1

Alcohol Consumption in Axial Spondyloarthritis: An Informative Predictor of Radiographic Progression or Merely a Confounding Factor?

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Objectives: In axial spondyloarthritis (axSpA), the body of evidence regarding the effect of alcohol on radiographic progression is limited. We evaluated the impact of alcohol consumption (AC) on spinal radiographic progression in axSpA as measured by the modified Stoke Ankylosing Spondylitis Spinal Score (mSASSS) and examined whether AC is a predictor of mSASSS change (DmSASSS).

Methods: We included AxSpA patients from the University Health Network (UHN)-Spondyloarthritis cohort, where they are prospectively followed annually with a standardized protocol. We used data collected from March 3, 2008, to May 17, 2023. Patients' characteristics in the non-drinker and drinker groups were compared by either chi-square or two-sample t-test. Univariable and multivariable linear regression analyses were conducted to determine the association between baseline AC and 4-year DmSASSS. The covariates included were CRP at baseline, BASDAI at baseline, disease duration, smoking, biologic use, baseline mSASSS, gender, and HLA-B27 status.

Results: The study included 370 patients meeting either the ASAS criteria for axSpA or the modified NY criteria for AS (134 in the drinker group and 236 in the non-drinker group). The mean age was 38.9 years old (SD = 13.6). 70% were male participants and 75% were positive for HLA-B27. Among drinkers, the mean quantity of AC at baseline was 5.1 units per week (±6.4). 73% of participants had been treated with biologic therapy. Drinkers were more often former smokers (26% vs. 12%, p = 0.001), and had lower ASDAS-CRP scores (2.8 ± 1.1 vs. 3.1± 1.2, p = 0.03), better EQ5D scores (0.7 ± 0.2 vs. 0.6 ± 0.3, p = 0.007), shorter disease duration (15.6 ± 11.4 vs. 18.3±10.7, p < 0.001), and higher occurrence of GI adverse effects related to their medication (0.2 ± 0.7 vs. 0.1 ± 0.5, p = 0.04). There was no difference between groups in terms of age, gender, education, BASFI, biologic use or ESR/CRP. There was an upward trend in DmSASSS at 4 years between drinkers (2.4 ± 3.7) and non-drinkers (1.6±6.4), but this was not statistically significant. In the multivariable regression model of 4-year DmSASSS, mSASSS at baseline was a significant predictor of mSASSS progression and CRP almost reached significance. AC was not significantly associated with the progression of mSASSS (0.88, 95%CI -1.00, 2.77).

Conclusion: AC was not significantly associated with 4-year DmSASSS, although there was a trend towards increased progression for drinkers. Baseline mSASSS and baseline CRP were identified as predictors of DmSASSS.

2

Reduced Time to Diagnosis of Spondyloarthritis in Patients With Inflammatory Bowel Disease: A Retrospective Review of Data from a Novel Combined Rheumatology and Gastroenterology Clinic

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Objectives: The prevalence of spondyloarthritis (SpA) in inflammatory bowel disease (IBD) is

reported to range from 5-15% for AxSpA and 30-45% for pSpA. [1,2] Despite the high prevalence, diagnosis may often be delayed for up to 8 years, [3] highlighting the need for an interdisciplinary approach to diagnosis and treatment. We assessed the prevalence of SpA and time to diagnosis from symptom onset in IBD patients evaluated for arthralgia in a combined gastroenterology and rheumatology clinic in a large tertiary care center.
Methods: We conducted a retrospective chart review of patients with IBD and arthralgia who were evaluated by a rheumatologist and gastroenterologist at the same visit. Patients over the age of 21 with a diagnosis of IBD and subjective reports of arthritis, arthralgia, or back pain were included. We calculated the prevalence of axial and peripheral SpA, time to diagnosis, and recommended treatment changes for patients assessed by this interdisciplinary approach.
Results: 92 patients (60.9% females) with an average age of 42.5 ± 13.4 years were assessed in this combined clinic. 76 (82.6%) patients were evaluated with SpA from which 55 (72.4%) had a prior diagnosis of SpA and 21 (27.6%) were newly diagnosed in this combined clinic. The median duration of symptoms in newly diagnosed patients was 11.0 months. In patients with SpA, 10 (13.2%) had AxSpA, 41 (53.9%) had pSpA, and 25 (32.9%) had both axial and peripheral SpA. We observed a high prevalence of SpA in patients with CD (53, 88.3%) and UC (21, 72.4%). Patients with SpA were treated with both biologic and conventional disease-modifying anti-rheumatic drugs (DMARDs). [Table 1] Treatment changes were implemented as a result of the combined assessment in 34 patients (44.7%) with the addition of a csDMARD or bDMARD in 44.1%, DMARD dose change in 17.6%, bDMARD class switch in 20.6% and combination biologic treatment in 17.7%.
Conclusion: We report a high prevalence of IBD-associated SpA in patients presenting for evaluation of arthralgia to a combined rheumatology and gastroenterology clinic with a reduced time to diagnosis than that reported in literature. Diagnosis and management of SpA in the context of IBD can be challenging and warrants a multidisciplinary approach to timely diagnosis and management. Combined efforts to make treatment changes to induce and maintain disease remission can lead to improvement in morbidity in these patients. This study highlights the characteristics of patients with IBD-associated SpA and demonstrates the value of integrated management in clinical practice. References: [1.] de Vlam K, Mielants H, Cuvelier C, De Keyser F, Veys EM, De Vos M. J Rheumatol. 2000;27(12):2860-2865. [2.] Orchard TR, Wordsworth BP, Jewell DP. Gut. 1998;42(3):387-391. doi:10.1136/gut.42.3.387 [3.] Malaty H, Lo G, Hou J. Clinical and Experimental Gastroenterology. 2017;10:259-263

3

Persistent Moderate and Severe Disease Results from The Canadian Early Arthritis Cohort Study (Catch): A Single-Site Retrospective Study

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Objectives: There is a significant variation in the utilization of biologic agents to attain clinical outcomes that are comparable within the Canadian Early Arthritis Cohort (CATCH). Previous studies of the Newmarket cohort have reported most patients were maintained on conventional synthetic disease-modifying antirheumatic drugs (csDMARDs). The objective of this study was to discern the patient treatment patterns at a single Newmarket site and the incidence rate, duration, and prognostic factors for moderate and severe rheumatoid arthritis (RA).

Methods: Retrospective chart review of a single-site, single investigator in a Newmarket cohort was conducted of early rheumatoid arthritis (ERA) CATCH patients enrolled from 2008-2017 with at least 2 years of follow-up. Moderate disease and severe disease were defined as having a CDAI of 10.1-22.0 or > 22.0, respectively, at the most recent assessment. Persistent moderate and severe disease activity was defined as having a CDAI score of 10.1-22.0 and > 22.0, respectively for ≥ 6 months.
Results: There were 197 patients that participated in the single investigator Newmarket site study. 12 patients remained in or progressed to persistent moderate or severe disease. At induction, these 12 patients had a mean age of 55 ± 10.3 years, 83.3% were female, the mean baseline Rheumatoid Disease Comorbidity Index (RDCI) was 1.08 ± 1.08, DAS28 CRP was 4.54 ± 0.99 and DAS28 ESR was 4.84 ± 1.04. Patients in remission in the same cohort had a mean age of 55 ± 14 and 73.5% were female, with mean baseline RDCI 1.13 ± 1.21, DAS28 CRP 4.77 ± 1.28, and DAS ESR 4.96 ± 1.58. Among the moderate or severe disease patients, 5 patients were maintained with csDMARDs alone, two patients with combined csDMARD therapy, two patients with combined csDMARD and biologic therapy, two patients with biological therapy, and one patient was medication-free due to an elected decision to discontinue csDMARD therapy. Overall, 50% of patients had baseline erosions with three showing radiographic progression. Analysis of moderate and severe CDAI patients revealed 33.3% of scores could be attributed to symptoms of osteoarthritis (OA) and/or mechanical back pain, or disease flare.
Conclusion: The results indicate that there is a small proportion of ERA patients with persistent moderate to severe disease and less than 4% of patients developed or maintained a severe disease state, by CDAI definition. The study suggests the majority of patients did not experience long-term moderate to severe disease and their CDAI was often reflective of an RA flare, mechanical or osteoarthritis pain.

4

Risk of Malignancy Associated With Biologic Use in Patients With Previous Cancer: A Systematic Review

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Objectives: Patients with immune-mediated diseases and previous cancer are increasingly treated with biologic therapies, yet the safety of these agents in this population is unknown. This study investigates the risk of cancer in patients with prior malignancy who are treated with biologics for psoriasis, inflammatory bowel disease, rheumatoid arthritis (RA), or hidradenitis suppurativa.
Methods: Systematic literature searches were conducted in MEDLINE and EMBASE. We included articles investigating adults with previous malignancy exposed to ustekinumab, tumor necrosis factor alpha inhibitors (TNFi), interleukin-17 (IL-17), and interleukin-23 (IL-23) inhibitors. Data was collected on patient demographics, time from index cancer to biologic initiation, duration of exposure, and primary outcomes. Data was synthesized using narrative review according to PRISMA guidelines.
Results: We included 31 studies: 29 on TNFi, 5 on IL-17, 2 on IL-23, and 5 on ustekinumab. In

total, there were 15,470 patients contributing 36,933 patient-years. There were 385 cancers among 4343 (8.9%) biologic-exposed individuals compared to 837 in 10,831 (7.7%) non-exposed patients. All 16 cohort studies reported no increased risk of cancer with TNFi monotherapy. Only one study found an increased risk of non-melanoma skin cancer in RA patients receiving a combination of methotrexate and TNFi [adjusted HR: 1.49 (1.03-2.16)]. [1] Stratification of cancer types and time to initiation found similar results.
Conclusion: Our findings indicate that there is no heightened risk of new or recurrent malignancies in patients with previous cancer who are treated with biologics. However, further data is warranted, particularly regarding the use of IL-17 and IL-23 inhibitors in this specific population. References: [1.] Scott FI, Mamtani R, Brensinger CM, Haynes K, Chiesa-Fuxench ZC, Zhang J, Chen L, Xie F, Yun H, Osterman MT, Beukelman T. Risk of nonmelanoma skin cancer associated with the use of immunosuppressant and biologic agents in patients with a history of autoimmune disease and nonmelanoma skin cancer. JAMA dermatology. 2016 Feb 1;152(2):164-72.

5

Braf Inhibitor Therapy Associated Inflammatory Arthritis in Patients With Metastatic Cancer: A Case Series

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Case 1: A 69-year-old female with metastatic melanoma presented with two months of arthralgias in bilateral shoulders, hands, knees, and feet after starting BRAFi/MEKi therapy with encorafenib/binimetinib. Previous treatment included immune checkpoint inhibitors (ICIs), discontinued 3 months prior. The examination showed 25 tender and 12 swollen joints. ANA and RF were negative. Ultrasound showed bilateral knee effusions with synovial hypertrophy. BRAFi therapy was held, with mild symptomatic improvement. She was treated with prednisone 20mg daily and bilateral knee intra-articular (IA) corticosteroid injections, with no active joints at follow-up. BRAFi therapy was restarted, and she was continued on prednisone 10mg daily. Restaging scans showed disease progression; targeted therapy was discontinued, and prednisone was tapered without recurrence of symptoms.
Case 2: A 61-year-old male with metastatic colorectal cancer presented with three months of arthralgias after starting BRAFi/EGFRi therapy with encorafenib/cetuximab. He was never treated with ICIs. Examination showed 11 swollen joints. Inflammatory markers were elevated, with positive ANA and anti-Ro, negative RF, and no signs of connective tissue disease. He was treated with prednisone 10mg daily and a left wrist IA corticosteroid injection. Targeted therapy was restarted. Restaging scans showed disease progression and BRAFi therapy was discontinued. Arthritis remained quiescent off glucocorticoids.
Case 3: A 68-year-old woman with metastatic melanoma presented with ICI-associated arthralgias and sicca symptoms, which resolved spontaneously. Shortly after starting BRAFi/MEKi therapy with encorafenib/binimetinib, she developed bilateral wrist, hand, knee, and foot arthritis. The examination showed 5 swollen joints and left 3rd flexor tenosynovitis. She was ANA positive (1:80) and RF negative. She was treated with prednisone 10mg and IA corticosteroid injections to her right wrist, left 3rd flexor tendon sheath, and bilateral knees. Targeted therapy was restarted, and arthritis remained under control as prednisone was tapered.

6

Investigating The Role of Interferon in Promoting Flares of SLE at a Single Cell Level

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Cancer Centre, Toronto); Kieran Manion (University Health Network, Toronto); Carolina Munoz-Grajales (University of Toronto, Toronto); Carol Nassar (Schroeder Arthritis Institute, Toronto); Michael Kim (Krembil Research Institute, Toronto); Dafna Gladman (Schroeder Arthritis Institute, Krembil Research Institute, Toronto Western Hospital, University Health Network, University of Toronto, Toronto); Murray Urowitz (Schroeder Arthritis Institute, Krembil Research Institute, Toronto Western Hospital, Toronto); Zahi Touma (Schroeder Arthritis Institute, Krembil Research Institute, Toronto Western Hospital, Toronto); David Brooks (Princess Margaret Cancer Centre, Toronto); Joan Wither (Schroeder Arthritis Institute, Krembil Research Institute, Toronto Western Hospital, Toronto)
Objectives: Systemic lupus erythematosus (SLE) is a heterogeneous disease with unpredictable flares interspersed with prolonged periods of disease quiescence. Interferon (IFN) is a hallmark of the disease and has been linked to disease flares, but the precise mechanism by which this occurs remains unclear. To address this question, we examined the association between IFN and the immune changes in flaring and quiescent SLE patients at a single-cell level.
Methods: A 41-marker panel was developed that enabled the measurement of IFN-induced proteins (IIPs) in peripheral blood immune populations using CyTOF. 15 healthy controls, 26 quiescent (clinical SLEDAI (cSLEDAI) = 0 for one year with no increase in immunosuppressive treatment, ≤ 10 mg prednisone) and 42 recently flaring (< 1 month, change in cSLEDAI ≥ 1, requiring escalation of therapy) SLE patients were examined. Of these, 12 quiescent and 23 flaring patients were also examined at follow-up (6 months, 1 year, and/or 3 years). Expression of individual IIPs normalized to healthy controls, as well as a composite IIP score incorporating the expression of all six proteins was assessed.
Results: 26 distinct immune populations were identified, all of which demonstrated a strong correlation between IIP levels and global IFN-induced gene (IIG) expression. In most populations (22/26), the IIP score was elevated in flaring compared to quiescent SLE patients and correlated with the cSLEDAI-2K at baseline. Only the proportions of monocytes and age-associated B cells (ABCs) were significantly elevated in flaring as compared to quiescent patients. Very limited changes were seen between these 2 groups of patients for markers of cellular activation, such as CD86, TLR7, TLR9, and Ki67. In contrast, in many relevant immune populations elevations of these markers were associated with IIP levels suggesting that IFN, rather than disease status (i.e., flare vs quiescence), is driving this activation. Although the cSLEDAI-2K improved in most flaring patients at 6 months, the IIP signature remained relatively stably elevated in the majority of patients for up to 3 years follow-up. In patients who were flaring at baseline, the elevation of the IIP score in ABCs was associated with clinical disease activity one year later, whereas in patients who were quiescent at baseline an elevated IIP score in pre-ABCs forecasted disease activity.
Conclusion: Measurement of the IIP score accurately reflects IIG expression, allowing dissection assessment of the impact of IFN exposure at a single cell level and highlighting the importance of ABCs in promoting flares. Best Abstract by a Post-Graduate Research Trainee Award.
7
Elevated CA19-9 in IgG4-Related Disease
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Lim (University of British Columbia, Vancouver); David Schaeffer (Pathology, University of British Columbia, Vancouver); Jennifer Telford (University of British Columbia, Vancouver); Luke Chen (Hematology, University of British Columbia, Vancouver); Mollie Carruthers (Arthritis Research Canada, Vancouver)
Objectives: Immunoglobulin G4-related disease (IgG4-RD) often presents in the pancreas and hepatobiliary system, and these patients are often initially thought to have malignancy. Tumour markers such as carbohydrate antigen 19-9 (CA19-9) may be ordered in these patients, and in isolated cases, patients with IgG4-RD and elevated CA19-9 in the absence of malignancy have been reported. Polyclonal serum IgG4 at high concentrations has previously been reported to bind non-specifically to IgG1 and IgG2, acting as a "novel rheumatoid factor" that may interfere with immunoassays. CA19-9 could be a similar non-specific binder of IgG4. We performed a chart review of patients with IgG4-RD at Vancouver General Hospital with elevated CA19-9 and examined the potential causes of this association.
Methods: This was a single-center retrospective study of patients diagnosed with IgG4-RD at Vancouver General Hospital from 2012 to 2023. To investigate potential immunoassay interference between serum IgG4 and CA19-9, all unique patients with an initial IgG4 measurement performed at St. Paul's Hospital over the time period of January 1, 2017, to September 1, 2023, using mass spectrometry, were matched with a CA19-9 measurement from the Tumour Marker Laboratory (Siemens Centaur), where available, within a 6-month time frame from the IgG4 measurement.
Results: Ten patients (6%) diagnosed with IgG4-RD with concurrent elevated CA19-9 were identified out of 178 patients with known IgG4-RD. CA19-9 levels ranged from 34 – 874 kU/L. Radiographic investigation revealed frequent hepatic duct dilatation (30%), pancreatic mass (40%), hepatic mass (20%), bile duct stricture (50%), and an enlarged pancreas (40%). Biopsies ruled out malignancy in 9 patients and the remaining patient had resolution of a mass after a course of prednisone. To investigate test interference, 487 patients were found to have both serum CA19-9 and IgG4 measurements taken within a 6-month time frame. [Figure 1] No relationship was found between the reported serum CA19-9 and IgG4 measurements.
Conclusion: Patients diagnosed with IgG4-RD can have concurrent elevated serum CA19-9. All patients had manifestations in the liver, pancreas, or biliary tree, but the prevalence is uncertain because CA19-9 is not routinely checked. IgG4 at high concentrations does not interfere with CA19-9 immunoassays, suggesting that elevation in CA19-9 is a pathological process in IgG4-RD.

8

The Effect of a Western Diet on The Gastrointestinal Microbiome and Barrier Function in an Animal Model of Rheumatoid Arthritis

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Objectives: Patients with rheumatoid arthritis (RA) have an altered gastrointestinal (GI) microbiome. The mechanisms underlying this dysbiosis and whether it promotes joint inflammation in RA is unknown. Diet significantly impacts the microbiome and has been shown to affect RA prognosis. Additionally, obesity is a risk factor for RA and influences RA outcomes. The objective of this study was to investigate the interaction between diet, the GI

microbiome, and autoimmunity in an animal model of RA.
Methods: Mice transgenic for HLA-DRB1*04:01, the strongest genetic risk factor for RA were fed a Western (high fat and sugar) diet (WD) or a regular diet (RD) for 4 weeks (n= 8/group). Subsequently, these mice received subcutaneous and intra-articular citrullinated fibrinogen (CitFib) to induce arthritis. Using ELISA, sera from these mice were tested for RA-associated antibodies (IgG anti-CitFib) and for zonulin (a gap junction protein that is a marker for bowel permeability). To characterize the GI microbiome, DNA was isolated from the feces of the mice and 16S RNA sequencing was performed using the MiSeq by Illumina® platform. Data from the 16S RNA sequencing was analyzed using compositional analysis. Outcomes were measured prior to immunization (day 0), before arthritis onset (day 30), and at peak arthritis (day 40).
Results: Mice developed worse joint swelling when fed a WD compared to an RD ($p= 0.015$). All but one of the mice had detectable IgG anti-CitFib antibodies and levels were similar in mice fed a WD or RD. Bowel permeability significantly increased after arthritis onset ($p< 0.01$) in all the mice regardless of the diet. The fecal microbial composition of mice fed WD was distinct from those that received an RD. In particular, the Lachnospiraceae bacterial species was more abundant in WD-fed mice. The proportional abundance of fecal microbes did not change with the development of anti-CitFib antibodies or arthritis onset; however, the study duration was short and changes in the microbiota may take longer to develop.
Conclusion: In a humanized animal model of RA, a diet high in fat and sugar altered the GI microbiome with an increased abundance of Lachnospiraceae species. These bacteria have previously been shown to be associated with inflammatory bowel disease and RA and may have contributed to the more severe joint swelling that was observed in mice fed a Western diet. Induction of arthritis leads to impaired GI barrier function, which can further exacerbate inflammation and promote the loss of immune tolerance.

9

Novel Gene Expression Analysis Documents Significant Differences in Osteoarthritis Cartilage Based on The Presence of Mutations in ALDH1A2

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Objectives: Osteoarthritis (OA) is a common joint disease that affects up to a third of the population and is responsible for substantial disability and healthcare resource utilization. There is an enormous unmet need to understand and treat OA more effectively; the precise etiology of the disease is unknown, but recent evidence has suggested an inflammatory component. To better understand the etiology of OA, we analyzed gene expression profiles of OA cartilage from patients with and without a high-risk mutation in ALDH1A2, a gene encoding for the critical enzyme involved in the synthesis of all-trans retinoic acid (atRA) and associated with severe hand OA.
Methods: Clinical parameters and RNA sequencing data from articular cartilage of the carpometacarpal joint were obtained and analyzed from nineteen patients with hand OA requiring surgical intervention.1 ALDH1A2 gene status was obtained by genotyping. A number of gene modules were used to interrogate RNAseq data. These included gene modules detecting the presence of inflammatory cells and pathways, cartilage biology and signatures of genes deduced from OA genome-wide association studies. These latter genes were identified by determining the most likely gene influenced by each Single Nucleotide Polymorphism associated with OA, grouped by protein-protein interaction mapping and the function of the gene groups

identified with Ingenuity pathway analysis. Each of these gene modules was employed to assess patient samples using Gene Set Variation Analysis (GSVA). Patients were segregated based on stable K-means clustering of GSVA scores and enrichment of gene modules assessed in the groups.
Results: Unsupervised clustering of GSVA scores identified two clusters of hand OA patients based on gene expression in affected cartilage. Of twelve patients with ALDH1A2 mutations, ten clustered into the same group. Two of the patients who did not cluster appropriately exhibited normal mRNA levels of ALDH1A2, suggesting their mutations did not alter gene expression. Similar results were observed when different GSVA gene sets were used as the basis of clustering. Gene sets that were enriched in those with ALDH1A mutations included TGF-beta signaling, HIF1-alpha signaling, and transcription regulation; downregulated pathways included those involving vitamin D and PPAR-alpha signaling.
Conclusion: Gene expression analysis from hand OA cartilage successfully identified those with ALDH1A2 mutations. Differences in gene expression profiles suggest variation in the dominant mechanisms in OA cartilage when the availability of atRA is limited. References: [1.] Zhu L. et al. Sci Transl. Med. 2022;14:1-14. Best Abstract on Basic Science Research by a Trainee Award.
10
BI 685509: A Potent Activator of Soluble Guanylate Cyclase as a Novel Treatment of Vasculopathy and Fibrosis in Systemic Sclerosis
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Objectives: Systemic sclerosis (SSc) is an autoimmune disease characterized by vasculopathy and tissue fibrosis. Oxidative stress is hypothesized to play a significant role in the inflammatory and fibrotic damage observed in affected organs. Soluble guanylate cyclase (sGC) is an enzyme that binds nitric oxide (NO) to a prosthetic heme group, catalyzing the production of cyclic guanosine monophosphate (cGMP). cGMP acts as a second messenger, regulating tissue remodeling and immune/inflammatory responses. [1] Pharmacologic modulation of sGC with sGC stimulators has shown anti-fibrotic and anti-inflammatory effects in SSc models. [2] In a phase II study in SSc, patients treated with the sGC stimulator Riociguat showed a trend toward clinical efficacy. [3] The action of sGC stimulators is dependent on NO-sGC complexes bearing a reduced heme molecule. The altered redox balance in SSc may limit the efficacy of sGC stimulators due to heme oxidation and the formation of NO-insensitive sGC. Another class of sGC compounds called sGC activators, which are heme-independent, may offer enhanced activity under conditions of compromised redox balance. Objective: To evaluate the efficacy of the potent sGC activator BI 685509 in cellular and in vivo models of SSc pathobiology.
Methods: Human dermal microvascular endothelial cells (HDMVEC) were cultured in normoxic or hypoxic conditions with varying concentrations of BI 685509. The concentration of TGFβ2, a tissue remodeling factor, was measured in the culture supernatant. Human platelet-rich plasma (PRP) was isolated and activated with ADP in the presence of BI 685509 or Riociguat and the level of CXCL4 was measured. Bleomycin-induced skin and lung fibrosis studies were conducted using adult female C57Bl/6 mice. Mice were treated with BI 685509, Riociguat, or Nintedanib, and histologic analysis was performed to assess cellular and biochemical markers of

tissue fibrosis in the lungs and skin.
Results: Treatment with BI 685509 (10μM) significantly inhibited hypoxia-induced production of TGFβ2 in HDMVEC. In the mouse model of bleomycin-induced skin and lung fibrosis, sGC activation via BI 685509 resulted in significant improvement in skin thickness and lung fibrosis, comparable to mice treated with Nintedanib (60mg/kg) or Riociguat (1 mg/kg). Additionally, BI 685509 effectively inhibited the induction of CXCL4 in activated PRP, mimicking a NO-deficient environment seen in SSc, while minimal inhibition was observed with Riociguat.
Conclusion: Collectively, these results point to the use of the sGC activator BI 685509 as a novel treatment for SSc and suggest potential superior effects vs. sGC stimulators like Riociguat in this autoimmune disease. References: [1.] Stasch JP, et al Circulation 2011;123:2263-2273 [2.] Dees C, et al Ann Rheum Dis 2015;74:1621-1625 [3.] Khana D., et al Ann Rheum Dis 2020;79:618-625

11

Characterizing Memory T Cell Subsets Associated With Systemic Lupus Erythematosus Etiopathogenesis

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Objectives: Systemic Lupus Erythematosus (SLE) is a chronic autoimmune disease associated with severe morbidity and mortality. Around 70% of SLE patients follow a relapse-remitting pattern of disease characterized by unpredictable periods of exacerbation of symptoms known as flares, followed by prolonged periods of disease quiescence. Memory CD4+ T cell subsets have been shown to play an important role in driving the autoantibody production which causes flares in SLE, however, the precise T cell changes that accompany flares are unknown.
Methods: A CITE-seq protocol was developed to assess the transcriptomic profiles of CD4+ memory T cells in flaring and quiescent SLE patients. CD4+ memory T cells were isolated from PBMCs by negative selection using magnet sorting. The cells were then stained with oligo-conjugated antibodies against surface proteins for subset classification and subsequently partitioned, barcoded, and sequenced. We examined samples from 6 distinct patients at two separate clinical visits spaced one year apart, yielding 12 paired samples. The longitudinal nature of our data allows us to inspect transcriptional changes both between and within patients.
Results: [Fig.1.A] Integration of the gene expression data from all 12 paired samples revealed 19 unique cell clusters. [Fig.1.B] Among these, we were able to detect four regulatory T cell (Treg)-enriched clusters through their expression of canonical Treg-associated genes such as FOXP3 and IL2RA (CD25). Their designation was further confirmed by assessing their expression of surface proteins detected via our oligo-conjugated antibody panel (e.g., CD127-). [Fig.1.C] We also looked at the relative expression of key molecules among the four clusters. This allowed us to classify two of the Treg subsets. Cluster 6 was characterized by markers associated with recent activation, whereas cluster 8 had high expression of exhaustion markers, as well as features

consistent with cell-reprogramming to a more inflammatory phenotype (increased IFNg, IL-17, and IL-2 expression). When comparing between overall flare and quiescent samples, we found that samples from flaring patients were more enriched for the exhausted Treg subset relative to samples from quiescent patients. Further assessment of these subsets revealed differentially expressed genes between flaring and quiescent samples within the clusters.
Conclusion: CITE-seq is a powerful tool for identifying immune populations in SLE. In our integrated data, we found an abnormal Treg subset that appears exhausted and may potentially have been re-programmed to secrete inflammatory cytokines. This subset appears to be more prevalent during flare, suggesting that dysregulated immunoregulation may contribute to SLE pathogenesis.

12

"It's a Chronic, Vicious, Cycle": Diabetes Health Professionals' Perceptions of the Impact of Knee Osteoarthritis on Type 2 Diabetes Management

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Objectives: Type 2 diabetes (T2D) and knee osteoarthritis (OA) frequently co-occur, and concomitant knee OA increases the risk for diabetes complications. Previous studies have found that patients perceive OA to be an important barrier to the management of diabetes. Despite this, OA is frequently undertreated in people with T2D and OA. Diabetes health professionals' (HPs') perceptions of the impact of knee OA in people with T2DM may have implications for how OA is addressed in clinical practice. The objective of our study was to understand how diabetes HPs perceive the impact of knee OA on diabetes management and outcomes.
Methods: In this qualitative study, informed by interpretative description, we conducted semi-structured interviews with 18 diabetes HPs (endocrinologists, primary care providers, and diabetes educators) recruited from academic and community practices in Ontario, Canada. Interview transcripts were inductively coded and thematically analyzed.
Results: We developed three themes: 1) Frequent co-occurrence of OA; 2) OA's impact on diabetes management; and 3) Conscious disconnect between patient and HP priorities. Diabetes HPs recognized that knee OA commonly co-occurred in their patients, who often offered OA as a reason they struggled to engage in physical activity as part of diabetes management. Most HPs perceived that OA had deleterious effects on diabetes management and glycemic control through challenging patients' ability to engage in physical activity. OA was also seen to negatively affect diabetes management through direct effects of pain, poor sleep, and low mood on glycemic control. Despite observing OA's impact on their patients, and the importance that patients placed on their OA, most participants did not address OA during diabetes visits due to the existing focused structure of diabetes appointments and culture of siloed care.
Conclusion: Diabetes HPs recognized the high prevalence of knee OA in their patients and its deleterious effects on diabetes management, though OA management was usually not prioritized. Crucially, limitations in the provision of OA care related not to lack of awareness of OA or its effects, but rather to the perceived constraints and demands of being a diabetes HP that led to a lower prioritization of OA. Therefore, our findings highlight a missed opportunity in optimizing care for persons with T2D. Advancing the implementation of strategies to promote OA care in people with T2D, including drawing on interdisciplinary approaches, may improve disease

outcomes for both conditions.

13

Investigating The Prevalence and Health Profiles Among Patients Using Cannabis Therapeutically for Management of Rheumatologic Diseases

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Objectives: The expanding implications of cannabis as therapeutics coupled with increasing public attention is leading to rising patient interest in using cannabis for the treatment of rheumatic conditions. Nevertheless, issues with legalization and social stigma have impeded providers from attaining an accurate understanding of its uptake and demand. Through this study, we aim to delineate the prevalence of cannabis use as well as identify the health profiles and correlations of cannabis use among patients with rheumatic disease in Alberta.

Methods: Adults in Alberta were contacted for recruitment through Alberta Health Services, the sole provincial-level administrative health authority, if, they had one or more diagnostic codes for rheumatologic conditions and at least one billing code related to health system use in the past year. Data were collected between March and November 2022 from participants using an online survey designed to capture a broad range of factors including sociodemographics, rheumatologic diagnoses and therapeutics, medical history and comorbidities, patterns of cannabis use, and lifestyle factors. Descriptive statistics were used to assess the prevalence and patterns of rheumatologic conditions and cannabis use among our sample. Logistic regression modelling was used to investigate the factors associated with cannabis use among respondents who had ever used cannabis.

Results: Our sample of 2,932 respondents consisted largely of female (54.1%, n= 1,588), Caucasian (92.5%, n= 2,711), and older (mean age= 66.7 years, SD= 12.2 years, range= 18-98 years) respondents, with 730 (24.9%) current cannabis users, 851 (29.0%) past users, and 1,351 (46.1%) never users. The most prevalent rheumatic conditions specified by respondents were osteoarthritis (60.6%, n= 1,776), rheumatoid arthritis (17.9%, n= 526), and osteoporosis (11.4%, n= 335), with 614 respondents (20.9%) reporting two rheumatologic conditions and 200 respondents (6.8%) reporting three or more conditions. 535 (18.2%) and 2,334 (79.6%) respondents experienced at least one mental and physical comorbid condition, respectively. Logistic regression model estimates indicate that individuals with increased odds of using cannabis were those who were younger, male, experienced mental illness, and sleep disturbances, reported high levels of pain, lacked health insurance, were previous or current smokers, and consumed four or more alcoholic drinks per week. [Figure 1]

Conclusion: Our study highlights several factors indicative of likely cannabis use including being younger, experiencing higher levels of pain, and previous smoking and alcohol use. This data provides a foundational context for ongoing work on improving our understanding on the role of cannabis use as a therapeutic tool for rheumatology patients.

