

## A rapid 4- joint ultrasonographic score to daily monitoring disease activity in patients with rheumatoid arthritis: validity and sensitivity to change.

**Background/Purpose:** Ultrasound has demonstrated to be a sensitivity and specific tool to assess patients with Rheumatoid Arthritis (RA). However, the feasibility of this technology in daily clinical practice is still under debate. The purpose of our study was to evaluate the validity and sensitivity to change of a rapid 4-joint ultrasonographic score that could be applied to daily monitoring disease activity in patients with RA.

**Methods:** We included patients with RA (ACR/EULAR 2010). Data was collected at baseline, 3 and 12 months. Each patient underwent clinical (DAS28) and ultrasonographic (US) evaluation of 28-joints. Power Doppler (PD) and gray scale (GS) were graded from 0 to 3, according to OMERACT standards. Three ultrasonographic scores were calculated: 4-joints (bilateral radio and intracarpal joint and second metacarpophalangeal), 6-joints (4-joints plus bilateral fifth metatarsophalangeal), and 28- joints. US scores come as the result of the addition of PD and GS score, with a total score ranged from 0 – 36, 0 – 48, 0 – 174, respectively. We evaluated psychometric properties of 4-joints score in comparison with others US scores, including criterion, construct validity and internal consistency (Cronbach's  $\alpha$  coefficients). Sensitivity to change was measured at 12 months using standardized response mean (SRM) and classified according Cohen's effect size. The minimal important change (MIC) was defined as a change of 1.96 times the standard error of measurement.

**Results:** 49 patients were included. All patients completed annual visits. Mean age was  $53 \pm 10$  years, 85% were female, and disease duration was  $8 \pm 5$  years. Baseline DAS28 score was  $4.8 \pm 1.5$ . Mean 4-joints ultrasonographic score was  $12 \pm 6$  (Doppler subscale  $5 \pm 3$ ; Synovitis subscale  $6 \pm 3$ ). The score showed an acceptable confiability and a moderate to good correlation with DAS28, 6 and 28 joints US scores (Table 1). The 4-joint US examination was able to measures change in clinical status (SRM=0.98, large effect size). A change in score  $\geq 5$  was defined as a minimal important change. The ultrasonographic evaluation of 4-joint US score was fast, taking 5 minutes per patient, in comparison with 8 and 35 minutes for 6 and 28 joints scores, respectively.

Table 1.

US score	Baseline mean $\pm$ S D	Floor effect	Celling effect	Cronbach's $\alpha$ coefficients	MI C	SRM	Correlation matrix (r)		
							US 6-joints score	US 28-joints score	DAS28
4-joints	$12 \pm 6$	0%	0%	0.84	4.9	0.98	0.96*	0.80*	0.60*
6-joints	$14 \pm 7$	0%	0%	0.84	5.5	0.94	-----	0.83*	0.65*
28-joints	$34 \pm 20$	0%	0%	0.94	5.0	0.72	-----	-----	0.77*

\* P- value <0.05

**Summary of Results:** A reduced US score of 4 joints showed to be a valid tool to detect and monitor disease activity in patients with RA. The quickness and high ability to detect clinical changes make this score a feasible and useful tool in daily rheumatology practice