

## **7. Abstract**

**Background.** The sacroiliac joints (SIJ), enthesal structures and HLA B27 are of central importance for the pathogenesis of the spondyloarthritides (SpA).

Ankylosing spondylitis (AS) and undifferentiated SpA (uSpA) are the most frequent SpA subsets. There has been debate whether and to what extent synovial and enthesal structures are involved in sacroiliac inflammation. Magnetic resonance imaging (MRI) is a powerful tool to visualize inflamed areas in joints and elsewhere.

**Objective.** To localize inflammatory changes to defined different areas in the SIJ in patients with early compared to later stages of SpA.

**Patients and Methods.** We examined 93 SpA patients with inflammatory back pain and sacroiliitis using MRI: 31 AS and 62 patients of other SpA subsets including 48 uSpA (37 f, 56 m, mean age 32.2 years (16-57 years)). MRI was performed on 186 SIJ with T1w, T2\*w, STIR and dynamic contrast-enhanced sequences (gadolinium-DTPA). Nine areas in the SIJ, partly the ventral and caudal region, were differentiated: joint capsule (JC), cavum (CA), subchondral bone (SB), bone marrow (BM), entheses (ENT) and ligaments (LIG).

**Results.** Sacroiliitis was more often bilateral in AS (84%) than in uSpA (53%). Inflammatory changes were found in  $4.7 \pm 2.9$  regions/joint: in  $4.5 (\pm 3.2)$  regions in early vs.  $5.2 (\pm 2.3)$  in late disease (n.s.). Involvement of the iliac vs. the sacral side of the SI joints was found to be more frequent in early (58% vs. 48%;  $p < 0.01$ ) as compared to late disease (58% vs. 63%, n.s.). The dorsocaudal parts of the joint and the BM were the most frequently inflamed structures in early disease ( $p < 0.001$  for ventral vs. dorsal JC). In contrast, involvement of ENT was more common in advanced disease (43% vs. 86%,  $p < 0.001$ ). Similarly, LIG were more frequently involved in late stages (26% vs. 40%,  $p = 0.06$ ). Both patterns of BM inflammation (focal and diffuse) were observed in equal frequencies in early and late disease (17% and 42% vs. 26% and 43%, n.s.). HLA B27-positive patients (n=80) had more enthesal involvement than HLA B27-negatives (n=13; 60% vs. 39%,  $p = 0.05$ ). HLA

B27-negative patients had a shorter disease duration (2.2 vs. 4.4 years,  $p = 0.05$ ) and were more often female (62%,  $p = 0.02$ )).

When all pathologic changes were looked at, the STIR-sequence (performed in 62 patients) was less sensitive than the contrast enhanced sequences; it was not able to show all relevant changes in 27% of these patients ( $n=17$ ) not revealing inflammation of the joint cavum in 15 and of the bone marrow in 2 patients.

Conclusions. As visualized by MRI, sacroiliitis in SpA is characterized by involvement of different joint structures. While the iliac and the sacral side of the SIJ are almost equally affected, the dorsocaudal part of the joint is involved significantly more often than the ventral part. Enthesitis is not a special feature of early sacroiliac inflammation.