

Ultrasonography Role in Evaluation of Achilles Tendon Enthesis in Reactive Arthritis Patients

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ABSTRACT: Reactive arthritis is an inflammatory joint disease which develops after 1-4 weeks following an enteral, genital or ORL infection, with a higher frequency in HLA-B27 positive patients. As a group feature, enthesitis is defined as inflammation in bone insertions of tendons, ligaments and muscular fascia. **Aims:** the main object of this study was to demonstrate the importance of musculoskeletal ultrasonography in Achilles tendon evaluation in patients with reactive arthritis. **Patients and methods:** we designed a transversal, retrospective study which included 15 patients diagnosed, based on ESSG criteria, with reactive arthritis (ReA), in Rheumatology Department, Emergency County Hospital. From those 15 patients, 9 were positive for a genital infection with Chlamydia trachomatis and 6 patients with enteral infection, 2 with Shigella, respectively 4 with Yersinia. Healthy control group included 15 patients, with no inflammatory joint diseases. After clinical examination, all patients and controls underwent ultrasound (US) evaluation for Achilles tendon changes, using an Esaote MyLab 25 machine, with a linear high frequency probe (10-18 MHz), using EULAR recommendations and OMERACT definitions for enthesitis, tendinitis and erosions. The cutoff value for the Achilles tendon thickness was 5.29mm, as described by Balint et al. **Results:** We examined 30 Achilles tendons in 15 patients, with a mean age of 35,2years±10,19 standard deviation (SD) and 30 tendons in 15 controls with a mean age of 35,8 years ±12,00 SD. In both groups sex prevalence showed more males than females (66,66% males in controls vs. 60,00% in patients group). We found a statistic significant higher ESR and CRP in patients group, compared to controls (24,86mm/h vs. 11,8mm/h; 18,90mg/dl vs. 6,22mg/dl). Most frequent finding in patients group was retrocalcaneal bursitis (56.66%), followed by tendon thickening (46.66%), compared to control group in which we found more frequently osteophytes (36.66%) and calcifications (23.33%). Tendon thickness was significantly higher in the patients group compared to control group 5.30mm±1.39SD vs. 4.42mm±0.77SD, p=0.008). When compared to clinical examination, US found at least one change in all patients (100% vs. 40.0%). **Conclusions:** A higher prevalence of retrocalcaneal bursitis and tendon thickening were found in reactive arthritis patients compared to control group. The US found more changes compared to clinical examination and manage to discriminate between the types of changes found more frequently in inflammatory conditions.

KEYWORDS: musculoskeletal ultrasonography, enthesitis, reactive arthritis, tendon thickening, erosions

Introduction

Spondylarthritides are a group of inflammatory joint diseases, with common features, like genetic profile with HLA-B27 antigen often present [1] and clinical pattern different from rheumatoid arthritis, involving more frequently the lower limb. Reactive arthritis, one of the entities included in the group of spondylarthritides, is defined as an inflammatory joint disease, with the onset after an interval of 1-4 weeks consecutive an enteral or uro-genital infection. The higher incidence in patients HLA-B27 positive might be explained an increased IL-10 in those patients, besides a lower synovial level of IFN γ , leading to a higher persistence of the pathogen. Most commonly involved pathogens are Chlamydia trachomatis and Ureaplasma urealyticum for genital

infections and Salmonella, Shigella flexneri and Campylobacter jejuni for enteral ones [2,3].

Even if usually the disease is self limiting and the average duration for reactive arthritis is between 3-5 months, there are about 15% of the patients with a chronic evolution. The etiology of the infection can change the outcome of the disease, as Chlamydia trachomatis might lead to chronic arthritis in more than half of the patients [4-7].

The diagnosis of reactive arthritis (ReA) is made using ESSG spondylarthritides criteria, but in patients without radiologic features for sacroiliitis and no impaired spinal mobility, the management is often difficult. The inflammatory involvement of the enthesitis, a characteristic feature of spondylarthritides is thought to be the primary lesion in those patients [8,9,10]. For this

reason, many clinical tenderness enthesitis indexes have been proposed, but most of them are time consuming and with low performance compared to US evaluation [11,12]. Besides this, US is more specific, can discriminate between the types of changes and it is reproducible [13,14,15].

Aim

The aim of the study was to demonstrate the US role in Achilles tendon evaluation in patients with reactive arthritis.

