32nd Annual Resident Research Day

Wednesday, May 18th, 2016
8:15a - 3:45p

MSAC
Medical Student & Alumni Centre
2750 Heather St

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8:15a - 3:45p

Faculty of Medicine
Department of Medicine
University of British Columbia
Department of Medicine
32nd Annual

Resident Research Day

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MSAC (Medical Student & Alumni Centre)
2750 Heather Street

Schedule

8:15 - 8:45a  Breakfast and Coffee
8:45a  Opening Remarks
9:00 - 10:00a  Oral Presentations - Session 1
               Hardwick Hall
10:00 - 10:20a  Break
10:20 - 11:32a  Oral Presentations - Session 2
               Hardwick Hall
11:32 - 12:45p  Lunch
12:45 - 2:10p  Poster Presentations - Session 1
               Latham Student Activities Centre
1:00 - 2:12p  Oral Presentations - Session 3
               Hardwick Hall
2:12 - 2:30p  Break
2:30 - 3:30p  Oral Presentations - Session 4
               Hardwick Hall
               Poster Presentations - Session 2
               Latham Student Activities Centre
3:30p  Closing Remarks
       Dr. Graydon Meneilly
6:00 - 9:00p  Resident Research Day Dinner & Awards
               University Golf Club
               5185 University Blvd.
               Reception followed by dinner

*MSAC Wi-Fi Password: internet@msac
INTRODUCTION

I am very pleased to welcome you all here today to the Annual Resident Research Day. The event today marks the 32nd annual Resident Research Day, an important celebration of the scholarly endeavors of the Residents and Fellows in our program. Today we take time to recognize the many hours of hard work, dedication and effort necessary to execute these scholarly research projects, and acknowledge the efforts of the faculty mentors who have contributed to the success of these projects.

The Department of Medicine is the largest department in the Faculty of Medicine, with over 1200 faculty members and staff across the province of BC. Our members represent 18 distinct divisions which focus on understanding the nature, cause and prevention of adult disease. The mission of the Department is to provide the highest possible standards of excellence in patient care, teaching and research. As residents trained in the Department of Medicine, you all play an integral part in helping deliver this mission by directly contributing to the high standards of patient care and research for which UBC Department of Medicine is recognized. Each year your hard work contributes to the over 1000 peer reviewed publications and abstracts. Your dedication to the creation, dissemination and translation of new knowledge is part of evolving health care landscape.

Today I encourage you to reflect on the lessons you have learned throughout your research projects and carry these forward as you develop your own practice. We hope that you will continue to develop and utilize evidence to inform your decision making, and contribute to the strong history of patient care through innovation.

Graydon Meneilly, MD, FRCPC, FACP
Head, UBC Dept of Medicine

MODERATOR

Daniel Renouf is a medical oncologist at the British Columbia Cancer Agency, Vancouver Centre, and an Assistant Professor at the University of British Columbia, Department of Medicine.

He received his Doctor of Medicine from the University of Alberta and completed his internal medicine and medical oncology training at the University of British Columbia and British Columbia Cancer Agency. He undertook further training in early drug development and gastrointestinal oncology at Princess Margaret Hospital and the University of Toronto, and obtained a Masters of Public Health from Harvard University.

Daniel's research interests include developmental therapeutics, genomics, and biomarker development within gastrointestinal cancers, with a focus on pancreatic cancer. He is the leader of the BC Cancer Agency Phase I program, the Co-Director of Pancreas Centre BC and is the Co-chair of the NCIC pancreatic cancer clinical trials group.

Daniel Renouf, MD, MPH, FRCPC
PODIUM ADJUDICATORS

Dr. Montessori obtained her MD from the University of British Columbia in 1990 and completed a rotating internship at the Royal Columbian Hospital in New Westminster in 1991. After a year of work as a locum tenens in family practice, she returned to the University of BC to pursue a residency in Internal Medicine.

She was Chief Medical Resident at St. Paul’s Hospital in 1995 and then continued her training as an Infectious Diseases Fellow at UBC from 1995 - 1997 and as a Research Fellow with the Canadian HIV Trials Network from 1997 - 1999. She obtained her Royal College of Physicians and Surgeons FRCPC in Internal Medicine in 1996 and Certificate of Special Competence in Infectious Diseases in 1997. She joined the Infectious Diseases Division at St. Paul’s Hospital in 1997.

Her interests include infections in injection drug users, with a special focus on HIV and Hepatitis C. She is the Medical Director of the John Ruedy Immunodeficiency Clinic at St. Paul’s Hospital and Co-Chair of the BC Therapeutic Guidelines Committee for the Treatment of HIV/AIDS.

Valentina Montessori MD, FRCPC

PODIUM ADJUDICATORS cont.

Dr. Quon received joint degrees in Medicine and Business Administration at McGill University, Montreal, Canada (2005), completed medical residency in Internal Medicine and Respiratory Medicine at the University of British Columbia (in 2010) and received a Master’s of Science degree in Clinical Epidemiology at the University of Washington, Seattle, USA (2012).

Dr. Quon began his academic appointment as Assistant Professor of Medicine at the University of British Columbia (UBC) in 2014. He is the inaugural recipient of the Cystic Fibrosis (CF) Canada – UBC Clinician Scientist Award. He is a Principal Investigator of the UBC James Hogg Research Centre and Research Director of the St. Paul’s Hospital Adult CF Clinic.

He is a Staff Respiratologist and CF Physician at St. Paul’s Hospital in Vancouver. His research program focuses on the discovery of novel biomarkers to improve the care and diagnosis of patients with CF, which is the most common inherited fatal disease in Caucasians. Additionally, his research program focuses on CF-related co-morbidities that influence the quality of life and longevity of adults with CF.

Brad Quon, MD, MSc, MBA
POSTER ADJUDICATORS

Dr. Monica Beaulieu is Associate Professor of Medicine at the University of British Columbia. Dr. Beaulieu is the head, Division of Nephrology, Providence Health Care and the Physician Program Director, Renal Program, Providence Health Care. She also serves as the medical lead of Provincial Kidney Care Committee, BC Renal Agency.

She received her Pharmacy, Internal Medicine and Nephrology training at UBC as well as a Masters in Health Administration from the Sauder School of Business. Her research interests focus on CKD - optimizing the integration of chronic disease management models, wait list management and system redesign.

Monica Beaulieu, MD

POSTER ADJUDICATORS cont.

Dr. Jay Johnston is a Respirologist and Evaluation Lead at BCCDC TB Services. He is a Clinical Assistant Professor in the Department of Medicine at UBC and recipient of a 2014 Michael Smith Foundation Scholar Award.

He completed Internal Medicine training at McGill before moving to UBC for his Respiratory Medicine Fellowship. He completed a BC Lung Association Grzybowski Fellowship in Tuberculosis Research and has a Master’s in Public Health from the Harvard School of Public Health.

Jay Johnston, MD
PRIZES & AWARDS

RESEARCH AWARDS

- The G.B. John Mancini Resident Research Achievement Prize
  Senior Resident Award

- The John H. Dirks Prize
  Best Research Project by a Core Resident

- The Stefan Grzybowski Prize
  Best Research Project by a PGY4/PGY5/PGY6

- A. Dodek Outstanding Clinical and Ethical Performance in Cardiology Award
  Awarded to incoming cardiology fellow

- Best Oral Presentation by a PGY1
- Best Oral Presentation by a PGY2
- Best Oral Presentation by a PGY3
- Best Oral Presentation by a PGY4/5/6
- Best Poster Project by a PGY1
- Best Poster Project by a PGY2
- Best Poster Project by a PGY3
- Best Poster Project by a PGY4/5/6

TEACHING AWARDS

- The Richard Edward Beck Prize
  Outstanding Teaching by a Senior Resident/Fellow
  (Nominated by Faculty & Voted by Core Residents)

RESIDENT AWARDED PRIZES

- Shelly Naiman Awards x 2
  For Outstanding Faculty Teaching

- Outstanding Clinical Teaching by a PGY2
- Outstanding Clinical Teaching by a PGY3
- Outstanding Clinical Teaching by a PGY4/PGY5/PGY6
ORAL PRESENTATIONS

SESSION 1

9:00a  Palliative Care access for End Stage COPD in the United States: A retrospective cohort analysis
Dr. Barret Rush, PGY5 - Critical Care
Sponsor: Dr. Donald Griesdale

9:12a  Latent Tuberculosis Treatment in Chronic Kidney Disease: The Vancouver Experience
Dr. Miriam Harris, PGY3
Sponsor: Dr. James Johnston

9:24a  Reducing blood testing on the Clinical Teaching Unit at VGH: a quality improvement project to implement Choosing Wisely Canada
Dr. Kiley Cindrich, PGY2
Sponsor: Dr. Penny Tam

9:36a  The Use of Mechanical Ventilation in Patients with Idiopathic Pulmonary Fibrosis
Dr. Katie Wiskar, PGY2
Sponsor: Dr. Donald Griesdale

9:48a  Observational study of pollen counts in BC from 2000-2015
Dr. Kateryna Vostresova, PGY 2
Sponsor: Dr. Donald Stark

10:00a  Coffee Break + Poster Viewing

SESSION 2

10:20a  Hospital Triggered Atrial Fibrillation (HoT-AF)
Dr. Chris Cheung, PGY3
Sponsor: Dr. Ken Gin

10:32a  Single-center comparison of clinical characteristics and adverse outcomes between two continuous flow left ventricular assist device
Dr. Hamed Nazzari, PGY2
Sponsor: Dr. Mustafa Toma

10:44a  I4855M is a novel RyR2 suppression-of-function mutation underlying an overlapping phenotype of left ventricular non-compaction cardiomyopathy, catecholaminergic polymorphic ventricular tachycardia, Wolff-Parkinson-White syndrome and sudden cardiac arrest
Dr. Tom Roston, PGY2
Sponsors: Drs. Shubhayan Sanatani, Andrew Krahn, & Anna Lehman

10:56a  Targeted Temperature Management (TTM): State-of-the-Art-Review
Dr. Dylan Stanger, PGY2
Sponsor: Dr. Graham Wong