14

Exploring The Personal Health Factors Associated With Cannabis Use for Rheumatic Disease Management Among Young and Middle-Aged Adults in Alberta, Canada

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Objectives: Interest in the use of cannabis for managing pain and symptoms of rheumatic diseases is rapidly rising among the young adult population posing an imminent need for healthcare providers to provide evidence-based guidance. To establish a stronger understanding of the population of interest, we perform a comprehensive assessment of the health profiles of users and non-users of cannabis for the management of rheumatic diseases among young and middle-aged adults (18-45y/o) in Alberta, Canada.
Methods: Adults in Alberta were contacted for recruitment through Alberta Health Services, the sole provincial-level administrative health authority, if, they had one or more diagnostic codes for rheumatologic conditions and at least one billing code related to health system use in the past year. Data were collected between March and November 2022 from participants using an online survey designed to capture sociodemographic, lifetime cannabis use, and health factors. Descriptive statistics and bivariate methods were used to explore the health and cannabis use characteristics of survey respondents.
Results: Our sample included 193 respondents between the ages of 18 and 45 (mean age= 36.1, SD= 6.5). Majority of respondents had used cannabis, with 94 (48.7%) current users, 59 (38.6%) past users, and 40 (20.7%) never users. The most prevalent rheumatologic conditions reported were rheumatoid arthritis (16.6%, n= 32), osteoarthritis (15.5%, n= 30), and fibromyalgia (7.8%, n= 15) with 27 (14.0%) respondents having reported two or more rheumatologic conditions. Additionally, 101 (52.3%) and 111 (57.5%) respondents reported experiencing mental and physical comorbidities, respectively. When comparing self-rated health profiles, the proportion of respondents with high pain scores (47.0% vs. 23.1%, p= 0.007) and low well-being scores (55.0% vs. 27.0%) were significantly higher for cannabis users (current and past users) compared to never users. Amongst cannabis users (n= 153), the proportion of respondents with high pain scores (53.2% vs. 36.7%, p= 0.047) was significantly higher among current users versus past users, with no significant difference in low well-being scores between groups (58.1% vs. 50.0%, p= 0.338). A higher proportion of current cannabis users report using cannabis to address rheumatologic pain (54.3% vs. 30.5%, p= 0.004) and stress (64.9% vs. 17.0%) compared to past users.
Conclusion: Our results indicate that young adult and middle-aged rheumatology patients experiencing high pain and high stress are more likely to use cannabis. Further work is needed to determine if cannabis use results in improvement in pain and well-being.
15
Evaluating The Distribution of Vasculitis Among Rural Farmers, Rural Non-Farmers, and Urban Residents in Alberta
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Objectives: Systemic vasculitis encompasses a group of autoimmune diseases involving inflammation of blood vessels. Although a rare disease, vasculitis can present with life-threatening symptoms which pose a significant burden on patients as well as the health care

system. Studies have demonstrated some association with environmental factors and geographic location. In this study, we compare the epidemiology of vasculitis of farmers to other populations in Alberta in a province-wide study.
Methods: An Alberta intergovernmental data linkage identified all farm families in 1999. Two comparison groups were chosen: a random sample of rural residents and a random sample of urban residents. Vasculitis cases across these groups were determined using linked administrative health data from physician claims and hospital episodes. Data was retrieved from Alberta Health Services, a unifying healthcare provider for all residents of Alberta. This data includes all residents covered under the Canadian universal healthcare system. Descriptive statistics were generated comparing incident cases of vasculitis. Data was collected between April 1, 2000, and March 31, 2021.
Results: A total of 5488 vasculitis cases were found across all populations. Incidence rates varied across the 3 populations with farmers having the highest at 110.6/100,000 person-years followed by rural non-farmers (94.3) and urbanites (71.7). Age adjustment narrowed the variation between the incidence rates, but they remained in the same order: 90.1 farmers, 83.8 rural non-farmers, and 70.7 urbanites. Polymyalgia rheumatica accounted for 47% of cases followed by Arteritis Unspecified (15%) and small-vessel vasculitis (14%) with the remainder being distributed among 9 other sub-categories. [Table 1] More males were observed having vasculitis in the farm population (50%) versus rural non-farmers and urbanites (41% and 40% respectively). Age at diagnosis was also higher in the farmer population (66.2 years) compared to rural non-farmers (64.5 years) and urbanites (63.9 years). The rural non-farmer population had the highest use of health care services as well as the highest mortality rate (31.8/100,000py), followed by rural farmers (25.4/100,000) and urban residents (23.8/100,00py).
Conclusion: Our province-wide study shows that rural non-farmers face the second highest incidence rates of vasculitis and the highest burden of disease in terms of healthcare service needs and mortality. They are followed by farmers and urban residents respectively. This study will be the cornerstone for subsequent assessment of environmental exposures and evaluation of the distribution of healthcare resources.

16

Validation of Handheld Ultrasound Devices for Point of Care Use in Rheumatology: Interim Analysis

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Objectives: Ultrasonography (US) has experienced a rapid evolution in rheumatology. Despite many advantages being shown repeatedly, several barriers persist and stand in the way of a wider use of US in rheumatology, equipment cost being an important one. Hand-held US technology promises to take this cost down substantially. However, before it can be specifically used for rheumatology, its performance must be validated against gold-standard devices for key interventions. We aim to test the concurrent validity of a handheld US device versus a gold-standard device to detect characteristic features of psoriatic arthritis (PsA).
Methods: PsA patients presenting with at least one tender and swollen joint were included. Each patient had consecutive US examinations using a handheld (Clarius Mobile Health Inc, HD3 L20

and L15 scanners) and a gold standard US device (GE LogicE9) for detecting synovitis, nail disease, and erosions. B mode and power Doppler images were saved for each site. Every image was given a unique identifier number at the end. Image reading was performed at least 2 weeks after the acquisition of US in all patients. A random order slide show was conducted for scoring, irrespective of the machine used or the anatomical site or patient assessed, to ensure blindness. Here we present interim analysis for the first 10 patients to detect synovitis (n= 240), nail disease (n= 20), and erosions (n= 40).

Results: The median (IQR) tender and swollen joint counts were 8.5(18.5) and 4.5(5.75), respectively. At least moderate agreement was observed between the handheld and gold standard devices in all elementary lesions. [Table] Specifically, both detecting synovitis, the L15 and L20, had a kappa of 0.499 and 0.535 compared to the GE machine, respectively. For detecting the intrasynovial Doppler signals, the L15 had a substantial agreement (kappa: 0.667) and L20 had a moderate agreement (kappa: 0.428). The nail lesions were compared with L20, which showed a moderate agreement to detect the loss of tri laminar appearance (kappa: 0.490) and substantial agreement to detect nail bed vascularity (kappa: 0.732). For erosions, there was an almost perfect agreement with the L15 (kappa: 0.876) and moderate agreement with L20 (kappa: 0.486).

Conclusion: In this interim analysis, the handheld US devices show moderate-substantial agreement to detect synovitis, nail lesions and erosions, and Doppler signals. The final analysis will be conducted after 30 PsA patients are enrolled, and enthesitis will also be analyzed. These interim results encourage testing the use of handheld US devices for wider use.

17

The Prediction of Response to Advanced Therapies on a Joint Level in Rheumatoid Arthritis: The Interpretation of Tenderness and Doppler Ultrasound

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Objectives: Ultrasound (US) is a sensitive method for evaluating disease activity in Rheumatoid Arthritis (RA). Several studies have shown discrepancies between the physical examination and US. [1] In this study, we aimed to understand the significance of baseline Doppler signals to predict response and flare on a joint level, in comparison to physical examination, following a new biologic therapy.

Methods: At the ORCHESTRA (Ottawa Rheumatology CompreHEnSive TReatment and Assessment) Clinic, RA patients starting a new bDMARD/tsDMARD therapy are assessed using a comprehensive screening process which includes a protocoled US scan at baseline and three months after new therapy initiation. For this analysis, we included all MCP, PIP and wrist joints. Analysis was performed on a joint level. Tenderness of the joint as baseline and at follow-up were grouped according to having grade ³2 Doppler signals at baseline. Odds ratios were calculated to understand the predictive value of baseline US for a) response in joints that were tender at baseline and b) flare in joints that were non-tender at baseline.

Results: The analysis included 878 joints of 40 RA patients (70% female). The median (IQR) tender and swollen joint counts were 8(11) and 7.5(5), respectively, with a DAS28 score of 3.76 (1.58). Twenty-one patients (52.5%) were bionaive at baseline. 219/878 joints were tender at

baseline, 48 (21.9%) of whom had Doppler signals. Among the Doppler positives, the response rate was 46%. The response rate of the joints with no Doppler signals at baseline was 71%, meaning they were no longer tender at follow-up. The odds of achieving response on a joint level was lower if there were Doppler signals at baseline (OR 0.34 (CI:0.18-0.66)). [Table-1] Among the 659 non-tender joints at baseline, 108 (16.4%) had Doppler signals. Within these, 24.1% became tender at follow-up. Among the Doppler negative, 10.1% became symptomatic. The odds of flaring on a joint level that was previously non-tender was higher if there were Doppler signals at baseline (OR 2.64 (CI:1.58-4.44)). [Table-1]

Conclusion: Our study shows that Doppler signals at the initiation of an advanced therapy has two critical meanings on a joint level: Doppler-positive tender joints are more resistant to therapies (than Doppler-negatives) and Doppler-positive non-tender joints have a higher risk of becoming symptomatic. It is still not clear how US should be incorporated into the treatment algorithms, but the US information suggests a different phenotype. References: [1.] Naredo E. Ann Rheum Dis. 2005; 64:375-381

18

Improving Outcomes of Patients Living With Psoriatic Arthritis: The Observational Best Practices Research Initiative (OBRI-PsA)

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Objectives: The Observational Best Practices Research Initiative – Psoriatic Arthritis (OBRI-PsA) was launched in 2022 to better understand PsA patients' characteristics in real life, the impact of disease domains on impairment of physical function, quality of life, work productivity, and therapy decisions.

Methods: PsA patients with active disease (due to either tender or swollen joints, axial disease, enthesitis or dactylitis) that require new anti-rheumatic treatment are recruited to OBRI-PsA. Socio-demographic, disease activity measures and medication use are collected at enrollment, three months later, and approximately every six months thereafter.

Results: To date, 12 rheumatologists (most in community practice) have recruited 80 patients. At enrolment, the mean age (SD) was 53.9 (13.1) years, and 59% were female. [Table 1] 89% of the patients had polyarticular pattern and 34% of them were classified as having axial disease by their rheumatologist. Axial disease classification was based on inflammatory back pain in 64% and MRI in 41% of these patients. The most frequent indications for starting a new therapy were joint involvement (86%), psoriasis (32%), and axial disease (21%). Although 52% of patients had at least one enthesitis on physical examination, it was reported as being the reason for the

new treatment in only 11% of patients. For those with a first follow-up, 44% were reported to be in remission or low disease activity, based on the rheumatologist's judgment, without using any indices, and 22% and 7% of patients fulfilled the Minimal Disease Activity (MDA) and the Very Low Disease Activity (VLDA) criteria, respectively. While mean (SD) tender and swollen joint counts before and after [10.5 (9.3) vs 7.6 (11.9) and 7.2 (5.6) vs 2.9(4.4)] showed significant reductions with treatment, the mean (SD) Spondyloarthritis Research Consortium of Canada Enthesitis Index (SPARCC) did not significantly change [2.5 (3.6) vs 2.2 (3.6), p= 0.5461]. Within patients whose treatment was maintained at first follow-up, only 60% had controlled disease activity. 40% of patients continued on the same treatment despite not reaching remission or low disease activity (24% waiting for the medications' effect, 8% patients' and 8% rheumatologists' preference).
Conclusion: Here, we present the first-year results of the OBRI-PsA registry. Although the data presented only includes patients living in Ontario, the registry is expanding to other provinces. As there are some differences across provinces in access to medications, this expansion will provide an opportunity to compare provinces, highlight inequities, and advocate for best practices across Canada.

19

Influence of Age and Sex on Disease Trajectory in Rheumatoid Arthritis: Results from The Ontario Best Practices Research Initiative

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Objectives: Rheumatoid arthritis (RA) is the most common inflammatory rheumatic disease, with a female predominance of approximately 3:1. Females with RA experience more severe functional decline and increased disability than males. The sex-based differences in RA development and progression remain inadequately understood. [1] The onset of and progression of RA is affected by physiological processes, such as menopause and aging. [2] Therefore, we aimed to study the possible influence of age and sex on the disease trajectory (outcome and treatment) of rheumatoid arthritis.
Methods: This prospective cohort study used a registry database in Ontario, Canada, from 2008 to 2023. Patients were included if they had active RA (≥1 swollen joint), were in moderate or severe status, started a bDMARD at enrolment or first interview, and had at least one follow-up visit. Knowing the mean age of menopause is 52 years in Canadian women, [3] the cohort was divided into four groups: Males and females 52 years and older; males and females under the age of 52. We compared baseline characteristics and time to first remission between the four groups. Remission was defined using the Clinical Disease Activity Index (CDAI ≤2.8). The Multivariable Cox proportional hazards model was used to estimate the time to remission.
Results: The study included patients (years old): 62 male (< 52), 147 male (≥52), 285 female (< 52) and 492 females (≥52). Males ≥52 years were more likely to have longer disease duration, higher proportion of erosions, lower HAQ-DI and pain scores, and more likely to have reported CVD, diabetes mellitus, and lung disease compared to the other groups. In contrast to the other

groups, females ≥52 years were less likely to smoke, be married, use steroids and were more likely to report hypertension and cancer. The median time to first CDAI remission for males ≥52 years was numerically longer than other categories. However, the CDAI remission rate was not statistically different between age and sex categories at 6, 12, 18 and 24 months. In univariate analysis, compared to males < 52 years, females ≥ 52 years were significantly less likely to achieve remission (HRs: 0.64; 95% confidence interval [0.44-0.94], p= 0.022). [Figure 1] After adjusting for other factors, the likelihood of first remission was not significantly different between groups.

Conclusion: Conclusions: Some age- and sex-dependent differences in the disease trajectory for RA patients were observed. Thus, age and sex of patients must be taken into account by rheumatologists in their treatment strategy. References: [1.] Mollard E et al, Rheumatology 2018;579(5),798–802 [2.] Shah L et al, Cureus. 2020;12(10): e10944. [3.] Costanian et al, Menopause 2018;25(3):265-272

20

The Trust Study – Transition Us Together: Evaluating The Impact of a Parent- and Adolescent-Centered Transition Toolkit on Transition Readiness in Patients With Juvenile Idiopathic Arthritis and Systemic Lupus Erythematosus

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Objectives: Adolescents with pediatric-onset rheumatic diseases take on increasing responsibility of disease management from parents/caregivers as they prepare for transition to adult care. Ideally, adolescents receive transition support from parents and healthcare providers. However, parent-focused education and support during transition is sparse, and the impact of shifting parental responsibility to adolescents on parents and adolescents is not well understood. We provided parents and their adolescents with a transition toolkit and aimed to i) determine the toolkit's impact on patients' transition readiness, and ii) explore the parent-adolescent relationship as a mitigating factor.

Methods: A prospective cohort study of patients 14-18 years with Juvenile Idiopathic Arthritis (JIA) or Systemic Lupus Erythematosus (SLE) was conducted in the multidisciplinary rheumatology transition clinic at McMaster Children's Hospital. Participant demographics, disease characteristics (cJADAS, CHAQ, QoL, and pain), transition readiness (Transition-Q; maximum 100, higher scores reflect higher self-management skills), and parent-adolescent communication quality (Parent-Adolescent Communication Scale; PACS, maximum 100, higher scores reflect stronger communication) were collected at enrolment. A transition toolkit (parent-centered pamphlet on transition, roadmap of five domains of transition readiness, tip sheets) was provided to adolescents and their parents at enrolment. Two Transition-Q scores were obtained from routine clinical care prior to enrolment, and two after sharing the toolkit. Descriptive statistics determine means and standard deviations for continuous variables, and frequencies and proportions for categorical variables. We performed generalized estimating equation analyses to determine the toolkit's impact on transition readiness and understand the potential role of parent-adolescent communication quality. We also conducted subgroup analyses by sex.

Results: Of 21 patients included, 19 completed one post-toolkit Transition-Q while 16 completed two. Patient demographics, excluding QoL, were similar between sexes. [Table 1.1] Overall, parent PACS scores were greater than adolescents (mean (SD) 80.7 (9.6), mean (SD)

72.3 (13.0), respectively). On average, Transition-Q scores increased by 7 from the first to fourth timepoint ($\beta = 7.2$, $P < 0.05$), with the greatest increase after the provision of the toolkit ($\beta = 11.5$, $P < 0.05$). PACS scores did not significantly influence transition readiness scores after controlling for sex. [Figure 1.2]

Conclusion: Transition-Q scores increased over time with the greatest increase observed after the transition toolkit was shared with participants and parents. In this small sample, transition readiness did not appear to be affected by the quality of communication between the parent and adolescent. Future work will investigate the impact of the toolkit on parent transition readiness, and we will continue to explore the role of parent-adolescent relationships on transition readiness.

21

Lyme Disease: An Emerging Mimic of Giant Cell Arteritis

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Objectives: The incidence of Lyme disease across Canada has increased over six-fold in recent years (Gasmi et al.). Notably, one of the prominent symptoms of early localized Lyme disease is headache, and when Lyme presents in an older individual, it can raise suspicion of Giant Cell Arteritis (GCA).

Methods: Here, we present a case series involving patients referred to the adult outpatient rheumatology clinic at a single academic medical centre, in Halifax, Nova Scotia, which is a region where Lyme disease is endemic. The cases in this series span from 2020 to 2023 and include patients who were referred for evaluation of suspected GCA, but ultimately diagnosed with Lyme disease. The attending rheumatologists at the centre were surveyed and identified relevant cases for inclusion. Clinical, laboratory, and pathological data was collected through a retrospective chart review and summarized in tabular format.

Results: There were five cases included in the series. [Table 1] Among the cases, 60% were male, with ages ranging from 48 to 64 years. All patients presented with sudden and severe onset of headache, general malaise, and markedly elevated inflammatory markers (CRP and/or ESR) at initial presentation. No patients endorsed jaw claudication, and laboratory investigations did not exhibit anemia or thrombocytosis. Notably, only one patient exhibited the classic erythema migrans rash and neck stiffness, manifestations typically associated with early localized Lyme disease. As GCA was the suspected initial diagnosis, all patients were prescribed high doses of prednisone for empiric treatment, leading to observed improvement in clinical symptoms and inflammatory markers in all cases. Each patient underwent a temporal artery biopsy, all of which were negative for active arteritis. Subsequently, all patients underwent serologic testing that demonstrated the presence of antibodies to Borrelia burgdoferi, confirming the final diagnosis of Lyme disease. All patients received appropriate antimicrobial therapy with oral doxycycline.

Conclusion: Here, we identify a series of cases that illustrate how early localized Lyme disease can be mistaken for GCA when it presents in older adults. This is an important entity for clinicians to recognize when formulating a differential diagnosis for older adults who present with headache, general malaise, and elevated inflammatory markers. As its incidence rises, rheumatologists must be aware of Lyme disease as a potential disease mimic in patients referred for suspected GCA. References: [1.] Gasmi S, Ogden N, Lindsay L, et al. Surveillance for Lyme disease in Canada: 2009–2015. Can Commun Dis Rep. 2017;43(10):194-199.

22

Effectiveness, Acceptability and Accessibility of a Rheumatology Hybrid Model of Care in Thunder Bay District, ON

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Objectives: Timely access to pediatric rheumatology care is inadequate for patients residing in rural and remote communities. This gap has been addressed with use of Advanced Clinician Practitioner in Arthritis Care (ACPAC) for adult patients in a hybrid virtual care model (video link) to improve access to a musculoskeletal care provider while maintaining diagnostic accuracy. The primary aim of our study was to evaluate the effectiveness and accessibility of an ACPAC-led hybrid model of care (MoC) compared to traditional in-person assessments in pediatric rheumatology. Secondary aims included characterizing the geographical distribution and measures of socioeconomic status (SES) for the population served.

Methods: A retrospective chart review of patients from the Thunder Bay District, Ontario referred to paediatric rheumatology at London Health Sciences Centre or SickKids between January 2017 and March 2023 was conducted. Descriptive statistics were used to examine patient demographics, effectiveness and accessibility of the hybrid model versus in-person assessments. Postal codes were used in aggregate to describe the SES of communities served, with geographical spatial analysis conducted in ArcGIS Pro 3.0.

Results: One hundred and fifty-nine patients were assessed by pediatric rheumatology. Seventy-eight were seen through the hybrid MoC. See Patient Characteristics. [Table 1] Nineteen patients from the hybrid MoC required additional travel to tertiary care site, but none were for diagnostic clarity. Wait times did not significantly differ between groups; hybrid 1.4 ±1.3 months vs. in-person 1.8 ±2.5 months. Similar to the in-person model, the hybrid MoC was able to provide hands on assessments, while prescribing appropriate treatment strategies (medications, physiotherapy), and assessing patient reported outcomes. The hybrid MoC reduced the travel burden with a mean of 7.3 kms travel to Thunder Bay clinic compared to 1286.3 kms travel to a tertiary center. Examination of SES demonstrated that 5.2% of communities in which patients reside are under the low income cut off, 20.2% in a single caregiver household, and 18.5% of the population identifies as Indigenous.

Conclusion: The hybrid model improved accessibility of pediatric rheumatology care within remote and small communities in Northwestern Ontario, particularly for patients with JIA, non-inflammatory pain, and pain amplification disorders. While wait times did not differ, ACPAC led clinics were limited due to manpower and clinic space. If this MoC can be sustained, it may save not only patients' and families' time and money, but also the healthcare system, while providing the highest level of pediatric rheumatology care closer to home. References: [1.] Ahluwalia V., Larsen T., Kennedy C., Inrig T. & Lundon K. J. Multidiscip. Healthc. 2019;12:63–71. [2.] Warmington, K. et al. Open Access Rheumatol. Res. 2017; Rev. 9:11–19. [3.] Ahluwalia, V. et al. J. Multidiscip. Healthc. 2021;14:1299–1310.

23

Depression and Anxiety Symptoms in Children With Systemic Lupus Erythematosus and Healthy Controls in The Era of Covid-19

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Objectives: Depression and anxiety symptoms in patients with childhood-onset systemic lupus erythematosus (cSLE) are associated with adverse outcomes. [1] The COVID-19 pandemic triggered various psychosocial stressors for many youths, which may further exacerbate depression and anxiety in youth with cSLE. We aimed to compare depression and anxiety symptomatology in youth with cSLE and healthy peers and examine the role of the COVID-19 pandemic period.

Methods: Cross-sectional surveys were administered to patients with cSLE, and age and sex-matched controls aged 10-17 years old recruited from the Hospital for Sick Children between January 2020 and June 2023. Clinically validated questionnaires included the Beck Depression Inventory (BDI-2, comprised of items assessing cognitive affect and somatic symptoms) and the Screen for Child Anxiety Related Emotional Disorders (SCARED, comprised of items assessing 5 anxiety subtypes). A total score of ≥10 on the BDI and ≥25 on the SCARED indicated clinically significant depressive and anxiety symptoms, respectively. Another questionnaire was administered concurrently to evaluate negative impact of COVID-19 on daily life [visual analogue scale from 0(not at all) to 100(a great deal)]. We used Fisher's exact test to compare the proportion with clinically significant depression and anxiety symptoms between patients and controls, and Pearson correlation tests to examine the relationship between these symptoms and COVID-19 negative impact. P-values < .05 were considered statistically significant.

Results: Participants included 55 patients with cSLE and 42 controls. The BDI identified clinically significant depression symptoms in 69% of cSLE vs 55% of control subjects ($p= 0.26$), and somatic symptom sub scores were significantly higher in the cSLE group [median= 6 (IQR= 7) vs median= 4 (IQR= 5), $p< 0.05$]; cognitive affect symptom scores did not differ. The SCARED identified clinically significant anxiety symptoms in 44% of cSLE vs 33% of control subjects ($p= 0.40$), and separation anxiety was significantly higher in the cSLE population (29% vs 10%, $p< 0.05$); there were no differences for panic disorder, generalized anxiety, social anxiety disorder and significant school avoidance. There were no group differences between the cSLE patients and controls in COVID-19-related experiences [median= 50 (IQR= 18) vs median= 50 (IQR= 41), $p= 0.65$]. However, worse COVID-19 experiences were related to increased anxiety and depression symptoms within the control ($p< 0.05$) but not the cSLE group

(Fig.1).
Conclusion: Depression and anxiety symptoms were prevalent in both patients with cSLE and healthy controls but presented differently in terms of anxiety subtype and negative impact of COVID-19. Future work will examine disease-related and psychosocial factors to better address mental health needs in cSLE. References: [1.] Quilter MC. Lupus 2019;28: 878–887.

24

The Impact of Increases on Treatments on The Health-Related Quality of Life of Children With Juvenile Idiopathic Arthritis in Canada: Results from ReACCh-Out and The CAPRI Registry

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Objectives: Treatments for Juvenile idiopathic arthritis (JIA) have changed substantially in the last decades with increasing use of conventional and biologic disease modifying anti-rheumatic drugs (cDMARDS and bDMARDs). Recent analyses comparing two Canadian JIA cohorts observed secular increases in DMARD use and in attainment of inactive disease, but little improvement in the one-item patient-reported Quality of My Life scale. The objective of this study was to assess detailed changes in health-related quality of life (HR-QoL) using the parent-completed 72-item Juvenile Arthritis Quality of Life Questionnaire (JAQQ).

Methods: Patients recruited in the 2005-2010 Research in Arthritis in Canadian Children Emphasizing Outcomes (ReACCh-Out) study were compared to patients recruited in the 2017-2023 Canadian Alliance of Pediatric Rheumatology Investigators (CAPRI) JIA Registry. Patients were included if they fulfilled JIA classification criteria, were recruited within three months of diagnosis, and completed the JAQQ at both enrollment and one-year in English or French. The mean changes in scores from baseline to one year were compared using t-tests. In addition to the JAQQ total and section scores (Gross Motor, Fine Motor, Psychosocial, Symptoms, Side Effects), we compared changes in pain intensity, Childhood Health Assessment Questionnaire Disability Index, physician global assessment of disease activity, and Quality of My Life scale.

Results: Overall, 668 patients (66.5% female) from the 2005-2010 cohort and 478 patients (60.2% female) from the 2017-2023 cohort were included in our analyses. JIA category distribution and age were comparable. During the first year of treatment, more patients in the 2017-2023 cohort used cDMARDs and bDMARDS compared with the 2005-2010 cohort (cDMARD 58.6% vs 51.8%, bDMARD 27% vs 6.5%). By one year, decreases in total JAQQ score from baseline were similar in both 2005-2010 (-0.92; 95% CI -1.02 to -0.82) and 2017-2023 (-0.97; 95% CI -1.09 to -0.85) cohorts, suggesting that treatments improved quality of life for both cohorts. [Table 1] However, none of the JAQQ total or section scores improved significantly in the 2017-2023 cohort relative to the 2005-2010 cohort (p-values 0.13 to 0.77). Although, pain scores did improve significantly (mean difference -0.46; 95% CI -0.81 to -0.10).

Conclusion: Although DMARD use for JIA increased from 2005-2010 to 2017-2023 in Canada, and pain scores improved, there was no significant concurrent improvement in HR-QoL measured by JAQQ. Further research is needed to elucidate the impact of increased DMARD use on HR-QoL.

25

Project Echo Rheumatology – Rationale and Results from a Mixed Methods Study to Capture Impact

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Objectives: Project ECHO (Extension for Community Healthcare Outcomes) is a virtually-delivered health professions education model, designed to improve patient care by enhancing primary care capacity in specialty topics. [1] Launched in 2017, Project ECHO Rheumatology ('ECHO') has welcomed over 500 primary care clinicians provincially to learn about rheumatic disease diagnoses and management. Qualitative and quantitative data pertaining to provider self-efficacy, satisfaction, knowledge, and practice change have been rigorously collected since its inception. Owing to the protean clinical presentations, heterogeneous diagnoses discussed in each patient case presented, and varied management approaches, capturing impact regarding clinical outcomes has proven challenging. It is in this context that we have undertaken a mixed methods study to robustly analyze ECHO impact. Objectives: To evaluate ECHO impact on clinicians by 1) exploring experiences in ECHO and its impact on rheumatic disease management (focus group discussions, FGD) and 2) assessing the impact of ECHO on clinicians' self-efficacy and knowledge (pre-post questionnaires).

Methods: We adopted a convergent mixed methods study design, where both qualitative and quantitative strands of this study were conducted concurrently [Fig. 1] [2] Descriptive statistics, paired samples t-tests, and effect sizes were calculated from questionnaire results. The qualitative descriptive approach was used to analyze FGD transcripts. [3] Integration of the qualitative and quantitative data occurred at the analysis and interpretation stage through merging analytic findings to compare, relate, and synthesize themes from each qualitative and quantitative. A narrative approach was used to weave findings from both strands together. Findings were summarized in a joint display. [Table]

Results: Through integration of qualitative and quantitative strands, ECHO impacted clinicians in multiple ways: clinicians increased in knowledge, self-efficacy in managing rheumatic conditions, benefited from ongoing mentorship and a supportive community of practice, and integrated teachings from weekly sessions into their clinical practice. Clinicians from rural and Northern Ontario were particularly impacted as access to specialists in their areas was sparse to none. Clinicians also increased their awareness of interprofessional approaches to rheumatic management, utilizing pharmacy, nursing, occupational therapy, and physical therapy to their full potential. Ultimately, primary care clinicians were able to better manage rheumatic conditions within primary care, using specialists and the larger health care system more wisely.

Conclusion: The burden of rheumatic disease is rising. ECHO is a promising education model that builds capacity within primary care to manage rheumatic conditions more adeptly and wisely. The mixed methods research approach permitted systematic analysis and synthesis of rich qualitative and quantitative data. References: [1.] Arora, S., et al., Knowledge Networks for Treating Complex Diseases in Remote, Rural, and Underserved Communities, in Learning Trajectories, Innovation and Identity for Professional Development, M.E. Anne McKee, Editor.

2012, Springer: New York, NY. p. 47-70. [2.] Creswell, J.W. and V.L. Plano Clark, Core Mixed Methods Designs, in Designing and Conducting Mixed Methods Research. 2018, SAGE Publications, Inc.: Los Angeles, CA. p. 51-99. [3.] Sandelowski, M., What's in a name? Qualitative description revisited. Res Nurs Health, 2010. 33(1): p. 77-84.

26

Distance Not Travelled in a Tele-Rheumatology Shared Care Model: Leveraging The Expertise of an Advanced Clinician Practitioner in Arthritis Care (ACPAC)-Trained Extended Role Practitioner (ERP) in Rural-Remote Ontario

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Objectives: A shortage of Rheumatologists has led to gaps in inflammatory arthritis (IA) care in Canada. Amplified in rural-remote communities, the number of Rheumatologists practicing rurally remains very low. Alternate strategies to provide care need to be adapted. The economic impact of a shared - care Tele-rheumatology model utilizing a community-embedded ACPAC-trained ERP and a remote urban Rheumatologist is described in terms of estimated travel cost savings (distance not travelled).

Methods: A Rheumatologist and an ACPAC-trained ERP located 463 kilometers apart established a monthly half-day Hub and Spoke Tele-rheumatology clinic to care for patients with suspected IA. Patients were triaged by the ACPAC-trained ERP. Collaborative visits occurred with the Rheumatologist (Hub, St. Michael's Hospital, Toronto) attending virtually. Geospatial information for individual patients was obtained using regional postal codes collected via demographic data. Calculation of distance between these locations and St. Michael's Hospital were based on the most efficient and cost-effective driving route using Google Maps. Aggregate data were used to calculate differences not travelled, due to the virtual care delivered. An estimation of further cost savings was based on Ontario Ministry of Health (MOH) travel grants that would have been reimbursed to these patients had they travelled for their specialty rheumatology care.

Results: Data from 124 patients seen between January 2013-January 2022 were retrospectively collected. 98% (n= 496/504 visits) were virtual. Based on the number of virtual visits, an estimated 493,470 km of patient-related travel was avoided. The loci where more than 5 patients resided is represented. [Figure 1] A hypothetical estimate of MOH travel grant cost was $276,428, calculated and based on the number of patient visits that would have incurred, had these patients travelled to Toronto for in-person care.

Conclusion: Half a million kilometers (493,470) of travel was avoided for patients receiving virtual care in this Tele-rheumatology study, significantly reducing the environmental impact by not travelling to access specialty rheumatology care. The estimated $276,428 cost-savings represents a minimal fiscal value of the ACPAC-trained ERP working in this limited (half day/month) Tele-rheumatology model of care. Other indirect costs need to be further captured in a more robust economic analysis. There is a compelling fiscal argument to support scaling-up of this model to deliver comprehensive and cost-effective virtual rheumatology care in underserviced communities in Ontario. References: [1.] Kulhawy-Wibe S C, J. Rheum 2022;49(6):635-43 [2.] Ahlualia VA. J.Rheum 2020;47(3):461-7 [3.] McDougall JA. Arthritis care Res (Hoboken) 2017;69(10):1546-57

27

Use and Discontinuation of Tumour Necrosis Factor Inhibitors Among Pregnant Women

with Chronic Inflammatory Diseases

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Objectives: Early consensus statements recommended discontinuing tumour necrosis factor inhibitors (TNFi) during pregnancy. Despite new guidelines recommending against this, the choice to stop TNFi pre-conception is patient- and provider-dependent. Understanding TNFi discontinuation pre-conception may help inform initiatives to optimize outcomes. We examined calendar trends in TNFi discontinuation pre-conception in women with chronic inflammatory diseases and compared characteristics of those who stopped using TNFi pre-conception (without resuming in pregnancy) compared with those who used TNFi at any time during pregnancy.

Methods: We created a cohort of pregnant women with rheumatoid arthritis, ankylosing spondylitis, psoriasis/psoriatic arthritis, and/or inflammatory bowel disease who delivered between 2011 and 2019 using the MarketScan commercial database. TNFi use was defined as ≥1 filled prescription or infusion procedure claim, categorized as a) TNFi pre-conception only (i.e. ≥1 prescription filled or infusion procedure claim in the 12 weeks preceding the gestational period but not within the gestational period) or b) TNFi use at any time during pregnancy (i.e. any prescription filled or infusion procedure claim during the gestational period, including restarts, new starts, and those continuing from pre-conception).

