ORIGINAL RESEARCH ARTICLE

Sacroiliac Joint Findings in MRI for Low Back Ache

Krishna Kiran S[1], Bipin Augustine Joseph[2], Berton Monteiro[3]

[1]Associate Professor, [2]Final Year Post Graduate, [3]Assistant Professor, Department of Radiodiagnosis, Father Muller Medical College , Mangaluru, India

Corresponding author: Bipin Augustine Joseph, Final Year Post Graduate, Department of Radiodiagnosis, Father Muller Medical College, Mangaluru Pin 575002, India

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A B S T R A C T

Introduction: Significant proportion of low back pain can be from SI joint source. This study proposes to identify extent of sacroiliitis in patients undergoing MRI of lumbar spine by performing coronal STIR sequence in addition to other routine sequences.

Materials and methods: 77 patients underwent MRI of lumbar spine from February to May 2018. In addition to routine sequences for MRI of lumbar spine, every patient also underwent STIR sequence in coronal plane covering SI joints.

Results: Of 77 patients,16 had evidence of sacroiliitis. Acute changes of sacroiliitis were present in 3 patients, acute on chronic changes were present on 4 patients and 9 patients had evidence of chronic changes only.

Conclusions: Performing STIR coronal sequence in patients undergoing routine MRI of lumbar spine for low back ache is helpful in detecting sacroiliitis.

Keywords: MRI , Lumbar Spine, Coronal STIR, Sacroiliitis

INTRODUCTION

Low back pain is a pervasive problem that affects two thirds of adults sometime during their life time. Differential diagnosis of low back pain can be divided into mechanical causes (no primary inflammatory or neoplastic causes), visceral causes (no primary involvement of spine) and all others.[1] Identification of primary pain generator in a patient with low back pain is difficult. In patient`s presenting with low back pain at spine surgery clinic, up to 25% may have significant contribution from hip or SI joint.[2] An Indian study utilizing fat suppressed coronal sequence (STIR) for SI joints in MRI revealed incidence of 7.8%.[1] In 2009 ASAS (Assessment in Spondyloarthritis International Society) defined criteria for axial Spondyloarthritis (SpA) based on MR imaging. It defined criteria for acute and chronic sacroiliitis.[3] Our study proposes to look at sacroiliitis based on these criteria.

MATERIAL AND METHODS

Study was conducted in Department of Radio diagnosis, Father Muller Medical College, Mangaluru. Ethics committee approval was obtained. Seventy seven patients underwent MRI Lumbar spine from February to May 2018. Apart from lumbar spine sequences , every patient also underwent oblique coronal STIR (fat suppressed) sequence covering SI joints. SI joints were covered partially also in axial T1 sequences obtained at L5-S1 disc level. The MRI Machine used was Philips Achieva 1.5 T Netherlands Eindhowen. STIR refers to Short tau inversion recovery. It is a fat suppression technique with an inversion time in which fat signal is zero.

Inclusion criteria

1. All lumbar spine done during the study period.
2. History of low backache.

Exclusion criteria

1. Patients presenting with acute trauma.
2. Those patients for metastases screening.

Evidence of sacroiliitis

There are four findings of active sacroiliitis according to ASAS criteria.

1. Osteitis or bone marrow edema.
2. Enthesitis.
3. Capsulitis.
4. Synovitis.

Of these, osteitis or bone marrow edema is the single most important one to call active sacroilitis. Presence of other criteria in itself is not sufficient to make diagnosis.

MR criteria for diagnosing chronic lesions associated with sacroiliitis.

1. Subchondral sclerosis.
2. Subchondral erosions.
3. Bony ankylosis.
4. Periarticular fat deposition.

STATISTICAL ANALYSIS

Descriptive statistics like mean and percentages were used for the analysis.

RESULTS

77 patients underwent MRI for Low back ache during the study period. Of these 16(22%) patients had evidence of sacroiliitis. 7(10%) patients had evidence of unilateral disease , whereas bilaterality was found in 9 (11%) patients. Evidence of only acute disease was present in 3 (3.8%)patients. Features of acute on chronic sacroiliac disease was present in 4(5.1%) patients. In all , marrow edema was present in 8.9% of patients. Only chronic disease (no evidence of marrow edema) was found in 9 (11%) patients. 59 (76%) patients had evidence of lumbar spondylosis. Moreover, 7 (9%) patients had vessels in articular surfaces of SI joints mimicking marrow edema. Age group of patients with SI joint disease were 16-76 years. Active disease was found in age group of 26-60 years. Male to female ratio in the SI joint disease group was 6:11 (table 1,2).

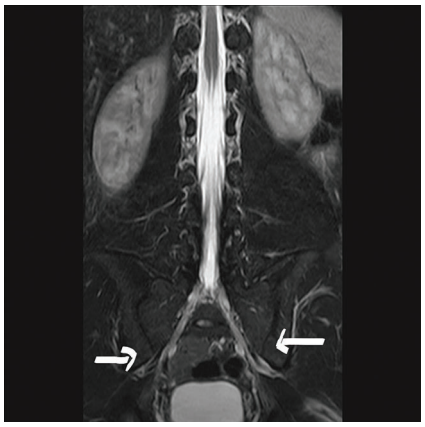

Image-1: Coronal SPIR sequence depicting normal SI joints.

