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Imaging in the diagnosis and management of peripheral psoriatic arthritis—The clinical utility of magnetic resonance imaging and ultrasonography



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ABSTRACT

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Psoriatic arthritis (PsA) is an inflammatory joint disease characterised by the presence of arthritis and often enthesitis and/or spondylitis in patients with psoriasis. However, it presents a wide range of disease manifestations in various patterns. Imaging is an important part of management of PsA, and is used for multiple reasons including establishing/confirming a diagnosis of inflammatory joint disease, determining the extent of disease, monitoring activity and damage, assessing therapeutic efficacy, and identifying complications of disease or treatment, in the setting of clinical practice or clinical studies. Magnetic resonance imaging (MRI) allows detailed assessment of all peripheral and axial joints involved in PsA, and can visualise both inflammation and structural changes. Ultrasonography (US) can visualise many of the peripheral heterogeneous tissue compartments affected by PsA. In contrast to MRI, US is not useful for assessing axial involvement in

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the spine and sacroiliac joints. In this paper, we will provide an overview of the status, strengths and limitations of MRI and US in peripheral PsA in routine clinical practice and clinical trials.

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Introduction

Psoriatic arthritis (PsA) is a chronic inflammatory joint disease associated with the skin disease psoriasis [1]. It is characterised by arthritis, enthesitis, spondylitis and/or dactylitis. PsA was first described as a distinct rheumatic disease in the 1950s and subsequently in the 1970s as part of spondyloarthropathy (SpA) [1,2]. Differential diagnoses include rheumatoid arthritis (RA), SpA including ankylosing spondylitis (AS), osteoarthritis (OA), gout and fibromyalgia.

Different imaging procedures, primarily conventional radiography, ultrasonography (US) and magnetic resonance imaging (MRI), all having different strengths and limitations, can be used in suspected or established PsA and provide important information on the disease process. Conventional MRI allows high-resolution visualisation of all structures involved in arthritis, and is sensitive for peripheral and axial disease manifestations. US can visualise the peripheral joints and entheses involved in PsA with high resolution and can guide invasive procedures. However, MRI and US in PsA have received less attention than in RA [3]. However, new studies and developments are constantly emerging, and improved techniques and novel imaging methods such as whole-body MRI, dynamic contrast-enhanced MRI and very high-resolution US are exciting future options. Here, we review MRI and US in terms of technique and findings, diagnosing and management of peripheral PsA in clinical practice, monitoring PsA in clinical trials, and new methodological developments and research agenda. A description of the importance of MRI in axial joints, and the utility of other imaging modalities, such as conventional radiography and computed tomography, is beyond the scope of the present paper.

Ultrasonography

US technique and findings

Musculoskeletal US uses non-ionising sound waves to visualise soft tissues in high detail. It can visualise tendons, entheses, ligaments, synovial recesses, skin and nails (Fig. 1). Of note, ultrasound cannot visualise intraosseous structures but can discern cortical defects on the osteal surface and osteoproliferation. Vascularity within the soft tissues can also be detected without the use of contrast using power Doppler or colour flow Doppler. Sonography has the added advantage of being used at the bedside and on multiple areas, with the optional use of dynamic scanning as well as directed according to patient's symptoms. In contrast to RA, PsA can affect multiple soft tissue compartments and a variable presentation of synovitis from polyarticular patterns to asymmetric oligoarthritis. In the following section, key sonopathoanatomical findings found in PsA are briefly discussed.

Enthesitis

The importance of enthesitis is denoted by its inclusion in the CIASSification of Psoriatic ARthritis (CASPAR) criteria [4]. Several sonographic enthesal schemes have been published [5]. On the whole, these have reasonable reliability, sensitivity and responsiveness [6]. However, these have not been the designed specifically for PsA but for SpA in general. The majority of these are heavily weighted to include lower extremities entheses. This is problematic since mechanical changes at the lower extremity entheses can have similar appearances to inflammatory enthesitis and can occur in individuals with obesity and with diabetes [7,8]. A significant proportion of patients with PsA or psoriasis have higher body mass indices. A recent study by Eder et al. revealed that the Madrid Sonographic Enthesitis Index (MASEI) was unable to distinguish patients with PsA, psoriasis and controls when the BMI was greater than 30 [9]. In addition to selecting entheses, there needs to be agreement over what

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