Psoriatic Arthritis, from symptoms to instrumental semiotics: a rheumatologist’s perspective

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Summary

In the Psoriasis Arthritis (PA) pathogenesis, the enthesis organ and the synovio-entheseal complex are crucial. Microtraumas and microinflammation at the entheses may be the first cause of evident enthesitis and consequent inflammation of the adjacent synovial. Therefore, it is crucial to study entheses in psoriatic patients by using currently available imaging techniques. Musculo-skeletal ultrasound imaging has become fundamental in the assessment of arthritis since it allows to: a) detect any signs of enthesitis and synovitis, b) detect any effusion (in joints, bursa and tendon sheaths), c) demonstrate bone erosions, d) study tendons precisely and in detail, e) show the cartilage damage, f) guide invasive maneuvers (i.e. arthrocentesis), g) monitor therapeutic response. Traditional X-ray imaging has the advantage of having low cost and of being widely available, well standardized and repeatable over time, but it has a poor sensitivity to changes (difficulty in identifying small bone erosions which are visible in the PA initial phase) and provides monoplane images. MRI has some advantages as compared to both traditional X-rays and ultrasound imaging, although some disadvantages should be mentioned including cost and poor standardization.

KEY WORDS: psoriatic arthritis; ultrasound; magnetic resonance; enthesitis; dactylitis.

Rheumatologists are aware of the real burden of psoriatic arthritis (PsA), mainly because they can assess the overall impact of this disease not only from an osteo-articular viewpoint. Indeed, psoriatic arthritis is associated to an extremely high cost for the society, due to a number of factors: the clinical history of patients (increased risk of co-morbidities), the functional aspect (disability), and the impact on personal relationships for patients and their families.

The data and observations currently available show that this complex disease is a morbid condition characterized by a clinical progression that, in 20% of cases, results in a level of bone damage that is comparable to that observed in rheumatoid arthritis (1). Up to 40% of affected patients have more than five damaged joints in the course of the disease, with a severe functional impairment occurring in a mean of 11% of affected patients (1).

Wong et al. observed, as early as in 1997, that patients with psoriatic arthritis have an increased mortality risk compared to the general population (2). The main prognostic indicators of more aggressive disease include findings of poly-articular involvement, increase in inflammation markers since disease onset, and concomitant presence of genetic factors such as positivity for HLA-B27 in the presence of HLA-DR7 and HLA-B39 and HLA-DQw3 in the absence of HLA-DR7 (3). Usually, other factors regarded as predictive of a poor outcome include early-onset disease, female sex and the appearance of acute joint involvement, as well as the concomitant presence of signs and symptoms of cardiovascular disease (3).

According to experts, a patient with psoriatic arthritis should be evaluated in a global manner, in order to assess – in addition to the clinical and radiological presentation – the severity of the disease (defined as the number of affected joints, number of sites with enthesitis, axial involvement, presence of dactylitis), the persistence and degree of osteo-articular erosion, to be assessed using the currently available radiological and imaging techniques. Findings of enthesitis, dactylitis and/or nail disease are regarded as essential to make a correct diagnosis.

Table 1 shows the tools that are used to measure the severity of psoriatic arthritis as defined by the GRAP-PA group (Group of Research and Assessment of Psoriasis and Psoriatic arthritis).

In a study published in 1992, it was clearly stressed that the severity of psoriatic arthritis is usually underestimated, especially when compared with that of other rheumatologic conditions (4).

As regards PsA diagnosis, the main criteria currently used include those first proposed by Moll & Wright (5), that identified a symmetric oligo-articular form (60-70% of cases), a so-called classical form with involvement of distal
Psoriatic Arthritis, from symptoms to instrumental semiotics: a rheumatologist’s perspective

Psoriatic arthritis is a chronic inflammatory disease that affects the skin, nails, and joints. It is characterized by a wide spectrum of clinical presentations, ranging from a mild form with limited joint involvement to a severe form with mutilating deformities. The classification of psoriatic arthritis is complex and depends on the clinical presentation and the presence of specific features such as enthesitis, nail involvement, and skin disease.

The classification criteria proposed by the CASPAR (Classification of Psoriatic Arthritis Group) group are based on the evaluation of patients with inflammatory arthropathy. These criteria require a minimum of three of the following five points:

1. Evidence of current psoriasis, a personal history of psoriasis, or a family history of psoriasis.
2. Typical psoriasis nail dystrophy.
3. A negative test result for rheumatoid factor.
4. Either current dactylitis, defined as swelling of an entire digit, or a history of dactylitis.
5. Radiographic evidence of juxta-articular new bone formation appearing as ill-defined ossification near joint margins (but excluding osteophyte formation) on plain radiographs of the hand or foot.

