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ORIGINAL RESEARCH

Discrepancies between routine sacroiliac joint MRI reporting and current expert recommendations in patients with spondyloarthritis

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ABSTRACT

Background Sacroiliac joint (SIJ) MRI is commonly used in diagnosing spondyloarthritis (SpA). Current Assessment of SpondyloArthritis International Society (ASAS) recommendations on reporting SIJ MRIs in patients with known or suspected axial SpA recommend always stating whether bone marrow oedema (BME), erosions and fat lesions are present/absent and whether the MRI is compatible with axial SpA.

Purpose To investigate if routine care radiologists already report what has now been recommended and to assess the agreement between local radiologists and central SpA experts.

Materials and methods This study includes retrospective interpretation of images acquired in routine care. Patients diagnosed with SpA enrolled in a clinical registry in one of five European countries involved in the EuroSpA Collaboration, with an available SIJ MRI and an associated local MRI report, were included. MRIs were read centrally by two readers, who registered global features (eg, MRI indicative of SpA), and various inflammatory and structural lesions as present/absent. Similar information was extracted from local reports. Findings were analysed with descriptive statistics.

Results Overall, 913 patients (40 years±13, 492 men) were included. In 24%, the local MRI reports stated whether the MRI was overall indicative of SpA or not. Presence/absence of BME, erosions and fat lesions was mentioned in 88%, 48% and 29% of local reports, respectively. Inflammatory lesions were more often reported as present by local than central readers (46% vs 36%), and structural lesions less often (33% vs 50%).

Conclusion This study demonstrated a large gap between the clinical practice of reporting SIJ MRIs and recent reporting recommendations.

WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ Recommendations on how SIJ MRIs should be reported in patients with suspected spondyloarthritis (SpA) have been published.
⇒ There is no knowledge of how reporting was done in routine care before these recommendations were published.

WHAT THIS STUDY ADDS

⇒ Only about one-fourth of the 913 reports mention whether the MRI is indicative of SpA or not.
⇒ In general, the image reports overcall inflammatory lesions in sacroiliac joint MRI and undercall structural lesions.
⇒ There is a gap between European image reports created in routine care and current reporting recommendations in axial SpA.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ This study suggests a need for further dissemination of the recommendations and standardisation of reporting in routine care.

INTRODUCTION

Sacroiliac joint (SIJ) MRI aids diagnosing and monitoring of patients with spondyloarthritis (SpA). However, radiologists in daily clinical practice may be less familiar with assessing SIJ MRIs in SpA, potentially leading to misinterpretations of findings, thereby influencing the final diagnosis.

In recent recommendations by the Assessment of SpondyloArthritis International Society (ASAS), Diekhoff *et al* discussed how SIJ MRI for known or suspected axial SpA (axSpA) should be reported.[1] The recommendations include technical aspects, how to

Table 1 Patient characteristics extracted from clinical registries

	All N=913	Czech Republic N=31	Denmark N=624	Switzerland N=240
Age, mean (min–max)	39.7 (18–77)	32.8 (18–53)	39.9 (18–77)	40 (18–76)
Gender, n (%)				
Female	421 (46%)	11 (35%)	301 (48%)	99 (41%)
Male	492 (54%)	20 (65%)	323 (52%)	141 (59%)
Diagnosis, n (%)				
axSpA	736 (81%)	31 (100%)	499 (80%)	191 (80%)
PsA	177 (19%)	0 (—)	125 (20%)	49 (20%)
Disease duration, n (%)				
Before diagnosis	185 (20%)	12 (39%)	123 (20%)	45 (19%)
<2 years after diagnosis	278 (30%)	12 (39%)	179 (29%)	82 (34%)
2–5 years after diagnosis	118 (13%)	<5 (<16%)	84 (13%)	28 (12%)
5–10 years after diagnosis	104 (11%)	<5 (>16%)	62 (10%)	37 (15%)
>10 years after diagnosis	107 (12%)	0 (—)	65 (10%)	39 (16%)
Not registered	121 (13%)	0 (—)	111 (18%)	9 (4%)
Fulfils CASPAR criteria, n (%)				
Yes	239 (26%)	0 (—)	180 (29%)	59 (25%)
No	0 (0%)	0 (—)	0 (—)	0 (0%)
Not registered*	674 (74%)	31 (100%)	444 (71%)	181 (75%)
Fulfils ASAS criteria, n (%)				
Yes	583 (64%)	31 (100%)	350 (56%)	193 (80%)
No	13 (1%)	0 (—)	6 (1%)	6 (3%)
Not registered	317 (35%)	0 (—)	268 (43%)	41 (17%)
HLA-B27 positive, n (%)				
Yes	483 (53%)	26 (84%)	339 (54%)	109 (45%)
No	273 (30%)	5 (16%)	208 (33%)	59 (25%)
Not registered	157 (17%)	0 (—)	77 (12%)	72 (30%)

