Poster Tours

Thursday, February 9, 2023
3:00 PM-3:30 PM ET

Poster Tour 1: Rheumatoid Arthritis (live-stream)

TOUR01
Sex Differences in Employment Outcomes in Patients with Recent Onset Rheumatoid Arthritis
Carol Hitchon (University of Manitoba, Winnipeg); Marie-France Valois (McGill University, Montreal); Orit Schieir (McGill University, Montreal); Susan Bartlett (McGill University & Research Institute MUHC, Montreal); Louis Bessette (Laval University and CHU de Québec, Quebec); Gilles Boire (Université de Sherbrooke, Sherbrooke); Glen Hazlewood (University of Calgary, Calgary); Edward Keystone (University of Toronto, Toronto); Carter Thorne (The Arthritis Program Research Group, Newmarket); Janet Pope (University of Western Ontario, London); Diane Tin (Southlake Regional Health Centre, Newmarket); Vivian Bykerk (Hospital for Special Surgery, New York); CATCH Canadian Early Arthritis Cohort Investigators (Toronto)
Objectives: To describe sex differences in work status and work productivity over time in newly diagnosed RA patients and to identify factors associated with work cessation.
Methods: Between November 2011 to March 2020, 945 early RA patients (<1 year of symptoms at baseline) reported work status (employed or not-employed), reasons for stopping work (RA, retirement, other) and work productivity [Work Productivity and Activity Index (WPAI)] annually over the first five years of follow-up. WPAI scores for overall work productivity loss, absenteeism (time away from work), presenteeism (reduced productivity at work) and general activity are expressed as impairment percentages (%) with higher numbers indicating greater impairment and less productivity. GEE regression models estimated associations of sociodemographic and disease-related variables with stopping work due to RA or early retirement (retiring before age 65). Analyses were stratified by sex. Odds ratio (OR) and 95% confidence intervals are reported.
Results: At baseline 479 (51%) were employed (131/278 males; 348/667 females). Of those not working at baseline, 2% had stopped working due to RA, 62% were retired and 36% had stopped working for other reasons. At baseline, participants reported mean 39.2% overall work impairment, mean 8.5% absenteeism, and mean 36.5% presenteeism. WPAI scores improved during followup and were similar for males and females (Figure). Of those employed at baseline, 14% (47 females, 20 men) stopped working due to RA or retired early during the first 5 years of follow-up. Only 12 (29%) of those who stopped working due to RA returned to work (8/17 males 47%; 4/24 females 17%). Factors associated with stopping work due to RA or retiring early were for females age (OR 1.31; 1.16, 1.45), whereas previous visit pain (OR 0.9; 0.82, 0.99), oral steroid use (OR 0.38; 0.15, 0.92) and worse mental health RAND-12 mental health t-score increase of 5 (OR 0.87; 0.77, 0.97) reduced work stoppage. For males, stopping work was associated with previous visit pain (OR 1.31; 1.01,1.70) whereas increased household size of one other (OR 0.22; 0.05, 0.95), and mental health (OR 0.79; 0.63,0.99) reduced work loss.
Conclusion: Impairments with work and leisure activities improve over time but plateau. Sex differences between RA patients that stop vs continue work are driven by age, household size,

pain and mental health. Females that stop working due to RA are less likely than men to return to work. Interventions to optimize continued engagement in work may improve productivity outcomes for RA patients and their employers.

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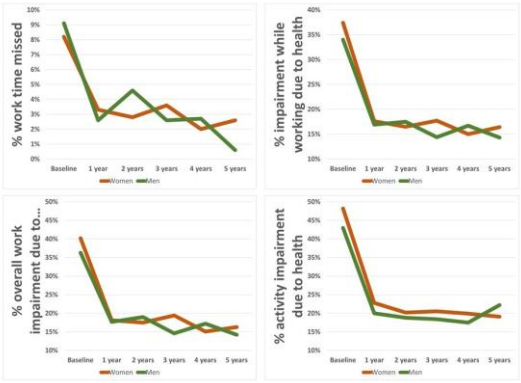

TOUR02

Using Administrative Health Data to Construct a Frailty Index as a Measure of Susceptibility to Adverse Health Outcomes Among Individuals Living With Rheumatoid Arthritis

Alexandra Legge (Dalhousie University, Halifax); Diane Lacaille (Arthritis Research Canada, University of British Columbia, Vancouver)

Objectives: Frailty defines a state of increased vulnerability due to the degradation of homeostatic mechanisms. It can be identified using a frailty index (FI), which conceptualizes frailty as a loss of physiologic reserve arising from the gradual accumulation of health deficits across multiple domains. Our aim was to develop and evaluate an FI for individuals living with rheumatoid arthritis (RA) using administrative health data.

Methods: We conducted a population-based cohort study using administrative health data for British Columbia from 1990-2018. A previously validated case definition based on physician billing data was used to assemble an incident cohort of all RA cases with onset from 1996-2008. The baseline date for FI derivation was defined as 5 years after RA index date. We randomly sampled 50% of the cohort for FI derivation, while the remaining 50% was used for FI validation. Health deficits for the FI were selected using published criteria. First, 101 candidate variables were identified via literature review and evaluated in the derivation cohort for feasibility, prevalence, and age-relatedness. Next, 60 eligible variables were evaluated by an expert panel in a modified Delphi consensus process. Forty variables met all required criteria for inclusion. Each deficit was scored from 0 (absent) to 1 (present) and individual scores were summed to produce an FI score for each patient. We evaluated the association between baseline FI scores (measured using data for the preceding 3 years) and health outcomes during follow-up (from baseline date until the earliest occurrence of death, leaving the province, or study end date). Mortality risk was modelled using Cox regression, while negative binomial regression was used to model rates of acute care hospitalizations and emergency department (ED) visits. Predictive accuracy of the FI was compared to the Romano version of the Charlson comorbidity index (CCI).

Results: Baseline characteristics were similar in the derivation (n=16093) and validation (n=16092) cohorts (data not shown). In both cohorts, baseline FI scores were associated with

increased mortality risk and higher rates of hospitalizations and ED visits during follow-up. [Table 1] The FI was similar to the Romano CCI for predicting mortality risk, but superior for predicting rates of future hospitalizations and ED visits. The FI improved outcome prediction when added to models that already included available demographic variables and the Romano CCI.

Conclusion: The FI is a promising tool for understanding the impact of frailty on the risk of adverse health outcomes among individuals living with RA.

TOUR03

Risk Factors and Clinical Outcomes Associated with Sarcopenia in Rheumatoid Arthritis: A Systematic Review and Meta Analysis

Keith Tam (McMaster University, Hamilton); Matthew Wong-Pack (University of Toronto, Toronto); Theodore Liu (McMaster University, Hamilton); Jonathan Adachi (St. Joseph's Healthcare, McMaster University, Hamilton); Arthur Lau (McMaster University, St. Joseph's Healthcare, Hamilton); Jinhui Ma (McMaster University, Hamilton); Alexandra Papaioannou (Hamilton Health Sciences, Hamilton); Isabel Rodrigues (Hamilton Health Sciences, Hamilton)

Objectives: Sarcopenia, an important risk factor for adverse outcomes, 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: We conducted this review in accordance with 2020 PRISMA guidelines. 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. Risk of bias assessments were completed using the Newcastle-Ottawa Scales for observational studies. Studies which used the same definition for sarcopenia and shared consistency in reporting of patient or disease variables were analyzed using random effects meta-analysis.

Results: We identified 3602 articles, and after duplicates were removed, 2636 articles were included for screening. We excluded 2541 articles in the title and abstract screen and 79 articles in the full-text review, resulting in 16 articles being included for final analysis. All studies had observational study designs. The pooled prevalence of sarcopenia ranged from 24% to 56%, depending on the consensus definition used. Factors associated with sarcopenia included higher Disease Activity Score-28 (+0.39 score, 95% CI +0.02 to +0.77) and baseline methotrexate use (odds ratio 0.70, 95% CI 0.51 to 0.97). Baseline glucocorticoid use had a positive correlation with sarcopenia in multiple studies. Hand grip strength and gait speed were lower among patients with sarcopenia. Several studies found lower bone mineral density (BMD), higher prevalence of vertebral fractures, and higher incidence of falls among patients with RA and sarcopenia.

Conclusion: RA patients have a high risk of developing sarcopenia. Higher RA disease activity and baseline glucocorticoid use may be risk factors for developing sarcopenia, while methotrexate use may be protective. While more research is needed to assess clinical outcomes associated with sarcopenia in RA, there is some evidence to suggest lower BMD and increased rates of falls and fractures in sarcopenic patients. As a result, early screening of sarcopenia in RA patients is important to incorporate into clinical rheumatology practice.

TOUR04

Impact of the COVID-19 Pandemic on Patients with Rheumatoid Arthritis: Data from the Ontario Best Practices Research Initiative (OBRI)

Matthew Wong-Pack (University of Toronto, Toronto); Elliot Hepworth (Division of Rheumatology, Department of Medicine, University of Ottawa, Ottawa ON, Ottawa); Mohammad Movahedi (University Health Network, Toronto); Bindee Kuriya (Sinai Health System, University of Toronto, Toronto); Janet Pope (University of Western Ontario, London); Edward Keystone (University of Toronto, Toronto); Carter Thorne (The Arthritis Program Research Group, Newmarket); Vandana Ahluwalia (William Osler Health System, Ontario Rheumatology Association, Brampton); Angela Cesta (University Health Network, Toronto); Carol Mously (University Health Network, Toronto); Claire Bombardier (University of Toronto, Toronto); Arthur Lau (McMaster University, St. Joseph's Healthcare, Hamilton); Sibel Aydin (Ottawa Hospital Research Institute, University of Ottawa, Ottawa)

Objectives: The COVID-19 Pandemic created challenges for patients with rheumatoid arthritis (RA), including accessing the health care system, transitioning to unplanned virtual care, reduction in physical activity, and management of disease activity. Our study examined the impact of the pandemic on RA patients reported outcomes (PROs), disease activity (DA) and medication profiles before and after the pandemic.

Methods: The Ontario Best Practices Research Initiative (OBRI) is an observational cohort of adult patients with active RA. We defined two study periods of one-year duration each: (1) a pre-COVID-19 pandemic phase (12 months before March 15th, 2020) and (2) a COVID-19 pandemic phase (12 months after March 15th 2020). Patients enrolled in OBRI were included if they had at least one visit with a physician or interviewer (virtually) in both study periods. Baseline characteristics, disease activity (DA), as well as other PROs (i.e. Health Assessment Questionnaire Disability Index, Rheumatoid Arthritis Disease Activity Index, EuroQoL- 5 Dimension Questionnaire, and medication use/changes) were included. Paired two-sample t-test and McNamar's test were performed for continuous and categorical variables, respectively.

Results: We identified 1508 patients (mean age = 62.7, 79.3% female). Table 1 outline changes in disease activity measures and PROs, respectively. During the first year of the pandemic, the number of physician visits per patient increased by a mean of 0.21 visits (SD:1.51) ($p < 0.0001$). Despite the patient global and physician global assessments and composite DA scores being similar before and after the pandemic, swollen joint count (SJC) and tender joint counts (TJC) showed improvement during the pandemic (differences of -0.49 (3.04), $p < 0.0001$ and -0.40 (3.73), $p < 0.003$ respectively). Similar improvements were observed in PROs, such as RADAI (-0.17 (1.40), $p = 0.002$) and fatigue (-0.48 (2.42), $p < 0.0001$). There were also statistically significant changes in treatment during the pandemic with decreased biologic (32.6% vs 29.9%; $p=0.002$) and conventional synthetic DMARDs use (83.3% vs 79.5%; $p< 0.0001$), while prescription of targeted synthetic DMARDs increased during the pandemic (12.1% vs 15.4%; $p< 0.0001$).

Conclusion: Disease activity and treatments for RA changed during the pandemic. Improvements in PROs may be explained by changes in patients' lifestyles, such as being able to work from home. Changes in medication profiles may relate to preferring oral agents or those with shorter half-life given the concern of immunosuppression. Future work is needed to determine if these changes persist and what implications they may have beyond the pandemic.

Poster Tour 2: CIORA/Choosing wisely

TOUR05

Utilization of a new educational platform designed to improve the care of cancer patients receiving immunotherapy: An Initiative of CanRIO (Canadian Research Group of Rheumatology in Immuno-Oncology)

Nicole Beckett (Dalhousie University, Halifax); Carrie Ye (University of Alberta, Edmonton); Daniel Ennis (University of British Columbia, Vancouver); Marie Hudson (McGill University, Jewish General Hospital, Lady Davis Institute for Medical Research, Montreal); Shahin Jamal (Division of Rheumatology, University of British Columbia, Vancouver); Steven Katz (University of Alberta, Edmonton); Nancy Maltez (University of Ottawa, Ottawa); Janet Roberts (Division of Rheumatology, Dalhousie University, Dartmouth)

Objectives: Immunotherapy has revolutionized treatment of many advanced stage malignancies by harnessing the immune system to fight cancer. Use of these agents can lead to many off-target effects known as immune-related adverse events (irAE). The management of patients with rheumatic immune-related adverse events (Rh-irAE) as well as cancer patients with pre-existing rheumatic disease (PRD) is challenging in the face of limited guiding-evidence. This is a rapidly evolving area of medicine where many rheumatologists lack experience, knowledge, and confidence. To improve the knowledge of health care providers on two specific patient populations (i) cancer patients who develop de-novo Rh-irAE and (ii) patients with PRD being treated with immunotherapy by developing an educational platform that facilitates cross discipline and region collaboration and supports healthcare providers caring for these patients to ensure educational resources are available and easily accessible. Here we assess the utilization of this platform.

Methods: We developed an educational platform (www.canrio.ca) to house multiple tools to facilitate knowledge acquisition and transfer including a) case-based learning modules (with pre and post module questionnaires) b) interactive bi-monthly case rounds c) up-to-date compilation of relevant research publications d) patient resources including drug information handouts e) healthcare provider resources including Rh-irAE specific handouts d) list of rheumatologists specializing in this field in Canada. Google Analytics is embedded within the www.canrio.ca website and was used to track website traffic since the website's inception in February of 2021.

Results: Between February 2021 and October 2022, 1431 users from 47 different countries accessed the www.canrio.ca website. The top three countries from which users accessed the site were Canada, China and the United States (Figure 1). The most accessed website pages included the homepage and login (1,739), case rounds (477), learning modules (307), doctors and clinics (243). Ninty-one people registered for case rounds; 41% rheumatologists, 43% trainees (rheumatology, oncology, internal medicine and neurology), 9% oncologists and 7% other (research coordinators, pharmacists).

Conclusion: As the use of immunotherapy increases, rheumatologists across Canada and the world will be increasingly called upon to co-manage these patients in partnership with oncologists and other healthcare providers. There is a need for further education in this rapidly evolving field of medicine and this educational program has been able to reach users not only in Canada, but all over the world. Future initiatives would be to facilitate international collaboration through case rounds, adding and updating resources, and specifically targeting an international audience. **Supported by CIORA grant**

TOUR06

Preparing for a Shared-Care Model: what Proportion of Patients with Stable Rheumatoid Arthritis could be Followed in Primary Care?

Shakeel Subdar (University of Toronto, Toronto); Kiran Dhiman (University of Calgary, Calgary); Nicole M. S. Hartfeld (University of Calgary, Calgary); Diane Lacaille (Arthritis Research Canada, University of British Columbia, Vancouver); Alison M. Hoens (University of British Columbia/Arthritis Research Canada, Vancouver); Glen Hazlewood (University of Calgary, Calgary); Rick Ward (University of Calgary, Calgary); Elena Lopatina (University of Calgary, Calgary); Megan R.W. Barber (University of Calgary, Calgary); Sarah Manske (University of Calgary, Calgary); Leah Phillips (Alberta College of Family Physicians, Edmonton); Paul MacMullan (University of Calgary, Calgary); Dianne Mosher (University of Calgary, Calgary); Aurore Fifi-Mah (University of Calgary, Calgary); Michelle Jung (University of Calgary, Calgary); Marinka Twilt (Alberta Children's Hospital, Calgary); Nadia Luca (Section of Rheumatology, Department of Paediatrics, Alberta Children's Hospital/University of Calgary, Calgary); Karen Then (University of Calgary, Calgary); Trafford Crump (University of Calgary, Calgary); Kelly Osinski (Alberta Health Services, Calgary); Becky Job (Alberta Health Services, Calgary); Saania Zafar (University of Calgary, Calgary); Gurjeet Bhangu (University of Calgary, Calgary); Claire Barber (University of Calgary/Arthritis Research Canada, Calgary)

Objectives: To determine the proportion of patients with stable rheumatoid arthritis (RA) currently receiving specialist rheumatology care who could be managed with primary care in a shared-care model.

Methods: A retrospective chart review was conducted using a random sample identified from two university-based clinics in Calgary, Alberta. One year of rheumatology chart notes were reviewed (01/03/2021-28/02/2022). Data were extracted for type and frequency of rheumatology visits, disease activity, and visit outcomes (e.g., medication changes). RA was classified as active based on established DAS28 (≥2.6) and CDAI (≥2.9) score parameters or when visit outcomes included a medication change (added, stopped, or switched) or dose change. Patient and visit characteristics and outcomes were summarized descriptively. Patients were deemed appropriate for a shared-care model with management in primary care when RA was inactive for one year on conventional synthetic disease modifying anti-rheumatic drugs (csDMARDs) or no medication.