Results: We identified 3,372 pregnancies; 14% discontinued TNFi in the 12 weeks before conception and did not restart, and 86% were exposed to TNFi during pregnancy. [Table 1] IBD patients accounted for 47% of all pregnancies. Comparing rheumatologic to non-rheumatologic patients, more RA individuals (difference of 18%, 95% confidence interval, CI, 15-21%) and PsA/PsO (20%, 95% CI 16-24%) discontinued their TNFi than IBD patients. Corticosteroid use was similar in both TNFi exposure groups, and those using TNFi during pregnancy were more likely to use non-biologic disease-modifying agents concomitantly (difference of 8%, 95% CI 5-12%). Across comorbidities (diabetes, asthma, and hypertension), there was no difference in discontinuation. Over time, a lower proportion of patients stopped TNFi pre-conception (2011-2013 19% vs 2014-2016 13% vs 2017-2019 10%; p-value for trend < 0.0001).

Conclusion: In our study, 14% discontinued TNFi in the 12 weeks before conception and did not restart. The proportion of patients stopping TNFi pre-conception decreased over time, possibly reflecting how changes in the observational literature pre-dated (and influenced) guidelines. Further research on TNFi discontinuation in the years after the 2020 ACR guidelines is warranted to establish guideline compliance and monitor perinatal outcomes.

28

Factors Associated With Incident Cardiovascular Disease in Patients With Rheumatoid Arthritis: A Scoping Review

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Objectives: Rheumatoid arthritis (RA) is the most common form of inflammatory arthritis and is

associated with various comorbidities, including cardiovascular disease (CVD). [1] This scoping review aims to provide an overview of the current literature exploring risk factors for incident CVD in RA patients.
Methods: Scopus, PubMed, Ovid MEDLINE and Cochrane databases were used to find the relevant studies. Two reviewers screened and extracted the relevant studies independently. Studies were included if they had longitudinal follow-up and reported CVD incidence, the study subjects were aged ≥ 18 years, and the articles were written in English. CVD was defined as any disease of heart or blood vessels. The extracted data included study characteristics, demographic characteristics of the subjects, co-morbidities, behavioural and RA-related risk factors (including RA treatments).
Results: Thirty-two research papers were included in the current review. The majority of the studies were done in the United States with a mean follow-up duration of 7.8 years. The sample size of the studies ranged from 182 to 4,311,022 subjects, the mean age of the subjects in the studies ranged from 46.1 to 72.3 years, and on average, 34.6% of the subjects were male. Among the traditional or behavioural cardiovascular risk factors, hypertension (84.4%), diabetes mellitus (78.1%), smoking (71.8%) and obesity or BMI (65.6%) were among the most studied risk factors. Additionally, rheumatoid factor (46.9%), C-reactive protein (34.4%), erythrocyte sedimentation rate (31.3%) and 28-joint Disease Activity Score (DAS28) (25%) were the top studied RA-related factors. In terms of the impact of RA treatments on CVD incidence, DMARDs (including conventional and biological types) and NSAIDs were the most frequent groups of medications that were studied. While most studies reported a composite outcome for CVD, some other studies measured the incidence for specific types of CVD such as myocardial infarction or heart failure.
Conclusion: Demographic, environmental and behavioural risk factors including socioeconomic status, pollution exposure, alcohol consumption and diet along with some RA-related factors such as anti-citrullinated protein antibodies and functional impairment are among the less-studied risk factors that future research needs to focus on. Finally, the majority of current evidence comes from the USA and European countries, with a paucity of Canadian studies on this topic. Therefore, our future work will use data from the Canadian Longitudinal Study on Aging (CLSA) to assess this topic in the Canadian context. References: [1.] Littlejohn E. Prim Care 2018; 45: 237-255.

29

Discovering The Periodic Fever Syndrome Population at Hamilton Health Sciences

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Objectives: The rapid discovery of new periodic fever syndromes has outpaced the scientific community's ability to adequately describe their epidemiology, clinical course, and genetic determinants, and to disseminate the available information to referring physicians. The aim of this study was to describe the demographics, diagnoses, and disease course of the periodic fever syndrome patient population at Hamilton Health Sciences (HHS).
Methods: A registry was created to follow patients of all ages seen at HHS clinics with periodic fever syndromes including monogenic fever syndromes, periodic fever, aphthous stomatitis,

pharyngitis, and cervical adenitis (PFAPA) and syndrome of undifferentiated recurrent fever (SURF). Data were collected using both a retrospective chart review upon initial enrolment, and prospective data collection at each follow-up visit. Descriptive statistics were used to report on the prevalence of specific periodic fever syndrome diagnoses, time to diagnosis (time between symptom onset and establishment of diagnosis) and response to treatment.
Results: In the first six months of data collection, 36 participants were enrolled. Median age of participants was 11 years (range 3 – 53 years) and 31% were female. Half (49%) of patients were diagnosed with familial Mediterranean fever (FMF), 31% were diagnosed with PFAPA, 14% were diagnosed with SURF, and 6% had other periodic fever syndrome diagnoses, including Behçet's disease and NLRP3-associated autoinflammatory syndrome. Time to diagnosis varied greatly, ranging from 0.5 - 23 years. The mean (SD) time to diagnosis was 5.5 (± 6.0) years. Time to diagnosis was shortest for PFAPA (mean 3 ± 2.5 years, range 0.5 – 9) and longest for FMF (mean 7.7 ± 8.2 years, range 0 – 23). The majority (81%) of participants had genetic testing with the Next Generation sequencing autoinflammatory disease and recurrent fever syndrome panel at the Hospital for Sick Children. Twenty-eight percent of those tested had a negative panel result. The majority of participants were treated with colchicine and/or intermittent systemic corticosteroids. The utilization and treatment response rates are shown. [Table 1]
Conclusion: Results from this study help to characterize the periodic fever syndrome patient population in our community. The significant variability and the long mean time to diagnosis highlights the need to identify and address factors associated with diagnostic delay. The next phase of this project will examine those factors and explore the additional diagnostic value of whole exome sequencing for participants with undifferentiated fever syndromes and negative genetic panel testing.

30

Bridging The Gap: Optimizing Transition Visits for Youth With Rheumatic Disease in Southern Alberta

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Objectives: The transition period from pediatric to adult rheumatology care is a high-risk time for loss to follow up. A joint transition visit including the patient, caregiver(s) and both pediatric and adult providers is recommended by the EULAR/ PReS transitional care guidelines. [1] In the Southern Alberta Young Adult with Rheumatic Disease (YARD) program, a transition visit is offered to patients, traditionally in-person, with virtual visits offered during the COVID-19 pandemic. The purpose of this study is to evaluate and optimize the model for transition visits in Southern Alberta.
Methods: Patients with a rheumatic disease aged 18-24 years who had completed a transition visit between January 2020 and July 2023 were eligible to participate. Study participants were invited to a 30-minute semi-structured interview to discuss their satisfaction with the transition visit, suggest improvements in visit structure, and offer suggestions for additional program components. The Zoom sessions were audio recorded and transcribed using REV transcription

services. Interview transcripts were uploaded into NVivo 14 to facilitate the coding and ensure intercoder reliability between two coders. [2] Braun and Clarke's method for thematic analyses was used for the qualitative analyses. [3]
Results: Twelve youth participated, with demographic characteristics presented. [Table 1] Two participants had an in-person and ten had a virtual transition visit. Four themes emerged. 1) Participation in transition visits enables youth to feel involved, increases confidence in transition and allows an opportunity to share information. 2) Youth prefer detailed information to be provided at the transition visit; specifically, a highlight of differences between adult and pediatric care and how to access emergency care. 3) Despite the transition visit, there remains a period where youth feel that no one is following them - a "gap time" between their last appointment with the pediatric rheumatologist and first appointment with the adult rheumatologist. Youth would like more structure and clarity about booking with the adult rheumatologist, including a document with contact information for their providers. Many expressed a desire for a "wrap-up" visit with the pediatric rheumatologist after the first adult rheumatology appointment. 4) Youth identified significant advantages to both in-person (enables a better bond with the adult rheumatologist, opportunity to say goodbye to their pediatric rheumatologist) and virtual (convenient, flexible) transition visits.
Conclusion: This feedback will help to improve transitional care in Southern Alberta and may be extrapolated to other centres. Virtual transition visits are an acceptable alternative for patients with limited access to rheumatology centres. References: [1.] Foster HE, et al. Ann Rheum Dis 2017;76:639-646. [2.] Kurasaki, K S. Field Methods 2000; Vol.12. No. 3.;179-194. [3.] Braun, V., & Clarke, V. Sage. 2022.

31

Pediatric Uveitis in Saskatchewan from a Rheumatology Perspective: Epidemiology, Treatment and Prognosis

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Objectives: Uveitis is a potential complication of juvenile idiopathic arthritis (JIA), the most common rheumatologic disease of childhood. In addition, it is relatively common in some subtypes of JIA and often asymptomatic; this has led to development of guidelines for uveitis screening, monitoring and treatment for patients with JIA. However, there is less guidance around uveitis in the pediatric population when not associated with JIA. We sought to describe the status of pediatric uveitis patients within the province of Saskatchewan that are referred to a pediatric rheumatology clinic in a tertiary centre. We looked to assess the risk factors, treatment, and prognosis of patients with uveitis, with emphasis on the difference between JIA associated and non-JIA associated uveitis.
Methods: A retrospective chart review was completed for patients referred to a pediatric rheumatology clinic in Saskatoon within the past five years with a diagnosis of uveitis. Inclusion criteria were: a diagnosis of uveitis made by an ophthalmologist, onset of disease prior to their 16th birthday, and meeting the definition of chronic uveitis. Chart review assessed for disease markers (anti-nuclear antibody [ANA], rheumatoid factor [RF], HLA-B27), treatment (topical, systemic), disease duration, remission, and sequelae of disease.
Results: A total of 48 patients were included in the study. Although our study failed to reach significance, several trends could be seen within our data. Our study found that 37% of patients were positive for ANA, relapses occur more often in anterior and panuveitis, and complications

of uveitis were seen more frequently in non-JIA related uveitis, despite similar treatment.
Conclusion: There remain ongoing significant challenges in the management of pediatric uveitis, particularly non-JIA associated uveitis. Further research into the risk factors associated with more severe uveitis outcomes, the differences between JIA associated uveitis and other causes, and optimal treatment for these patients is required. It would be prudent for future directions of study to include a collaborative effort between ophthalmologists, rheumatologists and optometrists, particularly in rural areas.

32

Clinical Audit of Subcutaneous Methotrexate Counseling in Pediatric Patients With Juvenile Idiopathic Arthritis

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Objectives: Subcutaneous methotrexate is recommended for children with juvenile idiopathic arthritis (JIA) who have inadequately responded to NSAIDs and/or intraarticular glucocorticoids. [1] Non-adherence to methotrexate is multifactorial, including limited time/resources and lack of knowledge for patients and families. Comprehensive methotrexate education may improve adherence and clinical outcomes. [2] Proper documentation of counseling in patient charts is important for coordinated care and reducing medical errors. The primary objective was to perform a chart audit to determine the proportion of children with JIA at a tertiary children's hospital who received full methotrexate counselling based on documentation in electronic medical records.
Methods: A chart audit was performed to review pediatric patients who were diagnosed with JIA (oligoarticular, polyarticular, psoriatic, and undifferentiated subtypes) and started on subcutaneous methotrexate between January 1, 2018, and April 30, 2023, at the Stollery Children's Hospital. Physician documentation at the time of methotrexate initiation was reviewed to determine whether counseling was provided in each of the categories: general education (indications and benefits, patient resources, administration teaching), side effects (avoidance of sulfa-containing medications, alcohol, pregnancy, immunosuppression, gastrointestinal symptoms, and laboratory effects), monitoring (bloodwork at initiation and routine monitoring), and vaccinations. Description statistics were performed for data analysis.
Results: Sixty patient charts were audited. [Table 1] None of the patients received full methotrexate counseling. Most patients (56/60, 93.3%) were counselled on the benefits of subcutaneous methotrexate and were provided with instructions on how to take folic acid. Almost two-thirds (38/60, 63.3%) of families received counselling for each of the immunosuppression, gastrointestinal symptoms, and laboratory side effects categories. Half (32/60, 53.3%) of patients were instructed to avoid alcohol and pregnancy due to the risk of teratogenicity. Of the 28 patients who did not receive counselling on pregnancy, 8 were male. Initial bloodwork monitoring was discussed with 57 patients (95.0%) and the importance of long-term monitoring was documented for 51 patients (85.0%). Education about vaccinations was the lowest audited item; 12 (20.0%) received counseling about updating inactivated vaccines and 21 (35.0%) about avoiding live vaccines.
Conclusion: Patients and families at initiation of subcutaneous methotrexate were usually educated about the indications, benefits, and folic acid supplementation. There was limited and incompletely documented counseling about immunosuppression, side effects, toxicity monitoring, alcohol use, and pregnancy. Vaccinations was the least frequently counseled category, representing an area for improvement. This chart audit provides a framework for

creating and implementing a standardized checklist to use during clinical encounters when starting children with JIA on methotrexate. References: [1.] Cellucci T, Guzman J, Petty RE, Batthish M, Benseler SM, Ellsworth JE, Houghton KM, Leblanc CM, Huber AM, Luca N, Schmeling H, Shiff NJ, Soon GS, Tse SM; Pediatric Committee of the Canadian Rheumatology Association. Management of Juvenile Idiopathic Arthritis 2015: A Position Statement from the Pediatric Committee of the Canadian Rheumatology Association. J Rheumatol. 2016 Oct;43(10):1773-1776. doi: 10.3899/jrheum.160074. PMID: 27698103. [2.] Len CA, Miotto e Silva VB, Terreri MT. Importance of adherence in the outcome of juvenile idiopathic arthritis. Curr Rheumatol Rep. 2014 Apr;16(4):410. doi: 10.1007/s11926-014-0410-2. PMID: 24504596.

33

Assessing The Prevalence and Complexity of Diagnosing and Managing Pediatric Chronic Non-Bacterial Osteomyelitis Across Canada

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Objectives: Chronic non-bacterial osteomyelitis (CNO) is a rare autoinflammatory bone disorder that is frequently associated with delayed diagnosis due to its variable clinical presentation, overlap with other conditions, and lack of awareness. The study objectives were to: (1) determinate the minimum prevalence of CNO in pediatric patients across Canada based on a survey of pediatric rheumatologists; and (2) characterize referral patterns, treating specialists, access to imaging and medications, and diagnosis and management protocols across Canada.

Methods: An electronic survey was distributed to 95 pediatric rheumatology specialists who are members of the Canadian Rheumatology Association. Survey questions focused on the number of existing CNO patients, diagnostic criteria, referral patterns, treating specialists, access to investigations, and diagnosis and management protocols. One representative from centers that have shared clinical practices completed the survey.

Results: Of the 40 responses received (42% response rate), 35 were complete and identified 443 current pediatric CNO patients with an estimated minimum prevalence of 5.4 per 100,000 Canadian children. There was variation across Canada in prevalence, referral sources, prescribing practices and access to biologic agents. [Table 1] Diagnosis was based on expert opinion in 88.6% and exclusively based on diagnostic criteria in 2.9%. The most frequent referral sources were pediatricians and orthopedic surgeons, although infectious diseases physicians were frequent referrers in Alberta, Ontario, and Quebec. Referrals frequently described musculoskeletal pain and abnormal imaging findings. Whole-body MRI was described as always or often needed for diagnosis by 72.7% of respondents, while bone biopsy was always or often required by 15.2%. All but 3 sites across Canada had a specialized MRI protocol for

CNO, but only 2 sites had shared protocols for blood work and treatment. Rheumatologists led CNO management at all sites. Treatment protocols were used by 45.7%; of these, 31.4% used the Childhood Arthritis and Rheumatology Research Alliance (CARRA) protocols and 14.3% used shared site protocols. Intravenous bisphosphonates were prescribed frequently with no reported use of oral bisphosphonates. Adalimumab was the most frequent biologic agent chosen; 28.5% of respondents had never treated CNO with biologic therapy.
Conclusion: CNO has been identified in 443 current pediatric patients across Canada with geographic variation in prevalence, referral sources, bisphosphonate prescribing practices, and access to biologic therapies, but shared general approaches to diagnosis and management. Further work is required to understand the variations in prevalence and referral patterns to optimize care.

34

Therapeutic Drug Monitoring of Rituximab to Predict Early B-Cell Repopulation in Children

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Objectives: Despite a lack of paediatric-specific pharmacokinetic (PK) data, rituximab is increasingly used to manage children with inflammatory diseases. As a result, dose and dosing interval are extrapolated from adults. It is not uncommon for children to have early B-cell repopulation, requiring redosing as early as 3-4 months after their last rituximab infusion. This interruption in B-cell depletion may result in disease activity. Therapeutic drug monitoring (TDM) is an approach where drug-level measurements guide pharmacotherapeutic decisions. This study evaluates whether individualized TDM can predict when redosing of rituximab is required.
Methods: All children receiving treatment with rituximab were eligible to participate in this study. Blood samples for rituximab concentrations, anti-rituximab antibodies and CD19+ B-lymphocyte counts were collected with routine clinical blood work (i.e., at random time points). Drug concentrations were determined by sandwich enzyme-linked immunosorbent assay (ELISA) (Sanquin Diagnostic Services, The Netherlands). The first two rituximab concentration measurements (> 1 month apart) were used to calculate the half-life and predict future drug concentrations. Subsequent serum drug concentrations were compared to the predicted values.
Results: We enrolled eight participants (6 female) with a median age of 15.1 years (range 6.3-17.0), receiving rituximab for neuroinflammatory disease (n= 3), ANCA-associated vasculitis (n = 3) or childhood-onset SLE (n= 2). An example graphical output of the analysis is shown. [Figure 1] The median rituximab half-life was 2.4 (range 1.8-3.5) weeks. The first, second and third samples were collected at a median of 3.7 (range 1-9), 10.4 (5.4-21.9), and 15.7 (range

12.1-26) weeks, respectively. The median rituximab concentration of the third sample was 1.5ug/mL (range 0.2-6.7), with a median difference between the predicted and measured concentration of 0.24ug/mL (range 0.02-0.41). Three participants had a total of seven additional samples collected, with a median difference of 0.27ug/mL between predicted and measured values (range 0.03-1). B-cell repopulation was seen in 3 participants at a rituximab concentration of < 0.3ug/mL, consistent with previous reports. The remaining participants were either retreated with rituximab before repopulation, or additional samples were unavailable. No anti-drug antibodies were detected.

Conclusion: This study indicates that measured rituximab concentrations show a minimal deviation from predicted values allowing us to predict when individuals will achieve subtherapeutic rituximab concentrations. These results may help determine when to retreat with rituximab and quantify an individualized wash-out period when needed. The data obtained in this study will be used to build a population PK model that will help further understand the PK variations observed in our participants. Best Abstract on Pediatric Research by Young Faculty Award.

35

Prescribing of Medications With Pharmacogenetic Guidance in Children and Adolescents With Systemic Lupus Erythematosus

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Objectives: The objective of this study is to determine the prevalence of pharmacogenetic (PGx) medication prescribing within a cohort of children and adolescents diagnosed and followed for systemic lupus erythematosus at the Hospital for Sick Children Lupus Clinic.

Methods: We completed a retrospective cohort study of patients diagnosed and followed for SLE at SickKids between January 1997 and December 2017. All patients met American College of Rheumatology and/or Systemic Lupus International Collaborating Clinics SLE classification criteria and had clinical and medication data in the dedicated lupus database. We created a list of medications that have clinical PGx guidelines or clinical PGx recommendations in FDA-approved drug labels using the Pharmacogenomics Knowledgebase (www.PharmGKB.ca). After excluding medications with uninformative guidance (i.e., no dosage changes were recommended for patients with the PGx variants), we cross-referenced this list with all the medications taken by patients in our cohort. Subsequently, we identified the number of prescriptions of medications with PGx guidance, the proportion of PGx to non-PGx prescriptions, and the time to a first and second instance of a PGx prescription following SLE diagnosis using Kaplan-Meier time-to-event analyses.

Results: Our cohort included 616 children and adolescents with SLE. We identified 219 distinct prescribed medications, including 43 with PGx guidance. Sixty-six percent (405/618) of patients were prescribed at least one PGx medication during follow-up. Of this sixty-six percent, the

majority were prescribed the medication within the first year following SLE diagnosis (n= 292, 47%). Patients were prescribed anywhere from 1 to 27 medications in total and between 0 and 8 PGx medications. Lastly, we identified the top three most prescribed medications with PGx guidance to be Azathioprine (330/616 patients), Omeprazole (216/616) and Lansoprazole (94/616).

Conclusion: In a large cohort of children and adolescents with SLE, we observed that a large proportion of patients were prescribed a medication with PGx guidance, mostly within 1 year of SLE diagnosis. These findings detail the prevalence and prescribing patterns of PGx medications, showing that medications with PGx guidance are frequently prescribed to children and adolescents with SLE. Future plans include genetic analyses of the prevalence of variants for prescribed PGX medications.

36

An Unusual Case of Pediatric Systemic Lupus Erythematosus Complicated by Sialadenitis, Pancreatitis and Hemophagocytic Lymphohistiocytosis

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Background: A 16-year-old female had a 3-year history of polyarticular juvenile idiopathic arthritis (antinuclear antibody (ANA) and rheumatoid factor negative) that resolved with naproxen and remained inactive off therapy for 8 months. She presented to clinic with a 3-day history of fever, fatigue, polyarthritis, neck swelling, sore throat, and abdominal pain. Bloodwork revealed transaminitis, c-reactive protein (CRP) of 13.4 mg/L, erythrocyte sedimentation rate (ESR) of 16 mm/hr, and normal complete blood count. During a brief hospital admission one week later, urinalysis and infectious work-up were normal. She was re-admitted one week after discharge with worsening fever, fatigue, joint pain, abdominal pain, and significantly enlarged salivary glands. She had increasing pancytopenia; elevated ferritin (5360 ug/L), CRP (64 mg/L), ESR (107 mm/h), lipase (4824 U/L), transaminases and triglycerides; new nephrotic range proteinuria (542 mg/mmoL); and negative antibodies to double-stranded DNA and extractable nuclear antigens.

Case: Her clinical picture was concerning for hemophagocytic lymphohistiocytosis (HLH). She was treated with intravenous immune globulin, pulse methylprednisolone and anakinra, but continued to demonstrate clinical and laboratory deterioration with altered level of consciousness and cognitive dysfunction.

Bone marrow biopsy was negative for malignancy and extensive infectious work-up including viral serologies was negative. Renal biopsy revealed hemophagocytosis and glomerulonephritis with immune complex deposits and tubuloreticular inclusions, indicative of SLE. ANA by immunofluorescence was 1:320.

Her fevers, arthritis (other than left elbow arthritis), sialadenitis, pancreatitis, and laboratory markers of HLH improved after switching to dexamethasone and anakinra was weaned.

Conclusion: Prior to discharge, she developed new behaviour disinhibition and cognitive dysfunction that were concerning for neuropsychiatric SLE. Repeat brain MRI showed bilateral asymmetric cerebral white matter hyperintensities. She started intravenous cyclophosphamide and is now clinically well other than ongoing behaviour disinhibition. References: [1.] Charras A. Curr Rheumatol Rep 2021;23(3):20. [2.] Brunner HI. Arthritis Rheum 2008;58(2):556-62.

37

Case Report: A Novel Pathogenic Splicing Variant in COL9A3 Causing Erosive

Arthropathy in Multiple Epiphyseal Dysplasia

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Background: Multiple epiphyseal dysplasia (MED, OMIM #600969) is a common but mild form of skeletal dysplasia characterized by early onset osteoarthritis leading to possible short stature and mild myopathy. Radiographic skeletal survey is required to identify the delayed epiphyseal ossification and articular cartilage changes. Additionally, since MED is a genetically heterogeneous condition with dominant or recessive inheritance, molecular testing is essential. [1]

Case: We present a 14-year-old Pakistani male from a non-consanguineous relationship, known to have type-1 diabetes and hypothyroidism, with bilateral knee effusions, right knee flexion-contracture and chronic arthralgias of his elbows and wrists. His bloodwork was unremarkable apart from a mildly elevated erythrocyte sedimentation rate (ESR). Plain radiographs surprisingly showed sclerotic changes and fragments along the femoral and tibial epiphysis suggesting destructive arthropathy with epiphyseal involvement (Image 1). Juvenile idiopathic arthritis (JIA) was initially thought to be the likely cause, however given the significant radiological findings, the differentials were modified to missed septic arthritis, MED, Wolcott-Rallison syndrome, and Charcot arthropathy in diabetes mellitus. Subsequently, genetic testing was done which revealed a variant in the COL9A3 gene, denoted as c.148-1G> C. Testing also revealed a paternally inherited CTLA4 variant likely contributing to his autoimmune diseases (T1D and hypothyroidism). To date, there are only four identified COL9A3 variants associated with MED. [2] Our patient's splicing variant in COL9A3 gene (denoted as c.148-1G> C) has not been previously reported in the literature however, it was interpreted to be likely causative of MED given similar pathogenic mutations have been previously reported. [2] Potential complications of this diagnosis include progressive joint damage and precocious osteoarthritis such that joint surgery may eventually be required. Interestingly, although mild myopathy is reported with COL9A3 mutations, our patient has reported no such symptoms. Currently, he continues Naproxen for his symptoms; no further changes noted in his most recent knee X-rays.

Conclusion: In conclusion, our patient presented with clinical signs and symptoms most suggestive of JIA, however upon radiological investigations, he was found to have significant findings not in keeping with this diagnosis. This prompted genetic evaluation which revealed a new pathologic splicing variant in COL9A3 gene, thus giving him the diagnosis of MED. This case report highlights the value of early molecular testing given the heterogenicity of MED both clinically and genetically. References: [1.] Unger S, Bonafé L, Superti-Furga A. Multiple epiphyseal dysplasia: clinical and radiographic features, differential diagnosis and molecular basis. Best Pract Res Clin Rheumatol. 2008 Mar;22(1):19-32. doi:10.1016/j.berh.2007.11.009. PMID: 18328978. [2.] Jeong C, Lee JY, Kim J, Chae H, Park HI, Kim M, Kim OH, Kim P, Lee YK, Jung J. Novel COL9A3 mutation in a family diagnosed with multiple epiphyseal dysplasia: a case report. BMC Musculoskelet Disord. 2014 Nov 8;15:371. doi: 10.1186/1471-2474-15-371. PMID: 25381065; PMCID: PMC4236474. [3.] Briggs MD, Chapman KL. Pseudoachondroplasia and multiple epiphyseal dysplasia: mutation review, molecular interactions, and genotype to phenotype correlations. Hum Mutat. 2002 May;19(5):465-78. doi: 10.1002/humu.10066. PMID: 11968079.

Pediatric Rheumatology Care in The Canadian Context: A Qualitative Analysis Work on Behalf of The Pediatrics Human Resources Subcommittee, Under The Pediatrics Committee of The Canadian Rheumatology Association

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Objectives: Previous work highlighted a national deficit in pediatric rheumatologists, a geographic maldistribution, and a deficit of allied health support in Canada. [1] The aim of this study is to further evaluate the clinical care structures and processes in place within Canadian pediatric rheumatology centres that promote or impede care delivery, from the perspective of pediatric rheumatology health care providers.

Methods: Data was collected through semi-structured interviews with pediatric rheumatologists and Advanced Clinician Practitioners in Arthritis Care (ACPACs) across Canada. Strategic sampling was used in order to achieve variations in practices. The interview guide was developed by the research team to ensure important topics were addressed, including information on how each clinician practices, their clinical and non-clinical responsibilities, and how their clinic/division functions. Interviews were recorded and transcribed verbatim. Analysis was performed by two investigators following the four stages of qualitative content analysis described by Bengtsson [2]: Decontextualisation, recontextualisation, categorisation, and compilation. Data were analyzed through latent analysis due to the informal nature of interviews, and themes were identified iteratively.

Results: Twelve individuals agreed to participate in the study, including 9 pediatric rheumatologists (7 working in tertiary care, 2 in the community) and 3 ACPACs. Interviewees practice across the country with a range of career experience. Through the initial coding process, data were grouped into 8 categories and 13 subcategories. [Figure 1] From these categories, 58 distinct groups were generated for extraction of themes for discussion. Prominent themes included: geographical barriers affect access to care, ACPAC practitioners improve team functioning and access to care, and community pediatric rheumatology helps improve access to care. Several themes reflected a lack of allied health resources nationally, including there is a lack of social work support, there is inconsistent access to physiotherapy and occupational therapy that are knowledgeable about pediatric rheumatology care and disease, and the burden of biologic therapy coordination often falls on physicians and nurses and detracts from other clinical duties. Discussion around the COVID-19 pandemic highlighted that the COVID-19 pandemic resulted in improved support and resources for virtual care that has allowed for ongoing utilization of virtual care.

Conclusion: Although there is variation in pediatric rheumatology practice across Canada, there are many common themes of supports and barriers to clinical care. The description of these themes can help guide pediatric rheumatology practice by highlighting thriving practice patterns and concomitantly emphasize the deficits in resources and functioning that can advise future advocacy work. References: [1.] Lee JJY. J Rheumatol. 2022;49:197-204. [2.] Bengtsson M. Nursing Plus Open. 2016;2:8-14. Abstract findings and conclusions do not represent the official position of the Canadian Rheumatology Association.

39

Irrespective of The Number of Erosions at Baseline, Patients With Psoriatic Arthritis Treated With Ixekizumab Show Improved Clinical Outcomes

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Objectives: Psoriatic arthritis (PsA) is a chronic and progressive disease characterized by high rates of early joint erosions, which have been associated with impaired quality of life and increased mortality rates. In this post-hoc analysis, we assessed the efficacy of placebo (PBO), ixekizumab (IXE) or adalimumab (ADA) on patients (pts) with erosions visible on hand radiographs at baseline (BL).
Methods: Biologic-naïve pts with PsA (SPIRIT-P1) were randomized to PBO, IXE 80-mg every 2 weeks (Q2W) or 4 weeks (Q4W) after a 160-mg starting dose, or ADA 40-mg Q2W. Pts were stratified into two groups based on the number of BL erosions (erosion component of the modified total sharp scores ≤4 and > 4). At week 24, outcomes analyzed for different baseline erosion score (BES) groups included American College of Rheumatology (ACR) 20%, 50%, 70%, Disease Activity index for PSoriatic Arthritis-Low Disease Activity (DAPSA-LDA), Health Assessment Questionnaire-Disability Index (HAQ-DI) and Minimal Disease Activity-Psoriasis Area Severity Index (MDA-PASI). Missing data were imputed using non-responder imputation (NRI) for categorical, and modified baseline observation carried forward (mBOCF) for continuous outcome variables. Comparisons between PBO and treatment within each BES group used logistic models for categorical, and ANCOVA for continuous outcome variables, adjusting for BL values, disease duration, geographic region, and prior conventional DMARD (cDMARD) experience.
Results: 183 pts with BES≤4 and 205 pts with BES> 4 at BL were included. At week 24, pts with BES> 4 on PBO had worse outcomes across all parameters versus those with BES≤4. There was significant improvement in DAPSA-LDA response rates versus PBO in pts treated with IXE regardless of BES, whereas significant response rates were seen in ADA treated pts with BES> 4. [Figure 1a] MDA-PASI response rates were significant versus PBO in pts treated with IXE Q2W and IXE Q4W who had BES≤4, whereas pts with BES> 4 demonstrated a significant response rate with IXEQ2W and ADA. [Figure 1b] Change from BL in HAQ-DI was significant for all pts treated with biological DMARDs (bDMARDs), regardless of BES. [Figure 1c] Similarly, regardless of BES, significant differences in ACR50 and ACR70 response rates versus PBO were seen for pts treated with bDMARDs. [Figure 1e and 1f]
Conclusion: Pts with higher BES in the PBO group experienced worse outcomes. Higher response rates (e.g., ACR50/70) were also harder to achieve in pts with higher BES. Irrespective of BES, IXE treated pts showed greater improvement compared to PBO in the achievement of LDA and functional outcomes.
40
Validation of a Psoriatic Arthritis Flare Questionnaire
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Ahmadvand (Schroeder Arthritis Institute, University Health Network, Toronto); Vinod Chandran (Schroeder Arthritis Institute, Krembil Research Institute, Toronto Western Hospital and Division of Rheumatology, Department of Medicine, University of Toronto, Toronto)
Objectives: Flares of Psoriatic Arthritis (PsA) are difficult to characterize due to disease heterogeneity. Helliwell et al. recently developed a PsA FLARE questionnaire in the UK that identified ≥4/10 cut-off for self-reported flares. The objective of this study is to validate the PsA FLARE questionnaire in a Canadian cohort of PsA patients.
Methods: We prospectively enrolled 125 subjects. We collected demographic and disease characteristics, routine labs, patient reported outcomes, the FLARE questionnaire, and a standalone question asking participants whether they believe they are experiencing a flare. Internal consistency of the FLARE questionnaire was measured using Cronbach's α. Test-retest reliability was evaluated using the intraclass correlation coefficient by administering the FLARE questionnaire twice to the first 50 subjects (1 week apart assuming no change in clinical status). Inter-rater reliability between the FLARE questionnaire ≥4/10 cut-off and standalone question was determined using Cohen's κ. Disease features were compared between subjects with and without flares based on the cut-off. Criterion and construct validity was determined by correlating clinical features and patient reported outcomes with the scores from the FLARE questionnaire.
Results: The FLARE questionnaire demonstrated good internal consistency (α= 0.88, 95% CI 0.85–0.91) and good test-re-test reliability (ICC= 0.76, p< 0.001 95% CI 0.59–0.86). We demonstrated moderate inter-rater reliability between PsA flare assessment using the cut-off and standalone question (κ= 0.59, p< 0.001). Non-parametric analyses demonstrated generally worse clinical features in subjects with PsA flares. [Table 1] Active joint count (AJC), physician global assessment (PHGA), Dermatology Life Quality Index (DLQI), Psoriatic Arthritis Impact of Disease 12 (PsAID-12), patient global assessment (PGA7), Pain, Functional Assessment of Chronic Illness Therapy (FACIT)-Fatigue, Health Assessment Questionnaire (HAQ), 36-Item Short Form (SF-36) physical and mental scores, Disease Activity in Psoriatic Arthritis (DAPSA), and Psoriatic Arthritis Disease Activity Score (PASDAS) were significantly worse in those with flares. No significant differences were observed for Psoriasis Area and Severity Index (PASI) and hsCRP. Criterion and construct validity was demonstrated through significant correlations of the flare scores with worse clinical features indicated by DLQI (ρ= 0.43), PsAID-12 (ρ= 0.72), Pain (ρ= 0.66), FACIT-Fatigue (ρ= -0.46), HAQ (ρ= 0.56), SF36 physical score (ρ= -0.59), SF36 mental score (ρ= -0.33), DAPSA (ρ= 0.61), and PASDAS (ρ= 0.61); all p< 0.001. These results are similar to those obtained by Helliwell et al.
Conclusion: Inter-rater reliability, test-re-test reliability, internal consistency, and criterion and construct validity demonstrate that the FLARE questionnaire is valid and has a similar ≥4/10 cut-off defining PsA flare in the Canadian context. References: [1.] Helliwell P. JRheum 2021;48:1268-71

41

Pain Mechanisms in Psoriatic Arthritis: Differentiating Inflammation Related Pain in Enthesitis Using Ultrasound, in Comparison to Functional MRI

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Objectives: Approximately 50% of PsA patients have persistent pain despite a well-controlled inflammatory state, which has been attributed to non-nociceptive pain and central sensitization. Enthesitis is a key domain in PsA. Unfortunately, physical examination of the entheses is challenging and lacks sensitivity and specificity. Ultrasound (US) is used to differentiate inflammatory enthesitis from widespread or non-specific pain syndromes, however whether "inflammatory enthesitis on US" corresponds to a different underlying pathogenic mechanism is yet to be tested. In this proof-of-concept study, we aimed to compare functional MRI (fMRI) features in response to entheseal pain stimuli in PsA, within patients with or without entheseal inflammation on US.
Methods: This study was conducted at the Arthritis Center at The Ottawa Hospital and the Brain Imaging Centre of the Royal Ottawa Mental Health Centre. We recruited two PsA groups; Group-1: With Achilles enthesitis on exam and positive US (hypo echogenicity and Doppler signals), Group-2: With or without Achilles tenderness on exam but negative US. Patients had an fMRI with rest and after induction of pain by applying pressure on the Achilles with a blood pressure cuff. Whole brain, between group investigations included a two-sample t-test analysis (second level analyses) conducted at a set threshold of p= 0.05 corrected, with a cluster-wise correction at pFWE = 0.05
Results: Among 12 patients included to the study, five patients were in Group-1 and seven in Group-2. Nine patients were female and mean age was 50.6 (25.2). The mean (SD) TJC and SJC were lower in group-1 (TCJ: 1.80 (2.68), SJC: 1 (2.23)) then group-2 (TJC: 6.86 (8.15); 3 (4.9)). The SPARCC enthesitis score was also numerically lower in group-1 than group-2 (1.40 vs 2.14) Patients who were US (+) had more neural activity when processing pain than US (-) patients. With induction of pain, US (+) patients had significantly more activity in the orbitofrontal gyrus, anterior cingulate, left precentral gyrus, supramarginal gyrus, superior temporal gyrus, and left paracentral lobule than the US (-) group. These regions are related to movement, body representation, and pain. The US (+) patients did not show less activity than US (-) patients in any brain regions.
Conclusion: According to our preliminary results, patients who have pain and inflammatory enthesitis on US, process pain differently than the US negative patients, despite the induction of pain or discomfort on all groups. This pilot study confirms that the US can differentiate different pain mechanisms.