Patients and methods

We designed a transversal, retrospective study, which included 15 consecutive patients diagnosed with ReA, based on ESSG criteria, in the Rheumatology Department, Emergency County Hospital. Exclusion criteria included any Achilles tendon and ankle surgery, peripheral neuropathy and ankle joint and Achilles peritendinous corticosteroids (SAID) injection one month prior inclusion. Fifteen controls, age and sex matched, with no inflammatory joint diseases or ankle trauma were included too. In the patients group, there were 9 patients positive for a genital infection with Chlamydia trachomatis and 6 patients with enteral infection, 2 with Shigella, respectively 4 with Yersinia.

The study was approved by the hospital ethics committee and both patients and controls signed an informed consent, before entering the study.

A short anamnesis, full clinical examination and serological tests were performed on both groups and disease duration, and results of conventional radiography were noted in patients group.

Ultrasound evaluation

US was performed by an expert examiner (FAV), using an Esaote MyLab25 Gold Machine, with a linear high frequency probe (10-18MHz) on both Achilles tendons, with patient lying prone and feet hanging over the

edge of examination table at a 90 degrees of flexion. Each tendon was scanned in both the longitudinal and transverse planes.

US evaluated the following lesions at enthesis site: calcifications, bursitis, erosions, osteophytes and any change in the tendon and paratendon, like thickness or fibrillar pattern changes:

- bursitis was defined as we defined, anechoic or hypoechoic area, compressible by the transducer, localized at the level of retrocalcaneal bursa [13,16,17];

- erosions were defined as a bone cortical step down breakage confirmed in both longitudinal and transverse mode;

- tendon thickness was measured at bone insertion and the cutoff for normal aspect was considered 5.29mm as previously described [14];

- fibrillar hyperechoic aspect was considered as normal structural pattern; the presence of hyperechoic linear area, in contact with the bone (hyperechoic spur formed at tendon insertion into the bone), growing in the direction of natural force lines of the tendon, was noted as enthesophytes; Power Doppler was standardized with a pulse repetition frequency (PRF) of 0.7kHz and a Doppler frequency of 8MHz; Power Doppler signal close to the bone cortical was considered specific for inflammatory changes at enthesis site;

- calcifications were defined as hyperechoic linear images not in contact with the bone.

All the changes were noted in terms of present/absent, with 1 if present and 0 if absent. Tendon thickness was noted on both Achilles tendon in each patient and controls.

Statistical analysis

Statistical analysis was performed with Microsoft Excel software and all the data were expressed as the mean ± standard deviations (SD), unless specified otherwise. Values of p<0.05 were considered to be significant.

Table I. Demographic, clinical and paraclinical data of the patients and controls included.

Characteristic	Value	
	Patients	Controls
Gender – Man, number (%)	9 (60.0%)	10 (66.6%)
Age, years (mean±SD)	35.2±10.19	35.8±12.00
HLA-B27 positive, number (%)	8 (50.33%)	1 (6.66%)
ESR, mm/1h (mean±SD)	24.86±11.5	11.8±4.44
CRP mg/l (mean±SD)	18.9±11.27	6.22±2.74

Results

Demographic data

Demographic, clinical and paraclinical data of the 15 patients with reactive arthritis and 15 controls enrolled in the present study, are reported in the Table I. A total of 60 Achilles

tendons were examined in 15 patients and 15 controls, both in grayscale (GS) and Power Doppler (PD).

We found a statistic significant higher ESR and CRP in patients group, compared to controls (Fig.1).

