

The Role of Ultrasound in Psoriatic Arthritis — Do We Need a Score?



Enthesitis is one of the hallmarks of the spondyloarthritis (SpA) group, including psoriatic arthritis (PsA)^{1,2}. Enthesitis is usually defined as inflammation at the site of attachment of a tendon, ligament, and capsule onto bone, which can cause significant pain and disability for patients². In recent years, the interest in this domain of disease has grown with increasing evidence of its prevalence and potential importance in the pathogenesis of the disease³. One of the limitations in understanding the exact role of enthesitis in these diseases has been the difficulty in assessing this feature^{3,4}. Usually enthesitis is evaluated by clinical assessment, which measured the pain provoked by physical examination of enthesal sites. However, tenderness at the enthesal site does not always denote inflammation, and its absence does not rule out enthesitis. The introduction of new drugs and the wider use of imaging, especially magnetic resonance imaging and ultrasound (US) in clinical and research practice, highlight the pivotal role of enthesitis for the diagnosis and management of both SpA (axial and peripheral) and PsA. Nevertheless, it has frequently been shown that clinical assessment of pain at tendon insertions does not always correlate with imaging assessment of inflammation^{5,6,7,8}. The clinical examination of enthesitis may also identify pain from tendinosis, from nearby joint synovitis, or from other pain mechanisms without any true involvement of the adjacent enthesis.

In addition, it has been reported that a significant proportion of patients with PsA, and indeed patients with psoriasis, have subclinical enthesitis with inflammation seen on imaging, without tenderness at the insertion⁹.

US has been proven to be a valuable tool to assess enthesal involvement across the SpA spectrum, including PsA^{7,8,9}. Extensive descriptions of the US findings defining enthesitis as well as the application of the technique as a management tool of both SpA and PsA have been published several times since the first observation by Lehtinen, *et al* in 1995^{6,7,8,10,11,12}.

In routine clinical practice, there has been an increase in

the use of US for both diagnosis and monitoring of PsA. In borderline cases with psoriasis and musculoskeletal (MSK) pain, US can be very helpful to differentiate inflammatory synovitis or enthesitis from other common conditions including osteoarthritis (OA) and mechanical joint pain^{13,14,15}. Once a diagnosis is established, US can also be used to quantify inflammation in joints and tendons if there is doubt in the clinical examination¹³.

The US appearance of enthesitis can be defined as a combination of morphological changes in greyscale and inflammatory findings in Doppler mode^{7,8,9,16}. The Outcome Measures in Rheumatology (OMERACT) US group has established a definition of enthesitis and the different elementary inflammatory and structural components that can be visualized (hypoechoogenicity, thickening, bone erosion, enthesophytes, calcification, Doppler signal) at entheses, as well as their scoring^{17,18}. The development and validation process were performed on both SpA and PsA, allowing a standardization of this tool for research. Since the first OMERACT publication in 2004¹⁹ proposing a preliminary definition of *enthesopathy*, and the more recent publication on which elementary features compose the *enthesitis*, an improvement in the quality of the published studies has been observed. Therefore, at the enthesal level, there is no need to develop new US scoring methods for detecting the presence of enthesitis.

The unmet questions at the moment are the following: Which and how many enthesal sites should be scanned for developing a scoring system at patient level? Should these enthesal sites be different according to the purpose of the US examination (i.e., diagnostic purpose or monitoring purpose)? And finally, should the enthesal sites examined in PsA differ from those examined in SpA?

