POD01

Bridging the Gap between Symptom Onset and Diagnosis in Axial Spondyloarthritis

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Objectives: Symptoms of inflammatory back pain can be difficult to differentiate from mechanical back pain (MBP) amongst primary care providers (PCP), causing delay in diagnosis of axial spondyloarthritis (axSpA). The purpose of this study was to evaluate a stratified screening process for the early identification of axSpA. Within the context of this process, our objectives were to: 1) measure time to diagnosis by rheumatologist; 2) measure referral wait times from PCP to rheumatology screening; 3) determine the incremental precision and accuracy of a stratified screening process from primary to rheumatology care.

Methods: Adults (≥ 18 years old) with low back pain attended their PCP or a dedicated interprofessional back pain model of care (www.isaec.org) and underwent primary screening, consisting of a standardized clinical assessment. At the primary care level, patients with back pain > 3 months duration; onset age <50 years and at least one feature of inflammatory back pain, were referred for a secondary screen by a physiotherapist with advanced rheumatology training. The probability of axSpA (vs MBP) was determined at each screening level and defined as low, medium, or high. Precision and accuracy of primary and secondary screens were measured against the clinical judgement of a rheumatologist with axSpA expertise. The utility of HLA-B27 was assessed as an independent screen of axSpA. Sensitivity, specificity and predictive values were calculated.

Results: 410 patients underwent primary and secondary screening over a 3-year study period. Mean age was 36.9 years (±9.8); 55% were female; average back pain duration was 7 years (±7.2). HLA-B27 was present in 14.4% of patients. Average time from back pain onset to diagnosis for patients with medium or high risk of axSpA (as determined by rheumatologist) was 6.0 years (±6.3). Median wait time from primary to secondary screen was 22 days. AxSpA risk assignment by rheumatologist was 63.6% (MBP or low risk axSpA) and 36.4% (medium or high risk axSpA), with 18.0% of all patients receiving a final diagnosis of axSpA. HLA-B27 performed poorly as an independent screen with low sensitivity (28%). The best combination of sensitivity (68%), specificity (90%), positive predictive value (80%) and negative predictive value (84%) was evident with the secondary screen.

Conclusion: The inclusion of a secondary screening process utilizing a stratified interprofessional model can shorten time to diagnosis, with high precision and accuracy in patients with axSpA. The results of this study provide a platform to close the gap between onset of back pain and diagnosis.

POD02

Presence of Microparticle Containing Immune Complexes in Asymptomatic ANA+ Individuals Despite the Absence of Inflammation

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Objectives: Currently, little is known about what distinguishes asymptomatic Anti-Nuclear Antibody (ANA) positive individuals who will progress to Systemic Autoimmune Rheumatic Disease (SARD) from those who will not.Preliminary data from our laboratory indicates that pro-inflammatory cytokines are increased in SARD but not in ANA+ individuals with no (ANA+ NS) or insufficient classification criteria for a SARD diagnosis (UCTD). This finding suggests that the development of SARD is characterized by a change in the ability of the autoimmune response to elicit inflammation. Previous studies have found increased levels of Microparticles (MPs) complexed with IgG (MP-ICs) in Systemic Lupus erythematosus (SLE) as compared to healthy controls (HC) and have shown that they constitute a strong pro-inflammatory stimulus. In this study, we examined if the ANA+ NS have MP-ICs to determine whether the lack of inflammation in these individuals results from the absence, or change in character, of their immune complexes.

Methods: Flow cytometry was used to examine the number, origin, nucleic acid content, and IgG binding of peripheral blood Annexin V+MPs in ANA- HC (n=7), ANA+ NS (≥1:160 by IF, n=30), UCTD (n=25) and SLE patients (n=10). MP nucleic acid content was determined by staining with Syto13 which detects DNA and RNA, and the MP cell source by antibodies against CD41a (Platelets), CD105/CD144 (endothelium), CD45, CD19, CD3, CD14, CD16, and CD235a. Eleven specific ANAs were detected using the Bioplex 2200 ANA Screen.

Results: Consistent with previous studies SARD patients had increased levels of MPs, and MP-ICs that contained higher levels of nucleic acids, as compared to ANA- HC. Surprisingly, ANA+ NS and UCTD patients had similar elevations in the amount of IgG coating their MPs to those seen in SLE and in a subset of these individuals the MP nucleic acid content was also higher than ANA-HC. Most of the MP obtained from HC, SARD patients and ANA+ NS individuals exhibit platelets markers, with only a small proportion of MP from SARD and ANA+NS individuals displaying CD45, CD14 or endothelial markers. There was a non-statistically significant trend to higher MP-ICs in ANA+ NS and UCTD individuals with specific ANAs.