11:08a  Risk Stratification of Pericardial Effusion: Validity of the Pericardial Effusion Scoring Index at the VGH
Dr. Calvin Tong, PGY2
Sponsor: Dr. Teresa Tsang

11:20a  The Effect of Statin Therapy on Cardiac CT-based Indices of Coronary Artery Disease
Dr. Darryl Wan, PGY1
Sponsor: Dr. John Mancini

11:32a  Lunch + Poster Viewing
SESSION 3
1:00p Hemophagocytic syndromes (HPS) including Hemophagocytic Lymphohistiocytosis (HLH) in Adults: a Systematic Scoping Review
Dr. Anna Hayden, PGY3
Sponsor: Dr. Luke Chen

1:12p In vivo imaging reveals collaboration between platelets and neutrophils in the development of microvascular dysfunction in sepsis
Dr. Braedon MacDonald, PGY3
Sponsor: Dr. Craig Jenne

1:24p Adrenal vein sampling for subtype classification of primary aldosteronism in British Columbia: insights and challenges
Dr. Pol Darras, PGY2
Sponsor: Dr. Dan Holmes

1:36p Ultrasonographic Detection of Lipohypertrophy: Criteria and Comparison to Standard Clinical Examination
Dr. Jordanna Kapeluto, PGY5 - Endocrinology
Sponsors: Drs. Graydon Meneilly & Breay Paty

1:48p The Hepatitis C Cascade of Care in a Women-Centered HIV Clinic in Canada
Dr. Allison Mah, PGY5 - Infectious Diseases
Sponsor: Dr. Neora Pick

2:00p Physician-assisted death: survey assessment of UBC resident attitudes and prior educational experiences
Dr. David Spicer, PGY1
Sponsor: Dr. Jocelyn Chase

2:12p Coffee Break + Poster Viewing

SESSION 4
2:30p A risk-based approach to cancer surveillance after completion of primary therapy in rectal cancer
Dr. Jonathan Loree, PGY5 - Medical Oncology
Sponsor: Dr. Winson Cheung

2:42p Predictive factors for completion of radium 223 (Ra223) in metastatic castration resistant prostate cancer (MCRPC) patients
Dr. Erica Tsang, PGY1
Sponsor: Dr. Scott Tyldesley

2:54p Correlating quantitative fecal immunochemical test (FIT) results with neoplastic findings on colonoscopy in a population-based colorectal cancer screening program: A prospective study
Dr. Neal Shahidi, PGY3
Sponsor: Dr. Jennifer Telford

3:06p Characteristics of Patients with Colonic Polyps Requiring Segmental Resection
Dr. Robert Mitchell, PGY2
Sponsor: Dr. Robert Enns

3:18p The Utility of Infliximab Therapeutic Drug Monitoring Among Patients with Inflammatory Bowel Disease and Concerns for Loss of Response: A Retrospective Study
Dr. Robert Mitchell, PGY2
Sponsor: Dr. Brian Bressler

3:30p Closing Remarks
POSTER PRESENTATIONS

SESSION 1

12:45p  Late-Onset Wilson Disease: A Diagnostic Dilemma Reported
Dr. Robert Mitchell, PGY2
Sponsor: Dr. Hin Hin Ko

12:57p  Characteristics Associated With Hepatitis C Monitoring Among HIV/HCV Coinfected Active Illicit Drug Users
Dr. Laurie Cloutier, PGY2
Sponsor: Dr. MJ Milloy

1:09p  Repeat Endoscopic Ultrasound Guided Fine Needle Aspiration in Patients with Suspected Pancreatic Cancer: Diagnostic Yield and Associated Change in Access to Appropriate Care
Dr. Robert Mitchell, PGY2
Sponsor: Dr. Robert Enns

1:21p  CRUS Control: A Retrospective Analysis of a Canadian Rheumatology Ultrasound Clinic
Dr. Mo Bardi, PGY2
Sponsor: Dr. David Collins

1:33p  Effectiveness of a Weekly Text Messaging Intervention to Improve Medication Adherence and HIV Viral Load in Vulnerable Canadian Populations
Dr. Elizabeth King, PGY1
Sponsor: Dr. Melanie Murray

1:45p  Frailty as a predictor of functional stability in older patients undergoing transcatheter aortic valve replacement (TAVR)
Dr. Walid Al Keridy, PGY5 - Geriatrics
Sponsor: Dr. Amanda Hill

1:57p  Mineralocorticoid receptor antagonist utilization in eligible patients post ST-elevation myocardial infarction
Dr. Hamed Nazzari, PGY2
Sponsor: Dr. Mustafa Toma

SESSION 2

2:12p  Coffee Break + Poster Viewing

2:30p  Genotype-Phenotype Correlations in Catecholaminergic Polymorphic Ventricular Tachycardia: An Analysis of the Genetic Predictors of Life-threatening Cardiac Events from an International Multicenter Registry
Dr. Tom Roston, PGY2
Sponsor: Dr. Shubhayan Santani

2:42p  Therapeutic Drug Monitoring in Tuberculosis Treatment: A systematic review and meta-analysis
Dr. Khalid Al-Efraij, PGY5 - Respirology
Sponsor: Dr. James Johnston

2:54p  Use of non-invasive mechanical ventilation for asthma in the United States: a national retrospective cohort analysis
Dr. Alexandra Bond, PGY1
Sponsor: Dr. Barret Rush

3:06p  Novel Gene Mutation for Resistance to Thyroid Hormone May Be Associated With Atrial Fibrillation
Dr. Sawyer Huget-Penner, PGY3
Sponsor: Dr. Julie Lee

3:18p  Retrospective Study of Progression of Diabetic Retinopathy during Pregnancy in Type 1 Diabetes
Dr. Mandana Moosavi, PGY4 - Endocrinology
Sponsor: Dr. David Thompson

3:30p  Closing Remarks
Palliative Care access for End Stage COPD in the United States: A retrospective cohort analysis
Dr. Barret Rush MD

BACKGROUND: Patients with end stage chronic obstructive pulmonary disease (COPD) have a limited life expectancy and suffer from significant symptoms related to their dyspnea. Palliative Care (PC) is recommended by all major respiratory societies as a cornerstone of management of these patients.

OBJECTIVE: To investigate the use of PC in patients with end-stage COPD on home oxygen hospitalized for an exacerbation across the United States.

METHODS: Retrospective nationwide cohort analysis utilising the Nationwide Inpatient Sample (NIS). All patients >18 years of age with a diagnosis of COPD on home oxygen admitted for an exacerbation were included. Logistic regression analysis was utilized for multivariate modelling with the outcome of PC referral.

RESULTS: 55,208,382 hospitalizations from the 2006-2012 NIS samples were examined. There were 181,689 patients with COPD on home oxygen admitted for an exacerbation, 3,145 (1.7%) patients also had a palliative care contact. There was a 4.5-fold relative increase in PC referral from 2006 (0.45%) to 2012 (2.56%, p<0.01). Patients receiving palliative care consultations compared to those who did not were: older (75.0 years SD 10.9 vs 70.6 years SD 9.7, p<0.01), had longer hospitalizations (4.9 days IQR 2.6-8.2 vs 3.5 days IQR 2.1-5.6) and more likely to die in hospital (32.1% vs 1.5%, p<0.01). Race was significantly associated with referral to palliative care, with White patients referred more often than visible minorities (p<0.01). Factors associated with PC referral in multivariate analysis were: age (OR 1.03, 95% CI 1.02-1.04, p<0.01), metastatic cancer (OR 2.40, 95% CI 2.02-2.87, p<0.01), non-metastatic cancer (OR 2.75, 95% CI 2.43-3.11, p<0.01), invasive mechanical ventilation (OR 4.89, 95% CI 4.31-5.55, p<0.01), non-invasive mechanical ventilation (OR 2.84, 95% CI 2.58-3.12, p<0.01), and DNR status (OR 7.95, 95% CI 7.29-8.67, p<0.01).
Latent Tuberculosis Treatment in Chronic Kidney Disease Patients: The Vancouver Experience  
Dr. Miriam Harris  
Supervisor: Dr. James Johnston

BACKGROUND: Diagnosis and preventative therapy in patients with latent tuberculosis infection (LTBI) remains a focus for TB prevention in low incidence regions. Much of the current literature on LTBI in patients with chronic kidney disease (CKD) has focused on the effectiveness of available screening tools, however, there is little data on how CKD patients fair while undergoing chemoprophylaxis treatment with isoniazide (INH) or rifampin.

OBJECTIVE: To examine treatment regimens, outcomes, adherence, and adverse events of LTBI treatment in CKD patients in Vancouver, British Columbia.

METHODS: We conducted a retrospective chart review from 2007 to 2014 from the British Columbia Centre for Disease Control database, with a supplemental chart review. Patients included in the analysis were identified through their reason for referral to the BCCDC. CKD patients in this study were defined as end stage renal disease (eGFR<15 mL/min/1.73 m2), starting dialysis, on dialysis, or were to undergo/underwent renal transplant. Patients were diagnosed as having LTBI through IGRA, TB skin test, or clinically. The sample included 619 patients. Patients received either standard 9 month INH therapy, or 4 months of rifampin.

RESULTS: Of the 619 patients referred to the BCCDC 606 had either end stage renal disease and/or were on dialysis, and 13 were post renal transplant. 113 patients tested IGRA positive, and 81 of these patients went onto LTBI treatment. Additionally, 17 more patients were treated based on presumptive clinical diagnosis or positive tuberculin skin test. Of the patients who underwent treatment 82 patients (or 82.7%) completed their course, and 12 patients switched to an alternative regime. Of the 10 patients who did not complete treatment 7 patients terminated early due to drug reactions, 3 for other reasons. 23 patient had drug reactions, and 1 patient had a significant drug drug interaction. There were no deaths associated with treatment and no patients required hospitalization for the adverse events.

CONCLUSION: This case series demonstrates that despite having multiple comorbidities, and complicated pharmacotherapies, CKD patients are able to complete chemoprophylaxis for LTBI. Furthermore, they can do so without requiring hospital admission for serious adverse events.

