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Clinical information on imaging referrals for suspected or known axial spondyloarthritis: recommendations from the Assessment of Spondyloarthritis International Society (ASAS)

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Handling editor Josef S Smolen

► Additional supplemental material is published online only. To view, please visit the journal online (https://doi.org/10.1136/ard-2024-226280).

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Received 19 June 2024
Accepted 8 September 2024

To cite: Diekhoff T, Giraudo C, Machado PM, *et al*. *Ann Rheum Dis* Epub ahead of print: [*please include* Day Month Year]. doi:10.1136/ard-2024-226280

ABSTRACT

Objectives This study aims to establish expert consensus recommendations for clinical information on imaging requests in suspected/known axial spondyloarthritis (axSpA), focusing on enhancing diagnostic clarity and patient care through guidelines.

Materials and methods A specialised task force was formed, comprising 7 radiologists, 11 rheumatologists from the Assessment of Spondyloarthritis International Society (ASAS) and a patient representative. Using the Delphi method, two rounds of surveys were conducted among ASAS members. These surveys aimed to identify critical elements for imaging referrals and to refine these elements for practical application. The task force deliberated on the survey outcomes and proposed a set of recommendations, which were then presented to the ASAS community for a decisive vote.

Results The collaborative effort resulted in a set of six detailed recommendations for clinicians involved in requesting imaging for patients with suspected or known axSpA. These recommendations cover crucial areas, including clinical features indicative of axSpA, clinical features, mechanical factors, past imaging data, potential contraindications for specific imaging modalities or contrast media and detailed reasons for the examination, including differential diagnoses. Garnering support from 73% of voting ASAS members, these recommendations represent a consensus on optimising imaging request protocols in axSpA.

Conclusion The ASAS recommendations offer comprehensive guidance for rheumatologists in requesting imaging for axSpA, aiming to standardise requesting practices. By improving the precision and relevance of imaging requests, these guidelines should enhance the clinical impact of radiology reports, facilitate accurate diagnosis and consequently improve the management of patients with axSpA.

INTRODUCTION

Imaging plays a pivotal role in the diagnosis and ongoing management of axial spondyloarthritis (axSpA), a condition often presenting with diverse clinical features and a variety of differential diagnoses.[1 2] In routine clinical practice, particularly outside of specialised centres, there is a significant disparity in the approach to requesting imaging for patients with axSpA.[3–6] This inconsistency stems, in part, from a communication gap between referring physicians and radiologists, and a lack of standardised guidelines for imaging referrals.[4 7]

The precision in selecting an appropriate imaging modality—whether it is radiography, MRI or CT—is crucial in answering specific clinical questions pertinent to axSpA.[8] Guidelines from the American College of Radiology (ACR) and the European Society of Musculoskeletal Radiology (ESSR) detail when to use radiography, MRI or CT for axSpA.[9–12] However, providing relevant clinical information to radiologists is vital for both image interpretation and selecting the appropriate imaging test and protocol design. Tailoring imaging protocols to each patient's unique clinical scenario is essential for acquiring necessary diagnostic information and for mitigating risks associated with radiation exposure and other potential imaging-related complications.[13] Understanding the individual's symptoms, diagnostic dilemmas and differential diagnoses is vital in crafting an imaging request that is both informative and specific.[14] This is particularly important in cases where the referring physician may not be specialised in rheumatology and might be less familiar with the intricacies required in an axSpA imaging request.

The primary aim of this project is to bridge the gap in communication between treating physicians requesting imaging and radiologists responsible for image interpretation and reporting in the context of suspected or known axSpA. Thus, the Assessment of SpondyloArthritis international Society (ASAS) has already published a set of recommendations for the imaging report of patients with axSpA.[15] By developing a set of standardised recommendations for the request of imaging investigations in known/suspected SpA, we hope to streamline the process,

enhance the clarity of communication and ultimately improve patients' outcome. This project to improve referral practices is built on the foundation of previous work by ASAS in managing patients with axSpA and understanding imaging findings.