Results: Records from a total of 334 visits were reviewed from 165 patients (72% female) with RA, 66% (n=81) had seropositive RA. Median age was 65 years (IQR:51-72) and median time in rheumatology care was 8 years (IQR:5-9). Patients had a median of two rheumatologist appointments (IQR:1-3) each. Visits were held in person (70%) more often than by phone (30%). Current treatment was csDMARDs (monotherapy or combination therapy) in 43%, targeted synthetic DMARDs in 14%, biologics in 37%, and no DMARDs in 6%. Over the year, 73/155 (47%) patients had active disease at one or more, representing 119/334 (36%) of visits. Eighty-two patients had inactive disease at all visits, of which 36 were treated with csDMARDs only, and 9 were on no medication. Collectively these patients had 68 visits, with 42% (n=19) having 2+ visits and 58% (n=26) having 1 visit. We estimate that the overall number of rheumatologist follow-up visits could be reduced by 20% if patients who have stable inactive disease, not on medication or solely treated with csDMARDs were managed by their primary care provider.

Conclusion: Current models of care are based on pre-determined scheduled follow-ups which may lead to challenges in accessing care when patients need it most. RA visits could be reduced by approximately 20% by using alternative models of care, such as redirecting stable patients to primary care, thus increasing clinic capacity for new patients or for urgent appointments. Our

work demonstrates an opportunity to rethink models of rheumatology care to use limited resources more efficiently, and improve access to care. **Supported by CIORA grant**

TOUR07

Does Changing Anti-CCP Testing From Restricted Ordering to Open Ordering Change Healthcare Utilization and the Rate of Positive Testing?

Diane Ramsay (Northern Ontario School of Medicine, Thunder Bay); Trudy Taylor (Dalhousie University, Halifax)

Objectives: Rheumatoid arthritis (RA) is the most common type of inflammatory arthritis and if untreated, can cause irreversible joint destruction. The autoantibodies associated with RA are rheumatoid factor (RF) and anti-cyclic citrullinated protein (anti-CCP). Testing these antibodies together can increase diagnostic accuracy. Wait times to see rheumatologists are long, and inability to access testing may delay diagnosis of RA. In Nova Scotia prior to 2015, anti-CCP testing was restricted to rheumatologists. This changed in 2015, and these ordering restrictions were lifted. This study investigated the effect of these changes on anti-CCP ordering.

Methods: Nova Scotia Health (NSH) Laboratory anti-CCP data from January 2010-December 2019 was collected and analyzed for the number of anti-CCP tests pre- and post-restricted ordering, the number of positive and negative results, and the specialty of individuals ordering these tests.

Results: With removal of anti-CCP order restriction, testing increased 66% from 2010-2014 to 2015-2019. Between 2010 and 2019, the number of anti-CCP tests ordered by rheumatologists remained stable, while from 2015 when restricted ordering was removed, the number of anti-CCP tests ordered by other providers increased by 436%. The total number of positive anti-CCP tests ordered between 2010-2014 to 2015-2019 did not increase, while the number of negative anti-CCP tests increased by 191%. In terms of rates of positive tests ordered, 32% of rheumatologist ordered anti-CCP tests from 2015-2019 were positive, while 10% of the tests ordered by other providers in the same time frame were positive.

Conclusion: When ordering restrictions were removed, there was an increase in anti-CCP testing, however there was no increase in the overall rates of positive anti-CCP tests performed in Nova Scotia annually. Access to appropriate testing is important for early diagnosis of RA, and increased testing may result in quicker referrals. However, as testing itself comes with costs to the health care system as well as risks to the patient, the current study shows that more education may be necessary around appropriate anti-CCP ordering. This may help to decrease health care system overuse and unnecessary testing.

TOUR08

Less than Half of Cryoglobulin Tests Ordered at a Tertiary Hospital Network are Successfully Completed: an Opportunity for Improvement

Joo Young (Esther) Lee (McGill University, Division of Experimental Medicine, Montreal); Alexis Baas (McGill University Health Centre, Montreal); Sasha Bernatsky (McGill University Health Centre, Department of Medicine, Division of Rheumatology, Montreal); Évelyne Vinet (Department of Medicine, Division of Rheumatology, McGill University Health Centre, McGill University, Montreal); Arielle Mendel (McGill University Health Centre, Department of Medicine, Division of Rheumatology, Montreal)

Objectives: Cryoglobulin detection is essential for diagnosing cryoglobulinemic vasculitis, a condition leading to high healthcare use, organ damage, and even death. Successful cryoglobulin testing requires specific sample collection, transport, and preparation procedures, leading tests to be cancelled if appropriate conditions are not met. We evaluated factors associated with

unsuccessful (i.e., cancelled by the laboratory) cryoglobulin testing at our institution, and examined the effect of cryoglobulin cancellation on hospital length of stay.
Methods: We extracted data on consecutive cryoglobulin tests ordered at a university-affiliated hospital network (4 adult sites, 1 paediatric) between January 2019-November 2021. We collected patient demographics, year of test, clinical setting where the test was ordered (ambulatory vs. emergency department [ED]/inpatient), hospital site, and whether the testing was ultimately successful. Multivariable logistic regression (using generalized estimating equations) assessed factors associated with cancelled cryoglobulin testing, adjusting for age, sex, year of test, and clinical setting. We determined the most frequent reasons for cryoglobulin cancellation. Within the inpatient sample, we used linear regression to assess the association of cryoglobulin cancellation with hospital length of stay, adjusting for age, sex, hospital site, and whether patient was in intensive care unit at sampling.
Results: Of 761 cryoglobulin tests ordered, 259 (34%) were ordered for inpatients, 387 (51%) for outpatients, and 115 (15%) for ED patients (Table 1). Mean patient age at the time of test ordering was 54.5 years (standard deviation, 18.5), half (n=384) were female, and 197 (26%) were repeated tests for the same patient. Cryoglobulin tests were cancelled 55% of the time overall, and 71% of the time among inpatients. The majority of repeat tests (68%) were ordered within 1 week of a prior cancelled test. In multivariable analyses, cryoglobulins ordered in inpatient/ED settings were more likely to be unsuccessful versus those from outpatients (adjusted odds ratio 5.6, 95% CI 4.1, 7.7). The most frequent reason for cancellation was that the specimen was not received at 37oC/98.6 oF (46%). Among inpatients at the 3 primary adult hospital sites, having a first cryoglobulin test cancelled (versus performed successfully) was associated with a 62% (95% CI, 0.94-161%) increase in hospital length of stay.
Conclusion: At our institution, cryoglobulin tests are cancelled more than half the time they are ordered, potentially leading to delayed diagnoses, repeat blood draws, and longer hospital stay. Optimizing systems of sample collection and transportation to maintain appropriate sample temperature might improve successful testing, saving resources and reducing potentially dangerous diagnostic delays.

Poster Tour 3: Vasculitis

TOUR09
False positive findings of large vessel vasculitis on FDG-PET in patients treated with immune checkpoint inhibitors: A case series
Dylan Johnson (University of Alberta, Edmonton); Shahin Jamal (Division of Rheumatology, University of British Columbia, Vancouver); Ryan Hung (University of Alberta, Edmonton); Carrie Ye (Division of Rheumatology, University of Alberta , Edmonton)
Objectives: FDG-PET is increasingly used in the diagnosis of large-vessel vasculitis (LVV). The ability of FDG-PET to accurately differentiate between LVV vs. physiologic uptake or atherosclerosis is dependent on multiple variables including reader expertise and FDG uptake duration. Cancer patients treated with immune checkpoint inhibitors (ICIs) frequently undergo FDG-PET for monitoring their response to therapy. Findings of vessel-wall uptake in these patients may prompt concerns for ICI-induced LVV. We aim to review the clinical course of three patients treated with ICI with probable false positive findings of LVV on FDG-PET.
Methods: Three cases of probable false positive FDG-PET imaging suggestive of LVV in the

setting of ICI therapy are presented.
Results: Case One: 68-year-old female with stage IIIC melanoma on combination nivolumab and ipilimumab completed in May 2019. In July 2020, a routine FDG-PET scan demonstrated uptake throughout the thoracic aorta. There were no clinical features of LVV and CRP was normal. She was treated with high dose prednisone until a repeat scan in October 2020 had no evidence of LVV. There was no evidence of LVV over the next 2 years of follow up. On review of the original scan, greater than typical tracer to scan time may have caused false positive findings. Case Two: 52-year-old female with stage II squamous cell carcinoma who initiated ceplimab monotherapy one week after FDG-uptake to the thoracic and proximal abdominal aorta and proximal great vessels on FDG-PET in February 2022. She was not treated with immunosuppression and did not develop any clinical features of LVV. A follow up scan in May 2022 had no features of LVV. Case Three: 60-year-old male with stage IV melanoma completed a one-year course of pembrolizumab in December 2021. An FDG-PET in March 2022 demonstrated uptake within the thoracic and abdominal aorta, and the subclavian and common carotid arteries. There were no clinical features of LVV and temporal artery ultrasound and CT-angiogram did not identify features of LVV. He was not treated with immunosuppression and a follow up FDG-PET in August 2022 had no features of LVV. Technical issues around FDG-PET scans that can lead to these false positive findings are explored.
Conclusion: Incidental vascular wall uptake on FDG-PET in patients undergoing ICI may not represent true vasculitis. Recognition of potential vascular uptake mimicking LVV is crucial to inform the need for immunosuppression and the safety of continuing ICI therapy, highlighting the need to understand potential pitfalls of FDG-PET scan reporting.

TOUR10

Characteristics of relapse of individuals with ANCA-associated vasculitis enrolled in the PEXIVAS trial

Mats Junek (McMaster University, Hamilton); Peter Merkel (University of Pennsylvania, Philadelphia); Eswari Vilayur (John Hunter Hospital, Sydney); Ron Wald (University of Toronto, Toronto); Nader Khalidi (McMaster University, St Joseph's Healthcare Hamilton, Hamilton); David Jayne (Addenbrooke's Hospital, Vasculitis Clinic, Cambridge); Michael Walsh (McMaster University, Hamilton); PEXIVAS PEXIVAS Investigators (Hamilton)
Objectives: Relapses of granulomatosis with polyangiitis and microscopic polyangiitis, collectively ANCA-associated vasculitis (AAV), are common and important events. Few large, international studies describe risk factors for relapse of AAV.
Methods: Relapses occurring in participants with severe AAV enrolled in PEXIVAS, an international, 2-by-2 factorial trial of induction treatments, were studied. The primary outcome of this analysis was relapse occurring at least 90 days after randomization. Candidate predictors included baseline participant and disease characteristics. The association between relapse and the candidate predictors was assessed using time-to-event models incorporating death as a competing event using the Fine and Gray method. All models were adjusted for induction therapies.
Results: Over a median follow-up of 2.93 years, 150 (23.3%) participants experienced at least one relapse (incidence rate 7.4 per 100 patient-years). The median time to relapse was 483.5 days (interquartile range 198-920). The most common manifestations of disease at relapse were renal (58.0%), constitutional (38.7%), and ear/nose/throat (31.3%). Baseline characteristics associated with an increased risk of relapse included: PR3-positive ANCA, skin involvement, and non-hemorrhagic lung involvement (Table 1). Characteristics associated with a lower risk of relapse

included female sex and receipt of dialysis.
Conclusion: Relapses remain common among patients with severe AAV. Identifying those most at risk of relapses may help plan treatments and monitoring.

TOUR11

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

Matthew Jessome (McMaster University, Hamilton); Faiza Khokhar (McMaster University, Hamilton); Christian Pagnoux (Vasculitis Clinic, Canadian Network for Research on Vasculitides (CanVasc), Division of Rheumatology, Mount Sinai Hospital, University of Toronto, Toronto); Stephanie Garner (University of Calgary, Calgary)

Objectives: Delivering comprehensive vasculitis training in Canadian rheumatology programs is challenging. Barriers include competing attention from other subjects, complexities of management, and limited exposure to rare vasculitis presentations. The CAnadian VAsculitis Learning Initiative (CAVALI) provides interactive clinical cases to supplement resident education, and currently exists in paperback and PDF formats. Using a quality improvement framework, we propose to adapt the CAVALI resource into an eModule for improved effectiveness, efficiency, and learner-centeredness. We herein report the results of a stakeholder analysis and needs assessment for this initiative.

Methods: A review of the literature, discussion with stakeholders (vasculitis experts, rheumatology learners) and a root cause analysis was conducted to inform the development of two complementary needs assessment questionnaires. Questionnaires were electronically distributed using Google Forms to Canadian rheumatology program directors, and residents enrolled in Canadian rheumatology training programs. Responses were collected anonymously.

Results: Seventeen rheumatology residents and 5 rheumatology program directors responded. Themes were consistent between residents and program directors. Respondents indicated that vasculitis education was incorporated into the curriculum most frequently through formal teaching sessions (100%), dedicated specialty clinics in vasculitis (86%), exposure during non-specialized clinics (86%), and recommended textbooks (41%). Frequently identified 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 by residents for immune complex small vessel vasculitis (65%), polyarteritis nodosa (59%), Takayasu arteritis (53%), Behcet's disease (53%), and central nervous system vasculitis (47%). Respondents were satisfied with vasculitis education quality (86%) and quantity (68%) at their institution. 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) as a vasculitis case-based resource. Similar numbers preferred an eModule over a PDF. 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%).

Conclusion: This needs assessment reinforces that 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, with piloting in a small cohort of Canadian rheumatology residents.

TOUR12

The effects of initial treatment on relapse of ANCA-associated vasculitis in the PEXIVAS trial

Mats Junek (McMaster University, Hamilton); Peter Merkel (University of Pennsylvania, Philadelphia); Eswari Vilayur (John Hunter Hospital, Sydney); Ron Wald (University of Toronto, Toronto); Nader Khalidi (McMaster University, St Joseph's Healthcare Hamilton, Hamilton); David Jayne (Addenbrooke's Hospital, Vasculitis Clinic, Cambridge); Michael Walsh (McMaster University, Hamilton); PEXIVAS PEXIVAS Investigators (Hamilton)

Objectives: Relapses of granulomatosis with polyangiitis and microscopic polyangiitis, collectively ANCA-associated vasculitis [AAV]), are important health outcomes. We describe the effects of the two randomized treatments: plasma exchange (PLEX) or no PLEX and standard- or reduced-dose oral glucocorticoid dosing regimens on relapses based on data from the international cohort of patients enrolled in the PEXIVAS trial.

Methods: Data from participants in the PEXVAS trial were included in this post-hoc analysis. PEXIVAS was a 2-by-2 factorial randomized controlled trial in patients with severe AAV evaluating the effect of 7 plasma exchanges in 14 days and two regimens of oral glucocorticoids, in addition to standard initial immunosuppression (oral cyclophosphamide, intravenous cyclophosphamide, or rituximab). The primary outcome in PEXVAS was a composite of end-stage renal disease or death. The primary outcome for this new analysis was relapse of vasculitis occurring at least 90 days after randomization on the Birmingham Vasculitis Activity Score. Participants were followed for up to 7 years. Respiratory involvement was categorized as to whether there was diffuse alveolar hemorrhage or non-hemorrhagic pulmonary manifestations. Analyses were conducted using Cox proportional hazards models adjusted for the randomly assigned treatments and baseline characteristics including initial immunosuppression.

Results: Of the 704 participants in PEXIVAS, 150 (23.3%) experienced at least one relapse. There was no evidence of an interaction between PLEX and glucocorticoid regimen (p=0.41). PLEX did not reduce the risk of relapse (hazard ratio [HR] 0.97, 95% confidence interval [CI] 0.70-1.34). The reduced glucocorticoid regimen did not alter the risk of relapse compared to the standard dose regimen (HR 0.95, 95% CI 0.68-1.32). Compared to intravenous cyclophosphamide, oral cyclophosphamide (HR 0.55, 95% CI 0.36-0.83), but not rituximab (HR 0.75, 95% CI 0.43-1.33) was associated with a reduced risk of relapse. Findings were similar when considering the competing risk of death and considering only relapses as the outcome.

Conclusion: In the PEXIVAS trial neither PLEX nor the induction oral glucocorticoid regimen substantially altered the risk of relapse in patients with severe AAV. Treatment with IV cyclophosphamide was associated with a higher risk of relapse.

Poster Tour 4: SLE

TOUR13

Timeliness of Fetal Echocardiography for Congenital Heart Block Detection in Anti-Ro/La Positive Pregnancies.

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Objectives: Guidelines recommend screening for congenital heart block (CHB) in anti-Ro/La-positive pregnancies with serial echocardiography starting between 16 and 18 weeks of gestational age (GA). As the most vulnerable period for CHB is from 18 to 24 weeks and early detection may improve outcomes, we evaluated timing of: 1) first fetal echocardiography for CHB screening, and 2) CHB detection in anti-Ro/La pregnancies.
Methods: We retrospectively identified all pregnancies undergoing fetal echocardiography for CHB screening and/or diagnosis between 2013 to 2021 at our institution, using an electronic database. We included those with anti-Ro/La antibodies as ascertained by chart review. We estimated GA at the first and last fetal echocardiography based on the date of the last menstrual period.
Results: We identified 44 pregnancies, with 98% exposed to anti-Ro and 39% to anti-La. [Table 1] Majority of pregnancies occurred in SLE women (68%) and most (82%) were exposed to hydroxychloroquine. Mean GA at first echocardiography was 20.4 (SD 2.8) weeks, with 32% of echocardiographies performed ≤18 weeks, 55% < 20 weeks, and 91% < 22 weeks. Four pregnancies had only one echocardiography throughout pregnancy: two due to late GA at first screen (30.6 and 29.1 weeks) and two due to pregnancy loss. In the 42 pregnancies with ≥2 echocardiographies, last screen was at a mean GA of 31.5 (SD 2.8) weeks. CHB was detected in 3/47 (6%) fetuses undergoing screening, all on their first echocardiography at 19.0, 22.4 and 29.3 weeks, respectively. Two other CHB cases were referred for echocardiography at 20.3 and 23.4 weeks of GA after incidental finding of bradycardia, with subsequent testing confirming maternal anti-Ro/La antibodies. Only one fetus (undergoing CHB screening) reversed from a 3rd-degree to a 1st-degree atrioventricular block (AVB) after receiving dexamethasone. The other four CHB fetuses remained in 3rd-degree AVB throughout pregnancy.
Conclusion: We observed that most fetal echocardiography screening for CHB in anti-Ro/La pregnancies did not occur by the recommended 16 to 18 weeks of GA. This represents an important potential care gap as all CHB were present on the first fetal echocardiography, and all were already 3rd-degree. Despite this, one fetus (out of five CHB cases) reversed from 3rd to 1st-degree AVB after dexamethasone. Timely initial screening and/or alternative diagnostic approach might be necessary to detect earlier reversible cardiac involvement in anti-Ro/La-positive pregnancies.