42

Tuft Resorption in Patients With Psoriatic Arthritis

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Objectives: Tuft resorption (TR) has been reported in patients with psoriatic disease. [1] This study aimed to define the prevalence of TR in patients with Psoriatic Arthritis (PsA), the predictors of its occurrence, and the clinical and radiographic features associated with it.
Methods: Patients with PsA were recruited from a prospective observational PsA cohort. Radiographs of the hands, feet, pelvis, and spine were obtained at the first clinic visit and every 2

years. TR was defined as resorptive changes in the terminal tufts of the hands and/or feet on X-rays and was identified by one or two expert rheumatologists. We identified patients with TR and compared them to those without TR at the first clinic visit. For predictors of TR, only patients who did not have it at clinic entry were included. Multivariate Cox regression analysis for the time to event was used, with adjustments for age, sex, and disease duration. Generalized estimating equations (GEE) were used for the characterization of the associated disease features.
Results: 1303 patients were included in the study, of whom 729 (55.9%) were males; the mean age at baseline was 44.92 ± 13.03 years. 526 (40.4%) patients had evidence of TR on radiographs of the hands and/or feet. Of these, 345 patients (65.6%) had TR at their baseline visit, whereas 181 (34.4%) developed it during follow-up, with a mean time to event of 9.36 ± 7.19 years. In the multivariate Cox regression models, [Table 1], the following factors were found to be predictive of the development of TR: Male sex (HR= 1.47, p= 0.018) and vertebral osteopenia (HR= 1.70, p= 0.011). Biologics were protective (HR= 0.69, p= 0.030). Age at baseline (HR= 0.99, p= 0.053) and the presence of erosions (HR= 1.38, p= 0.068) were associated with a higher risk of developing TR although not significant at the 5% level. In the GEE analysis, TR was found to be positively associated with inflammatory axial disease (OR= 1.84, p < 0.001), the number of systemic DMARDs (including biologics) used (OR= 1.23, p= 0.002), and radiologically damaged joint count (OR= 1.02, p= 0.003). Interestingly, TR was negatively associated with nail disease (OR= 0.82, p= 0.039).
Conclusion: TR is a common radiographic feature of PsA. It is associated with more severe disease, including peripheral and axial radiographic damage, as well as increased use of systemic DMARDs. References: [1.] Kemp SS, Dalinka MK, Schumacher HR. Acro-osteolysis. Etiologic and radiological considerations. JAMA. 1986 Apr 18;255(15):2058-61. Best Abstract on Spondyloarthritis Research Award.

43

Short and Long-Term Outcomes of Patients With Pure Membranous Lupus Nephritis Compared to Patients With Proliferative Disease

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Objectives: Membranous lupus nephritis (MLN) is thought to have a more benign course than proliferative lupus nephritis (PLN). We aimed to determine the differences in short and long-term outcomes between patients with MLN and PLN.
Methods: This is a retrospective analysis of patients followed prospectively at a Lupus cohort. We included patients with biopsy-proven MLN and PLN. First recorded biopsies were analyzed. The short-term outcome, complete proteinuria recovery (CPR), was defined as proteinuria < 500 mg/24h. Long-term outcomes included chronic kidney disease (CKD) (eGFR < 60 mL/min/1.73 m2), end-stage renal disease (ESRD) (eGFR < 15 mL/min/1.73 m2), and death. The outcomes were compared between the MLN and PLN groups. The time to outcomes was assessed with Kaplan-Meier curves.
Results: Of 215 patients, 51 had pure MLN and 164 had PLN. The latter group included 120 isolated proliferative and 44 mixed biopsies (Class III+V or IV+V). MLN patients were more

likely to be of Black race (37.3% vs. 17.7%, p 0.014), with a higher median eGFR (94.3 vs. 83.5, p 0.009) and a lower median SLEDAI-2K (12.0 vs. 16.0, $p < 0.001$) at baseline. PLN patients were more serologically active (anti-dsDNA and low complement). They also had more hematuria and higher median activity and chronicity scores on biopsy ($p < 0.05$). MMF was the most commonly used immunosuppressive (39.2% of the MLN group and 48.8% of the PLN group). The use of corticosteroids was more common in PLN (100% vs. 90.2%, $p < 0.001$). Short-term outcomes: Median proteinuria was 3.04 g/d in MLN and 2.39 g/d in PLN (p 0.52). Achieving CPR at years 1 and 2 was more likely in PLN compared to MLN (42.1 vs. 35.3% and 53.0% vs. 49.0 %, respectively); the difference was not statistically significant. Median time to CPR was comparable (1.03 years for PLN vs. 1.28 years for MLN, p= 0.14). Long-term outcomes: Median duration of follow-up was 8.38 years for MLN and 8.25 years for PLN. CKD was more common in PLN (60 [36.8%] vs. 11 [21.6%] in MLN, p 0.06). Median time to CKD was significantly shorter in PLN (4.71 vs. 6.93 years, p 0.05). Although more PLN patients had ESRD and death (24 [14.7%] vs. 4 [7.8%] and 23 [14.0%] vs. 4 [7.8%], respectively), this was not significant. [Figure 1] displays the differences.

Conclusion: The resolution of proteinuria in LN is slow. MLN is not a benign disease and may be associated with CKD, ESRD, and death.

44

Anifrolumab in Systemic Lupus Erythematosus: Real World Experience

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Background: Anifrolumab is a type I interferon receptor antagonist and currently approved for the treatment of active, non-renal, non-neuropsychiatric systemic lupus erythematosus (SLE). Herein, we report our experience from the 8 first SLE patients treated with anifrolumab in the McMaster Lupus Clinic.

Case: Retrospective chart review of SLE patients treated with at least 3 doses of anifrolumab in our centre. Particular emphasis was given to the initial clinical manifestations, concomitant treatment as well as the rapidity and sustainability of the response.

Eight patients were treated with anifrolumab 300 mg IV e4w (all females, mean age 42±15.3 years, mean SLEDAI-2K at baseline 8.75±5.4). Six patients had active musculoskeletal involvement (polyarthritis), seven patients had active mucocutaneous disease (subacute cutaneous lupus erythematosus or discoid lupus). Concomitant therapies included antimalarials in seven patients, glucocorticoids in all (mean daily prednisone dose 15.3±6mg) and immunosuppressives in seven (5 with methotrexate, one with leflunomide, one with mycophenolate). Previous exposure to biologics was documented in five of them.

All patients responded well with clinical remission after the 2nd or 3rd infusion. Mean SLEDAI-2K after the 2nd infusion was 1.25±1.8. The time to clinical remission was 2.5±0.5 months. Daily prednisone dose at last visit was 5±4.4mg; three patients were able to discontinue glucocorticoids. Two patients were able to discontinue their immunosuppressives.

Concerning safety, two patients were instructed to postpone their scheduled infusion due to upper respiratory tract infections; they resumed their treatment after their recovery without further complications.

Conclusion: Anifrolumab was effective in our SLE patients with refractory musculoskeletal and/or mucocutaneous disease and led to rapid clinical remission as well as significant reduction of the daily prednisone dose. No significant safety signals were observed.

45

Association of Serum Analytes With SLE Cognitive Impairment Phenotypes Formed by Machine Learning: MMP-9,s100A8/a9, Il-6, Il-10, and NGAL

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Objectives: Cognitive impairment (CI) is highly prevalent in patients with SLE [prevalence of 38% (range: 20%-80%)]. The exact mechanisms underlying CI is complex and multifactorial. Understanding the relationship between SLE CI phenotypes and analytes may be crucial for improving patient care and developing targeted interventions. We have previously defined two SLE CI subtypes (A and B) where subtype A performed worst on objective cognitive function compared with subtype B. Subtype A also, had greater levels of disease burden/damage, worse performance on subjective cognitive function, worse HRQoL and psychiatric measures compared with subtype B. We aimed to explore the associations between SLE CI phenotypes and serum analytes levels.

Methods: SLE patients aged 18-65 years attending a single lupus centre (January 2016 – October 2019) completed the ACR Neuropsychological Battery (ACR-NB) cognitive assessment. Age and gender matched normative data were used to obtain z-scores on all 19 tests of ACR-NB. The ACR-NB tests were reduced using principal component analysis (PCA). Similarity network fusion (SNF) was used to identify patient subtypes on the ACR-NB data, demographic and clinical variables, disease burden/activity, health related quality of life (HRQoL: SF-36, LupusQoL), the PDQ-20 (perceived cognitive deficits), Beck Depression Inventory-II, Beck Anxiety Inventory, and the fatigue severity scale (FSS) in addition to the serum levels of nine analytes (IL-6, IL-10, IFN-ɣ, MMP-9, NGAL/lipocalin, S100A8/A9, S100B, TNF-α, and TWEAK [determined by ELISA]). Differences between the SNF identified subtypes were evaluated using Kruskal-Wallis tests and chi-square tests.

Results: Of the 296 patients, 87% were female, mean age 41.5 ± 18.4 and mean disease duration 13.8 ± 10.1 years at study visit. The level of S100A8/A9, MMP-9, NGAL/lipocalin, and IL-6 were statistically significantly higher in the more severe SLE CI subtype A compared to B. [Figure 1] No difference in the levels of IL-10, IFN-ɣ, S100B, TNF-α, and TWEAK were identified between SLE CI subtypes A and B.

Conclusion: This study demonstrated a higher level of serum analytes in association with the SLE CI subtypes identified with machine learning analysis. S100A8/A9, MMP-9, NGAL, and IL-6 levels were higher in the more severe subtype A where patients experience worse objective and subjective cognitive function with a higher disease burden and damage compared with subtype B. The results of this study will further decipher the mechanisms of cognitive impairment in patients with SLE and the identification of targeted therapy.

46

RA Symptom Clusters at Diagnosis Predict Disease Activity in The First 6 Months of Early RA: Results from The Canadian Early Arthritis Cohort (CATCH)

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Objectives: We have identified 4 distinct symptom clusters in newly diagnosed RA patients, and shown that patients with higher emotional symptoms experienced greater symptom burden over the first 6-months. Here, we examine trajectories of disease activity over the first 6 months in these 4 patient subgroups.

Methods: Data were from 310 adults with new RA enrolled in CATCH who were initiating treatment with MTX and had complete data at baseline, 3- and 6-months. PROMIS-29 anxiety, depression, fatigue, and pain scores were used to classify patients into 4 patient sub-groups using latent group analysis: Group 1: Minimal Sx; Group 2: Mild Physical+Emotional Sx; Group 3: Moderate-Severe Physical Sx; and Group 4: Moderate-Severe Physical+Emotional Sx. Linear mixed effects regression was used to estimate group trajectories of CDAI disease activity over the first 6 months of MTX treatment adjusting for age, sex, race, education, smoking status, obesity, comorbidities, serology status and symptom duration.

Results: The sample included 310 adults with RA starting MTX treatment for the first time. Participants had a mean age of 56 years, CDAI of 29.3, and symptom duration of 5 months; 67% were women and 78% were White. At baseline, mean disease activity was high across all groups though mean CDAI scores were highest for patients in Group 3 (Moderate-Severe Physical Sx; mean (sd) CDAI: 29.2 (12.7)) and Group 4 (Moderate-Severe Physical+Emotional Sx; mean (sd) CDAI: 32 (14.0). Disease activity improved for all groups over 6-months though not to the same degree. Compared with patients in Group 1 (Minimal Sx), mean CDAI was nearly 3 points higher for Group 2 (Mild Physical + emotional Sx), 6-points higher for Group 3 (Moderate-Severe Physical Sx), and nearly 11 points higher for Group 4 (Moderate-Severe Physical + emotional sx). [FIGURE]

Conclusion: Despite being treated with the same conventional RA MTX therapy, early RA patients displayed varying levels of physical (pain, fatigue) and emotional symptoms [anxiety, depression] and that these symptom clusters could be used to identify distinct patient sub-groups with substantial differences in disease activity over the initial 6 months of treatment. Results suggest that both the presence and intensity of physical symptoms plus the levels of anxiety and depression may indicate more complex subtypes of RA with a less favorable prognosis.

Evaluating both physical and emotional symptoms at the time of diagnosis may help providers better tailor RA treatment by potentially combining medications and supportive interventions that reduce overall symptom burden and improve treatment outcomes and QOL.

47

Similar Treatment Adherence Between Individuals With Rheumatic Diseases Treated With Etanercept Originator and Biosimilar: A Population-Based Study

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Objectives: Treatment adherence is crucial to optimizing outcomes in rheumatic diseases. Suboptimal adherence is common with inflammatory and chronic diseases, which are often treated with biologics. However, population-based comparisons of biosimilar and bio-originator adherence remain scarce. Our objective is to compare etanercept (ETA) adherence among patients with rheumatic disease treated with biosimilar (ETA-B) and bio-originator (ETA-O).

Methods: CAN-AIM is a team funded to do high-priority research projects for Health Canada and other stakeholders. We used data from the National Prescription Drug Utilization Information System (NPDUIS), which contains pan-Canadian (except Quebec) claims-level data on prescriptions from public drug programs. We studied ETA-naive adults (18+ years) with hospital discharge diagnostic codes for rheumatoid arthritis, ankylosing spondylitis, and psoriatic arthritis (ICD-10 codes M05-06, M45, M070-M073, L40), initiating ETA between Jan. 2015-Dec. 2019. ETA-O (Enbrel) and ETA-B (Brenzys, Erelzi) were defined using Drug Identification Numbers. From the date of first ETA dispensation, adherence was measured by the medication possession ratio (MPR) during the first year of treatment (sum of all supply days divided by 365). MPR ≥80% was considered good adherence. We assessed adherence during the first year for bio-originator versus biosimilar initiators using logistic regression models, adjusted for sex at birth, age at ETA initiation, calendar year, and biologic use and prednisone use prior to ETA initiation.

Results: Among 615 ETA initiators, 50.8% initiated ETA-B. Most were female (68%), with a median age of 66 (interquartile range 57-73) at initiation. Within the first year, good adherence was seen in 30.7% of biosimilar and 36.1% of originator users. The odds of having an MPR ≥= 80% were similar for ETA-B versus ETA-O initiators (adjusted odds ratio, aOR, 0.83, 95% confidence interval, CI 0.59-1.17). The only model covariate clearly correlated with achieving MPR ≥80% was age (continuous) at ETA initiation (aOR 1.01, 95% CI 1.00-1.03).

Conclusion: For rheumatic disease patients initiating ETA, both originator and biosimilar had similar adherence. Low adherence is common among these patients but better in older individuals. Limitations of our analyses include our assumption that every individual was under the same regimens and that reasons for nonadherence/treatment gaps are not available in claims data.

48

Comparison of Malignancies and Serious Infections Between Etanercept Biosimilar and Bio-Originator Initiators: Population-Based Analyses

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Objectives: Safety outcomes, particularly malignancy and infections, are important issues for people taking biologics. We aimed to compare these outcomes among initiators of etanercept originator (ETA-O) versus biosimilar (ETA-B) across all indications and also specifically for individuals with rheumatoid arthritis (RA).
Methods: CAN-AIM is a team funded to do high-priority research projects for Health Canada and other stakeholders. We used data from the National Prescription Drug Utilization Information System, which contains pan-Canadian (except Quebec) claims-level data on prescription dispensations for public drug programs, linked to the hospital Discharge Abstract Database (DAD) and the National Ambulatory Care Reporting System. We studied adults (≥18 years) initiating ETA Jan. 2015-Dec. 2019, further restricted to RA based on ICD-10 diagnostic codes. Those with ICD diagnostic codes indicating malignancy, HIV or organ transplant one year before ETA/INF initiation (baseline) were excluded. For infection, follow-up began at ETA initiation and ended at end of data or 90 days after discontinuation. For malignancy, follow-up began 365 days after ETA initiation and ended 365 days after discontinuation or end of data. For each individual, we identified all the first hospitalizations with ICD-10 indicating infectious disease or malignancy (excluding non-melanoma skin cancer). Using Cox regression adjusted hazard ratios (aHR), we compared originator and biosimilar. Potential confounders or effect modifiers included sex at birth, age at ETA initiation, prior corticosteroids or other biologics, region (Ontario vs. other), and calendar year.
Results: The cohort (6,583 users, 695 RA, 31.7% on ETA-B) was mostly female (65%), median age (interquartile range, IQR) of 62 (50-69) years at ETA initiation. Overall, malignancy incidence was 10.3 per 1,000 person-years, and infection rate was 8.9 per 1,000 person-year, but higher rates were found when restricted to RA (malignancy: 16 (95%CI 10.1-24.1); infection, 23.2 (95%CI 16.4-32.1). The aHR for ETA-B versus ETA-O (reference) was 1.14 (95% CI 0.68-1.91) for malignancy and 1.33 (95% CI 0.77-2.30) for infection. Similar results were seen when restricted to RA. [Table 1]
Conclusion: In this real-world dataset, we were unable to identify clear differences in serious infectious and malignancy comparing biosimilar and originator ETA initiators. Limitations include potential outcome misclassification and relatively short follow-up regarding malignancy occurrence.

49

Low Uveitis Rates in Patients With Axial Spondyloarthritis Treated With Bimekizumab: Pooled Results from Phase 2B/3 Trials

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Objectives: To compare incidence rates of uveitis in patients with axial spondyloarthritis (axSpA) treated with placebo (PBO) or bimekizumab (BKZ) 160mg every four weeks (wks; Q4W) to Wk16 of phase 3 trials BE MOBILE 1 and 2, and evaluate incidence rates of uveitis in patients with axSpA treated with BKZ 160mg Q4W using pooled phase 2b/3 data.
Methods: Phase 3 trials BE MOBILE 1 (NCT03928704; non-radiographic [nr]-axSpA) and 2 (NCT03928743; radiographic [r]-axSpA): 16-wk double-blind treatment period (DBTP; BKZ 160mg Q4W or PBO) and 36-wk maintenance period (BKZ 160mg Q4W). [1] Upon entry to ongoing BE MOVING open-label extension (OLE; NCT04436640; cut-off 4-Jul-2022) at Wk52, all patients remained on BKZ 160mg Q4W. Phase 2b trial BE AGILE (NCT02963506; r-axSpA): 12-wk double-blind, dose-ranging period, and 36-wk randomised period (BKZ 160mg or 320mg Q4W). [2] Upon entry to its ongoing OLE BE AGILE 2 (NCT03355573; cut-off 4-Jul-2022) at Wk48, all patients received BKZ 160mg Q4W. Phase 2b/3 data were pooled for all patients treated with BKZ 160mg Q4W. Data pooled separately for patients randomised to BKZ or PBO in DBTP of BE MOBILE 1 and 2. Uveitis treatment-emergent adverse events (TEAEs) identified using preferred terms “autoimmune uveitis”, “iridocyclitis”, “iritis”, and “uveitis”, and reported as incidence and exposure-adjusted incidence rates (EAIRs)/100 patient-years (PY) for patients who received ≥1 BKZ dose.
Results: Baseline characteristics were reflective of a patient population with moderate-to-severe axSpA. In DBTP of BE MOBILE 1 and 2, uveitis TEAEs occurred in 11/237 (4.6%; EAIR/100PY [95% CI]: 15.4 [7.7, 27.5]) and 2/349 (0.6%; 1.8 [0.2, 6.7]) patients randomised to PBO and BKZ (% difference [95% CI]: 4.07 [1.71, 7.60]), respectively. [Figure] Among 45 PBO-randomised (19.0%) and 52 BKZ-randomised (14.9%) patients with history of uveitis, uveitis TEAEs occurred in 20.0% (EAIR/100PY [95% CI]: 70.4 [32.2, 133.7]) and 1.9% (6.2 [0.2, 34.8]) of patients, respectively. From pooled phase 2b/3 trial data, total BKZ exposure was 2,034.4PY (N= 848); 130 (15.3%) patients had history of uveitis. Uveitis TEAEs occurred in 25 (2.9%; EAIR/100PY [95% CI]: 1.2 [0.8, 1.8]) and 14 (10.8%; 4.6 [2.5, 7.7]) patients overall and with history of uveitis, respectively. [Figure] All uveitis TEAEs were mild/moderate, one led to discontinuation.
Conclusion: Incidence rate of uveitis TEAEs was lower to Wk16 in axSpA patients randomised to BKZ 160mg Q4W versus PBO. In the largest pool of phase 2b/3 data available at the time of this report, the incidence rate of uveitis with BKZ 160mg Q4W remained low (1.2/100PY).
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50

Ixekizumab Significantly Improves DIP Joint Tenderness, Swelling, and Adjacent Nail Disease in Psoriatic Arthritis

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Objectives: Nail psoriasis is a strong predictor for the development of psoriatic arthritis (PsA) and has been reported in 63–83% of patients with PsA1. Psoriatic nails are linked to arthritis in the adjacent distal interphalangeal joint (DIP)2, and both can lead to severe functional impairment. In the SPIRIT-H2H (NCT03151551) study of adults with PsA, patients treated with ixekizumab (IXE) achieved significantly greater improvements in nail psoriasis compared to those treated with adalimumab (ADA)5. This analysis aimed to assess the treatment effects of IXE and ADA at the individual digit level among patients with PsA, DIP joint disease, and adjacent nail psoriasis.

Methods: This post hoc analysis included 354 patients from SPIRIT-H2H treated with either IXE (N= 186) or ADA (N= 168) who had DIP joint disease (tenderness and/or swelling) and adjacent nail PsO (Nail Psoriasis Severity Index (NAPSI) total score > 0) in at least one digit at baseline. Treatment effects were assessed for each individual finger unit displaying DIP joint disease and adjacent nail PsO; here, finger unit defines the DIP joint and adjacent nail of an individual digit. Joint involvement was measured by tender/swollen joint count scores (TJC68/SJC66). Nail PsO was measured using NAPSI in the fingers only. Patients were evaluated for both joint and nail involvement at baseline and Weeks 12, 16, 24, 32, 40, and 52. Proportions of finger units with resolution of DIP joint disease, and proportions of finger units with resolution of adjacent nail PsO were analyzed using Chi-square tests. Non-responder imputation was used to handle missing data.

Results: There were 1309 (IXE= 639, ADA= 670) finger units affected by DIP joint and adjacent nail disease at baseline. Resolution of DIP joint tenderness and/or swelling [Figure 1A] and resolution of adjacent nail psoriasis [Figure 1B] of the finger unit was significantly higher with IXE vs ADA at all post-baseline assessments over 52 weeks. DIP joint tenderness was resolved in a significantly larger proportion of IXE-treated finger units vs ADA at all post-baseline assessments over 52 weeks [Figure 1C]. DIP joint swelling was resolved in a larger proportion of IXE-treated finger units vs ADA, and these differences reached statistical significance at all visits except Week 16 and Week 40 [Figure 1D].

Conclusion: IXE treatment showed a significant advantage over ADA in resolving DIP joint tenderness, DIP joint swelling, and adjacent nail psoriasis among the finger units with DIP joint and adjacent nail disease of patients with PsA. References: [1.] Elkayam O. Clin Rheumatol. 2000; 19(4): 301-305. [2.] Lai TL. Clin Rheumatol. 2016; 35(8): 2031-2037 [3.] Smolen JS. Rheumatol Ther. 2020;7(4):1021-35

51

Impact of Antirheumatic Treatments on The Individual Components of The American College of Rheumatology Composite Score in Patients With Rheumatic Arthritis: Real-World Data from Two Registries

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Objectives: Standard criteria for measuring treatment efficacy in patients with RA include ACR

response rates, which require meeting a threshold of ≥ 20/50/70% improvement in several physician- and patient-reported measures, including tender and swollen joint counts (TJC and SJC, respectively; primary criteria) and at least 3 of 5 secondary criteria (Physician (Ph) global assessment (GA), Patient (Pt) GA, Pain, HAQ-DI, and CRP). The purpose of the analysis was to evaluate the impact of csDMARDs, TNF inhibitors (TNFi), and tofacitinib (TOFA) on each ACR score component in real-life practice.

Methods: Clinical data of RA patients with a CDAI > 10 at the time they started a csDMARDs (all biologic naïve), TNFi or TOFA were pooled from two registries: Ontario Best Practices Research Initiative (OBRI) and RHUMADATA. Endpoints summarized descriptively included proportions of pts achieving: ACR20/50/70 responses, ≥ 20/50/70% improvements and mean percent improvement in individual ACR components (TJC, SJC, PhGA, PtGA, Pain, HAQ-DI, and CRP) at Month (M6)

Results: A total of 669 pts were included (csDMARD, n= 157, TNFi, n= 252; TOFA, n= 260). At baseline, patients starting TOFA had longer disease duration, failed more bDMARDs and used more corticosteroids than csDMARDs and TNFi. The CDAI was similar between the 3 groups. ACR50 response rates were numerically lower for the TOFA group. The ACR70 response was similar in the 3 groups. An overall higher proportion of patients in all three-medication groups achieved ≥20/50/70% improvement in primary ACR components vs secondary components. Among secondary components, ≥20/50/70% improvement rates were numerically highest for PhGA and lowest for HAQ-DI and pain. The improvement in the SJC and TJC were numerically similar between all groups. Among ACR20/50/70 responders for all medications, mean percent improvement was more than 80% for primary components and ranged from 30% to 80% for secondary components. [Figure]

Conclusion: In this real-world practice analysis, physician-reported measures (TJC, SJC, and PhGA) contribute slightly more to overall ACR20/50/70 responses, compared with Pt-reported outcomes (PROs; PtGA, Pain and HAQ-DI). In the ACR20 response group, a lower-level outcome, the improvement of the SJC and TJC, exceeded 80%. Pain was the most important factor in achieving an ACR50 for pts treated with TOFA, possibly reflecting the different effects of JAKi on pain

52

Health Literacy in Arthritis Care in Canada: The Perspective of BIPOC Individuals Across Age Categories

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Objectives: Health literacy can be defined as an individual's ability to find, understand, and use information and services to support their health. Our aim was to examine the intersecting effects of age and ethnicity on health literacy.

Methods: Arthritis Consumer Experts conducted a 40-question online Survey (June 1- 25, 2023) in English and French. Respondents answered questions regarding sociodemographic information, communication and application of health information, self-care and advancing knowledge. Data were analyzed in subgroups (i.e., BIPOC vs white; ≥54 years vs 34-53 years vs ≤33 years) and aggregate (including incomplete survey responses). Chi-square tests (exact tests where possible) were used to test for associations.

Results: A total of 1,148 responses were received from 449 (39%) BIPOC and 699 (61%) white respondents. The age of BIPOC respondents was well distributed; 187 were ≤33 years of age, 179 were 34-53 years and 83 were ≥54 years. Sociodemographic information [Table 1]. Interestingly, education and annual income were observed to be slightly higher for BIPOC when compared to white respondents. However, intersectional analysis by age category and ethnicity revealed that these findings were not indicative of BIPOC ≥54 years, who instead experienced the greatest barriers to health literacy. For instance, only a proportion of BIPOC respondents ≥54 years vs ≤53 years were able to understand health information online (10% vs 40%), via media (14% vs 33%), in conversation (10% vs 32%), knew where to go for health advice (17% vs 30%) and how to apply the health information (20% vs 37%). When asked about decision-making around self-care, BIPOC ≥54 years reported disproportionate challenges when compared to white respondents ≥54 years. For example, when asked about medication instructions, only 22% of BIPOC ≥54 years selected "fully" understand when compared to 74% of white respondents ≥54 years. This trend continued for questions related to exercise and nutrition. Across all age categories, support meetings were a popular self-care strategy amongst BIPOC (approximately 50%) when compared to white respondents in the same age category. Overall, BIPOC vs white respondents were less likely to ask others for help (19% vs 37%).
Conclusion: More work is needed to tailor arthritis care and policy to support underserved groups, specifically BIPOC ≥54 years, to practice self-care and navigate health care services. Together, researchers, care providers and policy makers must strive towards health outcomes in ways that are aligned with unique cultural values.

53

"Comparison of The Efficacy, Safety and Immunogenicity of a Proposed Biosimilar MSB11456 With Tocilizumab Reference Product in Moderate-To-Severe Rheumatoid Arthritis: Results of a Randomized Double-Blind Study (Aptura I)"

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Objectives: MSB11456, a proposed biosimilar to tocilizumab has shown equivalent pharmacokinetic (PK), pharmacodynamic (PD), safety, tolerability, and immunogenicity profiles in healthy volunteers. This multicenter, randomized, double-blind, multiple fixed-dose, parallel group study compared the efficacy, safety, and immunogenicity of MSB11456 and EU-approved tocilizumab for the treatment of adults with moderate-to-severe RA.
Methods: Patients were randomized to weekly SC 162mg injections of either MSB11456 (n= 302) or EU-approved tocilizumab (n= 302) for 24 weeks (W). At W24, patients in the EU-approved tocilizumab group were re-randomized to continued treatment or switched to MSB11456 up to W52. Patients receiving MSB11456 continued treatment until W52. A safety evaluation was conducted up to W63. At W24, Disease Activity Score-28 Joint Count (DAS28)-erythrocyte sedimentation rate (ESR) change from baseline (primary endpoint) was analyzed to determine the least squares mean (LSM) difference between MSB11456 and EU-approved

tocilizumab; MSB11456 was considered equivalent to EU-approved tocilizumab if the 95% confidence interval (CI) was within the equivalence interval -0.6–0.6. Secondary endpoints were 20% improvement in American College of Rheumatology core set measures (ACR20) at W24 and DAS28-ESR at W12. Additional endpoints included ACR50/70 (50% and 70% improvement), change in DAS28-C-reactive protein, Simplified Disease Activity Index, Clinical Disease Activity Index, evaluation of immunogenicity at various time points up to W55 and safety up to W63.
Results: At W24, the LSM difference in the change from baseline in DAS28-ESR between treatments was 0.01 (95% CI -0.19, 0.22). The 95% CI for the LSM difference in the change from baseline in DAS28-ESR between treatments was fully included within the predefined equivalence interval, indicating therapeutic equivalence of MSB11456 and EU-approved tocilizumab. Equivalence was further supported with the analyses of the other efficacy endpoints. Treatment-emergent adverse events (TEAEs) were usually mild or moderate and occurred at similar frequency in both treatment groups. There were no discernible patterns in terms of the nature, frequency, or other characteristics of serious or treatment related TEAEs to suggest a difference between treatments. Immunogenicity results were similar in both treatment groups. The switch from EU-approved tocilizumab to MSB11456 at W24 had no clinically relevant impact on efficacy or safety, including immunogenicity.
Conclusion: Equivalent efficacy and similar immunogenicity and safety profiles of MSB11456 and EU-approved tocilizumab were demonstrated in patients with moderate-to-severe RA.