METHODS

The project was initiated by ASAS with the aim of developing comprehensive guidelines for imaging requests in suspected and known axSpA, focusing on adult patients. It was conducted according to the Appraisal of Guidelines for Research and Evaluation II concept.[16]

Project organisation

A steering committee was appointed, including experts in rheumatology imaging of axSpA (XB and DP) and a musculoskeletal radiologist specialising in inflammatory musculoskeletal diseases (TD). To ensure a broad representation of perspectives, a diverse task force was assembled from the ASAS membership. This group included 11 rheumatologists with expertise in imaging, 7 musculoskeletal radiologists and a patient representative (MM) from the Axial Spondyloarthritis International Federation. The task force's composition reflected a global reach, with members from 11 countries in Europe, North and South America and the Middle East. In recognition of the importance of balanced input, it was agreed that radiologists and rheumatologists would contribute equally to decision-making within the task force. Thus, being fewer in number, radiologists were granted representation on every decision or recommendation.

Questionnaire preparation

Initial steps involved conducting an unstructured literature review to identify existing guidelines and specific items previously discussed for axSpA imaging referrals, encompassing modalities like radiography, MRI and CT. The literature review highlighted the scarcity of specific recommendations, with only a single publication providing a checklist for items.[17] Based on these findings and discussion within the task force, the steering committee drafted a preliminary project statement and designed a questionnaire aimed to identify the main clinical domains/information required on the imaging request. After further discussion and modifications by the task force members, this questionnaire was finalised, and launched to all ASAS members. Therefore, the items selected for the questionnaire are primarily based on the expert opinion of the task force members about possible domains influenced by the current literature.

Questionnaire conduct

The questionnaire process was structured in two rounds of an online survey. The first round comprised 30 questions and aimed to identify specific clinical items or domains for inclusion in the recommendations for imaging referrals in the context of axSpA. Items were selected for further consideration if they received >50% support from respondents. The outcomes of this round were discussed in a subsequent task force meeting, leading to the design of an additional questionnaire with 33 refined questions. This second round focused on determining the level of detail required for each previously selected item in the referral process.

Recommendation formulation and vote

The task force used a majority vote system to generate the final recommendations. If more than two possible answers were presented, the option with at least 50% agreement from ASAS members was chosen. The draft recommendations underwent discussion and refinement within the task force by email circulation, followed by a presentation to the ASAS community at the annual workshop 2022 for a final vote.

The level of agreement (LoA) among task force members was quantified using a numerical rating scale, ranging from 0 (no agreement) to 10 (full agreement) in a separate voting procedure. The average score and SD were calculated, along with the percentage of members scoring at least 8, to assess the consensus strength.

RESULTS

The task force's efforts resulted in the formulation of six comprehensive recommendations for the imaging referral process in suspected or known axSpA (table 1). *The recommendations include both general guidelines (recommendations 1, 4 and 5) that are essential for all radiological referrals, and specific aspects for axSpA (recommendations 2, 3, 6, and HLA-B27 in recommendation 1). While the general guidelines are well-supported in the existing literature, the specific recommendations provide new, axSpA-related contributions*.

Table 1 Recommendations for requesting imaging in suspected or confirmed axSpA

Imaging request		LoA±SD[61]	%≥8
1	The referring physician should communicate important clinical information when requesting imaging examinations. This clinical information should include the patient's age, sex and HLA-B27 status.	9.2±1.2 (6–10)	90%
2	Requests for imaging should include current or history of back pain, its duration, localisation and inflammatory features, whether present or not. For follow-up examinations, a change in clinical symptoms should be indicated.	8.8±1.7 (5–10)	85%
3	Radiologists should be informed if the patient undertakes physically demanding activities or has a history of childbirth (number of children and date of most recent delivery).	9.0±1.3 (5–10)	90%
4	Radiologists should have access to the images of prior imaging studies for comparison or the respective reports if those are not available.	9.8±0.9 (6–10)	95%
5	The referral should include possible contraindications to certain imaging modalities or to contrast medium.	8.7±2.6 (0–10)	90%
6	The referring clinician should indicate the suspected clinical diagnosis and possible alternative explanations for the symptoms, whether SpA was previously diagnosed, and if the examination is requested for primary diagnosis, to assess disease activity or treatment response.	9.3±1.4 (4–10)	95%

LoA provided with SD and range. %≥8: percentage of task force members voting for agreement with 8 or higher on a 0–10 rating scale.
axSpA, axial spondyloarthritis; LoA, level of agreement.