In their study described in this issue of *The Journal*, Tom and colleagues tried to develop an enthesal scoring system at patient level that could identify which entheses should be evaluated by US for detecting PsA²⁰. They scanned a pre-defined set of entheses in 50 consecutive patients with

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active PsA to investigate US evidence of enthesitis. These patients were compared to 50 healthy controls who were similar in age and sex but did have a lower body mass index than the patients with PsA. In keeping with previous data, a significant proportion of patients (42%) had a clinically tender enthesial insertion, although this was also seen in 22% of controls. In the study, 11 different enthesial sites were scanned bilaterally²⁰. The most frequent abnormalities, at enthesial level, found in PsA were enthesophytes, thickening, and hypoechogenicity, but these were also reasonably frequent in controls. In contrast, Doppler changes, bony proliferation, and erosions were less common (5–12% of PsA cases), but appeared to be more specific for PsA. When considering individual sites of enthesitis, key sites that differentiated PsA from controls were patellar ligament insertions, Achilles, plantar fascia insertion, common extensor tendon insertion at lateral epicondyle of the elbow, and supraspinatus insertion. These sites are similar to previously published reports⁸, with the addition of the greater trochanter insertion, which was not assessed in this study⁸.

Although the study provides further evidence of the high prevalence of enthesial changes in patients with PsA, and the high prevalence of asymptomatic findings (because the enthesial involvement was detected more frequently with US than with clinical assessment based on tenderness), it does not, however, answer completely the question of which sites are more specific for the presence of PsA and which should be scanned in priority²¹.

The results of this study highlight once again what has been recently published^{21,22}: the discrepancy between clinical and US findings and the absence of correlation between clinical characteristics of active enthesitis and US inflammatory activity^{6,22}.

The lack of correlation between clinical and US evaluation of enthesitis, as well as the different US definitions of enthesitis used to date, have generated discordant data about the capability of the technique to clearly differentiate between enthesitis involvement in SpA or PsA and in other pathologies. A common US definition of enthesitis for the SpA group is therefore highly sought. This definition has been developed by the OMERACT US group¹⁷.

The OMERACT definition points out the importance of Doppler signal to distinguish between enthesitis in SpA or PsA and other pathologies or normal subjects. Although greyscale components are important for detecting the presence of structural changes, they are alone unable to differentiate between mechanical and inflammatory involvement^{7,23}. The lack of discriminant capability of greyscale findings has been already reported^{6,23}.

The results of this study²⁰, along with those from the previous cited studies, lead to the question of whether inflammatory findings should be weighted more heavily than structural damage in the development of an US enthesitis score,

at patient level, to differentiate better PsA-related enthesitis from other biomechanical factors potentially affecting the entheses.

In the Tom, *et al* study²⁰, patients were compared to healthy controls, which does not mirror the potential use of US in diagnosis²¹. In this context it would be useful to follow on from this with a comparison of patients with psoriasis and other MSK complaints (e.g., OA, mechanical joint pain). This may help us understand the key differentiators to aid diagnosis of PsA within patients with psoriasis and MSK symptoms. Additional longitudinal data on patients with psoriasis who may develop PsA may also help us to understand more about the primary pathology of PsA and the spectrum of disease, and the role of the identified US lesions at different enthesial sites.

It is well recognized that clinical assessment of enthesitis has limitations and that imaging may have a key role to play in assessing this domain of PsA. Therefore, much effort should be put into keeping the field unified. There are 2 potential roles for imaging in this sphere: first, the opportunity to validate US as an outcome measure of enthesitis in PsA to be used in clinical practice. US definition of enthesitis and of the elementary lesions has been agreed on and published by the OMERACT US group. An extensive scanning protocol is currently being performed in a number of clinical trials. This will allow analysis of which features are sensitive to change in longitudinal studies and which sites of the body should be included in an optimal disease activity score.

Second, there is the potential to improve the use of US in diagnosis and classification of patients with PsA among those with psoriasis. Therefore, this study can be considered a first attempt to develop a US scoring system at the patient level that can identify which entheses should be scanned in patients with PsA and which lesions should be more weighted²⁰. However, a big effort is required to identify specific inflammatory and structural changes that discriminate between disease and mechanical involvement.

Members of the GRAPPA US group have significant experience in longitudinal inception psoriasis cohorts, the OMERACT US group has developed a validated scoring, and there may be potential to include US in these studies, to support the differentiation of PsA from other MSK symptoms in patients with psoriasis.

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