54

Advanced Clinician Practitioners in Arthritis Care: A Workforce Profile

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Objectives: The Advanced Clinician Practitioner in Arthritis Care (ACPAC) Program is a post-licensure, competency-based academic and clinical educational program that prepares experienced physiotherapists, occupational therapists, nurses, and chiropractors for extended roles in the diagnosis and management of rheumatic and musculoskeletal (RMD) conditions. Since 2005, the program has graduated extended role practitioners (ERPs) to manage a growing population with RMD conditions; address a progressive decline in RMD specialists and better utilize healthcare professionals to improve access to care. The objective of this study was to profile the current ACPAC workforce with respect to 1) demographics, including aspects of ethnicity, diversity and inclusion; 2) practice setting and clinical roles; 3) health system integration and 4) remuneration.
Methods: ACPAC graduates from 2006 to 2022 were sent an electronic questionnaire from February to April 2023 using Research Electronic Data CAPture software. The questionnaire was developed based on review of workforce literature and was reviewed by the investigative team for face and content validity, clarity, relevance, and format. Univariate statistics were used to analyze data.
Results: Seventy-two of 103 graduates completed the questionnaire (response rate 69.9%). Demographics: Most respondents were from Ontario (95.8%) and were physiotherapists (78.8%). Mean age was 49.4 (SD 9.2) years. The majority identified as women (77.8%) and White-North American/European ethnicity (71.8%). No respondents identified as North

American Indigenous. Practice setting and clinical roles: Most reported current employment in an ERP role (76.4%). There were inconsistencies regarding ERP title. Most graduates were working in hospital-based settings (80%), with adult populations (89.1%), and providing orthopaedic (54.5%) or rheumatology (40%) care. Only 12.2% reported working in rural or remote settings. Health system integration: Respondents reported working in various orthopaedic and rheumatology models of care including triage, interprofessional collaborative care programs and transition clinics from paediatric to adult care. Remuneration: Most funding models were from government sources (90.9%) with almost half (47.2%) reporting an annual salary of at least $100,000 CAD.

Conclusion: Most ACPAC ERPs are physiotherapists working in urban publicly funded, hospital-based practices providing adult orthopaedic and rheumatology care. There is an opportunity to maximize employment of current graduates in rural and remote areas and expand roles to other practice settings (e.g., family medicine clinics, community-based clinics, and emergency departments). A small proportion of respondents identified as non-white, with Indigenous individuals not represented in this workforce. There is value in targeting recruitment strategies to attract program candidates who are representative of diverse ethnic backgrounds and inclusive of Indigenous populations.

55

Mapping 24-Hour Movement Guidelines in Axial Spondylarthritis: Meeting Activity Targets but Missing The Mark for Sleep

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Objectives: The 2022 Canadian 24-Hour Movement Guidelines integrate evidence-based targets for physical activity, sleep and sedentary behaviours to achieve health outcomes in adults aged 18-64 years. The purpose of this study was to determine if patients diagnosed with axial spondyloarthritis (axSpA) are meeting these guidelines. The specific objectives were to: 1) profile moderate-vigorous physical activity (MVPA); 2) profile sedentary behaviours and sleep patterns and 3) evaluate discrepancy between objective and subjective measures of activity and sleep.

Methods: Participants with axSpA (meeting ASAS criteria) attending an urban academic rheumatology clinic were provided a wrist-mounted accelerometer, worn for 24 hours over a consecutive 7-day period. The average data validated for a 75% wear-time was used for analysis. Variables included time spent in MVPA per week; time spent in sedentary activity per 24 hours, and sleep/wake duration per 24 hours. Participants completed the International Physical Activity Questionnaire to measure subjective physical activity engagement and a 7-day sleep log to subjectively evaluate sleep quality. Univariate statistics were used to create profiles aligned with the guideline's core recommendations.

Results: Of the 41 participants, 37 (90%) had validated accelerometer data. Most participants were male (56.7%); mean age of 46.0 years (SD 12.6); mean disease duration 23.9 years (SD

11.4); mean Bath Ankylosing Spondylitis Disease Activity Index was 3.2 (SD.1); mean Bath Ankylosing Spondylitis Functional Index was 2.6 (SD 2.2). 35.1% had a history of peripheral joint involvement; 56.7% were receiving biologic treatment. All the cohort met the MVPA targets of ≥150 minutes of MVPA per week (mean 978.5 minutes, SD 387.9) and sedentary behaviour limits of ≤8 hours daily (mean 5.0 hours, SD 0.9). Only 37.8% of participants met the sleep target of ≥7 hours of sleep (mean 6.4 hours, SD 2.0), with multiple disruptions per sleep period (mean 17.7, SD 7.1), indicating poor sleep quality. Participants tended to underestimate their subjective engagement in physical activity and overestimate sleep quality.
Conclusion: The results of this study suggest people with axSpA are highly engaged in physical activity and demonstrate minimal sedentary behaviour, both which exceed recommended activity guidelines. These results are considerably higher when compared to the literature. There is a discrepancy between subjective and objective measures of activity and sleep. Sleep quantity and quality are concerned, with few people with axSpA meeting recommended targets. Further studies that examine sleep-wake patterns, understanding of sleep physiology and potential management strategies are recommended to address sleep deficiency in people with axSpA.
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56

Towards an Earlier Diagnosis of Axial Spondylarthritis: Performance of Clinical Variables in a Spondylitis Screening Clinic

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Objectives: There is a window of opportunity in the treatment of axial spondylarthritis (AxSpA). The diagnosis is often delayed due to a lack of pathognomonic clinical features and biomarkers. A prospective study was performed on patients presenting with undifferentiated back pain to identify factors aiding in the diagnosis of AxSpA.
Methods: Adults with low back pain (LBP) attending the Inter-professional Spine Assessment and Education Clinic [1] were referred to a spondylitis screening clinic (SSC) if they had LBP for more than three months and their age-of-onset was < 50. An assessment was done by a physiotherapist and rheumatologists both with AxSpA expertise. The final diagnosis was made by the rheumatologist. MRI was done only if deemed clinically indicated. Data was collected at each visit. First, we validated an existing diagnostic approach for AxSpA by Poddubnyy et al. (2021) [2] that used probability estimations based on likelihood ratios (LR) and pre-test disease probability. Then, using the same methodology, we included variables that were statistically and clinically (i.e. sex and gender) significant in our dataset. To further examine the significance of these variables, we used a machine learning model, Elastic-net regression. The discrimination ability of each model was assessed by comparing the area under the receiver operating characteristic (ROC) curves. Appropriate internal cross validation was conducted to ensure each robustness of each model.
Results: 359 patients were referred to SSC. 61 (17%) received a diagnosis of AxSpA and 298 (83%) had mechanical back pain. Using the Poddubnyy model on our dataset, the combination of risk factors resulted in a model with an area under the curve (AUC) of 0.76 (95% CI, 0.63, 0.83). On univariable regression, we identified several significant risk factors, including NSAID

response, HLA-B27, CRP > 10mg/L, enthesitis, dactylitis, alternating buttock pain, and positive imaging findings (x-ray / MRI). When developing an LR model using only these variables from our study, the AUC was 0.81 (95% CI 0.58, 1). The elastic-net approach yielded an AUC of 0.82 with a (95% CI 0.61,1) for the same variables.
Conclusion: The proportion of AxSpA among patients referred through the ISAEC program to SSC was higher than the 5% prevalence of AxSpA within the literature. Key risk factors identified in another study were validated. and a better performing set of variables with their relative contributions to the diagnosis of AxSpA were presented here through cross-validation. By further refining these predictive models, we can strive to achieve an earlier diagnosis.
References: [1.] Passalent L, et al. Bridging the Gap Between Symptom Onset and Diagnosis in Axial Spondyloarthritis. Arthritis Care Res (Hoboken). 2022 Jun;74(6):997-1005. [2.] Poddubnyy, D., Proft, F., Spiller, L., Protopopov, M., Rios Rodriguez, V., Muche, B., Rademacher, J., Torgutalp, M., Vahldiek, J. L., Sieper, J., & Redeker, I. (2021). Diagnosing axial spondyloarthritis: estimation of the disease probability in patients with a priori different likelihoods of the diagnosis. Rheumatology (Oxford, England), 60(11), 5098–5104. https://doi.org/10.1093/rheumatology/keab227

57

Exploring Experiences and Perspectives of Canadian Patients With Lupus Nephritis Through Photovoice

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Objectives: LN is a major cause of morbidity and mortality and develops in up to 60% of adult SLE patients. The experiences of patients with SLE have been explored quantitatively and qualitatively, however we know little of the lived experiences of patients with LN. This research used a social constructionist perspective to explore patient experiences of LN.
Methods: Patients aged ≥18 years with biopsy-proven pure or mixed ISN/RPS Class III-V LN and fulfilling the ACR 1997 or SLICC 2012 Classification Criteria for SLE were purposefully recruited from a Canadian lupus cohort to participate in a photovoice exercise. Participants took photos of what LN means to them, impacts on daily life, and how they manage their LN. Photos (3–5/participant) were discussed in virtual focus groups. Discussions were transcribed verbatim for subsequent thematic analysis using NVivo Software.
Results: Thirteen patients participated; 92.3% were female, mean (SD) age was 41.7 (14.0) years. Of 54 photos, images depicting activities that contribute to wellbeing (n= 14), the participants themselves (n= 13), healthcare experiences (n= 10), home (n= 5), work (n= 2), community (n= 2), friends (n= 2), and other challenges (n= 6) were shared. [Table 1] All participants described the physical (e.g. fatigue) and psychosocial (e.g., stress, social exclusion) impacts of living with LN. Although twelve discussed activities that contribute to wellbeing (e.g. spending time with family), participants were consistently reminded of their LN during/following these activities due to physical symptoms (There'd be days where my hands would cramp and my knees would be stiff, but I just push through… because I love that experience of looking around at my surroundings, and the leaves falling (P5)), and altered life trajectories (My husband and I had envisioned we'd be playing with grandchildren… but I was never able to carry… [The dogs] are affectionate, loyal, and they need us… so they are sort of the light (P3)). Eleven participants discussed the need and burden of medications to manage their

LN; side effects (n= 10) and medication-related financial challenges (n= 5) were highlighted. **Conclusion:** Respondents reported a substantial psychosocial burden associated with their LN diagnosis. While activities that contribute to wellbeing were emphasized, the physical, emotional, and lifestyle impacts of LN serve as frequent reminders of the disease burden. The need for flexibility (i.e. from employers themselves) is an essential component of navigating altered life trajectories. Funding: GSK (GSK Study 218747) Encore abstract: Presented at American College of Rheumatology (ACR), 10-15 Nov 2023. Reused with permission.

58

Exploring The Experiences and Perspectives of Patients Living With Antiphospholipid Antibodies: A Qualitative Study

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Objectives: Patients with antiphospholipid antibodies (aPLs) are at risk of the hallmark thrombotic and/or obstetric complications of antiphospholipid antibody syndrome (APS). Many aspects of aPL/APS management are controversial and challenging, exerting a poorly understood psychosocial burden. This research investigated patient experiences of aPL/APS 1) diagnosis; 2) effects on daily life; and 3) healthcare.

Methods: Patients aged ≥18 years with ≥1 positive aPL on ≥2 occasions were purposefully recruited from a Canadian multidisciplinary APS clinic to participate in semi-structured in-depth interviews. Interviews were conducted virtually and transcribed verbatim for subsequent thematic analysis using NVivo software.

Results: Twenty-one patients with aPLs/APS were interviewed; 95.2% were female, mean (SD) age was 45.6 (15.0) years, 71.4% had aPLs/APS with SLE (per 1997 ACR or 2012 SLICC criteria), and 28.6% had aPLs/APS without SLE. Patients experienced a range of challenges (e.g., obstetric/thrombotic complications) and emotional impacts (e.g., fear, relief) around the time of aPL/APS diagnosis. [Figure 1] In addition to the physical and psychosocial impacts of living with aPLs/APS, patients reported modified leisure activities, altered employment trajectories, and positive and negative impacts on relationships (My relationship with my family has become stronger, my relationship with the family that I'm potentially marrying into has become weaker (Participant #11)). There were substantial impacts on family planning; patients shared experiences of miscarriage and other pregnancy complications and medication-related challenges, such as with low-molecular-weight heparin injections (I would have these bruises, it made it awkward when I would go for ultrasounds (#10)). Challenging aspects of aPL/APS healthcare and treatment were also discussed, particularly related to lifestyle, and the physical and emotional burden of medications. Participants expressed trust in healthcare providers when making management decisions or when seeking information but felt there was a lack of tailored aPL/APS resources. Suggestions included additional medication-related information (long-term risks, dietary requirements; Being able to speak with somebody who knows how warfarin works in relation to Vitamin K… that was my biggest battle (#8)), examples to help contextualize management behaviours (Can I sit on the couch and watch a movie?... I think more situational examples would have been helpful (#12)), and additional information for those with aPLs/APS without SLE (There might be a whole different resource instead of always focusing on lupus patients (#7)).

Conclusion: Patients highlighted how the diverse manifestations of aPLs/APS, accentuated by management-related challenges, impose considerable physical and psychosocial burdens. Results will inform the development of patient resources and decision aids aligned with patient priorities.

59

Health Information Use by Patients Living With Antiphospholipid Antibodies and Antiphospholipid Syndrome

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Objectives: Patients living with aPLs/APS are at risk of thrombosis and pregnancy morbidity. The management of aPLs/APS is controversial, [1] yet little research on how patients access health information has been conducted. We identified the information sources that patients with aPLs/APS access to understand their illness, quantified their trust in these sources, identified perceived obstacles to accessing information and addressed whether they were negatively impacted by certain sources.

Methods: Patients who had > 1 positive aPL on > 1 occasion or those who met the Revised Sapporo Criteria for APS were recruited from a Canadian APS clinic. Participants completed an online survey from 11/2022-04/2023 on how they accessed and trusted various health information sources. We calculated the percentage of patients accessing each source of information, quantified their trust in each source, reported perceived obstacles to accessing information and addressed whether they were negatively impacted by information from advocacy organizations, websites, or social media. McNemar tests were used to compare proportions of patients accessing and trusting information sources at time of diagnosis versus currently (within the past 6 months).

Results: 69 patients completed the survey (64% response rate); 88.4% were female, mean age at aPLs/APS diagnosis was 40.0 years (SD 15.6), 22.7% reported non-White ethnicity and 76.8% had aPLs/APS with SLE (per 1997 ACR or 2012 SLICC criteria) while 23.2% did not have underlying SLE. The health information sources most frequently accessed both at diagnosis and currently were rheumatologists/lupus specialists (75.4% vs. 65.2%), family physicians (47.8% vs. 31.9%) and hematologists (47.8% vs. 31.9%). [Table 1] The most trusted health information sources at diagnosis were rheumatologists/lupus specialists followed by family physicians and hematologists (82.6%, 66.7%, 55.1% respectively). At diagnosis, 42.0% of patients accessed websites (most commonly mayoclinic.org and hopkinslupus.org) and 13.0% accessed social media. Only 30.4% of patients accessed and trusted advocacy organizations at diagnosis. Challenges communicating with health care providers was the most frequently reported obstacle in accessing information related to aPLs/APS (20.3%). Few patients felt negatively impacted by information accessed through advocacy organizations (8.7%), websites (8.6%), or social media (9.1%).

Conclusion: Rheumatologists/lupus specialists, family physicians and hematologists were the most accessed and trusted sources of health information by patients. Fewer than one third of patients accessed and trusted advocacy organizations and 20.3% of patients felt communication with healthcare providers was an obstacle to accessing aPL/APS information. There is a need for enhanced outreach efforts through advocacy organizations as well as improved patient-physician communication pathways. References: [1.] Noureldine M. Semin Arthritis Rheum 2019: 860–6.

60

Prevalence of Contraindications to Advance Therapies in Patients With Inflammatory Arthritis

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Objectives: Biologic disease-modifying anti-rheumatic drugs (bDMARDs) and targeted synthetic DMARDs (tsDMARDs) effectively reduce inflammation in multiple domains in inflammatory arthritis. With limited data available to compare their effectiveness in a head-to-head design [1,2], most therapy decisions are driven by comorbidities and contraindications. [3] In this study, we aimed to explore the distribution of the contraindications for different classes of therapies in inflammatory arthritis in the patient population from the ORCHESTRA Clinic (Ottawa Rheumatology CompreHEnSive TReatment and Assessment) at the Ottawa Hospital.

Methods: In the ORCHESTRA Clinic, patients with inflammatory arthritis who are starting bDMARD / tsDMARD therapies undergo a detailed assessment before initiating the therapy to detect the comorbidities through a checklist and investigations. The demographic data for the absolute and relative contraindications for each of the available therapeutic classes, based on Health Canada and labelling information, are presented here depending on the disease.

Results: Of 130 patients, 68 (52%) had rheumatoid arthritis (RA), 35 (27%) axial spondyloarthritis (AxSpA) and 27 (21%) psoriatic arthritis (PsA). No patients were found with a history of hypersensitivity, lymphopenia, neutropenia, thrombocytopenia, anemia, active infection, history of demyelinating disease, progressive multifocal leukoencephalopathy, pregnancy, or breastfeeding. Only one patient, with RA, had contraindications for all drugs. The leading cause of absolute contraindications in RA and PsA was for Janus Kinase Inhibitors (JAKi), which was an increased risk of thrombosis in 26% and 14% of RA and PsA patients, respectively. The presence of inflammatory bowel disease (IBD) was the leading absolute contradiction in AxSpA patients for the interleukin-17 inhibitors (IL-17i), detected in 14%. The presence of ≥2 cardiovascular risk factors is the main cause of relative contraindications in patients with RA and PsA. Details of the number of patients with contraindications are shown. [Figure 1] The AxSpA patients usually had more therapy choices for the absence of absolute and relative contraindications.

Conclusion: The therapeutic arsenal in inflammatory arthritis is broad, with multiple options available for the patients and minimal absolute contraindications. As most of the contraindications are relative, informed decision-making between patients and physician is crucial before the initiation of bDMARD / tsDMARD therapies. The increased risk of thrombosis and cardiovascular disease are the leading contraindication; therefore research that will enhance the understanding of potential mechanisms for cardiovascular disease, as well as primary and secondary intervention of cardiovascular risks are important to increase the therapy choices for these patients. References: [1.] Jacobs ME. Rheumatology. 2021;60(2):780-784. [2.] Erhardt DP. Arthritis Care Res. 2019;71(10):1326-1335 [3.] Bateman J. Clin Exp Rheumatol. 2009;27(6):935-939

61

A Comparison of Ultrasound Responsiveness in Bio-Naïve and Bio-Experienced Rheumatoid Arthritis Patients

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Objectives: Although several advanced therapy options exist for patients with Rheumatoid arthritis (RA), many patients do not respond to the first biologic therapy and require a change. Unfortunately, patients with previous advanced therapies (bio-experienced) have lower response rates with the new treatment when compared with bio-naïve patients. [1] In this study, we compared the bio-naïve and bio-experienced patients' demographics, disease features and ultrasound scores at baseline and follow-up to better understand the features responsive to change and factors leading to no-response.

Methods: The Ottawa Rheumatology CompreHEnSive TReatment and Assessment Clinic (ORCHESTRA) is a prospective cohort that includes all patients with inflammatory arthritis starting a new advanced therapy at the Ottawa Hospital Rheumatology Division. Patients are assessed at baseline and followed up every 3 months after the first dose, until they reach remission or low disease activity. A standardized protocol is followed, including data collection on sociodemographic features, comorbidity assessments, patient-reported outcomes (PROs) and other disease activity measures including a comprehensive ultrasound scan. Here, we only included RA patients who had the first month-3 follow up. We compared bio-naïve and bio-experienced RA patients for the baseline features and response.

Results: Baseline features: Bio-naïve RA patients (n= 29) were similar to bio-experienced patients (n= 22) for demographics including age, BMI, seropositivity as well as disease activity measures (TJC, SJC, DAS28 and ultrasound scores), [Table 1] except women being more frequent bio-experienced. Bio-experienced patients had significantly longer disease duration, HAQ scores, and more frequent deformities, erosions and extraarticular disease. Response: In bio-naïve patients, all PROs, objective measures of disease activity, composite indices and ultrasound scores improved. In contrast, in bio-experienced patients, the only improved parameters were the CRP and HAQ scores as well as grey scale synovitis on US – but not Doppler scores. None of the other disease activity measures suggested a significant change. [Table 1]

Conclusion: Bio-experienced patients' subjective and objective measures for baseline disease activity are similar to bio-naive patients. The longer disease duration of the bio-experienced group is likely to be the reason for more erosions, deformities, damage, and reduced function, suggesting the contribution of non-inflammatory mechanisms to no-response. However, the reduction on the grey scale synovitis, but not Doppler signals, may be suggestive of not being able to stop the neovascularization with the subsequent biologic therapies. US can provide a different perspective on the disease process and better understand the difficult-to-treat population. References: [1.] Mokbel A. J Clin Rheumatol. 2023 Jun;29(4):183–9.

62

Survey Study of Canadian Clinician Screening Practices in Rheumatoid Arthritis Related Interstitial Lung Disease

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Objectives: Interstitial lung disease (ILD) is a well-documented extra-articular manifestation of rheumatoid arthritis (RA) with significant associated morbidity and mortality. There is agreement on the need for therapeutic agents in RA-ILD patients with the objective of slowing lung function decline. However, identifying patients with RA-ILD who would benefit from these interventions remains a challenge. Although risk factors for the development of RA-ILD, such as male sex, older age, smoking status, higher disease activity, and positive Anti-Citrullinated Peptide Antibody (ACPA)/Rheumatoid Factor (RF) status have been described, there remains no specific consensus guidelines in Canada for the screening, diagnosis, or management of RA-ILD. This study aimed to better understand the current practice patterns of rheumatologist in Canada caring for patients with RA at risk of developing ILD and patients with RA-ILD.
Methods: All adult rheumatologist who were members of the Canadian Rheumatology Association were invited to complete an anonymous online survey. Data included both quantitative metrics as well as qualitative free text. Responses were analyzed using descriptive statistics.
Results: 47 rheumatologists completed the survey. 27 (56%) identified as community physicians, 14 (29%) as academic physicians and 7 (15%) had a mixed community/academic practice. Most respondents screen patients for dyspnea at every visit (42%) or if patients report respiratory symptoms (30%). In terms of clinical exam, 47% of respondents auscultate the chest for crackles at every visit. Most respondents (59%) do not check oxygen saturation. 96% of respondents do not routinely screen for ILD with pulmonary function testing (PFT), with most (67%) doing so only if the patient reports dyspnea. 45% of respondents will order CT chest for patients with crackles on exam or PFT abnormalities while 27 (55%) will do so if patients present with features high risk for RA-ILD in addition to abnormal physical exam or PFT findings. 32% of respondents were unsure of features associated with an increased risk of RA-ILD, which were not specified in the question stem of the survey. 29% of rheumatologists work closely with a Respirologist, 59% have easy access to Respirology and 12% have limited access to Respirology.
Conclusion: The results of this survey suggest that there are inconsistent screening practices by Canadian rheumatologist caring for adult patients in the screening and investigation for ILD in patients with RA. These findings suggest areas for targeted continuing medical education for Canadian rheumatologists as new data emerges to provide evidence-based approaches for screening ILD in RA patients.

63

All Cause Emergency Visits and Hospitalizations in Persons With Inflammatory Arthritis and Gout: A Systematic Review

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Objectives: Despite advances in management of inflammatory arthritis (IA) and gout, many patients still access acute care services. This review sought to estimate the frequencies (% accessing per year) and/or rates (events per person years) of all cause emergency department (ED) visits or hospitalizations in IA or gout cohorts.
Methods: A systematic review was conducted in EMBASE and MedLine online databases for January 2000 to February 2023. Keywords for the search strategy were based on the types of

arthritis of interest including rheumatoid arthritis (RA), psoriatic arthritis (PsA), ankylosing spondylitis (AS), juvenile idiopathic arthritis (JIA), and gout, as well as the type of acute care services of interest (EDs and hospitalizations). Title and abstract screening, full-text review, and data extraction were completed independently by two researchers. Mean frequency and rate of ED visit or hospitalization were calculated by IA condition.
Results: From 6,497 initial studies, 844 underwent full-text review and 81 met inclusion criteria for analysis. Over half (53%) of the studies reported estimates from American administrative datasets. Studies focused largely on patients with RA (59% of ED frequency studies, 80% of ED rate studies, 67% of hospitalization frequency studies, and 83% of hospitalization rate studies) and only 1 study provided estimates for those with JIA. Overall, EDs were accessed annually by 27.5%, 14.3%, 17.1% and 25.5%, and hospitalizations occurred in 18.3%, 18.2%, 19.9% and 23.4% of individuals in RA, PsA, AS, and gout cohorts respectively. Rates of ED visits varied widely in the 5 identified studies. Mean hospitalization rates of 27.4, 22.6 and 23.1 per 100 person years occurred in RA, PsA and SpA cohorts respectively. No analyses for ED use in equity-deserving populations were identified, and just 2 of 60 studies on hospitalization frequency reported estimates stratified by age and sex or were specific to persons > age 65.
Conclusion: Compared to those with PsA or AS, persons with RA and gout had higher frequencies of accessing ED for care. In contrast, the frequency and rate of hospitalization was consistent across IA types. Studies identified in this review reflected predominantly western health system structures. There is a paucity of data available for JIA, and for equity deserving groups in all IA conditions. Studies to understand the reasons for acute care use and if use can be prevented are recommended, as research is focused on acute care use trends and needs in equity-deserving groups.

64

Going Beyond Pain: Consensus Meetings to Expand The JIA Option Map With Other Symptoms and Functional Activities

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Objectives: Young people with juvenile idiopathic arthritis (YPJIA) experience physical and psychological symptoms that negatively impact functional activities. YPJIA and their families need more information and decision support to manage symptoms and participate fully in functional activities. Our team previously developed the JIA Option Map, a web-based patient decision aid for JIA pain management. The current study aimed to expand the app to include treatment options for other relevant symptoms and tips to participate fully in activities. We recently conducted (1) virtual research team meetings and (2) an online survey of research team members to identify the range of symptoms and functional activities that could be added to the JIA Option Map. The current step aimed to obtain consensus on the symptoms and functional activities that should be integrated next into the JIA Option Map.
Methods: Our research team has 35 members, including patient partners, health care providers (HCPs) and researchers, with expertise in JIA, shared decision making and research methods. HCPs include pediatric rheumatologists, nurses, occupational therapists, physical therapists, psychologists, social workers and dietitians. We conducted two virtual consensus meetings with research team members using a modified nominal group process. Further team discussions helped determine how to integrate this information into the app and a prototype was developed with computer science researchers and students.
Results: A total of 18 people participated in the consensus meetings, including three patient partners and HCPs from four different professions. Both meetings had at least one patient partner, researchers and clinicians from at least three professions. Both meetings determined that fatigue, stress/anxiety, and joint stiffness were the most important symptoms to add next. All functional activities were considered important to add, with school and daily living activities rated as the most important. Research team members suggested to integrate this information into the steps in the app by asking YPJIA to (1) choose and rate the symptoms and functional activities that are important to them, (2) assess their preferences in terms of treatment options and (3) provide evidence-based information on the options that match their preferences.
Conclusion: Our team of patient partners, HCPs and researchers agreed on the most important symptoms and functional activities to integrate next into the JIA Option Map. The next step will be a systematic review of the literature for evidence-based approaches to manage these symptoms and tips to improve participation in functional activities that will be integrated into the app. Supported by a CIORA grant. Mapping 24-Hour Movement Guidelines in Axial Spondylarthritis: Meeting Activity Targets but Missing The Mark for Sleep

65

Interviews to Explore Perceptions of The Role of Occupational Therapists in The Treatment of Juvenile Idiopathic Arthritis in Canada

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Objectives: Juvenile idiopathic arthritis (JIA) involves a variety of symptoms, such as joint pain, stiffness, fatigue and mental health symptoms that can negatively impact participation in daily activities. Youth with JIA can benefit from a wide range of interventions provided by a multidisciplinary team including pediatric rheumatologists (PRs) and occupational therapists (OTs). Currently, there is a wide variation in the occupational therapy services offered in pediatric rheumatology clinics across Canada. The aim of this study is to explore the perceptions of OTs and PRs of the role of occupational therapists in treating JIA, as well as facilitators and barriers to providing occupational therapy services.
Methods: Using a qualitative descriptive study, we conducted semi-structured virtual interviews with OTs and PRs working in pediatric rheumatology clinics in Canada. We recruited participants through professional organizations and e-mail invitations to our target participants from various regions and from clinics offering a range of OT services. The research team developed and pilot-tested two semi-structured interview guides to explore the current role of OTs in treating patients with JIA (including objectives and interventions), desired role of OTs, and facilitators and barriers to delivering optimal occupational therapy services. We audiotaped, transcribed verbatim, and analyzed interviews using thematic analysis.
Results: Six OTs and nine PRs from eight pediatric rheumatology clinics of various sizes across Canada participated in interviews, with five of the PRs working with an OT on their team as opposed to being available for referrals. The following key themes emerged: (1) the variation in the role of OTs in pediatric rheumatology (with different reasons for referrals to OTs, treatment objectives, assessments and interventions, often depending on the presence of an OT on the team); (2) the importance of a multidisciplinary team to treat JIA, including an OT (with increased communication within the team and with families when OTs are on the team); (3) the need for increased education on the role of OTs (for both OTs and PRs through research and team interactions); and (4) the lack of available resources as a barrier to optimal occupational therapy services (e.g., funding, time and research evidence).
Conclusion: This study demonstrates the variable perceptions of the role of OTs, and suggests the importance of interprofessional communication, and the need for increased education and resources to facilitate the delivery of optimal occupational therapy services in pediatric rheumatology clinics in Canada.

66

Checkpoint Inhibitor Immunotherapy Induced Inflammatory Arthritis Secondary to Nivolumab and Ipilumab: A Pediatric First

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Background: Over the last decade, immune checkpoint inhibitor (ICI) therapy has expanded the arsenal of cancer therapeutics in adults. Although beneficial in improving oncologic outcomes, ICIs are associated with a spectrum of immune-related adverse events (irAEs). ICIs have different toxicities than conventional chemotherapy, and most irAEs result from increased

autoimmunity. As a result, irAEs can affect a wide range of organ systems, including rheumatic complications such as inflammatory arthritis, myositis, polymyalgia-like syndrome, sicca syndrome, systemic lupus erythematosus, sarcoidosis, and vasculitis.1 Nivolumab, an anti-PD1 receptor ICI, and Ipilimumab, an anti-CTLA4 ICI, are approved for treating mesothelioma in adult patients and have been associated with developing inflammatory arthritis as an irAE.2 A literature review shows no published cases of ICI-induced inflammatory arthritis in the pediatric population.

Case: A 14-year-old female with metastatic epithelioid mesothelioma was referred to the pediatric rheumatology clinic after developing progressive inflammatory arthritis in her bilateral shoulders, hips, and the small joints of her hands following her second cycle of Nivolumab and Ipilumab immunotherapy. She had no prior joint symptoms to suggest a pre-existing rheumatologic condition. Her initial examinations showed bilateral shoulder joint line tenderness, positive FABERs test bilaterally, tenderness over bilateral greater trochanters, and effusions of her bilateral second PIPs of the hands. Her serological profile was notable for positive anti-CCP, positive HLA-B27, negative Rheumatoid Factor, and negative ANA. PET scan [Figure 1] showed bilateral symmetrical increased activity around the shoulder girdle, knees, and greater trochanters. Her initial presentation was consistent with a grade 1 irAE with mild pain with clinical arthritis.[1] She was initially treated with Naproxen with good improvement in pain; however, with each subsequent cycle of immunotherapy, her inflammatory arthritis worsened despite escalating naproxen doses. Her symptoms worsened to a grade 2 irAE with moderate pain and limitations in activities of daily living, resulting in her being started on oral prednisolone 0.5mg/kg/day, and her Naproxen was changed to Celebrex due to GI intolerance.[1] As of her last follow-up, she had achieved clinical remission of her mesothelioma following six cycles of Nivolumab and Ipilumab and had control of her inflammatory arthritis on Celebrex monotherapy.

Conclusion: Currently, there are no published cases of ICI-induced inflammatory arthritis in children. This case highlights the importance of increasing awareness of irAEs in children. Gathering further data will help determine the optimal management strategy of rheumatologic irAEs in children and if they differ from adults. Pediatric rheumatologists' involvement in multidisciplinary management is crucial. References: [1.] Jamal S, Hudson M, Fifi-Mah A, Ye C. J Rheumatol 2019; 47(2):166-175 [2.] Ramos-Casals M, Brahmer JR, Callahan MK, Flores-Chávez A, Keegan N, Khamashta MA, Lambotte O, Mariette X, Prat A, Suárez-Almazor ME. Nat Rev Dis Primers. 2020; 6(1):38.

