

Comparison of MRI of the hand and feet for detecting early arthritis

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Introduction:

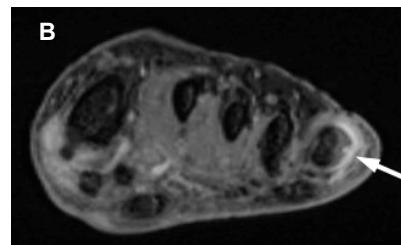
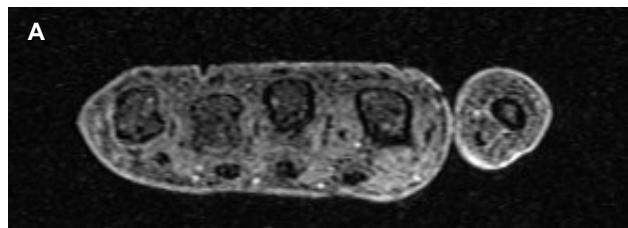
Previous studies have shown that MRI of the feet of patients with early rheumatoid arthritis can provide additional information when MRI of the hands is unhelpful [1-3]. However patients frequently present with joint symptoms but fail to fulfill the criteria for rheumatoid arthritis. Patients who are positive for anti-cyclic citrullinated peptide (CCP) are known to be at high risk of developing rheumatoid arthritis in the future, but clinical diagnosis may still be difficult [4]. MRI of the hands may identify characteristic features, in particular erosions, allowing a diagnosis to be made [5]. The purpose of this study was to investigate whether MRI of the feet offered additional information, potentially aiding earlier diagnosis.

Methods:

18 patients with musculoskeletal symptoms but without a clinical diagnosis of arthritis were included in the study. All the patients reported non-specific musculoskeletal symptoms. All patients were positive for the anti-CCP antibody but did not have a specific diagnosis of arthritis and in particular failed to meet the 1987 American College of Rheumatology criteria for the diagnosis of rheumatoid arthritis [6]. Each of the patients underwent MRI of the most symptomatic hand including T2-weighted fat suppressed and STIR coronal, and T1-weighted pre and post contrast 3D-VIBE images. At the same appointment, imaging of both feet was undertaken using T2 weighted fat suppressed long axis and T1-weighted post contrast 3D VIBE Dixon sequences. Two experienced MSK radiologists read the images by consensus. Initially only the scans of the feet were read blinded to the results of the hand MRI. Images were scored for the presence or absence of synovitis, erosions and bone marrow edema at the forefoot, midfoot, hindfoot and ankle joints and the presence or absence of tenosynovitis in the foot and in the ankle. A radiological diagnosis on the basis of the overall imaging appearances of the feet and ankles was also made. Findings were defined as typical of rheumatoid arthritis if there was erosive change in the characteristic MTP distribution with associated synovitis. The 1st MTP joint was specifically excluded from the study because of the frequency of osteoarthritis at this joint. After one week the hand studies were read in a different order to the foot studies and without reference to the foot MRI findings. Again, the presence or absence of synovitis, erosions and marrow edema in the MCP and wrist joints was recorded along with the presence or absence of tenosynovitis. A specific diagnosis on the basis of all the hand and wrist appearances was made and recorded.

Results:

16/18 patients showed at least one abnormality on hand and wrist imaging and 16/18 patients showed at least one abnormality on the foot and ankle studies. In 10 patients the findings in the hand and wrist suggested a diagnosis of rheumatoid arthritis on the basis of pattern of erosion and distribution of disease. The remaining 6 patients with abnormality present in the hands/wrists had non-specific findings of a non-erosive inflammatory arthritis. Among the 8 patients with normal hands/wrists or non-specific findings, 7 showed an abnormality in the feet/ankles and in 5 of these cases the diagnosis of rheumatoid arthritis was suggested by the presence and pattern of erosions and marrow edema. In all 5 of these cases the changes seen were in the forefeet.



Axial T1 weighted post contrast 3D VIBE Dixon images from a study patient through the metacarpal (A) and metatarsal (B) heads. No hand abnormality was shown, however there is synovitis and erosion at the 5th MTP joint (arrow).

Discussion:

The results showed a high incidence of erosive change in CCP positive patients with musculoskeletal symptoms, despite the absence of a clinical diagnosis of rheumatoid arthritis. This is in keeping with the known high risk of developing RA in these patients [4,5] and the sensitivity of MRI [5]. The results of this study show that MRI of the feet may be useful for demonstrating early erosive changes typical of rheumatoid arthritis in this patient group. These changes were identified in the feet of a substantial proportion (5/8) of patients in whom standard MRI of the hand was unhelpful. Erosive changes in the foot and ankle were only demonstrated in the MTP joints. These results suggest that in patients with anti-CCP antibodies and musculoskeletal symptoms, imaging of the feet may be helpful where MRI of the hands is non-diagnostic. However, it may be sufficient to restrict imaging to the forefoot.

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