POS0034

RADIOGRAPHIC ENTHESEAL LESIONS AT HIP AND PELVIC REGION ARE ASSOCIATED WITH LONGER DISEASE DURATION, HIGHER BMI AND MORE SEVERE SPINAL AND HIP RADIOGRAPHIC DAMAGE IN PATIENTS WITH ANKYLOSING SPONDYLITIS

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Background: Enthesitis is an important feature of ankylosing spondylitis (AS) and structural and inflammatory enthesal lesions (EL) are frequently present on ultrasound. Plain radiographs also provide good imaging of structural enthesal involvement¹. Until now, little is known about the presence of structural EL at the hip and pelvic region and the association with patient characteristics in AS.

Objectives: Our aim was to investigate the prevalence of radiographic EL at the hip and pelvic region in AS patients compared to age and sex matched control subjects and to explore the relation with AS patient characteristics.

Methods: AS patients from the Groningen Leeuwarden Axial SpA (GLAS) cohort, included between November 2004 and December 2010, with available anteroposterior (AP) pelvis radiographs at baseline were included. All patients fulfilled the modified New York criteria for AS. Additionally, 100 randomly selected AP pelvis radiographs from age and sex matched control subjects were obtained from the radiology department of the University Medical Center Groningen. The sacroiliac joints of all radiographs were blinded and radiographs were scored independently by two trained observers unaware of patient characteristics and treatment. The enthesal sites scored were: trochanter major, trochanter minor, os ischium, crista iliaca, both left and right side. The following 3 EL were scored: erosion/cortical irregularity, calcification and enthesophyte. Only lesions with absolute agreement between both observers were used for analyses. Radiographic spinal involvement was scored according to the modified Stoke AS Spine Score (mSASSS; range 0-72) and radiographic hip involvement according to the Bath AS Radiology Index (BASRI)-hip (range 0-4). Independent samples t test, Mann-Whitney U test, Chi-Square test, and Fisher Exact test were used to compare patient characteristics between patients with and without radiographic EL.

Results: Of the 167 included AS patients, 117 (70%) were male, mean age was 43 ± 11 years, 133 (80%) were HLA-B27 positive and median symptom duration was 16 years (range 1-53). 127 (76%) AS patients and 58 (58%) controls showed EL, with 501 lesions in total of which 377 (75%) in AS patients. AS patients showed significantly more lesions than controls at all 5 locations. Os ischii showed the most lesions in both AS patients and controls (66% vs 53%, p<0.05). The most prevalent type of lesion in both groups was erosion/cortical irregularity (72% vs 51%, p<0.005). Enthesophytes were also more often observed in AS patients than in controls (31% vs 21%, p=0.07). Prevalence of calcifications was low in both groups and not significantly different (5% vs 2%, p=0.22). AS patients with EL were significantly older (mean 45.2 vs 35.1 yrs, p<0.005) and had longer symptom duration (median 18 vs 7.5 yrs, p<0.005) than patients without EL. Furthermore, patients with BMI >25 had significantly more often enthesophytes (42% vs 16%, p<0.05) than patients with a normal BMI. Additionally, AS patients with EL had significantly more often radiographic spinal damage than patients without EL with median mSASSS total score 8.7 vs 1.0 (p<0.005) and a trend toward significance for radiographic hip involvement (BASRI-hip score ≥2; p=0.06).

Conclusion: Radiographic EL at hip and pelvic region are significantly more prevalent in AS patients than in age and sex matched controls. AS patients with EL were significantly older, had longer symptom duration and more spinal radiographic damage than patient without EL. Furthermore, BMI >25 was associated with a higher prevalence of enthesophytes. These new findings contribute to the knowledge of enthesal involvement in AS.

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Disclosure of Interests: Freke Wink Consultant of: Abbvie, Thomas Diemel: None declared, Suzanne Arends: None declared, Anneke Spoorenberg Consultant of: Abbvie, Pfizer, MSD, UCB, and Novartis, Grant/research support from: Abbvie, Pfizer, UCB and Novartis.

DOI: 10.1136/annrheumdis-2021-eular.3057

POS0035

ONE IN TWENTY INFLAMMATORY BOWEL DISEASE PATIENTS WHO UNDERWENT ABDOMINOPELVIC COMPUTED TOMOGRAPHY HAVE UNDIAGNOSED AXIAL SPONDYLOARTHRITIS

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Background: The diagnosis of axial spondyloarthritis (axSpA) is challenging and hindered by delay. There may be an opportunity to identify sacroiliitis for further rheumatology review in inflammatory bowel disease (IBD) patients who undergo Computed Tomography (CT) for non-musculoskeletal (MSK) indications. **Objectives:** To identify what proportion of IBD patients who underwent abdominopelvic CT for non-MSK indications have axSpA and to explore the role of an imaging strategy for identifying axSpA.

