



ORIGINAL RESEARCH PAPER

Surgery

A MULTI-METHOD STUDY OF SACROILIAC JOINTS IN PATIENTS WITH BEHCET DISEASE (BD) AND AAU (ACUTE ANTERIOR UVEITIS) COMBINED EVALUATION OF SACROILIAC JOINTS BY X-RAY, CT AND MRI IN COMPARISON

KEY WORDS: Behcet Disease; Spondylarthropathies; Magnetic Resonance Imaging; Sacroiliitis.

Izzo S	Department of Surgery "Pietro Valdoni" , University "La Sapienza" Rome, Italy
Izzo L	Department of Surgery "Pietro Valdoni" , University "La Sapienza" Rome, Italy
Codacci Pisanelli M	Department of Surgery "Pietro Valdoni" , University "La Sapienza" Rome, Italy
Costi U	Department of Surgery "Pietro Valdoni" , University "La Sapienza" Rome, Italy
Valabrega S	Department of Medical and Surgical Sciences and Translational Medicine, Faculty of Medicine and Psychology, Sapienza University, St. Andrea Hospital, Rome, Italy
De Santis A	Department of Surgery "Pietro Valdoni" , University "La Sapienza" Rome, Italy
Pugliese F	Department of Surgery "Pietro Valdoni" , University "La Sapienza" Rome, Italy
Izzo P	Department of Surgery "Pietro Valdoni" , University "La Sapienza" Rome, Italy

ABSTRACT	<p>Objective: It's controversial if Behcet Disease (BD) must be included in the group of seronegative spondyloarthropathy (SpA). Our aim was to establish the prevalence of sacroiliitis (SI) in patients with BD using X-Ray, CT and MRI, in comparison with patients with Acute Anterior Uveitis (AAU), that is known to belong to the subgroups of SpA.</p> <p>Methods: We considered, in the period from 04/2006 to 04/2009, 21 consecutive patients with BD, positive for HLA B51 and 28 consecutive patients with AAU, positive for HLA B27. These patients were previously selected by our Rheumatological Ward. Altogether we evaluated 98 sacroiliac joints (SIJ); each side of any patient was graded separately.</p> <p>Results: X-ray of the pelvis showed advanced SI (grade 4) in 14% of the cases in patients with AAU; in BD group only 7% CT showed advanced SI in 14% within AAU patients versus 6-12% of advanced SI (right to left) within BD patients. MR showed 14% of advanced SI (bilateral) within AAU versus 6-11% of advanced SI (right to left) in BD patients.</p> <p>Conclusions: This study supports the trend to not consider BD within the SpA, being the prevalence of SI in BD patients not very different from general population and anyway lower than that observed in patients with AAU. On the other side the prevalence of SI in AAU patients is higher than in BD patients and very similar to the one observed in patients with seronegative arthritis, and anyway high enough to consider joint involvement as an important feature of the disease.</p>
-----------------	---

Introduction

It's controversial if Behcet Disease (BD) must be included in the group of seronegative spondyloarthropathy (SpA). In favour of this hypothesis are some case reports and small case series in which has been identified an overlap between BD and several SpA, particularly ankylosing spondylitis (1-3). Other studies, evaluating larger number of patients, showed discordant results for the prevalence of sacroiliitis (SI) in patients with BD, perhaps in relation with different ethnic groups involved. Moreover high interobserver variation in interpreting radiographs of sacroiliac joints (SIJ) has been suggested as the main cause of these differing results (4-8). Computed Tomography (CT) and Magnetic Resonance (MR) are known as more sensitive techniques than plain radiograph in early detection and definition of changes occurring during SI. Our aim was to establish the prevalence of SI in patients with Behcet disease using X-Ray (XR), CT and MRI, in comparison with patients with Acute Anterior Uveitis (AAU), that is known to belong to the subgroups of SpA.

Materials and Methods

We considered, in the period from 04/2011 to 04/2016, 21 consecutive patients with diagnosis of BD, positive for HLA B51 and 28 consecutive patients with diagnosis of AAU, positive for HLA B27. These patients were previously selected by our Rheumatological Ward and were evaluated by a rheumatologist for the presence (past or present) of inflammatory low back pain, and other rheumatologic symptoms. All patients were not assuming steroid or other pharmacological therapy at the moment of the radiological evaluation.

Altogether we evaluated 98 SIJ; each side of any patient was graded separately.

Patients underwent X-ray of the pelvis, CT and MR of SIJ; informed written consent was subscribed by each one. For the evaluation of SI by X-ray and CT were used a grading

system on the basis of the modified New York Criteria (9). For MR, in the absence of univocally accepted international criteria, a similar evaluation system has been adopted, considering also subchondral edema and fatty accumulation (see table 1). X-Ray study of the pelvis comprehended traditional anteroposterior view and oblique projection for each SIJ.

CT scans (Siemens Somatom Sensation 64-slices, Germany) were done in axial plane and then reformatted in coronal plane, using osseous algorithm (Kernel B70 very sharp).

MR scans (Siemens Magnetom Avanto 1.5T, Germany) were done in axial and coronal plane obtaining T1- and T2-weighted images and fat-suppressed STIR images.

All images were transferred to a PACS (picture archiving and communication system) in order to be evaluated by the two radiologists L.T. (five years experienced) and A.S. (three years experienced); each one was blinded for the diagnosis of the patient (BD vs AAU) and for the radiological evaluation of the colleague. The inter-observer concordance was estimated by statistical test of Cohen's kappa with linear weighting.