Reducing blood testing on the Clinical Teaching Unit at Vancouver General Hospital: a quality improvement project to implement Choosing Wisely Canada  
Kiley Cindrich, Meghan Ho, Constantin Shuster, Jing Luo, Nicole Li, Penny Tam

BACKGROUND: In healthcare, blood laboratory testing is important for clinical decision making; however, inappropriate testing is wasteful and can be harmful to patients. Choosing Wisely Canada is a campaign aimed at decreasing such unnecessary testing, procedures and treatments in healthcare.

OBJECTIVE: To implement the recommendation of the Choosing Wisely Canada Internal Medicine group to not order repeat complete blood count and electrolytes on clinically stable inpatients and to decrease testing by 15%.

METHODS: This quality improvement initiative was implemented on one general internal medicine Clinical Teaching Unit (CTU) at Vancouver General Hospital. The design was a controlled before-and-after study. Data was gathered for 54 weeks pre-intervention and for 8 weeks during the intervention period on a control CTU and an intervention CTU. The intervention consisted of a 15 minute PowerPoint education presentation, visual poster aids, and order prompting. Order prompting involved the unit clerk flagging daily blood test orders and then a study team member clarifying the order with the senior resident. The number of blood test orders per patient day were collected and analyzed.

RESULTS: 12,194 blood test orders prior to and 1,292 orders during the intervention period were analyzed. When standardized to patient days admitted under CTU, 0.84 orders per patient day were noted in the pre-intervention period, whereas 0.74 orders per patient day were noted in the control CTU group during the intervention period. In the intervention CTU group, orders per patient day decreased to 0.69 orders per patient day (5% decrease from the control CTU group or 15% compared to pre-intervention period). Statistical analysis is pending.
The Use of Mechanical Ventilation in Patients with Idiopathic Pulmonary Fibrosis
Katie Wiskar

BACKGROUND: Idiopathic pulmonary fibrosis (IPF) is a chronic progressive respiratory disease of unknown etiology. Historically, IPF patients presenting in respiratory failure have been reported to do very poorly with mechanical ventilation (MV). The current guidelines are unclear on the role of MV in IPF patients.

OBJECTIVE: To investigate the mortality of patients with idiopathic pulmonary fibrosis (IPF) who undergo mechanical ventilation (MV) and non-invasive mechanical ventilation (NIMV) in the United States.

METHODS: We performed a retrospective cohort study using data from the Nationwide Inpatient Sample, isolating patients with a diagnosis of IPF who underwent MV and NIMV between 2006 and 2012. Patients over the age of 18 with discharge diagnosis of IPF (ICD9 codes 516.3 and 516.31) were identified. This cohort was segregated into patients who received MV (ICD9 codes: 96.70, 96.72, 96.71) or NIMV (ICD9 code 93.90). Patient-level variables including age, sex, race, use of supplemental home oxygen, and in-hospital mortality were collected. Statistical analysis was performed using complex national weights, allowing for estimates of national proportions.

RESULTS: We analyzed 55,208,382 hospitalizations and identified 17,770 patients with IPF, of whom 1703 received MV and 778 received NIMV. Those receiving MV had higher mortality (51.6 vs 30.9 percent, p<0.0001) than those receiving NIMV. The mortality of IPF patients treated with MV decreased from 58.4 percent in 2006 to 49.3 percent in 2012 (p=0.03).

CONCLUSION: In a nationally representative sample from 2006 to 2012, the mortality rate in patients with a diagnosis of IPF who received MV for acute respiratory failure was 51.6%. The mortality rate for patients with IPF who received NIMV was 30.9%. Both of these figures are substantially lower than previously reported, suggesting that a diagnosis of IPF alone should not preclude consideration of MV.

Observational study of pollen counts in British Columbia from 2000-2015
Kateryna Vostretsova, Andrew Moses, Amin Kanani and Donald Stark

BACKGROUND: Allergic diseases in Canada are on the rise and are associated with medical, societal and economic burdens. Pollens are the main trigger and cause of respiratory allergic conditions. Total pollen counts have been rising and have become more serious and of longer duration as a result of warmer temperatures and climate change. Knowledge of pollen counts and trends would allow for targeted patient allergy management.

METHODS: We sought to identify major trends in pollen counts over the past 15 years in two major urban centers in British Columbia. Data was obtained from Aerobiology, a company responsible for outdoor pollen and fungal spore identification. Prevalent allergens known to cause the majority of allergic conditions including alder, grasses and Cladosporium were analyzed from 2000-2015. A literature review was undertaken to explore the role of these allergens and their effect on systemic allergic disease in the context of climate change.

RESULTS: Alder is a major allergen in Vancouver and pollen counts have been increasing over the past 15 years. In Victoria, grasses predominate with data suggesting a shift towards an earlier grass pollen season and higher overall pollen counts while Alder pollen counts have been relatively stable. For both locations, the common mold, Cladosporium, is peaking later during its usual season further supporting the evidence of rising temperatures and longer warmer seasons.

CONCLUSION: Although Vancouver and Victoria are in close proximity, they have very different patterns of pollen distribution. These findings will help guide patient management and fuel further research in this area.
Hospital Triggered Atrial Fibrillation (HoT-AF)
Christopher Cheung

BACKGROUND: New-onset atrial fibrillation (AF) occurring during hospitalization can occur post-operatively, during severe sepsis, or with admission to the intensive care unit. In these circumstances, AF is associated with an increased risk of in-hospital mortality, and long-term risk of heart failure, stroke, and death. We described the incidence and demographics of patients developing hospital “triggered” AF (HoT-AF).

METHODS: Patients discharged from one of 10 hospitals in the Vancouver Coastal Health region from 2009-2015 were retrospectively identified using the Discharge Abstracts Database. HoT-AF was defined as the presence of AF exclusively as a post-admit comorbidity (i.e. not present on any prior hospitalization or emergency room visit).

RESULTS: From April 2009 to December 2015, 607,622 patients were discharged from one of 10 VCH hospitals. In total, 4,529 patients (0.7%) were identified as having HoT-AF. Most patients were between 60-79 years (61%), with 25% over 80 years, and 14% less than 60 years. The majority of patients were male (64%). The most responsible services were cardiac surgery (46%), family practice (9%), general surgery (9%), and internal medicine (9% - Table 1), with an average length of stay (LOS) of 19.06 days. There were 4,370 visits to intensive or special care units (e.g. ICU, CCU) with an average special care LOS of 4.55 days.

CONCLUSIONS: Patients developing new-onset, hospital triggered AF were frequently observed on surgical services, with high rates of admission to special care units.

FUTURE DIRECTIONS: We plan to evaluate the long-term risks of HoT-AF, including recurrent AF, stroke, and death.

Single-center comparison of clinical characteristics and adverse outcomes between two continuous flow left ventricular assist devices

BACKGROUND: Left ventricular assist devices (LVADs) are becoming increasingly utilized worldwide for the treatment of end-stage heart failure. With the evolution and development of newer generation LVADs the focus has shifted in comparing clinical characteristics and outcomes between these devices.

OBJECTIVE: Our objective was to examine the differences in clinical characteristics and adverse outcomes between the HeartMate II (HMII) and HeartWare VAD (HVAD) devices implanted at our center.

METHODS: We conducted a retrospective cohort study of 108 patients implanted with either a HMII or HVAD device at our institution between February 2008 and January 2015. We compared baseline characteristics and adverse outcomes using event per patient year analyses (EPPY). We compared survival and transplantation rates using Kaplan Meier curves.

RESULTS: We analyzed baseline characteristics and adverse outcomes between 32 HMII and 76 HVAD patients. The mean age and gender profile were similar between the two devices. There was a larger proportion of ischemic cardiomyopathy and bridge to candidacy patients in the HVAD population. Survival at six months was not significantly different between HMII and HVAD, at 90.3% and 84.8%, respectively (p=0.694). The number of transplanted patients at six months was 14.6% and 26.6% for HMII and HVAD, respectively (p=0.527). EPPY analysis revealed similar outcomes for GI bleed, thromboembolism and drive line infection. Neurological events were greater within the HVAD cohort. Sintering of the HVAD device did not reduce adverse neurological outcomes with 0.23 and 0.29 EPPY pre- and post-sintering. Finally, the majority of neurological adverse events occurred during the first 30 support days compared to post-30 days.

CONCLUSION: Overall, baseline characteristics between HMII and HVAD patients were similar. Survival and transplantation rates at six months were similar. Adverse outcomes were also similar; however there were non-significant but greater number of adverse neurologic outcomes in the HVAD group, with the majority of these events occurring within the first 30 VAD support days.
I4855M is a novel RyR2 suppression-of-function mutation underlying an overlapping phenotype of left ventricular non-compaction cardiomyopathy, catecholaminergic polymorphic ventricular tachycardia, Wolff-Parkinson-White syndrome and sudden cardiac arrest

Thomas M. Roston (1, 2), Wenting Guo (3), Julie Hathaway (1), Andrew D. Krahn (1), Ruiwu Wang (3), Filip van Petegem (1), Shubhayan Sanatani (1)*, S.R. Wayne Chen (3)*, Anna Lehman (1)*
(1) University of British Columbia, (2) University of Alberta, (3) University of Calgary
*Shared senior authorship

BACKGROUND: Catecholaminergic polymorphic ventricular tachycardia (CPVT) is an ion channelopathy usually caused by gain-of-function variants in RYR2. Left ventricular non-compaction (LVNC) is an unusual, often genetic cardiomyopathy. An LVNC-CPVT overlap syndrome may occur in rare cases of exon 3 deletion in RyR2.

OBJECTIVE: To characterize the mechanistic basis of a novel RyR2 variant underlying a novel familial syndrome.

METHODS: Several members of an affected family underwent clinical and genetic assessment. We created a homology model of the mutated RyR2 pore-region to determine variant localization and predicted impact. Functional characterization of the mutant protein was undertaken in HEK293 cells using [3H]ryanodine binding assays.