67

Assessing Mental Health in Adolescents With Juvenile Idiopathic Arthritis: A Retrospective Chart Review

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Objectives: Youth with chronic disease are at an increased risk of developing a mental health condition compared to youth without chronic disease. It is important to understand the prevalence of mental health conditions in youth with chronic rheumatic disease in order to advocate for better mental health supports. Thus, we aimed to determine the proportion of patients with JIA in a Canadian pediatric rheumatology clinic who 1) have a documented mental

health condition in their medical chart and/or 2) are currently taking medications traditionally used to treat a mental health condition.
Methods: Patients ≥12 years old diagnosed with JIA who were followed in the Pediatric Rheumatology Clinic at McMaster Children's Hospital and had been seen at least once since June 4th, 2022 (when EHR system went live) were considered eligible. Clinic notes were reviewed to identify any of the following documented mental health conditions: generalized anxiety disorders (GAD), attention deficit hyperactivity disorder (ADHD), major depressive disorders (MDD), suicidal ideations, self-harm behaviours, separation anxiety disorder, obsessive compulsive disorder, eating disorder, adolescent adjustment disorder, substance use disorder, panic disorder, or social anxiety disorder. Medications were recorded and categorized as NSAIDs, conventional disease-modifying antirheumatic drugs (cDMARDs), biologic DMARDs, corticosteroids, antidepressants/anxiolytics, stimulant and non-stimulant medications to treat ADHD, and antipsychotics.
Results: In total, 126 charts (n= 47 female) were eligible for review (mean (SD) age 14.5 (1.7) years). Twenty (15.8%; n= 13 females (65%)) had one or more documented mental health conditions in their chart: GAD (n= 10), ADHD (n= 7), MDD (n= 3), suicidal ideations (n= 2), self-harm behaviours (n= 2), and other mental health conditions (n= 6). Eleven (8.7%) patients were taking medications related to mental health, all of whom were within the twenty patients with one or more mental health conditions. Medication use in patients with documented mental health diagnosis is shown. [Table 1]
Conclusion: Among those 12-18 years old seen in our clinic, 15.8% had a documented diagnosis of a mental health condition, of whom 45% were on an antidepressant/anxiolytic. Without routine screening for mental health conditions, patients may not always share this information with their pediatric rheumatologist, leading to an under-representation of the number of youths with mental health comorbidities. Further prospective research will focus on screening for mental health conditions in youth with chronic rheumatic disease and better understanding the barriers, facilitators, and preferences for mental health supports.

68

A Comparison of The Diagnostic Performance of and Level of Agreement Between Temporal Artery Biopsy, Ultrasound, and Magnetic Resonance Imaging Used for Giant Cell Arteritis Diagnosis

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Objectives: To assess the overall diagnostic performance of temporal artery biopsy (TAB), ultrasound (US), and magnetic resonance imaging (MRI) used for GCA diagnosis and compare the level of agreement between the 3 diagnostic tests in patient cases where multiple tests are conducted.
Methods: In this retrospective chart review, we compared the diagnostic effectiveness of US and MRI with TAB and determined whether the results of the 3 tests aligned with each other. We included 79 patient cases from between 2006-2023 where one or more of the tests were conducted. True positives (TP), true negatives (TN), false positives (FP), and false negatives (FN) were determined using the final clinical diagnoses and were used to calculate sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), and accuracy. [Table 1] Percent agreement was used to assess the level of agreement between tests in cases where multiple tests were performed.

Results: TAB (n= 75) showed an accuracy of 0.707, a sensitivity of 0.388, and a specificity of 1. US (n= 16) showed an accuracy of 0.625, a sensitivity of 0.375, and a specificity of 0.875. MRI (n= 5) showed an accuracy of 0.5, a sensitivity of 0.333, and a specificity of 1. US and TAB showed a moderate percent agreement of 61.5% while there was 100% agreement between MRI/US and MRI/TAB. There were (n= 17) cases where two or three of the diagnostic tests were conducted. Of these cases, there were (n= 5) cases where US and TAB results did not align. Of note, there was one case (n= 1) where US correctly detected a case of biopsy negative GCA.
Conclusion: Our findings support that TAB may have excellent specificity but low sensitivity. US results appear to mostly align with TAB results while MRI results appear to greatly align with TAB results. However, US and MRI may have slightly less favourable diagnostic parameters and reduced diagnostic value compared to TAB, which suggests that these tests may not effectively replace TAB. US and MRI may be useful for cases where TAB cannot be conducted or for biopsy-negative cases. Due to the limitations of our small sample sizes, our study serves as a pilot project for assessing the level of agreement between each test and the situations in which they differ. Further research involving larger sample sizes is needed to more conclusively compare the diagnostic effectiveness of each test and determine when/if US or MRI are effective replacements for TAB.

69

Impact of Aging on Rheumatic Immune-Related Adverse Events Secondary to Immune Checkpoint Inhibitors: Experience from The Canadian Research Group of Rheumatology in Immuno-Oncology (CanRIO)

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Objectives: Immune checkpoint inhibitors (ICI) have revolutionized cancer therapy. However, their use is complicated by development of immune-related adverse effects (irAEs), including rheumatic irAEs (Rh-irAE). Aging is known to be associated with an increase in chronic inflammation, likely driven by age-related changes in inflammatory networks and proinflammatory pathways, referred to as "inflammaging". [1] Older age has been implicated with the development of more frequent and severe irAEs. [2] In this study, we aim to examine whether older patients with Rh-irAEs develop more severe Rh-irAEs or greater number of irAEs compared to younger patients.
Methods: Adults who develop new Rh-irAEs after ICI exposure are prospectively followed at 10 academic sites across Canada as part of the CanRIO prospective cohort. We compared the severity and number of irAE between patients $\geq$ 65 years and $<$ 65 years, using logistic regression and Poisson regression, respectively. As part of secondary analysis, we compared the immunosuppression and cancer treatment received in both groups.
Results: A total of 139 patients with de novo Rh-irAEs recruited between Jan 2020 and March

2023 were included, 58 in the “younger” (< 65 years) and 81 in the “older” (≥ 65 years) group. [Table 1] There was no significant difference in severity of Rh-irAE (p = 0.86) or number of irAEs in each group (p = 0.283). [Table 2] Treatment of irAEs was similar between the two groups, with most patients receiving prednisone monotherapy, conventional synthetic DMARD (csDMARD) monotherapy, or combinations of prednisone/csDMARDs. Biologic DMARDs were infrequently used in both groups. ICI use was similar in both groups. There was a non-significant trend towards more severe joint-related Rh-irAEs in the younger group (32% vs 24%, p-value = 0.400) and more severe non-joint related Rh-irAEs (12% vs. 26%, p-value = 0.292) in the older group.

Conclusion: There is growing literature on the role of aging and autoimmunity, but limited data on the relationship between aging and autoimmune reactions, especially after exposure to ICI. In this prospective cohort study, we found similar numbers of overall irAE and severity of Rh-irAE in older and younger patients and similar treatment in both groups. As the role of immunotherapy continues to expand, further investigations in this area can provide insight on whether age-related changes in the immune system influence the development, severity, and clinical course of irAE, which may impact patient counselling and underlying cancer therapy. References: [1.] Franceschi C, Bonafe M, Valensin S, Olivieri F, De Luca M, Ottaviani E, et al. Inflamm-aging: An Evolutionary Perspective on Immunosenescence. Nat Hum Behav. 2019;3(2):114–21. [2.] Huang X, Tian T, Zhang Y, Zhou S, Hu P, Zhang J. Age-Associated Changes in Adverse Events Arising From Anti-PD-(L)1 Therapy. Front Oncol. 2021;11(May):1–8.

70

Health Related Quality of Life Varies With Changes in Symptoms of Depression and Anxiety over Time in Individuals With Rheumatoid Arthritis and Inflammatory Bowel Disease

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Objectives: To evaluate change in health-related quality of life (HRQoL) and to compare the impact of depression and anxiety on HRQoL in individuals with rheumatoid arthritis (RA), inflammatory bowel disease (IBD) and primary depression or anxiety without RA or IBD (PSYC).

Methods: Individuals with physician diagnosed RA(n= 154), IBD(n= 247), and PSYC(n= 306) were recruited between November 2014 and July 2016. Using validated measures over 3 years, participants annually reported symptoms of depression and anxiety (Hospital Anxiety and Depression Scale), fatigue (Fatigue Impact Scale for Daily Use), HRQoL (RAND-36), and had functional assessments (physical: nine-hole peg test and 25-foot timed walk test; cognition: Symbol Digit Modalities Test). Generalized linear models with generalized estimating equations tested between-person and within-person associations of depression and anxiety with HRQoL. In adjusted models, time-invariant covariates included self-reported gender, ethnicity, education, and age at symptom onset; time-varying covariates included age, income, marital status, smoking status, body mass index, physical comorbidity count, physical function, cognitive function,

disease activity and use of disease-modifying therapy. Physical (PCS-36) and mental (MCS-36) HRQoL were assessed separately for RA, IBD and PSYC and compared across diagnostic groups.
Results: RA participants were older than IBD or PSYC participants [mean age= 59.49(11.66), 47.45(14.80), 43.87(12.94) p< 0.0001]. Average baseline HRQoL scores were lower in all groups as compared to population norms. Within individuals, most participants reported meaningful changes in HRQoL (±3 point change) during the study period [RA: PCS-36 N= 135 (87.66%); MCS-36 N= 143 (92.86%); IBD: PCS-36 N= 209 (84.62%); MCS-36 223 (90.28%); PSYC PCS-36 N= 260(84.97%); MCS-36 N= 278 (90.85%)]; nearly a third of participants reported a large change (±> 10 point change) in PCS-36 (RA 24.03%, IBD 31.17%, PSYC 29.08%) and nearly half reported a large change in MCS-36 (RA 48.05%, IBD 52.63%, PSYC 65.03%). Regression models, adjusted for covariates and testing for differences across disease groups showed that on average, RA participants had worse PCS-36 scores than IBD or PSYC participants. MCS-36 scores were the lowest for PSYC participants. Within-person analysis found poorer MCS-36 was associated with increased depression (HADS-D> 10) and anxiety (HADS-A > 10); poorer PCS-36 was associated with increased fatigue and poorer cognitive and physical function. In separate models for RA and IBD, increased disease activity was also associated with lower HRQoL (PCS-36 and MCS-36).
Conclusion: Variations in depression, anxiety, fatigue, cognition, and function are associated with HRQoL fluctuations in people with RA, IBD and PSYC, highlighting the importance and magnitude of benefit by addressing these issues in addition to standard medication.

71

Quinacrine Use in Systemic Lupus Erythematosus: A Single Centre Cohort Experience

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Objectives: The antimalarial hydroxychloroquine is a cornerstone drug in systemic lupus erythematosus (SLE), but retinopathy is a known complication of long-term use. Quinacrine, an older antimalarial, is widely considered to have minimal risk of retinal toxicity, and is potentially a useful adjunct or alternative to hydroxychloroquine. We describe patterns of quinacrine use in a prospective cohort, along with its effectiveness and safety.
Methods: The McGill SLE cohort consists of over 500 adult patients undergoing annual research visits that prospectively provide data on demographics, disease course and damage, and treatments. We included any participant exposed to quinacrine during follow-up, based on a keyword search of the study database. We determined the frequency of lupus rash (as recorded in the Systemic Lupus Erythematosus Disease Activity Index, SLEDAI) and calculated whether patients were in a modified Lupus Low Disease Activity State (mLLDAS) (SLEDAI ≤ 4, physician global ≤ 1, prednisone ≤ 7.5 mg/day) at each visit.
Results: 11 patients had at least one record of quinacrine exposure. Of these, 91% were female, with an average age of 47 years (standard deviation, SD 13) and an average disease duration of 17 years (SD 11) when quinacrine was introduced. [Table 1] The reason for quinacrine initiation

was documented in 8 patients and was always for cutaneous lupus. Quinacrine was typically prescribed at 100 mg daily and was most often combined with hydroxychloroquine (64%) or chloroquine (45%). Only 2 individuals took glucocorticoids while on quinacrine. Average treatment duration was 1780 days (SD 1165). Two patients stopped quinacrine after being diagnosed with retinopathy (in one, quinacrine was used with hydroxychloroquine and in another, chloroquine). Three patients stopped taking quinacrine due to drug unavailability. Lupus rash based on SLEDAI was present in 36/94 (38% [95% CI 29-48]) study visits before starting, 15/44 (34% [95% CI 22-49]) visits while taking, and 9/28 (32% [95% CI 18-51]) visits after stopping quinacrine. Participants were in mLLDAS for 32/92 (35% [95% CI 26-45]) visits before starting, 15/42 (36% [95% CI 23-51]) visits while taking, and 12/17 (71% [95% CI 47-87]) visits after stopping quinacrine.

Conclusion: In a prospective SLE cohort, quinacrine was primarily used for cutaneous lupus manifestations, usually in combination with other anti-malarials. Although two individuals on quinacrine developed retinopathy, both were also taking another anti-malarial concurrently. Quinacrine was most commonly stopped due to lack of access.

72

An Atypical Case of VEXAS Syndrome: The Diagnostic Challenge of an Acquired Auto-Inflammatory Disorder

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Background: VEXAS syndrome is a recently discovered auto-inflammatory condition caused by an acquired variant in the UBA1 gene in myeloid cell lines. VEXAS syndrome, as discovered by Beck et al (2020), has been named for its Vacuoles on bone biopsy, E1 ubiquitin-activating enzyme reduced function, X-chromosome gene location, Auto-inflammation, and Somatic gene variant. This abstract outline the diagnostically challenging case of an 81-year-old male presenting with a variety of relapsing inflammatory signs and symptoms eventually confirmed to have the novel VEXAS syndrome.

Case: An 81-year-old male presented to hospital over the course of 3 years with a spectrum of signs and symptoms with no clear etiology. [Figure 1] He experienced transient symptoms affecting cutaneous, pulmonary, musculoskeletal, and hematologic systems. [Figure 1b-e] shows left hand swelling and arthritis, an erythematous nodular rash present on the forearm, right periorbital edema, and a purpuric rash on lower limb, respectively. An extensive work-up was performed, which identified no underlying infectious nor malignant causes for his presentations. The symptoms were severe, but quite short-lived – making timely diagnostic testing challenging. He had persistently elevated inflammatory markers, marked inflammatory symptoms, normocytic anemia and other mild hematologic manifestations.

Given the challenging and non-specific presentation of the patient, many medical specialists were involved, and multiple diagnoses queried. His presentation was complicated by his positive ANA and fulfilment of the systemic lupus erythematosus (SLE) criteria. He furthermore had severe peri-orbital edema, leading to involvement of ophthalmology and allergists, for evaluation and treatment of periorbital syndrome and angioedema. After nearly three years of repeat presentations, multiple specialist consultations, and trials of management, the novel and rare VEXAS syndrome was queried as the possible underlying etiology. He was sent for bone biopsy, which identified the characteristic vacuoles in the myeloid progenitor cells. Genetic

testing was then sent for confirmation, which identified a pathogenic acquired gene variant diagnostic for VEXAS syndrome. With these investigations, a unifying diagnosis was identified. **Conclusion:** Due to the variety of symptoms and mimickers of other clinical phenotypes, the prevalence of VEXAS syndrome is presumed to be vastly underestimated. Many patient presentations with alternative diagnoses may in fact be due to underlying UBA1 gene variants causing the acquired auto-inflammatory disorder. The highly variable and non-specific signs and symptoms that arise in VEXAS syndrome can make timely diagnosis challenging. We encourage consideration of VEXAS syndrome, even in the setting of presentation that may be atypical for VEXAS syndrome. References: [1.] Beck DB, Ferrada MA, Sikora KA, et al. (2020). Somatic Mutations in UBA1 and Severe Adult-Onset Autoinflammatory Disease. N Engl J Med. 2020;383(27):2628 - 2638.

73

Teenage Heartache: Pericarditis as a First Presentation of Pediatric ANCA Vasculitis

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Background: Pediatric ANCA-associated vasculitis (AAV) is a rare disease of childhood with a global prevalence of 1 per million. [1] The diagnostic criteria for pediatric granulomatosis with polyangiitis (GPA) differs from that of adults, and considers CT evidence of lung nodules, cavities, or infiltrates for better delineation of respiratory involvement. No specific pediatric criteria exist for microscopic polyangiitis (MPA) or eosinophilic granulomatosis with polyangiitis (EGPA). This case represents a unique presentation of pediatric AAV with a cardiac chief complaint. Typical presenting symptoms of pediatric patients with GPA and MPA include constitutional symptoms (malaise, fever, weight loss), renal impairment (biopsy-proven glomerulonephritis) and pulmonary manifestations (cough, alveolar hemorrhage, hemoptysis). However, in adults with EGPA, itself a rarer form of AAV, patients more commonly present with pericarditis or pleuritis.

Case: A 14-year-old transgender male presented with a 1-month history of intermittent pleuritic chest pain, worse when supine and after activity. Past medical history was non-contributory, and review of systems was negative apart from mild fatigue, low appetite, and self-resolving frontal headache with no red flags. Physical examination showed distant but otherwise normal heart sounds and decreased air entry to lung bases bilaterally. A left-sided ptosis (present > 6 months) was also noted. Investigations revealed normal white cell count and electrolytes, C-reactive protein 201.9 mg/L, troponin 4 ng/L, sinus tachycardia on ECG, moderate pericardial effusion on echocardiogram and small bilateral pleural effusions on chest x-ray. Negative urinalysis. The patient was started on Naproxen 500 mg BID. Despite a negative infectious workup, the patient continued to decompensate and the possibility of AAV was raised. MPO came back strongly positive > 134U. IgG4 normal.

Conclusion: The diagnosis of AAV was made on post-admit day 16, based on the positive MPO, chest imaging, and ptosis (found to be secondary to a lacrimal mass on CT and reported in AAV). [Figure 1] The patient did not fulfill pediatric GPA criteria, [2] but we note that 20-30% of adult GPA patients may be MPO-positive. [3] Rheumatology was consulted on post-admit day 5 but given that the patient's presentation was not consistent with common pediatric rheumatological causes of pericarditis, e.g., systemic juvenile idiopathic arthritis, SLE, the likelihood of a rheumatological cause was initially felt to be low. The patient was treated as AAV and had induction therapy with high-dose steroids and cyclophosphamide. AAV remains an important differential in patients with seemingly atypical presentations of vasculitis, including

cardiac involvement. References: [1.] Bohm M. Pediatr Rheumatol 2014;12:18. [2.] Ozen S. Ann Rheum Dis 2006;65:936-41. [3.] Puéchal X. RMD Open 2022;8:e002160.

74

Underrepresented Groups in Scleroderma Randomized Controlled Trials over The Last 10 Years (2012-2022)

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Objectives: Systemic sclerosis (SSc) is a progressive autoimmune disorder that disproportionately affects minority groups. For instance, despite accounting for only 4.3% of the population, people who identify as Black represent 37.9% of patients with SSc. These groups also experience a higher burden from manifestations of SSc and have poorer health related outcomes. This study is a systematic review and meta-analysis of RCTs in SSc with the goal of assessing the proportion of Black, Indigenous, and other minority groups in their study cohorts, as they may not be reflective of those who are most affected by SSc.

Methods: A systematic review of the literature was conducted using PUBMED, MEDLINE and clinical trial registries employing the search terms “scleroderma“ or “systemic sclerosis”, and “interstitial lung disease” on March 21, 2023. Studies were included in analysis if they were in English, they were RCTs, and occurred between 2012 and 2022. Revman 5.4 was used to calculate pooled proportions and generate forest plots. Studies were excluded from subgroup analysis if they had either 0% or 100% representation from a single racial group. Due to high heterogeneity between studies, a random effects model was used.

Results: The search strategy identified 3766 studies, of which 18 were included. Only 11/18 (61%) mentioned race/ethnicity as a variable in their data collection. Within studies that reported race, the pooled proportion of people who identified as Black [95% CI] was 6% [2, 11%] $p = 0.003$. People who identified as Indigenous represented 1% [0, 2] $p = 0.004$ of those studied. Pooled study cohort proportions were 66% [57, 76%] $p < 0.001$ for those who identified as white, and 18% [9, 27%] $p < 0.001$ for those who identified as Asian. This data is presented in tables 1-4. Females represented 80% [74, 86%] $p< 0.001$ of study populations.

Conclusion: The racial makeup of trials exploring therapeutics in SSc are not reflective of the populations that are affected with the disease burden. Approximately half of the trials lacked a breakdown of race/ethnicity. Standardized reporting of race/ethnicity in SSc randomized controlled trials is essential to ensure comprehensive data representation that aligns with the diversity in the SSc population so that they are broadly applicable. The ethical implications of excluding minority populations, especially those burdened with a high prevalence of disease, warrant careful consideration.

75

Vacuoles, E1 Enzyme, X-Linked, Autoinflammatory, Somatic Syndrome and Risk of Infectious Complications: A Retrospective Analysis and Literature Review

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Objectives: VEXAS syndrome is a recently described X-linked somatic autoinflammatory syndrome which can manifest as autoinflammation, an MDS-like syndrome, and probable immunodeficiency. The objective of this study is to describe the clinical presentation and

outcomes of patients with VEXAS syndrome with a focus on immunodeficiency and infectious complications.
Methods: We performed a retrospective case analysis of consecutive VEXAS patients seen by the Division of Rheumatology and a literature review surrounding immunodeficiency and infectious complications.
Results: We identified five patients in the Edmonton zone who were diagnosed with VEXAS syndrome between 2021 and 2023. All patients had autoinflammatory syndromes, UBA1-mutations, and characteristic vacuolization on bone marrow biopsy, while none met criteria for MDS. Infectious complications were identified in all patients at the time of diagnosis, [Table 1] before the introduction of corticosteroids or immunosuppressant medications. At presentation, patient 1 had Klebsiella pneumoniae bacteremia, patient 2 had disseminated nocardiosis, patient 3 had CAP, patient 4 had disseminated histoplasmosis, and patient 5 had CAP complicated by cavitary pulmonary lesions. All patients received corticosteroids and tocilizumab once infection was treated. The mean length of hospitalization was 107 days (SD= 104 days). Patients 4 and 5 underwent allogeneic hematopoietic stem cell transplantation (HSCT), with patient 4 developing PTLD-EBV requiring rituximab. All patients received prophylaxis against Pneumocystis jirovecii, while no patients received antifungal or antiviral prophylaxis prior to HSCT. All patients had bone marrow flow cytometry performed which did not reveal any monoclonality, with patients 3, 4, and 5 also having peripheral flow cytometry without detectable monoclonality. Lymphocyte subsets were sent for patients 1, 2, and 4, which revealed a reduction in the number of peripheral B and T cells.
Conclusion: We identified a trend of severe infections in five consecutive patients associated with peripheral B and T cell depletion. There are reports of patients with VEXAS syndrome acquiring severe opportunistic infections, including disseminated nocardiosis. In addition to promoting the VEXAS phenotype, UBA1-mutations have been proposed to impair various immunocyte subsets, including monocyte dysfunction and depletion secondary to dysregulated Wnt-beta-catenin signaling, apoptosis of lymphocyte progenitors, and loss of T cell receptor diversity. UBA1-mutations in VEXAS syndrome patients may directly contribute to infection risk through these mechanisms. Our future research aims to perform full immunophenotyping, including TCR repertoires, on all our VEXAS syndrome patients to elucidate immunodeficiency, treatment targets, and utility of infection prophylaxis. References: [1.] Shimizu T. et al. Rheumatology 2022 Dec 1;61(12):e374-6. [2.] Kosmider O. et al. medRxiv 2022:2022-10. [3.] Wu Z. et al. Cell Rep Med 2023;4(8):101160.

76

Barriers to Accessing Mental Health Services in Adults With Systemic Lupus Erythematosus

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Objectives: To determine the barriers to mental health care in Canadian SLE patients as identified by both adult SLE patients and their physicians, as well as potential interventions.
Methods: Self-administered surveys were distributed to Canadian patients ≥18 years old with a diagnosis of SLE, as well as to practicing rheumatologists across Canada.
Results: One-hundred twenty patients across British Columbia, Alberta, Saskatchewan, Manitoba, Ontario, Quebec, Newfoundland, New Brunswick, Nova Scotia, and the Northwest Territories participated, with a mean age of 41 years (SD= 13.4). Anxiety (52%) and depression (49%) were the most frequent self-reported psychiatric diagnoses. Thirty percent of patients

reported their rheumatologist performed mental health screening, while 47% reported screening performed by their family physician. Only 53% of patients felt able to seek mental healthcare, with the most frequent barriers being referral wait times (39%), affordability (27%), time (27%), stigma (24%), and discomfort discussing (24%). Prioritized interventions included increased screening (86%), referral to mental health services (81%), assistance with healthcare navigation (81%) and integrated mental health services within the rheumatology clinic (77%). Seventeen rheumatologists across British Columbia, Alberta, Ontario, and Nova Scotia participated. Seventy-one percent identified easy access to mental health services, with 94% previously referring to these services. Twenty-nine percent reported prescribing treatment, the most common being antidepressants, anxiolytics, and hypnotics. All had previously suggested the patients' family physicians conduct mental health screening and/or consider treatment. Twenty-nine percent had screened for anxiety/depression using standardized questionnaires, while 35% screened for cognitive impairment. Physicians generally felt comfortable with asking about mental health and referring to appropriate services, but less comfortable with screening and prescribing medications. Frequent reported barriers included limited availability of mental healthcare providers (88%), limited staff resources for screening (88%), and lack of time during appointments (82%). Suggested interventions included access to referral systems (94%), access to urgent psychological or psychiatric consultation (88%), patient support for healthcare navigation (82%), with less consensus for standardized screening and integrated services within the rheumatology clinic.

Conclusion: Our study identifies barriers and proposed strategies for improving mental healthcare, but also a potential disconnects between SLE patients and their rheumatologists. There is a trend for patients to seek screening and integrated services from their rheumatology clinic, while physicians report less comfort in assessment of mental health and cited preference for external supports over integrated services and in-clinic screening. We plan to continue data collection and conduct a local quality improvement initiative in the future.

77

Efficacy and Safety of Cannabis Use in Rheumatology: A Scoping Review of Condition-Specific Outcomes

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Objectives: Cannabis-based medicines (CbMs) have garnered increasing interest for their potential therapeutic benefits. [1.] Despite not being recommended in clinical practice guidelines, patients have been using CbMs to manage various rheumatologic conditions. [2.] We conducted a scoping review to summarise the evidence on the efficacy and safety of using CbMs for rheumatologic conditions.

Methods: Following the PRISMA-ScR guidelines and framework by Arksey and O'Malley, [3.] our search spanned MEDLINE, Embase, Cochrane Library, CINAHL, Scopus, and Proquest from database inception to June 2021. After deduplication, title and abstract screening, and full-text reviews, 48 peer-reviewed articles met our inclusion criteria for data extraction and analysis. [Fig. 1]

Results: The included articles encompassed case reports (n= 21, 44%), cross-sectional studies (n= 11, 23%), cohort studies (n= 9, 19%), and randomized controlled trials (n= 6, 13%). Investigated rheumatologic conditions included cannabis arteritis and thromboangiitis obliterans (n= 20, 42%), fibromyalgia (n= 18, 38%), systemic sclerosis (n= 2, 4%), osteoarthritis (n= 2, 4%), rheumatoid arthritis (n= 1, 2%), ankylosing spondylitis (n= 1, 2%), and unspecified rheumatology patients (n= 4, 8%). CbMs used include inhaled cannabis products, cannabis oils, CBD products, delta 9-THC, and synthetic cannabinoids like lenabasum, nabilone, and nabiximols. Most studies found a statistically significant improvement in patient-reported outcomes such as pain, sleep, mood, quality of life, or function with using CbMs. Side effects were generally mild in severity, with common symptoms of dizziness, dry mouth, and drowsiness. However, a notable collection of case reports (n= 18) has linked heavy cannabis smoking to cannabis arteritis and thromboangiitis obliterans.
Conclusion: The available evidence suggests CbMs are generally safe and could improve pain, sleep, mood, and quality of life for rheumatology patients. However, the current literature focuses on fibromyalgia and data for other rheumatologic conditions is sparse. Future studies should include a broader range of rheumatologic conditions and gather more long-term safety data using more robust methodologies, such as randomized controlled trials. References: [1.] Fitzcharles M.-A. J. Rheumatol. 2019;46:532-538. [2.] Fitzcharles M.-A. Arthritis Rheumatol. 2012;64:2417-25. [3.] Arksey H. and O'Malley L. Int J Soc Res Methodol 2005;8:19-32.

78

The Use of Virtual Nominal Groups in Research and Education: An Extended Scoping Review

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Objectives: The Nominal Group Technique (NGT) is a consensus group method used to synthesize expert opinions when empiric evidence is lacking and involves an explicitly structured format to generate and prioritize ideas. [1] It has been used extensively for activities such as defining diagnostic criteria, disease classification, quality indicators, curriculum content and informing management guidelines. [2] A perceived strength of the NGT is the opportunity for discussion among participants which is usually conducted in-person. Given the global shift to virtual meetings during the COVID-19 pandemic, the extent to which researchers leveraged this for the NGT is unclear. This scoping review explores the use of the virtual NGT in research.
Methods: The Arksey and O'Malley framework was used to guide our review. Eight cross-disciplinary databases were searched and date-limited using the onset of the COVID-19 pandemic to present (January 2020 - July 2022). English-language reports that included four NGT stages (idea generation, round robin sharing, clarification, and voting) were eligible for inclusion. An extraction form was created to collect data and results were combined via quantitative and thematic analyses. In addition, corresponding authors of selected studies were surveyed to gather more information on perceived benefits/concerns of using the virtual platform. [3]
Results: Of 2,589 citations, 32 references were included. Articles covered healthcare (27/32) and healthcare education (4/32). Rheumatology topics were included in 9 studies; patient preference

for osteoporosis treatment, monitoring drug algorithms, physical therapy for scleroderma, scleroderma dietary resources, barriers to lipid testing in RA, barriers to achieve RA disease control, patient views on OA treatment, provider view on gout disease modification and exercise treatment targets for low back pain. The platforms used most were Zoom (66.6%; 12/18), followed by Microsoft Teams (11.1%; 2/18), GoTo (11.1%; 2/18), Crisco (5.6%; 1/18) and Skype (5.6%%; 1/18) but was not reported in 44% (14/32) of studies. Only 22% commented on the benefits/challenges of moving the NGT virtually. Of those authors (16/32) who responded to our survey 44%, 36%, and 19% felt that the virtual NGT was superior, comparable, or inferior to an in-person NGT, respectively

Conclusion: The virtual format appears to have preserved the foundational principles that NGT promotes, with added benefits of facilitating greater inclusion and promotion of balanced participation. In consideration of ableism, equity, and social justice, virtualized consensus-based decision-making may afford greater equity in research and beyond. In practice, however, experts should consider whether virtual meetings impact the richness of discussions and subsequent study results. References: [1.] Harvey N. Int J Nurs Pract 2012;18(2):188-194. [2.] Humphrey-Murto S. Acad Med 2017;92(10):1491-1498. [3.] Humphrey-Murto S. PloS one 2023;18(1):e0280764.

79

Expectant Anxiety: Impact of Medication Adjustments on Anxiety and Patient-Reported Outcomes in Pregnant Patients With Rheumatic Diseases

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Objectives: In women with autoimmune rheumatic diseases (ARDs) who are pregnant or planning a pregnancy, achieving low disease activity is important in optimizing pregnancy outcomes and reducing rates of pregnancy complications. Completing a pre-pregnancy review of medications is recommended to ensure that patients have low disease activity on pregnancy-compatible medications prior to conception. In some scenarios, this may necessitate discontinuation of previous medicines; in others, this may require escalation of treatment, to have better disease capture. Objective: To determine whether modifications in medication regimes impact self-reported health assessment, depression, and anxiety scores, among pregnant patients with ARDs.

Methods: We conducted a prospective study of patients diagnosed with at least one ARD seen at a rheumatic diseases and pregnancy clinic between July 2021 and September 2023. In addition to baseline demographics, participants completed the Health Assessment Questionnaire (HAQ) and the Hospital Anxiety and Depression Scale (HADS) during follow-up visits. Participants were grouped as: 1) those whose medication regimen was not modified throughout pregnancy, and 2) those whose medication regimen was stopped, changed, or otherwise modified at any stage of pregnancy. Patient-reported outcome scores were compared using Mann-Whitney U Test, setting significance level at $p = 0.05$.

Results: The study sample included 49 pregnant women with ARDs (mean age 35.25 years). Most patients were diagnosed with systemic lupus erythematosus (22%), undifferentiated connective tissue diseases (18%), or rheumatoid arthritis (16%). 19 patients (38.77%) had medications modified during pregnancy. In the 3rd trimester, patients whose medications were modified reported significantly higher (worse) HAQ scores (Med= 1.375), compared to those

whose medications were not modified (Med= 1); U= 62, n1= 14, n2= 20, p< 0.01. Additionally, HADS scores at post-partum follow-up suggested significantly greater anxiety among patients whose medications were modified during pregnancy (Med= 6), compared to those whose medications were not modified (Med= 2); U= 26, n1= 9, n2= 15, p< 0.05.
Conclusion: Modifications to pharmacotherapy among pregnant patients with ARDs may be necessary to optimize the safety of the pregnancy for mother and child. While the direction of association is unclear, pregnant patients reported worse self-reported health assessment scores when their medications were modified, compared to those who remained on stable drug regimens. Additionally, modifying medications were observed to increase anxiety post-partum, compared to those who remained on stable drug regimens. This finding is pertinent to clinicians involved in patient care in and around the time of pregnancy. Patients may benefit from counseling surrounding ARD management prior to pregnancy to achieve minimal disease activity on pregnancy-compatible medications.

80

Assessment of Cutaneous and Extracutaneous Factors Involved in Morphea (Localized Scleroderma) Among Pediatric Patients in Saskatchewan

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Objectives: Morphea (localized scleroderma: LS) is a rare autoimmune fibrosing skin disease affecting skin and deeper structures. C-MORE (Canadian-Morphea Registry) aims to study its pathogenesis, epidemiology, natural history, and treatment to enhance patient outcomes and care. Our objective was to characterize the demographics, clinical features, and outcomes of morphea patients in Saskatchewan from 2017-2023. We aimed to compare the LS Cutaneous Assessment Tool (LoSCAT), consisting of LS Skin Activity Index (LoSAI) and Skin Damage Index (LoSDI), at onset and follow-up.
Methods: We completed a retrospective chart review of 14 patients and a prospective analysis of 11 patients. Prospective analysis included a demographic intake form, a standardized 60-minute phone interview gathering information on potential triggers, detailed medical history, and comorbidities. Treating physicians completed a diagnostic questionnaire, confirming diagnosis, subtype, severity, and extent (using LoSCAT), and recorded relevant investigation results and treatments. We calculated descriptive statistics and used a paired T-test to compare localized scleroderma disease activity and damage scoring.
Results: Localized scleroderma was more prevalent in females, with an average age at diagnosis of 10.5 years. Linear scleroderma was the predominant subtype, affecting over half of patients, often involving the scalp and presenting with Parry-Romberg syndrome in nearly 30% of cases. Over 30% exhibited extracutaneous manifestations. Methotrexate was the most frequently prescribed therapeutic agent. Localized scleroderma patients showed dermatological quality of life scores comparable to common skin ailments, demonstrating their resilience. LoSAI showed significant improvement at follow-up, with remission rates exceeding 80%, and only a minority experiencing active disease at the last follow-up.
Conclusion: Our study, the most comprehensive collection of pediatric LS patients in Saskatchewan, provides valuable insights into this rare autoimmune fibrosing skin disease. Linear scleroderma, particularly involving the scalp and presenting with Parry-Romberg syndrome, emerged as the most common subtype. Further research and collaboration within the C-MORE registries will continue to advance our understanding of morphea and guide future

interventions for patients' benefit.

