

# Early imaging diagnosis of seronegative spondylarthropathies: preliminary results

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## Introduction

The prevalence of seronegative spondylarthropathies (SSA) is between 0.5 and 1.9% worldwide and 1-2% in Europe. The variability of reported incidence and prevalence is probably due to the different selection criteria of the target population (clinical and diagnostic criteria, prevalence of HLA-B27, etc.). On the other hand, up to 5% of all patients with chronic low back pain are expected to be affected by AS.

Inflammatory back pain (IBP) is a distinctive symptom, especially a non-radicular, alternating buttock pain with an insidious onset. Morning stiffness improving with exercise but not with rest may be an additional finding.

The correct diagnosis of AS is made with a 5-7 years delay after clinical onset. 50% of the patients are not seen by a rheumatologist in the first 2 years. Possible causes are:

- an awareness problem with difficulties to consider SSP amongst the more commonly occurring unspecific low back pain;
- inaccuracy of diagnostic modalities, especially when radiological diagnosis relies only on plain films, frequently performed without dedicated projections and reported without adequate knowledge of the clinical problem.

Therefore, efforts to improve the diagnosis should be directed towards educational programs and the implementation of multimodal imaging strategies. It is hypothesized that all patients with middle and high degree inflammatory low back pain undergo a radiological investigation during the course of the disease, commonly with projection radiography or MRI.

The aim of this study was to define the reliability of imaging parameters for determining the prevalence, for improving the diagnosis of early forms of SSA, and for optimizing the precision of the imaging workflow.

## Materials and Methods

Patients who came to their first visit in the rheumatologic outpatient department of a large community hospital because of inflammatory back pain were included if male and if their age was between 25 and 45 years after informed consent.

A questionnaire was filled out by the patients and included information about profession (and potential biomechanical load on the spine and the sacroiliac joints), type and duration of pain as well as its manifestation during day and night, numbness or tingling in the legs, morning stiffness, associated skin or bowel disease, potential similar diseases in family members and other relatives, and information about previous image investigations.

The MR examination was performed with a field strength of 3 Tesla, covering the thoraco-lumbar spine and the sacroiliac joints. Examination of the sacroiliac joints included axial, oblique coronal STIR

sequences, and oblique axial and oblique coronal short-TR (T1-weighted) sequences without and with fat-saturation before and after intravenous injection of 0.1 mmol/kg body weight of gadolinium DTPA. A perfusion study with 12 dynamic oblique coronal opposed-phased GRE consecutive acquisitions was added.

Projection radiographs included images of the lumbar spine, the pelvic bones and sacroiliac joints. Image data analysis following the modified New York criteria for SSA.

Image data evaluation of the sacroiliac joints included uni- or bilateral manifestation, location in each joint (superior, median or inferior third), presence of early lesions (i.e. tiny discontinuities of the subcondral bone plate, edema, effusions, widening of the joint space), presence of erosions, sclerotic areas, joint space width, ankylosis, and/or periarticular fat accumulation. The spine was evaluated with respect to presence of early abnormalities (erosions at the anterior aspect of the thoracolumbar and less frequently lumbosacral vertebral bodies - Romanus lesions), discitis, sclerotic changes and syndesmophytes, parasyndesmophytes or large paravertebral ossifications, "squared" appearance of vertebral bodies, and/or fusion of syndesmophytes and a "bamboo" appearance.

The final diagnosis was established following the criteria of the European Spondylarthropathy Study Group.

## Results

- 19 of all 570 male patients (3,3 %) suffered from inflammatory back pain. All but one (with a transitional vertebra at the lumbo-sacral junction) were finally diagnosed as SSA, mainly in the form of ankylosing spondylitis or enterogenic spondylarthropathy.
- In the majority of patients findings with both projection radiography and MRI were in an advanced stage of disease with a high percentage of sclerosis and ankylosis (Figs. 1, 2).
- One third had had previous imaging investigations (mainly projection radiographs of the spine, CT of the abdomen) that had been reported negatively with respect to SSA (Fig. 3).
- MRI was more sensitive than projection radiographs in the diagnosis of SSA.
- Sacroiliitis was the predominant finding, whereas abnormalities of the spine less frequently were observed.