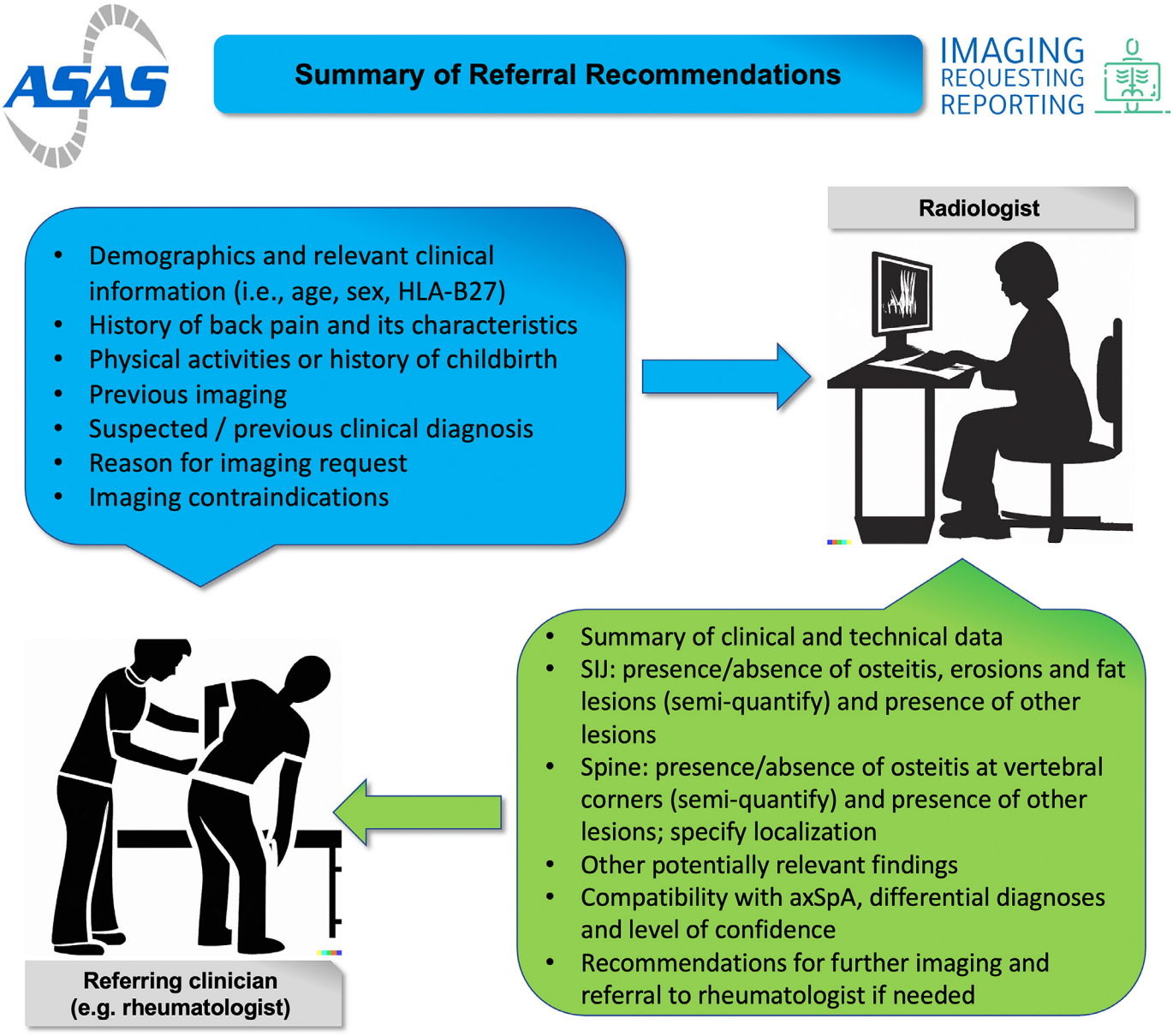

Figure 1 Graphical summary of the recommendations for imaging referrals and reports as a mutual give and take between specialties. axSpA, axial spondyloarthritis; SIJ, sacroiliac joint.

Survey outcomes

The first round of the survey garnered responses from 143/190 (75% response rate), with a share of 90% (128/143) rheumatologists, 7% (10/143) radiologists (all 10 radiologist members of ASAS responded) and 3% (5/143) other specialties or non-physicians. Similarly, the second round of the survey was completed by 112/190 members (59% response rate), maintaining a significant participation of rheumatologists (88%; 98/112) and radiologists (9%; 10/112). The details of the survey responses and the distribution of participant specialties are available in online supplement 1. This work complements reporting recommendations that were developed in parallel (figure 1) and a concurrent project on recommendations on reporting imaging examinations.