RESULTS: A multigenerational family presented with a history of sudden death and a phenotype of CPVT, LVNC and Wolff-Parkinson-White syndrome. Genetic testing revealed a RyR2 variant (I4855M) in 2 affected subjects. A homology model of the RyR2 pore-region showed that the I4855M variant resides in the ‘inner vestibule’, a water-filled cavity where ions can remain in a hydrated form. I4855M appeared to interfere with calcium permeation and was also predicted to affect interactions between the four RyR2 pore subunits. I4855 is highly conserved and predicted in silico to be damaging. Co-expression of the mutant in HEK293 cells with wildtype RyR2 indicated a dominant negative effect of I4855M on the wildtype channel, with suppression of caffeine-induced calcium release. In conclusion, a novel RyR2 variant underlies an overlapping phenotype of CPVT, LVNC and Wolff-Parkinson-White syndrome. Expression and functional studies in HEK293 cells suggest that I4855M is a suppression-of-function mutation.

Targeted Temperature Management (TTM): State-of-the-Art-Review
Dylan Stanger

OBJECTIVE: To present a current and critical synthesis of the multifaceted science of targeted temperature management (TTM) following cardiac arrest.

METHODS:
• A systematic review was conducted to address 10 PICO questions regarding TTM in the post-cardiac arrest patient, including: appropriate population for TTM, as well as the effect of timing, temperature, route, duration and precision of TTM.
• The searches were conducted for studies published between January 2000 and February 2016. The following databases were searched: PubMed, EMBASE, and the Cochrane Library.
• A bias assessment was completed for all included studies using the Cochrane Handbook for Systematic Reviews of Interventions for RCTs and the NIH Study Quality Assessment Tools for observational studies.
• The quality of evidence and subsequent recommendations were determined using GRADE methodology.

RESULTS:
• Low-quality evidence suggests TTM after ROSC from out-of-hospital cardiac arrest (OHCA) in shockable rhythm improved mortality and neurologic outcome. There is no RCT evidence to support TTM in nonshockable OHCA or in-hospital cardiac arrest (IHCA).
• Analysis demonstrates overall moderate-quality evidence to suggest prehospital cooling does not reduce mortality or poor neurological outcome.
• Very low-quality evidence suggests duration of TTM should be at least 24 hours.
• Analysis demonstrates overall low-quality evidence to suggest there is no mortality or neurological outcome benefit of TTM with use of intravascular or feedback-controlled cooling.
• Very low quality evidence suggests there are worse neurological outcomes when cooling time is under 120 minutes and suggests fever management up to 72 hours might be of additional benefit to TTM.

CONCLUSION:
• TTM should be utilized for adults with OHCA with initial shockable rhythm at a constant temperature between 32°C and 36°C for at least 24 hours. Similar recommendations are made for OHCA with a nonshockable rhythm and IHCA.
• Prehospital cooling, rapid rate of cooling and post-cooling fever should all be avoided following cardiac arrest.
Risk Stratification of Pericardial Effusion: Validity of the Pericardial Effusion Scoring Index at the Vancouver General Hospital
Dr. Calvin Tong, Dr. Teresa Tsang

BACKGROUND: Management of at least moderate pericardial effusion without hemodynamic compromise are often at the discretion of attending cardiologists. An objective scoring index was developed to facilitate identification of potential patients requiring pericardiocentesis.

OBJECTIVE: To assess the validity of this scoring index at the Vancouver General Hospital.

METHODS: This is a cohort study of consecutive hospitalized patients with at least moderate pericardial effusion without hemodynamic instability on presentation between January 1, 2014 to December 31, 2015. Patients whose pericardial effusion was intervened upon served as cases, and those managed conservatively served as controls. The composite pericardial effusion score is based on effusion etiology from retrospective chart review (1 point each for malignant, HIV/immunocompromised, treatment failure, and recurrent effusion; and 4 points each for aortic dissection, purulent effusion, and trauma), size (2 points for 1-2cm and 3 points for >2cm), and hemodynamic findings on echo studies (maximum of 3 points: 1 point for right atrial collapse and 2 points for right ventricular diastolic collapse. If one or both of the above findings were present, then additional 1 point each for respiratory flow variation >25% across mitral valve, and for inferior vena cava plethora).

RESULTS: 58 patients underwent pericardiocentesis and the 82 controls did not. No significant difference was found between the two groups with regards to their blood pressure, heart rate, and eGFR on presentation. Pericardial effusion from heart failure (p=0.0002) and pulmonary hypertension (p=0.02) were likely to be treated conservatively. Malignant (p=0.006) and infection etiology (p=0.01) were likely to receive pericardiocentesis. Mean pericardial effusion score for those who had pericardiocentesis was 5.7421 and those without was 2.7411 (p<0.0001). The area under the curve for receiver operator characteristic was 0.89 (95% CI 0.83-0.95) and the optimal cutoff score was 3.5. This is consistent with the proposed cutoff score of 4 in predicting patients who will require pericardiocentesis. This is the first study that validated the pericardial effusion scoring index in the patient population presenting to a tertiary healthcare center in Canada.

The Effect of Statin Therapy on Cardiac CT-based Indices of Coronary Artery Disease
Dr. Darryl Wan, Dr. A. Yashar Tashakkor, Dr. G. B. John Mancini

BACKGROUND: The effect of statin therapy on coronary artery calcification is unclear. Early observational studies suggested a reduction in the rate of coronary artery calcification over time, but more recent prospective trials have failed to show this benefit. Recent studies have explored the use of Cardiac Computed Tomography Angiography (CCTA) to further characterize plaque features beyond calcification. We provide a systematic review of the available literature documenting the effects of statin therapy on the progression of coronary artery calcification score (CACS) and non-calcium-based indices.

OBJECTIVE: To review the impact of statin therapy on the progression of calcium and non-calcium-based indices of coronary artery disease.

METHODS: A systematic search was performed from January 1, 1980 to May 29, 2015 using the following databases: Cochrane Database, ACP Journal Club, Health Technology Assessment, Embase, NHS Economic Evaluation Database, Ovid MEDLINE, Health and Psychosocial Instruments. English language publications that quantitatively measured the relationship between statin therapy and CACS or non-calcium-based indices over a temporal period were included in this study. Case reports, reviews and meta-analyses were excluded. Data regarding the progression of calcium and non-calcium-based indices were extracted and analyzed.

RESULTS: 2075 articles were retrieved for screening, of which 22 met the pre-defined inclusion criteria. 9 were randomized controlled trials and 13 observational studies. Observational trials did not consistently demonstrate a reduction in the progression of CACS with statin therapy. No randomized trials demonstrated convincing evidence that statin therapy reduces the progression of CACS. CCTA studies of non-calcium-based indices suggested that statin therapy might reduce non-calcified plaque volumes over a temporal period.

CONCLUSIONS: Based on studies using statins, an intervention known to alter atherosclerosis, serial studies of non-calcified plaque volume, but not CACS, may be useful for the non-invasive assessment of medical interventions with postulated effects on progression or regression of atherosclerosis.
Hemophagocytic syndromes (HPS) including Hemophagocytic Lymphohistiocytosis (HLH) in Adults: a Systematic Scoping Review
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BACKGROUND: Most knowledge of hemophagocytic syndromes (HPS) including hemophagocytic lymphohistiocytosis (HLH) is derived from pediatric studies; literature on adult HPS/HLH predominantly consists of small retrospective studies with clinical and methodological heterogeneity.

OBJECTIVES: The aims of this systematic scoping review were to provide an overview of existing literature on adult HPS/HLH, describe current practices in diagnosis and treatment, and propose priorities for future research.

METHODS: All relevant English language articles identified in Ovid Medline, Embase and Pubmed (1975-2015), as well as reference lists of key articles were evaluated. Studies describing 10 or more unique adults (age > 15 years) with HPS/HLH were included. 82 publications were eligible: 10 were prospective and 72 were retrospective. 56 studies were published since 2005, and 44 were from Asia. The Histiocyte Society’s HLH-2004 criteria were employed in 42 of 54 studies published since 2007. A minority of studies tested for genetic abnormalities (12), soluble interleukin-2 receptor (11), and/or NK function (11) in a subset of patients. Most centers used steroids and either etoposide based (HLH-94/HLH-2004) or doxorubicin based (CHOP) initial therapy regimens. Liposomal doxorubicin, etoposide and methylprednisolone (DEP) salvage therapy was evaluated in the first multicenter prospective clinical trial in adults. Allogeneic hematopoietic cell therapy for treatment of adult HLH has rarely been reported. Mortality in larger treatment focused studies ranged from 20.4 to 88%. Developing adult-specific diagnostic criteria based on widely evaluable features of secondary HPS/HLH and establishing a standard for initial therapy are priorities for future research.

In vivo imaging reveals collaboration between platelets and neutrophils in the development of microvascular dysfunction in sepsis
Braedon McDonald and Craig N Jenne

BACKGROUND: Thrombocytopenia is a common complication of sepsis and is associated with poor prognosis, but the underlying biological mechanisms are poorly understood. Platelets are best known for their role in hemostasis, but also have important functions in host defense and inflammation, and emerging evidence implicates platelets in the pathogenesis of sepsis. However, the cellular and molecular mechanisms that enable platelets to influence the pathophysiology of sepsis are unknown. In this study, we hypothesized that platelets contribute to the development microcirculatory dysfunction in sepsis through interactions with innate immune cells within the vasculature.

OBJECTIVE: To investigate the behavior of platelets in the vasculature during sepsis, characterize their interactions with immune cells, and elucidate their contributions to microvascular dysfunction.

METHODS: Multi-color confocal intravital microscopy was used in mouse models of sepsis (endotoxemia and E. coli peritonitis) to visualize and quantify platelet kinetics, neutrophil trafficking, intravascular thrombin activity, and microvascular perfusion.

RESULTS: Using a novel in vivo imaging technique to visualize platelet dynamics in septic mice, we observed profound platelet aggregation and sequestration within the microvasculature of various organs, leading to the development of thrombocytopenia. Platelet sequestration was dependent on interactions with neutrophils, as neutrophil-depletion or inhibition of beta2-integrin-mediated adhesion prevented microvascular platelet aggregation. Functionally, platelets sequestered within the microcirculation precipitated intravascular thrombin activation and coagulation through a mechanism involving the release of inorganic polyphosphate from platelets, ultimately leading to small vessel occlusion and ischemia. Blocking platelet-neutrophil interactions, or neutralization of inorganic polyphosphate, resulted in significantly reduced intravascular coagulation, improved tissue perfusion, and reduced end-organ damage.

