

The Natural History of Enthesitis-related Arthritis on Biologic Therapy

^{1,2}Bray TJP, ¹Vendhan K, ¹Atkinson D, ²Fisher C, ²Sen D, ²Ioannou Y, ¹Hall-Craggs MA

¹Centre for Medical Imaging, University College London ²Arthritis UK Centre for Adolescent Rheumatology, University College London

Introduction

Magnetic resonance imaging (MRI) can provide a wealth of information about inflammation, erosions, fusion and fat metaplasia in the sacroiliac joints in patients with enthesitis-related arthritis (ERA). However, there is currently a lack of information regarding the natural history of imaging findings when patients are treated with biologic therapy. The aim of this study was to evaluate the disease course of patients with enthesitis-related arthritis after biologic treatment using repeat MRI scans before and after treatment.

Materials and Methods

A picture archiving and communication system (PACS) search was used to identify all adolescent patients aged 12-24 with ERA who had undergone at least three MRI scans of the sacroiliac joints, over at least a two-year period, with scans before and after biologic treatment. Each scan was scored for inflammation according to the Spondyloarthritis Research Consortium of Canada scoring system¹, and for erosions, fat metaplasia and fusion using a recently proposed structural score².

Results

Twenty-two patients were identified for the study. Patients were started on biologics at a mean age of 17y2m, and the mean number of scans per patient was 3.9. Scans were acquired between 3.5 years before starting biologics and 7.8 years after starting biologics. Graphs showing inflammation, erosions, fat metaplasia and fusion over time from biologic start are shown in Figure 1.

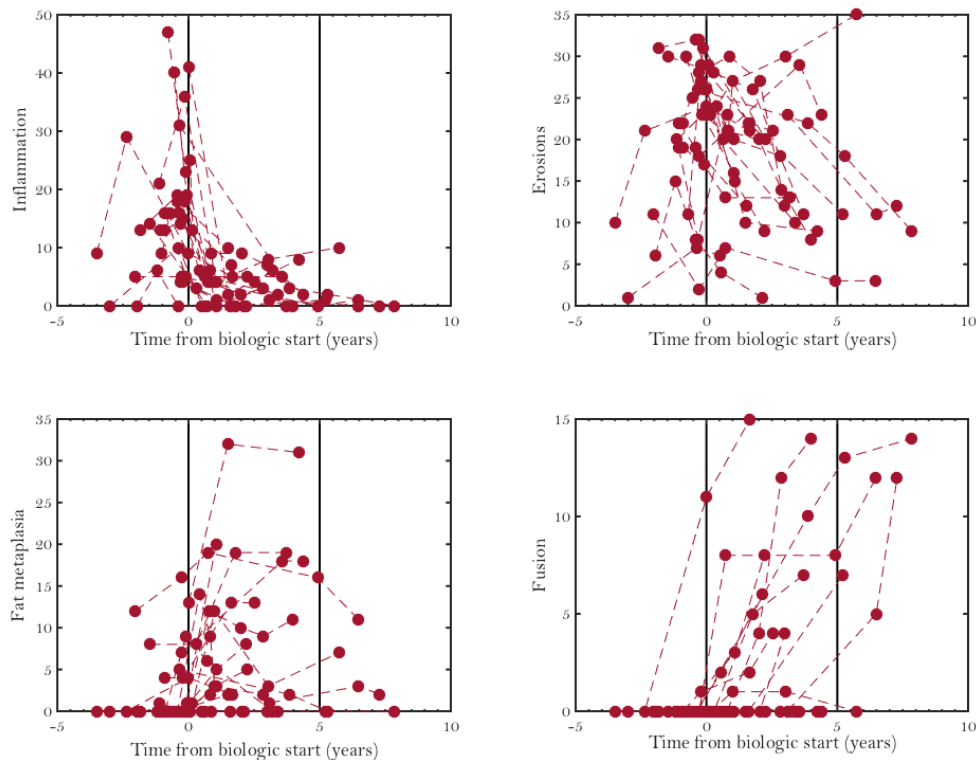


Figure 1 – scatterplots showing inflammation, erosions, fat metaplasia and fusion over time from biologic start. Biologic therapy was started at time 0. Repeated data from individual patients are joined by dotted lines.

Scores for inflammation and erosions were both significantly lower after treatment than before treatment ($p < 0.001$). Fusion and fat metaplasia scores were significantly higher after treatment ($p < 0.001$).

Discussion

These data suggest that ERA patients undergo a reduction in inflammation but a substantial increase in fusion and fat metaplasia after biologic treatment. These findings are consistent with studies in adult spondyloarthritis which suggest a link between resolution of inflammation and new bone formation during biologic therapy³.

Conclusions

Biologic treatment in enthesitis-related arthritis effectively reduces inflammation, but fails to prevent fusion.

References

1. Maksymowych, W. P. *et al.* Spondyloarthritis Research Consortium of Canada magnetic resonance imaging index for assessment of sacroiliac joint inflammation in ankylosing spondylitis. *Arthritis Care Res.* **53**, 703–709 (2005).
2. Maksymowych, W. P., Wichuk, S., Chiowchanwisawakit, P., Lambert, R. G. & Pedersen, S. J. Development and preliminary validation of the spondyloarthritis research consortium of Canada magnetic resonance imaging sacroiliac joint structural score. *J. Rheumatol.* **42**, 79–86 (2015).
3. Pedersen, S. *et al.* Radiographic progression is associated with resolution of systemic inflammation in patients with axial spondylarthritis treated with tumor necrosis factor α inhibitors: a study of radiographic progression, inflammation on magnetic resonance imaging, and c. *Arthritis Rheum.* **63**, 3789–800 (2011).