Clinical data on patients from Iceland and Slovenia are not shown separately due to the low number of patients (<30), and thereby subgroups would be too small according to GDPR regulations. In the Czech data, two groups had <5 patients and therefore the specific number is not reported due to GDPR. Data are included in the column for all patients.
*The CASPAR criteria are mainly registered for the PsA patients, which explains the high amount of missing data.
ASAS, Assessment of SpondyloArthritis International Society; axSpA, axial spondyloarthritis; CASPAR, CLASsification for Psoriatic ARthritis; GDPR, General Data Protection Regulation; HLA-B27, human leukocyte antigen B27; PsA, psoriatic arthritis.

report specific lesions, the overall interpretation of the MRI and differential diagnoses. It was recommended that bone marrow oedema (BME), erosions and fat lesions should always be reported, both when present and absent. In addition, the radiologist should clearly state whether the findings are compatible with axSpA. The recommendations do not include stating whether the ASAS definition of a positive MRI is fulfilled.

Two earlier studies have investigated the agreement between local and central readings on structured cohorts of patients with relatively short symptom duration, and with the local readings done with standardised questionnaires by readers who knew they were reading for a study.[2 3] Both studies found disagreement on the identification of active inflammatory lesions on SIJ MRI.

To our knowledge, an investigation of routine clinical practice MRI reports (ie, generated outside the controlled environment of a clinical research study) and their agreement with central expert readings has not been performed previously.

The European Spondyloarthritis Research Collaboration Network (EuroSpA) is a scientific collaboration between European clinical registries that follow routine care patients with SpA, including axSpA and psoriatic arthritis (PsA).[4 5]

Using data from EuroSpA, the present study aimed to (1) investigate the content in local SIJ MRI reports from routine care in five European countries in patients with a clinical diagnosis of axSpA or PsA, (2) compare these with central experts' readings of the same images and

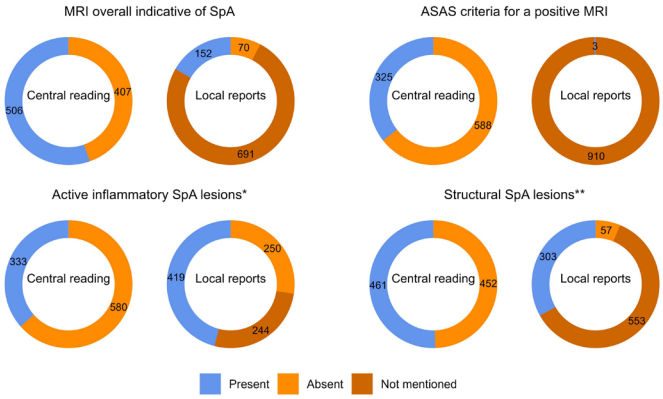

Figure 1 Count of global features in local reports and central readings. *Active inflammatory SpA lesions are also reported in the local reports as sacroiliitis/active disease/SIJ arthritis/inflammatory activity/inflammatory changes. **Structural SpA lesions are also reported in the local reports as sacroiliitis sequelae, postinflammatory changes, chronic inflammatory changes and chronic changes after sacroiliitis. ASAS, Assessment of SpondyloArthritis International Society; SIJ, sacroiliac joint; SpA: spondyloarthritis; MRI, magnetic resonance imaging.

(3) investigate if routine care radiologists already report findings on SIJ MRI in accordance with what has recently been recommended by ASAS.

MATERIALS AND METHODS

Study design

In this study, with retrospective interpretation of images acquired in routine care, five clinical registries participating in EuroSpA (Czech Republic, ATTRA registry; Denmark, DANBIO; Iceland, ICEBIO; Slovenia, biorx.si and Switzerland, SCQM; see online supplemental table S1[5–8] for detailed information) collected SIJ MRIs and local SIJ MRI reports from routine care. The MRIs were reread by central experienced readers to allow investigation of the content in local SIJ MRI reports in patients with SpA. Clinical data were extracted from the registries.

Clinical data

The following clinical data were extracted from the clinical registries: age, sex, year of diagnosis, fulfilment of the Classification for PsA criteria, fulfilment of the ASAS criteria and human leucocyte antigen B27.

