

CONCISE REPORT

Very early spondyloarthritis: where the inflammation in the sacroiliac joints starts

M Bollow*, K-G A Hermann*, T Biedermann, J Sieper, M Schöntube, J Braun

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Involvement of the sacroiliac joints (SIJ) is a major and characteristic feature of the spondyloarthritides (SpA). In early ankylosing spondylitis and undifferentiated SpA (uSpA) sacroiliitis is the most common early clinical finding and the presumed first manifestation of the disease. Magnetic resonance imaging has proved useful for visualising inflammation in the SIJ in adults and children. Recently, initial localisation of the inflammation in the SIJ has been described in some detail, but it has not been completely defined to date—either in imaging or in histopathological studies. This is mainly owing to the lack of data in very early disease and the lack of follow up studies. Here we present a patient with early disease, which may augment our understanding of this stage of SpA.

Involvement of the sacroiliac joints (SIJ) is a major and characteristic feature of the spondyloarthritides (SpA). The most common symptom in adults is inflammatory low back pain due to sacroiliitis.¹ In early ankylosing spondylitis (AS) and undifferentiated SpA (uSpA) sacroiliitis is the most common early clinical finding and the presumed first manifestation of the disease.² In children with SpA there are more often other locations which may precede involvement of the SIJ and the axial skeleton. Magnetic resonance imaging (MRI) has proved useful for visualising inflammation in the SIJ in adults³ and children.⁴ The SIJ of children have some anatomical differences which need to be recognised.⁵ There is evidence that acute spinal inflammation in AS can be well visualised by MRI.^{6,7}

Recently, initial localisation of the inflammation in the SIJ has been described in some detail,⁸ but it has not been completely defined to date—either in imaging or in histopathological studies.^{9,10} This is mainly because of the lack of data in very early disease and the lack of follow up studies. Here we present a patient with early disease, which may augment our understanding of this stage of SpA.

CASE REPORT

A 12 year old boy developed symptoms of an inflammatory rheumatic disease in 1996 when his second right toe and, 3 months later, his right thumb, became painfully swollen—a condition clinically interpreted as dactylitis. There was no other personal or family history of a rheumatic disease or suggestive symptoms, especially not of back pain, including inflammatory back pain (IBP). The erythrocyte sedimentation rate was 102 mm/1st h, C reactive protein 52 mg/l (normal <6 mg/l), HLA-B27 was positive, antinuclear antibodies and rheumatoid factor negative.

Treatment with a non-steroidal anti-inflammatory drug helped to relieve symptoms initially, but after another 4 months the whole right forefoot was affected with arthritis, tarsitis, tendonitis, enthesitis of the Achilles tendon, and

polydactylitis. MRI of the SIJ was negative at this time (figs 1A and B). The patient was then treated with sulfasalazine (2×1 g/day) and local corticosteroid injections. Because the patient did not improve much and because he also developed signs of inflammation in the left foot methotrexate was prescribed (15 mg/week subcutaneously).

One month later in February 1997 the patient developed typical IBP. A second MRI was performed which disclosed acute sacroiliitis on the left side (figs 2A and B) that was not detectable by conventional x ray examination (fig 2C). A computed tomography guided intra-articular injection of 40 mg triamcinolone acetonide¹¹ resulted in significant improvement with no more IBP and reduced erythrocyte sedimentation rate (40 mm/1st h) and C reactive protein (8 mg/l) values. In November 1997 the patient, although in partial remission, still had joint pain, and he subsequently developed a post-arthritis foot deformity with subluxation of the lower ankle joint. For some weeks the patient had to use a wheelchair to be able to attend school.

Everything worsened in December 1997 after the patient had a fall. In February 1998 he developed IBP located in both buttocks. A third MRI showed bilateral sacroiliitis with moderate chronic features and severe acute inflammatory changes (figs 3A and B). At this time a conventional pelvic x ray examination showed changes suggesting sacroiliitis on the left (fig 3C). Again, a computed tomography guided intra-articular injection of 40 mg triamcinolone acetonide was given. In May 1998 both ankle joints had to be injected with corticosteroids as well.

Because of continuing progressive IBP a fourth MRI scan of the SIJ was performed in July 1998, which disclosed chronic sacroiliitis with signs of severe inflammation (not shown). In November 1998 the patient's arthritis in the left ankle joint relapsed again, associated with pain and swelling of the left sternoclavicular joint. Both were locally treated with intra-articular steroids with some success.

Retarded growth of the patient was documented: between the 12th and the 14th year of life there was a transition from the 10th to the 3rd centile for height. Since May 1998 the patient has attended a school for handicapped pupils. A final MRI evaluation in March 2000 showed typical chronic features of sacroiliitis and—in concordance with absence of clinical symptoms—only moderate signs of activity (figs 4A and B). At this point, definite sacroiliac changes were visible on conventional radiographs for the first time (fig 4C), 3 years after the onset of clinical symptoms.

