

# Analysis of the usefulness of magnetic resonance imaging evaluation for rheumatoid arthritis treated with biological agents in the early phase: retrospective observation of abatacept and infliximab

Sirs,

Magnetic resonance imaging (MRI) evaluation of rheumatoid arthritis (RA) is useful because it is 3-7-fold more sensitive than conventional radiography for detecting bone erosion in RA (1, 2) and recent studies have been reported that baseline MRI-detected synovitis and bone marrow oedema (BME) can independently predict future radiographic progression (3, 4). While whole-body is more expensive in terms of both startup costs and maintenance fees, and is not always convenient. We developed a 0.3T low-field extremity MRI system to address these limitations; it is commercially available. Previously we reported that our low-field extremity MRI image obtained almost same results as 1.5T whole body MRI image for the detection of synovitis, BME and erosion (5, 6). The aim of this study was to reveal whether MRI findings of RA patients given a biological agents, abatacept (ABT) or infliximab (IFX), improve with clinical response in the early (24-week) phase. This was a retrospective observational study and not randomised owing to the small population, and treatments were likely influenced by the patient characteristics and by other factors such as previous treatments undergone. MRI images of bilateral hands were obtained at baseline and at 24 weeks by using our MRI. Images were scored by 2 independent readers.

A total of 18 patients treated with ABT and of 18 patients treated with IFX were included in the study. Simplified Disease Activity Index (SDAI) scores were significantly decreased after administration of either ABT or IFX (ABT:  $12.22 \pm 9.28$  to  $7.16 \pm 5.03$ ,  $p=0.006$ ; IFX:  $17.37 \pm 7.41$  to  $12.12 \pm 7.21$ ,  $p=0.001$ ). No significant differences between the 2 groups were shown in the  $\Delta$ SDAI score.

In MRI images, the synovitis score was significantly improved (ABT:  $12.22 \pm 9.28$  to  $7.16 \pm 5.03$ ,  $p=0.006$ ; IFX:  $17.37 \pm 7.41$  to  $12.12 \pm 7.21$ ,  $p=0.001$ ) from baseline to 24 weeks, as was the BME score (ABT:  $5.90 \pm 9.58$  to  $2.22 \pm 4.05$ ,  $p=0.018$ ; IFX:  $8.43 \pm 9.65$  to  $2.73 \pm 2.93$ ,  $p=0.011$ ). On the other hand, the  $\Delta$  synovitis and  $\Delta$  BME scores of both groups did not differ significantly ( $\Delta$ synovitis: ABT  $5.05 \pm 7.68$ , IFX  $5.25 \pm 4.26$ ;  $\Delta$ BME: ABT  $3.68 \pm 7.54$ , IFX  $5.98 \pm 9.10$ ). No significant change was found in the erosion scores of both groups. In an additional comparison, no significant

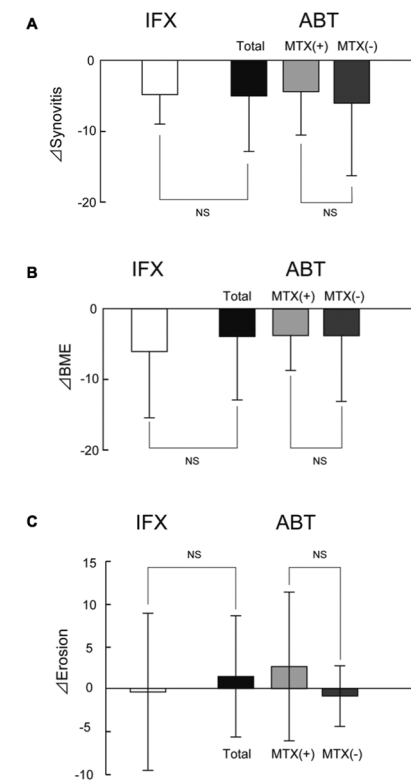


Fig. 1.

differences were observed in the  $\Delta$ MRI scores between with or without MTX therapy (Fig. 1).

The synovitis score could be predicted by the SDAI at baseline and at 24 weeks in the combined patients of both the IFX and the ABT groups (data not shown). Therefore, the evaluation of the SDAI reflects MRI-detected synovitis to some extent. No factors significantly associated with BME or erosion were found.

At 24 weeks, 6 patients treated with ABT and 4 patients treated with IFX could achieve SDAI remission. Synovitis scores of the remission group differed significantly from that of the non-remission group (remission group:  $5.80 \pm 4.42$ ; non-remission group:  $10.81 \pm 6.69$ ;  $p<0.05$ ). However, all patients who could achieve remission had residual synovitis. Recent studies have reported that MRI-detected synovitis and BME remain after achieving clinical remission and that this subclinical inflammation leads to structural destruction (7-9) and especially, RAMRIS synovitis score of  $>5$  can predict radiographic progression (10). In conclusion, the present study indicates that MRI findings of RA patients in both the IFX and the ABT groups improve with clinical response in the early phase, while subclinical synovitis may persist even if achieved clinical remission. MRI evaluation is useful to identify the more detail disease activity of RA.

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