Image collection

For inclusion in the study, the following were required: a registered diagnosis of axSpA or PsA in the clinical registries, age ≥18 years at initial diagnosis and an SIJ MRI (T1-weighted, and short τ inversion recovery (STIR) or T2-weighted fat-saturated (T2FS) images) obtained between 2005 and 2022 with an associated local MRI report. All MRIs, local reports and clinical data were

Table 2 Global features and individual lesions in local image reports and central MRI readings (n=913); descriptive statistics and agreement, when central readings are considered the standard reference

	Local MRI reports			Central MRI readings*		Agreement			
	Present	Absent	Not mentioned	Present	Absent	PEA (%)	Kappa	Sensitivity	Specificity
Global features									
MRI overall indicative of SpA	152 (17%)	70 (7.7%)	691 (76%)	506 (55%)	407 (45%)	56.4	0.19	0.26	0.95
Fulfilment of ASAS criteria definition of for a positive MRI	3 (0%)	0 (0%)	910 (100%)	325 (36%)	588 (64%)	64.2	−0.01	0.00	0.99
Active inflammatory SpA lesions†	419 (46%)	250 (27%)	244 (27%)	333 (36%)	580 (64%)	79.4	0.58	0.85	0.76
Structural SpA lesions‡	303 (33%)	57 (6.2%)	553 (61%)	461 (50%)	452 (50%)	65.0	0.30	0.48	0.82
Individual lesions, patient level									
Bone marrow oedema	501 (55%)	302 (33%)	110 (12%)	464 (51%)	449 (49%)	80.8	0.62	0.85	0.76
Sclerosis	232 (25%)	33 (3.6%)	648 (71%)	120 (13%)	793 (87%)	76.8	0.27	0.58	0.80
Erosion	296 (32%)	143 (16%)	474 (52%)	344 (38%)	569 (62%)	69.3	0.33	0.52	0.80
Fat lesion	212 (23%)	50 (5.5%)	651 (71%)	282 (31%)	631 (69%)	75.9	0.39	0.49	0.88
Backfill	7 (1%)	0 (0%)	906 (99%)	83 (9%)	830 (91%)	90.4	0.01	0.01	0.99
Ankylosis	120 (13%)	261 (29%)	532 (58%)	115 (13%)	798 (87%)	94.2	0.74	0.79	0.96

*Results of central readings are based on concordant positive findings, that is, 'presence' requires detection by 2 readers (either both primary readers or one primary reader + the adjudicator).
†Active inflammatory SpA lesions are also reported in the local reports as sacroiliitis/active disease/SIJ arthritis/inflammatory activity/inflammatory changes.
‡Structural SpA lesions are also reported in the local reports as sacroiliitis sequelae, postinflammatory changes, chronic inflammatory changes and chronic changes after sacroiliitis.
ASAS, Assessment of SpondyloArthritis International Society; MRI, magnetic resonance imaging; PEA, percentage exact agreement; SIJ, sacroiliac joint; SpA, spondyloarthritis.

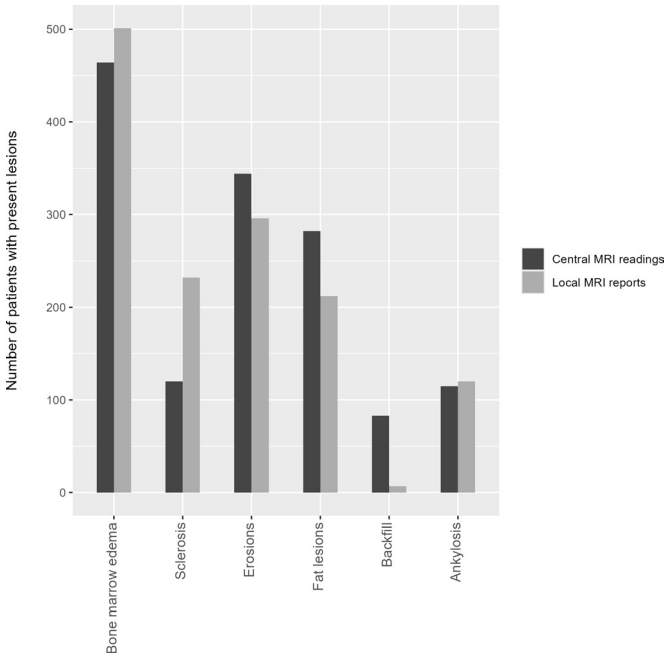

Figure 2 Positive findings of individual lesions in local reports and central readings. Number of patients with different lesions in the SIJ MRI in the central readings and the local MRI reports. For a lesion to be considered present in the local MRI reports, it had to be mentioned explicitly. SIJ, sacroiliac joint; MRI, magnetic resonance imaging.