81

Osteoarthritis and Cognitive Function: A Population-Based Cross-Sectional Study

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Objectives: To determine if self-reported memory problems are more (or less) common in people with osteoarthritis (OA) compared with the general population.

Methods: Survey data were collected as part of a chronic inflammation team project. Invitations were mailed to 5,000 individuals, randomly selected within OA/general population from British Columbia's administrative health databases; 2,000 had a diagnosis of OA according to ICD9/10 physician billing codes, and 3,000 were general population without OA controls. Data collection included demographics, comorbidities, and the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC). Memory problems were ascertained using the reliable and validated 13-item version of the Everyday Memory Questionnaire (EMQ-13) (0-4 scale for each item, where higher scores indicate more memory problems) and were analyzed as the natural log of the (sum score+1) (lnEMQsum), thus rating memory problems on a scale of ln(1) to ln(53). Linear regression models predicting memory problems were fit adjusting for a propensity score (PS) in female, male, and overall populations. The PS was developed in binary logistic regression models predicting OA from the following predictors: age, sex, ethnicity, marital status, education, income, high blood pressure, high cholesterol, diabetes, heart disease, stroke, Alzheimer's/dementia, depression, anxiety, current smoking, alcohol use past year, age at menopause, daily activities past 3 months, number of close friends, sleep quality and WOMAC. Missing values in the confounding variables were addressed using multiple imputations. For all models, ten regressions were fit (one with each imputation), then combined to produce a single set of synthesized regression coefficients with 95% confidence intervals (CIs) and p-values.

Results: 580 participants aged ≥19 years completed the survey, including 341 with OA and 239 without OA. Mean EMQsum was similar in the OA and control groups (10.7 vs 9.0, p= 0.236). OA participants were significantly older and more frequently white than controls. OA was not significantly associated with lnEMQsum in females, males, or overall. The OA coefficient (95% CI) amongst females was 0.008 (-0.230, 0.247), p-value 0.944 and amongst males was 0.182 (-0.052, 0.415), p-value 0.128. Overall the OA coefficient was 0.083 (-0.087,0.253), p-value 0.339.

Conclusion: In this random population sample of people with and without OA, we found that the risk of memory problems, as measured by the EMQ-13, was not significantly increased in females or males with OA compared to general population controls without OA, after adjusting for potential confounders.

82

Pilot Study of Urine Biomarkers for Assessing Kidney Disease in Pediatric-Onset Anti-Neutrophil Cytoplasmic Antibody-Associated Vasculitis

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Objectives: Urinary monocyte chemoattractant protein-1 (MCP-1), [1] soluble CD163 (sCD163), [2] and soluble CD25 (sCD25) [3] have been identified as predictive biomarkers of renal involvement in adult-onset anti-neutrophil cytoplasmic antibody (ANCA)-associated vasculitis (AAV). In the adult clinical setting, these biomarkers are used to inform decisions regarding initial treatment as well as starting/stopping of treatment throughout the disease course. In this study, we sought to assess the predictive performance of these and novel biomarkers of renal involvement in pediatric-onset AAV.

Methods: Concentrations of MCP-1, sCD25, and sCD163 were measured (ELISA) in urine collected at the time of diagnosis from children and adolescents diagnosed with AAV (n = 98). Urine from a subset of these AAV participants with (n = 12) and without (n = 19) renal involvement were screened by The Metabolomics Innovation Centre (TMIC) using a Di/LC-MS/MS assay for the identification and absolute quantification of 263 metabolites. MetaboAnalyst 5.0 was used to identify and evaluate differential metabolites. The correlation of urinary concentrations of proteins and metabolites with renal disease activity (measured in the renal domain of the Pediatric Vasculitis Activity Score - pVAS) and function (estimated glomerular filtration rate - eGFR) at diagnosis and 1-year post-diagnosis was assessed using R (R Foundation for Statistical Computing).

Results: A total of 30 differentially abundant metabolites were identified that, together, resulted in a high AUC on a Receiver Operating Curve (ROC) when distinguishing between the presence and absence of renal involvement in children with AAV. Of the 30 differential metabolites, the concentrations of 10 metabolites were significantly correlated with renal pVAS at diagnosis, with choline exhibiting the strongest positive correlation. The concentration of choline at diagnosis was also significantly correlated with eGFR at 1-year post-diagnosis. These data were compared to correlations of urine concentrations of MCP-1, sCD25, and sCD163 with renal disease at diagnosis and 1-year post-diagnosis.

Conclusion: In this pilot study, urine proteins and metabolites demonstrated potential as predictive biomarkers for assessing renal involvement and aiding the early identification of children with AAV and poor renal prognosis. References: [1.] Tam FWK, Sanders JS, George A, et al. Nephrol Dial Transplant 2004;19(11):2761-8. [2.] O'Reilly VP, Wong L, Kennedy C, et al. J Am Soc Nephrol 2016;27(9):2906-16. [3.] Dekkema GJ, Abdulahad WH, Bijma T, et al. Nephrol Dial Transplant 2019;34(2):234-242.

83

Evaluating Kidney Disease in Pediatric-Onset Anti-Neutrophil Cytoplasmic Antibody-Associated Vasculitis: Disease Course, Outcomes, and Predictors of Outcome

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Objectives: Pediatric-onset anti-neutrophil cytoplasmic antibody (ANCA)-associated vasculitis (AAV) is a group of rare, systemic diseases that are characterized by inflammation and damage to small and medium sized blood vessels in major organ systems. Over 75% of children with AAV have renal disease, and more than half have moderately reduced renal function or worse at time of diagnosis (TOD). [1,2] Due to disease rarity, it is unclear how these patients do over time and if there are early features that may predict their outcomes. We aimed to study the disease course, outcomes, and predictors of outcome in children with AAV affecting the kidneys.
Methods: PedVas is an ongoing multi-center, international study collecting clinical data from children with chronic primary vasculitis. Eligible patients with AAV were < 18 years at TOD and had renal disease (defined by biopsy or dialysis dependence); and had clinical data minimally at TOD and 12-month follow-up. Patients' renal function was categorized by estimated glomerular filtration rate (eGFR) into KDIGO (Kidney Disease Improving Global Outcomes) stages, as normal eGFR (> 90) (units: ml/min/1.73m2), mildly reduced (MildR) (60-89), mild-moderately reduced (mild-ModR) (45-59), moderately-severely reduced (Mod-SevR) (30-44), severely reduced (SevR) (15-29) and renal failure (RF) (< 15). Predictive analyses were conducted using a proportional odds logistic regression model.
Results: 145 patients met inclusion criteria with data available for TOD and 12 m; 76 of these patients had 24 m data. The trajectory of eGFR categories are shown. [Figure 1] At TOD, there were 38% with normal or mild eGFR categories compared to 64% at 12 m. Comparing the three worst eGFR categories, 55% were in the Mod-SevR/SevR/RF eGFR categories versus 31% at 12 m. The odds of being in a higher (worse) eGFR category at 12-months for patients with moderately-severely reduced eGFR at TOD was 18.2 times higher than for patients with a normal eGFR at TOD. The adjusted odds ratio of being in a higher KDIGO stage at 12-months compared to TOD were as follows: 1.36 (MildR), 1.02 (Mild-ModR), 4.77 (Mod-SevR), 8.62 (SevR) and 26.3 (RF). 99.3% of patients were treated with cyclophosphamide and/or rituximab.
Conclusion: Despite the majority of patients receiving aggressive treatment, two-thirds continued to have reduced renal function at 12 – and 24 m follow-up. The results of this study represent an important advancement in our ability to better predict pediatric AAV renal disease course and outcomes at TOD based on eGFR. References: [1.] Morishita KA, Moorthy LN, Lubieniecka JM et al. Arthritis Rheum 2017;69(7):1470-1479. [2.] Chen A, Mammen C, Guzman J et al. Clin Exp Rheumatol. 2022 May;40(4):841-848.

84

Pulmonary Manifestation of Pediatric Anti-Neutrophil Cytoplasmic Antibody-Associated Vasculitis: Disease Course and Outcomes

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Objectives: Pediatric-onset anti-neutrophil cytoplasmic antibody (ANCA)-associated vasculitis (AAV) is a group of rare, systemic diseases that are characterized by inflammation and damage to small and medium sized blood vessels in major organ systems. Two-thirds of patients have pulmonary manifestations at the time of diagnosis (TOD). [1] The aim of this project is to characterize pulmonary disease in children with AAV at diagnosis and describe the course and outcome of their lung disease.
Methods: PedVas is an ongoing multi-center, international study collecting clinical data from children with chronic primary vasculitis. Eligible patients with AAV were < 18 years of age at the TOD; with pulmonary disease (defined by presence of pulmonary manifestations, abnormalities in lung imaging, pulmonary function test, bronchoscopy, or rhinolaryngoscopy); and had clinical data minimally at TOD and 12-month follow-up. The following registry data was collected at TOD and/or follow-up: demographics, diagnosis, clinical manifestations, ANCA status (positivity and specificity for PR3 and MPO), medications, disease activity (pVAS range 0-63) and damage (pVDI, range 0-76 at follow-up only). Descriptive statistics were used to summarize the results.
Results: 188 patients met inclusion criteria, with a median age of 14.1 years. Of these patients, 76.1%, 8.0%, 12.2% and 3.7% had a diagnosis of granulomatosis with polyangiitis, microscopic polyangiitis, unclassified AAV and eosinophilic GPA, respectively. At TOD, 87.3% of patients had abnormal imaging, 32.3% with abnormal PFTs, 20.1% with abnormal bronchoscopy, 21.7% with abnormal rhinolaryngoscopy, and 55.0% had some form of pulmonary involvement as determined by the chest component of the pVAS. Additionally, at TOD, 37.0% presented with massive haemoptysis/alveolar haemorrhage, 23.8% with a supplemental oxygen requirement, and 14.3% with a wheeze/expiratory dyspnea. At 12 months post-diagnosis, fewer patients (47.4% vs 87.8% at TOD) had abnormal imaging. Although a similar percent (29.3% vs 31.9% at TOD) of patients had abnormal PFTs, a minority (14.1%) of individuals had damage at 12-months in the form of chronic respiratory insufficiency, PFT obstruction, pulmonary fibrosis, or pulmonary hypertension. The pulmonary features at diagnosis and 12 ms are shown. [Table 1]
Conclusion: The majority of patients in this pediatric cohort presented with lung involvement, and one-third had significant disease in the form of massive pulmonary haemorrhage. Despite significant initial clinical and imaging manifestations at TOD, at 12-months only 14% had evidence of permanent damage. Further studies looking at longer term outcomes and predictors of outcome are planned. References: [1.] Morishita KA, Moorthy LN, Lubieniecka JM et al. Arthritis Rheum 2017;69(7):1470-1479.

85

Work Productivity and Its Relationship to Clinical Features of Psoriatic Arthritis

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Objectives: Psoriatic arthritis (PsA) is a chronic inflammatory condition that affects joints and skin, often leading to substantial reductions in work productivity. While biologics and Janus kinase (JAK) therapies show potential in slowing disease progression, their cost and limited use as first-line treatments require further evaluation of their impact on work impairment. This study

aimed to investigate the relationship between work productivity and clinical features of PsA, and differences in patients treated with or without biologics and/or JAKs.
Methods: Between May and August 2023, PsA Clinic patients were invited to complete the Work Productivity and Activity Impairment (WPAI) questionnaire, assessing disease-related work and activity limitations. Clinical assessments of activity and damage, as well as X-rays (using the modified Steinbrocker method), were used to gauge disease severity. Kendall's correlation explored associations with WPAI outcomes. Logistic and linear regression analyses, adjusted by propensity scores, examined the relationship between biologics and/or JAKs usage and WPAI outcomes.
Results: Among the 113 participants, 60 (53%) were employed, and 66 (58%) were male, with an average age of 60.66 (± 11.72) years. Various PsA clinical features were significantly associated with WPAI outcomes. [Table] Notably, the percent work time missed exhibited significant positive correlations with measures, including the Clinical Disease Activity Index for PsA (cDAPSA; p= 0.007), Health Assessment Questionnaire (HAQ; p= 0.017), Patient Pain Assessment (p= 0.005), Patient Skin and Joint Activity Assessment (p= 0.006), Physician Global Assessment (p< 0.001), Physician Joint Assessment (p= 0.017), and Physician Skin Joint Assessment (p= 0.019). The percent impairment while working, overall work impairment, and activity impairment showed significant positive associations with the same measures (p< 0.05). However, physician global was the sole physician-assessed score significantly correlated with the percent impairment while working (p= 0.044) and overall work impairment (p= 0.004). Significant positive associations were observed between Tender Joint Count (p= 0.032), Swollen Joint Count (p= 0.044), Actively inflamed Joint Count (p= 0.008), and the percent activity impairment. Importantly, patients treated with biologics and/or JAKs experienced a statistically significant reduction in the percent impairment while working compared to those without such treatments (β= -16.97, p= 0.016).
Conclusion: Clinical features of PsA, specifically disease activity, were significantly associated with reduced work productivity. There was no association between PsA damage (either clinical or radiological) and work productivity. This study highlights the effectiveness of biologics and/or JAKs therapies in improving work-related outcomes, particularly in reducing impairment while working caused by PsA. Future research should delve deeper into these treatments to enhance patients' work productivity and overall quality of life.

86

Predicting Response to Anti-Tumor Necrosis Factor Agents in Rheumatoid Arthritis Using an Extended Set of Clinical and Laboratory Variables Remains Suboptimal

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Objectives: This study aimed to develop a model to predict response to anti-tumor necrosis factor (anti-TNF) drugs in rheumatoid arthritis (RA), using an extended set of clinical and laboratory data, thereby addressing the need for personalized treatment in this disease.
Methods: Data were sourced from the Early Undifferentiated PolyArthritis (EUPA) cohort,

which includes adult RA patients recruited since 1998. Detailed clinical and laboratory variables were collected at baseline and at 12, 18, 30, 42 and 60 months after symptom onset. For this analysis, only biologic-naïve RA patients initiating their first anti-TNF and having at least eight months of follow-up thereafter were included. The primary outcome was the attainment of a Disease Activity Score 28 with C-reactive protein (DAS28-CRP) of 3.2 or less, which corresponds to a low disease activity (LDA) according to the EULAR response criteria, within 16 months of anti-TNF initiation. Using an intention-to-treat analysis and stepwise model selection, logistic regression models were generated to identify variables at the time of initiation of anti-TNFs associated with responder/non-responder status. Models were compared using the area under the receiver operating characteristic (AUROC).
Results: 105 patients were included in the analysis, of which 50.5% achieved the primary outcome. There were no significant differences in demographic and disease characteristics, including age, sex, methotrexate use at the time of anti-TNF initiation, RF/CCP status and shared epitopes between responders and non-responders. However, responders had lower disease activity at baseline, including physician global assessments (range 0-10; 4.8 (SD 2.5) vs 6.0 (SD 2.0), p= 0.01) and modified Health Assessment Questionnaire (mHAQ) scores (range 0-3; 0.66 (SD 0.54) vs 0.96 (SD 0.61), p= 0.01) compared to non-responders. Various prediction models were generated, with the best-performing model including sex, age, mHAQ, current hydroxychloroquine use, and etanercept (versus other anti-TNF) having an AUROC of 0.7014 (95% CI: 0.5994; 0.8034). [Table 1] Baseline mHAQ was the only variable significantly associated with anti-TNF response (OR 0.39, 95% CI 0.18; 0.83).
Conclusion: Despite an extended set of clinical and laboratory predictors, we found only modest discrimination between anti-TNF responders and non-responders in RA, similar to previously reported models. In an era with multiplying drugs available to treat RA, our study highlights the need for further research to predict the most appropriate treatments for individual patients, which holds the potential for improved outcomes and cost savings.

87

Patients' Perspectives on Musculoskeletal Healthcare in Alberta-System Roadblocks and Workarounds: Preliminary Analysis

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Objectives: Musculoskeletal (MSK) conditions, specifically those affecting the low back, knees, and shoulders, have a significant impact on patients' well-being as they are related to dysfunction, disability, and increased healthcare use. [1-3] Yet, many Albertans report challenges in receiving high-quality MSK healthcare in Alberta. To improve the MSK healthcare in Alberta, there is a need to better understand the patient's experience of receiving healthcare for shoulders, knee, and low back issues.
Methods: We recruited patients living with low back, shoulder, and/or knee problems who received healthcare services in Alberta to take part in a 1-hour semi-structured telephone interview. A purposively diverse sample was generated using a multi-pronged recruitment approach. Interview data were transcribed and qualitatively analyzed using an interpretive descriptive approach and framework analysis supported by NVivo software.

Results: Sixty patients consented to be interviewed about their experiences in accessing and receiving healthcare for their MSK conditions. Emergent findings indicate that participants experience various roadblocks in accessing timely and effective MSK care and address these through self-initiated 'work-a-rounds. [Figure 1] System roadblocks appear at every step in the MSK care pathway (i.e., primary care, assessment, specialist consult, initiation of treatment and system exits). System roadblocks included a lack of available providers or services; providers who function as gatekeepers rather than enablers; dismissive providers; disconnects between different providers; lack of public access to key MSK providers (e.g., physiotherapists), no diagnosis (sometime for years); and getting the wrong treatment or diagnosis. To by-pass these roadblocks, patients often employ 'work-a-rounds', such as drawing upon personal or social resources to facilitate access to the right provider, going outside the provincial healthcare system by paying out of pocket for care, and undertaking the burden of making the system work for them. In addition, emerging enablers for effective system navigation include persistence, luck, money, and providers who truly listen.
Conclusion: Steps in the MSK care pathway are often perceived as barriers, rather than enablers, to accessing quality MSK care and services. Moving through the MSK care system is often circuitous, discontinuous, long, and frustrating. These patient experiences are critical to integrate in any system redesign aiming to move Alberta's MSK health care system towards providing more patient-centered care. References: [1.] Bevan S. Economic impact of musculoskeletal disorders (MSDs) on work in Europe. Best Pract. Res.: Clin. Rheumatol. 2015;29:356–73. https://doi.org/10.1016/j.berh.2015.08.002. [2.] Urwin M, Symmons D, Allison T, Brammah T, Busby H, Roxby M, et al. Estimating the burden of musculoskeletal disorders in the community: The comparative prevalence of symptoms at different anatomical sites, and the relation to social deprivation. Ann Rheum Dis 1998;57:649–55. https://doi.org/10.1136/ard.57.11.649. [3.] MacKay C, Canizares M, Davis AM, Badley EM. Health care utilization for musculoskeletal disorders. Arthritis Care Res (Hoboken). 2010; 62:161–9.

88

Comparable Safety Among New Users of Biosimilar Versus Originator Anti-TNFs in Inflammatory Arthritis: Population-Based Evidence from a Natural Experiment Due to a Policy Change

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Objectives: British Columbia's (BC) health policy mandated that all new biologics initiations after 06/2017 use biosimilars when available, providing the context for a natural experiment. Our study objective was to compare infections and healthcare resource utilization (HRU), as surrogate markers of safety, after initiation of etanercept or infliximab for inflammatory arthritis in new users of biosimilars versus originators, using historical controls pre-policy change.
Methods: Using administrative health data, we identified all incident users of a new biologic (i.e., without prior prescriptions over 6 months) with rheumatoid arthritis (RA), psoriasis or psoriatic arthritis (Pso/PsA), or ankylosing spondylitis (AS) in BC. The biosimilar cohort includes incident users starting etanercept or infliximab between 07/01/2017 and 12/31/2019, followed until 12/31/2020 (post-policy period). Historical controls include all incident users

starting etanercept/infliximab originators between 01/01/2014 and 06/30/2016, followed until 06/30/2017 (pre-policy period). To control for temporal trends, we selected new users of adalimumab (no biosimilar available over those periods) as comparators. Outcomes included severe infections (hospitalization with infection diagnostic code in any position); mild infections (oral/IV antibiotics without hospitalization); number of: hospitalizations (any cause), hospital length of stay, physician, and emergency department visits. People were followed for ≤3 years from anti-tumor necrosis factor (anti-TNF) initiation until discontinuation, death, moving out-of-province, or follow-up end, whichever occurred first. Quasi Poisson Models estimated the adjusted rate ratio (aRR) of each outcome and propensity overlap weights controlled for potential confounders. To control for temporal trends, we employed the difference-in-difference (DID) method, comparing the aRRs for each outcome among new users of biosimilar versus originator etanercept/infliximab with new users of adalimumab post- versus pre-policy change, expressed as the ratio of the two aRRs. [Table1]

Results: Our sample includes 827 biosimilar etanercept users (RA:576, AS:171, Pso/PsA:80) and 271 infliximab users (RA:150, AS:54, Pso/PsA:67); 1312 etanercept and 230 infliximab originator users; and 2213 adalimumab originator users post- and 1773 pre-policy change. Outcome rates are reported. [Table1A] After adjusting for baseline covariates and accounting for temporal trends, [Table1B] there were no differences in infections or HRU except for a lower likelihood of mild infections observed in infliximab and etanercept biosimilar users (DID aRR(95%CI): 0.69(0.55,0.86) $p< 0.01$; and 0.88(0.77,1.01) $p= 0.061$, respectively); a lower likelihood of hospitalization in etanercept biosimilar users, and of family physician visits in infliximab biosimilar users.

Conclusion: Real-world population-based data showed that incident users of biosimilar etanercept and infliximab had similar rates of infections and HRU compared to originators, suggesting comparable safety for inflammatory arthritis. Supported by a CIORA grant.

89

Reducing Avoidable Care Use and Improving Care Experience: A Focus on Emergency Department Use by Persons With Inflammatory Arthritis

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Objectives: Emergency departments (ED) become a location for non-urgent care when ambulatory care systems are not sufficient. We aim to describe contributing factors to the decision taken by persons with inflammatory arthritis (IA) to present to the ED, their experiences of ED care, and propose enhancements to improve care navigation.

Methods: An invitation to complete an online survey was distributed by the health authority in October 2021 and March 2022 to a sample of individuals with an IA condition who had visited an ED within the previous year. Mixed methods research approaches were taken to summarize quantitative data and apply thematic analysis of free text responses to contextualize decision making and experiences of ED care, and generate system-level recommendations to reduce avoidable ED use.

Results: 82 persons (48% RA, 12% PsA, 6% SpA, 34% Gout; 63% aged 16-55 years; 48%

female; 50% urban residents) completed the survey. Over 1/3 (37%) of visits were for arthritis flare or other musculoskeletal symptoms, with other primary symptoms being chest pain (15%), injury (12%) and infection (11%). Attempts to access alternative care other than an ED were made by 36%, 29% of persons proceeded directly to the ED, and 32% made a return visit within 72 hours of initial ED use. For visits specific to arthritis flare 26% were asked to follow up with a rheumatologist on discharge, but 38% could not do so in the time frame suggested. Challenges in healthcare system coordination, system processes and pressures, and communication and relationality between IA patients and healthcare providers led to negative experiences of ED care. They experienced not having their disease knowledge acknowledged and their symptoms appropriately attributed to their arthritis condition or not. After an ED visit patients had remaining concerns about not having been assessed comprehensively, not having the cause of their symptoms being explained to them, being discharged too soon, and not having a symptom management plan in place. They were given the responsibility to coordinate multiple further assessments with different ambulatory providers and only a minority were aware of the ED provider contacting a rheumatologist on call for advice.
Conclusion: Recommendations to reduce avoidable ED use include improving access to rheumatology care for both initial visits and urgent concerns, introducing initiatives for improved ambulatory care coordination and service delivery, resourcing EDs at appropriate levels to provide quality care, and to enhance provider education about arthritis condition assessment and management.

90

Confidence in Covid-19 Vaccine Among At-Risk and Under-Vaccinated Groups: Migrants Living With Systemic Autoimmune Rheumatic Diseases

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Objectives: Living with a systemic autoimmune rheumatic disease (SARD) imposes innumerable challenges. Among people living with a SARD, migrants are particularly vulnerable as they more frequently face adverse realities including unstable housing, high rates of poverty, employment exposing them to COVID-19 acquisition, and challenges accessing medical care. These factors may account for suboptimal uptake of preventative measures such as vaccination. The attitudes toward COVID-19 vaccines and the approaches to enhance vaccine confidence in migrants with SARDs remain unexplored. The aim of this qualitative study was to explore enablers of COVID-19 vaccine confidence and reasons for vaccine hesitancy/refusal among migrants living with SARDs.
Methods: Adults with a diagnosis of SARDs attending the MUHC outpatient rheumatology clinics who self-identified as migrants (i.e. anyone born outside Canada), were invited to participate in structured interviews. Interviews, which were held between June and December 2022, were audio-recorded, transcribed verbatim, and imported to MAXQDA software. A thematic analysis was undertaken through an inductive/deductive approach using the determinants of vaccine hesitancy model proposed by the Strategic Advisory Group of Experts

on Immunization (SAGE) as categories and themes for data analysis.
Results: The sample included 14 English speaking migrants with SARDs living in Canada for 13.80±12.20 years (±SD). All participants were females of mean age 42.07±12.27 years, and four of them reported a physical disability. The interviews' content fit within three main categories of vaccine hesitancy determinants proposed by the SAGE framework, including contextual, individual and group influences, and vaccination-specific issues. Two themes present in the SAGE model were not identified in the data: 'covid-19 is not real', and 'getting vaccinated will help stop the spread of the SARS-CoV-2 virus among populations'. The main barriers to vaccine uptake were concerns associated with the fast development of the vaccines, fear of side effects, and the consideration that alternative protective measures (e.g., wearing mask, staying isolated, etc.) were sufficient. In contrast, the most frequently mentioned facilitators of vaccine uptake were the difficult experience of participants during the COVID-19 pandemic (e.g., lockdown, absence of social interactions, etc.) and general trust toward vaccination and vaccines (e.g., flu vaccine, hepatitis, etc.).
Conclusion: This preliminary analysis suggests that reasons for COVID-19 vaccine acceptance or refusal in long-term migrants living with SARDs map those present in the general population. Behavioral change interventions effective in the general population should aim to include long-term migrants with SARDs.

91

A Novel Tool to Document Vessel Wall Involvement in Patients With Large Vessel Vasculitis

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Objectives: Serial imaging is used to monitor disease progression and response to therapy in patients with large vessel vasculitis (LVV). However, interpreting radiology reports can be challenging and changes are not easily followed. The main objectives of this project were to 1) outline the current process at the Mount Sinai Vasculitis Clinic for interpreting LVV radiology reports, 2) understand the barriers to accurately tracking vessel involvement over time, and 3) develop a tool to improve documentation of vessel wall changes over time.
Methods: An exploratory analysis was conducted by surveying clinicians and trainees in the vasculitis clinic to understand the challenges of monitoring LVV using our current workflow. A fishbone cause and effect diagram was developed to identify areas for improvement in documenting vessel wall involvement. In response to gaps identified, we created a standardized labeled visual tool. Subsequent PDSA cycles were used to refine the tool and assess its implementation. A post-intervention survey was then disseminated to characterize the clinician's experience of the modified tool.
Results: Our survey identified several challenges associated with our current workflow of documenting vessel wall involvement, including lack of standardization in the radiology reports,

inconsistent interpretation by radiologists, lengthy reports, and clinician unfamiliarity with vascular anatomy. After consulting stakeholders, a standardized labeled visual tool was created to improve familiarity of vascular anatomy and ease of tracking vessel involvement longitudinally. After piloting the initial tool, successful uptake and implementation was observed in 7/11 charts reviewed. After obtaining verbal feedback from clinicians and trainees who used the tool, challenges such as inconsistency in labelling and small font were identified. In the next PDSA cycle, the tool was refined to address these issues. [Figure 1] A second random audit of five charts suggested that the tool demonstrated clarity, organization, comprehensibility, and accuracy as compared with original radiology reports. In our post-intervention survey, clinicians commented that the tool was easy to use, improved knowledge of vascular anatomy, and was even used to educate patients in certain instances.

Conclusion: Documenting vessel involvement in LVV over time is challenging due to lengthy non-standardized radiology reports and unfamiliarity with vessel anatomy. Through several PDSA cycles, a standardized labeled visual tool was created that improved clinician familiarity of vessel anatomy and eased tracking vessel involvement longitudinally. Future steps include further validating accuracy of the tool, improving uptake/dissemination, capturing end user and patient experiences, assessing effect on clinic efficiency, and exploring its role in patient education.

92

Identifying Heterogeneity in Temporal Artery Biopsy Positivity Criteria for The Diagnosis of Giant Cell Arteritis: An Umbrella Review

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Objectives: The frequency that information concerning processing and interpretation of temporal artery biopsies (TAB) in the literature is reported is unknown. This umbrella review sought to demonstrate this and how reporting practices may impact diagnoses of giant cell arteritis (GCA).

Methods: We performed an umbrella review of studies that diagnosed GCA that were found through three strategies: a systematic search of randomized controlled trials, a systematic search of systematic reviews on the diagnosis of GCA, and four systematic reviews highlighting TAB sensitivity. Studies included for analysis diagnosed GCA, included TAB in diagnostic assessments for GCA, and reported TAB positivity criteria.

Results: 426 publications were screened; of these 90 (25.4%) reported on preparation and/or interpretation of TABs and were included. Median TAB positivity was 30.5%, the overall prevalence of GCA was 28.5%. Reporting of procedures and criteria used to interpret TABs was heterogeneous. Where histopathological positivity criteria were listed, it was poorly defined and inconsistent between studies. The criteria most often used for determining TAB positivity were the presence of an inflammatory infiltrate granulomas, and/or giant cells. Pre-published criteria for TAB positivity were used in 30% of studies; the use of these criteria did not impact TAB yield compared to studies that did not use pre-published criteria.

Conclusion: Reporting of TAB positivity criteria was infrequent and of poor quality. There was no evidence if this impacted the rate of GCA diagnoses. Standardized reporting of TAB positivity criteria in the literature would improve the integrity of reporting.

93

Improving Biologic Start Times in a Rheumatology Clinic in Northern Ontario: A Quality

Improvement Study and Comparison to Southern Ontario

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Objectives: Living in rural and remote settings is associated with reduced access to biologic therapies for patients with systemic autoimmune rheumatic diseases, specifically the inflammatory arthritides. Starting biologics rapidly in inflammatory arthritis is critical to improving outcomes. However, there is limited data describing the barriers to accessing biologic therapy in this population. This study aimed to determine the time to start biologic therapy in a rheumatology clinic in Northern Ontario (Timmins - TADH), factors that influenced start times, and compared it to a Southern Ontario urban clinic (Toronto - WCH) to identify differences between these settings.

Methods: A retrospective chart review was conducted of TADH patients starting a biologic from January 2020-December 2022, to collect demographic information, time from physician decision to biologic start date, and the number of 'pre-biologic' workup steps needed. Mean and median start times were calculated and stratified by number of pre-biologic workup steps. The data was compared to a similar cohort at WCH.

Results: Twenty-eight patients were analyzed. Two-thirds were female, with an average age of 57, and 61% had rheumatoid arthritis. Median and mean start times were 56 and 70 days respectively. [Table 1] Median start times at WCH were 70.5 days (N= 27). Patients requiring one pre-biologic workup step had longer wait on average (87.4 days) compared to four or five steps (80.3 and 72.8 days respectively).

Conclusion: Patients in a northern rheumatology clinic wait on average for over two months to start a biologic therapy for inflammatory arthritis. This is much longer than recommended. The number of pre-biologic workup steps does not seem to impact wait-times, as patients requiring only one step waited longer. The reason is not currently clear but could be due to patient factors or less assistance from the patient support programs for shorter work-ups. Interestingly, despite the challenges in accessing healthcare in northern communities, biologic start times were shorter at TADH compared to WCH over the same time period. Differences in information flow and communication methods with patients and primary care providers may be the main reason. Phase 2 of this study will determine the reasons for biologic start delays at TADH and apply QI interventions to reduce biologic start times.

94

Prevalence of Frailty in Systemic Lupus Erythematosus: Systematic Review and Meta-Analysis

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Objectives: Frailty is a condition associated with increased vulnerability that affects one's physical, social, and psychological function. It is associated with adverse health outcomes. Systemic lupus erythematosus (SLE) has been linked with increased frailty among all age groups. The objectives of this review are to systematically review the literature on frailty, its definitions, and overall prevalence in patients with SLE.

