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Power Doppler ultrasonographic evaluation of enthesitis in psoriatic arthritis. A multi-center study

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Enthesitis represents a frequent abnormality in psoriatic arthritis (PsA). The involvement of peripheral entheses can be asymptomatic and underestimated by clinical examination and can be detected only by imaging techniques [1,2]. Recently, ultrasound (US) has demonstrated to be a valuable tool in the assessment of enthesal involvement in spondylarthropathies (SpA), providing depiction of enthesal abnormalities at all stages of the disease process [1,3–5]. However, only limited focus on extensive evaluation of peripheral enthesitis in PsA by US has been developed, so far. Thus, by using US combined with power Doppler (PD) and including both assessment of inflammatory changes and structural alterations, the aims of the present study were to investigate the prevalence and severity of peripheral entheses involvement in PsA and to compare PDUS-detected findings with clinical and laboratory data.

1. Methods

Consecutive PsA patients and rheumatoid arthritis (RA) controls were included in a multi-center prospective study. In each rheumatology unit, patients underwent clinical examination, laboratory tests and PDUS examination (Logiq9/Logiq5 GE machine; 8–15 MHz linear probe) of major entheses at both extremities. Previously to patients' enrolment, the US examination methodology was clarified among sonographers and a consensus was obtained on scanning protocol and image interpretation. By using the OMER-ACT definition for enthesopathy [6], different elementary lesions were assessed by PDUS and scored either on a semi-quantitative (0–3) or a dichotomous (0–1) scale. The sums of the local scores at single enthesal sites and at a global enthesal level (global enthesal PDUS score) were calculated. The following entheses were examined bilaterally: common extensor tendon at its insertion at the lateral humeral epicondyle; gluteus tendons at their insertion at the greater trochanter; quadriceps tendon at its insertion at the superior pole of the patella; patellar tendon at its proximal insertion at the inferior pole of the patella; patellar tendon at its distal insertion at the tibia tuberosity; Achilles tendon at its insertion at the calcaneus; plantar aponeuroses at its insertion at the calcaneus.

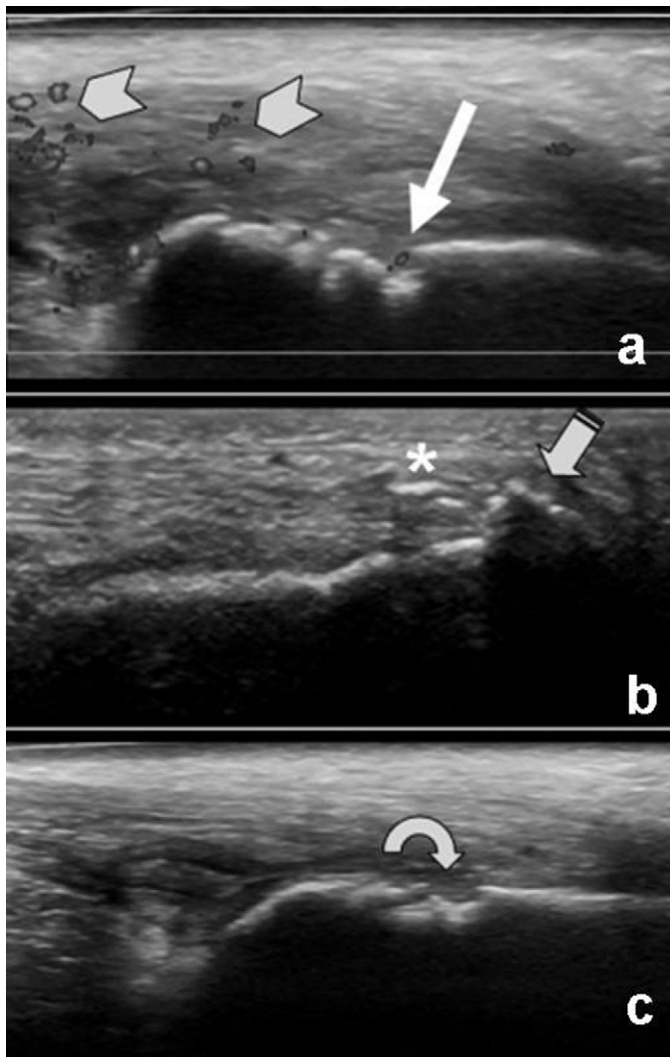


Fig. 1. PDUS of the Achilles tendon enthesis. Longitudinal scan. a: power Doppler signal at the enthesis level (arrow) and at the tendon level (arrowhead); b: presence of an enthesophyte (arrow) and calcifications (*); c: evidence of calcaneal bone erosions (curved arrow).

