were male, and the mean age was 45.6 (10.4). The mean follow-up period of the patients was 10.6 (7.9) years. Of all patients, 468 (55.1%) were using a bDMARD at the time of evaluation. 12 SpA patients stated that their spouses had SpA. In the review of these patients, it was found that four patients did not have SpA, and one of them had PsA. Spouses of patients with nr AxSpA and peripheral SpA did not have AS/SpA AS was detected in the spouses of 7 patients. The incidence of AS in the entire SpA patient group was calculated as 7/695 (1.01% (0.4-2.1)). The incidence of AS in spouses of AS patients are 7/582 (1.20% (0.5-2.5)) calculated. 2 of 7 wives were cousins' children. The incidence of AS in unrelated spouses of AS patients are 5/580 (0.86% (0.3-2)). Only one of the spouses with AS knew her spouse's diagnosis at the time of marriage, while the other six were diagnosed after marriage. The median time for these patients to be diagnosed after marriage is 22 (7-32) years.

Conclusion: In the Turkish population, the frequency of AS was 0.49%, and the frequency of SpA was 1.05%. [2] The incidence of AS in the spouses of SpA patients has increased approximately two times compared to the average Turkish population. A 2.4-fold increased risk was found in AS patients. This situation may be related to environmental factors that play a role in the pathogenesis of SpA disease. However, the fact that half of the patients were using bDMARDs suggests that they were analyzed in the group with the potential for more severe disease. The results require confirmation in more extensive studies.

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AB1013 ARTIFICIAL INTELLIGENCE FOR DETECTION OF INFLAMMATORY SACROILIITIS IN MAGNETIC RESONANCE IMAGING IN PATIENTS WITH AXIAL SPONDYLOARTHRITIS

Keywords: Artificial intelligence, Imaging, Spondyloarthritis

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Background: Magnetic resonance imaging (MRI) is frequently used to evaluate active inflammatory sacroiliitis for early axial spondyloarthritis (axSpA) diagnosis. However, evaluation of sacroiliitis in MRI requires expertise because noninflammatory degenerative changes can mimic axSpA, and the semiquantitative diagnosis remains subject to significant variation. Artificial intelligence could function as assistance for inflammatory sacroiliitis detection.

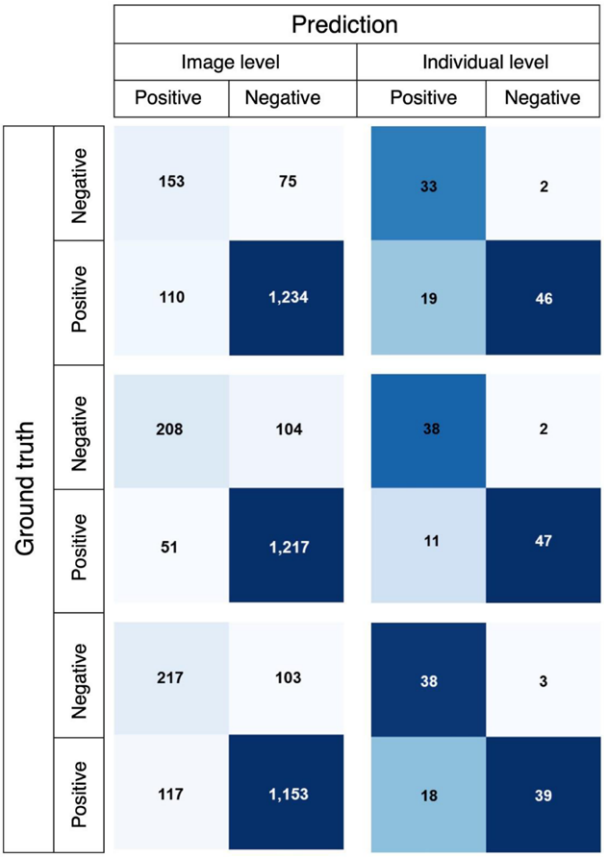
Objectives: This study aimed to develop artificial intelligence for detecting inflammatory sacroiliitis for axSpA in MRI.

