
IMAGING OF PSORIATIC ARTHRITIS

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SUMMARY

Imaging of psoriatic arthritis (PsA) is important for two reasons: the differential diagnosis from other arthritides and the assessment of structural damage that can be inhibited by the new drugs such as the anti-TNF α agents.

Plain film radiographic findings of peripheral arthritis have been important in elaborating the concept of PsA as a separate disease entity. Characteristic aspects of psoriatic peripheral arthritis help the differentiation from rheumatoid arthritis. High-resolution ultrasonography (US), US combined with power Doppler (PDUS) and magnetic resonance imaging (MRI) can be used to image joint synovitis of PsA.

Radiologic features of spondylitis associated with psoriasis are similar to spondylitis associated with reactive arthritis and differ from those of primary ankylosing spondylitis (AS) and the spondylitis associated with inflammatory bowel disease. MRI is very sensitive for the early diagnosis of sacroiliitis. There have been no MRI studies on the spine of patients with PsA. In primary AS bone oedema in the vertebral bodies is an indicator of active disease and can ameliorate during anti-TNF α therapy.

Historically, plain film radiography have played a pivotal role in defining enthesitis lesions of SpA. However, enthesal bone changes appear late. US and MRI have proved to be a highly sensitive and non invasive tools.

Recent US and MRI studies on both finger and toe dactylitis have established that dactylitis is due to flexor tenosynovitis and marked adjacent soft tissue swelling with a variable degree of small joint synovitis. There is no evidence of enthesitis of the insertion of the flexor digitorum tendons and of the attachment of the capsule of the digit joints.

Key words: Enthesitis, dactylitis, spondyloarthritis, ultrasound, magnetic resonance, imaging

PERIPHERAL ARTHRITIS

Plain film radiographic findings have been important in elaborating the concept of psoriatic arthritis (PsA) as a separate disease entity (1).

Characteristic aspects of PsA which help differentiation from rheumatoid arthritis include: predilection for the interphalangeal joints of the fingers and toes; asymmetric joint involvement in hands and feet; marginal erosion with adjacent bone proliferation resulting in “whiskering”; a tendency to ankylosis of the joint; a relative lack of osteoporosis in comparison to the degree of joint involvement; resorption of the tufts of terminal phalangeal of hands and feet (acro-osteolysis); osteolysis of phalangeal, metacarpal and metatarsal bone resulting in tele-

scoping digits (arthritis mutilans); periarticular and shaft periostitis; pencil-in-cup deformity (expansion of the base of the distal phalanx combined with “whittling” of the middle phalanx) (2). Four scoring methods for the assessment of structural damage in peripheral joints in PsA, particularly in the context of clinical trials, have been proposed (3). High-resolution ultrasonography (US) and US combined with power Doppler (PDUS) have been validated as sensitive techniques in the disclosure of synovitis in established PsA (4). Studies to establish their role in early PsA are under way (5).

Magnetic resonance imaging (MRI) can measure synovitis of PsA. However, it appears indistinguishable from that of rheumatoid arthritis (6). Some authors have observed inflammation extending far beyond the joint capsule, involving the adjacent soft structures (7).

McGonagle and his colleagues described in great detail the enthesal features that may be seen in association with synovitis in PsA (8). MRI of synovitis of PsA can show bone oedema (9). In rheumatoid arthritis bone oedema is a strong pre-

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dicator of bone erosion (10), but this has not been demonstrated in PsA.

SPINAL DISEASE

Radiologic features of spondylitis associated with psoriasis are similar to spondylitis associated with reactive arthritis and differ from those of primary ankylosing spondylitis (AS) and the spondylitis associated with inflammatory bowel disease (11). Distinguishing findings include: unilateral or markedly asymmetric involvement of the sacroiliac joint more frequent than in primary AS; non-marginal, asymmetric, coarse and broad syndesmophytes; severe cervical spine involvement with relative sparing of the thoracolumbar spine; rarity of the typical "bamboo" spine of primary AS.

MRI is very sensitive for the early diagnosis of sacroiliitis. Williamson and his co-workers found MRI evidence of sacroiliitis in 38% of a group of consecutive and unselected patients with PsA. Sacroiliitis was not indispensably associated with a clinical history of inflammatory low back or buttock pain or positive provocation test (12). The MRI changes detected were similar to those found in patients with primary AS (13) and included bone oedema, erosions, chronic changes of periarticular fat accumulation and sclerosis. There have been no MRI studies on the spine of patients with PsA. In primary AS bone oedema in the vertebral bodies is an indicator of active disease and can ameliorate during anti-TNF α therapy (14).