Conclusion: MPs appear to be an important source of autoantigen in ANA+NS individuals. The results suggest that the differences in elaboration of pro-inflammatory factors between ANA+ NS individuals and SLE patients do not result from a lack of immune complexes, but rather from the capacity of the immune complexes to elicit inflammation.

POD03

The Risk of Acute Mental Illness Service Use in Rheumatoid Arthritis and Ankylosing Spondylitis: A Population-Based Cohort Study

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Objectives: Rates of mental illness are significantly increased in rheumatoid arthritis (RA) and ankylosing spondylitis (AS) but it is not well known if serious mental illness sequelae are also higher in these inflammatory arthritis conditions. Our objective was to estimate the rates and risk of emergency department (ED) visits and acute hospitalizations for mental illness in RA and AS compared with the general population.
Methods: We evaluated population-based cohorts of RA (N=53,240) and AS (N=13,964), each matched 1:4 by age, sex, and calendar year (at diagnosis) with population comparators in Ontario between April 1, 2002 and March 31, 2016. Individuals with a history of mental illness, prior ED visit or mental illness hospitalization were excluded. The outcomes were a first ED presentation or acute hospitalization for a mental illness, subsequent to RA or AS diagnosis. We estimated hazard ratios (HR) and 95% confidence intervals (95% CI) for RA and AS, separately, versus comparators, adjusting for clinically important demographic, clinical and non-mental health service use variables.
Results: Individuals with RA had higher rates of ED visits (6.59/1,000 person years [PY] versus 4.39/1,000 PY in comparators) and hospitalizations for mental illness (3.11/1,000 PY versus 1.80/1,000 PY in comparators). Higher rates of ED visits (7.92/1,000 PY versus 5.62/1,000 PY in comparators) and hospitalizations (3.03/1,000 PY versus 1.94/1,000 PY in comparators) were also observed in AS. Overall, RA was associated with a 34% increased risk for mental illness hospitalization (HR 1.34, 95% CI 1.22-1.47) and AS was associated with a 36% increased risk of hospitalization (HR1.36, 95% CI 1.12-1.63). The risk of ED presentation for a psychiatric diagnosis was attenuated, but remained significant, after covariate adjustment in both RA (HR 1.08, 95% CI 1.01-1.15) and AS (HR 1.14, 95% CI 1.02-1.28).
Conclusion: RA and AS are associated with higher rates and risk of acute health care encounters including ED presentations and hospitalizations for mental illness. These findings underscore the need for routine evaluation of mental illness as part of the management of chronic inflammatory arthritis. Additional research is needed to identify the underlying individual characteristics, as well as system-level variation that may explain these differences, and to help plan interventions to make mental health service use more responsive to the needs of individuals living with RA and AS.

POD04

Interferon-Alpha Disrupts DNA-specific B Cell Tolerance in 3H9 Mice

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Objectives: Interferon-Alpha (IFNα) is a central mediator of Systemic Lupus Erythematosus (SLE) pathogenesis. IFNα has been shown to enhance B cell signalling, survival, and induce B-cell activation factor (BAFF). While past studies have explored the effects of BAFF on B cell tolerance, little work has focused on how IFNα directly affects this process. We hypothesize that elevation of IFNα may directly contribute to the breach of B cell tolerance in SLE. To address this question, we obtained an adenoviral vector encoding mouse IFNα and used it to induce