Methods: Abdominopelvic CT scans of verified IBD patients were identified retrospectively from eight years of imaging archive. Patients between 18-55 yrs. were selected as having the highest diagnostic yield for axSpA. CT review (using criteria from a validated CT screening tool developed by Chan¹) was undertaken by a trained radiology team for presence of CT-defined sacroiliitis (CTSI). All CTSI patients were sent a screening questionnaire. Those with self-reported chronic back pain (CBP), duration > 3 months, onset < 45 years were invited for rheumatology review. This included a medical interview, physical examination (joint count, MASES, dactylitis count, BASMI), patient reported outcomes (BASDAI, BASFI, BASGI, Harvey-Bradshaw-Index, Partial-Mayo-Index), relevant laboratory tests (CRP, ESR, HLA-B27), axSpA protocol MRI, and remote review by a panel of experienced rheumatologists with a special interest in axSpA.

Results: CTSI was identified in 60 of 301 patients. Thirty-two (53%) responded to the invitation to participate and 27 (84%) were enrolled. Of these, eight had a pre-existing axSpA diagnosis and five did not report chronic back pain. Fourteen patients underwent rheumatological assessment; three of 14 (21.4% [95% CI: 4.7%, 50.8%]) had undiagnosed axSpA. In total, 11 of 27 (40.7% [95% CI: 22.4%, 61.2%]) patients had a rheumatologist verified diagnosis of axSpA.

Conclusion: One in five patients (60/301) with IBD who underwent abdominopelvic CT for non-MSK indications have CTSI and at least one in five (11/60) have axSpA. Five percent (3/60) were previously undiagnosed. This highlights a hidden disease burden and a potential strategy for identifying new cases.

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Acknowledgements: We are indebted to Baljeet Dhillon and Shin Azegami for their assistance in the scoring of the CTSI.

Disclosure of Interests: Chong Seng Edwin Lim Grant/research support from: AbbVie, Louise Hamilton: None declared, Samantha Low: None declared, Andoni Toms: None declared, Alex MacGregor: None declared, Karl Gaffney Speakers bureau: AbbVie, Eli Lilly, Novartis, UCB Pharma, Consultant of: AbbVie, Eli Lilly, Novartis, UCB Pharma, Grant/research support from: AbbVie, Gilead, Eli Lilly, Novartis, UCB Pharma.

DOI: 10.1136/annrheumdis-2021-eular.2047

POS0036

AN ARTIFICIAL INTELLIGENCE MODEL IN RHEUMATOLOGY: INTERPRETATION OF THE SACROILIAC JOINT GRAPHY IN ANKYLOSING SPONDYLITIS

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Background: There is an average of 8 years delay in the diagnosis of ankylosing spondylitis (AS). The most important danger of late diagnosis is that the disease can cause physical and functional disability (2). There is no specific diagnostic biomarker for AS. Sacroiliac joint (SIJ) radiography is frequently used in the diagnosis and follow-up of AS due to its easy accessibility and low cost. It can be classified as grade 0, 1, 2, 3, 4, and these classes may not be sharply separated from each other (3).

Objectives: Interpretation of the SIJ radiography may differ from physician to physician. In fact, the same physician may interpret it differently at different times (3). We wanted to find a solution to the intraobserver disagreement problem with the artificial intelligence model.

Methods: The SIJ radiography of 590 patients who applied to our center were divided into 3 categories as right and left, separately, grade 0, grade 1-2, grade 3-4, and an educational data set was prepared for the object recognition method. 488 images were augmented through noise from 490 images in the training data. 242 articular objects were trained for grade 0, 278 for grade 1-2, and 1426 for grade 2-3. The model was tested with 100 images for 36 joint objects for grade 0, 29 for grade 1-2, and 135 for grade 3-4 to create a computer vision-artificial intelligence model (image 1).

Results: Training performance is 70% for grade 0, %63 for grade 1-2, %90 for grade 3-4 and test performance is %52 for grade 0, %24 for grade 1-2, %86

intersection over union (I/U: Intersection over Union is a form of measurement used to indicate the accuracy of an object detector.) for grade 3-4. The mean average precision (mAP) score of our object detection model is %65.9 for test data set (image 1). The estimation quality of the model can be affected by the distribution and number of each class.