We considered 4 grade of pathology for sacroiliitis: grade 1 (within normal limits) and grade 2 (dubious/minimal abnormalities) were judged negative for SI whereas grade 3 was mild positive (osseous abnormalities) and grade 4 clearly positive (advanced SI).

Results

X-ray of the pelvis showed advanced SI (grade 4) in 14% of the cases (bilateral); overall positives (both grades 3 and 4) were 28 and 35% of the cases (respectively right side and left side) in patients with AAU; in BD group only 7% of the patients showed advanced SI (bilateral) and this was the total percentage of positives.

CT showed advanced SI in 14% and 38% of total positives (bilateral) within AAU patients versus 6-12% of advanced SI and 23-29% (right to left) of total positives within BD patients.

MR showed 14% of advanced SI (bilateral) and 46-39% (right to left) of total positives within AAU versus 6-11% of advanced SI and 17-22% (right to left) in BD patients.

These results are summarized in table 2 (AAU patients) and table 3 (BD patients)

Inter-observer agreement was very good for XR (K = 0.8), good for MR (K > 0,7) and only moderate good for CT (K > 0,6).

Discussion

A very recent study (10) estimated prevalence of inflammatory SIJ abnormalities in a primary back pain cohort about 8%. In another work (11) 170 patients with inflammatory back pain were analysed for the occurrence of SI; 106 fulfilled ESSG criteria for SpA and 64 did not; of these 7 showed "undifferentiated" SI (about 11%). Therefore, even though the prevalence of SI in a primary low back pain population remains a troubled question, this study supports the trend to not consider BD within the SpA, being the prevalence of SI in BD patients not very different from general population (8) and anyway lower than that observed in patients with AAU.

On the other side the prevalence of SI in AAU patients is higher than in BD patients and very similar to the one observed in patients with SpA (12), and anyway high enough to consider joint involvement as an important feature of the disease.

A limitation of this study is that we could not study a control population by the fact that, for the Italian law, it's not ethically acceptable submit an healthy person to XR/CT study with unjustified exposure to ionizing radiation (art.99 D. Lgs 230/1995).

Another limitation of this and previous studies is the high inter-observer variation in interpreting radiological examinations of SIJ. In fact, in spite of the use of an evaluation system carefully stated, agreement of our readers was very good only for X-ray, decreasing as the technique becomes more complex and radiographic details to be evaluated become more numerous.

In conclusion:

- further studies with higher population are needed in order to reach a better knowledge of the prevalence of SI in BD.
- X-Ray may underestimate the grade of SI, being clearly positive only in advanced SI (look at total positive percentage of XR versus CT and MR in table 2 and 3).
- CT perfectly depicts sclerosis and/or erosions of articular surfaces (figure 1), especially using multi-planar reformation (MPR, figure 2)
- MR is superior to X-Ray and CT in depicting osseous abnormalities linked with SI because can demonstrate not only pathological changes of the articular surfaces but also fatty accumulation and subchondral edema (figure 3) and so could be considered as "one-stop-shop" examination.
- inter-observer agreement is good only for XR, probably because the findings are pretty simple and clear to state, but quickly decreases as the technique become more complex and the elements to be judged less conspicuous; so a specific grading system and a consequent training of the radiologist in the evaluation of the SI by CT and MR is mandatory

Reference

1. Chamberlain MA, Robertson RJH. A Controlled study of sacroiliitis in Behcet disease. *Br J Rheumatol* 1993;32:693-698
2. Moll JMH, Haslock I et al. Associations between ankylosing spondylitis, psoriatic arthritis, Reiter's disease, the intestinal arthropathies and Behcet's Syndrome. *Medicine* 1974;53:343-364
3. Maghraoui AE, Tabache F et al. A controlled study of sacroiliitis in Behcet's disease. *Clin Rheumatol* 2001;20:189-191
4. Yazici H, Turunc M et al. Observer variation in grading sacroiliac radiographs might be a cause of sacroiliitis reported in certain disease states. *Ann Rehum Dis* 1987;46:139-145
5. Olivieri I, Salvarani C et al. Is Behcet disease part of the spondyloarthropathy complex? *J Rheumatol* 1997;24:1870-1872
6. Olivieri I, Gemignani G et al. CT of the sacroiliac joints in four patients with Behcet's Syndrome: confirmation of sacroiliitis. *Br J Rheumatol* 1990;29:264-267.

7. Chang HK, Lee DH et al. The comparison between Behcet's Disease and spondyloarthritides: does Behcet's disease belong to the spondyloarthropathy complex? *J Korean Med Sci* 2002;17:524-529
8. Kotevoglu N, Tasbasi I et al. CT does not support sacroiliitis as a feature of Behcet disease. *J Clin Rheumatol* 2004;10:42-44
9. van der Linden SM, Valkenburg HA et al. Evaluation of diagnostic criteria for ankylosing spondylitis: a proposal for modification of the New York criteria. *Arthritis & Rheumatism* 1984;27:361-368
10. O'Shea FD, Boyle E et al. Inflammatory and degenerative sacroiliac joint disease in a primary back pain cohort. *Arthritis Care Res* 2010 Apr;62(4):447-454
11. Brandt J, Bollow M et al. Studying patients with inflammatory back pain and arthritis of the lower limbs clinically and by magnetic resonance imaging: many, but not all patients with sacroiliitis have spondyloarthropathy. *Rheumatology* 1999;38:831-836
12. Luukkainen RK, Virtanen KOJ et al. Occurrence of sacroiliitis in patients with seronegative oligoarthritis. *Clin Rheumatol* 2007;26:715-717