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USEFUL II: DERIVATION OF THE LUPUS ARTHRITIS AND MUSCULOSKELETAL DISEASE ACTIVITY SCORE (LAMDA) USING DATA FROM A MULTICENTRE LONGITUDINAL STUDY

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Background: Musculoskeletal (MSK) disease is the commonest manifestation of SLE. We showed that the MSK components of the BILAG index and SLEDAI have limited sensitivity, specificity and responsiveness compared to ultrasound (US) synovitis. The USEFUL study evaluated response to glucocorticoids in SLE patients with inflammatory pain.

Objectives: To develop a disease activity tool for lupus MSK manifestations that is continuous, responsive, sensitive, and correlates with US-synovitis

Methods: 133 patients who received depomedrone 120mg IM were assessed at 0, 2 and 6 weeks for 66/68 swollen and tender joint counts, BILAG2004 index, SLEDAI-2K, physician global and MSK-VAS, inflammatory markers, patient pain and disease activity-VAS. Total US score (OMERACT-EULAR) in the hands and wrists was calculated blinded to patient and clinical assessor. Patients reported overall response using a Likert scale.

The LAMDA was developed by modelling a core set of clinical variables against total US score using penalized (Lasso) regression. Responsiveness was compared between LAMDA and other variables at week 6 using effect sizes. Minimum clinically important difference (MCID) was explored using the SEM and minimal disease activity threshold using ROC.

Results: The variables selected for the LAMDA score were swollen joint count, patient MSK pain VAS, physician MSK disease activity VAS and ESR. A continuous score was derived. This had a theoretical range from 0 to 26.5 based on maximum ESR of 100. The highest value observed in USEFUL was 15. LAMDA was significantly higher in patients with active US (mean (SD) 5.71 (2.67), n=78) compared to patients with normal US (3.27 (1.77), n=55; difference (95% CI) -2.45 (-3.26, -1.63), t=-5.93, p<0.001). This difference remained significant in patients with no swollen joints (difference (95% CI) -0.71 (-1.40, -0.02), t=-2.06, p=0.044).

Effect size was greater for the LAMDA (0.37) than the BILAG-MSK (0.31), SLEDAI-MSK (0.27) and total US score (0.33). In patients with active US at baseline, LAMDA's effect size was 0.42.

The MCID was 0.71 and correlated with patient-reported change in pain. A threshold for minimal disease activity of 3.23 optimized sensitivity (0.77 (0.65, 0.89)) and specificity (0.80 (0.68, 0.92)) against US score >0.

Conclusion: The LAMDA score is a novel continuous disease activity instrument for MSK manifestations of SLE derived from variables familiar to rheumatologists. The LAMDA score is sensitive to imaging detected synovitis without swelling and more responsive than other instruments. . LAMDA may improve the ability of clinicians to accurately determine therapeutic efficacy in clinical trials and practice. Future work will validate the LAMDA score in independent cohorts and randomized trials.

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