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Prevalence and topographic distribution of spinal inflammation on MR imaging in patients recently diagnosed with axial spondyloarthritis

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KEYWORDS
Axial spondyloarthritis;
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Abstract
Objective: The primary goal of this study was to determine the prevalence and topographic distribution of spinal lesions in lower thoracic and lumbar spine on magnetic resonance imaging (MRI) in patients with recently diagnosed with spondyloarthritis. The secondary goal was to identify variables associated with vertebral patterns consistent with spondyloarthritis on MRI.
Patients and methods: A total of 112 HLA-B27 positive patients with recently diagnosed spondyloarthritis were retrospectively included. There were 70 women and 42 men, with a mean age of 41 years ± 12 (SD) (range: 17—70 years). Mean symptom duration was 1 year (range: 0—7 years). MRI examinations of sacroiliac joints and thoracolumbar spine were reviewed for the presence of bone marrow edema, chronic structural abnormalities, and vertebral patterns consistent with spondyloarthritis. Age, gender and disease duration of patients with vertebral patterns on MRI consistent with spondyloarthritis were compared with those without MRI signs of spondyloarthritis.

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Results: Thirty-six patients (32.1%) showed spinal patterns of spondyloarthritis, including 16 patients (14.3%) with no associated inflammatory sacroiliitis. Posterior inflammatory lesions were present in 20.5% of patients. Posterior spinal inflammatory lesions were significantly associated with vertebral corner inflammatory lesions ($P = 0.03$). There were no differences in age, sex or mean duration of symptoms between the two groups of patients.
Conclusion: Spinal involvement is observed in 32.1% of HLA-B27 positive patients with recently diagnosed spondyloarthritis and is not associated with sacroiliitis in 14.3%. Age, gender or symptom duration are not associated with spinal involvement on MRI.

Seronegative spondyloarthritis corresponds to a general term for a group of joint conditions that are not associated with rheumatoid factors or rheumatic nodules. It includes several chronic inflammatory types of rheumatism that share some clinical manifestations, especially inflammatory low back pain and a common genetic background. The prevalence of seronegative spondyloarthritis ranges between 0.5% and 1.9% [1—3]. Axial spondyloarthritis is the most typical and severe form, characterized by predominant involvement of the spine and/or sacroiliac joints, with a prevalence of 0.5% [2,4]. The emergence of tumor necrosis factor-alpha (TNFα) inhibitors, which is a powerful treatment tool for patients with ankylosing spondylitis (AS), has called for new and more sensitive criteria to facilitate early diagnosis and treatment [5—7].

According to the Assessment of SpondyloArthritis international Society (ASAS) classification criteria for axial spondyloarthritis published in 2009, a patient with chronic back pain of more than 3 months' duration and symptom onset before the age of 45 years can be classified as having axial spondyloarthritis in two contexts: when sacroiliitis is detected by imaging (pelvic radiographs or sacroiliac joint magnetic resonance imaging [MRI]) if at least one additional clinical or laboratory feature is present (so-called 'imaging arm'); or when human leukocyte antigen B27 (HLA-B27) is present and at least two additional spondyloarthritis associated features are present ('clinical arm') [8]. The sensitivity of the ASAS classification is 82.9% with a specificity of 84.4% [8].

On MRI, sacroiliitis is thus defined as an active inflammation located in subchondral or periarticular bone marrow of the sacroiliac joint. Inflammation should be clearly present as bone marrow edema (BME) on short-tau-inversion-recovery (STIR) MR images in at least two consecutive MRI sections, or at least two BME lesions should be present in a minimum of one MRI section [9—11].

Although studies have shown that 20 to 30% of patients with pre-radiographic spondyloarthritis do not present with any sacroiliitis on MRI, the presence of MRI-documented inflammation of sacroiliac joints is only taken into account for fulfillment of the 'imaging arm' of ASAS criteria [12—14]. It is well known that vertebral inflammation in spondyloarthritis can also be identified on MRI, presenting as corner inflammatory lesions (CLs), endplate lesions, posterior element (facet and pedicle) lesions, and spinous process bone marrow edema lesions [15—19]. Those vertebral lesions may ultimately lead to chronic abnormalities, such as syndesmophytes or ankylosis viewed on X-rays.

One question asked by radiologists is whether or not it is useful to perform a spinal examination in addition to sacroiliac MRI when asked to diagnose spondyloarthritis. It could be useful but only in a subset of patients.

The primary goal of this study was to determine the prevalence and topographic distribution of spinal lesions in lower thoracic and lumbar spine on MRI in patients with recently diagnosed with spondyloarthritis. The secondary goal was to identify variables associated with vertebral patterns consistent with spondyloarthritis on MRI.

Materials and methods

Patients

This was a retrospective study conducted in the imaging department of a French urban-based university hospital from January 2010 to June 2014. Patients were consecutive with a diagnosis of spondyloarthritis established by treating rheumatologists from our hospital rheumatologic department according to ASAS criteria. The requirement for ethics approval was deemed not necessary by the ethics committee due to the retrospective nature of the study.

Medical records of all patients with a diagnosis of spondyloarthritis were retrieved from the hospital information system and reviewed. Inclusion criteria were:

- patients recently diagnosed with spondyloarthritis with symptoms onset ≤ 7 years;
- HLA-B27 positive patients;
- patients with complete MRI covering the sacroiliac joint and thoracolumbar spine (i.e., MRI acquisition from T8 to S1 vertebras).

Exclusion criteria were:

- patients who had received anti-TNFα treatment prior to MRI as this could, by eliminating the inflammatory signs, potentially normalize MRI;
- patients who had an incomplete MRI protocol.

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