Methods: This retrospective study included MRI examinations of patients with clinical suspicion of axSpA collected at Samsung Medical Center between January 2010 and December 2021. Only the patients who performed short tau inversion recovery (STIR) MRI of the sacroiliac joints were included. Active inflammatory lesions consisting of bone marrow edema (BME) were identified independently by a rheumatologist and a radiologist using the Assessment of SpondyloArthritis international Society (ASAS) definition of MRI sacroiliitis. We propose a two-stage deep learning framework that combines a sacroiliac joints (SIJs) localization network with a BME classification network. First, the Faster R-CNN network extracts regions of interest (ROI) to localize the SIJs using whole MR images. Here, Maximum Intensity Projection (MIP) using three consecutive images of SIJs ROI is applied to enhance the low intensity of BME and consider the contextual information between images. Second, the VGG-19 network determines the presence of BME on individual MR images of localized SIJs ROIs with a resolution of 128x256. During the training process, we augmented the positive dataset 6-fold using blurring, contrast, noise, rotation, and sharpening because of the smaller number of data than the negative dataset. The prediction models were evaluated using 3-round, 3-fold cross-validation. The performance of BME classification was measured using accuracy and area under the receiver operating characteristic curve (AUC-ROC) curve.

Results: A total of 296 participants with 4,746 MRI images were included in the study. Inflammatory sacroiliitis was identified in 864 MRI images from 119 participants. The mean average intersection over unions (IoU) of ROIs to localize the SIJs was 0.742 for the right side and 0.744 for the left side. The mean accuracy and AUC-ROC of inflammatory sacroiliitis were 0.898 and 0.830 for image level and 0.801 and 0.827 for patient level, respectively. The confusion matrices of inflammatory sacroiliitis prediction are shown in Figure 1. In the original model, without using MIP and dataset augmentation, the mean accuracy and AUC-ROC were 0.867 and 0.609 for image level and 0.717 and 0.620 for individual level. Compared to the original model, improved performances of inflammatory sacroiliitis could be observed.

Conclusion: Artificial intelligence can detect inflammatory sacroiliitis for axSpA according to the ASAS definition in MRI.

Figure 1. The confusion matrices of classification of inflammatory sacroiliitis prediction by image-based and individual-based in first round.



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AB1014 RADIOGRAPHIC VERSUS NON-RADIOGRAPHIC AXIAL SPONDYLOARTHRITIS: RESULTS FROM TREASURE DATABASE

