participating in the program and 68.3% (n=41) stated they would participate in the program after the pandemic resolves. Demographic and survey results comparison between our two main referral sources were conducted.

Conclusions: The intergenerational PFP telephone befriending program is a safe and effective method of reducing isolation among affected community dwelling older adults and may be beneficial in other contexts that may increase loneliness and social isolation in older adults.

Authors: Manan Ahuja PGY2
Supervisor: Dr. J. Lee

10 - S The Effect of an ICU Diary on Patient and Family Member Psychological Outcomes: A Systematic Review and Meta-Analysis of Randomized Trials

Background: There is a growing recognition that intensive care unit (ICU) survivors have significant psychological morbidity long after resolution of their initial critical illness. Among ICU-related risk factors for this outcome, fragmented recall of potentially traumatic experiences has been suspected as a significant factor. Numerous randomized control trials (RCTs) have aimed at using an ICU diary to provide lasting support for ICU patients and their families, but the results have not yet been summarized.

Research Question: In adults (>16 years old) admitted to the ICU, does the use of an ICU diary compared to usual care effect patient or family psychological outcomes?

Methods: We electronically searched MEDLINE, EMBASE, CINAHL, LILACs, PsychInfo, and the Cochrane Library from inception to April 2023 for RCTs. Pooled mean differences (MDs) and standard mean differences (SMD) for continuous outcomes were calculated with the corresponding 95% confidence interval (CI) using a random-effect model. The risk of bias was assessed using the Revised Cochrane risk-of-bias tool and certainty of effect was assessed using GRADE.

Results: Twelve RCTs were included (n=1963). The implementation of an ICU diary demonstrated a trend toward reduction in patient depression (n=276, MD -0.49, 95% CI -2.02-1.04; very low certainty), patient anxiety (n=274, MD -0.36, 95% CI -1.53-0.80; low certainty), patient PTSD (n=539, SMD -0.27, 95% CI -0.60-0.05; low certainty), relative PTSD (n=324, SMD 0.25, 95% CI -0.64-0.14; moderate certainty), and relative anxiety (n=367, SMD -0.06, 95% CI -0.26-0.15; high certainty).

Conclusion: ICU diaries represent a simple, inexpensive way to potentially mitigate the psychological harm of critical illness for patients and their families. The results are limited by imprecision and further large RCTs are needed.

Authors: Carter Winberg PGY3
Supervisor: Dr. K. Lewis

11 - S The Quality of Heart Failure Management on Internal Medicine and Cardiology Teaching Units – a retrospective chart review

Background: Heart failure (HF) is a major source of morbidity and mortality in Canada, with over 40,000 hospital admissions occurring due to acute decompensations of this chronic and debilitating condition. A broad range of pharmacologic and non-pharmacologic therapies for HF exist, stratified predominantly by assessment of left ventricular function. These include guideline-directed medical therapies (GDMT) and process of care (PoC) measures such as daily weight measurements, sodium intake/restriction, and consideration of fluid restriction.

Methods: We conducted a retrospective chart review of patients admitted with acute decompensated HF to both medical and cardiology inpatient wards at Hamilton General Hospital, from February to December 2018. Exclusion criteria included end-stage HF managed with palliative intent and HF secondary to structural heart disease or coronary artery disease requiring procedural intervention. Baseline demographics and therapies, rates of recommended PoC measures, and rates of GDMT initiation were recorded.

Results: 312 charts were identified in the screening period and 201 met the inclusion criteria. Patients were admitted to internal medicine in 51 cases (25.4%) and cardiology in 150 cases (74.6%). Baseline demographics and therapies, and rate of GDMT initiation were broadly similar between disciplines. Of the PoC measures, there was a clinically significant difference in the rate of daily weight measurement, as weights were measured in 33.3% of medicine patients compared with 86.7% of cardiology patients.

Conclusions: HF is a significant source of illness in the inpatient population on cardiology and internal medicine units. Our single-centre cohort study identifies an important care gap in HF management with regards to weight measurements on medicine wards compared to cardiology and can be used to develop a quality improvement initiative for HF care.

Authors: Pranali Raval PGY2, Ankur Goswami PGY6 Critical Care, Alexander Grindal PGY4 Internal Medicine
Supervisor: Dr. C. Demers

12 - S A Quality Improvement Initiative to Reduce Inappropriate Urinary Catheterization on a Clinical Teaching Unit

Background:
Indwelling urinary catheters are often inserted and left in place without appropriate indications, leading to catheter-associated urinary tract infections (CAUTI) and patient harm.

Methods:
Using quality improvement methods, we found that physicians are often unaware of catheters, an obvious barrier to timely catheter discontinuation. We therefore designed and implemented a physician-targeted Best Practice Advisory (BPA) in the electronic health record, restricted to patients admitted to a single medical ward. Each day, physicians were prompted to either discontinue the catheter, or continue the catheter for another 24 hours by selecting an approved indication.