CONCLUSION: During sepsis, platelets collaborate with neutrophils to induce intravascular coagulation, microvascular occlusion, and end-organ damage. This study reveals a key role for platelets in the pathogenesis of sepsis, and yields insight into the biological mechanism of sepsis-induced thrombocytopenia and its well-known association with disease severity and negative prognosis.
Adrenal vein sampling for subtype classification of primary aldosteronism in British Columbia: insights and challenges
Pol Darras

BACKGROUND: Primary aldosteronism (PA) is identified in 5 to 15% of patients with hypertension. Adrenal vein sampling (AVS) allows localization of aldosterone production, identifying cases where unilateral adrenalectomy can be curative. Unfortunately, AVS is technically challenging, and interpretation of results is not standardized. Studies have reported that cosyniptropin administration may improve AVS interpretability.

OBJECTIVE: To complete a retrospective review of the outcomes of AVS in British Columbia, and evaluate technical success rate and interpretability of results.

METHODS: Data from AVS procedures were extracted from the Clinical Chemistry Laboratory database at St. Paul’s Hospital, where all samples in British Columbia are analyzed using liquid chromatography – mass spectrometry. Pre and post-cosyniptropin cortisol and aldosterone levels from adrenal vein and inferior vena cava samples were analyzed using established cutoffs for selectivity index (evidence of successful cannulation of adrenal veins) and lateralization index (evidence of lateralization of aldosterone production).

RESULTS: From March 9 2011 to January 28 2016, samples from 216 AVS procedures were collected. Successful bilateral adrenal vein cannulation was confirmed in 174 cases (81%). In 71 of these cases (33%), cannulation was only confirmed in the post-cosyniptropin stimulation phase. Failure of right, left, and bilateral adrenal vein cannulation occurred in 27, 4, and 11 cases, respectively. Among successful procedures, aldosterone secretion was found to be right-lateralized in 53 cases, left-lateralized in 59 cases, and bilateral in 61 cases. In 22 cases, evidence of lateralization was lost in the post-cosyniptropin phase, while in 14 cases lateralization was only found in the post-cosyniptropin phase. One procedure yielded discordant lateralization results between pre and post-cosyniptropin samples.

CONCLUSION: AVS technical success rates in British Columbia are similar to published rates. While cosyniptropin administration improves study interpretability, it may also result in loss of lateralization of aldosterone production.

Ultrasonographic Detection of Lipohypertrophy: Criteria and Comparison to Standard Clinical Examination
Jordanna Kapeluto

BACKGROUND: Lipohypertrophy (LH) is a prevalent complication of insulin therapy that reduces insulin absorption. Clinical examination through palpation is the current standard for detection but cannot differentiate between LH and other causes of tissue distortion. LH has previously been reported with ultrasonography (US), however no standard criteria have been proposed.

OBJECTIVES: To characterize LH using US and compare its detection to clinical examination (CE).

METHODS: Ultrasound criteria for LH were determined in patients identified by physical examination (n=7). Image analysis demonstrated an echo signature consisting of the presence of heterogeneous or hyperdense echogenicity, a well-circumscribed area and connective tissue distortion in the absence of vascularity or capsule. A random cohort of 51 patients on insulin therapy (n=6 T1DM, n=45 T2DM) underwent CE by a nurse then US performed by a single, blinded operator. Analysis consisted of the Cohen kappa statistic and McNemar test.

RESULTS: Palpable LH was found in 67% of patients (n=34). Sixty-two areas identified as LH on CE and 105 areas meeting US criteria were noted with moderate intra-observer correlation between modalities (κ= 0.41). LH was detected by US significantly more frequently than CE (p<0.001). Sixty-six areas (P<0.001) meeting US criteria did not correlate with LH on CE and may represent subclinical LH. These subclinical findings were found in 22% of patients (n=11) without palpable LH, and 61% (n=31) with palpable LH. Additionally, six areas of LH identified on CE were consistent with lipoma or cyst when assessed by US. Our findings provide criteria for the detection of LH using ultrasonography with correlation to standard clinical examination. These results suggest a role for ultrasonography in detecting early changes to the subcutaneous tissue and that cysts and lipomas may be misidentified as LH on clinical examination.
The Hepatitis C Cascade of Care in a Women-Centered HIV Clinic in Canada
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BACKGROUND: Worldwide, 5 million people are co-infected with human immunodeficiency virus (HIV) and hepatitis C virus (HCV) however, few data are available to assess the continuum of care from diagnosis, linkage, engagement and treatment for co-infected women. Our objective was to characterize the HCV cascade of care for patients in a predominantly women’s HIV clinic.

METHODS: The Oak Tree Clinic (OTC) is a multidisciplinary HIV clinic in Vancouver, Canada. Data for all HIV positive patients ≥18 years old followed in the OTC was retrieved. We describe the characteristics of the cohort focusing on HCV co-infected patients.

RESULTS: A total of 694 patients were included of whom 565 (81%) were female. Mean age was 43 years (IQR 36-50), median CD4 count 557 cells/µL (IQR 350-720) and 526 (76%) patients had an undetectable HIV viral load. HCV antibody (Ab) status was known in 665 (96%) and 261 (38%) were Ab+. Of 261 HCV Ab+ patients, 58 (22%) spontaneously cleared, 33 (13%) were treated with a sustained virologic response, and 13 (5%) had an unknown method of RNA clearance. HCV RNA status was unknown in 8 (3%) patients. Of 149 HCV RNA+ patients, 145 (97%) had liver fibrosis staging by aspartate aminotransferase-to-platelet ratio index (APRI) and Fibrosis-4 (Fib4) scores, of whom 26 (17%) had severe fibrosis. Currently, 28 (19%) have been referred for HCV therapy, and 4 (2.7%) are on treatment, yet 59 (40%) patients qualify for HCV therapy based on local guidelines.

Conclusion: In this predominantly female population co-infected with HIV and HCV, 17% had evidence of significant fibrosis despite their relatively young age and 40% would qualify for HCV treatment. Despite this, few patients with active HCV infection were on HCV therapy. Enhanced efforts and gender responsive services may be helpful in optimizing access to treatment for HIV/HCV co-infected women.

Physician-assisted death: survey assessment of UBC resident attitudes and prior educational experiences
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BACKGROUND: The Supreme Court of Canada has ruled that physician assisted death (PAD) is no longer a criminal offence, as of February 6th, 2016. Attitudes toward PAD from practicing Canadian physicians has been formally assessed, however, the attitudes and corresponding educational needs of Canadian residents remain unstudied. In order to examine this gap, we developed a comprehensive qualitative and quantitative survey to assess the understanding and educational experiences of UBC residents with PAD and palliative care medicine.

METHODS: An online survey was developed following a literature search, and examination of prior surveys conducted in the area. All residents enrolled in a UBC affiliated program were contacted via email by Doctors of BC, and respective program directors. Survey participation voluntary was anonymous, and ethics approval was obtained. The survey collected information on program of study, year of training, knowledge and attitudes surrounding recent PAD legislative changes, and experience and prior education in palliative care medicine. The survey was comprised of yes/no questions, graded Likert scale questions, scenario based questions, and a general comments section.

RESULTS: To date, 275 surveys have been completed, with 64 coming from Internal Medicine residents. Data collection is ongoing until April 17th, with plans to analyze data quantitatively and separate qualitative data into themes.

CONCLUSION: At the time of submission, data collection and statistical analysis is still underway, and these findings will be presented. This information may assist in future planning of educational modules for residents.
A risk-based approach to cancer surveillance after completion of primary therapy in rectal cancer
Jonathan M. Loree, Gillian K. Gresham, Hagen F. Kennecke, & Winson Y. Cheung

BACKGROUND: For cancers with a high risk of recurrence, most guidelines recommend 5 years of surveillance after primary treatment in order to detect relapses that are still amenable to further curative therapy. We hypothesized that the duration of surveillance in rectal cancer (RC) can be individualized since cancer follow up mainly offers value if the risk of recurrence or death from cancer is higher than that of death from non-cancer causes. We used a cohort of early stage RC patients (pts) to test this hypothesis.

METHODS: We identified RC pts diagnosed from 1999 to 2009 and referred to any 1 of 5 cancer centers in British Columbia, Canada. Time-to-event data were analyzed using competing risks methods with Weibull distributions. The Weibull models were plotted to characterize the time point at which the hazard rate of non-RC death exceeded that of RC related recurrence or death in order to determine the optimal duration of surveillance. The analysis was stratified by age and stage.

RESULTS: We included 2995 pts: median age 66 (IQR 57-74) years and 63% men. There were 428 (14%) stage I, 865 (29%) stage II, and 1702 (57%) stage III cases. Median follow up was 7.4 (IQR 5.6-9.8) years during which 943 (32%) relapses occurred. We observed significant variations in the ideal duration of surveillance (see Table). In pts aged >80 with stage II disease, for example, the risk of non-RC death surpassed the risk of recurrence at only 1.5 years after curative treatment whereas this did not occur until >15 years in pts aged <60. While the time point at which non-RC death exceeded relapse was not modified by ECOG, it was affected by site of relapse whereby the ideal duration of surveillance for locoregional recurrences is shorter than that for distant recurrences.

CONCLUSIONS: A risk-based approach that considers key baseline characteristics may customize the optimal duration of follow up for specific cancer pts. This strategy balances the benefits of surveillance with the increasing need for value-based healthcare resource allocation.

Predictive factors for completion of radium 223 (Ra223) in metastatic castration resistant prostate cancer (MCRPC) patients (pts)
Erica Tsang, Sunil Parimi, Abraham Alexander, Francois Bachand, Michael Mckenzie, Katherine Sunderland, Kim Chi, Scott Tyldesley

BACKGROUND: Ra223 has demonstrated clinical activity, but its place in sequence among other MCRPC therapies remains unclear.

OBJECTIVES: To identify clinical and biochemical factors associated with successful completion of Ra223 and characterize its sequencing relative to other agents in MCRPC.

METHODS: Patients receiving Ra223 at the British Columbia Cancer Agency between September 2013 and September 2015 were identified. Patients were grouped based on completion of <5 versus ≥5 cycles. Abstracted clinical and biochemical factors were compared between these two groups by chi-square analysis to characterize factors associated with therapy completion, and to determine association with prostate specific antigen (PSA) decline and overall survival (OS).