TOUR14

Investigating the Role of Interferon in Promoting Flares in Systemic Lupus Erythematosis

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Krembil Research Institute; Division of Rheumatology, University Health Network; Department of Immunology, University of Toronto, Toronto)
Objectives: Systemic lupus erythematosus (SLE) is a heterogeneous autoimmune disease that ranges in severity depending on tissue and organ involvement. It is generally characterized by unpredictable periods of exacerbation, known as flares, followed by prolonged periods of disease quiescence. Interferon (IFN) is a hallmark of disease and may be involved in SLE flare mechanisms. In this study, longitudinal changes in the levels of IFN-induced protein expression were examined in the immune cells of flaring and quiescent SLE patients.
Methods: We developed a novel 41 marker mass cytometry (CyTOF) approach to study IFN-induced protein expression in various immune cells in an unbiased way. Archived peripheral blood mononuclear cells from 15 healthy controls (HCs), 26 quiescent (clinical SLEDAI = 0 for one year with no increase in immunosuppressive treatment, ≤ 10 mg prednisone) and 42 recently flaring (clinical SLEDAI ≥ 1 which required an escalation of therapy) SLE patients were examined using CyTOF. Of these, 11 quiescent and 22 flaring patients were also examined at 6 months and/or 1 year later.
Results: Many immune populations appeared to have differentiated in IFN rich environments in SLE patients compared to HCs, as evidenced by increased levels of IFN-induced proteins. There was substantial heterogeneity in the levels of IFN-induced protein expression between the different immune populations in the same patient and also between same immune populations in different patients, with significantly higher levels in flaring than quiescent patients in most immune populations. Immune populations with the largest variability in IFN protein expression levels between flaring and quiescent patients (p value between 0.01 – 0.001 for all IFN induced proteins) included age-associated B cells (ABC), which have many features suggesting that they are immediate precursors of antibody secreting cells, as well as the T cells that support their activation such as T peripheral helper cells (Tph) and T follicular helper cells (Tfh). Conversely, levels of IFN-induced protein expression on innate immune cell subsets such as monocytes and myeloid dendritic cells did not vary between flaring and quiescent patients. Similar trends were noted in patients followed over time.
Conclusion: IFN-induced protein expression on ABCs, Tfhs and Tphs is associated with SLE flare, suggesting that IFN plays a role in promoting flares through expansion of these cell subsets.

TOUR15

Levels of anti-mitochondrial antibodies are associated with disease manifestations and outcomes in systemic lupus erythematosus.

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Objectives: Mitochondria are intracellular organelles derived from the endosymbiosis between an α-proteobacterium and a primitive eukaryotic cell. Mitochondria display pro-inflammatory and antigenic properties when released into the extracellular milieu. We have reported that the

presence of anti-mitochondrial antibodies (AMAs) were associated with various clinical manifestations [e.g. lupus nephritis, arterial vascular events (AVEs), carotid plaque) in patients with systemic lupus erythematosus (SLE). In the present study, we aim to detect the presence and levels of various AMAs in samples from patients from the systemic lupus erythematosus collaborative clinics (SLICC) inception cohort

Methods: The SLICC protocol collected clinically relevant variables (sociodemographic variables, disease characteristics and medications) and disease-specific outcomes [i.e., SLICC damage index (SDI), death, AVE, lupus nephritis and SLICC definition A for neuropsychiatric events (NP-SLE)] and biosamples yearly for up to 20 years. Levels of autoantibodies against whole organelles (AwMA), mitochondrial DNA (mtDNA) or RNA (mtRNA) were measured by in-house direct ELISAs whereas SLE autoantibodies were detected by clinical laboratories. Healthy individuals, defined as having no known illnesses and infectious symptoms at the time of the blood draw, were recruited. Cox regressions with marginal effects for center were adjusted for covariables [e.g. sex, age, disease duration, body mass index (BMI), risk factors and medication]. Interaction of AMAs with sex were tested for each outcome

Results: Sera from 1114 SLICC patients were included from their inclusion up to 7 years of follow-up and a total of 3577 samples. Of these, 88.6% were female. Mean age (± SD) was 35.4 ± 13.4 year old, with a SLE disease activity index-2000 (SLEDAI-2K) score of 5.3 ± 5.3. AMA levels increased for both AwMA and AmtRNA but were stable for AmtDNA. An elevation of the AwMA were associated with higher risk of death in SLE patients [Hazard ratio (95% confidence interval) = 3.19 (1.40 - 7.26)]. Women with increased AmtDNA were at higher risks of lupus nephritis [4.00 (2.51 - 6.36)]. Risk of this outcome was also higher in patients with elevated AmtRNAs [1.68 (1.34 - 2.11)], with no influence of sex. Surprisingly, AmtRNA were associated with increased risks of AVEs in women [1.56 (1.11 - 2.19)] but decreased risk in males [0.32(0.11 - 0.99)]. No associations were observed between AMA levels and either damages, or NP-SLE (Table 1).

Conclusion: These results show that AMA constitute candidates for prediction of severe outcomes in SLE patients and that sex appears to interact with the effect of AMAs on disease manifestations.

TOUR16

Liver transplantation in a patient with systemic lupus erythematosus and liver failure

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Chronic liver disease occurs in 4-5% of patients with systemic lupus erythematosus (SLE) and is usually due to secondary causes (e.g., drugs, alcohol, or infection). While SLE is associated with other autoimmune diseases affecting the liver (e.g., autoimmune hepatitis, primary biliary cholangitis, and antiphospholipid antibody syndrome), lupus itself rarely causes symptomatic liver disease. Lupus hepatitis is often subclinical, presenting with elevated transaminases that typically correlate with disease activity.

We present a case of liver failure leading to transplantation in a 64-year-old patient with longstanding previously well-controlled SLE on hydroxychloroquine monotherapy. Her initial manifestations included malar rash, oral ulcers, fever, Raynaud's, and inflammatory arthritis. She had not had a flare in 15 years. She was brought to hospital with a one-week history of jaundice

and confusion. Initial labs revealed INR >9, AST 757, ALT 509 (normal 2 months prior), normal GGT and ALP, albumin 16, bilirubin 224, and platelets 77; she was diagnosed with acute liver failure. Her husband described 1-2 months of preceding fatigue and progressive bilateral hand, foot, and ankle pain. Due to worsening hepatic encephalopathy, she was intubated and transferred to the intensive care unit (ICU). On examination, she had symmetric synovitis in the MCPs and PIPs bilaterally. Extensive workup ruled out infectious, toxic, drug-induced, thrombotic/ischemic, malignant, and hereditary causes of liver failure. Autoimmune testing revealed negative anti-smooth muscle and liver/kidney microsome type 1 antibodies, but significant increases in dsDNA and decreases in C3 and C4 compared to outpatient values two months prior. Methylprednisolone pulse therapy was initiated; a liver biopsy was completed showing ≥99% necrosis with severe lymphoplasmacytic inflammation and central vein endothelitis. The patient was then induced with basiliximab and urgent liver transplantation was performed. Explanted liver pathology revealed severe hepatitis with necrosis and background cirrhosis. With post-transplant immunosuppression, the patient's complement levels normalized and dsDNA returned to pre-admission levels. She initially showed signs of recovery, but died of septic shock after two months in ICU. As no alternate cause was identified and she had preceding symptoms and biomarkers supportive of an SLE flare, her subclinical cirrhosis and subsequent subacute deterioration were attributed to SLE. This is the sixth published case of liver transplantation in SLE and the second where no alternate cause of liver failure was found. It is the first with evidence of preceding clinical and biochemical lupus disease activity. Cirrhosis and liver failure secondary to SLE are exceeding rare but described phenomena.

Poster Tour 5: Pediatric

TOUR17

Clinical Presentation and Outcomes of Children Treated for Lyme Arthritis: Experience from a Large Pediatric Cohort in Nova Scotia, Canada

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Objectives: Lyme disease (LD) has emerged as a major Canadian public health threat over the past decade. Lyme arthritis (LA), a late presentation of LD, disproportionately affects children. Our objective was to describe the presentation and clinical course of children with LA seen in a tertiary care pediatric rheumatology clinic.

Methods: Patients ≤ 18 years of age with LA, with at least one follow-up visit after initiation of antibiotics were identified from the IWK Pediatric Rheumatology Clinic Database in Halifax, Nova Scotia (Jan 2006-June 2022). LA was defined as clinical evidence of arthritis with a history of residence in, or visit to, a LD endemic area; and a positive two-tiered serologic test. Demographic, clinical presentation, treatment, and outcome data were collected from patient charts. Post-infectious LA (PILA) was defined as persistent arthritis 3 months after initiation of antibiotics.

Results: 184 patients were identified; 3 cases (2006-2010), 25 cases (2011-2015), 88 cases (2016-2020), and 68 cases in the last year and a half (2021-June 2022). Median age was 9 years (range 2-16); 122 (66%) were male. 46 (25%) children recalled a tick bite and 12 (7%) reported a history of erythema migrans. Arthritis was monoarticular in 113 (61%), oligoarticular in 63

(34%), and polyarticular in 8 (4%); the knee was involved in 172 (93%) patients. Additional clinical features and investigations are shown in Table 1. Median follow-up post-initiation of antibiotics was 3.5 months (range 1-63). 153 (67%) received one course of antibiotics, 45 (24%) received two, and 16 (9%) received 3. Intravenous ceftriaxone was used in 31 treatment courses (7 for initial antibiotic course, 13 as 2nd course, and 11 as 3rd course; some patients had > 1 course of ceftriaxone). Twenty-six (14%) children developed PILA; all but 5 received at least one course of ceftriaxone. Of the patients with PILA, 13 (50%) were treated with a steroid injection, 12 (46%) NSAIDs, 2 (8%) DMARDs and 1/26 (4%) a biologic (>1 treatment was received in some patients). Of those with PILA, 19 had full resolution; 7 had ongoing evidence of active arthritis at last follow-up (4% of entire cohort).

Conclusion: There has been a significant increase in the number children with LA referred to pediatric rheumatology in our centre. The outcome for most children is excellent although almost a third will require more than one course of antibiotic due to incomplete response and just over 10% will require ongoing follow-up for PILA.

TOUR18

Validation of a rapid Lyme Disease assay in children with Lyme Arthritis and non-Lyme Articular Presentations in a Lyme endemic region

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Objectives: Lyme disease (LD), an emerging public health threat in Canada, is endemic in all regions of Nova Scotia. Lyme arthritis (LA), which disproportionally affects children, is a late manifestation of LD and presents as a mono- or oligo-articular arthritis. The Standard Two-Tiered Test (STTT) is used to diagnose late LD, however, the turn-around time is days to weeks. In the acute setting, lack of a timely diagnostic test can lead to unnecessary testing (synovial fluid aspiration), interventions (joint incision and drainage) and hospital admission, particularly when there is a concern for a septic joint. The objective of this study was to retrospectively evaluate the diagnostic performance of the Sofia Fluorescent Immunoassay (SFIA) in children with articular symptoms known to be LD positive or negative by Western Blot (WB).

Methods: The SFIA detects and differentiates serum IgM and IgG antibodies to Borrelia burgdorferi providing results within 1 hour. Residual serum samples of LD negative [defined as enzyme immune assay (EIA) negative or EIA positive/IgG negative on WB] and LD positive (defined as EIA positive and IgG positive on WB) patients were identified at our institution. Samples from patients 1-16 years of age presenting with articular symptoms (e.g. pain, swelling, stiffness) were included in this study. Health records were reviewed for demographic, clinical, and laboratory data. SFIA IgG antibody positivity was the focus of this study as LA is a late manifestation of LD, whereas IgM is a marker of early LD. Sensitivity and specificity for the SFIA were calculated compared to the reference standard of the STTT.

Results: The study included 106 samples (51 LA, 55 non-LA). Non-LA diagnoses included JIA (21), mechanical (14), arthralgia (8), reactive (4), septic (1), and other (7). The SFIA IgG was positive in all LA samples and negative in 53 non-LA samples (specificity of 100% and sensitivity of 96.4%). The 2 false-positive results were from children with a diagnosis of JIA (ERA and RF neg poly). SFIA IgM was positive in 9 (16%) non-LA samples; WB testing

confirmed these samples were IgM negative.
Conclusion: Our results suggest that the SFIA IgG holds promise as a rapid stand-alone test to help diagnose or exclude LA in children presenting with articular symptoms in a Lyme-endemic region. This would allow for prompt initiation of antibiotics and avoidance of additional unnecessary testing and surgical intervention. In contrast, the SFIA IgM appears prone to false positives and should be confirmed by WB testing.

TOUR19

Lived Educational Experience of Young Adults with Childhood- and Adult-Onset Systemic Lupus Erythematosus: A Multi-Center Canadian Qualitative Study

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Objectives: Education and employment established in young adulthood predict future lifetime socioeconomic achievements. Young adults with Systemic Lupus Erythematosus (SLE) have physical, cognitive and mental health issues and other comorbidities that may impact employment. We aimed to understand the lived experiences of young adults with SLE (YASLE), as students, and to assess their perceived barriers from SLE.
Methods: YASLE were recruited from two Lupus clinics in Toronto and Winnipeg. Semi-structured qualitative interviews were conducted individually via secure video conferencing. As this study was conducted during the coronavirus pandemic, participants were also asked about the pandemic impacts on their education experiences. All interviews were transcribed verbatim, double-coded and analysed using a reflexive thematic approach.
Results: Twelve participants (2 males), 9 of childhood- and 3 adult-onset SLE (cSLE, aSLE) were interviewed. Nine participants (82%) were <25 years old. Five also worked while studying. Five were Asians, 5 were White, 2 of other ethnicities. Half have severe disease (central nervous system or renal involvement). Median years of disease was 4.0 (25th-75th percentile, 1.8- 5.3). The impacts of SLE on their education experience emerged in 5 themes: 1) Challenges imposed by SLE: Difficulties adjusting to the diagnosis, physical and cognitive symptoms of SLE. While most participants disclosed their diagnosis to their schools, some expressed hesitation. 2) Changes in aspirations: Education/career goals were modified by reducing course load or shifting to more sedentary or less cognitively demanding careers. 3) Coping and acceptance: More adaptive than maladaptive coping strategies were used to manage their SLE, including self-acceptance, pacing, planning and avoidance. All strived to do well in their studies despite SLE and were hopeful for their futures. 4) Facilitating factors for education success: Family and friends' social support, individualized accommodations from school and parental financial support were identified. 5) Pandemic impacts: Virtual learning and flexible schedules enabled participants to adapt their schedules according to their physical conditions (e.g. pain, fatigue). However, fewer opportunities to interact in-person were viewed as challenges. Participants want hybrid options to continue even after the pandemic.
Conclusion: SLE affected students' performance through physical symptoms, fatigue and cognitive dysfunction. Ongoing social and school supports help to support them. Maintaining the

remote learning options may increase accessibility for them. These results identified opportunities for developing future supportive interventions for YASLE patients in their schooling which then better prepare them for future employment.

TOUR20

Loss to Follow Up After Transfer to Adult Care in Patients with JIA or SLE

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Objectives: Adolescents with rheumatic disease must continue to receive care as they age, requiring transfer from pediatric to adult rheumatology around 18 years old. For patients with juvenile idiopathic arthritis (JIA) and systemic lupus erythematosus (SLE), the potential for their disease to remain or become active after transfer to adult rheumatology necessitates that efforts be made to minimize risk of losing these patients to follow-up. Since the reporting of loss to follow-up (LFU) rates between 1992-2005 from one Canadian centre [1], there is a dearth of LFU data despite significant advances in research and care to improve transition to adult care for patients. We aimed to i) determine rates of LFU of patients seen in a multidisciplinary transition program, and ii) describe characteristics of patients who were LFU.

Methods: We performed a retrospective review of patients diagnosed with JIA or SLE who were followed in the McMaster multidisciplinary rheumatology transition clinic and enrolled in an observational transition study. This clinic is staffed by pediatric rheumatologists and the adult rheumatologist to whom the patient will likely be transferred. Patients were considered LFU if they did not attend their first or second appointment with their adult rheumatologist. Patient demographics, disease characteristics (cJADAS, CHAQ, QoL, and pain) and transition readiness (Transition-Q, max score 100 [2]) scores were collected. Descriptive statistics were used to determine means and standard deviations for continuous variables, and frequencies and proportions for categorical variables.

Results: Eighty-six patients were included. Of these, 70% successfully transferred to adult care [Figure 1]. Of those who were LFU, 65% never saw the adult rheumatologist they were referred to. Three quarters of those who transferred successfully were female. Mean disease activity, quality of life, pain and Transition-Q scores [Table 1] appeared similar between those who were and were not LFU.

Conclusion: Integrating coordinated transfer of care processes from a multidisciplinary pediatric transition clinic resulted in lower LFU rates than those reported in a previous publication (50%). While disease activity, quality of life, pain and Transition-Q scores did not appear worse in those LFU, our results did not include data from all patients. Despite the predominance of females in the study, females comprised the majority of successful transfers leading us to question whether males may be at greater risk of LFU. These are areas that warrant further investigation. Multidisciplinary care programs may improve LFU potentially leading to improved long-term outcomes of patients with JIA or SLE.