Results:
Fifteen patients with urinary catheters triggered the BPA in the two months after implementation: 46% (7) had their catheter discontinued from the BPA and 73% (11) had an approved catheter continuation ordered from the BPA. However, since the BPA triggered daily for each physician opening the chart, it often took several prompts before a physician acted upon the BPA. Catheter-days per 100 patient-days decreased from 17 to 14 (22% relative reduction). Twenty percent of patients had a CAUTI and 1 patient required re-insertion due to urinary retention after catheter removal.

Summary:
Early results show that the BPA led to safe catheter discontinuation and a reduction in catheter days per patient days. However, physician interaction with the BPA was poor. Our next initiative will engage nursing staff to improve physician awareness of indwelling catheters by incorporating a daily catheter review during multidisciplinary rounds.

Authors: Meera Shah PGY2, Tina Zhou PGY3
Supervisor: Dr. S. Yohanna

13 - S Cholinesterase Inhibitors and Falls, Syncope and Injuries in Patients with Cognitive Impairment: A Systematic Review and Meta-Analysis

Objective: To conduct a systematic review and meta-analysis on the effects of commonly prescribed cholinesterase inhibitors (ChEIs) on falls and related adverse events (syncope, fracture, accidental trauma) in patients with neurocognitive diagnoses.

Methods: Embase, MEDLINE, Cochrane Central Register of Controlled Trials, Cumulative Index of Nursing and Allied Health Literature and AgeLine were systematically searched through January 2022 to identify all randomized controlled trials of ChEIs (donepezil, galantamine, rivastigmine). Corresponding authors were contacted for additional data necessary for meta-analysis. Inclusion criteria consisted of adults ≥ 19 years-old, with a diagnosis of dementia, Parkinson disease, mild cognitive impairment, or traumatic brain injury. All studies were extracted for the aforementioned primary outcomes. For each outcome, the pooled odds ratio (OR) and the 95% confidence interval (CI) were calculated with the random effects model.

Results: In total, 55 studies (31 donepezil, 14 galantamine, and 10 rivastigmine) were included after meeting eligibility. Data was extracted by two independent reviewers. The pooled ORs comparing ChEIs showed an overall reduced risk of falls (0.84 [95% CI=0.73-0.96, P=0.009]) and increased risk of syncope (1.50 [95% CI=1.02-2.21, P=0.04]) among ChEI users. There was no statistical significance in association of ChEI use and risk for accidental injuries or fractures. There was minimal heterogeneity among the studies for falls, syncope and fracture, but there was moderate heterogeneity for accidental injury (I2=47%, P=0.003), and no significant publication bias was observed.

Conclusion: In conclusion, our study demonstrates that ChEIs use may be associated with decreased falls risk, but increased risk of syncope. This may help clinicians better evaluate risks and benefits of ChEIs in light of new therapies for neurocognitive disorders with significant or unknown adverse effects.

Authors: Manan Ahuja PGY2, Kaitlin Lewis PGY1
Supervisor: Dr. C. Patterson

14 - S Finding Interprofessional Competencies within the CanMeds framework: A Delphi process

Introduction: Integration of interprofessional education (IPE) within postgraduate medical education (PGME) remains challenging. PGME is defined by physician competency frameworks, whereas interprofessional competency frameworks define IPE. No blueprint exists to help educators navigate between frameworks, which may hinder representation of interprofessional competencies in PGME. Our study aimed to develop a map of the intersection between CanMEDS and the Canadian Interprofessional Health Collaborative's (CIHC) Interprofessional Competency Framework to illuminate where interprofessional competencies are situated and identify gaps in postgraduate IPE.

Methods: A Delphi-informed approach was used to generate expert consensus. The interprofessional study team (n = 7) and 6 expert informants mapped 38 CIHC competency descriptors to the 7 CanMEDS roles. Nine competency descriptors met the ≥80% consensus threshold. Framework authors were recruited to validate the 9 mapped competency descriptors in a two-round Delphi process, with 12 authors participating. Agreement was assessed as a binary, with narrative comments collected.

Results: Five of thirty-eight interprofessional competency descriptors mapped to a CanMEDS role with ≥80% agreement after the Delphi process. Competencies mapped to either Communicator (n=4) or Collaborator (n=1). Three of six CIHC domains were represented: (1) interprofessional communication (2) patient/family/community-centered care and (3) role clarification. Conflict resolution, team function and collaborative leadership competencies did not map. Physician-provider elements of interprofessional communication were underrepresented.

Conclusion: The findings demonstrate the challenges of translating interprofessional competencies to uniprofessional role standards. Most competencies mapped to watershed areas between CanMEDS roles. Attempting to encompass interprofessional competencies within the Collaborator role may sideline competencies that map to other roles due to the inherent uniprofessional lens. Further work is needed to explore downstream impacts on preparation of postgraduate learners for collaborative practice.

Authors: Arden Azim PGY4 GIM
Supervisor: Dr. M. Sibbald

15 - S Improving the Use of SGLT-2 Inhibitors

SGLT-2 inhibitor (SGLT-2i) indications go beyond Type 2 Diabetes Mellitus and now include Chronic Kidney Disease and Congestive Heart Failure. Unfamiliarity with the evidence for use and cost are the biggest prescribing barriers. This study aimed to evaluate: 1) barriers to SGLT-2i use among postgraduate trainees at McMaster University and 2) if a prescribing tool can improve comfort, knowledge, and safety.