Keywords: Real-world evidence, Outcome measures, Registries

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Background: Axial Spondyloarthritis is an umbrella term including radiographic (r-axSpA) and non-radiographic (nr-axSpA) forms which has been initially suggested by Assessment of SpondyloArthritis International Society (ASAS) as a different stages of the disease. Within time, studies have tried to answer whether these two entities represent distinct features, and the debate is still ongoing.
Objectives: The objective of this study is to define the similarities and differences of r-AxSpA and nr-AxSpA patients using a large national registry data.
Methods: TReasure is a national, multicentre, longitudinal, and observational database, initiated in Turkey in 2017 [1]. This database included patients with inflammatory arthritis, rheumatoid arthritis, axial-and peripheral SpA at the time of the first introduction of biological treatment. At the time of this analysis database consisted of 7015 SpA patients. All patients registered to the database fulfill the 2009 ASAS classification criteria. For this analysis, patients were categorized into r-AxSpA and nr-AxSpA and demographic and clinical characteristics of patients were determined.
Results: There were 4629 (86.7%) patients with r-AxSpA, 707 (13.3%) patients with nr-AxSpA patients. *Demographic differences*; r-AxSpA group were older (45 (16) vs 41 (14), p<0.001) and male predominant (59.6% vs 46.0%, p<0.001), with longer disease duration at bDMARD initiation (3.0 (6.9) vs 1.1 (3.4) years, p<0.001) and more smoker (61.4% vs 50.4%, p<0.001). *SpA clinic/genetic differences*; r-AxSpA group had less arthritis (7.7% vs 27.5%, p<0.001), heel pain (11.1% vs 40.8%, p<0.001), dactylitis (3.4% vs 8.1%, p<0.001), psoriasis (10.2% vs 14.5%, p<0.001), SpA family history (28.2% vs 40.8%, p<0.001), IBD (4.5% vs 7.4%, p=0.001) and more HLA-B27 positivity (58.2% vs 51.4%, p<0.001), similar uveitis rate (13.2% vs 14.8%). *SpA Outcome measures (bDMARD baseline) differences;* r-AxSpA group had worse functionality and quality of life measured by BASFI (5.0 (3.0) vs 4.0 (3.9), p<0.001), HAQ-DI 0.63 (0.40) vs 0.55 (0.65), p=0.029) respectively. Worse metrology by BASMI 3.2 (2.6) vs 1.7 (2.1), p<0.001) and high disease activity by ASDAS-CRP (3.64 (1.28) vs 3.24 (1.33), p<0.001) with higher CRP (12 (21.8) vs 7.3 (15.0) p<0.001) was observed. *SpA imaging differences;* r-AxSpA group had higher rate of `any syndesmophytes `(26.6% vs 5.4%, p<0.001), hip involvement (24.6% vs 4.5%, p<0.001), hip prosthesis (2.3% vs 0.3%, p<0.001), MRI structural lesions (63.6% vs 37.3%, p<0.001), and less active MRI lesions (74.6% vs 87.0%, p<0.001). No significant difference was observed in the physician decision on the b-DMARD choice at baseline (p=0.673).
Conclusion: A significant proportion of SpA patients who were initiated bDMARD have r-SpA. Although the two entities are seen as the continuum of each other, they have significant differences in terms of demographic, clinical, genetic, functional, metrology, activity and imaging characteristics. On the other hand, there is no difference in treatment choices at the stage of bDMARD initiation.

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AB1015

FETUIN-A: A NEW BIOMARKER OF BONE DAMAGE IN EARLY AXIAL SPONDYLARTHRITIS. RESULTS OF AN INTERIM ANALYSIS OF THE SPACE STUDY

Keywords: Diagnostic tests, Imaging, Spondyloarthritis

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Background: Fetuin-A serum levels have been variably associated with radiological damage in axial spondyloarthritis (axSpA).
Objectives: The aim of this study was to evaluate the association of fetuin-A with the presence of radiographical sacroiliitis and syndesmophytes in early axSpA and to identify predictors of radiological damage in the sacroiliac joints (SIJ) after 24 months.
Methods: Patients with axSpA in the Italian cohort of the SpondyloArthritis-Caught-Early (SPACE) study were included. Physical examinations, laboratory tests (including fetuin-A), SIJ and spinal plain radiographs and MRIs at T0 (diagnosis) and at T24 were considered. Radiological damage in the SIJ was defined according to modified New York (mNY) criteria.
Results: Fifty-seven patients were included (41.2% males, average chronic back pain duration of 13.2±6 months). Fetuin-A levels were lower in patients with radiological sacroiliitis compared to those without at T0 (205.7±59.7 vs 249.7±50.4 µg/mL, respectively, p <0.001) and at T24 (222.3±51.5vs 272.3±91.6 µg/mL, p=0.03) (Table 1). T0 fetuin-A levels significantly correlated with mNY score at T0 and at T24, and T24 fetuin-A levels with mNY at T24 (Figure 1). At T0, fetuin-A levels were significantly higher in non-smokers, in patients with heel enthesitis and in those with a family history of axSpA; at T24 levels were higher in females, in patients with higher ESR/CRP at T0 and in those with radiological sacroiliitis at T0 (Table 1). Following multivariable analysis, fetuin-A at T0 resulted negatively associated with the likelihood of radiological sacroiliitis (OR=0.9 per 10-unit increase (95%CI 0.8, 0.999), p=0.048); but not with syndesmophytes. Fetuin-A at T0 and T24 were associated with mNY at T0 (β -0.5, p<0.001) and at T24 (β -0.3, p<0.001), respectively; T0 fetuin-A levels did not achieve statistical significance in predicting mNY at T24 (β -0.9, p<0.001).
Conclusion: Fetuin-A levels were negatively associated with radiological damage of the SIJ, but not of the spine, in early axSpA and after 2 years of follow-up. Fetuin-A levels may serve as biomarker to identify patients with a more severe disease and early structural damage.