Acceptance of recommendations

The resulting set of recommendations, shaped by the survey outcome and subsequent task force discussions, was presented for voting to the ASAS community. The voting outcome was favourable, with 73% of the voting ASAS full members endorsing the recommendations. However, it is notable that 17% voted against, and 10% abstained from voting. The recommendations were endorsed by the ESSR.

Recommendation 1

The referring physician should communicate important clinical information when requesting imaging examinations. This clinical information should include the patient's age, sex and HLA-B27 status.

ASAS acknowledges that some basic demographic and clinical information is crucial for approval of examinations by radiology departments and for image interpretation. Therefore, the reporting physician should be aware of the age and sex of the patient (those two pieces of information are usually included in the image file) and whether the patient is HLA-B27 positive, negative or the status is unknown. The patient's age, especially in combination with the symptoms or disease duration, is an essential factor in estimating the likelihood of the disease and

aids the interpretation of concomitant degenerative findings and differential diagnoses that should be considered.[18] Furthermore, recent studies suggested differences in axSpA findings depending on sex.[19 20] Another contributing factor is HLA-B27, as its presence or absence can help infer pretest probabilities in relevant populations.[21] Other information deemed necessary by the referring physician may also be provided.

Recommendation 2

Requests for imaging should include any history of back pain, its duration, localisation and inflammatory features, whether present or not. For follow-up examinations, a change in clinical symptoms should be indicated.

Radiologists should be informed about current or previous symptoms. Back pain is often the primary clinical symptom of patients with axSpA.[22] The localisation of pain can improve the anatomical coverage of the examination and direct the radiologist's attention to areas needing special awareness.[23] Current pain characteristics might also help design the optimal imaging protocol by including additional views, sequences or reconstructions (eg, axial sequences of specific spine regions to search for costovertebral arthritis or disc herniations) or administering a contrast medium.[24] Duration of back pain and inflammatory features provides essential contextual information for image interpretation. Inflammatory back pain consists of a set of symptoms that indicate a possible inflammatory origin of pain.[25] Those include chronic low back pain, an onset at an age <40 years, worsening with rest, night pain, morning stiffness and improvement with exercise. For follow-up examinations, information about the improvement or worsening of clinical symptoms can help interpret new imaging findings and improve the assessment of the reporting radiologist.[26]

Recommendation 3

Radiologists should be informed if the patient undertakes physically demanding activities or has a history of childbirth (number of children and date of most recent delivery).

Recent studies showed that imaging findings of the axial skeleton are affected by extensive mechanical strain, especially in the sacroiliac joints (SIJ).[27 28] Bone marrow oedema and specific structural lesions can occur in patients with mechanical stress and mimic findings that otherwise suggest axSpA.[29 30] Physically demanding activities include the type of work and sporting activities (eg, soccer, riding, long-distance running) and, in a broader sense, the patient's physique, for example, obesity.[31] For women, massive mechanical stress on the SIJ during pregnancy and around childbirth may lead to bone marrow oedema that can persist over at least 1 year.[32–35] Also, other long-lasting conditions, such as osteitis condensans ilii are often pregnancy-related.[36 37] Information about this mechanical stress is essential for any imaging of the SIJ aimed at ascertaining the diagnosis of axSpA. That said, the necessary information depends on the region to be imaged, and the provided data can be adapted to the desired imaging test. Furthermore, mechanical stress is a relevant and frequently encountered differential diagnosis.[38 39] Additional differential diagnoses, such as infections and tumours, which are less common and do not necessitate attention for every imaging referral, are discussed in recommendation 6.

Recommendation 4

Radiologists should have access to the images of prior imaging studies for comparison or the respective reports if those are not available.

Reviewing prior imaging examinations is often essential and frequently aids in the accurate interpretation of imaging findings, particularly if equivocal.[40] The development of new lesions or lesions being constant over an extended period gives crucial contextual information about the patient and the course of the disease.[41] Furthermore, lesions in a different anatomical location may help attribute these lesions towards the correct diagnosis. For this reason, ASAS recommends that radiologists should have access to the images, not just the written report, as the interpretation of previous imaging findings may change based on the current investigation.

Recommendation 5

The referral should include possible contraindications to certain imaging modalities or to contrast medium.