Internal Medicine, Endocrinology, Cardiology, and Nephrology trainees voluntarily completed a survey that evaluated barriers, comfort, knowledge, and safety of SGLT-2i use. A peer-reviewed SGLT-2i tool developed by our team was then provided. After 4 weeks a follow-up survey was completed. The primary outcome was perceived comfort with SGLT-2i use. Secondary outcomes were knowledge of indications and safety practices. The likert scale data was analyzed through medians, proportions, and a paired t-test (<0.05).

42 residents participated (70% internal medicine). Barriers to SGLT-2i use were comfort selecting the evidence-based SGLT-2i, adverse effects, and cost. 71% were comfortable with SGLT-2i use, however only 14% were comfortable selecting the specific evidence-based SGLT-2i. Using the tool, this increased to 73% and 54% respectively. 67% had good knowledge of the evidence for SGLT-2i use, side effects and contraindications. This improved to 95% after use of the tool. 71% were comfortable providing counselling when initiating SGLT -2i, which increased to 100% after the tool. However, only 50% provide counselling on sick day management, which did not change. No changes were statistically significant.

The major barriers to SGLT-2i usage among postgraduate trainees at McMaster University are comfort with selecting the evidence-based SGLT-2i, adverse effects, and cost. Use of a prescribing tool increased self-perceived comfort, knowledge, and safety, however this was not statistically significant.

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16 - S Endoscopic Biliary Sphincterotomy Versus Sham Procedure for Relieving Pain in Sphincter of Oddi Dysfunction: A Systematic Review and Meta-Analysis Of Randomized Controlled Trials

Background:
Endoscopic sphincterotomy (ES) is part of Sphincter of Oddi dysfunction (SOD) management, but recent studies changed attitudes about its utility. We conducted a systematic review and meta-analysis of randomized sham-controlled trials (RCTs) investigating ES for SOD-related pain.

Methods:
Articles were retrieved from PubMed, Medline, Embase, and CENTRAL. We included RCTs comparing ES to sham procedure on post-cholecystectomy patients ≥18 years old with biliary SOD. Standardized data collection sheets were used, as well as the Risk-of-bias 2 tool. A random-effects model was used to calculate risk ratios (RR) with 95% confidence intervals (CIs). Subgroups included normal versus abnormal Sphincter of Oddi manometry (SOM), and Type II versus III SOD.

Results:
From 517 articles retrieved, 4 RCTs were included, encompassing 376 patients. Overall, no difference existed between ES and sham procedure in improving SOD-related pain overall (RR 1.32, 95% CI 0.77-2.26, P =0.31), and for the normal (RR 0.83, 95% CI 0.42-1.65, P =0.60) and abnormal SOM subgroups (RR 1.90, 95% CI 0.84-4.29, P =0.12). ES was numerically favoured over sham procedure in Type II (RR 2.51, 95% CI 1.32-4.81, P =0.005), but not Type III patients (RR 1.02, 95% CI 0.32-3.27, P =0.98). However, there was no significant subgroup difference between these Type-based subgroups (P =0.18, I2 =43.2%).

Conclusions:
ES does not improve SOD-related pain overall, or for Type II versus III SOD or for normal versus abnormal SOM subgroups.
Additional RCTs are needed to characterize the effect of ES in SOD.

Authors: Dennis Wang PGY5 Adult Gastroenterology
Supervisor: Dr. M. Yaghoobi

17 - S Implementation of an eModule for Resident Education in Vasculitis: A Needs Assessment and Quality Improvement Initiative

Background: Delivering comprehensive vasculitis training in Canadian rheumatology programs is challenging. The CAnadian VAsculitis Learning Initiative (CAVALI) book provides interactive clinical cases to supplement resident education. Using a quality improvement framework, we propose to adapt the CAVALI resource into an eModule. We herein report the results of a stakeholder analysis and needs assessment for this initiative.

Methods: A review of the literature, discussion with stakeholders, and a root cause analysis informed the development of two complementary needs assessment questionnaires. Questionnaires were electronically distributed to Canadian rheumatology program directors, and residents enrolled in Canadian rheumatology training programs.

Results: Seventeen rheumatology residents and 5 rheumatology program directors responded. Frequently identified educational barriers were competing attention from other educational topics (64%), insufficient volume of patient exposure (36%), and lack of supplemental educational resources (32%). Direct clinical exposure was most frequently rated as insufficient for immune complex small vessel vasculitis (65%), polyarteritis nodosa (59%), Takayasu arteritis (53%), and Behcet's disease (53%). A majority (86%) agreed that a clinical case-based resource is useful for learning about vasculitis. Residents preferred an eModule (47% preferred) over a physical book (12% preferred). Features that residents identified most valuable in a vasculitis eModule were clinical images (100%), integrated knowledge checks (88%), and learner ability to control the pace of completion (88%).