Upload:

Patient Characteristic	All Patients, n=88	Non-LLV, n=60	LLV, n=28
Mean age at diagnosis (SD), years	53.3 (14.6)	53.5 (14.6)	53.3 (14.6)
Gender, n female (%)	28 (87.5%)	42 (72.4%)	13 (50%)
Diagnosis of SSc, n (%)	74 (84%)	49 (85%)	25 (86%)
Mean (SD) cSSDAI, n=37	5.3 (3.8)	3.5 (2.6), n=42	8.1 (3.8), n=25
Mean (SD) cHAQ, n=31	0.9 (1.5)	0.9 (0.9), n=25	0.9 (1.8), n=12
Mean (SD) dLoF, n=31	84.3 (20.3)	83.9 (20.7), n=25	82.9 (21.1), n=12
Mean (SD) bAIA, n=88	1.1 (1.1)	1.1 (1.6), n=28	1.1 (1.1), n=58
Mean (SD) Transition-Z score, n=53	0.2 (1.5)	0.0 (1.2), n=24	0.4 (1.0), n=29

Table 1.1: Patient demographics and characteristics.

Figure 1.1: Transition Z scores at 1 year to follow up (T1/1)

Poster Tour 6: SSc/Myositis

TOUR21

Overexpression of Mucin 16 and Mesothelin Promotes Fibrosis in Rapidly Progressive Systemic Sclerosis Patients

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Objectives: Systemic sclerosis (SSc) is a deadly, incurable disease characterized by fibrosis, immune dysregulation and vasculopathy. Skin fibrosis is the hallmark of SSc, and the extent of skin involvement is predictive of the extent of internal organ involvement. Of all patients with rheumatic diseases, patients with early diffuse SSc (edSSc) develop the highest mortality rate, which primarily stems from fibrotic complications associated with disease. The primary mediators of fibrosis are human dermal fibroblasts (HDF), which develop a myofibroblast phenotype. Previous study showed heavily glycosylated protein mucin16 (MUC16, also known as cancer antigen-CA-125) interact with its binding partner mesothelin (MSLN) to promote fibrosis, however its role in the pathogenesis of SSc is unknown. We have recently shown that MUC16 gene is frequently mutated in SSc skin. MUC16 mutations are predicted to generate a truncated form known to be secreted and/or act as an oncogene. We hypothesized that mutated MUC16-MSLN axis in HDF may promote fibrosis in patients with edSSc.

Methods: We enrolled 11 consecutive patients with edSSc (< 2 years from onset of non-Raynaud's symptoms) and consecutive age and gender-matched healthy controls (HCs). We generated HDFs from both groups using 4 mm skin biopsies obtained 5 cm from ulnar styloid. Serum MUC16 levels were measured via ELISA. MUC16 levels were determined in skin biopsy sections and low passage (P2-P5) in vitro cultured HDFs from each group by immunofluorescence microscope and dot blot using antibodies targeting the oncogenic C-terminal transmembrane domain, or other parts of protein. Expression of MSLN was analyzed by qRT-PCR. Furthermore, we treated HC HDFs with recombinant soluble MUC16 and measured pro-fibrotic signals, e.g. collagen 1 A1 (col1A1) via qRT-PCR.

Results: We found that patients with edSSc had a substantial increase in MUC16 expression in skin myofibroblasts and primary cultured HDF compared to HC (particularly its C-terminal oncogenic form) with nearly 10-fold increased MSLN mRNA expression. MUC16 serum levels were also increased compared to HC ($p<0.05$). Finally, treatment of HDFs with soluble MUC16 was sufficient to promote pro-fibrotic signals.

Conclusion: Mutations in MUC16 may be a promoter of fibroblast dysfunction and fibrosis in

SSc through a novel MUC16-MSLN axis. Further studies assessing the impact of MUC16 mutations in promoting disease progression, fibroblast dysfunction and immune dysregulation may provide added insights for its importance in SSc. It may also provide added rationale for targeting it therapeutically. Funding: our work was generously supported by the Arthritis Society, Scleroderma Canada, Dutch Kidney Foundation.

TOUR22

Impaired DNA Repair Response Activates a Novel FOXO1-Dependent Metabolic Remodelling in Patients with Progressive Systemic Sclerosis

Lamia Khan (University of Alberta, Edmonton); Muhammad Elezzabi (University of Alberta, Edmonton); Desiree Redmond (University of Alberta, Edmonton); Charmaine van Eeden (University of Alberta, Edmonton); Robert Gniadecki (University of Alberta, Edmonton); Jan Willem Cohen Tervaert (University of Alberta, Edmonton); Mohamed Osman (University of Alberta, Edmonton)

Objectives: Systemic sclerosis (SSc) is a deadly disease characterized by immune dysregulation, vasculopathy, and fibrosis. There is currently no known cure, and disease associated mortality rivals most aggressive cancers. Human dermal fibroblasts (HDFs), the primary cells promoting fibrosis, develop a myofibroblast phenotype associated with increased apoptosis resistance. We recently showed that SSc patients' HDFs have increased genomic instability that are associated with double-stranded DNA breaks (DSBs). Dysregulated DNA damage responses have been shown to be associated with transcription factor, forkhead box protein O (FOXO) activation in cancers. As such, we hypothesized that HDFs with increased DSBs from patients with SSc have increased apoptosis resistance promoted by FOXO1.

Methods: Primary human dermal fibroblasts (HDF) were generated from healthy volunteers (HC), pre-fibrotic patients with early limited SSc (elSSc), and patients with early diffuse severe scleroderma (edSSc) using 4 mm skin biopsies obtained 5 cm from ulnar styloid. All in vitro cultured HDFs were low passage (< P5). γ-H2AX (a DSB marker) was determined via immunoblots (IB). HC HDFs were treated with DNA damage-inducing agent etoposide, then nuclear FOXO1 and the myofibroblast marker alpha-SMA were quantified using IB and qRT-PCR. Nuclear FOXO1 activation was detected by immunofluorescence microscope. Pro-fibrotic signals (e.g. fibronectin) were determined in edSSc HDFs in presence or absence of FOXO1 inhibitor.

Results: We found that patients with aggressive edSSc have the highest levels of γ-H2AX compared to HC and elSSc patients. edSSc HDFs also had a substantial nuclear accumulation of FOXO1. This was associated with increased mRNA expression of known FOXO1 and its metabolic target, pyruvate dehydrogenase kinase 4. FOXO1 inhibition of edSSc HDFs resulted in decreased levels of fibronectin. Intriguingly, etoposide treatment of HDFs from HC also resulted in FOXO1 activation and was associated with myofibroblast differentiation.

Conclusion: DSBs are more commonly present in fibroblasts from patients with rapidly progressive severe SSc. DSBs may promote myofibroblast differentiation, and fibrosis through a FOXO1-dependent mechanism. FOXO1 activation may also promote resistance to apoptosis through metabolic remodelling. Our findings may lead to developing a deeper understanding for the mechanisms promoting progression in SSc. They may also have far-reaching implications such as novel prognostic and therapeutic strategies in SSc. Funding: Dutch kidney foundation, Arthritis Society, Scleroderma Canada and GlycoNET. LK is supported by WCHRI PhD graduate award and MO is supported by Arthritis Society STAR award.

TOUR23

Machine Learning Analysis of Sporadic Inclusion Body Myositis Biomarkers

Jenny Wei (University of Toronto, Calgary); Mark Tarnopolsky (McMaster University, Hamilton); Marie Hudson (McGill University, Jewish General Hospital, Lady Davis Institute for Medical Research, Montreal); Ross Mitchell (University of Alberta, Edmonton); Antoine Dufour (University of Calgary, Calgary); Luiz Almeida (University of Calgary, Calgary); Paul Fortin (Université Laval, CHU de Québec, Quebec); Eric Boilard (CHU de Québec-Université Laval Research Center, Québec); Yann Becker (Centre de recherche du CHU de Québec, Quebec); Katherine Buhler (University of Calgary, Calgary); Erin Hatcher (Mcmaster University, Hamilton); Mei Feng Zhang (University of Calgary, Calgary); Marvin Fritzler (University of Calgary, Calgary); May Choi (University of Calgary, Calgary)

Objectives: Sporadic inclusion body myositis (sIBM), a subset of autoimmune inflammatory myopathies (AIM), is often difficult to diagnose. The objective of this study was to identify sIBM biomarkers that would allow for an earlier and more accurate diagnosis and prediction of disease phenotypes using several machine learning (ML) approaches.

Methods: Clinical and demographic information were obtained on 230 sIBM patients and AIM disease controls. Baseline sera from these patients were tested for conventional and novel autoantibodies: myositis (including anti-NT5c1A/Mup44 and mitofusin (MFN)-1 and 2) using an addressable laser bead immunoassay, a multiplexed autoimmune liver disease array, and antinuclear antibodies (ANA) on HEp-2 substrates by an indirect immunofluorescence assay (IFA). Seven classification algorithms including an artificial neural network and a decision tree-based algorithms were trained to differentiate sIBM from AIM based on the autoantibodies. Agglomerative hierarchical clustering based on clinical features (creatine kinase level, dysphagia, knee extension weakness, quadriceps atrophy, grip strength, and disease severity (graded by expert)) was performed to identify clinical sub-phenotypes of sIBM. InterpretML explainable boosting machine, a generalized additive model that predicts feature contributions to patterns in the data, was performed to examine the autoantibodies associated with each sIBM cluster.

Results: The 230 individuals studied included 93 sIBM patients (38.7% female, mean age 68.3 +/- 9.1 years) and 137 AIM comparators (68.1% female, mean age 57.6 +/- 14.4 years). The neural network classification model classified sIBM with 92% accuracy, while the accuracy rate of the decision tree model was 79% (Figure 1). Compared to AIM, sIBM patients were characterized by higher frequency of anti-Mup44, anti-Mi2β, and the absence of ANA (particularly the nuclear fine speckled [AC-4] and nuclear homogenous [AC-1] IFA patterns), anti-RuvBL1, and anti-Ro52/TRIM21. Hierarchical clustering identified four sIBM clinical phenotypes (cluster 1: males with severe disease, cluster 2: males with mild disease, cluster 3: females with severe disease, cluster 4: females with mild disease). Autoantibodies to Mup44 and RuvBLl were associated with sIBM clusters having higher disease severity (clusters 1 and 3), while a positive ANA, anti-Ro52/TRIM21, and anti-MFN1 antibodies were associated with milder disease (clusters 2 and 4).

Conclusion: In this comprehensive ML analysis of established and autoantibodies, sIBM could be differentiated from other types of AIM with an accuracy of up to 92%. Four sIBM clusters that differed in sex, disease severity and autoantibody profiles were identified. Future studies to study other novel biomarkers and validate our findings in larger cohorts are needed.

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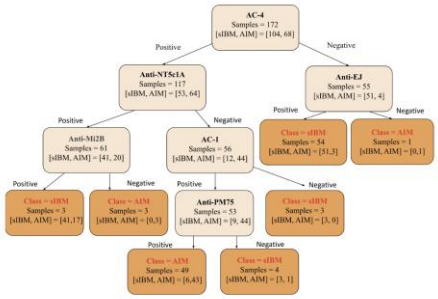

Figure 1. sIBM vs. AIM decision tree model based on autoantibody profile. sIBM, sporadic inclusion body myositis; AIM, autoimmune idiopathic inflammatory myopathies.

TOUR24

Use and Persistence of Trimethoprim Sulfamethoxazole Prophylaxis in Patients with Granulomatosis with Polyangiitis treated with Rituximab

Arielle Mendel (McGill University Health Centre, Department of Medicine, Division of Rheumatology, Montreal); Hassan Behlouli (McGill University, Montreal); Cristiano Soares de Moura (The Research Institute of the McGill University Health Centre, Montreal); Évelyne Vinet (Department of Medicine, Division of Rheumatology, McGill University Health Centre, McGill University, Montreal); Jeffrey Curtis (University of Alabama at Birmingham, Birmingham); Sasha Bernatsky (McGill University Health Centre, Department of Medicine, Division of Rheumatology, Montreal)

Objectives: Trimethoprim sulfamethoxazole (TMP-SMX) prophylaxis against of pneumocystis jiroveci pneumonia is recommended during induction of ANCA-associated vasculitis. We described the frequency and persistence of TMP-SMX prophylaxis in patients with granulomatosis with polyangiitis (GPA) treated with rituximab (RTX), and determine factors associated with TMP-SMX use.

Methods: We identified adults with GPA from the MarketScan United States Commercial and Medicaid health care databases who had a claim for RTX following the first GPA diagnostic code between 2011-2020. We defined baseline TMP-SMX prophylaxis as a minimum 28-day prescription of TMP-SMX, overlapping with the first RTX treatment or dispensed within the following month. Baseline covariates included age, sex, calendar year, insurance type, recent glucocorticoid and immunosuppressant use, health care use, and associated conditions. Univariable and multivariable logistic regressions identified factors associated with TMP-SMX use. We estimated TMP-SMX persistence, allowing a prescription refill gap of 14 days.

Results: We studied 1877 RTX-treated GPA patients. At the time of RTX initiation, mean age was 50.9 (SD 16) years and 54% were female [Table 1]. Baseline TMP-SMX was dispensed to 426 (23%) subjects. Median TMP-SMX persistence was 103 (IQR 44, 177) days. In multivariable analyses, female sex (OR 0.64; 95% 0.51,0.81) and atovaquone/dapsone prescription in the 6 months prior to rituximab (OR 0.23; 95% 0.09, 0.48) were negatively associated with baseline TMP-SMX use, while prednisone >20 mg/day in the month prior to RTX (OR 2.96; 95% CI 2.29, 3.82), and hospitalization (OR 1.89; 95% CI 1.45, 2.46) and immunosuppressant use (OR 1.54; 95% CI 1.13, 2.1) in the prior 6 months were positively associated with baseline TMP-SMX. Sensitivity analyses using new-user design (n=919) and defining TMP-SMX use as any 28-day prescription in the 6 months following RTX yielded

similar estimates.
Conclusion: In our analyses, TMP-SMX was dispensed to less than a quarter of GPA patients in the month following RTX, and among TMP-SMX users, median persistence was less than 6 months. Recent prednisone was associated with TMP-SMX use. Further work is needed to confirm if TMP-SMX reduces pneumocystis risk, and/or all-cause serious infections, in patients with GPA treated with RTX.

Friday, February 10, 2023
2:30 PM-3:00 PM ET

Poster Tour 7: COVID (live-stream)

TOUR25
Lived Experiences that Influenced Self-Perception and Identity among Individuals with Rheumatoid Arthritis during the COVID-19 Pandemic
Stephanie Therrien (Arthritis Research Canada, Vancouver); Smruthi Ramachandran (University of British Columbia/Arthritis Research Canada, Vancouver); Jenny Leese (University of Ottawa/Arthritis Research Canada, Vancouver); Catherine Backman (Rehab Sciences/Occupational Therapy, University of British Columbia, Vancouver); Jasmin Ma (University of British Columbia/Arthritis Research Canada, Vancouver); Kelly English (Arthritis Research Canada, Vancouver); Eileen Davidson (Arthritis Research Canada, Richmond); Shanon McQuitty (Arthritis Research Canada, Vancouver); Cheryl Koehn (Arthritis Consumer Experts, Vancouver); Alison M. Hoens (University of British Columbia/Arthritis Research Canada, Vancouver); James Gavin (University of Southampton, Southampton); Jo Adams (University of Southampton, Southampton); Linda Li (Rehab Sciences/Physical Therapy, University of British Columbia, Arthritis Research Canada, Vancouver)
Objectives: Experiences of Rheumatoid Arthritis (RA) self-care often involve dealing with emotional and psychological challenges arising from disruptions to a person's self-perception or their identity. One aim of our qualitative study was to explore lived experiences, from individuals with RA, on self-perception and identity during an unprecedented COVID-19 pandemic.
Methods: The study was jointly designed and conducted with patient partners with RA. Between December 2020 and December 2021, we conducted one-to-one semi-structured interviews (30-70 mins) with adults with RA. Participants were purposively sampled from a randomized controlled trial (RCT) testing a web-based self-care intervention. To be eligible, participants had: 1) a physician confirmed diagnosis of RA; 2) no joint surgery in the past six months; 3) no history of acute injury to any joints in the past six months; 4) an email address and daily access to a computer or mobile device. We aimed for maximum variation in age, sex, and education, within the limits of our RCT sample. A reflexive thematic analysis approach was used.
Results: Thirty-nine participants (aged 26-86; 36 females) were interviewed. Twenty-four (63%) completed post-secondary education. Three main themes were identified: 1) Taking time to self-reflect: Some participants described how the COVID-19 pandemic afforded them more time to learn more about themselves and connect with the (sometimes difficult) emotions they felt,

which generally helped to manage stress; 2) Being perceived differently: Some participants described how they were perceived by their families, friends, and others at work or in public after feeling forced to disclose their vaccination status and/or RA diagnosis for the first time. Others expressed experiences of unequal treatment and/or a threat of violence from others, driven by historical and ongoing racism; 3) Participating differently in roles: Most participants experienced disruptions in how they participate in various social roles (e.g., as a parent). Disruptions to valued social roles led some participants to describe taking time to re-evaluate friendships or workplace situations, while some examined mental health and fitness regimens. **Conclusion:** These lived experiences during the pandemic offer a unique opportunity to hear from individuals living with RA on how they experienced and renegotiated various dimensions of the self. Findings may be helpful for designing self-care programs and to assist healthcare professionals recognize the invisible work done by people with RA as they negotiate valued social roles, identity and sense of self during the pandemic.