sustained elevation of IFNα in a mouse model of B cell tolerance.
Methods: 6-8 week old 3H9 transgenic mice, which have an Ig heavy chain knock-in derived from a DNA-specific hybridoma, were injected with 107 PFU of Ad-mIFNα (mDEF201) or empty vector. At 2 weeks post-treatment immune cell populations in the spleen/bone marrow were examined by flow cytometry, and anti-DNA antibody production was measured by ELISA. Serum levels of IFNα/BAFF were quantified by ELISA and IFN-induced gene expression was assessed by qRT-PCR.
Results: Mice administered mDEF201 showed elevation of serum IFNα and increased mRNA expression of several IFN-inducible genes, but minimal changes in BAFF levels. Elevated IFNα was associated with a marked increase in the levels of anti-ss/dsDNA autoantibodies, signifying a breach of B cell tolerance. Consistent with this idea, mDEF201 infected mice displayed increased frequencies of activated B cells, age-associated B cells, germinal center B cells, and CD138+ plasma cells, together with increased numbers of mature follicular/marginal zone B cells. These changes occurred in the setting of minimal increases in T cell activation and the frequency of T-follicular helper cells. In the bone marrow, infected mice demonstrated reduced receptor editing, consistent with impaired tolerance induction. To assess the effect of IFNα on B cell anergy we examined the Igλ1+ population, a well characterized dsDNA-reactive population in 3H9 mice. Igλ1+ B cells expressed activation markers and entered germinal centers; however, anti-dsDNA Igλ1+ levels were not increased suggesting only a partial breach of B cell anergy.
Conclusion: Taken together, these data suggest that IFNα may be a major contributing factor to breaching B cell tolerance in SLE not only through the induction of BAFF, but also through direct effects on autoreactive B cells including: impaired receptor editing, activation and differentiation to antibody secreting cells, and a partial reversal of B cell anergy.

POD05

High Dose Influenza Vaccine in Seropositive Rheumatoid Arthritis Patients: Results of a Randomized Control Trial

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Objectives: Rheumatoid arthritis (RA) patients have higher risk of influenza and influenza-related illness than age-matched healthy controls. Although vaccination is the most effective intervention against influenza and its associated complications, vaccine induced antibody responses and protection in RA are low. It is unknown if the use of a high dose vaccine (high dose trivalent inactivated influenza vaccine: HD-TIV) can improve antibody responses over those conferred by the standard vaccine (standard dose quadrivalent inactivated influenza vaccine: SD-QIV) in RA.
Methods: We conducted a treatment-stratified, randomized, double-blind, active-controlled trial in adult seropositive RA patients to assess antibody responses to either SD-QIV (15 μg of hemagglutinin (HA) per strain) or HD-TIV (60 μg of HA per strain) (NCT02936180). This study was perfromed during the 2016–2017 (year 1) and the 2017–2018 (year 2) Northern-Hemisphere influenza seasons. Patients were stratified by treatment: DMARDs (Group 1-G1), anti-cytokine

therapy (G2), anti-B-cell therapy and small molecules (G3). Seroconversion (SC) and seroprotection (SP) rates were assessed using pre- (Day 0 – D0) and post-vaccine (D28) serum hemagglutination inhibition (HI) titers. SC was defined as at least a four-fold HI antibody increase from D0. SP rate was defined as percent with HI titres ≥1:40 at D28. Vaccine strains were A/HongKong/4801/2014(H3N2), B/Brisbane/60/2008 in Y1/2 with A/California/7/2009(H1N1) in Y1 and A/Michigan/45/2015(H1N1) in Y2.
Results: 279 seropositive RA patients were enrolled. 140 (50.2%) received SD-QIV and 139 (49.8%) received HD-TIV. The mean age (±SD) was 61.0±12.9 and 80% were female. According to treatment, 138 (49.5%) patients were in G1; 92 (33%) in G2 and 49 (17.6%) in G3. SP rates pre-vaccine were comparable between HD-TIV and SD-QIV groups. Overall responses to vaccination were consistently higher with the HD-TIV. SC (H3N2 22.3% vs 8.6%; B/Bris 44.6% vs 28.6%; H1N1 51.1% vs 30.0%) and SP rates (H3N2 48.5% vs 30.9%; B/Bris 60.9% vs 50.7%; H1N1 80.4% vs 73.5%) were seen in patients that received the HD-TIV compared to the SD-QIV. Patients that received HD-TIV were 2.8 times more likely to H3N2 seroconvert (odds ratio 2.84; 95% confidence interval 1.38 – 5.87), 2 times more likely to B/Bris seroconvert (1.91; 1.15-3.17), and 2.3 times more likely to H1N1 seroconvert (2.33; 1.42-3.85).
Conclusion: In seropositive RA patients, the use of HD-TIV substantially improves the immune response to vaccination compared to SD-QIV. This is the first study documenting a successful intervention to enhance vaccine responses in RA.