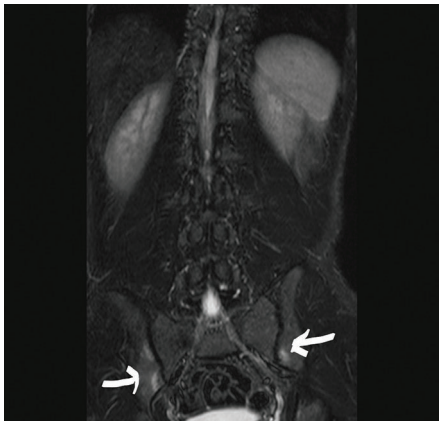

Image-2: Coronal SPIR sequence depicting bone marrow edema in bilateral SI joints.

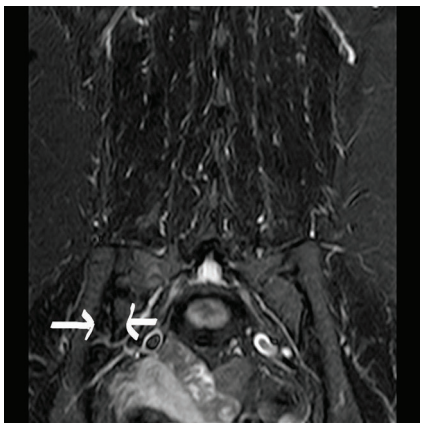

Image-3a: Demonstrating sclerosis in SI joint articular surfaces. Coronal SPIR sequence revealing hypointense signal in articular surfaces of right SI joint.

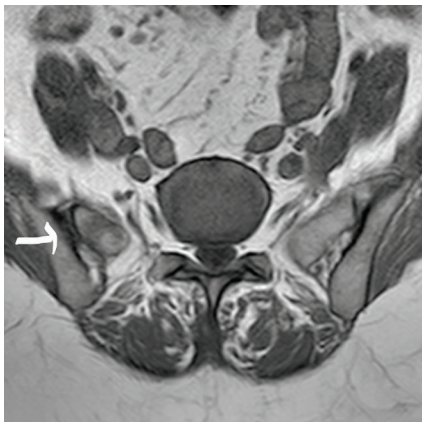

Image-3b: Demonstrating sclerosis in SI joint articular surfaces. Axial T1 sequence revealing hypointense signal in SI joint surfaces confirming sclerosis.

Age range	Number of cases
10-20 years	1
21-30 years	5
31-40 years	3
41-50 years	4
51-60 years	2
> 60 years	2

Table-1: Showing age pattern of sacroiliac disease.

Number of cases in male population	6
Active sacroiliitis in males	5
Chronic changes in males	1
Females with sacroiliitis	11
Active sacroiliitis females	2
Chronic changes females	9

Table-2: Showing sex distribution

DISCUSSION

Low back pain is a public health problem all over the world. A study from southern India among adult population showed 28.4% of males and 52.9% of females complained of back pain.[4] Significant contribution for low back pain can be from SI joint pathology.

Let us briefly review anatomy of SI joint.[5] The SI Joint has two parts. A lower ventral part which is predominantly cartilaginous and an upper dorsal part which is which is a fibrous part. The cartilage segment has smooth and parallel margins. Fibrous segment has irregular margins. Bone marrow edema involves lower and posterior part of the joint. MRI is considered the most important imaging modality as only it can show bone marrow edema, which is a criteria to diagnose active sacroiliitis. Other modalities are also helpful in diagnosis of sacroiliitis. Plain radiography demonstrates changes of sacroiliitis only 5 years after onset

of disease activity.[6] CT can demonstrate erosions, sclerosis and ankylosis, however cannot demonstrate marrow edema. In recent years, newer modalities have become available.[7] Digital tomosynthesis is a low radiation tool that can better demonstrate bone erosions. PET scan with 18FDG (Fluorodeoxyglucose) tracer may image inflammation and bone remodeling.

MRI study of incidence of sacroiliitis in patients presenting with low back ache has been published before. Sreedhar CM et al found 7.8% incidence of sacroiliitis in patients presenting with low back ache. Another study by Brooks F found SI joint pathology in 0.02% of patients.[8]

Given the high diagnostic accuracy of MRI in determining joint and related marrow abnormalities, it has become one of the cardinal tools for diagnosing active sacroiliitis associated with axial spondyloarthritis.

STIR sequence in MRI demonstrates active sacroiliitis as hyperintensity of marrow on joint surfaces. MRI can also demonstrate erosions, fatty marrow changes and also sclerosis. However , presence of only increased fat in joint surfaces is not sufficient for diagnosis of sacroiliitis. There are few pitfalls that mimic active sacroiliitis in MRI. Blood vessels , pulsation artifacts may mimic marrow edema.[3] One must scrutinize consecutive images to rule out this possibility (figures 1-3). In our study seven patients (9%) showed blood vessels near the SI joint mimicking bone marrow edema.

In our study , we found evidence of acute sacroiliitis in 2.3% of patients, acute on chronic disease in 3.8% of patients and only chronic changes were found in 7.7% of patients.

There are few limitations in our study. Sacroiliitis is often associated with HLA B-27 abnormalities. These tests were not available. Criteria for inclusion was not inflammatory back pain, but all patients undergoing MRI for low back ache. SI joint was covered with coronal STIR sequence. Axial T1 slices for lumbar spine also covered few slices of SI joints. Dedicated SI joint sequence was not done. Essentially, our aim was to detect incidence of sacroiliitis in patients undergoing MRI for low backache using mainly coronal STIR sequence.

CONCLUSION

In conclusion, cause of back pain can be difficult to detect. Inclusion of STIR sequence in routine MRI protocol for lumbar spine study for low back ache helps in detecting SI joint pathology. In this study, 8.9% of patients had evidence of marrow edema in SI joints which is considered as active sacroiliitis.

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