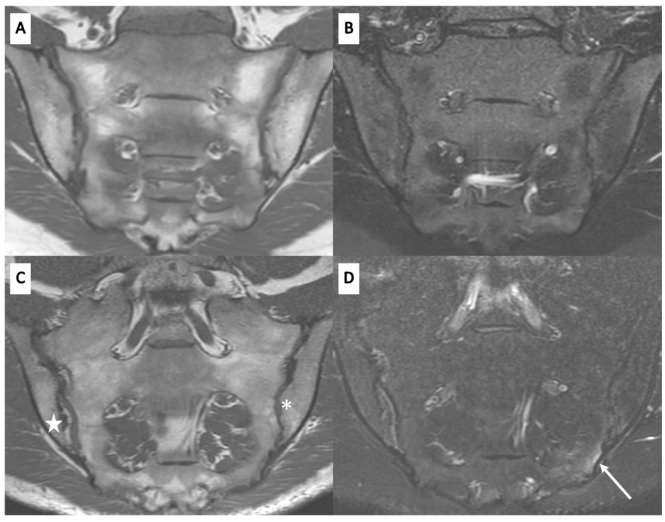

Figure 3 Examples of cases with disagreement between local MRI reports and central MRI readings. (A) and (B) are T1-weighted and STIR sequences of the same patient, respectively. Bilateral BME was reported in local MRI reports but not in central MRI readings. Dark areas on the STIR sequence (B) due to fat infiltration might give the impression that the normal bone marrow is bright. (C) and (D) are T1-weighted and STIR sequences of another patient. On the T1-weighted (C), there are backfill (star) and erosions (asterisk), which are not reported in local MRI reports but are in central MRI readings. On the STIR image (D), local MRI reports reported BME at the left sacroiliac joint, but central MRI readings did not, probably because it was considered either too small or more likely because the lesion is outside the joint (too caudal) (arrow) and central readers were asked only to score subchondral BME (ie, BME associated with the joint). The lesion may reflect enthesitis. BME, bone marrow oedema; STIR, short τ inversion recovery.

pseudonymised in each registry prior to transfer to the EuroSpA Coordinating Centre in Copenhagen via a secure server.

Central MRI reading

SIJ MRIs were read centrally by two primary readers: an experienced musculoskeletal radiologist (IE, TD, RGWL, ISS, KKG, KP and ZS) and another experienced reader (radiologist or rheumatologist) with more than 5 years of experience in assessment of SIJ MRIs (MØ, SJP, MdH, SK and AEFH). All readers calibrated before reading (for details, see Maksymowych *et al*[9]).

The MRIs were read blinded to other imaging and clinical information (except for age and sex) by answering an online questionnaire (see online supplemental table S2 for questionnaire). The questionnaire contained questions on 'global features': (1) whether the findings seen on the MRI were indicative of SpA, (2) whether the images fulfilled the ASAS definition of a positive SIJ MRI,[10–12] (3) whether there were typical active inflammatory lesions indicative of axSpA and (4) whether there were typical structural lesions indicative of axSpA. In addition, lesions defined by the ASAS working group were assessed.[10–12]

Images were adjudicated when readers disagreed on (1) whether the MRI was indicative of SpA, (2) fulfilment of the ASAS definition of a positive SIJ MRI and/or (3) if at least one reader had registered either fracture, neoplasia or infection as a differential diagnosis. The adjudicator was an expert musculoskeletal radiologist (IE, TD and RGWL) and member of the ASAS MRI group, who was blinded to assessments by previous readers.

Local MRI reports

The local MRI reports, generated by local radiologists (no data were available on the level of specialisation of these local radiologists) as part of routine care, were translated into English (except the Danish reports) using Google Translate and DeepL. Translations were afterwards quality checked by native speakers (rheumatologists or radiologists). Subsequently, the data in the reports were systematically registered centrally in a tabular format. Global features (MRI overall indicative of SpA, fulfilment of the ASAS definition of a positive SIJ MRI, presence of active inflammatory SpA lesions (also reported as sacroiliitis/active disease/SIJ arthritis/inflammatory activity/inflammatory changes) and presence of structural SpA lesions (also reported as sacroiliitis sequelae, postinflammatory changes, chronic inflammatory changes and chronic changes after sacroiliitis), as well as individual lesions (BME, sclerosis, erosions, fat lesions, backfill and ankylosis; and equivalent wordings), were extracted from the reports. A complete list of which wordings in the reports were interpreted as the different global features/

specific lesions is found in online supplemental table S3. Whether a global feature/specific lesion was reported as present or absent, or not mentioned at all was registered. If a lesion was reported in one SIJ and not the other, the lesion was considered absent in the other SIJ.

