Comparison of Sacroiliac Biopsies and Magnetic Resonance Imaging Examinations in Non-Radiographic Axial Spondyloarthritis

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Research article

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Abstract

Background : Early diagnosis and treatment are the key to improve the prognosis of axial spondyloarthritis (axSpA), therefore, we aimed to evaluate the diagnostic value of magnetic resonance imaging (MRI) and pathological examination of the sacroiliac joint (SIJ) for non-radiographic axSpA (nr-axSpA).

Methods : Fine needle aspiration biopsy of bilateral SIJs was performed in 107 patients with nr-axSpA after MRI examination. The active inflammatory manifestations and chronic structural changes in SIJs were evaluated using MRI. The pathological changes of SIJ specimens were examined using microscopy.

Results : Bone marrow edema (BME) was present in 67/214 joints on MRI (31.3%). The proportion of pannus formation and inflammatory cell infiltration were up to 63.8% and 53.4% in patients without BME on MRI, which were not significantly lower than 75.0% and 58.3% in patients with BME on MRI. The inflammatory infiltrating cells were mainly CD3 + T lymphocytes and CD68 + macrophages. In the group with normal cartilage on MRI, the proportions of chondrocytes and cartilage matrix degeneration were 22.2% and 44.9% respectively, which was not significantly lower than those in the group with abnormal cartilage on MRI (35.7% and 46.4%). However, a significantly higher proportion of pannus invasion was observed in the latter (26.6% vs 57.1%, $P = 0.001$). In the group with a normal bone plate on MRI, the incidence of subchondral pannus formation and bone plate destruction was as high as 74.0% and 71.7%, with no significant difference compared with that in the group with bone erosion on MRI (88.9% and 88.3%).

Conclusions: Pathological examination is more sensitive for detecting inflammatory and structural changes in early sacroiliitis than MRI examination. Key words : non-radiographic axial spondyloarthritis, sacroiliac joint, aspiration biopsy, magnetic resonance imaging.

Full Text

Due to technical limitations, full-text HTML conversion of this manuscript could not be completed. However, the latest manuscript can be downloaded and [accessed as a PDF](#).

Figures

Figure 1

The pathological changes and MRI of cartilage of SIJs. The pathology of SIJ with abnormal cartilage imaging on MRI (A) presented abundant pannus invasion into cartilage (B), resulting in fibrosis of cartilage (C), accompanied by high expressions of caspase-3 (D) and MMP-3 (E). The pathology of SIJ with normal cartilage imaging on MRI (F) showed abundant subchondral fibrous granulation tissues rich in blood vessels invading into cartilage (G) and cartilage fibrosis (H), also accompanied by the high expression levels of caspase-3 (I) and MMP-3(J) in cartilage area. K-N were the specimens of non-SpA autopsy control.

Figure 2

The pathological changes and MRI of subchondral bone plates of SIJs. In the SIJ with bone plate erosion on MRI (A), lots of fibrous granulation tissues were formed and invaded into bone plates, resulting in disconnection of bone plates (B), accompanied by abundant neovascularization marked by CD34 (C) and large numbers of CD68+ osteoclasts in the absorption zone of bone plate (D). In the SIJ without bone plate erosion on MRI (E), there was a little pannus formation, and local disruption of trabecula (F), increased angiogenesis beneath the bone plate (G), and lots of CD68+ osteoclasts infiltration in the bone plate absorption area (H). I-K were the specimens of non-SpA auto psycontrol.

Figure 3

The pathological changes and MRI of bone marrow of SIJs. In the SIJ with bone marrow edema (BME) on MRI (A), there were large numbers of inflammatory cells infiltration (B), most of which were CD3+ T lymphocytes (C) and CD68+ macrophages (D), accompanied by a high expression of TNF- α (E). In the SIJ without BME on MRI (F), there were less infiltration of inflammatory cells (G), but increased fibrous connective tissue rich in blood vessels marked by CD34 below the bone plate (H), and also increased CD68+ macrophages and osteoclasts (I), accompanied by an increased expression of TNF- α in bone marrow (J). K-N were the specimens of non-SpA auto psycontrol.

Figure 4

The pathological changes and MRI of synovitis of SIJs. The MRI of bilateral SIJs showed a little bone marrow edema (BME) in the entheses and subchondral areas (A). The pathological studies revealed typical pannus formation invading into the cartilage (B, HE staining), excessive CD34+ neovascularization in the pannus (C), excessive CD68+ (D) and CD163+ macrophage infiltration, and a high expression of VEGF (F), TNF- α (G), MMP-3 (H), and RANKL (I).