POS0031   **THE PREVALENCE OF INFLAMMATORY BACK PAIN AND HLA-B27 IN A LARGE POPULATION-BASED COHORT IN THE NETHERLANDS**

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Background: Although chronic low back pain (≥3 months) before the age of 45 and inflammatory back pain (IBP) are regarded as early presenting and key features of axial spondyloarthritis (axSpA), and Magnetic Resonance Imaging (MRI) can be used to demonstrate sacroiliitis, the substantial delay in the diagnosis of axSpA has not improved.(1) Additionally, knowledge on the prevalence of chronic low back pain before the age of 45 and IBP in combination with the axSpA-related genetic risk factor Human Leukocyte Antigen-B27 (HLA-B27) in the general population is scarce.

Objectives: To estimate the prevalence of chronic low back pain before the age of 45 and IBP in combination with the presence of HLA-B27 in a large Dutch population based cohort.

Methods: Participants of the Lifelines cohort, a large population-based cohort of the northern region of the Netherlands, filled out a questionnaire on chronic low back pain and IBP. Chronic low back pain was defined as an affirmative answer to the question 'Did you suffer from low back pain for ≥3 months?'. IBP was questioned based on the validated European Spondyloarthropathy Study Group (ESSG) IBP criteria and was confirmed if at least 4 out of the following 5 criteria were present: (a) onset before age 45, (b) insidious onset, (c) improvement with exercise, (d) associated with morning stiffness, (e) at least 3 months duration. Participants reporting to have been diagnosed with axSpA were identified using variations of the search terms "Bechterew", "spondyloarthritis" and "ankylosing spondylitis". The Illumina global screening array (GSA) beadchip-24 v1.0 was used to genotype genome-wide SNPs in a subset of Lifelines participants. HLA-B haplotypes were imputed using neighboring SNPs with HIBAG, which is an R-package, using published parameter estimates.(2) The predicted HLA-B haplotype was considered valid if the posterior probability was >80%.

Results: In total 94,277 Lifelines participants answered the chronic low back pain question, of which 93,665 (99.4%) completed the ESSG IBP questions. Of these participants, 56,008 (59.8%) were female, mean age was 45.6 ± 12.8 years and 22,192 (23.7%) reported to have been suffering from chronic low back pain. In this chronic low back pain group, the pain began before the age of 45 in 17,122 (77.2%; 18,3% of entire Lifelines population) participants, and 13,514 (60.9%; 14.4% of entire Lifelines population) participants reported to have IBP according to the ESSG criteria.
Of 32,785 participants genetic data were available and in 29,399 (89.7%) the HLA-B haplotype could be determined with high prediction accuracy, of which 2,279 (7.8%) participants were HLA-B27 positive. Of these HLA-B27 positive participants, 1,610 (70.6%) also had available chronic low back pain data, of which 373 (23.2%) reported chronic low back pain. Of these 373 patients with chronic back pain and HLA-B27 positivity, the pain began before the age of 45 in 296 (79.4%), and 237 (64.2%) fulfilled the ESSG IBP criteria of which only 11 (4.6%) participants reported to be diagnosed with axSpA.

Conclusion: In this large population-based cohort, 18.3% of participants reported chronic low back pain that began before the age of 45. 14.4% of the participants reported IBP, which is relatively high in comparison to previous studies. HLA-B27 prevalence (7.8%) was similar to previously published data from the North-Western European population. The vast majority of participants with both IBP and the presence of HLA-B27 did not report an axSpA diagnosis. A next step in the analyses will be to explore associations with other demographic and clinical factors present including additional SpA features.

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Imaging in axial spondyloarthritis

POS0032   **SCORING MRI STRUCTURAL LESIONS IN SACROILIAC JOINTS OF PATIENTS WITH AXIAL SPONDYLOARTHRITIS: HOW MANY SLICES ARE OPTIMAL?**

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Background: There is no international consensus on the optimal number of slices for evaluation of MRI structural lesions in the SIJ. An "all slice" method evaluates lesions from the most anterior slice, defined as the first slice with vertical height of ≥1cm of the SIJ joint cavity, up to the most posterior slice, defined as the most posterior slice where ≥1cm vertical height of the cartilaginous portion is still visible. The SPARCC method scores the transitional slice between cartilaginous and ligamentous compartments as the first slice and then an additional 4 slices anterior to the transitional slice.