POD06

Determinants of Opioid Analgesic Use in Patients with Advanced Knee Osteoarthritis Referred for Consideration of Total Knee Arthroplasty

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Objectives: Canada is facing an opioid crisis and therefore reducing unnecessary opioids prescriptions is desirable. Due to their low benefit-to-risk profile, opioid analgesics are not recommended across knee osteoarthritis (OA) treatment guidelines, yet use is rising. Some guidelines support their use if there is inadequate response and/or contraindications to recommended non-pharmacological and pharmacological treatments. The current study evaluated the prevalence of opioid analgesic use, and the relationship with prior receipt of recommended treatments and with coexisting medical conditions, in patients with knee OA referred for total knee arthroplasty (TKA).
Methods: Knee OA patients completed a standardized questionnaire prior to orthopaedic surgical consultation that assessed: sociodemographic factors, coexisting medical conditions, PHQ-8 depressive symptoms, smoking and alcohol use, OA disease severity and coping, and prior treatments used for OA. Multivariable logistic regression was used to assess the relationship between opioid use and prior receipt of recommended OA treatments and coexisting conditions, controlling for sociodemographic characteristics, disease severity and OA coping factors.
Results: 2,277 participants were included: mean age 66 years, 59% female and mean BMI 33 kg/m2. Mean WOMAC pain was 12/20 and mean KOOS-PS was 56.5/100 (higher scores worse); 30% were currently and 41 % had ever used opioid analgesia for knee OA. Individuals currently using opioid analgesia were more like have ≥2 coexisting conditions, more depressive symptoms, worse OA pain/disability/coping, and were more likely to be also currently using

acetaminophen, NSAIDs, knee injection, weight loss and physiotherapy (all $p<0.05$), although use of recommended treatments was suboptimal. In multivariable analysis, the likelihood of current use of opioids was higher among individuals who were younger (adj. OR 1 yr 0.98 [0.97 to 1.00]), male (adj. OR 1.54 [1.19 to 1.98]), had ≥3 coexisting conditions (adj. OR compared to none 1.57 [1.10 to 2.24]), greater depressive symptoms (adj. OR per 1 unit increase in PHQ-8 1.05 [1.02 to 1.07]), ≥3 troublesome joints (adj. OR compared to 1 joint 1.48 [1.08 to 2.02]) and had ever used acetaminophen (adj. OR 1.33 [1.01 to 1.75]).
Conclusion: In this large cohort of patients with advanced knee OA referred for orthopaedic evaluation for TKA, almost one third were using opioid analgesics. Individuals using opioids were more likely to have multiple other chronic conditions that might contraindicate use of NSAIDs or acetaminophen. Of concern, these individuals had not exhausted non-pharmacological treatments that have few contradictions. Further research is required to understand reasons why opioids are prescribed for knee OA.

POD07

Health Care Utilization for Musculoskeletal Issues During the Pre-diagnosis Period in Psoriatic Arthritis – A Population-Based Study

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Objectives: Numerous studies have shown delays in diagnosis of psoriatic arthritis (PsA) among patients with psoriasis. However, only limited data exist about the pre-diagnosis phases of PsA. We aimed to assess musculoskeletal-related health care utilization during the 5-year period prior to diagnosis of PsA compared with age/sex-matched non-PsA patients with the same family physician.
Methods: We conducted a matched case-control study using the primary care Electronic Medical Record Administrative data Linked Database (EMRALD) in Ontario. All patients with PsA were identified using a validated algorithm (PPV 85%) within EMRs (from 575 family physicians). For each patient with PsA we identified 5 age/sex-matched patient comparators cared for by the same physician. Patients were then linked with provincial administrative data to obtain information about health services utilization. The date of PsA diagnosis ("index date") was defined as the first date an inflammatory arthritis billing code was administered by a rheumatologist. The controls were assigned the same index date as their corresponding case. The study outcome included health care utilization related to non-specific musculoskeletal (MSK) issues during the 5-year period prior to the index date. We compared the proportion of patients with health care encounters for MSK-related issues between PsA and controls using GEE models with binary distribution.
Results: We studied 462 PsA patients and 2310 matched controls with a mean (SD) age of

54.2±13.8 (55.6% females). Relative rates and odds of visits were higher in each of the 5 years prior to the index dates for patients who ultimately developed PsA vs. controls. The odds ratios (OR) related to visiting a primary care physician for nonspecific MSK issues in patients who ultimately developed PsA vs. controls was 2.1 (95% CI 1.7, 2.6) in the year immediately preceding the index date and was similarly elevated up to 5 years prior. Additionally, the OR related to using other MSK-related health care services, including visits to MSK specialists (rheumatologist and non-rheumatologists), joint injections, MSK imaging and emergency department visits for MSK issues, were higher in patients who ultimately developed PsA compared to controls as early as 5 years preceding the index date (ORs ranging from 1.3 to 6.1). **Conclusion:** Our findings suggest that there may be a pre-diagnosis phase of PsA that is characterized by non-specific MSK symptoms which may explain some of the delays in diagnosis of PsA in the primary care setting.