TOUR26

COVID infection in a Canadian Lupus Cohort: A Post-Omicron Update

Jia Li Liu (McGill University, Montreal); Laura Yan (Research Institute of the McGill University Health Centre, Montreal); Arielle Mendel (McGill University Health Centre, Department of Medicine, Division of Rheumatology, Montreal); Évelyne Vinet (Department of Medicine, Division of Rheumatology, McGill University Health Centre, McGill University, Montreal); Louis-Pierre Grenier (McGill University Health Centre, Montreal); Christian A Pineau (McGill University Health Centre, Montreal); Fares Kalache (McGill University Health Centre, Montreal); Jennifer LF Lee (RI-MUHC, Montreal); Popi Panaritis (Research Institute of the McGill University Health Centre, Montreal); Wendy Singer (McGill University Health Centre, Montreal); Sasha Bernatsky (McGill University Health Centre, Department of Medicine, Division of Rheumatology, Montreal)

Objectives: SLE patients, their families, and their physicians were concerned that immunosuppressive medications may place them at high risk for COVID infection. [1]. However, early (pre-Omicron) data from Canadian clinical cohorts did not point towards an excess of severe COVID[2-3]. To provide updated data including the post-Omicron era, we evaluated COVID infections in the Montreal General Hospital (MGH) Lupus Cohort and described characteristics of those experiencing COVID infections, including demographics, COVID vaccination, and outcomes.

Methods: The MGH Lupus cohort has enrolled unselected patients aged 18+ who meet American College of Rheumatology SLE criteria. Patients are evaluated yearly, reporting detailed clinical information including COVID infection and vaccinations (from 2020 onward), and hospitalizations. We included data from all clinic visits from January, 2021 (start of vaccination availability) up to September 14, 2022, to determine the number testing positive for COVID (either clinic-based or home test) and describe their characteristics.

Results: From January 6, 2021, to September 14, 2022, 413 cohort patients had at least one clinic visit. Since the onset of the pandemic, 240 patients reported having taken a COVID test (in a clinic setting or at home) most frequently due to symptoms, with 75 patients (18.2% of the cohort with a study visit during this time) reporting a positive test at any time. The vast majority of infections occurred in the post-Omicron era. Almost half of patients reporting COVID infection were of non-white race/ethnicity. At COVID diagnosis, only 25 of 75 individuals were vaccinated with at least 2 doses; 12 with a third dose, and 2 with a fourth dose (Table 1). Two individuals were hospitalized due to COVID, with one admitted for 7 days, and the other for 14

days including an ICU stay.
Conclusion: In this cohort, 18.2% of SLE patients experienced COVID infection since the availability of COVID vaccines (most post-Omicron), and two-thirds of those infected were unvaccinated or had only received one vaccination. Fortunately, hospitalization was uncommon and no deaths due to COVID were recorded. Patients experiencing COVID infection were often non-white suggesting that attention be paid to preventive strategies in this vulnerable sub-group. References [1] Fu X. Lupus 2022;31(6):684-696. [2] Liu et al. Hospitalizations for COVID in Canadian SLE Patients Followed in Clinical Cohorts in the Pre-vaccination Period [Abstract 130] https://www.jrheum.org/content/jrheum/early/2022/05/26/jrheum.220297.full.pdf [3] Yan L, et al. SARS-CoV-2 Vaccine Side Effects and Infections in SLE [abstract]. Arthritis Rheumatol. 2022; 74 (suppl 9). https://acrabstracts.org/abstract/sars-cov-2-vaccine-side-effects-and-infections-in-sle/.
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Table 1: Characteristics of the 75 SLE patients with COVID infection since the onset of the pandemic

Female, N (%)	66 (88)
Age at last visit, mean (range)	46 (22-82)
Race/ethnicity, N (%)	
White	39 (52)
Asian	11 (16)
Black	11 (14.6)
Other	14 (18.7)
Mean SLE duration, years (standard deviation)	17.5 (9.6)
Vaccination status	
No vaccination	32 (42.6)
One dose	4 (5.3)
Two doses	25 (33.8)
Three doses	12 (16.0)
Four doses	2 (2.7)

TOUR27
COVID-19 Prevalence Among Rheumatoid Arthritis Patients in Canadian Outpatient Clinic

Jaden Lo (McMaster University, Hamilton); Hayton Chui (Queen's University, Kingston); Gabrielle Sraka (McMaster University, Hamilton); Jocelyn Chow (Newcastle University - School of Medical Education, Newcastle Upon Tyne); Alex Ngao (University of East Anglia , Norwich); Elaine Soucy (Credit Valley Rheumatology, University of Toronto, Mississauga); Andrew Chow (Credit Valley Rheumatology, University of Toronto, Mississauga)
Objectives: To assess the rate of COVID-19 infection and vaccination among patients with rheumatoid arthritis (RA) taking biologic agents, Janus Kinase inhibitors (JAKi), and disease-modifying antirheumatic drugs (DMARDs) in an outpatient clinical setting.
Methods: Using electronic health records derived from a single center (Ontario, Canada), patients treated with biologics, JAKi or DMARDs were identified. We included patients diagnosed with RA, positive for COVID-19, and with clinical visits post Jan-01-2020. COVID-19 results were obtained through self conducted rapid-tests confirmation during visits with rheumatologist, calls to the office, or polymerase chain reaction tests attained through Ontario Laboratories Information System between Jun-01-2019 to Aug-01-2022. Our medications of interest were: JAKi (tofacitinib, upadacitinib, baricitinib), Anti-CD20 monoclonal antibodies (rituximab), Interleukin-6 inhibitors (tocilizumab, sarilumab), TNF-alpha inhibitors (infliximab, etanercept, adalimumab, golimumab, certolizumab), T-cell inhibitors (abatacept), DMARDs

(methotrexate, sulfasalazine, leflunomide, hydroxychloroquine).
Results: Of the 560 RA patients reviewed, 75 were included (median age [IQR]: 63.02 [15.23], 14 [18.67%] male, median RA duration [IQR]: 5456 [3976] days) and identified to have tested positive for COVID-19. COVID-19 vaccination rate (minimum one vaccine) was 92.00% (median number of vaccines [IQR]: 3 [1]), with 51 patients (68.00%) receiving over three doses. The majority of patients (30 [40.00%]) tested positive prior to the first vaccine. Types of vaccines include Pfizer-BioN, Moderna, AstraZeneca, or combined. Of the JAKi and biologics used by individuals positive with COVID-19, etanercept was most prevalent (38 [50.67%]) with the longest median treatment duration (median [IQR] 3415 [3833] days), while methotrexate was the most prevalent DMARD (Table 1). Major symptoms exhibited during COVID-19 infection included cough (22 [29.33%]) and fever (20 [26.67%]). 16 individuals exhibited other symptoms after COVID-19 infection, including shortness of breath, non-ST-elevation myocardial infarction, and dyspnea (6 [37.50%]). There were 9 patient visits to the emergency room, 5 hospitalizations, 3 patients in intensive care units (1 tofacitinib/ 2 rituximab), and 2 deaths (1 rituximab/ 1 etanercept), all in relation to COVID-19.
Conclusion: COVID-19 prevalence among RA patients remains an important consideration for rheumatologists. A majority of infections occurred prior to first immunization. Infections affect patients on all types of advanced therapy, most of which the patient recovers from. Risk of COVID-19 did not seem to differ among types of medication, however rituximab was most present in severe responses after COVID-19 infection. Further scrutiny into long term effectiveness of the vaccine and/or impact of COVID-19 in patients on biologics would be beneficial.
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Table 1 - Patient drug usage during COVID-19 infection with treatment duration

Drug	n(%)	Treatment duration (days), median [IQR]
JAK inhibitors		
Tofacitinib	14 (18.67)	248 [1108]
Baricitinib	0	0 [0]
Upadacitinib	7 (9.33)	94 [61]
Anti-CD20		
Rituximab	12 (16.00)	1273 [1732]
IL-6		
Tocilizumab	18 (24.00)	429 [1090]
Sarilumab	0	0 [0]
Anti-TNF		
Infliximab	19 (25.33)	429 [1090]
Etanercept	38 (50.67)	3415 [3833]
Adalimumab	17 (22.66)	1447 [3430]
Golimumab	17 (22.66)	578 [1179]
Certolizumab	4 (5.33)	436 [220]
CTLA4-Ig		
Abatacept	19 (25.33)	787 [1058]
DMARDs		
Methotrexate	68 (90.66)	3538 [2861]
Sulfasalazine	23 (30.66)	189 [1956]
Leflunomide	49 (65.33)	507 [991]
Hydroxychloroquine	47 (62.66)	581 [2425]

TOUR28
Safety Profile of COVID-19 Vaccinations in Patients with Rheumatoid Arthritis (RA) and Systemic Sclerosis(SSc)
Elizabeth Ziming Yan (McMaster University, Michael G. DeGroote School of Medicine, Hamilton); Sumiya Lodhi (University of Ottawa, Faculty of Medicine, Ottawa); Lauren Heesels (McMaster University, Faculty of Health Sciences, Hamilton); Akhil Yerubandi (McMaster University, Hamilton); Jonathan Bellini (McMaster University, Michael G. DeGroote School of Medicine, Hamilton); Barbara Baker (McMaster University, Hamilton); Jenna Benoit (McMaster University, Hamilton); Lawrence Mbuagbaw (McMaster University, Hamilton); Dawn Bowdish

(McMaster, Hamilton); Maggie Larche (McMaster University, St Joseph's Healthcare Hamilton, Hamilton); Gilaad G Kaplan (University of Calgary, Calgary); Antonio Avina-Zubieta (University of British Columbia Faculty of Medicine; Arthritis Research Canada, Vancouver); Paul R. Fortin (Division of Rheumatology, Department of Medicine, CHU de Québec - Université Laval, Québec); Anne-Claude Gingras (Lunenfeld-Tanenbaum Research Institute, Toronto); Vinod Chandran (Krembil Research Institute, Toronto Western Hospital, Toronto); Gilles Boire (Université de Sherbrooke, Sherbrooke); Diane Lacaille (Arthritis Research Canada, University of British Columbia, Vancouver); Ines Colmegna (The Research Institute of the MUHC, Montreal); Carol Hitchon (University of Manitoba, Winnipeg); Jennifer LF Lee (RI-MUHC, Montreal); Sasha Bernatsky (McGill University Health Centre, Department of Medicine, Division of Rheumatology, Montreal); SUCCEED Investigators Safety and immUnogenicity of Covid-19 vaCcines in systEmic immunE mediated inflammatory Diseases (Montreal)
Objectives: Vaccine safety for patients with inflammatory-mediated diseases (IMID) is important as these patients may be prone to exaggerated vaccine responses such as more severe post-vaccination symptoms, increased thromboembolic events, and worsening disease severity. With the COVID19 pandemic, more robust data on the safety profiles of the currently available vaccines for IMID patients may improve vaccine guidelines and reduce vaccine misinformation. This study aims to explore the safety of COVID-19 vaccinations for patients with RA and SSc.
Methods: Patients with RA enrolled between April 2021 to Sept. 2022 at the Hamilton (McMaster) for the Safety and Immunogenicity of Covid-19 vaccines in Systemic Immune-Mediated Inflammatory Diseases (SUCCEED) study site were assessed at specific time points after each vaccine dose. The same methodology was applied for patients with Systemic sclerosis (SSc). Patients were asked to complete self-report questionnaires regarding their experiences with the first 2 doses of their COVID vaccine. Information regarding the type of vaccine received, changes in their pre-existing disease, local injection reactions (i.e. swelling, pain, rashes), systemic reactions (i.e., fever, nausea, diarrhea, joint pain) following each dose of the COVID vaccine, and other outcomes such as hospitalization were captured. Descriptive statistical analyses were used.
Results: Of the 43 RA and 21 SSc participants included for analysis, 81.4% were female and 18.6% were male for RA while 95.2% were female and 4.8% were male for SSc. The average age was 59 (SD = 23) for RA and 57 (SD = 11) for SSc. Pfizer was the most common vaccine for both doses. After Dose 1, the prevalence of any side effect was 51.2% and 33.3% for RA and SSc respectively and 44.2% and 42.9% respectively after Dose 2. The most common side effects after the first dose were sore arm/pain for both RA and SSc (39.5% and 19.0% respectively), as well as fatigue (19.0%) for SSc only. Similar patterns were seen for the second dose. For both RA and SSc, reported flare of disease was more common after the first dose. Moderna vaccination appeared to have a higher incidence of any side effect for both RA and SSc. No thromboembolic events were noted.
Conclusion: Overall, the incidence of adverse vaccine effects in both RA and SSc patients are low and most side effects are limited to local site reactions. There have been no severe side effects requiring urgent care or hospitalization. More data is required to confirm whether side effects are vaccine-specific.

Poster Tour 8: PsA (industry)

TOUR29

Stringent Disease Activity Control at 2 Years Across Psoriatic Arthritis Domains Irrespective of Baseline Characteristics in Patients Treated with Guselkumab: Post-Hoc Analysis of a Phase 3, Randomized, Double-Blind, Placebo-Controlled Study

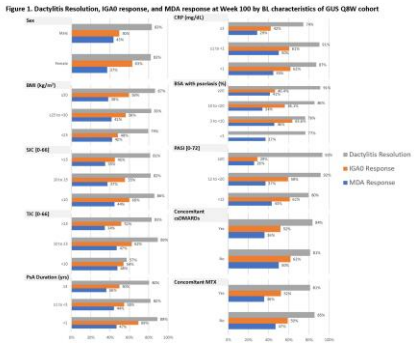
Christopher Ritchlin (University of Rochester, Rochester); Philip Mease (University of Washington, Seattle); Wolf-Henning Boehncke (Geneva University Hospital and Department of Pathology and Immunology, Geneva); John Tesser (Arizona Arthritis & Rheumatology Associates, Phoenix); Hugues Allard-Chamard (Université de Sherbrooke, Sherbrooke); Soumya Chakravarty (Janssen Scientific Affairs, Horsham); Emmanouil Rampakakis (JSS Medical Research Inc, Montreal); May Shawi (Janssen Inc, New Jersey); Elena Schiopu (Michigan Medicine Rheumatology Clinic – Taubman Center, Ann Arbor); Joseph Merola (Harvard Medical School, Boston); Iain McInnes (University of Glasgow, Glasgow); Atul Deodhar (Oregon Health and Science University, Portland)

Objectives: Guselkumab (GUS) is associated with robust and sustained improvement in PsA signs and symptoms in subgroups of patients (pts) pooled from the phase 3 DISCOVER-1 and DISCOVER-2 (D2) trials, across a variety of baseline (BL) pt characteristics through 1, and 2 years (D2 only). In this post-hoc analysis using D2 data, we evaluated the efficacy of GUS in inducing long-term (W100) stringent disease control in Group for Research and Assessment of Psoriasis and Psoriatic Arthritis (GRAPPA)-recommended domains across BL characteristics.

Methods: D2 enrolled biologic-naïve adults with active PsA defined as ≥5 swollen and ≥5 tender joint counts (SJC; TJC) and CRP ≥0.6 mg/dL. 739 pts were randomized (1:1:1) and treated with GUS 100 mg Q4W (n=245); GUS 100 mg at W0, W4, then Q8W (n=248); or placebo (PBO; n=246) with crossover to GUS 100 mg Q4W at W24. In this analysis, only GUS-randomized pts were included (n=493). Achievement of the following outcomes at W100 was assessed: minimal disease activity (MDA), ACR 50% improvement (ACR50), ACR70, Investigator's Global Assessment score of 0 [clear skin] (IGA 0), Psoriatic Arthritis Disease Activity Score - low disease activity (PASDAS LDA), resolution of enthesitis and dactylitis, Functional Assessment of Chronic Illness Therapy-Fatigue (FACIT-F) response (≥4-point improvement), and Health Assessment Quality Disease Index (HAQ-DI) response (≥0.35-point improvement). BL characteristics of interest were pt sex, baseline BMI, SJC, TJC, PsA duration, CRP, % body surface area (BSA) with psoriasis, and PASI score, and use of conventional synthetic (cs) DMARDs and methotrexate (MTX). Non-responder imputation was used for missing categorical response data.

Results: 442 (90%) GUS-randomized pts completed study treatment through W100. With few exceptions, achievement of MDA response, IGA 0, and resolution of dactylitis [Figure 1] at W100 was demonstrated across a variety of baseline pt characteristics, without consistent differences in proportion of responders across pt subgroups of adequate sample size or between GUS dosing regimens. Similar trends were observed for achievement of ACR50, ACR70, PASDAS LDA, enthesitis resolution, FACIT-F response, and HAQ-DI response.

Conclusion: Irrespective of dosing regimen, treatment with GUS resulted in sustained achievement of several stringent endpoints spanning key GRAPPA-recommended domains through 2 years across a variety of BL demographic and disease characteristics. These results further support the long-term efficacy of GUS across the full spectrum of PsA disease domains and diverse PsA populations.



TOUR30

Sex-related Measures of Inequity in Randomized Controlled Trials in Psoriatic Arthritis: A Systematic Literature Review and Meta-analysis

Keith Colaco (University of Toronto; Women's College Hospital, Toronto); Sivakami Mylvaganam (University of Toronto, Toronto); Jordi Pardo (Center for Practice-Changing Research, Ottawa); Jennifer Petkovic (University of Ottawa, Ottawa); Lihi Eder (Women's College Research Institute, University of Toronto, Toronto)

Objectives: Through a systematic review and meta-analysis of randomized controlled trials (RCTs) in psoriatic arthritis (PsA), we aimed to assess sex-related dimensions of inequity by describing the proportion of studies reporting sex-disaggregated data and by comparing the efficacy of advanced therapies between male and female participants.

Methods: We performed a systematic literature search of Medline, Embase and Central databases and conference abstract archives from January 2000 to June 2022. RCTs that reported sex-disaggregated results and assessed the efficacy of an advanced therapy (biologic or targeted synthetic) in adult participants with PsA were included. Efficacy endpoints included the proportion of participants achieving minimal disease activity (MDA), or meeting the American College of Rheumatology 20 (ACR20) and ACR50 response criteria at the primary endpoint of the study. Random-effects models were used to calculate pooled effects (Odds Ratio [OR] and 95% Confidence interval [CI]) for response in males vs. females for the different classes of advanced therapies.