Statistical methods

The data in the local MRI reports and the central reading, as well as the clinical data, were reported using descriptive statistics.

For the central readings, a lesion was only considered present when at least two readers had scored it as present. The confidence scores in the questionnaire were not taken into account in the calculations.

For the calculations below, the specific lesions that were not mentioned in the report were treated as absent. The agreement between the local MRI reports and the central MRI readings was assessed with percentage exact agreement and kappa. Sensitivity and specificity for all global features/specific lesions on both patient and joint level, with the central reading as the standard reference, were calculated. The calculations were also done on the subset of images obtained from 2015 to 2022.

The same analyses were done on subgroups stratifying for: diagnosis (axSpA versus PsA), scan plane (semicoronal versus other than semicoronal), country (Iceland and Slovenia not included due to low number of patients, <30) and disease duration (SIJ MRI obtained before diagnosis, <2 years, 2–5 years, 5–10 years, or >10 years after diagnosis).

Agreement between the central readers was calculated using the kappa statistic.

All calculations were done in R for Windows V.4.4.1.

RESULTS

Overall, 913 patients (mean age 40 years±13, 492 male) were included (table 1). Of the 913 MRIs, 190 (20.8%) were adjudicated. In 558 MRIs, semicoronal scan planes were available for both the T1-weighted and the STIR/T2FS sequences.

In 24% of cases, the local MRI reports explicitly stated whether the MRI was overall indicative of SpA or not (figure 1 and table 2). Fulfilment of the ASAS definition of a positive SIJ MRI was generally not reported (<1%). Active inflammatory SpA lesions (without details on the type of lesion) were mentioned in 73% of local MRI reports, and structural SpA lesions (without details on the type of lesion) in 39%. For the specific lesions, BME was the most frequently reported (88%), followed by erosion (48%) and ankylosis (42%) (figure 2 and table 2). Fat lesions and sclerosis were mentioned in 29% of the local MRI reports, and backfill in 1%. There was no difference between right/left SIJ (online supplemental table S4).

Active inflammatory SpA lesions were more frequently reported as present in local MRI reports versus central readings (46% vs 37%), while structural SpA lesions were less frequently reported as present in local versus central readings (33% vs 51%). BME was the most frequently reported lesion judged as present, both in local MRI reports and central readings (in 55% of local MRI reports and 51% of central readings), followed by erosion (32% and 38%). Sclerosis was reported as present more frequently in local MRI reports than central readings (local/central 25%/13%) and fat lesions less frequently (23%/31%), whereas backfill was only mentioned as present in 1% of the local MRI reports and in 9% of central readings. The frequency of detecting ankylosis was similar in the local MRI reports and the central readings (13%/13%). Some examples of disagreement are demonstrated in figure 3.

The sensitivity and specificity of local MRI reports were 0.85 and 0.76 for active inflammatory SpA lesions, and 0.48 and 0.82 for structural SpA lesions, respectively (table 3 and figure 4). For individual lesions, the sensitivity of local MRI reports was highest for BME and ankylosis, followed by sclerosis. The specificity of local MRI reports was ≥0.75 for all lesions.

When limiting the data to images from 2015 to 2022, no difference was found in the results (data not shown).

Subgroup analyses

When patients were stratified by clinical diagnosis, that is, axSpA versus PsA, the prevalence of the different global features/specific lesions was higher for axSpA than PsA both in the local MRI reports and the central readings (online supplemental table S5). For all lesions, the local reports showed a higher specificity in the PsA group, whereas the sensitivity was higher in the axSpA group (table 3).

When data were stratified by disease duration, that is, time from diagnosis to SIJ MRI was obtained, the prevalence of active inflammatory lesions decreased with increasing disease duration, whereas the occurrence of structural lesions increased with increasing disease duration (online supplemental table S6). The pattern was the same for both local MRI reports and central MRI readings. There was no consistent pattern observed in sensitivity or specificity (table 4).

When data were stratified by country or by scan plane, the frequency of the different global features/specific lesions was generally comparable (online supplemental tables S5 and S6), as were the sensitivity and specificity (online supplemental table S7).