RESULTS: 64 patients were included in this preliminary analysis: 34 (53%) completed <5 cycles, and 30 (47%) completed ≥5 cycles. Completion of <5 cycles was associated with a higher baseline alkaline phosphatase (ALP), and there was a trend towards significance for association with lower baseline hemoglobin (Hb) and albumin. A higher proportion of patients who completed >5 cycles had a PSA decline >30% (30% vs. 3%, p=0.004) and PSA decline >50% (17% vs. 0%; p<0.05).

CONCLUSIONS: Higher ALP, lower Hb and albumin may be associated with successful completion of >5 cycles of Ra223. Further study will determine whether baseline laboratory values can predict clinical outcomes, or help to prioritize Ra223 usage in the sequencing of MCRPC agents.
BACKGROUND: Quantitative fecal immunochemical test (FIT) performance depends on the test positivity cut-off chosen; the Canadian Partnership Against Cancer recommends that the FIT positive predictive value (PPV) for neoplasia be > 50%. Currently, there is no data assessing FIT performance at different test cut-offs in an average-risk Canadian population.

AIMS: To evaluate FIT performance in detecting colorectal neoplasia in an average-risk population.

METHODS: Data was obtained from a prospectively collected central database maintained at the British Columbia Cancer Agency (Vancouver, Canada) with consecutive participants of the BC Colon Screening Program included for analysis. A single quantitative FIT (NS-Plus, Alfresa Pharma Corporation, Osaka, Japan) with a cut-off of U 50 ng hemoglobin/ml buffer solution was used. Participants with a positive FIT were referred for colonoscopy (CSPY) and were classified by the highest risk pathology. High-risk polyps (HRPs) were defined as adenomas or sessile serrated adenomas/polyps (SSA/Ps) U 10mm, adenomas U 20% villous, adenomas with high-grade dysplasia, SSA/Ps with dysplasia, and traditional serrated adenomas. Colorectal cancer (CRC), HRPs and multiple (> 3) polyps were defined as high-risk findings while 1-2 tubular adenomas or SSA/Ps < 10 mm were considered low risk findings. This study was approved by the British Columbia Cancer Agency Research Ethics Board.

RESULTS: From 11/2013 to 12/2014, 32,152 participants had a positive FIT. Of those 20,317 (64.6%) underwent CSPY within the BC Colon Screening Program, with 1446 (4.6%) pending CSPY at time of analysis. Pathology results were available for 19,374 (95.4%). At the current cut-off, the PPV for the detection of neoplasia was 54.0%. As the FIT cut-off increased the PPV for neoplasia and CSPYs saved increased as did the proportion of lesions missed. Increasing the FIT cut-off to U 100 ng/ml would increase the PPV for CRC by 1.5% and for HRPs by 6.5% while saving 48.8% of CSPYs at a cost of missing 13.7% of CRCs and 32.4% of HRPs.

CONCLUSIONS: This is the first Canadian study evaluating the PPV of different FIT cut-offs in a screening population. As the FIT cut-off rises, the PPV for high risk findings increases alongside CSPYs saved but at the cost of missed lesions. The current cut-off of 50 ng/mL produces a PPV for neoplasia exceeding the nationally recommended cut-off of 50%.

Characteristics of Patients with Colonic Polyps Requiring Segmental Resection

Robert Mitchell, Cherry Galorport, Blair Walker, Jennifer Telford, Robert Enns

BACKGROUND: Endoscopic mucosal resection (EMR) of large or difficult to remove polyps has been validated as safe and effective. It is unclear if the availability of this technique has affected the use of segmental resection for polyps.

OBJECTIVE Evaluate the characteristics of polyps undergoing surgical resection, including involvement of therapeutic gastroenterologists (TG).

Methods: From 01/10-12/14, 484 patients had a colonic resection, of these, 165 (34%) were identified from the pathology database with polyp, adenoma, or mass in the clinical history field; these 165 charts were reviewed. Exclusion criteria were: obstructing colon mass; polyposis syndrome; prior colorectal cancer; post-polypectomy perforation; and transanal endoscopic microsurgery.

RESULTS: 128 patients were included in the study. Adenocarcinoma was diagnosed in 50 (39.1%), 97 (75.8%) patients had a polyp that was unresectable by EMR (Group A), and 31 (24.2%) underwent successful EMR (Group B) followed by surgery for adenocarcinoma on pathology (29), concomitant colitis (1), and technical difficulty with colonoscopy (1). The indication for surgery in Group A was polyp size or location (31), failed EMR without re-attempt (11), poor visualization (2), diverticulosis (2), and was not clearly documented in 51. Of the 97 patients within group A, only 17 (17.5%) had a TG involved. Successful use of EMR was not affected by polyp morphology (41.9% sessile resectable, 39.2% sessile unresectable, p=0.83). Adenocarcinoma was present in 21/97 of Group A (21.6%), and 29/31 of Group B (93.5%) (p<0.01).

CONCLUSION: A high proportion of polyps managed by segmental resection did not contain adenocarcinoma. The majority of segmental colorectal resections were performed for right colon polyps deemed unresectable at colonoscopy with few undergoing attempted polypectomy by a TG trained in EMR. This data suggests that even in a tertiary care center with advanced endoscopic techniques easily available, they are not always utilized.
The Utility of Infliximab Therapeutic Drug Monitoring Among Patients with Inflammatory Bowel Disease and Concerns for Loss of Response: A Retrospective Study

Robert Mitchell, Constantin Shuster, Neal Shahidi, Cherry Galorport, Mari DeMarco, Gregory Rosenfeld, Robert Enns, Brian Bressler

BACKGROUND: Infliximab (IFX) therapeutic drug monitoring (TDM) provides an objective measure to guide decision making for patients with concerns of loss of response. Questions remain about whether the availability of TDM leads to improved patient outcomes.

OBJECTIVE: We sought to evaluate the impact of IFX TDM on outcomes among patients with inflammatory bowel disease (IBD) and concerns for loss of response.

METHODS: Patients with IBD who had IFX TDM due to concerns for loss of response were considered for inclusion. IFX TDM included measurement of a serum IFX trough level and anti-drug antibody (ADA) level. Patients were grouped by TDM results: Group 1-low IFX/high ADA; Group 2-low IFX/low ADA; Group 3-therapeutic IFX. Appropriate change in management was then assessed: Group 1-switch to an alternative anti-tumor necrosis factor agent; Group 2-IFX dose optimization; Group 3-switch to an out-of-class biologic agent. The primary outcome was remission at 6 months after TDM.

RESULTS: 71 patients (27 UC, 44 CD) who had 6-month follow-up data available were included. Thirty-seven percent of all patients underwent an appropriate change in therapy with groups 1 (66.7%) and 2 (83.3%) having high adherence. Conversely, only 9% of patients in group 3 underwent an appropriate change in management. At 6 months, 56.5% of all patients had achieved remission. More patients who underwent an appropriate change in therapy achieved remission (69.2% vs. 48.8%; p=0.098).

CONCLUSIONS: Although not statistically significant, a trend towards superiority was observed for the appropriate use of TDM. Many patients with therapeutic IFX levels did not undergo an appropriate change in therapy, potentially reflecting a lack of readily available out-of-class options at the time of clinical decision making.
Late-Onset Wilson Disease: A Diagnostic Dilemma Reported
Robert Mitchell, Hin Hin Ko

BACKGROUND: This abstract presents a case of late-onset Wilson disease in a patient with biopsy showing non-alcoholic fatty liver disease (NAFLD).

OBJECTIVE: Describe a case of Wilson disease in an older adult with NAFLD.

METHODS: This case report is based on retrospective chart review.

RESULTS: This report presents an obese 53 year-old Chinese woman with a history of ulcerative colitis, who was found to have transaminits during routine blood work. Work up for abnormal liver enzymes was negative apart from low serum ceruloplasm (<0.08 g/L). She was also found to have elevated cholesterol and triglyceride levels. Abdominal ultrasound showed moderate fatty infiltration of the liver. 24-hour urine copper excretion was done and was found to be elevated (1.69 umol/d).

Given her high urine copper excretion, she was further worked up for Wilson disease. Slit-lamp examination did not show any evidence of Kayser-Fleischer rings. She then underwent a liver biopsy that showed features consistent with moderate steatohepatitis suspicious for, but not diagnostic of Wilson disease. Hepatic parenchymal quantification of copper demonstrated a tissue copper dry weight of 4.42 umol/g, consistent with the diagnosis of Wilson disease. The patient was given a diagnosis of Wilson Disease and non-alcoholic fatty liver disease (NALFD).

Subsequent MRI revealed no central nervous system involvement of Wilson disease. The patient was started on penicillamine at 750mg and further counselled on weight loss strategies.

CONCLUSIONS: Wilson disease is classically described as a disease of children and young adults. This case presents a diagnostic dilemma and approach to the diagnosis of Wilson disease in an older patient with a history, physical exam and other findings consistent with NAFLD. The most frequently observed histological abnormality in patients with Wilson disease is steatohepatitis, which is also seen in NAFLD.

Characteristics Associated With Hepatitis C Monitoring Among HIV/HCV Coinfected Active Illicit Drug Users
L. Cloutier-Gill, E. Wood, T. Kerr, J. Montaner, M.-J. Milloy

BACKGROUND: Co-infection with hepatitis C virus (HCV) and HIV is common, given their shared link to injection drug use, and is associated with high rates of morbidity and mortality. Inappropriate follow-up of HCV infection among people living with HIV/AIDS can occur. However, factors that lead to HCV monitoring among the HIV-positive illicit drug users population are not known.

METHODS: We accessed data from the AIDS Care Cohort to evaluate Exposure to Survival Services (ACCESS), an observational prospective cohort of HIV-positive illicit drug users, to determine what characteristics are associated with HCV disease monitoring. The outcome of interest was self-report of receiving HCV-related bloodwork, biopsy or ultrasound in the previous six months. We used multivariable generalized estimating equations to identify longitudinal factors associated with receiving HCV-related follow-up over the study period.