Objectives: We aimed to investigate inter-reader reliability, the extent of detection of lesions, and frequency of cases with a positive MRI for structural lesions when using an "all slice" approach versus the SPARCC scoring of 5 central slices.

Methods: MRI T1W images with DICOM series were available from 148 cases who had MRI performed in the ASAS-Classification Cohort. Seven central readers recorded MRI lesions in an eCRF that recorded global assessments of presence/absence of changes suggestive of axSpA and structural lesions typical of axSpA. Structural lesions per the ASAS definitions were also recorded in consecutive semicoronal slices using the "all slice" approach, but also recording the transitional slice, according to their presence/absence in SIJ quadrants (erosion, fat lesion, sclerosis) or halves (backfill, ankylosis). Structural lesion frequencies were assessed descriptively according to majority agreement (≥4/7) of central readers and also any 2 central readers. Reliability for detection of MRI lesions was compared between central and local readers using the ICC.

Results: The mean (SD) (range) number of anterior and posterior slices peripheral to the 5 central slices was 1.0 (1.0) (0-4) and 2.2 (1.8) (0-6) per case, respectively. There were 2 cases (1.4%) where ≥2 readers scored structural lesions in peripheral slices but not in the 5 central slices. The mean percentage of the total structural lesion score that was captured by the 5 central slices was >75% for all types of lesions except ankylosis (59%) (Table 1). Inter-reader reliability was greater for all lesions when assessing the 5 central slices and especially for erosion and backfill (Table 1).

Conclusion: The major component of structural lesion data is captured by assessment of 5 slices, which includes the transitional slice and the subsequent 4 anterior slices. Moreover, reliability for detection of structural lesions is substantially worse in peripheral slices.

MRI Lesion	"All slice"	Central 5 slices	Peripheral slices	P value central vs peripheral slices	P value "all slice" vs central slices
Mean (SD) Lesion Score Per Case					
Erosion	2.4 (4.5) (0-22.9)	1.8(3.4) (0-17.1)	0.6 (1.4) (0-10.1)	<0.001	< 0.001
Fat lesion	2.5 (5.9) (0-34.0)	1.8 (4.5) (0-25.1)	0.7 (1.8) (0-9.9)	< 0.001	<0.001
Sclerosis	2.0 (4.9) (0-39.0)	1.5 (3.6) (0-26.1)	0.5 (1.5) (0-12.9)	< 0.001	<0.001
Backfill	0.5 (1.5) (0-12)	0.4 (1.2) (0.0-9.3)	0.1 (0.4) (0-2.7)	< 0.001	0.84
Ankylosis	0.5 (3.4) (0-30.7)	0.3 (2.3) (0-20.0)	0.2 (1.2) (0-11.3)	0.10	0.18
Mean (SD) (Range) % of Total Lesion Score in Central vs Peripheral slices					
Erosion	100%	76.4% (28.9%) (0-100%)	23.6% (28.9%) (0-100%)	<0.001	NA
Fat lesion	100%	75.4% (26.5%) (0-100%)	24.6% (26.5%) (0-100%)	<0.001	NA
Sclerosis	100%	79.5% (22.9%) (0-100%)	20.5% (22.9%) (0-100%)	<0.001	NA
Backfill	100%	86.0% (20.2%) (0-100%)	14.0% (20.2%) (0-100%)	<0.001	NA
Ankylosis	100%	59.0% (36.4%) (0-100%)	41.0% (36.4%) (0-100%)	0.56	NA
ICC of 7 readers (Mean (SD) (Range))					
MRI lesion	**All slices**	**Central 5 slices**	**Peripheral slices**		
Erosion	0.54 (0.15) (0.28-0.84)	0.58 (0.13) (0.34-0.85)	0.40 (0.17) (0.10-0.66)		
Fat lesion	0.61 (0.18) (0.30-0.89)	0.63 (0.16) (0.35-0.88)	0.52 (0.20) (0.19-0.82)		
Sclerosis	0.73 (0.18) (0.36-0.94)	0.73 (0.16) (0.36-0.91)	0.67 (0.19) (0.27-0.94)		
Backfill	0.37 (0.21) (0.10-0.85)	0.39 (0.19) (0.14-0.83)	0.18 (0.23) (0.0-0.80)		
Ankylosis	0.97 (0.02) (0.91-0.99)	0.99 (0.01) (0.97-1.0)	0.85 (0.10) (0.62-0.98)		

