Magnetic Resonance Imaging of the Hand in Psoriatic Arthritis

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ABSTRACT. Although magnetic resonance imaging (MRI) studies of psoriatic arthritis (PsA) are fewer than those of rheumatoid arthritis (RA), interest in this field is growing. The type and site of the lesions, rather than the mere severity of synovitis, can help differentiate PsA from other arthritides. Extracapsular enhancement and enthesitis are features emphasized as typical of PsA, but their relevance for the diagnosis is more quantitative than qualitative. Erosions in PsA are probably less frequent and progressive than in RA. Bone edema is unlikely to predict the appearance of erosions in patients with PsA. The Rheumatoid Arthritis Magnetic Resonance Imaging Scoring (RAMRIS) system has been adapted to peripheral PsA, but standardization is still in progress. Dactylitis is a relatively specific feature of PsA. Its pathogenic mechanisms have been investigated with MRI. MRI evaluation of PsA may facilitate diagnosis, evaluation of treatment effects, and understanding of associated mechanisms. (J Rheumatol 2009;36 Suppl 83:39-41; doi:10.3899/jrheum.090221)

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Psoriatic arthritis (PsA) is a high prevalence disease affecting 0.42% (95% CI 0.31–0.61) of the Italian population, a value comparable to that of rheumatoid arthritis (RA)[1]. The hand, which is involved in about 40% of patients[2], is its most frequent location. Magnetic resonance imaging (MRI) is increasingly used to visualize the arthritic joints, but its clinical use is mainly restricted to the evaluation of RA[3]. MRI can help elucidate pathogenic mechanisms of arthritis, evaluate structural damage, and follow disease activity. Several recent reviews have described results of MRI investigation in different joints affected by PsA[4-6].

STRUCTURAL DAMAGE AND SYNOVITIS OF HAND JOINTS

Most MRI studies of the hand in PsA have simultaneously evaluated bone lesions, as a sign of structural damage, and gadolinium-enhanced synovial membrane, as an index of disease activity. The majority of studies compared findings of PsA with those of RA, considered the "reference disease." The first article on the subject was published in 1995 by Jevtic, et al[7], who described most of the relevant features of PsA. The hands of 16 patients with seronegative spondyloarthritides (13 PsA and 3 reactive arthritis) involving 7 proximal interphalangeal (PIP) and 6 metacarpophalangeal (MCP) joints were compared with those of 16 patients with RA. No differences were found in the amount of enhanced synovial tissue among the 2 conditions, suggesting that the severity of synovitis is similar. Six out of 13 patients with PsA had extracapsular enhancement, a feature that has been subsequently emphasized as typical of PsA[8]. However, extracapsular enhancement is of quantitative, rather than qualitative import because it can also occasionally be recognized in RA and other connective tissue diseases[9]. In the above study[7], no erosions or bone edema were found in patients with PsA, a fact that can be ascribed to the relatively short disease duration or to insufficient sensitivity of the specific sequences. By contrast, Giovagnoni, et al[10] showed in the same year that bone edema was present in 43% of 28 PsA patients, and that it was often associated with prominent edema of the periarticular tissues (Figure 1). Further studies have shown that bone edema was present in 17% of 25 patients with seronegative spondyloarthritis, of which 8 had PsA[11]. Although the results for patients with PsA were reported jointly with those of the remaining patients, thus making the interpretation difficult, the occurrence of bone edema seemed much lower than that observed in RA (68%). During followup of the same patient group, no increase in synovial membrane volume or number of bones involved by bone edema or erosions was seen[12]. Differently from RA, bone edema seems not to predict the appearance of erosions in patients with PsA.

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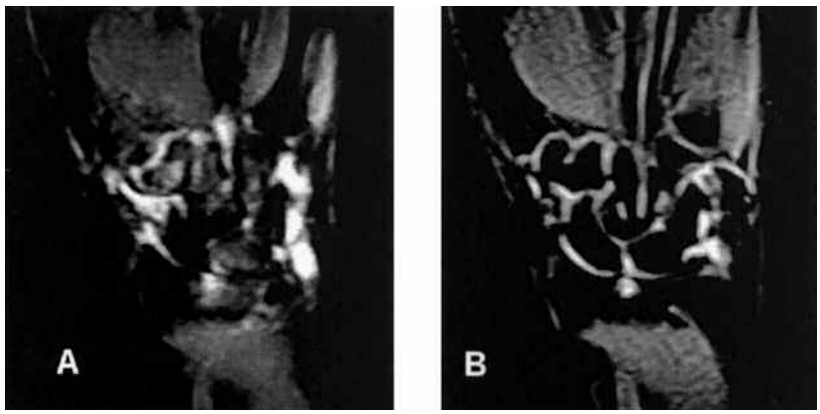