Agreement between central readers

The agreement between central readers showed a kappa of 0.72, 0.70, 0.69 and 0.70 for MRI overall appearance of SpA, fulfilment of the ASAS definition of a positive SIJ MRI, inflammatory lesions indicative of axSpA and structural lesions indicative of axSpA, respectively. For the different lesions, the kappa ranged from 0.37 to 0.81, with the highest for ankylosis and the lowest for backfill. The kappa between the central readers was for all global features/specific lesions consistently higher (on

Table 3 Local MRI reports' agreement, kappa, sensitivity and specificity, when central reads* are considered the standard reference, stratified by diagnosis

	axSpA				PsA			
	PEA (%)	Kappa	Sensitivity	Specificity	PEA (%)	Kappa	Sensitivity	Specificity
Global features								
MRI overall indicative of SpA	48.4	0.14	0.26	0.92	89.3	0.26	0.19	0.99
Active inflammatory SpA lesions†	77.2	0.55	0.86	0.71	88.7	0.46	0.61	0.92
Structural SpA lesions‡	59.2	0.22	0.48	0.76	88.7	0.31	0.38	0.94
Individual lesions, patient level								
Bone marrow oedema	80.9	0.60	0.88	0.72	80.8	0.49	0.60	0.88
Sclerosis	75.6	0.28	0.6	0.78	81.9	0.13	0.4	0.84
Erosion	65.5	0.29	0.53	0.75	85.3	0.27	0.39	0.91
Fat lesion	72.3	0.37	0.49	0.86	91.0	0.34	0.38	0.95
Backfill	88.6	0.01	0.01	0.99	97.7	0.00	0.00	1.00
Ankylosis	92.8	0.73	0.79	0.95	100	1.00	1.00	1.00

Fulfilment of the ASAS definition of a positive SIJ MRI is not included due to almost never (<10 times) being reported in local MRI reports, as seen in the main results.
*Results of central readings are based on concordant positive findings, that is, 'presence' requires detection by 2 readers (either both primary readers or one primary reader + the adjudicator).
†Active inflammatory SpA lesions are also reported in the local reports as sacroiliitis/active disease/SIJ arthritis/inflammatory activity/inflammatory changes.
‡Structural SpA lesions are also reported in the local reports as sacroiliitis sequelae/postinflammatory changes/chronic inflammatory changes/chronic changes after sacroiliitis.
ASAS, Assessment of SpondyloArthritis International Society; axSpA, axial spondyloarthritis; PEA, percentage exact agreement; PsA, psoriatic arthritis; SIJ, sacroiliac joint; SpA, spondyloarthritis.

average 0.16 above) than the agreement between local MRI reports and central readings.

DISCUSSION

In this study, investigating the content of routine care SIJ MRI reports from five European countries and comparing them to central MRI readings, we found that active inflammatory SpA lesions were reported more frequently as present in the local MRI reports than in the central MRI readings, whereas structural SpA lesions were less frequently reported. At the lesion level, BME was the most frequently reported lesion, followed by erosion. Furthermore, comparison with recent ASAS recommendations on reporting[1] demonstrated that local radiologists did not already report what is now recommended. Obviously, local readers could not be expected to follow recommendations that were not yet published, but our study highlights the need for dissemination of the recommendations, so future local reports will be more in alignment with them. To our knowledge, this is the first study investigating the content of local routine care MRI reports in SpA.

Our data document a tendency that is in accordance with the results of Maksymowych *et al*.[2] When looking at the individual lesions in our data, the local radiologists seemed to over-report BME and sclerosis and under-report all other structural lesions except ankylosis (reported equally often). Backfill showed a big discrepancy between local MRI reports and central MRI readings, which may reflect unawareness of this lesion among local radiologists and the difficulty in assessing it. In the recent recommendations for reporting SIJ MRIs created by expert SpA radiologists and rheumatologists, it is recommended that it should be clearly stated whether the findings on the MRI are compatible with SpA or not.[1] This was only reported in 24% of the local MRI reports. Furthermore, the ASAS recommendations state that BME, erosions and fat lesions should always be mentioned in the report, either as present or absent. In our data, these lesions were mentioned in 88%, 48% and 29% of reports, respectively. The relatively low percentage of MRI reports stating whether the MRI findings were indicative of SpA or not could be because the radiologist finds that diagnostic conclusions should be made solely by the rheumatologist. It might also be that the physician does not request information on whether the MRI is compatible with SpA, and/or that the MRI referral does not include sufficient information for the radiologist to decide on 'grey-zone' lesions and the overall appearance. Recommendations on what the rheumatologist's referral should contain have recently been published.[13] Unfortunately, however, we did not have the referrals available in the present dataset, but it would be relevant to investigate the content of the referrals in routine care in a subsequent study.