Conclusions: Vasculitis education remains challenging, particularly for a subset of infrequently encountered vasculitides. Rheumatology residents consider an eModule as a preferable vehicle for supplementary case-based vasculitis education. Valued eModule features such as knowledge checks, images, and controllable module pacing are concordant with eModule design elements recommended in the literature. Subsequent plan-do-study-act cycles will include eModule construction, and piloting with Canadian rheumatology residents.

Authors: Matthew Jessome PGY5 Rheumatology
Supervisor: Dr. F. Khokhar

18 - S Clinical Features of Patients with Connective Tissue Disease Related Interstitial Lung Disease

Objectives: Interstitial lung disease (ILD) is a well described complication of connective tissue diseases (CTD). We describe a Canadian cohort of patients with CTD-ILD with an emphasis on clinical, serologic, and imaging characteristics.

Methods: We conducted a retrospective cross-sectional study of all patients seen at the ILD clinic of a tertiary care center since its inception in January 2013 to April 2022. Patients were included if they had a diagnosis of ILD as per current International Guidelines and clinical diagnosis of CTD by expert opinion of a rheumatologist. Patients were excluded if their ILD was found to be due to another cause, such as drug-related or hypersensitivity pneumonitis. Clinical symptoms and serologic markers were recorded.

Results: 78 patients with CTD-ILD were recorded in total. 41 (52%) patients were female. Most patients were diagnosed with rheumatoid arthritis (n=46, 59%), followed by systemic sclerosis (n=13, 17%), inflammatory myositis (n=10, 13%) and Sjogren's syndrome (n=8, 10%). The most common clinical symptom was inflammatory arthritis (n=34, 44%), followed by Raynaud's phenomenon (n=18, 23%) and sclerodactyly (n=13, 17%). ANA was positive in 43 (55%) of patients. The most common ENA was anti-Ro52 (n=9, 12%), followed by anti-RNP (n=7, 9%) and anti-Ro60 (n=6, 8%). Of the patients with rheumatoid arthritis, 27 (59%) were positive for RF, 29 (63%) were positive for anti-CCP and 12 (26%) were seronegative for both. 29 (37%) patients met criteria for UIP pattern. 21 (27%) patients died over the course of their follow-up.

Conclusion: All patients with ILD should receive workup for CTD. In this Canadian cohort of patients with CTD-ILD, the most common diagnosis was seropositive rheumatoid arthritis, and the most common symptom was inflammatory arthritis.

Authors: Haonan Mi PGY4 Rheumatology
Supervisor: Dr. M. Clements-Baker

19 - S Inpatient Initiation of Alcohol Cessation Management for Patients Admitted with Acute Alcohol-Related Liver Disease: A Retrospective Review

Introduction: Multidisciplinary approaches to alcohol cessation are key in managing alcohol-related liver disease. We aim to determine the proportion of actively drinking patients admitted for decompensated alcohol-related cirrhosis or alcoholic hepatitis that are offered or started on alcohol cessation management during admission, and if inpatient alcohol cessation management is associated with reduced readmissions for alcohol-related liver disease.

Methods: We conducted a retrospective cohort study of actively drinking patients admitted at our institution from January 2017 to December 2021 with alcoholic hepatitis or decompensated alcohol-related cirrhosis. Logistic regression was used to identify factors associated with 30-day, 60-day, and 90-day readmissions for recurrent alcoholic hepatitis or decompensated alcohol-related cirrhosis.

Results: There were 132 alcoholic hepatitis admissions (mean age 47.2±13.6 years), and 202 decompensated alcohol-related cirrhosis admissions (mean age 58.1±9.4 years). Alcohol cessation management was offered in 80 (60.6%) and started in 69 (52.3%) alcoholic hepatitis admissions, and offered in 64 (31.7%) and started in 46 (22.8%) alcohol-related cirrhosis admissions. For alcoholic hepatitis, starting alcohol cessation management was associated with significantly reduced 30-day (OR 0.215, P =0.012, 95% CI 0.064-0.718) and 60-day (OR 0.294, P =0.025, 95% CI 0.101-0.855) readmissions, but not with reduced 90-day readmissions. For decompensated alcohol-related cirrhosis, there was no association between alcohol cessation management and 30-day, 60-day, or 90-day readmissions.

Conclusion: Alcohol cessation management was offered in only 30-60% of admissions for alcohol-related liver disease. Patients admitted for alcoholic hepatitis that received inpatient alcohol cessation management had decreased 30-day and 60-day readmission rates for alcohol-related liver disease.

Authors: Dennis Wang PGY5 Adult Gastroenterology
Supervisor: Dr. M. Puglia

20 - S The Use of Renal Replacement Therapy Solely to Manage Acute Severe Hypernatremia: A Scoping Review

Background: Acute severe hypernatremia is a challenge given the need for rapid correction using large volumes of fluid. Using renal replacement therapy (RRT) purely to correct this life threatening-electrolyte imbalance may be a possible treatment alternative.