In the further course of disease the patient developed the full clinical picture of AS with spinal involvement.

Abbreviations: AS, ankylosing spondylitis; IBP, inflammatory back pain; MRI, magnetic resonance imaging; SIJ, sacroiliac joint(s); SpA, spondyloarthritides; uSpA, undifferentiated spondyloarthritides

* Both authors contributed equally to this work.

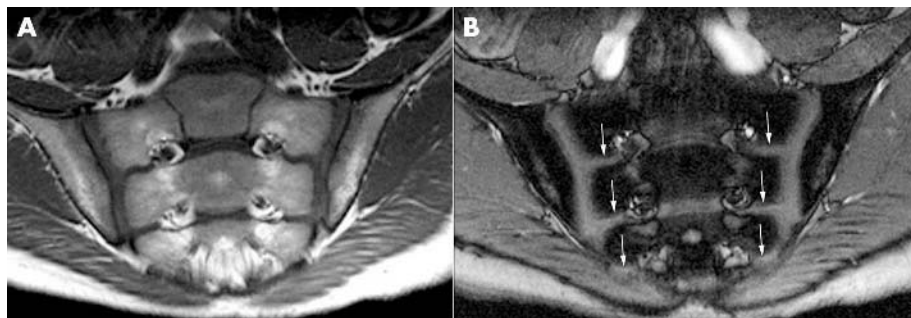


Figure 1 October 1996 (age 13 years and 4 months). (A) T₁ weighted fast spin echo sequence depicts smoothly margined sacroiliac joints of normal width. (B) Contrast enhanced T₁ weighted gradient echo sequence without enhancement related to sacroiliitis. Of note, the growth plates of the sacral bone (arrows) are seen.

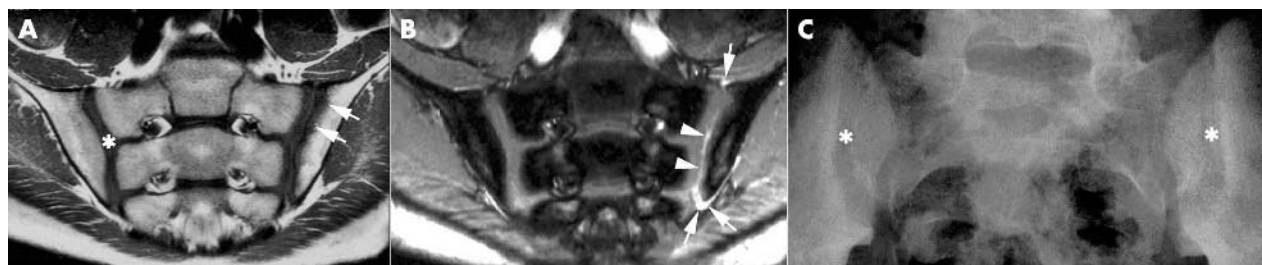


Figure 2 February 1997 (age 13 years and 8 months). The boy presented with IBP that had persisted for 2 weeks. (A) T₁ weighted fast spin echo sequence depicts a smoothly margined right sacroiliac joint (star). The subchondral zone of the left iliac bone shows band-like hypointense formations with irregular borders (arrows), suggesting osteitis. (B) Corresponding contrast enhanced T₁ weighted opposed phase gradient echo sequence showing pronounced enhancement within the joint space between the sacral and iliac cartilage (arrowheads) with continuous extension to the anterior and posterior joint capsule (arrows) and ligament attachments of the iliac bone. (C) Conventional radiograph shows normal joint contours (stars).