The sensitivity of local reports was generally low, except for BME and ankylosis. The reason may be that the local radiologists do not recognise the lesions or deem them

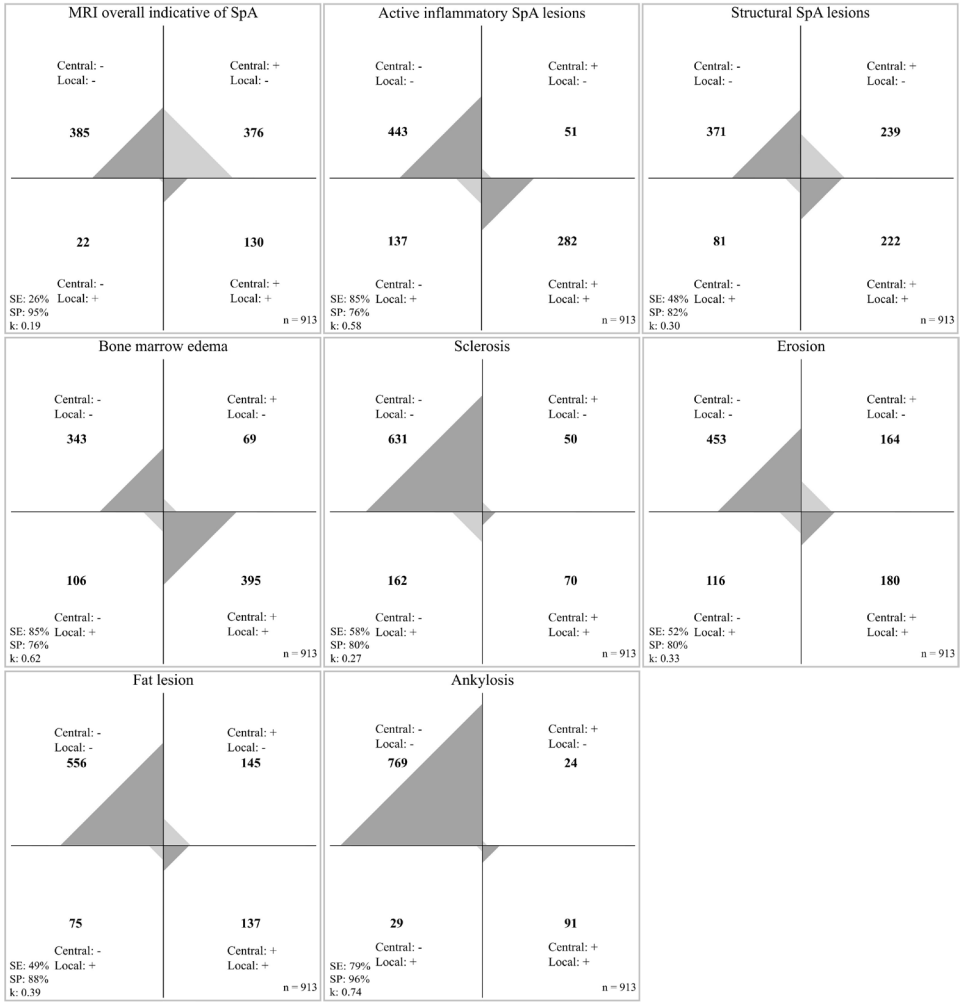

Figure 4 Analysis of agreement between local MRI reports versus central MRI readings, for both global features and individual lesions. Fulfilment of the ASAS definition of a positive SIJ MRI and backfill is not included due to almost never (<10 times) being reported in local MRI reports. Active inflammatory SpA lesions are also reported in the local reports as sacroiliitis/active disease/SIJ arthritis/inflammatory activity/inflammatory changes. Structural SpA lesions are also reported in the local reports as sacroiliitis sequelae/postinflammatory changes/chronic inflammatory changes/chronic changes after sacroiliitis. ASAS, Assessment of SpondyloArthritis International Society; k, kappa; n, number of patients; SE, sensitivity; SIJ, sacroiliac joint; SP, specificity; SpA, spondyloarthritis; MRI, magnetic resonance imaging.

unimportant. Alternatively, they may not report small lesions, possibly because (1) they consider the lesions unspecific and that reporting them can be misinterpreted by the treating physician as a sign of SpA or (2) there are many other lesions which are more specific for SpA, and the overall appearance is convincing without describing lesions considered less specific.