POD08

YouTube as a Platform for Narrative Medicine: A Novel Approach to Promote Empathy and Awareness for Patients with Chronic Disease

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Objectives: Narrative medicine is an effective way of humanizing medicine while promoting empathy and self-reflection in physicians and patients alike. YouTube is the largest video-sharing site in the world with incredible potential as a platform for sharing patient narratives. To date, its utility as a medium for narrative medicine has not yet been studied. A significant barrier to broadcasting on YouTube is the need to publish videos on an established channel with an associated viewer base to ensure sufficient views. The YouTube channel "Violin MD", with 176,000 subscribers and 7.8 million total views, was used as a platform for sharing a patient's story. The objective of this study was to qualitatively explore how people respond to a patient story video.

Methods: An individual living with granulomatous with polyangiitis (GPA) was interviewed about his experience with the disease. An 8-minute edited version of this patient's interview was posted on the YouTube channel "Violin MD". To encourage discourse and reflection, viewers were prompted at the end of the video to share their thoughts in the comment section. After ten days, the number views, total comments, likes and dislikes were recorded. Comments were analyzed using a constructivist grounded theory approach. To describe the viewer demographics the following data was collected from YouTube Analytics: viewer age, gender, geographic location.

Results: The video was viewed 64,607 times in 10 days. Based on self-reported YouTube Analytics, 81.4% of viewers were female and 47.8% were between the age of 18-24 years. The majority of views originated from the USA (55.4%), Canada (13%), UK (7.4%), Australia (6.6%). Four themes emerged in the comment analysis: empathy ("you never know what someone is going through"), a call to action ("You make me wanna become a better medical assistant and put more of my heart into this work."), awareness ("I'll have to rethink every time I say I'm tired!") and reflection on the ideal doctor-patient relationship ("I would like to see doctors listen more attentively to their patients"). We found comment threads where viewers shared their own stories of illness, supporting one another and coming together as a form of

community.
Conclusion: Our results suggest that YouTube may be a suitable and effective platform for narrative medicine, eliciting an an array of powerful reactions by viewers. Limitations include a sample bias as the video was likely more heavily viewed by channel subscribers who have a self-identified interest in medical content.

POD09

Measuring the Impact of an Innovative Educational Intervention in Rheumatoid Arthritis

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Objectives: Therapeutic education of patients is increasingly recognized as an integral part of the management of chronic disease, such as rheumatoid arthritis (RA). We tested whether an educational intervention consisting of a forty-minute educational DVD followed by a teleconference with a multidisciplinary team of health care providers improved behavioural intentions and knowledge at three months after the intervention and whether acquired knowledge was retained up to six months after the intervention.

Methods: A randomized controlled partial crossover design evaluated the impact of the educational intervention for patients with active RA starting on or changing biologic agents. Participants were randomized 1:1 to one of two arms. At baseline, participants received usual care in arm 1 and usual care plus the educational intervention in arm 2. Patients in the usual care group (arm 1) were offered the intervention at 3 months. All participants had their final visit at 6 months. At each visit, we quantified the impact of the educational intervention using the BioSecure questionnaire to measure patients' self-care safety skills, a behavioural intention questionnaire based on the theory of planned behavior and the beliefs about medicines questionnaire (BMQ). Changes in Biosecure questionnaire and BMQ between two arms at three-month post-intervention relied on an analysis of variance for repeated measures, whereas the intention questionnaire was analysed by the use of repeated measures logistic regression. All analyses were performed using SAS 9.4 and a p value of < 0.05 was considered statistically significant.

Results: We present here a preliminary analysis on 98 participants who completed the educational intervention. The evolution of the Biosecure score over time differed between two arms ($p=0.02$), but no difference was detected at month 3 between two intervention group ($p=0.15$). However, when pooling both arms, the educational intervention gave rise to an

increased mean score of 6.45 ± 0.92 of the Biosecure questionnaire ($p<0.0001$). No significant decrease was found for the educational intervention at six months in the early intervention arm (arm 2, $p=0.76$). The percentage of appropriate behaviour intention increased from 74.51% to 88% in arm 2 between baseline and 3 months ($p=0.11$). No significant changes between arms or over time were noticed regarding the four subscales of the BMQ.
Conclusion: The development of an educational DVD followed by a support teleconference improved participants' self-care safety skills in practical situations. The educational intervention had no significant impact on behavioural intentions or beliefs about medicines.