Conclusion: The experience of the x-ray technician, dose adjustment, and position differences due to patient compliance complicate the standardization of SIJ radiography and this may cause interobserver disagreement (3). Artificial intelligence models to be created with a larger and homogeneous data set in order to ensure objective standardization in the interpretation of the SIJ graph can help physicians.

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Disclosure of Interests: None declared.

DOI: 10.1136/annrheumdis-2021-eular.3343

POS0037

DOES IMAGING OF THE SACROILIAC JOINT DIFFER IN PATIENTS PRESENTING WITH UNDIAGNOSED BACK PAIN AND PSORIASIS, ACUTE ANTERIOR UVEITIS, AND COLITIS: AN INCEPTION COHORT STUDY

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Background: Axial spondyloarthritis (axSpA) presents diagnostic challenges incurring a delay of up to a decade and relies considerably on radiographic and MRI evidence of sacroiliitis which has led to the development of classification criteria which also rely on imaging. However, it has been suggested that such criteria may not be appropriate for axSpA patients presenting with other forms of SpA, especially psoriatic, because imaging features may vary in frequency and/or may be atypical. This hypothesis has never been tested in a prospective inception cohort of patients presenting with undiagnosed back pain.

Objectives: We aimed to compare the spectrum of radiographic and MRI abnormalities in the sacroiliac joint (SIJ) of an inception cohort of patients presenting with undiagnosed back pain and psoriasis, iritis, and colitis.

Methods: We used data from the prospective multicenter Screening for Axial Spondyloarthritis in Psoriasis, Iritis, and Colitis (SASPIC) Study, which is aimed at early detection of axial SpA in patients referred by the respective specialist after first presenting with these disorders. Consecutive patients ≤ 45 years of age with ≥ 3 months undiagnosed back pain with any one of psoriasis, AAU, or colitis undergo routine clinical evaluation by a rheumatologist for axial SpA followed by imaging. In SASPIC I, MRI evaluation of the SIJ was ordered per rheumatologist decision. In SASPIC II, MRI evaluation was ordered for all patients. Radiographs and MRI scans were assessed by two central readers and comparisons of the three groups were based on concordant assessments of imaging features. Evaluation of MRI scans included both global assessment for presence/absence of axSpA with confidence scale (-10 to +10), active and structural lesions typical of axSpA per recent ASAS definitions, and granular assessment of individual lesions according to SIJ quadrants and halves in consecutive semicoronal slices through the SIJ. Groups were compared by ANOVA and the chi-square test.

Results: A total of 240 patients were recruited, 143 from SASPIC I and 97 from SASPIC II, 101 (42.1%) being diagnosed with axSpA (65.3% male, mean age 34.4 years, mean symptom duration 8.7 years, B27 positive 55.4%). Mean age of colitis (N=101), psoriasis (N=61), iritis (N=78) patients were 33.4, 36.6, 34.3 years, respectively, mean symptom duration was 6.8, 7.2, 9.4 years, respectively, and % males were 45.5%, 52.5%, 51.3%, respectively. There were no significant group differences for unilateral versus bilateral radiographic sacroiliitis and no significant differences in the frequencies, type, or distribution of MRI lesions (Table 1).

Conclusion: Data from the SASPIC prospective inception cohort does not support the view that imaging of the SIJ differs in psoriatic axSpA, which appears similar to axSpA associated with iritis or colitis. These data support the umbrella concept of axSpA.

Imaging Feature	Colitis (n=30)	Psoriasis (n=19)	Iritis (n=52)	P value
Unilateral sacroiliitis (grade ≥ 2), N(%)	1 (3.3%)	0 (0%)	2 (3.8%)	0.69
mNY criteria +, N(%)	5 (16.7%)	6 (31.2%)	15 (28.8%)	0.39
Grade of sacroiliitis, mean(SD)	1.8 (2.2)	2.1 (2.7)	2.2 (2.4)	0.76
MRI indicative of axSpA, N(%)	15 (50.0%)	11 (57.9%)	32 (61.5%)	0.60
MRI indicative of axSpA (confidence $\geq 5/10$), N(%)	14 (46.7%)	10 (52.6%)	30 (57.7%)	0.63
MRI active lesion typical of axSpA, N(%)	6 (20.0%)	6 (31.6%)	18 (34.6%)	0.37
MRI structural lesion typical of axSpA, N(%)	11 (36.7%)	7 (36.8%)	18 (34.6%)	0.98
MRI with unilateral lesion (any)	2 (6.7%)	3 (15.8%)	11 (21.2%)	0.22
MRI with unilateral lesion (BME)	1 (3.3%)	2 (10.5%)	5 (9.6%)	0.54
MRI with unilateral lesion (Erosion)	0 (0%)	0 (0%)	3 (5.8%)	0.23
MRI with unilateral lesion (Sclerosis)	1 (3.3%)	1 (5.3%)	3 (5.8%)	0.89
MRI with unilateral lesion (Fat)	0 (0%)	0 (0%)	0 (0%)	NA
MRI with iliac lesion	17 (56.7%)	12 (63.2%)	32 (61.5%)	0.88
MRI with sacral lesion	12 (40.0%)	11 (57.9%)	31 (59.6%)	0.21