RESULTS: Between December 2005 and June 2014, 432 HIV- and HCV-positive active illicit drug users were recruited and contributed to 2056 interviews. Among these, 1250 (61%) contained a report of recent HCV-related follow-up from 374 (87%) of participants. Multivariable analysis showed that receipt of HIV antiretroviral therapy for at least a day in the last six months (adjusted odds ratio [AOR] = 2.40, 95% Confidence Interval [95% CI]: 1.78-3.22), reporting HCV symptoms (AOR = 1.47, 95% CI: 1.20-1.81), methadone maintenance therapy (AOR = 1.41, 95% CI: 1.14-1.74) and older age (AOR 1.02 per additional year, 95% CI: 1.00-1.03) were associated with a greater chance of HCV monitoring.

CONCLUSIONS: We observed that a majority of HIV-positive illicit drug users co-infected with HCV received regular monitoring for HCV-related morbidity during the study period. Factors associated with monitoring included engagement in treatment for addiction and for HIV/AIDS. Knowing which factors lead to HCV monitoring, and subsequently protect individuals from severe liver complications, could guide public health interventions.
Repeat Endoscopic Ultrasound Guided Fine Needle Aspiration in Patients with Suspected Pancreatic Cancer: Diagnostic Yield and Associated Change in Access to Appropriate Care
Robert Mitchell, Dylan Stanger, Constantin Shuster, Jennifer Telford, Eric Lam, Robert Enns

BACKGROUND: There is a high incidence of inconclusive cytopathology at initial EUS-FNA (Endoscopic ultrasound-guided fine needle aspiration) for suspected malignant pancreatic lesions. To obtain appropriate preoperative or palliative chemotherapy for pancreatic cancer, diagnostic cytopathology is often required. The utility of repeat EUS-FNA to obtain diagnostic cytopathology is unknown.

OBJECTIVE: This study aimed to report the outcomes of repeat EUS-FNA for Canadian patients with suspected pancreatic cancer and to evaluate how access to therapies for pancreatic cancer are influenced by a repeat procedure.

METHODS: A retrospective cohort study was conducted evaluating the yield of repeat EUS-FNA in determining a cytological diagnosis in patients who had undergone a prior EUS-FNA of suspected malignant pancreatic lesions with inconclusive cytopathology. The wait-time to the second procedure and to decisions regarding therapy were calculated.

RESULTS: 45 repeat EUS-FNA procedures were performed over a 7 year period for suspected malignant pancreatic lesions. The cumulative yield after repeat EUS-FNA for definite pancreatic adenocarcinoma seven (16%). Cytopathological class changed between first and second FNA in 30 patients (67%). Treatment was offered to 16 patients (36%) at similar rates in patients with and without cytopathology diagnostic of malignancy (40% vs 34%, p=0.73). The mean time interval between first and second EUS-FNA was 43 (±36) days. During the study period, 27 patients died (60%), and the mean time from referral to death was 574 (± 559) days.

CONCLUSIONS: This study showed that a substantial number of patients had a definitive diagnosis of adenocarcinoma on repeat FNA. In many patients, this facilitated access to care, but at an equal rate to patients without diagnostic cytopathology on repeat procedure.

CRUS Control: A Retrospective Analysis of a Canadian Rheumatology Ultrasound Clinic
Mohammad Bardi, Kamran Shojania, Jason Kur, John Watterson, Megan Hiltz, Kiran Manhas, Johannes Roth, Eric Sayre, Linda Li, Cameron Oliver, David Collins

BACKGROUND: Point of care ultrasound (POCUS) has become increasingly recognized in diagnosing and assessing response to treatment in rheumatic disease. The use of POCUS by Canadian Rheumatologists has historically lagged behind many other countries.

OBJECTIVE: The aim of this study is to demonstrate proof that a Canadian Rheumatology MSK US clinic provides value by impacting the diagnostic and therapeutic management of patients.

METHODS: Data Source and Study Design: A retrospective analysis of electronic medical records of patients referred to Dr Collins’ Rheumatology MSK US clinic in Vancouver, BC. 156 patients (64% female), with a mean age 53 (range 20 - 88) were seen at the MSK US clinic between May 2014 and June 2015. Referred patients had been assessed by their primary Rheumatologist and given a diagnosis. Referrals were to assess the presence of inflammatory arthritis, response to treatments or for joint aspiration/injections.

Patients had focused ultrasound exams to assess for inflammation, crystal arthropathy, joint damage or presence of osteophytes. This information, taken with the clinical context guided management suggestions to either escalate, reduce or to not alter therapy.

ANALYSIS: Frequency tables assessed reasons for referral, existing diagnoses, findings on ultrasound exam and how assessment impacted diagnosis and management. For diagnostic dilemmas we tested via 1-sided exact binomial test versus 50% with significant P-values.

RESULTS: When selectively used by Rheumatologists POCUS actually resulted in a change of diagnosis 55% of the time. POCUS was able to resolve diagnostic dilemmas 79% (p<0.001) of the time. For assessing and monitoring disease activity in inflammatory arthritis a change in management was recommended 56% of the time with 43% of those being escalations and 14% de-escalations.
Effectiveness of a Weekly Text Messaging Intervention to Improve Medication Adherence and HIV Viral Load in Vulnerable Canadian Populations

BACKGROUND: Antiretroviral therapy (ART) improves health outcomes for those living with HIV, but its effectiveness is limited by poor medication adherence, particularly in high risk populations. In a randomized control trial by Lester et al, a weekly text messaging intervention called WelT el improved ART adherence and HIV viral load (VL) suppression in patients with HIV.

OBJECTIVE: The aim of our study was to use the WelT el model in a cohort of vulnerable North American patients to evaluate its effect on ART adherence and HIV VL.

METHODS: We conducted a prospective cohort study following high risk patients at the Oak Tree Clinic in Vancouver, BC for 12 months. Participants were supplied a mobile phone with unlimited texting capability and received a weekly text message according to WelTel protocol. Demographic and clinical data were collected for the year preceding the study (control) and the year of the intervention. Repeated measures mixed-effect regressions were used to assess the effect of the text messaging intervention on primary and secondary patient outcomes.

RESULTS: Eighty-five participants were enrolled in this study, of which four patients withdrew for personal reasons. The population was predominantly female (90.1%) with a median age of 39 years. The cohort had a wide range of vulnerabilities which included substance abuse (28.4%), psychiatric illness (48.1%), and ART non-adherence (54.3%). Mean HIV VL was found to significantly decrease during the study period from 800 copies/mL in the control year to 400 copies/mL in the intervention year (p-value 0.015). ART adherence significantly improved from control to intervention year (67.1 to 70.0%; p-value < 0.0001), while appointment engagement decreased during the study period (52.3% to 47.0%; p-value 0.034). Overall this study suggests that introduction of an interactive text-messaging tool may result in decreased HIV VLs and improved ART adherence in high-risk Canadian populations.

Frailty as a predictor of functional stability in older patients undergoing transcatheter aortic valve replacement (TAVR)
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BACKGROUND: The management of aortic stenosis by transcatheter aortic valve replacement has well documented medical outcomes. However, there is limited data on functional outcomes. Transcatheter aortic valve replacement (TAVR) is a minimally invasive procedure that avoids sternotomy and cardiopulmonary bypass. TAVR is the standard of care in higher surgical risk patients. The TAVR population is primarily elderly, more frail than surgical patients, and burdened with multiple other comorbidities.

Our hypothesis is that TAVR procedure is not associated with significant functional decline and that preoperative frailty will be a predictor of functional and medical outcomes at one month and one year post-operatively.

METHODS: Our study is a retrospective data review of patients with symptomatic, severe aortic stenosis with prohibitive or very high surgical risk who were selected to undergo TAVR between June 2012 and November 2015 at Vancouver General Hospital and Saint Paul’s Hospital. Data was recorded in an administrative data base. Pre-morbid status, intraoperative events, and post-operative outcomes have been collected as part of usual care.

Our primary endpoint is functional stability following TAVR procedure, based on post-operative activities of daily living and gait -speed recorded at 30 days and 12 months. Secondary outcomes are hospital re-admissions and mortality at 12 months post-operatively. Subjects serve as their own controls with their pre-operative measures.

Preoperative indices and peri-procedure characteristics will be investigated as predictors of postoperative outcomes.

RESULTS: Our results are pending.

DISCUSSION: This study will add to the growing body of literature on the impact of frailty on surgical outcomes.

CONCLUSIONS: Our conclusions will depend on our results.
Mineralocorticoid receptor antagonist utilization in eligible patients post ST-elevation myocardial infarction


BACKGROUND: Mineralocorticoid receptor antagonists (MRAs) have been demonstrated to reduce the morbidity and mortality when used in patients with reduced left ventricular ejection fraction (LVEF) post myocardial infarction (MI). Current Canadian guidelines recommend the initiation of an MRA in patients post MI with an LVEF of M40% and documented heart failure or diabetes before hospital discharge, in the absence of any contraindications.

OBJECTIVE: The objective of this study was to examine if discrepancies between guideline-based therapy and actual prescribing rates exists in the prescription of MRAs in acute ST-elevation myocardial infarction (STEMI) patients.

METHODS: We conducted a retrospective analysis of consecutive patients enrolled in the Fraser Health Authority (FHA) and Vancouver Coastal Health (VCH) STEMI registry between March 2007 and September 2015, to determine the utilization rates of MRAs in eligible patients. Inclusion criteria were based on those originally outlined in the EPHESUS trial, which included an LVEF ≤40% and documented heart failure or history of diabetes. Patients on dialysis or with a serum Cr >221 were excluded.

RESULTS: A total of 7987 patients had a STEMI during the study period. Of these, 409 (5.1%) patients were determined to be eligible for MRA prescription at discharge. Of those eligible patients 40 (9.8%) were prescribed an MRA at discharge. Baseline characteristics between those patients that received an MRA at discharge versus those that did not, were similar. There were higher rates of hypertension and dyslipidemia in patients that received an MRA. Adherence to other evidence based practice guidelines was high in both patient populations. Patients, who received an MRA at discharge, were also more likely to receive an ACEi or ARB. The temporal trend in prescription patterns remains low with an 8-year prescription rate of MRAs at 11.36%.