## Discussion

The preliminary results of our study show a relatively high incidence of SSA. In accordance with the literature, the definite diagnosis of this disease is established after several years of duration. The incidence values are higher than reported in the literature and a detailed analysis of the data show that this might be only in part due to the higher percentage of SSA patients in a rheumatologic outpatient department. Moderate indicators show a better awareness of both clinicians and radiologists to detect SSA since this study was initiated. Previous imaging examinations, if performed in the early course of the disease, were done as projection radiographs of the spine or CT of the abdomen (especially in case of Crohn's disease). They were generally reported negative and in this way contributed to a further delay of the correct diagnosis.

To date, no real answer could be found, if all patients with inflammatory low back pain receive imaging investigations in the early course of disease. It may be argued, that the majority of these patients will undergo imaging. No correlation was found between the severity of the patients' symptoms and the severity of the imaging abnormalities.

## Conclusion

A delay of 7 or more years between the first onset of symptoms and the final diagnosis of SSA was reported in 1999 and this large time gap does not seem to have changed in the last years.

The role of imaging may be more important than stated previously: if positive, the diagnosis may be confirmed more rapidly, but if negative, the referring physician may be assured in the erroneous assumption of unspecific low back pain.

Reports of abdominal CT examinations should routinely include an assessment of the spine and the sacroiliac joints especially in case of inflammatory bowel disease or other autoimmunologic disorders.

The “awareness problem” is a central point of the diagnosis and efforts should be directed towards information and education of both patients and physicians.

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### **Figure legends**

Fig 1. First imaging documentation of sacroiliitis in the form of ankylosis that has not been diagnosed before.

Fig 2. Subchondral sclerosis in a patient with the first imaging diagnosis of sacroiliitis.

Fig 3. CT findings of erosive sacroiliitis was underreported in this abdominal CT of a patient with Crohn's disease.

Fig. 4. Rheumatic discitis of the lumbar spine along with subchondral edema of both sacroiliac joints.

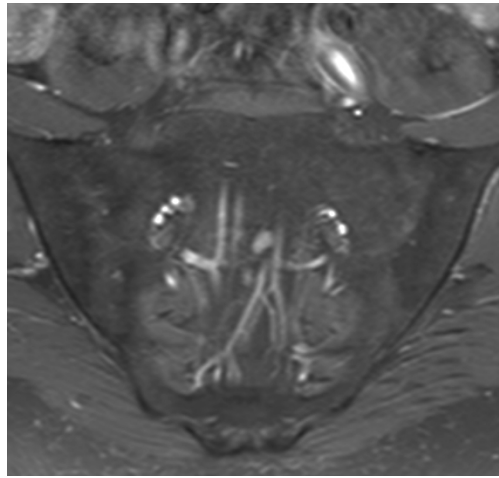


Fig 1.

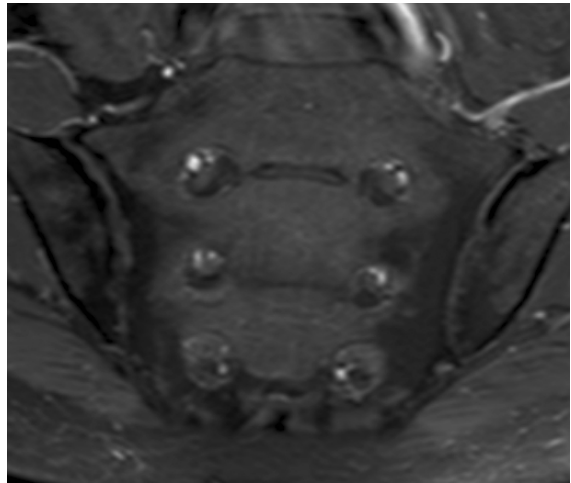


Fig 2.