Results: A total of 51 studies, including 21,603 participants, were included. The average percentage of male and female participants enrolled was 51.4% and 48.6%, respectively. Only five studies (10%) reported sex-disaggregated baseline characteristics, nine studies (18%) reported sex-disaggregated efficacy endpoints and one study (2%) reported sex-disaggregated safety endpoints. Differences in pooled estimates of efficacy endpoints were seen for males and females across the different classes of advanced therapies. The probability of achieving ACR20 response was higher in males vs. females for IL-17 (OR 1.76, 95% CI 1.27, 2.44), IL-23 (OR 1.47, 95% CI 1.14, 1.88) and TNF inhibitors (OR 1.80, 95% CI 1.40, 2.31), but not for JAK inhibitors (OR 1.08, 95% CI 0.82, 1.41). [Figure 1] Similarly, the probability of achieving ACR50 response was higher in males vs. females in all advanced therapies, except JAK inhibitors (OR 1.09, 95% CI 0.73, 1.62), however this analysis was based on fewer studies. The probability of achieving MDA was higher in males across all classes of advanced therapies, including IL-17 (OR 2.03, 95% CI 1.24, 3.34), IL-23 (OR 1.90, 95% CI 1.10, 3.29), TNF (OR

2.60, 95% CI 1.74, 3.90) and JAK inhibitors (OR 1.77, 95% CI 1.15, 2.73).
Conclusion: Female participants in RCTs are less likely to achieve efficacy end points for most classes of advanced therapies. Some differences in response outcomes were found across classes of advanced therapies. RCTs should report sex-disaggregated results to identify sex-related differences in efficacy and safety outcomes, which will inform patient-centered therapeutic strategies.

TOUR31

Time to Achieve Minimal Disease Activity for Ixekizumab Versus Adalimumab in Patients with Psoriatic Arthritis: Post-hoc Analysis of SPIRIT-H2H

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Objectives: To determine the time to achieve minimal disease activity (MDA) in patients with psoriatic arthritis (PsA) treated with ixekizumab (IXE) or adalimumab (ADA), and to enhance understanding of the dynamics of achieving MDA. Although remission is ideal, it is hard to achieve and maintain. MDA defines a satisfactory or desired state of disease activity, and a useful target for treatment, that is specific for PsA.
Methods: Patients had active PsA, met Classification for Psoriatic Arthritis criteria, had ≥3/66 swollen and ≥3/68 tender joints, active plaque psoriasis affecting ≥3% of body surface area, previous inadequate response to ≥1 conventional synthetic disease-modifying antirheumatic drugs (csDMARD) and were biologic DMARD and Janus kinase inhibitor naïve. Patients were randomized to receive approved dosing regimens of either IXE or ADA. Patients on csDMARDs at screening could continue a stable dose of csDMARD therapy. Kaplan-Meier analyses were used to estimate the time to reach first response and sustained response for MDA and its individual components, by treatment group over the 52-week observation period. Non-responders were censored at the last available visit (day 392, last known day of the week 52 visit for first response) or at day 309 (last possible day to achieve a sustained response). For each separate analysis, patients who already fulfilled the individual criteria at baseline were excluded. Sustained response was defined as meeting response criterion at two consecutive visits, achieved on the first of these two visits. Time to response was compared between groups using log-rank test.
Results: Baseline demographics and characteristics were balanced between treatment groups. With IXE (N=282) and ADA (N=283), 194 (68.8%) and 180 (63.7%) patients achieved a first MDA during the 52-week period, respectively. Median time to first MDA response tended to be reached earlier with IXE than with ADA (16.2 weeks vs 24.4 weeks, p=0.100) (Figure). A sustained MDA response was achieved by 54.6% of IXE-treated patients and 47.0% of ADA-treated patients. Median time to sustained MDA response was 32.1 weeks for IXE and could not be estimated for ADA-treated patients during the 52-week observation period (p=0.0421) (Figure). The same trends were identified for all components of MDA.
Conclusion: A rapid and sustained response encompassing all aspects of the disease is an

important treatment outcome for patients with PsA. Results of this post-hoc analysis suggest that, in patients with PsA, time to first and sustained MDA response is likely to be shorter with IXE than ADA.

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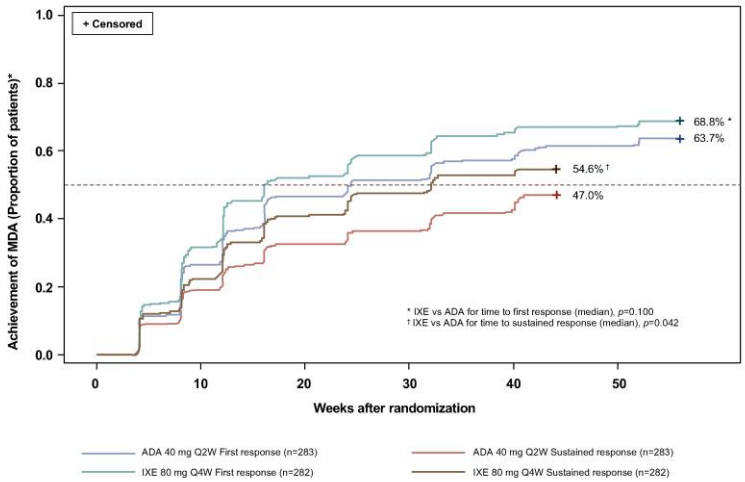

TOUR32

Performance of BASDAI vs. ASDAS in Evaluating Axial Involvement in Patients with PsA Treated with Guselkumab: Pooled Analysis of Two Phase 3 Studies

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Objectives: The Bath Ankylosing Spondylitis Disease Activity Index (BASDAI) assesses activity of axial disease in PsA patients (pts), but only one of its questions addresses axial symptoms. The Ankylosing Spondylitis Disease Activity Score (ASDAS) excludes assessment of enthesitis, gives less weight to peripheral activity and is more objective than the BASDAI. This post-hoc analysis compared the performance of BASDAI and ASDAS in evaluating symptoms of axial involvement in axial PsA (axPsA) pts.

Methods: Adult pts enrolled in DISCOVER-1/2 studies had active PsA despite standard therapies. Pts were randomized 1:1:1 to GUS 100 mg every 4 weeks (Q4W); GUS 100 mg at W0, W4, then Q8W; or placebo (PBO) with crossover to GUS Q4W at W24. axPsA was defined by presence of sacroiliitis based on previous radiograph or MRI confirmation. Data were pooled across treatment groups. In addition to BASDAI and ASDAS, modified versions excluding peripheral arthritis (mBASDAI/mASDAS) and enthesitis questions (mBASDAI) were calculated. Normalized (0-10 scale) versions of ASDAS and mASDAS were calculated based on maximum scores of ≈7 and ≈6.3, respectively. The correlation of BASDAI/mBASDAI and ASDAS/mASDAS with SJC, TJC, enthesitis, Functional Assessment of Chronic Illness Therapy (FACIT)-fatigue, pt pain, pt global, and physician global was assessed with Pearson's correlation

coefficient. Cross-sectional and longitudinal (W52) effects of Leeds enthesitis index (LEI), SJC, and axPsA on BASDAI/mBASDAI and ASDAS/mASDAS were assessed with mixed models.
Results: 436 pts with baseline (BL) BASDAI information were included. In axPsA pts, BASDAI showed weak correlation with SJC, TJC, LEI, and physician global; moderate correlation with fatigue; and strong correlation with pt global and pt pain. Similar results were observed for ASDAS and modified versions. Among pts without axPsA, correlations of BASDAI and ASDAS with SJC, TJC, and LEI remained weak; correlations with pt global and pt pain remained strong [Table 1]. Longitudinally, among pts with and without BL enthesitis, respectively, LEI and SJC showed significant but not clinically important associations with either outcome. Presence of axial disease was associated with significantly greater BASDAI and ASDAS scores, at BL and longitudinally, without differences in the incremental effect on BASDAI, normalized ASDAS, or their modified versions.
Conclusion: In pts with axPsA, the BASDAI and ASDAS performed similarly, with weak correlations with peripheral arthritis and moderate/strong correlations with pt fatigue and pain. They also showed similar ability to discern changes in axial disease activity suggesting that BASDAI and ASDAS are valid in assessing axial disease activity in PsA pts.
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Table 1. Correlation† of BASDAI and ASDAS with LEI, SJC, TJC, Physician Global, Pt Global, and Pt Pain at Baseline in Patients With and Without‡ Imaging-Confirmed axPsA

	Pts With axPsA (N=312)				Pts Without axPsA‡ (N=124)			
	BASDAI	mBASDAI	ASDAS	mASDAS	BASDAI	mBASDAI	ASDAS	mASDAS
SJC	0.20*	0.17*	0.18*	0.17*	0.18*	0.16	0.19*	0.18
TJC	0.29*	0.27*	0.21*	0.20*	0.12	0.11	0.14	0.14
LEI score	0.24*	0.23*	0.17*	0.16*	-0.04	-0.02	0.07	0.08
FACIT-Fatigue≠	-0.56*	-0.55*	-0.37*	-0.34*	-0.56*	-0.56*	-0.50*	-0.47*
Physician GA	0.35*	0.33*	0.44*	0.43*	0.43*	0.41*	0.44*	0.43*
Pt GA	0.69*	0.64*	0.62*	0.59*	0.62*	0.59*	0.60*	0.57*
Pt Pain	0.66*	0.61*	0.62*	0.58*	0.70*	0.67*	0.70*	0.66*

†Correlation assessed with Pearson's correlation coefficient.
‡Although, per the study protocol, the BASDAI questionnaire was to be completed only by pts with primary PsA subtype of 'peripheral arthritis with spondylitis', inadvertently it was also completed by some pts without spondylitis as the primary subtype. Of the 124 pts without imaging-confirmed axial disease, 52 had polyarticular arthritis with absence of rheumatoid nodules, 44 had asymmetric peripheral arthritis, 20 had peripheral arthritis with spondylitis (not confirmed by imaging), and 8 had distal interphalangeal joint involvement.
**Asterisks indicate statistically significant (p<0.05) coefficients.*
≠Higher scores indicate worse fatigue.

Weak correlation: 0.20–0.39 | Moderate correlation: 0.40–0.59 | Strong correlation: 0.60–0.79

Poster Tour 9: PsA/Auto-Immune Diseases/OA

TOUR33
Is There a Correlation Between Skin and Musculoskeletal Activity in Psoriatic Arthritis (PsA)
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Objectives: To assess the association between the extent and severity of skin psoriasis and

musculoskeletal manifestations of PsA at baseline and over time.

Methods: An inception cohort of patients enrolled in a tertiary care clinic from 2000-2020 was analysed. Patients are assessed according to a standard protocol including demographic information, clinical skin and joint assessments and laboratory evaluations at 6–12-month intervals. Skin activity is measured by the PASI score, and joint disease activity is measured by the number of tender and swollen joints. Axial disease is measured by the Bath Ankylosing Spondylitis Disease Activity Index (BASDAI) and the Bath Ankylosing Spondylitis Metrology Index (BASMI). Spearman correlations were calculated between PASI scores and joint counts and BASMI (in patients with axial disease). Multivariable analysis was carried out using negative binomial regression models for the joint counts and linear models for BASMI and BASDAI scores.

Results: The table provides the characteristics of 397 patients enrolled within 12 months of PsA diagnosis. A significant correlation was found between PASI score and the total active joint count (AJC) (p=0.01). Among patients on no treatment at the baseline assessment, a PASI score reduction by 1 was associated with a 2.4% reduction of AJC controlling for sex, age and psoriasis duration. There was no association between PASI score and AJC in patients taking conventional DMARDs (cDMARDs), while for those receiving biologic DMARDs (bDMARDs) a one-unit decrease in PASI was associated with a 3.9% reduction in AJC. When all longitudinal data were considered, in the absence of DMARDs, AJC was reduced by 4.8% on average with a PASI decrease of 1, while treatment with bDMARDs for each decrease of PASI of 1, the AJC decreased by 4.4% on average. Adjusting for sex, age, and PsC duration, we found a positive association between PASI and BASMI scores in all treatment groups at baseline. The longitudinal analysis showed that PASI is positively associated with BASMI among patients on cDMARDs. Among patients with axial disease, a positive association was found between PASI and BASMI at baseline in all treatment groups except cDMARDs; a positive association was found between longitudinal PASI and BASMI scores in all treatment groups.

Conclusion: In patients presenting within 12 months of diagnosis of PsA, there is an association between the severity of skin and joint or axial disease, both at baseline and longitudinally, but the nature of the association differs according to medication use.

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Table: Baseline characteristics of 397 patients

Variable	Mean (SD)*, Number (%)** N=397
Age (years)	44.97 (13.01)*
PsA duration (years)	0.43 (0.66)*
Psoriasis duration (years)	14.64 (13.65)*
Married	236 (60.5)**
Smoker ever	193 (48.7)**
Alcohol intake	246 (62.3)**
Employed	309 (78.4)**
Post secondary education	277 (71.0)**
BMI	29.21 (8.85)*
PASI	6.11 (9.03)*
Nail	238 (61.2)**
Active joint count (tender ± swollen)	7.3 (13/15)*
Swollen joint count	2.96 (4.93)*
Axial disease	53 (17.8%)**
Treatment level	
None/NSAIDS only	272 (68.2)**
DMARDs ± NSAIDs	98 (24.7)**
Biologics ± DMARDs	27 (6.80)**

TOUR34

The association between exposure to gut dysbiosis-inducing medication and immune-related adverse events from immune checkpoint inhibitor therapy

Oliver Terry (McGill University, Montreal); Alexandra Ladouceur (McGill University , Montréal); Khashayar Esfahani (Jewish General Hospital, Montreal); Wilson Miller (Jewish General Hospital, Montreal); Marie Hudson (McGill University, Jewish General Hospital, Lady Davis Institute for Medical Research, Montreal)

Objectives: Immune checkpoint inhibitors (ICI) have become first-line treatment for many cancers. Nevertheless, tumor response remains unpredictable and off-target immune-related adverse events (irAEs) can be severe and may require ICI discontinuation. A healthy gut microbiota is involved in ICI efficacy. However, cancer patients often need to take medications that can cause gut dysbiosis. When taken at the time of ICI initiation, exposure to gut dysbiosis-inducing medications has been associated with inferior ICI efficacy as well as irAEs. Little is known on the effect of gut dybiosis-inducing medications taken after the initiation of ICI. We aimed to determine whether exposure to antibiotics and other gut dybiosis-inducing medications after the initiation of ICI was associated with irAE. We hypothesized that exposure to antibiotics and other gut dysbiosis-inducing medications during treatment with ICI would be associated with irAEs.

Methods: We performed a retrospective nested case-control study. Data were extracted from the Montreal Immune Related Adverse Events (MIRAE) Biobank and supplemented by a chart review. Cases were defined as patients with a CTCAE grade 3 or more irAE and the date of irAE as the index date. Cases were matched to controls without irAE on calendar date of index date. Exposure to gut dysbiosis-inducing medications in the 30 days prior to index date was compared between cases and controls using univariate and multivariate logistic regression. In univariate analyses, time from ICI initiation to index date, non-small cell lung cancer (NSCLC), melanoma, and PD-1 treatment were associated with irAEs with $p<0.1$, and these variables were therefore selected as covariates for multivariate models. Statistical analyses were performed with the computing package R.

Results: Thirty-six cases (including 5 with myositis and 3 with arthritis) and controls were matched on index date, [Table 1]. Multivariate analysis showed no association between exposure to antibiotics 30 days prior to index date and irAEs (OR 0.91, 95% CI 0.13-6.58, p=0.928). Exploratory analyses with exposure windows of 60 and 90 days yielded similar results. Similarly, no associations were found for specific classes of antibiotics and other gut dysbiosis-inducing medications. Interestingly, cases were more likely to have tumor response than controls.

Conclusion: Exposure to antibiotics and other gut dysbiosis-inducing medications after ICI initiation was not associated with irAEs. Although our results are based on a small sample, these findings are reassuring for cancer patients who require gut dysbiosis-inducing medications during the course of ICI treatment. Larger studies are needed to confirm these findings.