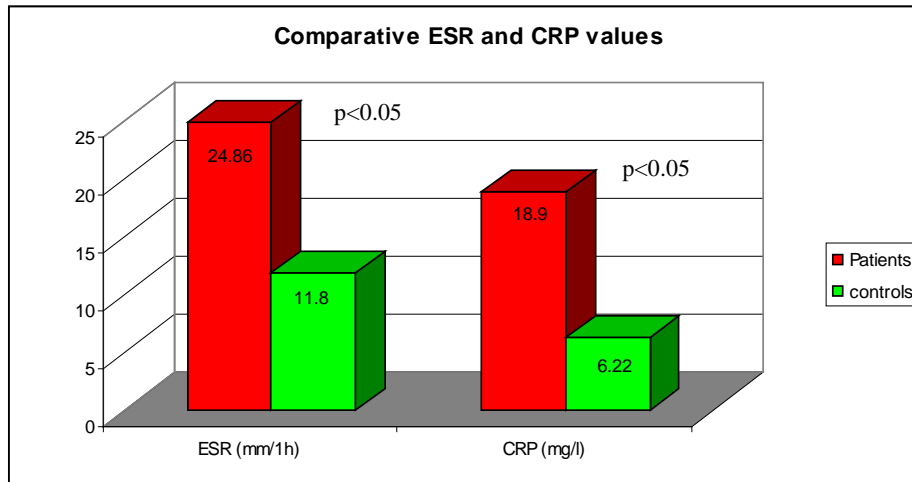


Fig.1. Comparative ESR and CRP values in patients and controls

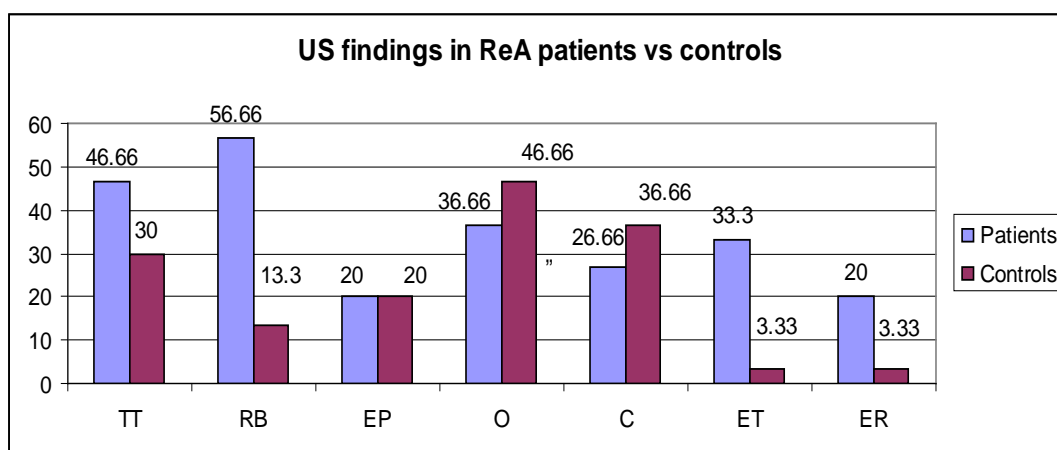


Fig.2. US findings in ReA patients and controls. TT-thickened tendon, RB-retrocalcaneal bursitis, EP-enthesophytes, O-osteophytes, C-calcifications, ET-enthesitis, ER-erosion

We found more frequently retrocalcaneal bursitis and tendon thickening in patients group, compared to controls (56.66% vs. 13.33% and 46.66% vs. 30.0%) (Fig.2).

In the same time, the mean tendon thickness was significantly higher in the patients group compared to control group (5.30mm±1.39SD vs.

4.42mm±0.77SD, p=0.008) (Fig.3). In control group we found more frequently osteophytes (36.66%) and calcifications (23.33%) (Fig.3). When compared to clinical examination, US found at least one change in all patients (100% vs. 40.0%).

Tendon thickness in patients vs controls

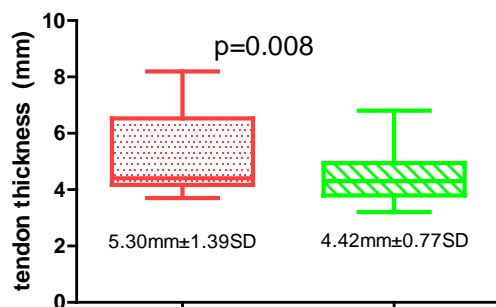


Fig.3. Tendon thickness in patients compared to controls

Fig.4 shows representative examples of tendon and enthesis changes found in our study.