Figure 1. Coronal short-tau inversion recovery sequence of the wrist of a patient with severe psoriatic arthritis showing intense synovitis and diffuse bone edema at baseline (A). After 6 months of conventional treatment (methotrexate 15 mg/week and prednisone 5 mg/day) the patient reached clinical remission, with disappearance of bone edema and reduction of synovitis (B).

Synovial membrane activity can be assessed by dynamic contrast-enhanced MRI (DCE MRI), a technique that evaluates the time-dependent diffusion of gadolinium in the inflamed synovium. In particular, the amount of neovascularization and vasodilation, 2 markers of inflammation activity, can be quantified[13]. In consecutive patients with PsA, DCE MRI showed less inflammation than in RA patients[14]. However, when patients were matched for clinical disease activity, the 2 diseases yielded similar findings. In an attempt to apply the Rheumatoid Arthritis Magnetic Resonance Imaging Scoring (RAMRIS) system to peripheral PsA[15], finger joints from 10 patients with PsA were scored by 4 readers for bone erosion, bone edema, synovitis, tendinopathy, and extracapsular features of inflammation, including enthesitis. Interobserver scoring reliability was moderate to high for bone edema and erosion, but lower for soft tissue inflammation.

In several studies[16-18], the performance of MRI in detecting abnormalities of the PsA hand was compared with that of other imaging techniques. Backhaus, et al[16] found erosions in 9/15 patients with PsA, but noted that frequently they were not enhanced when using gadolinium[16]. Fifteen PsA patients were examined in comparison with 5 RA and 4 control subjects by MRI, conventional radiography, and ultrasonography (US)[17]. US and MRI were more sensitive to inflammatory and destructive changes than conventional radiography and clinical examination. A high agreement (85%–100%) for all destructive changes and more moderate agreement (73%–100%) for inflammation were found between US and MRI. US detected a higher frequency of distal interphalangeal (DIP) joint changes in PsA patients compared to RA patients. Bone changes were exclusively found in PsA DIP joints. Further, bone proliferation was more common, but tenosynovitis less frequent, in PsA versus RA. In a recent study[18] of 13 PsA patients, among conventional radiography, MRI, and US, the first technique was the best to detect erosions and marginal osteoproliferation, with US coming second. Synovitis was best identified by MRI.

Dactylitis. Dactylitis or "sausage like" digit is a diffuse painful swelling of a finger or toe[19]. Its importance in PsA is supported by inclusion in the recently developed classification criteria for PsA[20]. On MRI, at least 4 lesions have been described as possible causes of dactylitis: flexor tenosynovitis[21], soft tissue edema, joint synovitis, and enthesitis[19]. These features most probably coexist, but one may prevail in a given patient.

HAND MRI AS A MARKER OF EFFICACY OF PsA TREATMENT

The effect of infliximab treatment in peripheral PsA (12 hands and 6 knees of 18 patients) was evaluated by MRI[22]. Bone edema, which was present in half the patients and 30% of examined joints, disappeared after 4 infusions. Synovitis improved between 10% and 90% by DCE MRI. In contrast, the effect of etanercept on PsA bone edema was less striking, with a decrease in size in 47%, but an increase of affected bones in 31%[23].

MRI OF JOINTS IN PSORIATIC PATIENTS

An interesting finding is the observation of PsA-associated lesions in the hands of 68% of 25 patients with mere cutaneous psoriasis[24]. Synovial fluid effusion or synovial membrane hypertrophy (44%), periarticular swelling (36%), bone marrow edema (36%), erosions (28%), and tenosynovitis (8%) were seen. These results have not been confirmed by other researchers to date.

CONCLUSION

MRI studies of PsA are fewer than those of RA, but their number is growing. The type and site of the lesions rather than merely synovitis help differentiate PsA from other arthritides. MRI evaluation of PsA could contribute to the diagnosis and the identification of the underlying mechanisms.

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