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Table 1: Baseline characteristics of cases and controls

	Cases n=36	Controls n=36	Univariate OR (95% CI)	p-value
Mean age, years (SD)	67 (14)	66 (15)	1.00 (0.97-1.04)	0.889
Sex				
Male	25 (69)	21 (58)	1.80 (0.60-5.37)	0.292
Female	11 (31)	15 (42)	0.56 (0.19-1.66)	0.292
Time from ICI initiation to index date, days (IQR)	163 (85-321)	94 (54-143)	1.01 (1.00-1.01)	0.02*
ECOG performance status				
0	14 (39)	10 (28)	1.57 (0.61-4.05)	0.350
1-2	22 (61)	26 (72)	0.64 (0.25-1.64)	0.350
Smoking status				
Never	22 (61)	17 (47)	2.00 (0.68-5.85)	0.206
Ever (past or current)	14 (39)	19 (53)	0.50 (0.17-1.46)	0.206
Cancer type				
Melanoma	11 (31)	4 (11)	0.36 (0.12-1.14)	0.08*
Renal cell	6 (17)	4 (11)	2.75 (0.88-8.64)	0.08*
Non-small cell lung	6 (17)	13 (36)	1.50 (0.42-5.32)	0.530
Gastrointestinal/hepatic	3 (8)	1 (3)	1.00 (0.20-4.96)	1.000
Head and neck squamous cell	3 (8)	3 (8)	2.00 (0.18-22.06)	0.571
Other	2 (6)	3 (8)	0.67 (0.11-3.99)	0.657
Cancer stage				
IV	27 (75)	28 (78)	0.875 (032-2.41)	0.796
III and below	9 (25)	8 (22)	1.14 (0.42-3.15)	0.796
ICI therapy				
Anti-PD-L1	3 (8)	1 (3)	3.00 (0.31-28.84)	0.341
Anti-PD-1	20 (56)	30 (83)	0.23 (0.07-0.81)	0.02*
Combination	5 (14)	2 (6)	4.00 (0.35-35.79)	0.215
Grade ≥3 irAE				
Colitis	8 (22)			
Endocrine	5 (14)			
Myocarditis	5 (14)			
Myositis	5 (14)			
Pneumonitis	5 (14)			
Hepatitis	4 (11)			
Dermatologic	3 (8)			
Arthritis	3 (8)			
Other	4 (11)			
Medications of interest 30 days pre-index date				
Antibiotic	4 (11)	4 (14)	1.00 (0.25-4.00)	1.000
Beta-lactam	3 (8)	4 (11)	0.75 (0.17-3.35)	0.706
Other	3 (8)	1 (3)	3.00 (0.31-28.84)	0.341
Proton pump inhibitors	14 (39)	11 (31)	1.60 (0.52-4.89)	0.410
Opioid	12 (33)	17 (47)	0.62 (0.25-1.49)	0.280
Pro-motility agent	4 (11)	9 (25)	0.38 (0.10-1.41)	0.147
Statins	15 (42)	12 (33)	1.60 (0.52-4.89)	0.410
Psychotropics	15 (42)	10 (28)	1.83 (0.68-4.96)	0.232
Angiotensin-receptor blockers	10 (28)	9 (25)	1.13 (0.43-2.92)	0.808
NSAIDs	5 (14)	3 (8)	1.67 (0.40-6.97)	0.484
Oral hypoglycemics	12 (33)	4 (11)	2.50 (0.49-12.89)	0.273
ACE inhibitors	7 (19)	5 (14)	1.67 (0.40-6.97)	0.484
Beta-blockers	4 (11)	2 (6)	2.00 (0.37-10.92)	0.423
Insulin	5 (14)	2 (6)	4.00 (0.45-35.79)	0.215
Alpha-blockers	5 (14)	2 (6)	4.00 (0.45-35.79)	0.215
Tumor responders	26 (72)	15 (42)	16.00 (2.12-120.6)	0.001

*Variables with p<0.1 were included in the multivariate analyses.

TOUR35

"You Don't Put It Down to Arthritis": Qualitative Analysis of the First Symptoms Recalled by Individuals with Knee Osteoarthritis

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Objectives: The Osteoarthritis Research Society International (OARSI)– endorsed Early-Stage Knee Osteoarthritis (EsKOA) initiative is developing classification criteria for EsKOA to facilitate identifying and enrolling individuals into clinical trials of disease-modifying OA therapies to prevent progression to late-stage OA. To seek patient perspectives during the first phase of the initiative, we explored the first symptoms and experiences of knee osteoarthritis (OA) recalled by individuals with knee OA, using qualitative methods.

Methods: In this qualitative study, informed by the methodology of qualitative description, we analyzed focus group (n=17 groups) and one-on-one interviews (n=3) conducted with a total of 91 individuals living with knee OA in 2006 as part of an OMERACT/OARSI initiative to better understand the OA pain experience. Participants with knee OA were recruited from five academic hospitals in Australia, Canada, UK, and USA. Participants were purposively sampled for a range of disease duration and symptom severity. As part of each focus group or interview, participants were asked to describe their first symptoms of knee OA. From the transcripts, we

conducted inductive thematic analysis, which included line-by-line coding, identifying repeated patterns across the data, and grouping data into themes.
Results: We developed four overarching themes: Insidious Onset, Must be Something Else, Early Symptoms, and Early Adaptations. Participants described the gradual and intermittent way in which symptoms of OA developed over many years; many could not identify a specific starting point. Many participants recalled a delay in self-identifying their symptoms as OA, often dismissing early symptoms, and not allowing themselves to believe the symptoms could be due to arthritis. Participants described diverse initial knee symptoms e.g., activity-exacerbated joint pain, stiffness and crepitus, that were low-intensity and strategies to compensate to allow continued participation in recreational or other daily activities. Participants reported placing greater importance on their knee symptoms, including seeking care, only when their physical function limited them from performing valued activities. Table 1 shows the themes with illustrative quotes.
Conclusion: This study illuminates the earliest symptoms and experiences of knee OA. Initial symptoms were insidious in onset, intermittent, low intensity, and often not attributed to arthritis. People with such symptoms would not fulfill current OA classification criteria, supporting the development of specific classification criteria for EsKOA.

TOUR36

Safety of COVID-19 Vaccines Varies Across Immune Mediated Inflammatory Diseases

Hamza Shah (University of Manitoba, Winnipeg); Charles Bernstein (University of Manitoba, Winnipeg); Catherine Card (Public Health Agency of Canada, Winnipeg); John Kim (Public Health Agency of Canada, Winnipeg); Christine Mesa (Public Health Agency of Canada, Winnipeg); Ruth Ann Marrie (University of Manitoba, Winnipeg); Carol Hitchon (University of Manitoba, Winnipeg)

Objectives: People with immune-mediated inflammatory diseases (IMIDs) including inflammatory arthritis (IA), systemic autoimmune rheumatic diseases (SARDS), multiple sclerosis (MS), and inflammatory bowel disease (IBD) benefit from COVID-19 vaccines. Data on safety of COVID-19 vaccines for IMIDS are scarce. We evaluated the pattern of COVID-19 vaccine reactogenicity, and the association of reactogenicity with post-vaccine activity/state and immunogenicity in people with IMIDs.
Methods: Participants with IMIDs [62 IA, 69 SARDS, 63 MS, 70 IBD; 80% female; age 56(15) years] self-reported the presence and severity of adverse events (AEs) daily for 7 days following each of 4 vaccine doses (reactogenicity), and completed measures of IMID activity/state and flare 1 month after each vaccination [Routine assessment of patient index data3(RAPID3), systemic lupus activity questionnaire(SLAQ), Expanded disability status scale(EDSS), inflammatory bowel symptom inventory short form(IBDSI-SF)]. Anti-receptor binding domain and anti-Spike IgG titers were assessed 1 month after each vaccination (immunogenicity). Descriptive statistics compared rates across groups. Multivariable models evaluated associations between reactogenicity burden (number of AEs) and a) IMID disease activity/state, b) flare, and c) immunogenicity. Covariates included sex, age, IMID category, vaccine sequence, and prior allergy (vaccine/drug/environmental).
Results: Most participants (90%) reported at least 1 AE (local AE 78% p=NS across IMIDs; systemic AE 74% p=0.005 across IMIDs). Injection site pain (76%), fatigue (56%), headache (44%), myalgia(41%) and arthralgia (31%) were the most common reported AEs. Most AEs were mild or moderate and short-lived (median 2 days; range 1-6 days) but this varied across IMIDs.(Figure) Constitutional AE (chills, fatigue, headache, feeling unwell) were most

frequently reported in patients with SARDS (IA 57%, SARDS 78%, MS 51%, IBD 56% p<0.0001); musculoskeletal AEs (joint pain/swelling, myalgia, morning stiffness) more frequent in IA (IA 47%, SARDS 38%, MS 10%, IBD 26% p<0.0001) and gastrointestinal AEs (nausea, emesis, diarrhea) in IBD (IA 19%, SARDS 28%, MS 14%, IBD 27%). Fewer AEs were reported post BNT162b2. Although IMID activity/state scores were similar across visits, SARDS patients were 5x more likely than other IMIDs to report a moderate disease flare 1 month post vaccine (OR 4.8 2.3-9.9). A higher reactogenicity burden was associated with worse IMID activity for RA, SARDs, and IBD [B (95%CI B); RAPID3 0.6 (0.2-1.0), SLAQ 0.5 (0.1-0.8), IBDSISF 1.5 (0.4-2.5)(all p< 0.01)]. Reactogenicity burden did not associate with post-vaccine seroconversion nor anti-SARSCOV2 titers.

Conclusion: Rates of AE in IMDs are comparable to the general population although the pattern of AE may vary across IMIDs. AE do not predict vaccine-mediated immunogenicity.

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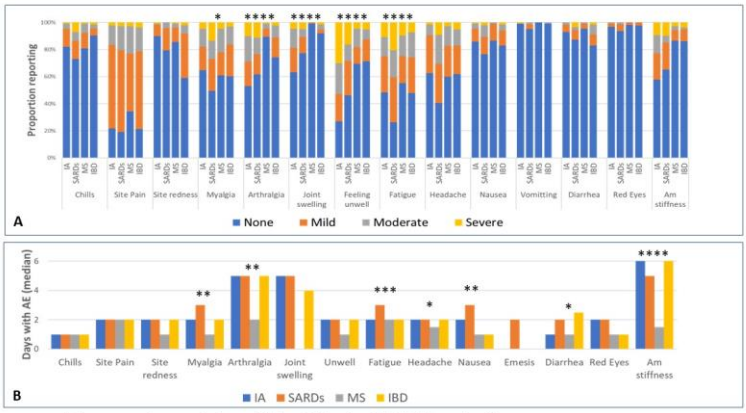

Adverse events reported over 7 days following COVID-19 vaccination
A. Presence and severity of adverse events B. Duration of adverse event if present
* p<0.05; ** p<0.01; *** p<0.001; p< 0.0001 across IMIDs

Poster Tour 10: RA/SPA

TOUR37

Cardiovascular Risk and Advanced Therapies Retention in Rheumatoid Arthritis: Results From the OBRI

Samar Aboulenain (University of Toronto, Toronto); Xiuying Li (University Health Network, Toronto); Mohammad Movahedi (University Health Network, Toronto); Claire Bombardier (University of Toronto, Toronto); Bindee Kuriya (Sinai Health System, University of Toronto, Toronto)

Objectives: Cardiovascular disease (CVD) is highly prevalent in rheumatoid arthritis (RA) and associated with morbidity and mortality. We previously demonstrated an association between CVD risk factors and higher disease activity and disability. In this study, we explored if CVD risk factors may lead to poor RA outcomes by evaluating the association between CVD risk factors and retention of biologic and targeted synthetic disease modifying antirheumatic drugs (bDMARD, tsDMARD) among methotrexate inadequate responders (MTX-IR).

Methods: Participants enrolled in the Ontario Best Practices Initiative (OBRI) RA registry were included if they had ≥ 2 visits within ≥12 months, had active disease (clinical disease activity index [CDAI] >10) and initiated their first bDMARD or tsDMARD. Patients were grouped based on the number of baseline CVD risk factors (0, 1 or >1), including hypertension,

dyslipidemia, diabetes, obesity (body mass index ≥30) or current smoking. The primary outcome was time-to-discontinuation of a first bDMARD or tsDMARD. A multivariable Cox proportional hazards model, adjusted for relevant confounders, was used to determine the association of number of CVD risk factors and medication retention.

Results: A total of 586 patients were included. bDMARDs were initiated in 91%, while the remainder initiated tsDMARDs. The mean (SD) age was 57 (13) years and 79% were females. Mean (SD) disease duration was 7 (8) years and mean (SD) CDAI score was 27 (11), reflecting high disease activity. The majority were seropositive (74%). At least 1 CVD risk factor was present in 38% while 27% had > 1 risk factor. Medication survival analysis by the CVD exposure groups is shown in the Figure. Patients without CVD risk factors had significantly better medication retention with median survival of 47 months, compared to 29 and 21 months in patients with 1 or > 1 risk factors, respectively (p=0.03). The individual CVD risk factors were not found to be associated with medication retention. In multivariate analysis, the presence of 1 CVD risk factor was associated with a significantly higher risk of medication discontinuation (HR 1.37, 95%CI 1.06-1.77, p=0.01) as was the presence of ³ 2 CVD risk factors (HR 1.40, 95% CI 1.05-1.86, p=0.02).

Conclusion: The presence of ≥1 CVD risk factor, compared to no risk factors, is associated with reduced initial bDMARD/tsDMARD retention among MTX-IR patients. Further investigation into the possible mechanisms is required to help determine if optimizing CVD risk factors can improve medication retention and RA outcomes.

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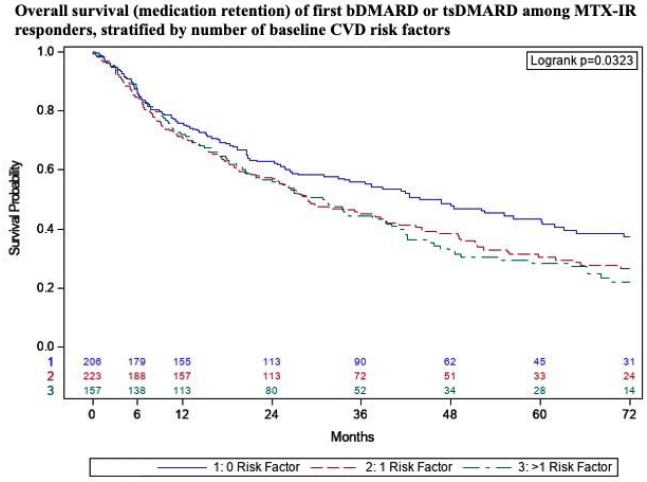

TOUR38

Comparative Use of Secukinumab And Ixekizumab In The Real-Life Observational Cohort RHUMADATA™

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Rhumatologie de Montréal, Montréal); Jean-Pierre Raynauld (Institut de Rhumatologie de Montréal, Montréal); Diane Sauvageau (Institut de Rhumatologie de Montréal, Montreal); Edith Villeneuve (Institut de Rhumatologie de Montréal, Montréal); Louis Coupal (Institut de Rhumatologie de Montréal, Montréal)

Objectives: Ixekizumab (IXE) and secukinumab (SECU) are human monoclonal antibodies (IgG4 and IgG1k) that bind to the protein interleukin-17A. They are approved in Canada for the treatment of both axial (axSpA) and peripheral (pSpA) spondyloarthropathies. Comparing the efficacy and safety of these antibodies seems interesting.

Methods: RHUMADATA patients diagnosed with axSpA or pSpA initiating treatment with IXE or SECU were selected for this analysis if they provided informed consent and if treatment was started after August 2016 (date of the first IXE prescription). Data included demographics, disease, and treatment characteristics. Assessment of disease activity, including HAQ-DI, BASDAI and BASFI, were calculated at TI and 12 months. All patients were followed until they discontinued their treatment or until September 18, 2022, the date data was extracted. Drug retention rates were estimated and compared using Kaplan-Meier survival estimates curves.

Results: Out of 272 patients 226 and 46 initiated SEC and IXE, respectively (83 with axSpA and 189 with pSpA). Among SEC and IXE patients, the average age at diagnosis and treatment initiation was 44.0 (standard deviation (sd)=13.2) and 51.6 (13.1), respectively, and 56% and 54% were women. In the SEC group, the Charlson comorbidity index was 1.52 (1.58), while in the IXE group, it was 1.83 (1.79). The pSpA patients had erosions present in 25% (SECU) and 29% (IXE) of the assessed cases. The physician and patient global disease activity assessments at the start of treatment were 4.9 (2.4) and 5.5 (2.4), and 5.1 (2.4) and 5.4 (2.8) in the SEC and IXE groups. The HAQ-DI, BASDAI, and BASFI scores were respectively 1.30 (0.63), 5.8 (2.3) and 4.5 (2.6), and 1.11 (0.56), 4.8 (2.9) and 3.7 (2.5). TSECU and IXE had average retention rates of 2.59 (0.12) and 2.03 (0.24) respectively. Kaplan-Meier log-rank p-value comparing retention between the two groups was 0.2519. Physicians' and patients' global assessments of disease activity were 2.0 (2.1) and 3.6 (2.4) at one year, and 2.4 (1.7) and 3.1 (3.0) in the SECU and IXE groups. HAQ-DI, BASDAI, and BASFI scores were 0.86 (0.52), 3.8 (2.1), and 3.1 (2.3), and 0.71 (0.72), 3.8 (2.7), and 3.6 (3.0).

Conclusion: Although SECU had numerically higher retention than IXE, there was no statistically significant difference between the two. These medications appear to have similar effectiveness and patients improved similarly at one year.

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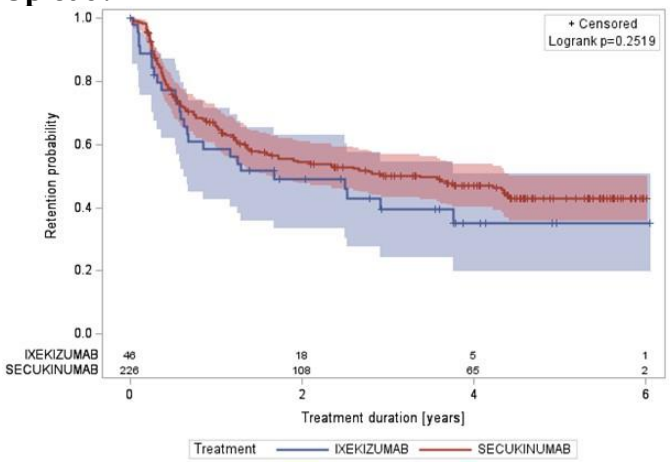

TOUR39

Contemporary Burden of Disease and Disease Activity of Axial-SpA Patients in Quebec – Results from the RHUMADATA Database

Denis Choquette (Institut de Rhumatologie de Montréal, Montréal); Louis Coupal (Institut de Rhumatologie de Montréal, Montréal); Marie-Claude Laliberté (AbbVie, St-Laurent); Pierre-André Fournier (AbbVie, Saint-Laurent); Tanya Girard (AbbVie Canada, Saint Laurent)

Objectives: To describe the contemporary burden of disease and disease activity among patients diagnosed with axial spondyloarthritis (axSpA) and treated with non-steroidal anti-inflammatory drugs (NSAIDs) or advanced therapies (ATs) in the RHUMADATA database.