Table 1Basic PDUS findings at all the enthesal sites examined in PsA and RA patients: prevalence, percentage (%) and grade (mean \pm 95% CI).

Basic PDUS findings	Prevalence and percentage (%) of basic PDUS findings		P	Grade of basic PDUS findings (mean \pm 95%CI)		P
	PsA	RA		PsA	RA	
Hypoechoogenicity	178 (16.7%)	14 (3.8%)	0.0000001	0.2 \pm 0.02	0.04 \pm 0.02	0.0001
Thickening	72 (6.8%)	19 (5.2%)	n.s	0.1 \pm 0.01	0.05 \pm 0.02	n.s
Calcifications	202 (19%)	31 (8.5%)	0.000003	0.3 \pm 0.04	0.1 \pm 0.04	0.0001
Enthesophytes	391 (36.8%)	107 (29.4%)	0.011	0.5 \pm 0.04	0.4 \pm 0.08	n.s
Erosions	67 (6.3%)	5 (1.4%)	0.0002	0.08 \pm 0.02	0.01 \pm 0.01	0.0001
Bony irregularity	126 (11.8%)	53 (14.6%)	n.s	0.12 \pm 0.01	0.15 \pm 0.03	n.s
PD signal entheses	49 (4.6%)	4 (1.1%)	0.002	0.07 \pm 0.02	0.01 \pm 0.01	0.002
PD signal tendon	64 (6%)	12 (3.2%)	0.046	0.1 \pm 0.02	0.03 \pm 0.2	0.009
Bursitis	86 (8.1%)	27 (7.4%)	n.s	0.01 \pm 0.02	0.08 \pm 0.03	n.s
Tendon lesion	5 (0.5%)	1 (0.3%)	n.s	0.04 \pm 0.03	0.027 \pm 0.005	n.s

PDUS: power Doppler ultrasound; PsA: psoriatic arthritis; RA: rheumatoid arthritis; CI: confidence interval; PD: power Doppler.

2. Results

One thousand and sixty-four entheses of 76 PsA patients and 224 of 26 RA controls were examined. The global number of entheses with PDUS-detected abnormalities (Fig. 1) were 756 in PsA patients and 224 in controls ($P=0.0008$). At entheses level, the prevalence and grade of most inflammatory and structural damage lesions (Table 1) resulted to be significantly higher in PsA than in RA ($P<0.0000001$ and 0.01 respectively). The global enthesal PDUS score showed a more serious involvement in PsA than in controls (22.77 ± 18.8 vs 14.04 ± 9.8 ; $P=0.03$). Poor significant correlations were demonstrated between global enthesal PDUS score and MASES ($P<0.033$). The analysis of the findings at patient level didn't give results able to discriminate between RA and PsA patients.

3. Discussion

This is the first study showing PDUS findings indicative of extensive and severe enthesal abnormalities, related both to inflammation and structural damage, in PsA. Enthesitis, a typical pathological feature of SpA, may assume variable aspects and different locations [7–9]. However, due to the low sensitivity of clinical assessment in the detection of inflammatory musculoskeletal changes, peripheral enthesitis is frequently mixed up with other joint and soft tissues disorders by physical examination and its presence may be often underestimated [1]. Therefore, imaging modalities, such as musculoskeletal US, play a fundamental role in this field helping in the detection of various enthesal abnormalities at different enthesal sites.

Disclosure of interest

The authors declare that they have no conflicts of interest concerning this article.

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Rheumatoid arthritis, alveolar echinococcosis, and rituximab: A case report[☆]

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