Methods: We searched MEDLINE, EMBASE, CINAHL and Web of Science for articles before August 2023. Studies that assessed frailty by any definition in adults with SLE were included. Abstract, title and full texts were screened by two independent reviewers. Disagreements were settled by consensus. Data extraction was completed using an extraction form. Data analysis was done by narrative synthesis and meta-analysis of pooled prevalence using the Freeman-Tukey Transformation with a fixed effects model to address variation in study size. In studies where the same cohort was analyzed, the reported prevalence was only included once in the meta-analysis.
Results: 1190 articles were identified from the literature search. After removing duplicates, 768 studies were excluded in title and abstract screen, and 45 articles were excluded in full text review. A total of 15 studies met the eligibility criteria. [Figure 1] Four studies examined frailty using the Systemic Lupus International Collaborating Clinics Frailty Index cohort (including 16 countries). Seven studies were from the United States. The remaining four studies were separately from Greece, Canada, Mexico, and Peru. Frailty was defined using a single index in 11 studies (SLICC-FI in 10 studies, Fried phenotype (FP) in one study), Four studies used multiple frailty indices. SLICC & FP in one, Frailty algorithm and claims-based frailty indices (CFIs) in one, and two studies used both FP and the self-reported Fatigue, Resistance, Ambulation, Illnesses, and Loss of Weight (FRAIL) scale. Pooled prevalence of frailty in SLE using all definitions was 31.6%, (95% confidence interval (CI) 30.4% to 32.9%), 33.8% (95% CI 32.1% to 35.4%) using SLICC-FI, and 37.3% (95% CI 35.4% to 39.3%) using FP.
Conclusion: We found that regardless of the definition used, the prevalence of frailty is nearly one-third in patients with SLE. There is a high degree of heterogeneity between the measures of frailty between studies. Further meta-analyses on secondary clinical outcomes are being undertaken as the next steps of this study on direct SLE disease activity, damage accrual, disease duration, and prevalence of fractures within this population. References: [1.] Barker T. BMC Medical Research Methodology 2021;21:1. Gao R. Joint Bone Spine 2022;89:4. Katz P. Lupus Science & Medicin 2017;4:1.

95

A Case Report of Thymoma in a Patient With Well Controlled Systemic Lupus Erythematosus for 8 Years

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Background: The thymus is a lymphoid organ that carries out positive and negative selection of T-cells, facilitates T-cell maturation and is essential for the establishment of central tolerance. Thymomas are tumors originating from tumor epithelial cells and are known to coexist with autoimmune disease. There is a growing body of case reports and case series outlining the coexistence of CTD, MCTD and SLE with thymoma. The exact association between thymoma and SLE is unclear.
Case: A 35-year-old, otherwise healthy female from China was diagnosed with connective tissue disease manifesting with alopecia areata, keratoconjunctivitis, pruritic and blistering and scarring rash on her chest, abdomen, and bilateral extremities. Her serologic profile consisted of (ANA 1:320 homogenous pattern, elevated Anti-dsDNA, hypocomplementemia and lymphopenia; ENA 1:2560, high positive anti-Chromatin antibody). She was initially managed with 9 months of prednisone prior to moving to Canada where she was diagnosed with SLE and established on hydroxychloroquine with varying doses over a 4 year period. She struggled with fertility and underwent IVF with ovarian stimulation a total of 4 times prior to having a successful, uncomplicated pregnancy. She was tapered to a very low dose of hydroxychloroquine, but

developed recurrent inflammatory arthritis and tenosynovitis and subsequently started methotrexate 15mg po weekly and hydroxychloroquine was increased to 200mg po daily. She for 1 year prior to developing weight loss, and chest discomfort with swallowing. A CT scan showed a mass in the anterior mediastinum. This was excised without any complications and full pathology report indicated a Type AB thymoma, pT1aN0 (TNM) modified Masaoka Stage 1. Post thymectomy she developed stiffness requiring an increase in Methotrexate and hydroxychloroquine dosing. Her disease activity stabilized, and she did not have any flares for 6 months. However, she started to have frequent viral illnesses.

Conclusion: Thymomas are known to be related to autoimmune disease, but their presentation with SLE is rare and the association is unclear. SLE has been proposed as a paraneoplastic manifestation of thymoma in contrast to thymoma being suggested as a manifestation of SLE, as in our case, where thymoma presented years after established and well controlled SLE. Furthermore, thymectomy has been associated with precipitation, exacerbation and remission of SLE. More evidence is needed to determine the association between thymoma and SLE.

96

Quinacrine in Systemic Lupus Erythematosus: An International and Canadian Survey of Availability, Effectiveness, and Safety

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Objectives: Antimalarials, particularly hydroxychloroquine (HCQ) are cornerstone systemic lupus erythematosus (SLE) treatment, but response to HCQ may be incomplete or limited by adverse events like retinal toxicity, skin discoloration and uncommonly cardiac toxicity. Quinacrine is an appealing adjunct or alternative for HCQ or chloroquine, though extensive safety, and effectiveness data in SLE are lacking. We solicited SLE experts' experience with quinacrine, including prescribing, availability, effectiveness, and adverse effects.

Methods: We conducted an electronic survey among Systemic Lupus International Collaborating Clinics (SLICC) and Canadian Network for Improved Outcomes in Systemic Lupus Erythematosus (CaNIOS) clinical researchers from April 25th to August 14th, 2023. Respondents provided their practice country, regional quinacrine availability, and situations warranting quinacrine prescription. For those with past quinacrine experience in SLE, we inquired about reasons for prescribing, discontinuation, and outcomes using a combination of multiple-choice and free-text questions.

Results: Forty of 102 SLICC and CaNIOS members and affiliates responded, with an average practice duration of 25.6 years (standard deviation, SD 11.8). Quinacrine was currently available to 6/25 (24%) North Americans and 4/10 (40%) Europeans, but it was unavailable in Singapore, Turkey, South Korea, and Peru. While 17 (43%) had previously prescribed quinacrine, only 7

(18%) had done so in the last 5 years. Among the 17 quinacrine-prescribers, 15 (88%) had used it for < 20 patients in their career, and 9 (53%) for ≤5 patients. Twelve (71%) had prescribed it following retinal toxicity and/or intolerance to other antimalarials, and 12(71%) had combined it with hydroxychloroquine due to incomplete cutaneous lupus response. Twelve (71%) reported at least one patient benefiting clinically from quinacrine, especially for cutaneous manifestations. All respondents reported instances where their patients had to stop quinacrine, including ineffectiveness (n= 10, 59%), adverse effects (n= 10, 59%), or unavailability (n= 9, 53%). Notably, 35% cited yellow skin discoloration as a reason for discontinuation, while 18% mentioned retinopathy as a cause, although the survey did not confirm a direct link between quinacrine and retinopathy. If available, most survey participants (90%) would consider prescribing quinacrine for refractory cutaneous lupus, while 30 (75%) would prescribe it in cases of intolerance or retinal toxicity from other antimalarials.
Conclusion: In this survey of SLE experts, less than half had previously used quinacrine, either alongside or as an alternative for other antimalarials. Currently, limited access hinders its use. To better understand quinacrine's role in SLE, concerted efforts are required to enhance drug accessibility and prioritize long-term observational studies.

97

Worse Lupus Nephritis Outcomes in Indigenous and Asian Patients Are Not Explained by Delays or Lack of Renal Biopsy

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Objectives: We and others have previously demonstrated more frequent lupus nephritis (LN) and worse renal outcomes in non-white ethnicities. We previously showed no difference in renal biopsy frequency or LN class between ethnic groups. In this analysis we examined the temporal relationship between first renal abnormality attributable to SLE and renal biopsy, and the rate of progression to kidney failure by ethnicity.
Methods: In this single-centre retrospective cohort study, demographic and clinical variables for all SLE patients seen since 2002 were extracted from medical records and a research database. Renal biopsy data were acquired from medical records and the Manitoba Glomerular Diseases Registry, including all local biopsies since 2002. Ethnicity was by self-report. Chi square, t-tests, one-way ANOVA, and logistic regression were used for analysis.
Results: 573 patients were included: 88% female, 46% White, 31% Indigenous, 19% Asian, and 4% Other. Renal involvement (meeting 1997 revised ACR criteria) was seen in 226 patients (39%); 143/226 (63%) had undergone renal biopsy. Proportion of SLE patients with LN: White 26%, Asian 57%, Indigenous 50%, and Other 52%. LN patients were significantly younger at disease onset (LN= 32±15yrs, no LN= 40±16yrs; p= < 0.001). There were no differences between ethnic groups in proportion of LN patients undergoing biopsy, ISN/RSP biopsy class, or reasons for lack of a renal biopsy. Reasons for no biopsy varied; most common was clinically mild nephritis. There were no differences in time from first documented renal abnormality to renal biopsy or clinical LN diagnosis between ethnic groups (Data not shown). 17% of all

patients progressed to kidney failure; 7% (6/83) of those never biopsied, compared to 22% of biopsied patients (32/143) ($p< 0.001$). Renal Outcomes are shown. [Figure 1] OR for kidney failure (adjusted for onset age, disease duration and sex) was 2.7 (95%CI 0.9-8.3) for Asian patients, 3.3 (95% CI 1.2-9.4) for Indigenous patients compared to white patients. Mean/median time to kidney failure was 6.7/6.1 years with no differences between ethnic groups.
Conclusion: We showed that Indigenous and Asian patients with LN had roughly threefold odds of renal failure. This difference is not explained by differences in choice to biopsy, biopsy delay, or delay in clinical LN diagnosis between ethnic groups. Patients with clinical LN without biopsy tended to maintain normal renal function, supporting milder disease in this group. Future studies should examine treatment patterns, adherence and loss to follow-up, and the impact of socioeconomic factors and distance from care on LN outcomes.

98

Systemic Lupus Erythematosus and Cervical Cancer Screening Frequency: Are We Up to Par?

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Objectives: Females with systemic lupus erythematosus (SLE) are at increased risk for cervical cancer, due to both SLE and immunosuppressive treatments. [1] Recommended screening practices in SLE reflect this increased risk, with screening onset the first of age 21 or 1 year after sexual activity, with annual screening thereafter. Single-center reviews, predominantly in American centers identified the actual mean screening interval ranges from 27-80 months. [2] Only 38% underwent screening at recommended intervals, 16% at intervals appropriate for the general population, and 46% were overdue for screening. [1] It appears screening rates are declining [2] which is worrisome given the potential morbidity and mortality associated with failure to identify precancerous lesions. Saskatchewan has additional barriers to accessing care, such as geographic distribution. We aimed to determine the rate of cervical cancer screening in SLE patients at our clinic.
Methods: A retrospective chart review of one clinic was performed. Females ages 21 to 69 were included provided they had a documented diagnosis of SLE and at least one visit with a rheumatologist between 2012 and December 31, 2021. A similar number of females with other connective tissue disease were included. Exclusion criteria included a history of hysterectomy. Manual review aimed to gather variables to identify whether females with SLE met guideline-directed screening intervals, and whether factors such as rural or urban home location or age affected screening intervals.
Results: 104 patients with SLE and 90 patients with another connective tissue disease were included. Mean age was 44.6 (SD 13.3). Of the SLE patients, 59.6% (62/104) underwent cervical cancer screening of any frequency during the study period. In the total population, 59.3% (115/194) underwent cervical cancer screening at least once. Of patients with SLE, 4.8% (5/104) underwent annual screening, 22.1% (23/104) had a screening interval greater than 3 years. The overall mean number of cervical cancer screens was 1.24 (SD 1.45) per patient during the study period and mean screening interval for SLE patients was 41 months. There was no effect of rural setting, year of diagnosis, age, or diagnosis on the average interval between cervical cancer screens.
Conclusion: Nearly 1 in 4 SLE patients in our center are not meeting cervical cancer screening intervals appropriate for the general population. Geography and limited numbers of physicians likely contribute to low screening rates. Our mean screening interval is similar to that reported

elsewhere. The home cervical cancer screening test kit may be one way to improve screening.
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99

N-Terminal Pro-Brain Natriuretic Peptide and Adverse Pregnancy Outcomes in Women With Systemic Lupus Erythematous: A Pilot Cross-Sectional Study

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Objectives: Cardiovascular disease (CVD) is the leading cause of death in SLE women. However, traditional risk factors fail to explain the premature CVD observed in young SLE women. Limited evidence suggest that a history of adverse pregnancy outcomes (APO) increases CVD risk in SLE women. N-Terminal pro-Brain Natriuretic Peptide (NT-proBNP) is a key biomarker for cardiovascular events and death. Although increased concentrations of NT-proBNP have been reported in SLE, to date no study has examined its association with APO in SLE. We assessed NT-proBNP in a cross-sectional sample of SLE women prospectively followed for pregnancy and investigated associations with APO.

Methods: Serum NT-proBNP was measured in SLE patients enrolled in the McGill Lupus Cohort, between 03/22-04/23 at annual visits. The "Lupus in prEGnAnCY (LEGACY)" cohort is a prospective cohort enrolling unselected SLE pregnancies < 17 gestational weeks at 7 Systemic Lupus International Collaborating Clinics, including McGill. The present study included LEGACY participants concomitantly followed in the McGill Lupus Cohort. We determined APO (occurring prior to NT-proBNP measurement and defined as ≥3 fetal losses < 10 weeks, ≥1 fetal loss ≥10 weeks, and/or preeclampsia/eclampsia) through the LEGACY detailed case report form. Factors associated with APO and NT-proBNP were evaluated.

Results: We identified 20 SLE patients [median age 36, interquartile range (IQR) 33-40 years] with NT-proBNP measured within a median of 2.1 (IQR 1.2-2.7) years from baseline pregnancy visit. [Table 1] Overall, 10/20 (50%) women experienced an APO, including 4/20 (20%) ≥3 fetal losses < 10 weeks, 4/20 (20%) ≥1 fetal loss ≥10 weeks, and 6/20 (30%) preeclampsia/eclampsia. Although results failed to reach statistical significance, there was a trend for increased mean and median NT-proBNP in SLE women with prior APO [respectively 120 pg/mL (96%CI 35, 204) and 70 (IQR 52-221)] versus those without prior APO [mean 71 pg/mL (95%CI 36, 106); median 56 pg/mL (IQR 33-114)]. In multivariate analysis controlling

for aPL, NT-proBNP in the highest quartile (> 118 pg/mL) were associated with APO (OR 2.5; 95%CI 0.2, 28.0), although the CI was wide and included the null value. Unsurprisingly, aPL were also strongly associated with APO (OR 10.5; 95% CI 1.2, 9.8).
Conclusion: Our preliminary results suggest that NT-proBNP might be higher in childbearing-age SLE women with prior APO compared to those without. Our novel research offers some insights on the association between APO and CVD in SLE, highlighting the need to explore NT-proBNP as an early predictor of CVD in SLE females of reproductive age. Supported by a CIORA grant.

100

Biosimilars of Rituximab in ANCA-Associated Vasculitis Compared to The Originator (Bravo): Baseline Characteristics of a Canadian Multicentre Study

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Objectives: Rituximab (RTX) is a first-line induction and maintenance treatment in granulomatosis with polyangiitis (GPA) and microscopic polyangiitis (MPA), the two most common forms of ANCA-associated vasculitis (AAV). Starting in 2020, reimbursement for RTX across Canada became increasingly restricted to biosimilars (including mandatory switching for prevalent users), despite little to no data on their comparative safety and effectiveness to the originator in AAV. We report baseline characteristics of a Canadian multi-centre AAV cohort starting RTX originator or biosimilars for induction or maintenance between 2018-2023.
Methods: We included adults with GPA or MPA who started RTX originator or biosimilar induction or maintenance 1) in the 6 months prior to enrollment, or 2) after January 2018 if followed within an existing vasculitis cohort. We also recruited patients who switched from originator to biosimilar RTX in the prior 6 months. Demographic and disease characteristics at Month 0 (time of starting RTX induction, maintenance, or switching) included disease activity, damage, prior RTX or cyclophosphamide use, and current vasculitis medications. We examined differences between originator and biosimilar subgroups at Month 0 using the 95% confidence interval (CI) for the difference in mean or proportion.
Results: We recruited 201 participants from 9 centres: 127 induction (52 originators; 75 biosimilar), 57 maintenance (23 originator, 35 biosimilar), and 17 switching from originator to biosimilar maintenance. [Table 1] Mean age was 57.2 (SD 17.4), 52% were female, and 79%

were White. The majority had GPA (69%) and were PR3-ANCA+ (64%). Vasculitis manifestations at last flare included ear/nose/throat (54%), pulmonary (58%), renal (53%), and musculoskeletal (39%). The originator induction group was younger compared to the biosimilar induction group (mean age 50.3 vs 59.8, difference 9.5 [95%CI 3-16]). The originator maintenance group had longer disease duration compared to the biosimilar maintenance group (mean 7.7 vs 2.4 years, difference 5.3 [95% CI 1.5-9.1]), and a greater proportion had PR3-ANCA (87% vs 56%, difference 31% [95%CI 7-50%]), had suffered a prior relapse (57% vs 12%, difference 45% [95%CI 20-64%]) and had previously received RTX induction (57% vs 26%, difference 30% [95%CI, 4-51%]).
Conclusion: This multi-centre cohort will evaluate real-world outcomes following treatment with RTX originator and biosimilars for AAV. Differences in baseline characteristics between RTX originator and biosimilar recipients (i.e., the latter group having older age when starting RTX induction, and less relapsing disease/shorter disease duration when starting RTX maintenance) might suggest less restricted access to RTX for AAV coinciding with the availability of biosimilars. Supported by a CIORA grant.

101

Work Disability in Patients With Systemic Lupus Erythematosus: A Pan-Canadian Qualitative Study

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Objectives: Work participation and disability have meaningful influences on mental wellbeing,

health-related quality of life, and disease-related outcomes in individuals with systemic lupus erythematosus (SLE). Previous studies estimate that 20-50% of SLE patients experience some form of work disability (WD). The objective of this study was to identify psychosocial and workplace factors associated with WD to create an SLE-related functional profile that is grounded in a WD prevention framework.
Methods: SLE patients (n= 41) were purposively recruited from multiple medical centres across Canada representing four provinces. Using a WD prevention framework, semi-structured interviews were conducted to qualitatively identify factors associated with WD and explore lived experiences of SLE-related WD across their employment history. The work disability prevention framework recognizes that disability in the workplace is not only due to the workers' characteristics, but also due to environmental factors. The framework indicates that personal, workplace, healthcare, and compensation systems are influential to a worker's health and wellbeing. Interview data was transcribed verbatim. Thematic analysis was utilized to inductively and deductively organize the data into underlying concepts and relevant themes.
Results: Three themes [Figure 1] emerged from the data: a) the illness experience and its impact on work, b) stigmatization of illness disclosure, c) availability of workplace resources and accommodations. Fatigue, physical limitations, and impaired mental health were frequently reported as barriers to work function. Participants reported that participation in work with reduced physical and mental demands, and increased personal control and workplace flexibility were more desirable and subjectively prevented WD.
Conclusion: WD in SLE necessitates the recognition of the complexity, multidimensionality, and temporal dimensions of SLE and its relationship to work. This study provides evidence that a collaborative, multidisciplinary intervention including the patient, the healthcare worker and their workplace is needed to effectively mitigate influential psychosocial and workplace factors to establish a goal-oriented preventative framework could improve WD outcomes in individuals with SLE. Supported by a CIORA grant.

102

Neurologic Symptoms Associated With Localized Scleroderma En Coup De Sabre - A Case Study

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Background: En coup de sabre (ECDS) is a rare variant of localized scleroderma affecting the head which has been associated with a variety of neurologic symptoms including seizures, focal neurologic deficit and movement disorders. Little is known about the disease course in ECDS given the scarce number of reported cases. Moreover, in cases that have been published, few have histopathologic correlation on brain biopsy. In our case study, we describe two patients in our practice with a known history of localized scleroderma ECDS who developed worsening neurologic symptoms after deepening of their preexisting skin lesions with evidence of inflammatory pathology on brain biopsy.
Case: We report on two patients in our practice with neurologic symptoms associated with ECDS. Our first patient was initially diagnosed with localized scleroderma ECDS at age 46. Concurrently, neuroimaging showed multifocal right frontal and temporal brain lesions in the context of neurologic symptoms of vertigo and headache. A brain biopsy was initially deferred due to patient preference and the patient was maintained on hydroxychloroquine with regular surveillance of his brain lesions. At age 50, he developed deepening of his skin lesions followed by new generalized tonic-clonic seizures and behavioral changes. MRI brain revealed worsening

of his brain lesions and ultimately brain biopsy confirmed focal perivascular lymphocytic reaction consistent with immune-mediated vasculitis. He was treated with pulse steroids and cyclophosphamide with improvement in his symptoms. Our second patient was diagnosed with localized scleroderma ECDS at the age of 12 which was treated with D-penicillamine. He re-presented to care at age 34 with progression of his skin lesions and new indentation of the occipital bone in conjunction with new neurologic symptoms of ataxia, cranial nerve IV palsy, and cognitive decline, all of which were progressive. MRI brain revealed multiple diffuse brain lesions, the largest of which was in the left temporal lobe. Brain biopsy was pursued given diagnostic uncertainty which confirmed increased perivascular foci of reactive T-lymphocytes consistent with a lymphocytic inflammatory process. He was treated with pulse steroids and mycophenolate with stabilization of his symptoms and brain lesions on imaging.
Conclusion: Neurologic symptoms associated with localized scleroderma are a rare but well documented association. In our centre's experiences, deepening of skin lesions closely preceded the onset of worsening neurologic symptoms and brain lesions were multifocal rather than localized. Our case series also supports the growing body of case reports documenting inflammatory processes on brain biopsy which can be treated with immunosuppressive medication with improvement of symptoms. References: [1.] Herbert J. Neurology 2008;71 (19):1538-1545 [2.] Appenzeller S. Autoimmune Dis. 2012; 2012: 719685

103

Multifocal Strokes in a Patient With Suspected CNS Vasculitis: A Case

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Background: Varicella zoster virus (VZV) is responsible for causing varicella, later entering a dormant phase before reactivating as herpes zoster. This can lead to central nervous system (CNS) disorders. We present a case of query CNS vasculitis and results of a focused literature review. The objective is to describe a case of multifocal stroke in a young woman and review the differential for CNS vasculitis.

Case: A 45-year-old female patient was diagnosed with pemphigus vulgaris in February 2023, treated with 50 mg prednisone daily with taper, CellCept 1 g BID, and monthly IVIG. In July 2023, she developed blurred vision and headaches. One month later, she developed left leg weakness and a transient episode of slurred speech. She presented to the ED in September 2023, and on exam had right side inferior quadrantanopia, and left upper and lower extremity drift. CT head showed infarcts in the L occipital, temporal, and R thalamic territories, and CT angiogram showed multiple severe vascular stenoses in anterior and posterior circulation. Rheumatology was consulted for suspected CNS vasculitis. On history, there were no features of systemic rheumatic disease, but a transient vesicular rash with L arm neuropathic pain occurred 4 months earlier, 2 days after an IVIG infusion, which was presumed to be a drug reaction. Cerebrospinal fluid (CSF) revealed 37 white blood cells (95% lymphocytes) with normal protein and glucose. Pulse solumedrol 1 g IV daily x 5 was initiated. Extensive autoimmune serology (ANA, ENA, anti-dsDNA, C3, C4, ANCA, cryoglobulins, RF, hepatitis B, C, HIV) was negative and ESR and CRP were normal. Lupus anticoagulant was positive. CT-angiography of chest, abdomen and pelvis revealed a small incidental pulmonary embolism. Anticoagulation was initiated. Three days later, CSF viral panel returned positive for varicella zoster virus (VZV) nucleic acid test. IV acyclovir was initiated, glucocorticoids were discontinued after 5 days, and a 3-month course of antiviral therapy was planned.

Intracerebral VZV vasculopathy mimics primary CNS vasculitis and typically presents with

stroke, headache, and other focal neurological deficits. There is an average delay of four months between vesicular rash and onset of CNS symptoms. Diagnosis is based on presence of CSF VZV DNA or anti-VZV IgG antibody. VZV infection can also be associated with a transient hypercoagulable state with antiphospholipid antibodies.
Conclusion: We report a 45-year-old female with multifocal stroke due to intracerebral VZV vasculopathy. Due to the delay between onset of typical vesicular rash and CNS manifestations, it is important to maintain a high index of suspicion for this diagnosis. This case illustrates the importance of CSF studies in the diagnosis of CNS vasculitis and its mimics. References: [1.] Nagel M. Current Opinion 2020;33;273-278

104

Anti-MDA-5 Positive Immune Mediated Necrotizing Myopathy Complicated by Rapidly Progressive Interstitial Lung Disease and Ischemic Stroke

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Background: Anti-melanoma differentiation-associated gene 5 (MDA5) positivity in the setting of dermatomyositis is associated with a clinically amyopathic phenotype with cutaneous involvement complicated by a severe and rapidly progressive interstitial lung disease which can be refractory to multiple lines of immunosuppression.1 Conversely, immune mediated necrotizing myopathy (IMNM), like dermatomyositis, is an idiopathic inflammatory myopathy. Pathologically the disorder is associated with myonecrosis with relatively minor infiltration by inflammatory cells. IMNM is typically associated with anti-signal recognition particle (anti-SRP) and anti-3-hydroxy-4-methylglutaryl coenzyme A reductase (anti-HMGCR) antibodies, and rarely other myositis-specific and myositis-associated antibodies.2 Herein, we report what is to our knowledge the first case description of anti-MDA-5 positive IMNM complicated by a rapidly progressive interstitial lung disease.
Case: A 72-year-old man presented April 2023 with proximal muscle weakness, elevated creatine kinase (31,510), and acute renal failure (Cr= 1,200). He had no evidence of cutaneous features of dermatomyositis. A chest x-ray completed in March 2023 was normal, whereas a chest x-ray in April 2023 showed minor fibrotic changes at the lung bases. CT chest imaging was not obtained. An MRI of the right shoulder was consistent with myositis. A myositis antibody panel was positive for anti-MDA5 antibodies. ANA, ENA panel, ANCA, anti-dsDNA antibodies, anti-CCP antibodies, and RF were negative. A thigh muscle biopsy showed necrotic fibres, myopaghia, and a paucity of round cell infiltration in keeping with IMNM. He was initiated on high dose oral prednisone however he returned in July 2023 with progressive cough and shortness of breath. His respiratory status declined rapidly and a CT chest demonstrated profuse ground glass opacities consistent with nonspecific interstitial pneumonia (NSIP).
In light of the positive anti-MDA5 antibodies on a background of an idiopathic inflammatory myopathy complicated by NSIP, the patient was treated with aggressive immunosuppression including intravenous solumedrol (1g daily), intravenous cyclophosphamide and oral tacrolimus. Initially the patient’s respiratory status improved but 48h into his admission he developed symptoms of left sided hemiparesis and was diagnosed with a right MCA stroke. Subsequent to the stroke his clinical status deteriorated and in discussion with the family he transitioned to comfort care and expired shortly thereafter.
Conclusion: This case demonstrates a rare but potential overlap of IMNM with anti-MDA5 antibodies and RP-ILD, as well as the need for aggressive immunosuppression in this setting. References: [1.] Selva-O’Callaghan A, Romero-Bueno F, Trallero-Araguas E, et al. Curr Treat

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105

A Case of Overlap Polymyositis and Sjogren's With Associated Lymphocytic Myopericarditis

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Background: Myocarditis is a common and potentially fatal manifestation of idiopathic inflammatory myopathies (IIM); however, pericardial involvement is considered rare. Here, we describe a case of polymyositis and Sjogren's with lymphocytic myopericarditis.

Case: We present a 64-year-old female with two-year history of weight loss and weakness, who developed congestive heart failure and hepatopathy. She was found to have severe tricuspid regurgitation and underwent tricuspid valve repair. Shortly after, she represented to hospital with worsening dyspnea & hypoxemia, and was found to have febrile neutropenia and lymphocytic transudative pleural effusions. She endorsed a two-year history of muscle wasting and sicca symptoms and was frail and cachectic on examination. Investigations revealed a high ANA titer (> 1:640), a high positive anti-Ro-52 (125.0 signal intensity [SI]) and a medium positive anti-PL-7 (19.0 SI) on myositis panel, as well as high positive anti-SSA/SSB antibodies on ENA. She had normal C3 and C4, a mildly elevated CRP (17.6 mg/L) and low CK (17 U/L). Over the course of her admission, she developed worsening biventricular failure and her left ventricular ejection fraction fell to 15-20% from 48% the month prior. Cardiac MR showed severely reduced global systolic function, diffuse non-ischemic fibrosis and late gadolinium enhancement concerning for myocarditis. Cardiac biopsy confirmed active lymphocytic inflammation with predominant CD3+ T cells on a background of chronic fibrosis. MRI demonstrated edema of the quadriceps suspicious for active myositis. She was treated with pulse methylprednisolone (500 mg IV daily x 4 days) but developed progressive renal decline and pulmonary edema presumed secondary to cardiorenal syndrome requiring CICU admission. Recognizing the risk of further volume overload from IVIG, she was treated with 1 g/kg for 2 days in addition to intensive diuresis and milrinone; however, the patient and her family chose to proceed with palliative care when it was felt there was a limited chance of cardiac recovery. The patient's family consented to focused autopsy of heart and skeletal muscle which showed the pericardium was densely adherent to the epicardium and mottling of the myocardium, a macroscopic pattern associated with myocarditis. Histology is pending.

Conclusion: This case demonstrates an example of myopericarditis secondary to overlap polymyositis and Sjogren's. Previous case series have suggested an association of pericarditis in IIM patients with anti-PL-7, including patients who co-expressed Ro-521. This case highlights the fact that in addition to myocardial involvement, pericardial involvement should also be considered in IIM and may contribute to cardiac dysfunction. References: [1.] Labirua-Iturburu, A., et al. Medicine (Baltimore) 2012; 91(4): 206- 211.

106

Advancing The Discovery of Rheumatoid Arthritis Biomarkers Via Serum Proteomic Analysis Employing Dia Mass Spectrometry.

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Objectives: Many Diseases Modifying Anti-Rheumatic Drugs (DMARDs) are approved for the treatment of Rheumatoid Arthritis (RA) with the aim to control inflammation and limit disease progression. However, 40% of patients respond poorly or not at all to their first DMARD, resulting in uncontrolled joint inflammation which can lead to bone loss and irreversible joint damage. Hence, identifying patients at risk of therapy non-responsiveness or developing bone erosion remains a current challenge in the management of RA patients. We conducted a proteomic analysis of the blood of RA patients collected prior and after treatment initiation. We intend to identify novel RA biomarkers capable of predicting therapy response and/or bone erosion susceptibility.
Methods: Serum samples from RA patients enrolled in the EUPA cohort (NCT00512239) were obtained through the Banque de Pathologies et Perturbations Immunes et Inflammatoires (BPPII) biobank from the Rheumatology Clinic of the CIUSSS de l'Estrie-CHUS, Canada. The serum proteome was analyzed by data-independent acquisition (DIA) mass spectrometry (MS) from blood collected at baseline and at the 12months follow-up. Samples were prepared for MS as follows: 50µg of serum proteins were lysed, reduced, alkylated and digested into peptides with trypsin. The peptides were then cleaned on Zip-Tip columns prior to analysis on a TimsTOF Pro mass spectrometer coupled to an HPLC at the University of Sherbrooke Proteomic Core. MS data were analyzed using DIA-NN software (Demichev V. et al. Nature Methods 2020) and R (www.R-project.org/).
Results: The serum proteome has been analyzed for 111 patients from our cohort, comprising 58 seropositive and 53 seronegative RA cases. Patients were categorized into 49 erosive and 61 non-erosive cases based on a Sharp erosion score > 2 at 12-30months follow-up. 1- As expected, we detected higher serum levels of CRP, SAA1, and SAA2 in patients with active disease (DAS28CRP≥3.2) compared to those in remission (DAS28CRP≤2.6) at 12months. 2-Principal component analysis and hierarchical clustering of our data indicate that RA patients could be grouped into three clusters. 3-Generalized estimating equations models were performed to identify proteins associated with disease activity ($n= 23$ $p< 0.05$) or erosion ($n= 39$ $p< 0.05$) outcomes.
Conclusion: The present study utilised contemporary DIA mass spectrometry techniques to improve the detection of low abundance proteins in serum samples obtained from RA patients. A set of potential protein candidates that could potentially be linked to the progression or erosion of RA has been identified. Additional validation studies are necessary to assess the potential of these biomarkers as indicators of outcomes.

107

Cannabis Use Among People With Arthritis: Evaluating Disease and Psychosocial Factors Associated With Being a Cannabis User

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Objectives: Both animal studies, and anecdotal reports suggest that cannabis can reduce pain, stress, and anxiety, and improve sleep in some people living with arthritis. We previously

reported that Canadian adults with arthritis who used cannabis regularly also reported worse arthritis severity and arthritis symptoms (pain, fatigue) compared with people who were not regular users. This study extends these findings by evaluating associations between known arthritis flare triggers (stress, poor sleep, anxiety, and depression) and regular cannabis use.
Methods: Data came from an online survey of health-seeking behaviors in Canadians with osteo- and inflammatory arthritis. Participants were recruited through patient arthritis organizations (Arthritis Consumer Experts, Arthritis Research Canada, etc.) and social media ads. Measures included the ISI (sleep quality), the Perceived Stress Scale, GAD-2 (anxiety), PHQ-2 (depression), and VAS (0-10) ratings of pain, fatigue, perceived arthritis activity/severity and overall health. Regular cannabis use was defined as using at least once/month for the past 3 months. Logistic regression was used to evaluate the independent effects of stress, poor sleep, low mood, and arthritis symptoms (pain, fatigue) on regular cannabis use after controlling for age, education, general health, arthritis type and severity.
Results: The 264 participants in the study were mostly female (85%) with a mean (SD) age of 61 years (13); 72 (27%) reported regular cannabis use. Regular users did not differ from those not reporting regular use by age, education, health perceptions, arthritis type or perceived arthritis activity/severity; however, men had twice the odds of reporting regular cannabis use. [Table 1] Worse arthritis symptoms (pain, fatigue), mood, higher stress or poorer sleep quality were not associated with regular cannabis use.
Conclusion: In this cross-sectional study of Canadians with arthritis, more than 1 in 4 reported regular cannabis use; men were more than twice likely to report regular cannabis use. Arthritis type, arthritis symptoms, and known flare triggers (mood, stress, and poor sleep) also did not independently predict regular cannabis use. Further research is needed to better understand predictors and patterns of use among people with arthritis.