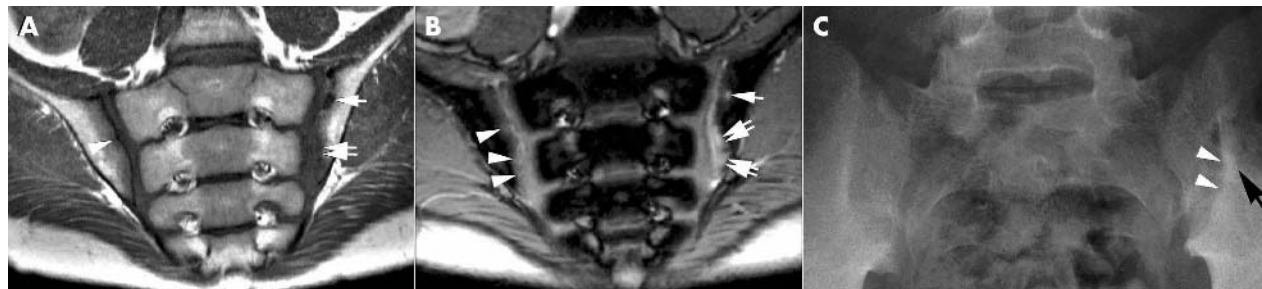


Figure 3 February 1998 (age 14 years and 8 months). (A) T₁ weighted fast spin echo image showing still normal width of the right sacroiliac joint. Band-like hypointensity in the iliac bone marrow, consistent with juxta-articular osteitis. The left anterior ilium shows a hypointense substrate (arrowhead), equivalent to an erosion and surrounding sclerosis. The posterior aspect shows an irregular hypointense configuration, indicating confluent erosions (double arrow) resulting in pseudodilatation of the joint. (B) Corresponding contrast enhanced T₁ weighted opposed phase gradient echo sequence reveals pronounced contrast enhancement, both on the right in the area of the juxta-articular osteitis (arrowheads) and on the left in the area of the erosions (double arrows) and posterior joint capsule. (C) Conventional radiograph shows slight subchondral sclerosis of the left iliac bone (black arrow) with two suspected iliac erosions (arrowheads).

DISCUSSION

As far as we know, this is the first case report with comprehensive documentation by MRI of the development and course of very early sacroiliitis (from 2 weeks of the onset of symptoms) in a patient with SpA (initially classified as uSpA) who rapidly developed AS. The MR images obtained support our recently published systematic study.⁸ The case is also remarkable because a lack of sacroiliac inflammation some months before was demonstrated when the patient had only peripheral symptoms. This fits well with earlier observations, in which few children had MRI evidence of sacroiliac inflammation without symptoms of back pain.¹²

Several possibilities for the initiating site of sacroiliitis have been proposed and discussed: subchondral bone, bone marrow, cartilage, synovial membrane, or ligamentous

structures such as the joint capsule or the ligaments in the dorsal part of the SIJ.⁸ The last of these may be better visualised in the semiaxial plane.¹³ The semicoronal plane which was used in this case is usually sufficient in daily practice.

The concept of enthesitis as the characteristic site of inflammation in SpA¹⁴ has recently come into favour again because the frequency of inflamed ligamentous structures in the knees of patients with SpA is higher than in patients with rheumatoid arthritis.¹⁵ The situation is more difficult in the SIJ as demonstrated recently.^{8, 10} However, clearly, the iliac, not the sacral side¹⁶ and the dorsocaudal part⁸ of the SIJ are affected early on. In this region there is a close proximity of synovial and enthesal structures, subchondral bone, and bone marrow. Using MRI it does not seem possible to get any



Figure 4 March 2000 (age 16 years and 9 months). The patient presented without clinical symptoms at the sacroiliac joints. Nevertheless, follow up imaging demonstrates increasing chronic signs of bilateral sacroiliitis. (A) T₁ weighted fast spin echo sequence visualises subchondral sclerosis as irregular, partly linear, hypointensities (arrowheads). In addition, there is widening of the right and left joint space owing to beaded iliac erosions (arrows). (B) Corresponding contrast enhanced T₁ weighted opposed phase gradient echo sequence showing minute enhancement in the joint space (arrowheads) and at the anterior capsule at the left side, indicative of only moderate inflammatory activity. (C) Anteroposterior radiograph depicting definite signs of bilateral sacroiliitis with sclerosis (black arrows) and widening of the joint space owing to confluent erosions.

closer to a final differentiation between these structures. However, this case confirms our recent report on a much larger number of patients⁸ and underlines the significance of this region close to the joint capsule where there is ample blood supply, which also allows for antigenic structures to be received from other internal and external sources.

Finally, this early and severe case reminds us that AS does not necessarily start bilaterally. As already emphasised, this seems to be rather a question of time and severity of the disease.

There is strong need to increase our knowledge about the early course of AS—a common rheumatic disease leading to disability and handicap.

The patient described here could not be treated with an anti-tumour necrosis factor agent because these most potent anti-inflammatory agents¹⁷ were not yet available. This kind of treatment needs to be urgently studied in patients with such early and severe disease.

Authors' affiliations

M Bollow, Department of Radiology, Augusta Hospital, Bochum, Germany

K-G A Hermann, Department of Radiology, Charité Medical School, Campus Mitte, Berlin, Germany

T Biedermann, Helios Clinics, 1st Children's Hospital Berlin-Buch, Pneumology/Allergology Unit, Berlin, Germany

J Sieper, Medical Department I, Rheumatology, Charité Medical School, Campus Benjamin Franklin, Berlin, Germany

M Schöntube, Helios Clinics, 2nd Children's Hospital Berlin-Buch, Rheumatology Unit, Berlin, Germany

J Braun, St. Josephs Hospital, Rheumazentrum Ruhrgebiet, Herne, Germany

Correspondence to: Dr K-G A Hermann, Department of Radiology, Charité Medical School, Campus Mitte, Schumannstr 20/21, 10117 Berlin, Germany; kgh@charite.de

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