These criteria are used to identify patients with early psoriatic arthritis, which can be defined as an oligo-entheso-arthritis associated with psoriasis, and is characterized by the presence of enthesitis and a high likelihood of developing erosive changes in the joints.

In psoriatic arthritis, bone erosions are observed in up to 70% of cases, with permanent changes and deformity of the joint axis in up to 24% of cases. This classification is limited by the exclusion of enthesites and by difficulties in classifying the so-called unstable forms, which have different clinical presentations in the course of the disease history.

A more recent classification is proposed by the CASPAR group (Classification of Psoriatic Arthritis Group), which is based on the evaluation of patients with inflammatory joint disease according to the criteria shown in Figure 1, and require at least 3 of the 5 criteria listed to confirm a diagnosis of psoriatic arthritis. This classification is important for identifying early psoriatic arthritis, which is associated with psoriasis, and is characterized by the presence of enthesitis and a high likelihood of developing erosive changes in the joints.

In the light of the above considerations, it is clear that a key goal is to increase diagnostic sensitivity in psoriatic arthritis, in order to establish a correct treatment and reduce the likelihood of permanent functional damage over time. Since 2003, both McHugh and Gladmann reported significant evidence that PsA can be regarded as a condition that may cause erosive lesions with bone deformities in 40-60% of patients since the first years of disease onset. In this respect, some authors have introduced the notion of early psoriatic arthritis, defined as an oligo-entheso-arthritis associated with psoriasis, which tends to evolve into an established form of PsA.

In psoriatic arthritis, imaging techniques are essential to demonstrate arthritic damage and make a definite diagnosis of psoriatic arthropathy. Imaging techniques include radiography, ultrasonography, and magnetic resonance imaging, which are used to detect bone erosion and joint space narrowing.

Table 1 - GRAPPA (Group of Research and Assessment of Psoriasis and Psoriatic Arthritis): instruments for the measurement of PsA severity in each domain.

<table>
<thead>
<tr>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peripheral arthritis</td>
<td>&lt;5 joints</td>
<td>≥5 joints (S or T)</td>
</tr>
<tr>
<td></td>
<td>No damage on x ray</td>
<td>Damage on x ray</td>
</tr>
<tr>
<td></td>
<td>No LOF</td>
<td>IR to mild Rx</td>
</tr>
<tr>
<td></td>
<td>QoL minimal impact</td>
<td>Mod LOF</td>
</tr>
<tr>
<td></td>
<td>Pt. evaluation mild</td>
<td>Mod impact on QoL</td>
</tr>
<tr>
<td></td>
<td>Pt. evaluation moderate</td>
<td>Pt. evaluation severe</td>
</tr>
<tr>
<td>Skin disease</td>
<td>BSA &lt; 5, PASI &lt; 5, asymptomatic</td>
<td>Non-response to topicals, DLQI, PASI &lt;10</td>
</tr>
<tr>
<td>Spinal disease</td>
<td>Mild pain</td>
<td>Loss of function or BASDAI&gt;4</td>
</tr>
<tr>
<td></td>
<td>No loss of function</td>
<td></td>
</tr>
<tr>
<td>Enthesitis</td>
<td>1-2 sites</td>
<td>&gt;2 sites or loss of function</td>
</tr>
<tr>
<td></td>
<td>No loss of function</td>
<td></td>
</tr>
<tr>
<td>Dactylitis</td>
<td>Pain absent to mild</td>
<td>Erosive disease or functional loss</td>
</tr>
<tr>
<td></td>
<td>Normal function</td>
<td></td>
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</tbody>
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Psoriatic arthropathy: instrumental semiotics

Imaging techniques are essential to demonstrate arthritic damage and make a definite diagnosis of psoriatic arthropathy.
Radiographs may provide an idea of the damage caused by the disease, and therefore of bone-destroying lesions, erosions, and osteophyte formation, but do not provide clinicians with information on joint inflammatory status (Figure 3) (14): therefore, radiographs have a quite limited value.

Moreover, this is a poorly sensitive imaging technique; in a work that partly reproduces what Wakefield did in 2000 for rheumatoid arthritis, the authors describe the results obtained in fifteen patients with psoriatic arthritis and two control groups (five patients with rheumatoid arthritis and five healthy subjects), who underwent evaluations of the joints of hand and foot fingers with radiography, magnetic resonance and ultrasound. Magnetic resonance and ultrasound demonstrated to be much more effective in determining the inflammatory state of the observed joints (15).

Several observations show that clinical examination is certainly less sensitive than ultrasound, and often it does not allow to make a differential diagnosis in arthritis, particularly in the psoriatic form (16).