POD10

C-X-C motif Chemokine 10 (CXCL10) is a Potential Biomarker of Disease Activity in Psoriatic Arthritis (PsA)

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Objectives: PsA is a spondyloarthritis that occurs in up to a third of patients with psoriasis. PsA disease activity is difficult to assess and requires detailed clinical evaluation complemented by imaging. Available laboratory markers such as CRP do not accurately reflect PsA disease activity. Identifying soluble biomarkers that reflect PsA disease activity is an important perceived clinical need. We have previously identified markers for PsA via transcriptomic and proteomic studies. In this study, we aimed to determine whether our panel of PsA markers correlate with PsA disease activity.
Methods: Serum samples were obtained from a cohort of patients with PsA who are assessed clinically every 6 months according to a standard protocol including several measures of disease activity: physician and patient reported outcomes, joint counts, skin scores and the composite measures- Disease activity score for PsA (DAPSA) and PsA Disease Activity Score (PASDAS). From our previously identified candidate PsA protein biomarker panel, we selected 17 markers for analysis as markers of PsA disease activity. The markers were assayed in 80 serum samples from PsA patients (Phase 1) not on treatment with disease modifying therapy using commercially available ELISA kits. Based on Spearman correlation coefficient, markers that significantly positively correlated with measures of disease activity were identified. In Phase 2, these markers were further verified in samples from an inception cohort of 80 patients not on treatment. In this phase, physician global assessment of disease activity (MDGA) was used as the primary measure of disease activity; other skin, MSK and patient reported measures were considered secondary measures.
Results: Of the 17 markers tested in Phase 1 in 80 PsA patients (mean age 47, males 58%, swollen joint count [SJC] 2, tender joint count [TJC] 3.6, PASI 2.9), 8 markers were associated with various measures of disease activity. In Phase 2, these markers were tested in 80 patients (mean age 49, males 54%, SJC 1.5, TJC 3.3, PASI 5.6). Of the 8 markers, 2 markers CXCL10 ($\rho= 0.25$, $p = 0.028$) and CRP ($\rho=0.26$, $p = 0.018$) correlated with MDGA, and did not correlate with each other. Three other markers correlated with secondary measures, but no marker correlated with DAPSA or PASDAS.
Conclusion: CXCL10, a marker previously associated with PsA, may also be a marker of PsA

disease activity. Composite disease activity measures developed for clinical trials may not perform well as outcome measures for biomarker studies in PsA.

POD11

Giving Children a Voice Through Art: Creative Expression Through Art and Digital Story Telling to Understand and Educate About the Impact of Juvenile Idiopathic Arthritis.

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Objectives: While over 20,000 children in Canada have Juvenile Idiopathic Arthritis (JIA), it is not well known, even in the health care community. It is often a life-long disease and children suffer from “invisible challenges”-pain, limited participation in age appropriate activities, need for medications, and painful procedures. In other chronic disease, art therapy and storytelling have been beneficial. An innovative art/ visual story telling program for children with JIA consisted of children creating an individual art work followed by “illness experience narrative” as a digital story. The aims were: 1) To understand if such an expressive opportunity improves children’s health status; 2) To publicize children’s art/stories to increase community education about JIA.

Methods: A prospective cohort of 10 children and adolescents (8 -18 years, 4 males and 6 females), affected by JIA, participated in one-day art workshop(s) and subsequently created a digital story using art, talking, writing and videoclips. Pediatric Quality of Life Inventory-Arthritis Module (PedsQL) was administered 1 week prior and 1 week post completion of the project. Individual structured interviews were conducted following the creation of digital story. Social media/public venues were used to exhibit the children’s creative work. This mixed methods study was guided by philosophical hermeneutics which is used in healthcare situations where knowledge is expected to emerge from dialogue in a form of an unpredictable discovery rather than a controlled outcome.

Results: PedsQL scores revealed the presence of psychosocial distress (eg. worry about future) and limitation in physical activities and school participation/performance before and after project. However, post project interviews confirmed that creation of art/digital stories was viewed by all children as psychologically beneficial. Each patient consented to have their art work/story publicly shared (youtube, TELUS SPARK, website etc.) improving community awareness and knowledge about JIA. An unexpected result was all of the adolescents reporting that JIA and its related challenges had been beneficial in allowing them to develop qualities that they viewed as positive, such as diligence, courage, and a determination to “not to give up”.