Objective: To perform a scoping review of the literature to describe the current evidence that exists for using RRT to correct acute hypernatremia.

Methods: We systematically searched MEDLINE, EMBASE, Cochrane and ClinicalTrials.gov for all studies that reported on the use of RRT of any kind to treat adults with acute hypernatremia. Opinion pieces, surveys, and non-English language studies were excluded. Title and abstract screening, full text review, and data abstraction were done independently and in duplicate.

Results: A total of 28 studies are included. Only observational trials and case reports were identified in the literature. In total, 217 patients were included who had an initial average sodium level of 172.9 +/- 14.0. 6 mmol/L. The most common reported etiology of hypernatremia was dehydration (secondary to reduce intake, sepsis, or burns) (60.7%), followed by diabetes insipidus (17.9%), and lastly iatrogenic causes (14.3%). Continuous veno-venous hemofiltration was the most common modality of RRT followed by intermittent hemodialysis (35.7%). The average sodium post-RRT was 149.2 mmol/L +/- 12.6. The average ICU stay was six days, and 75% of patients made a full neurological recovery.

Conclusion: Acute severe hypernatremia management has been variable across the included studies, especially regarding RRT modality. More efforts should be made to create a reproducible algorithm to manage this severe life-threatening issue, while minimizing adverse events.

Authors: Naif Alghamdi PGY6 Nephrology, Richard Hae PGY6 Renal Transplant, Natasha Ovtcharenko PGY5 Intensive Care

Supervisor: Dr. K. Lewis

21 - S A Systematic Review of Risk Factors and Clinical Outcomes Associated with Sarcopenia in Rheumatoid Arthritis

Background: Sarcopenia is an important risk factor for adverse outcomes, and it is more prevalent among patients with rheumatoid arthritis (RA). However, risk factors and outcomes associated with sarcopenia in RA are relatively unknown. We conducted a systematic review to identify patient factors, disease factors, and clinical outcomes associated with sarcopenia in RA.

Methods: A search was performed in PubMed, Embase, CINAHL, and Web of Science databases for articles published up to April 21, 2022. The search strategy combined the following search concepts: 1) rheumatoid arthritis and 2) sarcopenia. Title and abstract screen was independently completed by two reviewers, and full-text review was independently completed by four reviewers. Articles were included if they included RA patients, assessed for sarcopenia using a consensus working group definition, and assessed at least one clinical outcome in association with patients' sarcopenia classification.

Results: 16 articles were included for analysis. All studies had observational study designs. The prevalence of sarcopenia ranged from 24% to 56%, depending on the consensus definition used. Baseline glucocorticoid use and higher Disease Activity Score-28 had a positive correlation with sarcopenia in multiple studies, while baseline methotrexate use was associated with lower prevalence of sarcopenia in several studies. Several studies found lower bone mineral density (BMD), higher prevalence of vertebral fractures, and higher incidence of falls among RA patients with sarcopenia.

Conclusion: RA patients have a high risk of developing sarcopenia, and RA disease activity and baseline glucocorticoid use may be risk factors for developing sarcopenia. Early screening of sarcopenia in RA patients is important to incorporate into clinical rheumatology practice.

Authors: Keith Tam PGY4 Rheumatology
Supervisor: Dr. I. Rodrigues

22 - S Racial and Ethnic Disparities in Disease Related Outcomes among Patients with SLE: A Systematic Review

Introduction: Racial and ethnic minorities have worse SLE outcomes. The objective of this study is to perform a systematic review describing racial and ethnic disparities in the following disease-related outcomes among adult patients with SLE: (1) mortality, (2) endstage renal disease (ESRD), (3) disease-related damage, (4) cardiovascular disease, (5) malignancy, and (6) hospital utilization.

Methods: A systematic search of the scientific literature was performed to obtain articles published before October 2021. Search terms included the outcomes of interest and terms used to identify racial and ethnic groups. Longitudinal observational studies with a minimum of two years of follow-up were included. Screening of titles, abstracts and full-text articles were performed in duplicate. Data extraction and synthesis were performed.

Results: The systematic literature search yielded 5528 titles and abstracts, of which 127 studies were selected for inclusion. Most studies were conducted in North America (n=99). Racial and ethnic groups identified include Whites (n=122), Blacks (n=133), Asians (n=51), Indigenous peoples (n=20), Hispanics (n=48) and others (n=6).

A total of 102 studies (80%) reported worse outcomes among racial and ethnic minority groups. Disparities were most commonly identified in studies describing outcomes among Blacks (n=93) and Hispanics (n=37). Most studies reported outcomes related to mortality (n=60), with 52 (87%) reporting worse outcomes among racialized groups. Of 30 studies reporting on the development of ESRD, 20 (67%) identified racial and ethnic disparities. Worse outcomes were also reported among studies examining disease-related damage (n=20), cardiovascular disease (n=8), hospitalization (n=7), and malignancy (n=4).

Conclusions: This comprehensive review highlights the higher reported rates of mortality, ESRD, disease-related damage, cardiovascular disease, and hospitalization, among racial and ethnic minorities with SLE. A meta-analysis is currently underway.