However, it should be added that ultrasound is not able to detect the typical signs of a suspected disease: in other words, it is not possible to distinguish whether a synovitis is due to rheumatoid arthritis or to psoriatic arthritis, because a synovitis is exactly the same. The same applies to an inflammation process affecting the enthesis, or an inflammation of the tendons. Of course, the distribution of the inflammation may be of help. If the clinician is examining the hand of a patient with a still undefined arthritis and notices a prevalent involvement of distal interphalangeal joints, then a psoriatic form can be suspected, especially if the medical history is suggestive of psoriatic skin manifestations (14, 15).

An ultrasound exam, therefore, allows to assess a condition of synovitis, effusion, bone damage, erosions, osteophytes, but also the whole extra-articular disease (Figure 4).

In some cases, the exam may reveal an effusion at the level of a metacarpophalangeal joint – for example a proximal interphalangeal joint – and may even show a marked condition of synovial hypertrophy, which may suggest a diagnosis of arthritis. Likewise, a synovial hypertrophy of the knee may be more suggestive of osteoarthritis (17).

Together with ultrasound, power doppler sonography has been a great achievement for rheumatologists, as it is characterized by high sensitivity and specificity in demonstrating the level of joint inflammation.

If a joint seems to be the site of an effusion, with a very strong power doppler signal, it is clear that there is a significant inflammatory process ongoing in that area, which suggests a clinically relevant arthritis that, in most cases, require immediate treatment. Moreover, in cases of arthritis with very few signs, the use of contrast medium may help in the diagnosis (18).

Ultrasound is also the ideal tool for a dynamic examination of tendons; if PsA is clinically suspected, this procedure may evaluate the presence of a tenosynovitis, a distension of the sheath of the long head of the biceps tendon, or a distension of the sheath of extensors of the IV compartment, as well as lesions in the tendon structure.

In the presence of bone erosion, the patient is usually affected by erosive arthritis, a disease with a certain degree of activity and potential progression; obviously, monitoring the evolution of erosion over time may be a predictive factor of clinical worsening (17).
As regards spondyloarthritides, and psoriatic arthritis in particular, it is necessary to note that an enthesitic manifestation should also be considered; enthesitis, unlike enthesopathy, specifically refers to the presence of a primarily inflammatory condition – a key feature of spondyloarthritides in general. On the contrary, the term “enthesopathy” has a broader general meaning and refers to an involvement of the entheses that is potentially associated to traumatic, metabolic, or degenerative factors (19).

In the practice, detecting the signs of an enthesitis is not as easy, for the sonographer, as diagnosing an effusion, for example; in fact, unlike the synovium, the vessel network of the entheses is less pronounced and there is an increased likelihood of artifacts resulting from reflection of the cortical bone (20). Several authors acknowledge the importance of ultrasound in the early diagnosis of psoriatic arthritis, namely in the (even sub-clinical) identification of entheses and synovitis in patients with skin manifestations of psoriasis (21). In patients with psoriasis, there seems to be a higher prevalence of asymptomatic synovitis and enthesitis compared to both the general population and to patients with other skin conditions; this might suggest a musculo-skeletal subclinical involvement generally related to psoriasis (22).

Magnetic resonance imaging is considered to be a tool with a remarkable diagnostic accuracy, although it is less easily accessible in the clinical practice compared to ultrasound. MRI allows to have an optimal view of synovitic processes, of peri-articular and extra-capsular inflammation at both peripheral and axial level, and of bone damage, from swelling to erosion and proliferation (20).

Like all imaging procedures, MRI is a rapidly evolving technique. It should be noted that a key procedure for the assessment of tendons is the ultra-short echo-time imaging examination. Tendons cannot be optimally visualized through magnetic resonance because any changes can be detected only in the presence of tendon thickening. The ultra-short echo-time imaging examination allows to assess tendon structure and, therefore, could be a crucial aid for the evaluation of tendon damage (Figure 5).

CT (Computerized Tomography) is seen as a complementary exam. For example, it can be used to assess sacroiliac and sternoclavicular joints.

Scintigraphy is by now used with a certain caution, mainly due to the difficulties to perform this exam in the clinical practice compared to ultrasound. However, in a study conducted in forty-seven patients with recently diagnosed (within 12 weeks) psoriatic arthritis, with a clinical presentation of oligo-enthesoarthritides, scintigraphy has shown up to three times the number of affected sites than that clinically observed (23).

In conclusion, imaging techniques are essential to demonstrate arthritic damage and, therefore, to make a definite diagnosis of psoriatic arthropathy. MRI and ultrasound have shown a marked sensitivity in the diagnosis of synovitis, tenosynovitis and enthesitis in patients with psoriatic arthritis, and have demonstrated the presence of joint disease even at the pre-clinical state. Because of its widespread use, low cost, non-invasiveness, repeatability, and high degree of spatial resolution, ultrasound is the ideal technique to study soft tissue changes induced by the ongoing chronic inflammatory process in PsA.

References