Methods: Observational, retrospective analysis of RHUMADATA (Quebec, Canada). RHUMADATA was initiated in 1999 and collects data from all inflammatory arthropathies visiting 3 centers with 20 rheumatologists in the province of Quebec. RHUMADATA patients were eligible if they were adults at the time of axSpA diagnosis and were treated with NSAIDs or an AT (tumor necrosis factor inhibitor [TNFi] or interleukin [IL]-17 inhibitor) that was initiated between January 2010 and December 2019 and used for ≥12 months. For patients who had received >1 AT during the eligible time window, the most recent therapy was used to perform this analysis. Residual disease activity (primary endpoint) was defined as failing to achieve low disease activity (LDA), with LDA defined as achieving a Bath Ankylosing Spondylitis Disease Activity Index (BASDAI) score <3 at 6 and 12 months following initiation of the latest axSpA therapy. Further assessments of burden of disease included functional impairment, using the Bath Ankylosing Spondylitis Functional Index (BASFI) score, C-reactive protein >5 mg/dL, and level of axial pain, assessed using a visual analog scale (question 2 of the BASDAI).

Results: Overall, 708 subjects were included in this analysis. Mean (SD) age was 42.9 (12.6) years, 55% were male, 58 (8.2%) were taking NSAIDs only, 366 (51.7%) were taking their first AT, and 284 (40.1%) had taken at least one previous AT. The most common AT classes were TNFi (N=594; 83.9%), and IL-17i (N=56, 7.9%). Baseline mean (SD) BASDAI score was 5.72 (2.31); 391/457 (85.6%) subjects had a BASDAI score ≥3 (Table). By six months following AT initiation 183/315 (58.1%) of subjects were experiencing residual disease activity (BASDAI score ≥3), and by 12 months, this remained similar with 174 of 308 patients still with BASDAI score ≥3 (56.5%). Although disease activity, functional impairment, residual inflammation and axial pain seem to have improved overall from baseline (Table), a large proportion of patients still experienced residual burden of disease at 6 and 12 months following their latest therapy.

Conclusion: This analysis shows that despite the availability of ATs, more than half of patients with axSpA in the RHUMADATA database continued to experience residual disease activity 12 months after initiating their latest AT. Better therapeutic approaches are needed to achieve LDA in most patients with axSpA.

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Table. Measures of disease activity at baseline, Month 6 and Month 12 after most recent treatment initiation

	Baseline	Month 6	Month 12
Residual disease activity (BASDAI ≥3)	391*/457**	183*/315**	174*/308**
	(85.6%)	(58.1%)	(56.5%)
BASDAI score (n, mean [SD])	457**	315**	308**
	5.72 (2.31)	3.79 (2.41)	3.65 (2.37)
BASFI score (n, Mean[(SD])	452**	314**	307**
	4.82 (2.61)	3.22 (2.51)	2.92 (2.35)
CRP >5 mg/dL	200*/344**	104*/269**	123*/343**
	(58.1%)	(38.7%)	(35.9%)
Axial pain VAS score[1] (n, mean [SD])	457**	315**	308**
	6.33 (2.61)	4.25 (2.77)	4.08 (2.68)

1 BASDAI Question 2: How would you describe the overall level of AS neck, back, or hip pain you have had? Response VAS ranges from 0=None to 10=Very Severe. AS, ankylosing spondylitis; BASDAI, Bath Ankylosing Spondylitis Disease Activity Index; BASFI, Bath Ankylosing Spondylitis Functional Index; CRP, C reactive protein; VAS, visual analog score.
*Number of patients achieving the endpoint. **Number of patients with available assessment (may be lower than the total number of patients due to missing data).

TOUR40

Retention of triple therapy with methotrexate, sulfasalazine, and hydroxychloroquine compared to combination methotrexate and leflunomide in rheumatoid arthritis, a real world data from the Ontario Best Practices Research Initiative

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Objectives: 1. To assess the retention of triple therapy with methotrexate, sulfasalazine, and hydroxychloroquine compared to combination methotrexate and leflunomide (double therapy). 2. To compare the effectiveness of these treatment strategies at baseline, 6 months, and 12 months after treatment. 3. To investigate the causes of discontinuation of therapy and which agent of the combination was discontinued

Methods: The inclusion criteria were biologic and JAK inhibitor-naive patients who received triple therapy or double therapy on or after OBRI enrolment between 2008-2022. Baseline characteristics examined included demographics, private health issurance status, smoking use, disease duration, comorbidities, concomitant steroid and NSAID use, lab values, swollen and tender joint counts, physician and patient global assessments, disease activity scores (CDAI, SDAI, DAS28), and HAQ scores.

Results: There were 692 patients included: 258 patients received triple therapy and 434 received double therapy. Statistically significant differences at baseline between the two groups included patients on double therapy being older (58.6 vs 55.3 years), having higher rates of private health issurance (83.2% vs 74.6%), having longer disease duration (8.4 vs 5.8 years), being more likely to have a main comorbidity (43.5% vs 35.7%), and having higher DAS28 scores (mean 4.6 vs 4.3). Although patients on triple therapy numerically remained on treatment longer, this was not statistically significant. Baseline CDAI scores were similar between the two groups; however, at 6 months, patients on triple therapy were more likely to achieve low-disease activity (42.2% vs 50.7%). Similarly, DAS28 scores were lower at 6 months in patients who received triple therapy (3.4 vs 3.9). Patients on triple therapy were more likely to achieve DAS28 remission at 6 months

(30.1% vs 20.3%) and at 12 months (38.4% vs 30.5%). In multivariable analysis, risk factors for discontinuation of DMARD therapy were being female (HR 1.78) and having a comorbidity (HR 1.27). In patients who received double therapy, leflunomide was stopped more often than methotrexate (220 vs 67 patients). Patients on triple therapy stopped sulfasalazine more often than hydroxychloroquine and methotrexate (96 vs 50 vs 46 patients, respectively).
Conclusion: Although patients on triple therapy numerically remain on treatment longer, this was not statistically significant. Triple therapy was more likely to be associated with reaching low disease activity including remission at 6 months. Patients on triple therapy discontinued sulfasalazine more often, and patients on double therapy discontinued leflunomide more often. Patients who were female and those with at least one comorbidity were more likely to stop therapy.

Poster Tour 11: SLE

TOUR41

M-Phase Phosphoprotein 1 Autoantibodies as a Biomarker for Cranial Neuropathies in an International SLE Inception Cohort

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Objectives: Cranial neuropathies (CN) are a rare but significant neuropsychiatric SLE (NPSLE) manifestation. In a single centre SLE cohort, autoantibodies against the cytokinesis-associated protein M-Phase Phosphoprotein 1 (anti-MPP-1) were first reported to be associated with SLE-related cranial neuropathy (CN). This study further assessed anti-MPP-1 as a potential biomarker for CN in a large international SLE inception cohort.
Methods: SLE patients fulfilling the updated 1997 ACR classification criteria for SLE were included. Anti-MPP-1 antibody testing was performed on baseline (within 15 months of diagnosis) or first annual assessment samples using an addressable laser bead immunoassay (ALBIA) with purified recombinant human protein with results expressed as median florescence units (MFU). Based on healthy controls, a dilution of ≥1:500 MFU was considered positive. Univariate logistic regression was used to examine the association between anti-MPP-1 positivity and NPSLE manifestations (based on ACR case definitions using published NPSLE attribution rules [1,2]) occurring over the first 5 years of follow-up. For NPSLE manifestations associated with anti-MPP-1 positivity in the univariate analysis, baseline demographic and clinical characteristics were compared using T-tests and two-sample tests of proportions. Multivariable logistic regression analysis using penalized maximum likelihood estimates was then performed to assess the association between anti-MPP-1 and NPSLE manifestations associated with anti-MPP-1 positivity in the univariate analysis, adjusting for age at anti-MPP-1 testing, female, White race/ethnicity, and significantly different baseline clinical characteristics (Table 1).
Results: Seven hundred and ninety-five SLE patients were assessed; 29.8% were anti-MPP-1 positive, 88.7% female, and 52.1% White. The frequency of anti-MPP-1 positivity differed only for those with (n=10) versus those without (n=785) CN (70.0% vs. 29.3%; odds ratio [OR] 5.16,

95%CI 1.44, 18.54). Compared to patients without CN, patients with CN were more likely to fulfill the ACR hematologic (difference: 23.9%, 95%CI 5.0%, 42.8%) and antinuclear antibody criteria (difference: 4.3%, 95%CI 2.9%, 5.8%). In a multivariate analysis, anti-MPP-1 positivity remained associated with CN (OR 5.24, 95%CI 1.44, 19.09) (Table 1).
Conclusion: Anti-MPP-1 is potential biomarker for CN in SLE. Further studies are needed to examine how antibodies to MPP-1, which is differentially expressed in a variety of neurological cells and tissues, contributes to disease pathogenesis and if anti-MPP-1 titres change with disease activity. References: Hanly, J. G., Urowitz, M. B., Gordon, C., et al. Ann Rheum Dis. 2020; 79(3): 356-362. Ainiala H , Hietaharju A , Loukkola J , et al . Arthritis Rheum 2001 ;45: 419–23.

TOUR42

Association of Systemic Lupus Erythematosus Polygenic Risk with Neuropsychiatric Lupus in Two Multi-Ethnic Cohorts

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Objectives: Neuropsychiatric systemic lupus erythematosus (NPSLE) is clinically heterogeneous and significantly affects the survival and quality of life of SLE patients. Genetics plays a role in SLE pathogenesis, but its role in NPSLE has not been determined. We investigated the association between SLE genetic susceptibility loci and NPSLE in two large, multi-ethnic cohorts of adult SLE patients.
Methods: Patients were recruited from either the Systemic Lupus International Collaborating Clinics (SLICC) Registry from 1999-2011 or the Toronto Western Hospital (TWH) Lupus Clinic from 1970-2021. Patients recruited to both cohorts were counted once as part of TWH. Patients were genotyped on the Illumina multi-ethnic or Omni 1-Quad arrays. Ungenotyped SNPs were imputed using TOPMed reference, and HLA alleles were imputed using the Multi-Ethnic HLA Reference Panel from the Michigan Imputation Server. Ancestry was genetically inferred using principal components and ADMIXTURE with the 1000 Genomes Project as a referent. NPSLE cases were defined as ever meeting the 1997 ACR SLE classification criteria for Neurological Disorder, including seizures and psychosis. The SLICC and TWH cohorts were analyzed separately, then meta-analyzed using inverse variance weighting. SLE HLA and non-HLA polygenic risk scores (PRSs) were calculated using weighted log-odds-ratios. We excluded SLE HLA alleles with minor allele counts ≤12. We regressed with NPSLE outcome in binary logistic regression, adjusting for sex and ancestry.
Results: The study included 1617 adults diagnosed with SLE (896 from SLICC; 713 from TWH). The majority were female (89%) and of European ancestry (53%). The median age of SLE diagnosis was 32.1 years (IQR, 24.5-43.0). Median duration of follow-up was 10.6 years (IQR, 5.92-15.6). 173 patients (11%) had NPSLE. SLE HLA and SLE non-HLA PRS were not

significantly associated with NPSLE in univariate and multivariable-adjusted models (SLE HLA: OR=1.02, 95%CI 0.81-1.27, p=0.86; SLE non-HLA: OR=1.05, 95%CI 0.92-1.19, p=0.51). Similarly, there were non-significant associations between SLE HLA and SLE non-HLA PRSs with NPSLE in the SLICC cohort (SLE HLA: OR=0.85, 95%CI 0.53-1.36, p=0.51; SLE non-HLA: OR=1.04, 95%CI 0.83-1.3, p=0.73) and in the TWH cohort (SLE HLA: OR=1.18, 95%CI 0.86-1.65, p=0.30; SLE non-HLA: OR=1.06, 95%CI 0.81-1.38, p=0.67).
Conclusion: We did not observe a significant association between polygenic risk scores for SLE and risk of NPSLE in a large multi-ethnic cohort of adults with SLE. Future analyses include single-allele association tests for SLE HLA alleles with NPSLE outcome and investigating the relationship between risk loci for psychiatric and mood diagnoses and NPSLE.

TOUR43

Serum Cytokine Profiling Reveals Elevated Levels of S100A8/A9 and MMP-9 in Systemic Lupus Erythematosus Patients with Cognitive Impairment Independently of Disease Activity and Inflammatory Markers

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Objectives: Cognitive impairment (CI) is one of the most common manifestations of Neuropsychiatric Systemic Lupus Erythematosus (NPSLE), which may occur in the absence of active SLE. Its pathogenesis is largely unknown, and currently, biomarkers for the risk of CI are lacking. Here we investigated whether SLE patients with CI have elevated serum levels of cytokines that previous studies have suggested to have a potential pathogenic role in NPSLE.
Methods: 291 individuals between 18-65 years old who met the 2019 EULAR/ACR classification criteria for SLE were included. Cognitive assessment was performed by a psychometrist and included the ACR-Neuropsychological Battery (ACR-NB). The serum levels of nine cytokines (cytokine profile) were determined using high-sensitive (hs) ELISA kits for IL-10, IL-6, IFN-g, TNF-a, and NGAL, and Duoset (R&D Systems) for S100B, S100A8/A9, MMP-9, and TWEAK. Differences in the serum levels of the cytokine profile between patients with and without CI (z-score of $\leq$-1.5 in $\geq$ 2 domains in the ACR-NB) were determined by the Mann-Whitney U test. Correlations were assessed using Spearman's rank correlation coefficient and the association of the different cytokine levels with each CI test score by logistic regression.
Results: 40% of the patients (n=116) had CI. While no differences in the demographic characteristics and disease activity were observed between patients with and without CI, serum levels of S100A8/A9 and, to a lesser extent, MMP-9 were significantly higher in patients with CI

(Figure 1A). When the ACR-NB's domains were examined individually, patients with impaired simple attention-processing; visual-spatial construction; learning and memory; or executive function also had higher S100A8/A9 than those without impairment (Figure 1B). Indicative of probable collinearity, S100A8/A9 and MMP-9 moderately correlated with each other (Rho=0.52, p<0.0001) and both correlated with NGAL (Rho=0.64, p<0.0001; Rho=0.56, p<0.0001, respectively). S100A8/A9 had the strongest relationship with multiple CI tests by logistic regression. The serum levels of S100A8/A9 and MMP-9 did not correlate with TNF-a, IL-6, hs-CRP, or disease activity as determined by the SLE Disease Activity Index-2000 (SLEDAI-2K).
Conclusion: Only the heterodimer of the calcium-binding proteins S100A8 and S100A9 and MMP-9 were found to be increased in SLE patients with CI. The lack of correlation with the levels of other pro-inflammatory markers and its differential association with distinct cognitive domains may indicate that, in the setting of CI, S100A8/A9 mediates a regional neuroinflammatory response rather than systemic pro-inflammation. These results open new avenues to study the role of S100A8/A9 and MMP-9 in CI in adults with SLE.

TOUR44

Hospitalizations due to Ambulatory Adverse Drug Events in Patients with Systemic Lupus Erythematosus

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Objectives: Patients with systemic lupus erythematosus (SLE) take multiple long-term medications, increasing their risk of adverse drug events (ADEs; harm from appropriate or inappropriate use of a drug). Within an SLE cohort, we evaluated consecutive emergency department (ED) visits leading to hospital admission to identify whether there was an associated ADE, and when present, ADE preventability.
Methods: We identified all ED visits to the McGill University Health Centre among participants in the McGill SLE cohort between 2015-2020. For ED visits requiring admission, we extracted demographics and disease characteristics from the cohort database and recorded all usual home medications, the reason for visit, and outcomes. Two independent adjudicators evaluated each ED visit using the Leape and Bates scale to rank their confidence that an ADE contributed to the visit (1, little to no confidence; 6, virtually certain), using the kappa statistic to assess inter-rater reliability. ADE definitions included omission of indicated therapies, including non-adherence. Adjudicators classified ADEs as either potentially preventable/ameliorable or not.
Results: Among 481 patients followed in the SLE cohort between 2015-2020 (2303 person-years), 67 hospitalizations from the ED occurred among 45 patients (3 hospitalizations per 100 person-years). Median age at admission was 38 years (IQR 27-53), 41 (91%) were female, and median disease duration was 12 years (IQR 6-20). Patients took a median of 8 (IQR 4-11) medications (Table 1). Of the 67 hospitalizations from the ED, 27 (40%) were associated with >=1 probable ADE (Leape and Bates scores 4-6), 6 (9%) were possible ADEs (score 3), and 34 (51%) were unlikely due to an ADE (scores 1-2). Four (6%) hospitalizations were linked to 2 ADEs. Inter-rater reliability was very good (unweighted kappa, 0.7). Almost a quarter (23%) of

probable ADE-related hospitalizations occurred among indigenous patients. ADEs included infections in the context of immunosuppressants (42%), SLE flares associated with treatment non-adherence (19%), drug toxicities or adverse reactions (19%), and thrombosis (16%). Prednisone (39%) and/or other immunosuppressants (74%) were commonly implicated drugs. Twenty (65%) ADEs were potentially preventable/ameliorable. Modifiable factors included treatment adherence (38%), timely glucocorticoid tapering (14%), acting on laboratory results (19%), and institution of preventative measures (thromboprophylaxis, vaccination, infection screening, 20%).

Conclusion: Almost half of unplanned hospitalizations in this SLE cohort were related to probable/possible ADEs and two-thirds of these ADEs were potentially preventable or ameliorable. ADEs were primarily infections associated with glucocorticoids and/or immunosuppressants. At our centre, co-designing strategies with the involvement of higher risk groups will be paramount.