Authors: Teresa Semalulu PGY5 Rheumatology
Supervisor: Dr. K. Tselios

23 - S Adolescents and Young Adults Taking Methotrexate: Knowledge and Behaviours

Background:
Adolescents and young adults (AYA) with rheumatic diseases (RD) may face challenges in developing an understanding of harmful interactions between their medications and certain lifestyle choices they may make. This study sought to assess the knowledge and behaviours of AYA taking methotrexate (MTX) for chronic RD, with a focus on alcohol use and contraception. MTX is a first line, disease modifying antirheumatic drug (DMARD) which can be hepatotoxic and teratogenic.

Methods:
AYA 16-25 years old currently or previously taking MTX anonymously completed an online questionnaire co-designed by adolescents with chronic RD.

Results:
Of the 45 respondents, 79.5% were female, 66.7% were 19-21 years of age, and 84.6% had a diagnosis of Juvenile Idiopathic Arthritis. In assessing respondent knowledge of MTX, 21% did not know that MTX is considered a DMARD, 30% were not aware that MTX can cause liver damage, and 88% agreed that alcohol should be avoided when taking MTX. The vast majority (82%) of respondents stated that contraception should be used if the MTX user is female compared to 61% if the user is male.

In assessing respondent behaviours, 35% reported drinking ≥3 alcoholic drinks on at least one day each week, 28% reported discomfort discussing alcohol consumption with their rheumatologist, and 17% inaccurately reported alcohol consumption to their rheumatologist. Past or present sexual activity was reported by 55% of respondents, 31% reported discomfort discussing sexual activity with their rheumatologist, and 10% had provided inaccurate reports of sexual activity to their rheumatologist.

Conclusions:
This study identified opportunities for educational interventions to improve care for AYA with chronic RD as they navigate the transition from pediatric to adult care at this particularly vulnerable period.

Authors: Heather Bollegala PGY5 Rheumatology
Supervisor: Dr. M. Batthish

24 - S Sarcopenia and Post-Operative Outcomes Among Older Adults Undergoing Elective Hip or Knee Arthroplasty

Background:
Sarcopenia is an age-related disease of reduced muscle mass and strength. It is prevalent among older adults awaiting elective orthopedic surgery for osteoarthritis (affecting 33-44% of patients), but its impact on post-operative outcomes remains unclear.

Methods:
This prospective cohort study examines how sarcopenia affects postoperative outcomes among patients 65 years and older undergoing elective total hip or knee arthroplasty (THA or TKA). We used the validated SARC-F screening tool to identify those who may have had sarcopenia (scoring 4 or higher). It comprises five questions about Strength (difficulty lifting/carrying 10 lb), Assistance with walking, Rising from a chair, Climbing stairs and Falls (number in the past year). Frailty was assessed by the FRAIL Scale, and function by the Oxford Hip or Knee Score questionnaires.

Results:
We recruited a convenience sample of 137 patients from a pre-operative regional joint replacement clinic. Of these, 70 have since undergone surgery (27M, 43F; mean age 73 y), with time from enrollment to surgery of 90 ± 81 days (mean ± S.D.). The SARC-F screening tool was positive in 69% (THA) and 71% (TKA) of the patients. The presence vs. absence of sarcopenia was not associated with differences in age, gender, body-mass index or ASA score ($p > 0.05$), but was associated with more frailty ($t[68] = 1.99$, $p < 0.01$) and poorer pre-operative functional status ($t[55] = 3.22$, $p < 0.01$). However, patients both with and without sarcopenia experienced functional gains post-operatively as assessed by repeat Oxford Scores at 6 weeks, with no remaining significant difference between them ($p > 0.05$).

Conclusions:
These results suggest that patients with sarcopenia do derive functional gains from elective THA and TKA.

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Poster Presentations

Clinical

1 – 7

1 - C Immune Checkpoint Inhibitor-Induced Polyarthritis: A Case Series

Background:
Immune checkpoint inhibitors (ICIs) have revolutionized cancer care. However, their mechanism of action also results in ICI-related adverse events (ICI-AEs) caused by the uncontrolled collateral inflammation of non-cancerous tissues. Polyarthritis is a rare ICI-AE.

Objective:
Here we describe two cases of ICI-induced polyarthritis with the intention of helping clinicians to better diagnose and treat this rare condition.

Cases:
A 64-year-old male with metastatic melanoma received combination immunotherapy with nivolumab and ipilimumab. Within one month thereafter he developed vitiligo and widespread arthralgias in the small joints of the hands, the shoulders and knees. He was successfully treated with prednisone. A 43-year-old male received sasanlimab for high-grade non-invasive urothelial cell carcinoma. Within two months he developed a large-joint polyarthralgia involving the bilateral knees, ankles, elbows, and the cervical spine. His symptoms resolved with a course of prednisone but flared upon ceasing it. He was then treated with methotrexate. Both patients had a past medical history of non-rheumatological autoimmune disease. Both had negative autoantibodies and elevated inflammatory markers. Neither patient had to discontinue their anti-cancer therapy.