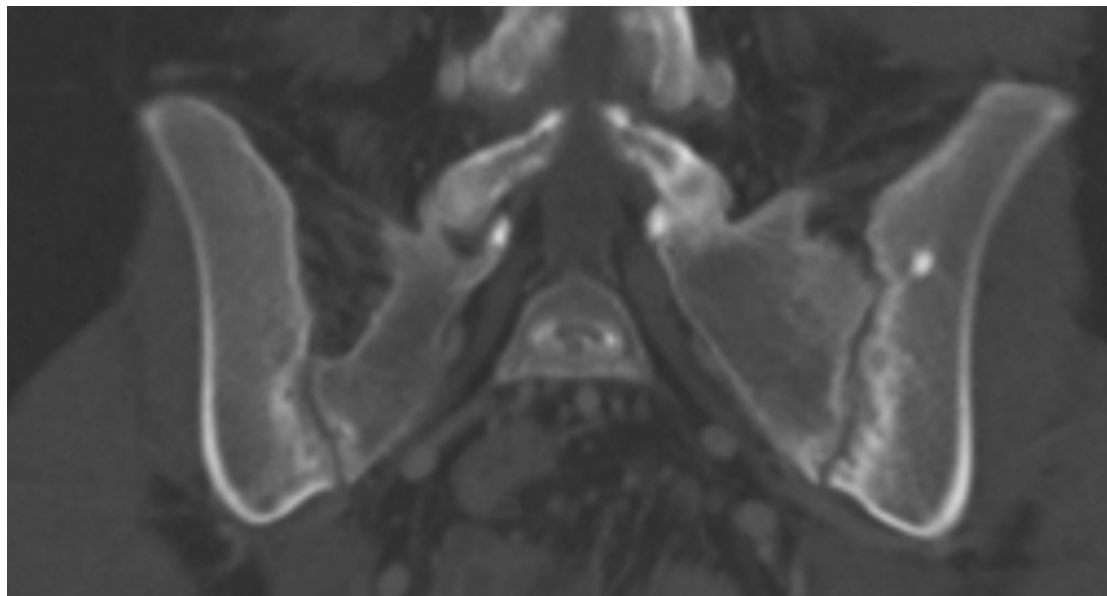


Fig 3.

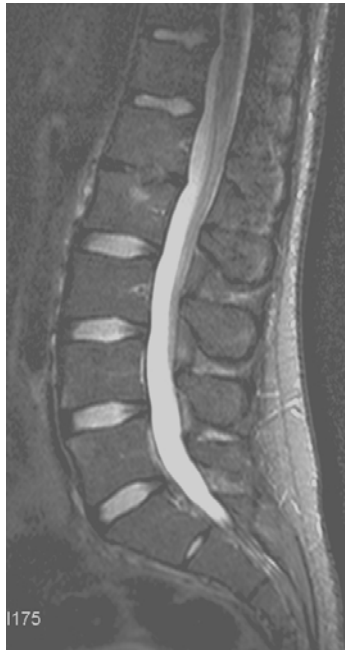


Fig 4 a.

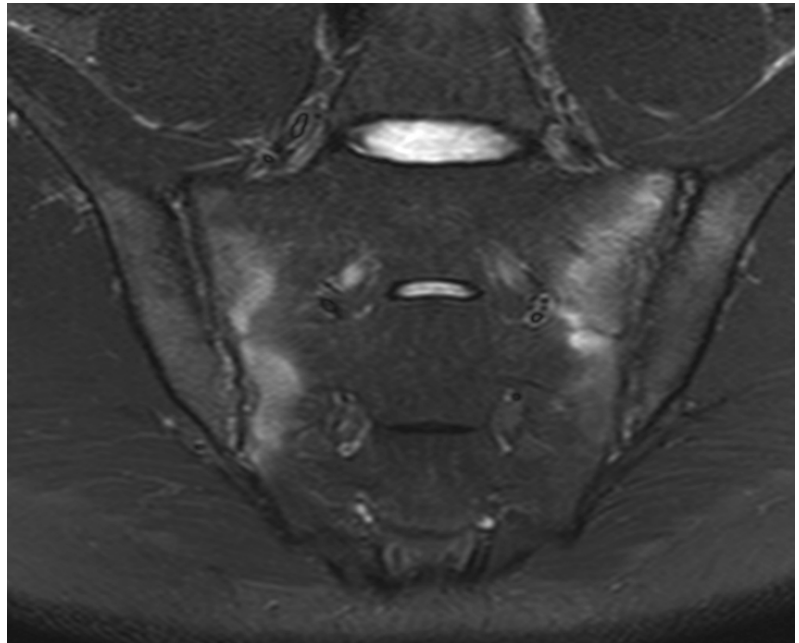


Fig 4 b.