PERIPHERAL ENTHESITIS

Inflammation at the entheses, the sites of attachment of tendon, ligament, fascia or joint capsule to bone, is a distinguishing pathological feature of the spondyloarthropathies (SpA) including PsA (15). Oriente et al have found peripheral enthesitis in 20% of their patients with psoriatic arthritis (PsA) with a peak value of 30% in the spondylitic pattern (16). There is also a subset of psoriatic arthritis with isolated enthesitis and/or dactylitis (17).

Historically, plain film radiography have played a pivotal role in defining enthesitis lesions of SpA. These include bone insertion osteopenia, bone cortex irregularity at insertion, erosion, enthesal soft tissue calcification and new bone formation. However, enthesal bone changes appear late and are al-

so common in mechanical disorders and in crystal related pathology.

Over the last few years, US has proved to be a highly sensitive and non invasive tool, especially in assessing tendon and joint involvement. Lehtinen et al (18) and Balint et al (19) were the first to describe extensively US B mode aspects of lower limb enthesitis of SpA, revealing the high frequency of asymptomatic US abnormal findings. In B mode, the appearance of enthesitis is characterized by the loss of normal fibrillar echogenicity, by an increasing thickness or intralesional focal changes of tendon insertion, calcific deposits at insertion of the tendon, periosteal changes (erosions or new bone formation). More recently, power Doppler technology has allowed to visualize abnormal vascularization and hyperemia in enthesitis (20).

The first MRI studies in SpA emphasized the extrasynovial nature of inflammatory lesions in synovial joints in SpA but did not identify enthesitis in the same joints (7). The use of Fat Sat MRI has demonstrated that the extracapsular inflammatory lesion in synovial joints of SpA is commonly an enthesitis, and that the inflammatory process associated with enthesitis may be quite extensive, involving the soft tissues and the bone marrow (7, 21-23). MRI pattern of SpA enthesitis is characterized by a diffuse bone edema adjacent to enthesitis, associated with surrounding soft tissue edema, and increasing ligament and bursa signal intensity after intravenous injection of gadolinium contrast (22, 23).

DACTYLITIS

Dactylitis is one of the clinical manifestations of the SpA. Although more frequent in PsA (24), dactylitis may be observed in all forms of SpA (25). Like other SpA manifestations that is to say, peripheral enthesitis, peripheral arthritis, inflammatory spinal pain, buttock pain, chest wall pain, acute anterior uveitis and aortic regurgitation together with conduction disturbances, dactylitis may sometimes occur for a long time in isolation as the only clinically apparent manifestation of the HLA-B27-associated disease process (26).

In the past, it was thought that the sausage-like appearance was due to concomitant flexor tenosynovitis and arthritis of the metacarpophalangeal (or metatarsophalangeal) and interphalangeal joints. Recent US and MRI studies on both finger and toe dactylitis have established that dactylitis is due to

flexor tenosynovitis and marked adjacent soft tissue swelling with a variable degree of small joint synovitis (27-31). Flexor tenosynovitis was always present while joint synovitis occurred in 17-62% of the sausage shaped digits. Another important conclusion was that clinical examination was a sufficient method for the diagnosis of tenosynovitis since it showed 100% sensitivity and specificity compared with MRI (27, 28).

Recently McGonagle and his colleagues hypothesized that enthesitis is the primary lesion in SpA and that synovitis of the various structures (joint, tendon and bursa) represents a secondary phenomenon due to the release of pro-inflammatory cytokines from the inflamed entheses (32, 33). In their opinion, the flexor tenosynovitis of dactylitis is due to enthesitis as a consequence of the diffusion of cytokines along the tenosynovial sheaths (33). A recent study has demonstrated, by using fast spin echo (FSE)-T2-weighted sequences with fat saturation, that in SpA dactylitis there is no evidence of enthesitis of the insertion of the flexor digitorum tendons and of the attachment of the capsulae of the digit joints (29). However, McGonagle and his colleagues have suggested that in dactylitis enthesitis could occur at the numerous "functional entheses" that the digit flexor tendons form with retinacula or pulleys (34). These "functional entheses" are frequently associated with the presence of fibrocartilage that reduce compression and shear. This hypothesis could be tested by using high resolution imaging.

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