Disclosure of Interests: Walter P Maksymowych Speakers bureau: Abbvie, Janssen, Novartis, Pfizer, UCB, Consultant of: Abbvie, BMS, Boehringer, Galapagos, Gilead, Lilly, Novartis, Pfizer, UCB, Grant/research support from: Abbvie, Novartis, Pfizer, Ulrich Weber: None declared, Jon Chan: None declared, Raj Carmona: None declared, James Yeung: None declared, Sibel Aydin: None declared, Jodie Reis: None declared, Liam Martin: None declared, Ariel Masetto: None declared, Olga Ziouzina: None declared, Dianne Mosher: None declared, Stephanie Keeling: None declared, Sherry Rohekar: None declared, Rana Dadashova: None declared, Joel Paschke: None declared, Amanda Carapellucci: None declared, Robert G Lambert: None declared.

DOI: 10.1136/annrheumdis-2021-eular.3382

POS0038

THE INFLUENCE OF AGE ON THE PREVALENCE OF INFLAMMATORY AND POST-INFLAMMATORY MRI LESIONS IN THE SACROILIAC JOINTS OF PATIENTS WITH AND WITHOUT AXIAL SPONDYLOARTHRITIS

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Background: Axial spondyloarthritis (axSpA) is clinically characterized by chronic inflammatory back pain and by inflammatory and structural changes in the sacroiliac joint (SIJ) as assessed by magnetic resonance imaging (MRI). Several studies have reported high rates of bone marrow edema (BME) suggestive of inflammatory SIJ changes in up to 20% of individuals in the general population <45 years. An update of the definition of a positive MRI of the SIJ in axSpA for classification purposes, based on the number of slices or quadrants showing BME or structural changes such as erosions or fat lesions (FL), was recently published by ASAS.

Objectives: To compare the influence of age on the prevalence of inflammatory and structural MRI changes in the SIJ of patients with chronic low back pain diagnosed with axSpA or non-SpA.

Methods: MRIs of the SIJ of patients referred for differential diagnosis of back pain who were finally diagnosed with axSpA or not by experienced rheumatologists, were evaluated using semi-coronal STIR and T1-weighted MRI sequences. All images were scored blinded to, age, sex and diagnosis for the occurrence of BME, FL, erosions and ankylosis on the level of SIJ-quadrants (SIJ-Q). Patient groups were built based on decade of age (until 29, 30-39, 40-49 and ≥ 50 years).

Results: A total of 309 patients (175 axSpA and 134 non-SpA) with complete MRI sets were included in the analysis. The mean age was 38.5 $\pm$ 11.4 and 43.4 $\pm$ 13.8, 66.9% and 35.8% were male, the mean CRP was 1.6 $\pm$ 2.4 and 1.1 $\pm$ 2.1mg/dl and the median back pain symptom duration was 48 and 60 months, respectively. The number of SIJ-Q with BME and erosions was significantly higher in axSpA vs. non-SpA independent of the age group (Table 1). In comparison, with exception of the patients in the oldest population (≥ 50 years), the number of SIJ-Q with FL and the number of patients with at least one FL was not different between subgroups, while the number of erosions and FL but not BME was higher in both groups with increasing age. In the univariate analysis, only female sex was significantly associated with higher occurrence of FL.

Conclusion: Despite a relatively high prevalence in non-SpA patients, BME and erosions were significantly more frequent in axSpA independent of age, while the presence of FL was not different between groups. FL and erosions are increasingly found in older age groups independent of diagnosis. These data are relevant for the interpretation of MRI findings in the SIJ of patients suspicious of axSpA.