The referring physician should communicate any contraindications to certain types of imaging or contrast media when those are present. This information will help the radiologist assign an optimal imaging protocol, prepare the patient for the examination and justify using or omitting imaging modalities or contrast media that were otherwise indicated per institutional, national or international standards.[42] This recommendation does not aim to exempt the radiology staff from critically checking the indication and contraindications in the individual patient but to help schedule the patient for the correct examination and identify patients who need special care in advance.[43] For instance, in the event of severe MRI claustrophobia, the scan will be planned with sufficient time to allow for medical sedation and appropriate monitoring. Likewise, if the kidney function is impaired, an unenhanced protocol or alternative contrast medium will be considered.[44] With this recommendation, ASAS does not want to promote contrast application in individuals with known or suspected axSpA, which is usually not necessary and not recommended by current guidelines.[45 46] However, individual protocols can be designed for patients with specific needs, and local standards might still include the administration of contrast media.

Recommendation 6

The referring clinician should indicate the suspected clinical diagnosis and possible alternative explanations for the symptoms, whether SpA was previously diagnosed, and if the examination is requested for primary diagnosis, to assess disease activity or treatment response.

The radiologists need to understand the circumstances for which the images are requested, in order to choose the appropriate protocol as well as for image interpretation. In primary diagnosis, searching for differential findings and possible alternative explanations is paramount. In contrast, correct assessment of lesions' evolution is more crucial for follow-up examinations. Therefore, it is essential to know whether the diagnosis of axSpA was already established or if the examination is requested to ascertain additional findings that support or refute the diagnosis. In this context, both the likelihood of axSpA based on clinical information and the referring physician's confidence in the diagnosis of axSpA are crucial factors. As a consequence, the radiologist can more specifically address the referral questions in the reporting. For follow-up examinations, it might be advantageous to indicate the current therapy, be it non-steroidal anti-inflammatory drugs or targeted synthetic or biological disease-modifying antirheumatic drugs, as the expected influence on the course of active inflammation and structural lesions is different.

Checklist for imaging requests of axSpA patients

IMAGING REQUESTING REPORTING

#	Item	Check
1	**Essential clinical information**	
	age and sex	☐
	HLA-B27 (positive, negative, unknown)	☐
2	**Back pain**	
	current	☐
	history of	☐
	duration	☐
	localization	☐
	inflammatory features	☐
	change of symptoms (follow-up)	☐
3	**Indicators for differential diagnoses**	
	physically demanding activities	☐
	childbirth (number of children, date of last delivery)	☐
4	**Previous exam images** (report if unavailable)	☐
5	**Contraindications** to imaging or contrast media	☐
6	**Clinical diagnosis**	
	suspected diagnosis	☐
	alternative explanations	☐
	previous diagnosis of axSpA	☐
	reason for exam (primary diagnosis or follow-up)	☐

Figure 2 Checklists for requesting imaging in axial spondyloarthritis (axSpA).

Checklist

The steering committee also prepared a detailed checklist for imaging referrals in suspected or known axSpA, which is provided in figure 2 and online supplement 2 for practical application.

DISCUSSION

ASAS has developed six key recommendations aimed at refining the clinical information on imaging requests in cases of suspected or confirmed axSpA. These recommendations were developed through a meticulous process involving two Delphi rounds of questionnaires, which saw active participation from the ASAS membership. The recommendations are designed to enhance collaborative communication between different healthcare professionals involved in the care of patients with axSpA, that is, clinicians referring to imaging and technicians and radiologists performing and interpreting imaging procedures. While these recommendations are primarily designed for referral forms and written imaging requests, it is equally important to convey this information to radiologists in other settings, whether in telephone calls or during clinical meetings.

This initiative builds on ASAS's previous endeavours, specifically concerning the management strategies for patients with axSpA,[47 48] the acquisition[49] and the interpretation[50 51] and report[15] of imaging. Furthermore, our recommendations align with the current diagnostic frameworks and work-up protocols for patients with low back pain, particularly when axSpA is suspected.[52] Inflammatory axial disease concepts have been integrated into guidelines for managing non-acute low back pain as 'red flags', thereby raising awareness of this important differential diagnosis.[53] Once axSpA is suspected, our guidance on imaging referrals is especially valuable outside dedicated rheumatology centres, such as in the general practice setting.

The endorsement of these recommendations by ASAS included relevant debates and discussions, particularly among the rheumatologists and radiologists. The subsequent sections will encapsulate the diverse viewpoints and areas of contention that emerged during the task force deliberations and the workshop conducted by ASAS.