POS0033

IN RADIOGRAPHIC AXIAL SPONDYLOARTHRITIS, BRIDGING SYNDESMOPHYTES INCREASE RISK OF FACET JOINT ANKYLOSIS ON THE SAME VERTEBRAL LEVEL WHILE FACET JOINT ANKYLOSIS DOES NOT INCREASE RISK OF SAME LEVEL SYNDESMOPHYTES

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Background: In radiographic axial spondyloarthritis (r-axSpA), spinal damage manifests as syndesmophytes and facet joint ankylosis (FJA).

Objectives: Explore whether syndesmophytes and FJA seem to have a preferential order of development.

Methods: Data were used from the Sensitive Imaging in Ankylosing Spondylitis cohort from Leiden and Herne. Patients underwent low-dose Computed Tomography (ldCT) at baseline and two-years. LdCT images were scored independently by two trained readers. Vertebrae were scored according to the Computed Tomography Syndesmophyte Score (CTSS) for presence and size of syndesmophytes; facet joints were scored as not-ankylosed and ankylosed. Analyses were performed on the vertebral unit (VU) level and using individual-reader data (Figure 1). Two hypotheses were tested: 1) presence of bridging syndesmophyte(s) is associated with FJA on the same VU two years later, and 2) presence of FJA is associated with syndesmophyte(s) on the same VU two years later. Generalized Estimating Equations (GEE) models were used to take into account the correlations between VUs from the same patient and adjusting for reader to account for individual reader scores. Two models were tested per hypothesis using different outcomes. Model 1 uses the presence of syndesmophytes or FJA as outcome adjusting for the outcome at baseline. Model 2 uses development of new syndesmophytes or FJA at two years plus an increase in the number of syndesmophytes or FJA. **Results:** In total, 50 patients were included (mean age 49, 84% male, 82% HLA-B27+). At baseline, there was a higher percentage of bridging syndesmophytes (range: 10-60%) than FJA (range: 8-36%) considering all VUs and both readers (Figure 1). In both models, presence of bridging syndesmophytes was associated with development of FJA two years later (OR (95%CI) Model 1: 3.35 (2.18-5.14); Model 2: 2.23 (1.19-4.16)) while presence of FJA at baseline did not have a statistically significant association with development of syndesmophytes two years later (Table 1).

Conclusion: The data showed a higher occurrence of bridging syndesmophytes than FJA at baseline and showed significantly increased odds to develop FJA when bridging syndesmophyte(s) are present on the same VU two years prior. This mechanism did not hold true for the other direction. These results cautiously imply that bridging syndesmophytes precede FJA, rather than FJA preceding syndesmophytes.

Figure 1. Percentage of occurrence of syndesmophytes and facet joint ankylosis per vertebral unit and per reader at baseline.

Figure 1 displaying percentages of patients with a bridging syndesmophyte and with facet joint ankylosis at baseline, per reader. The image on the left illustrates the vertebral unit level (VU) at which analyses were performed. Seven VUs are illustrated in dashed boxes as example. Synd, syndesmophyte; FJA, facet joint ankylosis; BL, baseline.

Table 1.   Associations between facet joint ankylosis and syndesmophytes

	Model 1: development of new FJA/syndesmophytes at FU OR (95% CI)	**Model 2**: development and/ or increase FJA/syndesmophytes at FU OR (95% CI)
Hypothesis 1 Presence bridging syndesmophytes at BL on development of FJA at FU	**3.35 (2.18-5.14)**	**2.23 (1.19-4.16)**
Hypothesis 2 Presence FJA at BL on development of syndesmophytes at FU	1.60 (0.88-2.91)	1.12 (0.76-1.66)

Disclosure of Interests: None declared.
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