Dissemination of the ASAS recommendations to radiologists around the world seems important. Systematic reporting using Reporting and Data Systems is already used in different fields of radiology, and using such systems is likely to improve radiology reports.[14] Therefore, using standardised radiology reports in SpA might be useful in routine care, and the content in the ASAS recommendations could be implemented in these. Moreover, educational activities through workshops and e-learning could be an effective tool for disseminating the recommendations.

The strengths of this study include collecting truly routine MRI reports from several European countries, systematically extracting information from them and comparing them to central rereadings of the same MRIs. Limitations include that the central reader did not have access to the clinical history, in contrast to the local radiologist. This may influence the interpretation of the images locally, as minor BME might be reported if the clinical history is highly suggestive of SpA. Furthermore, the reports were translated from the original language into English, and the translation process was not completely standardised (different number of people checked the translation and different translation tools were used). This may have led to some loss of information or a change in the interpretation of the original meaning. This was partly circumvented by the translation being approved by native speakers. In addition, it should be mentioned that central readers were obliged to register whether each

Table 4 Local MRI reports' agreement, kappa, sensitivity and specificity, when central readings* are considered the standard reference, stratified by disease duration

	Before diagnosis				<2 years after diagnosis				2–5 years after diagnosis				>5 years after diagnosis			
	PEA (%)	Kappa	Sensitivity	Specificity	PEA (%)	Kappa	Sensitivity	Specificity	PEA (%)	Kappa	Sensitivity	Specificity	PEA (%)	Kappa	Sensitivity	Specificity
Global features																
MRI overall indicative of SpA	56.8	0.20	0.29	0.93	56.4	0.19	0.25	0.95	55.9	0.19	0.24	0.96	56.4	0.20	0.29	0.93
Active inflammatory SpA lesions†	71.9	0.45	0.85	0.63	77.3	0.55	0.88	0.69	85.6	0.69	0.86	0.86	83.4	0.55	0.73	0.86
Structural SpA lesions‡	64.3	0.27	0.41	0.85	64.8	0.29	0.45	0.84	68.6	0.38	0.56	0.82	62.1	0.26	0.50	0.78
Individual lesions, patient level																
Bone marrow oedema	78.9	0.56	0.86	0.70	82.4	0.63	0.88	0.74	85.6	0.71	0.91	0.81	76.3	0.49	0.70	0.80
Sclerosis	79.5	0.32	0.58	0.83	75.9	0.24	0.50	0.80	73.7	0.32	0.70	0.74	78.2	0.26	0.65	0.80
Erosion	64.3	0.22	0.49	0.73	66.6	0.29	0.50	0.79	67.0	0.30	0.54	0.76	75.8	0.40	0.49	0.88
Fat lesion	77.3	0.40	0.46	0.90	79.1	0.45	0.45	0.94	72.9	0.33	0.50	0.82	70.6	0.33	0.47	0.84
Backfill	91.9	0.00	0.00	1.00	91.4	−0.01	0.00	0.99	90.7	0.00	0.00	1.00	86.7	−0.01	0.00	0.99
Ankylosis	97.8	0.85	0.92	0.98	94.6	0.68	0.69	0.97	93.2	0.71	0.86	0.94	91.9	0.78	0.79	0.90

Fulfilment of the ASAS definition of a positive SIJ MRI is not included due to almost never (<10 times) being reported in local MRI reports, as seen in the main results.
*Results of central readings are based on concordant positive findings, that is 'presence' requires detection by 2 readers (either both primary readers or one primary reader + the adjudicator).
†Active inflammatory SpA lesions are also reported in the local reports as sacroiliitis/active disease/SIJ arthritis/inflammatory activity/inflammatory changes.
‡Structural SpA lesions are also reported in the local reports as sacroiliitis sequelae/postinflammatory changes/chronic inflammatory changes/chronic changes after sacroiliitis.
ASAS, Assessment of SpondyloArthritis International Society; MRI, magnetic resonance imaging; PEA, percentage exact agreement; SIJ, sacroiliac joint; SpA, spondyloarthritis.

lesion/global feature was present or not, which is not the case for the local radiologist in routine care. Therefore, local radiologists may have chosen not to describe the absence of lesions.

In conclusion, this large European study of routine care imaging overall showed moderate agreement between local MRI reports and central MRI readings and demonstrated that local radiologists tend to overcall inflammatory lesions and undercall structural lesions in routine care SIJ MRIs. Our results also demonstrate that routine care radiologists tend to prioritise other aspects in their report than what has subsequently been recommended by ASAS experts. This encourages proper dissemination of the ASAS recommendations to radiologists around the world.

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