Discussion:
MSK ICI-AEs (arthritis, myositis, PMR) are rare. Most are linked to PD-1/PD-L1 inhibitors (e.g. nivolumab, sasanlimab). Glucocorticoids are the most commonly used treatment, and disease-modifying antirheumatic drugs are typically reserved for relapses. These cases add to the literature on ICI-induced polyarthritis. As ICIs become more widely used, clinicians should familiarise themselves with their adverse effects. More research is needed to understand the epidemiology, clinical presentation, and treatment of these conditions.

Authors: Megan Smith-Uffen PGY2
Supervisor: Dr. K. Tselios

2 - C Acquired Hemophilia in a Patient with Chronic Eosinophilic Leukemia: A Case Report

Background:
Acquired hemophilia A (AHA) is an acquired bleeding disorder caused by the spontaneous production of autoantibodies against factor VIII (FVIII) and clinically presents as new onset bleeding of variable severity. With an incidence of 1.5 cases per million persons annually, AHA predominantly affects elderly patients (>65 years old) but can be associated with pregnancy and autoimmune disease in younger populations.

Case Presentation:
A 73-year-old male with chronic eosinophilic leukemia on imatinib was admitted for a hemoglobin of 53 and debilitating leg pain. On presentation, he had a mild coagulopathy with INR 1.2 and aPTT 43. His hemoglobin failed to increment with 2 packed RBC transfusions despite no overt evidence of hemolysis or bleed. CT imaging then revealed multiple intramuscular hematomas in the bilateral lower extremities, the largest measuring up to 9.7cm.

A 1:1 mixing study for aPTT initially normalized. However, his FVIII levels were low at 0.06 and his von Willebrand screen was normal. An inhibitor assay confirmed an acquired FVIII inhibitor with a titre of 1.6 BU. He was diagnosed with AHA and started on prednisone 1mg/kg with subsequent decrease in inhibitor titres.

Conclusions:
AHA is a challenging clinical diagnosis as patients often have no personal or family history of bleeding disorders. Elderly patients are also often on anticoagulants that confound coagulation studies. AHA should be considered in patients with abnormal bleeding and an isolated prolonged aPTT. The abnormal aPTT can correct initially in 1:1 mixing studies but prolongs with incubation as anti-FVIII antibodies are time and temperature-dependent. The pillars of treatment are control of the acute bleed and immunosuppression, with prednisone 1mg/kg as first-line therapy and cyclophosphamide as a recommended second-line therapy.

Authors: Shiliang Ge PGY1, Meera Shah PGY2
Supervisor: Dr. M. Crowther

3 - C A Massive Lithium Overdose with Unusual Pharmacokinetics

Background:
Lithium has seen widespread use in psychiatry for 50 years and remains a first-line option for bipolar depression and mania. Approximately 7% of patients on lithium will develop toxicity at some point during their treatment. This can often be managed with isotonic crystalloid to promote excretion in the urine, but some patients will require hemodialysis. The most feared consequence of acute intoxication is the syndrome of irreversible lithium-induced neurotoxicity - usually presenting as persistent brainstem dysfunction.

Case Presentation:
Here we present the case of a 66-year-old female with type 1 bipolar disorder on chronic lithium who presented with a 12-gram lithium ingestion. She lacked indications for hemodialysis with a serum lithium of 2.05 mEq/L but did present with nausea, gait abnormalities, and worsening tremor. 28 hours after presentation, her serum lithium began to plateau despite adequate urine output and normal creatinine clearance. Although this was an immediate-release lithium product, the massive ingestion likely resulted in a pharmacobezoar that delayed absorption. While serum lithium levels were approaching 1.5 mEq/L at the time this occurred, in other patients, this delayed absorption could have an impact on the decision to pursue hemodialysis or bowel irrigation.

Conclusion:
This exemplifies the importance of calculating pharmacokinetic parameters in acute overdoses as these kinetics can bring to attention prolonged absorption. This has the potential to change management and may impact decisions regarding hemodialysis or bowel decontamination.

Authors: Justin Senecal PGY1, Zaki Alhashimalsayed PGY2
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4 - C Acute Myopericarditis Following COVID-19 mRNA Vaccine in a Young, Healthy Male

Background: Myocarditis, inflammation of the myocardium, has infectious and non-infectious etiologies. Recently there have been several published cases of myopericarditis following administration of the COVID-19 mRNA vaccines, many of which involve healthy, young males. Still, this phenomenon remains a correlation and no causative link has been established.

Case Presentation: A 29-year-old previously healthy male received his second dose of the mRNA-1273 vaccine. By the following evening, he developed dull retrosternal chest pain and shortness of breath. In the emergency room, he had a fever of 38.2 C but was otherwise vitally stable.

