

The Swiss musculoskeletal ultrasound recommendations and the SONAR score: do they meet current standards?

George A.W. Bruyn

Department of Rheumatology, MC Groep hospitals, Lelystad, the Netherlands

Imaging is a key technique for diagnosing arthritis and assessing activity of arthritis. For years, conventional radiography has been the gold standard for determining bone damage in rheumatoid arthritis (RA), that is, bone erosions. Although the presence of erosions may show us the relics of what has happened in the past, it delivers insufficient information about what actually is going on in the patient. Clearly, in times where the clinical rheumatologist is increasingly held responsible for the effects of drug management decisions, sophisticated imaging techniques providing up-to-date information are in the limelight. Any imaging technique should be able to guide us in our daily clinical decision making; that is, it should be able to tell us whether the patient's arthritic disease has reached a low activity state or, even better, remission, or on the other hand is still very active. Furthermore, the imaging technique should be sufficiently sensitive to detect arthritis at an early stage of the disease. In a nutshell, these are the basic criteria a modern imaging technique has to fulfil.

Two imaging techniques have revolutionised the way we assess arthritis activity: ultrasound and magnetic resonance imaging (MRI). Ultrasound is able to visualise synovitis and hyperaemia, whereas MRI visualises synovitis and bone marrow oedema. Yet although both imaging techniques are in widespread clinical use, ultrasound has practical advantages over MRI. For example, the "point of care" delivery makes the need for scheduling an appointment at the radiology department redundant. Of note, clinical studies have shown ultrasound to be more sensitive for detecting synovitis than clinical examination [1, 2]. On greyscale ultrasound, synovitis presents itself as hypoechoic synovial hypertrophy or anechoic effusion; power Doppler ultrasound depicts hyperaemia of inflamed tissue as positive Doppler signals. Both greyscale and power Doppler synovitis can be graded semiquantitatively, although pixels of Doppler signals can also be counted in an absolute manner by a computer. Scanning and grading is done by the rheumatologist himself; this may look quite efficient from the outside, but the flipside is that it makes any ultrasound scoring system a subjective measure.

Stepping stones towards a working ultrasound scoring system are the following: to begin with, synovitis grading has to be standardised, usually starting with a reading of numerous greyscale and Doppler scans of joints with synovitis, so that all rheumatologists involved reach consensus on basic definitions; they also have to agree on how to perform the scanning procedure, that is, the acquisition of ultrasound scans. Which joints should be assessed and how? Secondly, reproducibility has to be assessed in patients with RA and is expressed as the intraobserver and the interobserver reliability. Finally, the proposed ultrasound test is compared with some kind of comparator, such as histology, imaging techniques or clinical examination. In this validation phase, the heart of the matter is whether the scoring system outcome is a truthful representation of the "real" arthritis activity. As patients are unlikely to sacrifice a joint for the sake of science, other comparators are used as surrogate markers. For synovitis, MRI has been shown to correlate well with histology obtained at arthroscopy [3]; MRI is therefore frequently used as a surrogate gold standard. Additional issues at stake are whether the proposed score can readily be compared with common outcome measures, whether it is able to assess changes in synovitis activity over time and whether it consumes too much time. Time is an important economic element in clinical practice, so the fewer joints that have to be assessed, the higher the acceptance. Unfortunately, there is still international controversy surrounding the number of joints that should be included in a representative ultrasound scoring system, as well as the method of acquiring scans. Similarly, it is not yet clear whether other synovium-related structures, such as tendons, should be included in an ultrasound synovitis scoring system [4]. The result of all this is that various international scoring systems coexist with each other.

As Zufferey et al. point out [5], the validated Swiss SONAR scoring system assesses synovitis in 22 joints with both greyscale and Doppler ultrasound. The joints are identical to those of the clinical disease activity measure DAS28, with the exception of the first metacarpophalangeal joints and shoulders. This simplification makes sense, for two reasons: (1.) thumbs and shoulders are frequently

involved in other rheumatological problems, and (2.) it facilitates comparison with the DAS28. Given the high inter-reader reliability, the metrics of the SONAR score look promising. Trained Swiss rheumatologists store their ultrasound scans in a secured national database, where the ultrasound outcome measures can be compared with clinical disease activity scores. Of note, the Sonar score has a major acceptance rate among Swiss rheumatologists. Since the score is used only for clinical follow-up of patients with RA, the question arises whether its full potential is utilised. Zufferey et al. also report the Swiss recommendations for the use of ultrasound in clinical practice. The recommendations are both appropriate and timely. Appropriate, as they serve as alpine guides to Swiss clinical rheumatologists in climbing the ever increasing mountain of data and evidence on the utility of ultrasound. The Swiss recommendations are also timely as they coincide with the release of ten key European League against rheumatism (EULAR) recommendations for the use of imaging of the joints in the clinical management of RA, eight of them pertaining to ultrasound [6]. Although Zufferey et al. state that their recommendations are based on a literature review, they do not provide strength of recommendation for each proposition.

In conclusion, we do not know yet the exact strengths and weaknesses of the SONAR scoring system: can it be used to confirm low activity or remission states, important targets in the management of rheumatoid arthritis? Furthermore, we do not know whether SONAR is able to diagnose early disease. Evidence of sensitivity to change would make the SONAR score more robust. The imaging revolution is there, yet work remains to be done. In spite of these concerns, I think the authors have made an extremely valuable contribution to the clinical management of patients with RA.

Funding / potential competing interests: No financial support and no other potential conflict of interest relevant to this article was reported.

Correspondence: George A.W. Bruyn, MD, PhD, Chair, Department of Rheumatology, MC Groep hospitals, NL-8233 AA Lelystad, The Netherlands, [Gawbruyn\[at\]jwxs.nl](mailto:Gawbruyn[at]jwxs.nl)

References

- 1 Szkudlarek M, Narvestad E, Klarlund M, Court-Payen M, Thomsen HS, Østergaard M. Ultrasonography of the metatarsophalangeal joints in rheumatoid arthritis: comparison with magnetic resonance imaging, conventional radiography and clinical examination. *Arthritis Rheum.* 2004;50:2103–12.
- 2 Szkudlarek M, Court-Payen M, Strandberg C, Klarlund M, Klausen T, Østergaard M. Power Doppler ultrasonography for assessment of synovitis in the metacarpophalangeal joints of patients with rheumatoid arthritis: a comparison with dynamic magnetic resonance imaging. *Arthritis Rheum.* 2001;44(9):2018–23.
- 3 Ostendorf B, Peters R, Dann P, Becker A, Scherer A, Wedekind F, et al. Magnetic resonance imaging and miniarthroscopy of metacarpophalangeal joints. *Arthritis Rheum.* 2001;44:2492–502.
- 4 Bruyn GA, Hanova P, Iagnocco A, d'Agostino MA, Möller I, Terslev L, et al. Ultrasound definition of tendon damage in patients with rheumatoid arthritis. Results of a OMERACT consensus-based ultrasound score focussing on the diagnostic reliability. *Ann Rheum Dis.* 2013;203596 (Epub ahead of print).
- 5 Zufferey P, Tamborrini G, Gabay C, Krebs A, Kyburz D, Michel B, et al. Recommendations for the use of ultrasound in rheumatoid arthritis: literature review and SONAR score experience. *Swiss Med Wkly.* 2013;143:w13861.
- 6 Colebatch AN, Edwards CJ, Østergaard M, van der Heijde D, Balint PV, D'Agostino MA, et al. EULAR recommendations for the use of imaging of the joints in the clinical management of rheumatoid arthritis. *Ann Rheum Dis.* 2013;72:804–14.