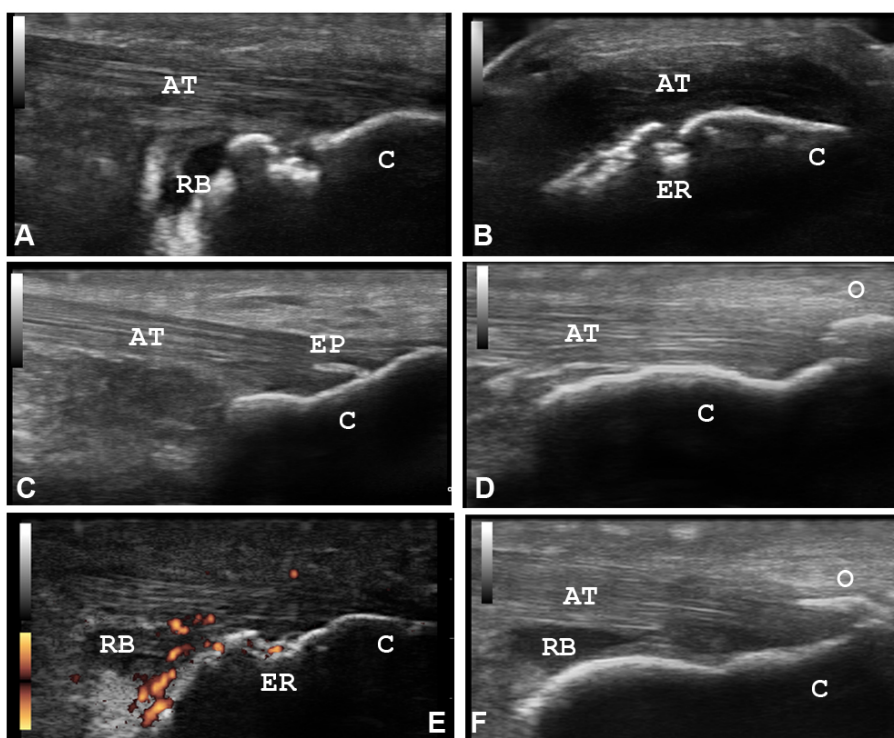


Fig.4. US images at the level of Achilles tendon insertion on the calcaneus in longitudinal (A, C, D, E, F) and transverse view (B). E. Power Doppler signal at the level of retrocalcaneal bursa, close to the bone cortical and inside erosion. AT- Achilles tendon, C – calcaneus, RB – retrocalcaneal bursitis, ER – erosion, EP – entesophyte, O – osteophyte.

In the patients group, different type of infection can lead to different involvement of Achilles tendon. In patients with genital infection prior to reactive arthritis, we found more aggressive inflammatory changes

compared to patients with enteral infections (Fig.5). In this idea, those patients are more prone to have more complex lesions of the Achilles tendons.

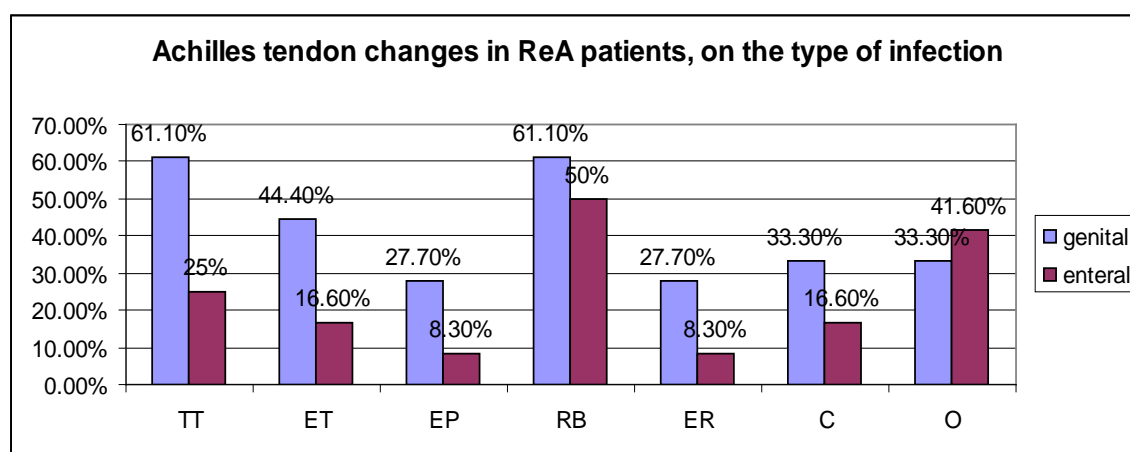


Fig.5. Achilles tendon changes in patients with ReA, depending on the type of preceding infection. TT – thickened tendon, RB – retrocalcaneal bursitis, EP – entesophytes, O – osteophytes, C – calcifications, ET – enthesitis, ER – erosion

Discussion and conclusions

To the best of our knowledge, this is the first study to investigate the role of US in evaluation of the Achilles enthesis in patients with reactive arthritis. We know there are few limitations of the study, first being the low number of patients, but we intended to be a pilot for an extended one. Previous studies provided important informations on the relevance of US in SpA group [18-21], but reactive arthritis needs to be more investigated.

The aim of the study was to demonstrate the US role in Achilles tendon evaluation and to identify most frequent US findings in patients with reactive arthritis, compared to controls, but inside the group too, depending on cause of the preceding infection.

The results of our study revealed that in ReA patients, the most frequent US finding might be retrocalcaneal bursitis, followed by tendon thickening. In the same time, when compared to control group, those changes are found significantly more often in ReA patients, fact that could help in early diagnosis and management of those patients, when other inflammatory changes are subclinical.

Between patients group, the ones with genital infections prior to onset of musculoskeletal involvement, seem to have more frequently a progressive disease.

As a conclusion, musculoskeletal US is a non expensive, non invasive and accessible imaging technique, that can help identify early changes in tendons and enthesis in patients with prior infections and give a hint on a possible reactive arthritis diagnosis and thus can optimize the management of the disease.

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Author contribution - Simona Covei Banicioiu and Ananu Florentin Vreju contributed equally to the manuscript.

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