Initial workup revealed an electrocardiogram demonstrating sinus tachycardia, diffuse ST elevation, and PR depression. The peak high sensitivity troponin was 9,992. Chest x-ray was normal. An echocardiogram showed preserved left ventricular function. The patient's presentation was suggestive of myopericarditis and he was started on colchicine and ibuprofen. A full autoimmune and inflammatory workup was conducted to rule out rheumatologic etiologies, which were unremarkable other than creatine kinase and c-reactive protein which were elevated at 431 and 37, respectively. He was discharged after a two-day admission with complete resolution of symptoms and subsequently underwent outpatient cardiac magnetic resonance imaging which demonstrated focal myocardial edema in keeping with myocarditis and pericardial involvement.

Conclusions: Without convincing evidence of ischemic, autoimmune, or infectious etiologies and given the temporal association to the vaccine, the most likely diagnosis in this patient is COVID-19 mRNA vaccine-induced myocarditis. It is important to continue reporting on cases of myocarditis associated with the mRNA COVID-19 vaccine to definitively establish a causative relationship. Future studies are needed to evaluate potential long-term cardiovascular injury of myocarditis following the COVID-19 mRNA vaccine.

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5 - C A Case of Gestational Gigantomastia

Background: Gestational gigantomasia effects 1/100,000 pregnancies and is defined as diffuse, extreme, and incapacitating enlargement of one or both breasts (1). Gestational gigantomastia is a rare, debilitating and potentially lethal complication of pregnancy hypothesized to be secondary to excessive production of estrogen or prolactin, increased hormone receptor sensitivity or an underlying autoimmune disease triggered by pregnancy (1,2).

The differential diagnosis for gestational breast enlargement includes physiologic changes in pregnancy, mastitis, malignancy, fibrocystic or adenomatous changes, and gestational gigantomastia (2). It develops rapidly in the first or second trimester and will recur with subsequent pregnancies. Risk factors include Caucasian background, multiparous and concurrent autoimmune disease (2). Complications include pain, infection, ulceration, and intercostal nerve damage (1). Investigations should include prolactin, calcium, ANA, RF, anti-CCP, ESR, CRP, breast ultrasound and breast biopsy to exclude malignancy (2). Medical management includes bromocriptine to arrest further breast growth and hyperplasia. Ultimately, many patients will require a reduction mammoplasty or total mastectomy (2).

Case Presentation: Our patient is a 30-year-old female who presented at 29 weeks gestational age with rapid breast enlargement and galactorrhea, resulting in skin ulceration with unbearable pain and staphylococcus bacteremia. Our patient's investigations showed an elevated prolactin of 1414.6ug/L of which 81.3% was macroprolactin. She was started on bromocriptine, which was up titrated to 2.5mg twice daily. This halted progression of her disease and stopped the galactorrhea. She had an elective cesarian section at 32+5 weeks. Post-partum she had significant reduction in breast size and a normal prolactin level allowing for discontinuation of bromocriptine 1-month post-delivery.

Conclusion: Gestational gigantomastia is a serious and under-recognized condition that needs to be accurately diagnosed so that treatment can be provided to prevent life threatening complications.

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6 - C Acute Aortic Intraluminal Thrombosis with Embolization and Lower-Limb Ischemia Following Intravenous Iron-Sucrose Infusion Reaction

Background: Hypersensitivity reactions to intravenous iron infusions are rare (estimated prevalence <0.1%). Symptoms often include gastrointestinal upset (nausea, vomiting, diarrhea) which are exacerbated by high potency labile iron. In patients with atherosclerotic disease, acute volume depletion can infrequently provoke aortic thrombosis due to circulatory stasis. We present a rare case of acute limb ischemia secondary to aortic intraluminal thrombosis following a dramatic gastrointestinal reaction to parenteral iron therapy.

Case Presentation: A 49-year-old woman presented with iron deficiency anemia. She had a 20 pack-year smoking history, hypertension, and a family history of coronary artery disease. After receiving intravenous iron-sucrose (500mg), she had an adverse reaction characterized by severe vomiting, diarrhea, diaphoresis, hypotension/tachycardia, and back pain. Over several hours, she reported progressive bilateral lower-extremity pain, followed by absent pulses, pallor, and inability to flex her toes.

The patient's complete blood counts demonstrated acute hemoconcentration (hematocrit increase from 0.242 to 0.326), leukocytosis (from 5.5 to 22.3 x 109/L), and platelet consumption (from 359 to 217 x 109/L). Creatine kinase peaked at 8912 U/L. Acute limb ischemia was suspected and CT angiography revealed distal aorta atherosclerosis, aortic intraluminal thrombus, and occlusion of the distal right popliteal artery with absent contiguous runoff to the ankle. Fortunately, her right lower extremity was salvaged with emergency embolectomies and fasciotomies, and she was initiated urgently on dual anticoagulant/antiplatelet therapy.

Discussion: Intravenous iron-sucrose, especially in large doses, can result in acute gastrointestinal toxicity with severe intravascular volume depletion. Acute hemoconcentration and platelet activation/consumption – in the setting of subclinical atherosclerosis – plausibly explain a previously unreported scenario of critical limb ischemia, secondary to acute intraluminal aortic thrombosis post-intravenous iron-sucrose.

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