Table 1.

	All patients	No radiological sacroiliitis	Radiological Sig. sacroiliitis		No syndesmophytes	Syndesmophytes	Sig.
Number	57	36	21		51	6	
Males	24 (42.1)	12 (33.3)	12 (57.1)	0.08*	19 (37.3)	5 (83.3)	0.03**
BMI	24.1±4.3	24.1±4.7	24±3.7	0.92	23.5±3.5	29±7	0.05**
Smoking	19 (33.3)	9 (25)	10 (47.6)	0.08*	16 (31.4)	3 (50)	0.36
Age of onset chronic back pain(CBP)	29.2±8.3	29.8±8.9	28.1±7.4	0.49	28.1±7.9	38.3±6.6	0.01**
Duration CBP	13.2±6	12.9±5.7	13.6±6.7	0.75	12.9±6.2	15.7±4.6	0.25
HLA-B27	22 (38.6)	12 (33.3)	10 (47.6)	0.29	21 (41.2)	1 (16.7)	0.24
Heel enthesitis	46 (80.7)	32 (88.9)	14 (66.7)	0.04**	40 (78.4)	6 (100)	0.21
Peripheral arthritis	24 (42.1)	13 (36.1)	11 (52.4)	0.23	20 (39.2)	4 (66.7)	0.2
Family history	28 (49.1)	19 (52.8)	9 (42.9)	0.47	26 (51)	2 (33.3)	0.41
Response to NSAIDs	55 (96.5)	35 (97.2)	20 (95.2)	0.69	49 (96.1)	6 (100)	0.62
Fetuin-A, µg/mL	233.5±57.6	249.7±50.4	205.7±59.7	<0.001**	233.8±59.3	231.4±44.6	0.68
Elevated CRP or ESR	30 (52.6)	16 (44.4)	14 (66.7)	0.11	27 (52.9)	3 (50)	0.89
BASDAI	4.4±2.5	4.9±2.3	3.5±2.6	0.03**	4.5±2.5	3.2±2.9	0.2
BASMI	0.8±1	0.8±1.1	0.7±1	0.8	0.7±1	1±1.5	0.98
ASDAS	2.5±0.8	2.5±0.8	2.5±0.8	0.6	2.5±0.8	2.1±0.9	0.18
MASES	3.5±2.5	4±2.7	2.5±1.9	0.04**	3.5±2.6	2.8±2.4	0.53
Radiological sacroliliitis	0.4±0.5	0±0	1±0	-	0.4±0.5	0.3±0.5	0.85
Syndesmophytes	0.1±0.3	0.1±0.3	0.1±0.3	0.85	0±0	1±0	-
mNY	0.5±0.8	0.2±0.4	1.1±0.9	-	0.5±0.8	0.3±0.5	0.61
mSASSS	3.3±3.9	3.2±4.2	3.5±3.3	0.36	2.5±2.8	10±5.3	<0.001**
SPARCC SIJ	5.1±11.7	3.3±10.9	8.2±12.7	0.09†	5.3±12.3	3.7±4.8	0.89
SPARCC spine	9.6±13.4	6.8±9.8	14.2±17.2	0.09†	9.9±13.9	7±7.1	0.63

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