Conclusion: This project revealed presence of psychosocial stress in JIA patients and confirmed psychological benefit of creating art and of knowing “how to tell your story” from JIA patients’ perspective. This benefit was better captured by a HRQL measure based on personal preferences

(digital story and interview) compared to a standardized measure (PedsQL). The novel use of social/public media allowed for increased public education about childhood JIA.

POD12

The Physiological Changes of the Enthesis in Response to Age, Body Mass Index and Physical Activity: An Ultrasound Study in Healthy People

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Objectives: Enthesis are continuously exposed to biomechanical stress and entheseal features on ultrasound may not reflect an underlying inflammatory spondylarthropathy in all cases. In this study, we aimed to determine the prevalence of sonographic entheseal abnormalities in healthy subjects and explore factors that are contributing to the occurrence and severity of these findings.
Methods: Eighty healthy subjects who had no joint pain, history of the rheumatic condition or recent joint trauma were enrolled. Ultrasound scans of the insertions of triceps, quadriceps, Achilles tendons and plantar fascia and the origins/insertions of patellar tendons were performed by a single sonographer. Each enthesis was scored using a semi-quantitative scale (0-3) for sonographic features of enthesitis: hypoechogenicity, thickening, Doppler signals, enthesophytes, erosions and calcifications. The correlation between the total enthesitis score and various demographic and lifestyle factors was evaluated. A multiple linear regression model was used to assess the association between the total US score and the following variables: age, sex, smoking status, body mass index (BMI), and physical activity.
Results: Doppler signals and erosions were detected in 10% and 6.25% of the participants, respectively. Thickening was the most frequent lesion within inflammatory features that could also be seen in the absence of hypoechogenicity (highest in 70% of the patellar tendon origin). Enthesophytes were common at the Achilles tendon insertion, seen in 78.5% of participants. The total scores correlated with age (r:0.561,p<0.001) and body mass index (r:0.344,p:0.022). Smokers had higher scores (14.0 ±10.6 vs 9.02 ±9.6, p:0.010), similar to participants who were exercising more (13.53 ±11.1 vs7.94 ±8.4, p:0.005). Additionally, men had higher scores than women (15.73 ±11.6 vs 8.06 ±8.2, p:0.001). In regression analysis the following variable were independent predictors of the US score: age (B:0.35, 95% Confidence interval [CI]:0.25-0.46; p<0.001), male sex (B:5.05, 95%CI:1.82-8.28; p:0.003), BMI (B:0.61, 95%CI:0.24-0.97; p:0.001) and higher level of physical activity (B:4.41, 95% CI:1.25-7.58; p:0.007).
Conclusion: There are physiological changes within the enthesis that are associated with older age, higher BMI and physical activity. The entheseal abnormalities observed in the healthy enthesis support the impact of biomechanical forces on the enthesis, not necessarily reflecting a pathology leading to any symptoms.

POD13

The RA BIODAM Study: Prospective Validation of Soluble Biomarkers as Predictors of Structural Damage in Rheumatoid Arthritis