CONCLUSIONS: Despite the endorsement and Class IA recommendation for the use of MRAs in this patient population, our study demonstrates that the majority of patients are not prescribed an MRA after STEMI. This demonstrates a large care gap between evidence based guidelines and clinical practice. The reasons for this discrepancy in practice patterns are unclear and will be the focus of further study. Further strategies are urgently needed to address this care gap.

Genotype-Phenotype Correlations in Catecholaminergic Polymorphic Ventricular Tachycardia: An Analysis of the Genetic Predictors of Life-threatening Cardiac Events from an International Multicenter Registry

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BACKGROUND: Catecholaminergic polymorphic ventricular tachycardia (CPVT) is a genetic ion channelopathy characterized by ventricular tachycardia and sudden cardiac arrest (SCA) during exertion or stress. Mutations in the Ryanodine Receptor-2 (RyR2) and Calsequestrin-2 (CASQ2) genes underlie most cases; however, approximately half of patients are genotype-elusive. RyR2 variants typically cluster to one of 4 “hotspot” domains. Limited data suggest that genotype may predict phenotype in CPVT.

OBJECTIVE: To characterize the phenotypic spectrum of CPVT and genetic predictors of life-threatening events (LTE).

METHODS: A multicentre, retrospective study was undertaken through the Pediatric and Congenital Electrophysiology Society. Children with CPVT aged <19 years and their first-degree affected relatives were enrolled by participating centres. LTE were defined as arrhythmic syncope and/or SCA. Variable penetrance was defined by the presence of UI asymptomatic subject(s) and UI subject(s) with LTE in a family. Variant locations were predicted based on a 3D structural model.

RESULTS: Genetic testing occurred in 194 of 236 subjects (82%) during 3.5 (1.4-5.3) years of follow-up. Most (60%) had a RyR2 variant. All hotspot 1 variants at the intersubunit interface led to SCA. Hotspot 3 variants increased the risk of SCA (p=0.026) and hotspots 3 and 4 were associated with syncope (p=0.035). C-terminal variants were also associated with syncope (p=0.014) while SCA frequently occurred in patients with mutations at S4–S5 linker and helices S5 and S6 of the C-terminus. Most LTE occurred during exertion or emotional stress (74%); however, approximately one quarter occurred during normal activities. A total of 79 patients made up 32 families with CPVT, including 23 RyR2-positive pedigrees (72%). Genetic penetrance was variable in 41% of families. Traditional homozygous CASQ2-related CPVT occurred in 4 subjects, while heterozygous CASQ2 variants were found in 5 cases. In conclusion, we identify genetic predictors of LTE in CPVT including localization of RyR2 variants to the C-terminal region and the intersubunit area of hotspot 1. In contrast to existing data, LTE often occur during rest. Family screening often reveals genotype-positive, asymptomatic cases, and variable expressivity is common. A novel form of mild CPVT may exist in heterozygous carriers of CASQ2 variants.
Therapeutic Drug Monitoring in Tuberculosis Treatment: A systematic review and meta-analysis
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BACKGROUND: A small proportion of TB patients are reported to have unsuccessful outcomes despite fully sensitive disease and appropriate treatment. Inadequate exposure to anti-TB drugs may constitute one of the factors underlying suboptimal treatment response. Therapeutic drug monitoring (TDM) may improve TB treatment outcomes, but there is little evidence to guide TDM in clinical practice.

OBJECTIVE: To perform a systematic review and meta-analysis to summarize existing literature for TDM in first-line drugs.

Methods: A systematic review and meta-analysis of the literature for TDM in first-line drugs.

RESULTS: We identified 41 studies that reported 2-hour post-dose drug concentrations (C2hr) for first-line drugs and 12 studies that reported clinical outcomes. We pooled data by study quality, design, region, dosing modality and patient characteristics.

The pooled proportion of subjects with low isoniazid C2hr was 0.43 (95% CI 0.32-0.55), while 0.67 (95% CI 0.60-0.74) had low rifampin C2hr, 0.27 (95% CI: 0.17-0.38) had low ethambutol C2hr, and 0.12 (95% CI: 0.07-0.19) had low pyrazinamide C2hr. Patients with diabetes had a non-significant increase in the proportion of subjects with low C2hr levels across all four drugs. Only 3 of 12 studies that examined clinical outcomes demonstrated an association between low C2hr and unsuccessful treatment outcome.

CONCLUSION: Across a wide variety of studies, a high proportion of patients undergoing first-line TB therapy had 2-hour drug concentrations below the accepted normal threshold. These findings point to a discrepancy between accepted 2-hour TDM thresholds and TB drug dosing recommendations.

Use of non-invasive mechanical ventilation for asthma in the United States: a national retrospective cohort analysis
Dr. Alexandra Bond

BACKGROUND: Responsible for millions of hospitalizations annually, asthma is a common chronic disease characterized by reversible airflow obstruction and airway inflammation. The role of non-invasive mechanical ventilation (NIMV) in the treatment of asthma exacerbations is not well defined due to limited validating evidence. Therefore, the use of NIMV in asthma remains relatively uncommon.

OBJECTIVE: The purpose of this study is to investigate the use of noninvasive mechanical ventilation in patients with acute asthma exacerbations hospitalized across the United States, using a Nationwide Inpatient Sample.

METHODS: For this analysis the Nationwide Inpatient Samples (NIS) from 2006-2012 were utilized. Patients κ18 years of age with a primary diagnosis of asthma exacerbation were extracted from the NIS and isolated according to ICD9 codes to capture the use of mechanical ventilation and non-noninvasive mechanical ventilation. Patient variables obtained from the dataset included: age, length of stay, gender, in-hospital mortality, race, and zip-code income quartile. Hospital characteristics collected included bed-size, location, and region of the country. Univariate analysis was by chi-squared and independent t-tests where appropriate, and an alpha level of 0.05 was used in all cases.

RESULTS: There were 405,802 patients admitted who had an asthma exacerbation as a primary diagnosis. Of these, 6448 (1.6%) underwent invasive mechanical ventilation and 12,522 (3.1%) received non-invasive mechanical ventilation. The utilization of NIMV increased from 1.26% in 2006 to 3.5% in 2012, a relative increase of 178%. Rates of MV remained constant during the study period, from 1.23% in 2006 to 1.79% in 2012.

CONCLUSION: There has been a significant increase in the utilization of NIMV for patients with acute asthma exacerbations in the United States whereas the use of MV has remained constant.
Novel Gene Mutation for Resistance to Thyroid Hormone May Be Associated With Atrial Fibrillation
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BACKGROUND: Resistance to thyroid hormone (RTH) is an uncommon cause of elevated TSH and thyroxine levels that manifests with both symptoms of hypo- and hyperthyroxinemia most commonly due to variable tissue resistance to triiodothyronine on the thyroid hormone receptor beta (THRβ). Sinus tachycardia is present in 16-94% of patients; however, atrial fibrillation (AF) is only reported in two series at an incidence of 6%.

CLINICAL CASE: A 41 year-old female from Bosnia was treated for hyperthyroidism with Favistan in 1992 for high total T4 of 204 nmol/L (n 69-141). She discontinued treatment in 1997 upon becoming pregnant with "normal thyroid tests". In Canada in 2008 she presented with goiter, tremor, elevated free T4 of 43 pmol/L (n 11-22) and TSH of 1.15 mU/L (n 0.3-5.5). RAIU showed 23% and 42% uptake. TSH-secreting adenoma excluded with normal alphaglycoprotein subunit and normal pituitary MRI. Binding protein abnormalities excluded by equilibrium dialysis. RTH diagnosed through PCR amplification of the THRβ gene showing a novel mutation of c.1322 A>C (p.His441Pro) in the thyroid receptor binding gene variant in exon 10. In 2014 she developed AF and a transient ischemic attack initially treated with procainamide and apixaban. Echocardiogram and exercise stress test were normal with no risk factors for AF. She was given methimazole; however stopped to trial an herbal preparation. Her palpitations were successfully treated with atenolol.

CONCLUSION: We report RTH and a novel mutation of the THRβ gene with development of AF in the absence of other risk factors. Although direct causation between specific mutations and AF has not been proven, this case adds to the growing literature on cardiac manifestations of RTH.

Retrospective Study of Progression of Diabetic Retinopathy during Pregnancy in Type 1 Diabetes
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BACKGROUND: Pregnancy and poor glucose control are associated with progression of retinopathy. It is not clear if rapid improvement in glucose control in early pregnancy further increases this risk.

OBJECTIVE: Our objective was to determine if rapid drop in HbA1c was associated with an increased risk of progression of diabetic retinopathy (DR) in pregnant patients with Type 1 Diabetes (T1DM).

METHODS: This was a retrospective study of 176 women with T1DM who delivered at BC Women's hospital between December 1999 and March 2015. Eligible patients had an HbA1c measurement and ophthalmology assessment either immediately before pregnancy or in the first trimester at 4 ± 7 weeks (mean ± standard deviation) gestational age (GA) and repeated at 25 ± 6 weeks. Retinopathy was assessed by 2 ophthalmologists and progression defined as an increase by 1 or more steps on the International Clinical Diabetic Retinopathy Scale. The patients were on average age 26 ± 1.3 ± 3 years with T1DM. The mean initial HbA1c was 7.2% ± 2.5 (range 4.2 to 12.5%).

RESULTS: Out of 173 patients, 55 had progression of DR and 118 did not. To examine if baseline glucose control affected the risk of progression, we defined poor control as entry A1c > 8.0 % and good control as ≤ 8.0%. Progression occurred in 57.5 % of patients in poor control compared with 28.5% with good control and this difference did not reach statistical significance (p = 0.11). The severity of baseline retinopathy also did not correlate with risk of progression. Progression of retinopathy occurred in 25% with mild or no DR compared with 30% in those with moderate or greater DR (p=0.217). We then examined if rapid improvement in blood glucose control, defined as a drop in A1c of >1% from baseline, affected the risk of progression. Progression occurred in 52.7% of those who had a rapid drop in A1c compared with 25% who did not quickly lower their A1c and this difference was highly significant (p = .0005). We conclude that a rapid lowering of A1c in early pregnancy is associated with an increased risk of progression of diabetic retinopathy.
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