Impact of clinical information on the radiologist's judgement

Some ASAS members were concerned that too comprehensive clinical information might negatively influence the radiologist's assessment. Doubts were raised about whether the radiologist would formulate "what he/she thinks the rheumatologist wants to hear" despite negative, unconvincing or contrary imaging findings. Similarly, some felt that the imaging test should stand alone, uninfluenced by clinical information and be finally interpreted by the rheumatologist in the context of all available data. While this notion was not shared by most ASAS members, it should still be considered, and the imaging evaluation must be the core of the radiology report, while clinical information provides a context in which to interpret the findings.

A recent study evaluated the impact of clinical information on the radiology report and found a statistically and clinically significant overall positive impact of available clinical information on the precision and specificity of interpretation by radiologists in SIJ imaging (radiography and MRI).[54] Data from other imaging fields suggest that accurate clinical information improves the assessment of imaging by providing a larger context for the patient while inaccurate information may mislead the radiologist's judgement in a similar way.[55] Missing or false information or imprecise differential diagnoses in clinical requests have been identified in several studies as a significant source of error in imaging reports.[56–59]

Clinical information is too comprehensive

It was mentioned that some referral systems do not allow for comprehensive clinical information, and the busy clinical working day might impede filling out or reading wide-ranging referral forms. However, these ASAS recommendations should be regarded as aspirational and the technological infrastructure is constantly changing. It should also be noted that the mentioned clinical information should be available to the radiologist, and availability can also be guaranteed by means of other than a referral paper, for example, in an electronic patient record.

Feasibility

ASAS members regularly pointed out that all recommendations must be feasible in clinical practice and designed for a general audience of practising rheumatologists and radiologists, not necessarily experts in the field of axSpA. Therefore, the many individual items were summarised in the process to form these six recommendations presented here. With these, we hope to balance detailed guidance and feasibility for daily practice.

Quality of clinical information on requests

The task force discussed the heterogeneity of the quality of referrals extensively during the meetings. Radiologists in the group pointed out that the quality of referrals is variable and clinical information is sometimes sparse, despite being important for the imaging protocol or interpretation. To tackle this problem, these recommendations do also fulfil the purpose of educating rheumatologists and other clinicians on what information is desired by the radiologist.

Other initiatives on structured imaging requests

Almodóvar *et al* present the joint efforts of the Spondyloarthritis Study Group of the Spanish Rheumatology Society and the Spanish Society of Musculoskeletal Radiology to develop referral checklists.[17] These checklists were based on more general efforts to improve the communication between the two specialties.[60] Our project expands on this, aiming to provide a more general view of international experts in the field.

Limitations

This project has inherent limitations from its data basis and conduct. While there are some studies on how clinical information is essential in patients with axSpA, there is little scientific data on how this information actually influences clinical practice, imaging interpretation or final treatment and outcome of patients with axSpA. Therefore, these recommendations are expert-driven and arose from clinical practice and preferences. New data might warrant further refinement. While some recommendations may appear to reiterate established processes and national guidelines (eg, providing age, sex and contraindications), ASAS acknowledges that infrastructure and processes can vary significantly between hospitals and countries. Therefore, including such essential information within these recommendations ensures their applicability and importance across diverse healthcare settings. Furthermore, ASAS is an international society with worldwide representation that is mainly driven by rheumatologists and radiologists and also includes other disciplines related to chronic back pain with chronic-inflammatory symptoms. During the conduct of the exercise, we took countermeasures against the notion that rheumatologists outweigh radiologists, who were nearly equally represented within the task force but under-represented within ASAS (only 10 radiologists in total). However, we found only a few conflicts between the groups of specialists. While the task force members showed a relatively high LoA, the agreement based on final voting within the membership of ASAS was lower, as reflected by the final vote due to various reasons discussed above. This project focused exclusively on adults with suspected or known axSpA, and therefore, the recommendations may not be fully applicable to paediatric patients that often require a different approach to meet their imaging needs. Finally, while these recommendations could cause more effort for the rheumatologist, it is a proposal aiming to establish a mutual give and take regarding information in the referrals and reports. Effective dissemination across radiological and rheumatological communities is crucial. To further promote the collaboration between specialists, these clinical information recommendations will be disseminated in the radiological community.