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Objectives: The OMERACT Soluble Biomarker International Working Group initiated the RA BIODAM study, an international, multicenter, prospective cohort study, directed from Canada, which closed 17May2018. The study was designed to allow the clinical validation of candidate biomarkers predictive of radiographic progression, development of new prognostic risk-assessment tools, and assessment of the prognostic role of ultrasound.
Methods: RA patients meeting 2010 ACR/EULAR Criteria from 10 countries, starting or changing conventional synthetic disease-modifying anti-rheumatic drugs and/or starting first tumor necrosis factor inhibitors, were followed for 2 years using a Treat-to-Target (T2T) strategy. Biosamples (serum, urine) were acquired every 3 months, and radiography of hands and feet every 6 months. Gray Scale and Power Doppler Ultrasonography (US) of hands and feet was conducted on a subset of patients every 3 months using the German US 7 Score. Serum, urine, and radiographs were obtained from 4638, 4591, and 2343 visits, respectively. US scores were obtained from 1034 visits. Clinical data collection included demographics, anti-cyclic citrullinated peptide antibody (anti-CCP) and HLA-DRB1 genotyping at Baseline; ESR, CRP, rheumatoid factor (RF) and a 44 swollen/53 tender joint count every 3 months. Patient self-reported questionnaires, collected every 3 months, included Pain, Patient Global Disease Activity, HAQ, Fatigue, SF-36, RA Impact of Disease Score, RA Flare Evaluation. Primary endpoint was radiographic progression assessed using the Sharp van der Heijde score. Patient baseline characteristics and adherence to T2T were assessed descriptively. Factors influencing adherence to T2T were analyzed using generalized estimating equations with auto-regression.
Results: A total of 571 patients were recruited with 439 (76.9%) completing 2-year follow-up. At baseline, the majority were female (76%), mean age 55.7 years, and mean disease duration 6.5 years. Patients had mean swollen and tender joints of 8.4 and 13.6, respectively; mean DAS44 of 3.8; 77.7% were RF or anti-CCP positive. Failure of adherence to T2T for remission (DAS44<1.6) and low disease activity (DAS≤2.4) was noted in 1765 (40.5%) and 1098 (25.2%) of visits, respectively. In the multivariable analysis older age, female gender, high baseline HAQ, high number of comorbidities and smoking were significantly associated with failure to implement T2T. High swollen joint count, anti-CCP positivity, and higher education levels were significant facilitators of T2T.
Conclusion: The RA BIODAM cohort has demographic and disease characteristics typical of RA. Analysis of this cohort demonstrated a lack of T2T adherence in a substantial proportion of patients, despite protocol specification, which can be predicted by baseline data.

POD14

Advanced Chronic Kidney Disease in Lupus Nephritis: Factors Leading to Progression

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Objectives: Advanced chronic kidney disease (CKD) carries an increased risk for progression to end-stage renal disease (ESRD) and renal replacement therapy. However, the rate of progression and the predictors that drive the decline of renal function in lupus nephritis (LN) are not known. The aim of the present study is to define such factors in patients with LN and advanced CKD.
Methods: Patients with advanced LN-related CKD for two consecutive clinic visits were identified from the Toronto Lupus Clinic cohort. Advanced CKD was defined according to the Kidney Disease Improving Global Outcomes as CKD stage 3b (eGFR=30-44ml/min/1.73m2) and stage 4 (eGFR=15-29ml/min/1.73m2), while ESRD was defined as eGFR<15ml/min/1.73m2 or initiation of dialysis. All individuals were followed until the progression to ESRD or the last visit and were divided into two groups ("progressors" and "non-progressors"). Demographic, clinical, immunological and therapeutic variables were compared at baseline (the second visit of advanced CKD). Multivariable Cox regression analysis was performed for the identification of predictors for transition to ESRD. Statistical analysis was performed with SAS 9.4; $p<0.05$ was considered significant.
Results: One hundred eighteen patients (74 with CKD 3b and 44 with CKD 4) were included. Median time from LN to advanced CKD was 5.6 years (range 0-34 years). Forty-five patients (38.1%) progressed [29 to ESRD (25 from stage 4 and 4 from stage 3b) and 16 from stage 3b to stage 4]. Their median eGFR was decreased from 36 to 24.3 ml/min/1.73m2 after 5.7±6.4 years. Regarding the patients who did not progress (n=73, 61.9%), their median eGFR remained unaltered from 38.6 to 37.1ml/min/1.73m2 after 10.4±8.0 years. Patients who progressed were younger (38.5±11.9 vs. 46.2±13.7 years, p=0.002), had higher diastolic blood pressure (87±10 vs. 82±12mmHg, p=0.014) and were taking glucocorticosteroids (93.3% vs. 78.1%, p=0.029) and antimalarials (51.1% vs. 30.1%, p=0.023) more frequently at baseline. Other variables did not differ significantly. Multivariate analysis for the identification of predictors for progression showed that active serology (positive anti-dsDNA antibodies plus low complements C3/C4) and glucocorticosteroid treatment at baseline were strongly associated with progression with an HR=3.2 (95%CI=1.6-6.2, p<0.001 and HR=3.61 (95%CI=1.1-11.9, p=0.035) respectively. CKD 4 had a higher transition rate to ESRD (HR=2.72, 95%CI=1.48-5, p=0.001).
Conclusion: Approximately 62% of our patients with advanced CKD (stages 3b and 4) did not progress in 10 years of follow-up on average. Risk factors for progression included active serology at the time of CKD as well as treatment with glucocorticosteroids.