

Development of a 6 joint simplified ultrasonographic score to assess and monitor disease activity in patients with Rheumatoid Arthritis

Cazenave Tomas; Waimann Christian Alfredo; Citera Gustavo; Rosemffet Marcos Gabriel.
Rheumatology section, Instituto de Rehabilitación Psicofísica, Argentina

Background: Ultrasound (US) has become a routinely available bedside method for the evaluation of patients with Rheumatoid Arthritis (RA). However, it is time consuming, making it difficult to implement in daily clinical practice. The aim of our study was to develop a new standardized ultrasound score including only 6 joints, that could be applied to the daily monitoring of disease activity in patients with RA.

Methods: We included patients with diagnosis of RA (American College of Rheumatology 1987' criteria). Each patient underwent clinical, radiological and ultrasonographic evaluation. Clinical data included erythrocyte sedimentation rate, rheumatoid factor and disease activity index 28 (DAS28).

Ultrasound evaluation was performed by two rheumatologists with experience on ultrasonography who were blind to clinical examination. Six joints were evaluated: bilateral wrist (dorsal view of radio and intracarpal joint), second metacarpophalangeal (2MCP; dorsal and palmar view), and fifth metatarsophalangeal (5MTP; dorsal view). Ultrasonographic synovitis was defined as presence of a gray scale (GS) sinovitis score ≥ 1 and/or the presence of synovial effusion. Synovial vascularity was assessed by power Doppler (PD) and graded from 0 to 3, according to OMERACT standards. The ultrasonographic score comes from the addition of the presence of synovitis (one point) and the degree of PD (graduated from 0 to 3), with a total score ranged from 0 to 40 (synovitis subscale = 0–10; PD subscale = 0–30). Final score were correlated with clinical variables (bivariate analysis) and stratified according to patients' disease activity. In addition we evaluated the validity of the score excluding the 5MTP and gray scale synovitis assessment.

Results: We assessed 124 patients. Mean age was 53 ± 13 years, 86% were female, and disease duration was 9.4 ± 8.5 years. Mean tender and swollen joints count were 3.3 ± 4 and 3.5 ± 4.5 , respectively. Mean DAS28 score was 3.8 ± 1.4 . A total of 744 joints were evaluated. 548 (74%) exhibited ultrasonographic changes (PD ≥ 1 = 35%; synovitis = 69%). 2MCP and 5MTP showed erosions in 70% and 83%, respectively. Mean ultrasonographic score was 11.4 ± 6.5 (Doppler subscale 4.8 ± 6.5 ; Synovitis subscale 6.6 ± 2.2). The score had a moderate correlation with swollen joint count and DAS28 (Table 1). The score was able to discriminate patients with high disease activity from those with moderate, low activity and remission (Remission = 8 ± 4 , low activity = 9 ± 5 , Moderate activity = 11 ± 5 , High activity = 19 ± 8 ; $p < 0.01$). Excluding the 5MTP and synovitis subscale did not affect the results, showing an excellent correlation with primary score (rho spearman equal to 0.98 and 0.96, respectively). US examination was fast, taking 8 minutes per patient, including documentation.

Conclusion: A reduced US score of 6 joints showed to be fast and a valid tool to detect and monitor disease activity in patients with RA. Ultrasonographic assessment of bilateral wrist, second MCP and fifth MTF could be enough for evaluating overall inflammatory activity, reducing the examination time, thereby making it possible to integrate the ultrasound to the daily rheumatologic practice.

Table 1. Correlation between ultrasonographic score and clinical variables

US score	Swollen joints count	Tender joints count	ERS	VAS activity	VAS pain	DAS28
Global Score	0.60	0.29	0.38	0.31	0.33	0.54
Doppler Subscale	0.60	0.28	0.40	0.29	0.32	0.53
Sinovitis Subscale	0.44	0.23	0.22	0.28	0.26	0.39

Spearman test was used and expressed as rho spearman coefficient.

All correlation were statistically significant (p- value <0.05)

VAS activity 0 - 100, where 100 is worst activity

VAS pain 0 – 100, where 100 is worst pain

Abbreviation: US=ultrasound; ERS=eritrosedimentation rate; VAS=visual analogue scale;

DAS28= disease activity index-28