In conclusion, ASAS has developed six recommendations to standardise clinical information on imaging requests for patients

with diagnosed or suspected axSpA. This initiative represents a significant step towards harmonising imaging referral practices, enhancing diagnostic accuracy and ultimately improving patient outcomes in axSpA. Emphasising the need for interdisciplinary collaboration, these recommendations bridge existing gaps in communication between rheumatologists, radiologists and other healthcare professionals. By doing so, ASAS aims to elevate the standard of patient care in axSpA and contributes to the broader educational efforts within the medical community.

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Acknowledgements The authors would like to acknowledge the special contribution of the European Society of Musculoskeletal Radiology executive committee and the patient representative (MM) as a member of the Axial Spondyloarthritis International Federation.

Contributors Project coordination: TD; conceptualisation: TD, DP, XB; development of questionnaires: all authors; manuscript drafting: TD; manuscript editing: all authors; approval of the manuscript: all authors; guarantor: TD.

Funding HM-O is supported by the National Institute for Health Research Leeds Biomedical Research Centre.

Disclaimer The views expressed are those of the authors and not necessarily those of the (UK) National Health Service (NHS), the NIHR or the (UK) Department of Health.

Competing interests TD: speakers bureau: Canon MS, Lilly, MSD, Novartis, Pfizer and UCB; consultant: Lilly; grant/research support: Canon MS. CG: speakers bureau: Boehringer Ingelheim. VN-C: has received speakers fees from AbbVie, Eli Lilly, Fresenius Kabi, Janssen, MSD, Novartis, Pfizer, UCB Pharma; consultant of AbbVie, Eli Lilly, MSD, Novartis, Pfizer, UCB Pharma; grant/research support from AbbVie and Novartis. IE: speakers bureau: AbbVie, Novartis. HH: speakers bureau: AbbVie, MSD, Janssen, Roche, Sobi and Pfizer, consultant of Roche, Boehringer Ingelheim, Janssen, MSD, AbbVie, Novartis and Sobi. PMM: honoraria from AbbVie, BMS, Celgene, Eli Lilly, Galapagos, Janssen, MSD, Novartis, Orphazyme, Pfizer, Roche and UCB, all unrelated to this manuscript, and is supported by the National Institute for Health Research (NIHR), University College London Hospitals (UCLH), Biomedical Research Centre (BRC). WM: speaking: AbbVie, Eli Lilly, Janssen, Novartis, Pfizer, UCB consultant: AbbVie, BMS, Celgene, Eli Lilly, Galapagos, Novartis, Pfizer, UCB grants: AbbVie, Eli Lilly, Novartis, Pfizer, UCB. HM-O: research grants from Janssen, Novartis, Pfizer and UCB, honoraria/speaker fees from AbbVie, Amgen, Celgene, Eli Lilly, Janssen, Moonlake, Novartis, Pfizer, Takeda and UCB. MØ: speaker fees: AbbVie, BMS, Celgene, Eli Lilly, Galapagos, Janssen, MEDAC, Merck, Novartis, Pfizer, Regeneron, Roche, Sanofi and UCB. XB: consultant: AbbVie, BMS, Boehringer Ingelheim, Celgene, Eli Lilly, Galapagos, Gilead, Hospira, Janssen, Merck, Novartis, Novo, Orion, Pfizer, Regeneron, Roche, Sandoz, Sanofi and UCB; grant/research support: AbbVie, Amgen, BMS, Celgene, Eli Lilly, Merck, Novartis and UCB. MRu: speaker fees from and/or advisor for AbbVie, Boehringer Ingelheim, Eli Lilly, Janssen, Novartis, UCB. KGH: speaker fees from Novartis, MSD and Pfizer. Consulting for AbbVie and Calyx. Co-founder of BerlinFlame. SJP: speaking fees from MSD, Pfizer, AbbVie, UCB, Novartis; consulting fees and/or honoraria from AbbVie, UCB, Novartis and research support from AbbVie, MSD and Novartis. MRe: ISS grant; ASAS consultant. RGWL: consultant: Calyx, CARE Arthritis, Image Analysis Group. UW: speaker fees: Novartis, Eli Lilly. AGJ: none for this article. MdH: speaker fees from UBC. FAS: speaker fees: Novartis, Pfizer, AbbVie, Janssen.

Patient consent for publication Not applicable.

Ethics approval Not applicable.

Provenance and peer review Not commissioned; externally peer reviewed.

Data availability statement Source data are available in the online supplement. Additional data can be shared by the authors on reasonable request.

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