

Frequency of sacroiliitis among patients with low back pain

Mohammad Bagher Owlia¹, Mitra Danesh-Ardakani²

¹ M.D., Full Professor of rheumatology, Department of Rheumatology, Faculty of Medicine, Shahid Sadoughi University of Medical Sciences, Yazd, Iran

² M.D., Infectious Diseases Specialist, Department of Infectious Diseases, Faculty of Medicine, Shahid Sadoughi University of Medical Sciences, Yazd, Iran

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Abstract

Introduction: Sacroiliitis is one of the important symptoms in patients attending infectious diseases and rheumatology clinics. Some patients with sacroiliitis are asymptomatic, and some have unspecific symptoms. The aim of this study was to determine the frequency of sacroiliitis causes among patients attending Shahid Sadoughi's infectious disease and rheumatology clinics.

Methods: In this study, we evaluated patients attending Shahid Sadoughi rheumatology and infectious diseases clinic in 2014. Patients who had positive findings in favor of sacroiliitis were evaluated by history, physical exam, laboratory tests, and imaging. The patients were divided into infectious, inflammatory non-infectious, and degenerative causes. The data were analyzed by IBM SPSS version 20 using the independent samples t-test, ANOVA, the chi-squared test, and the Fisher's exact test.

Results: We studied 136 patients. Among them 64 (47.1%) were male, and 72 (52.9%) were female. The mean age of the participants was 34.28 ± 10.36 years. Among the patients, 12 (8.8%) had infectious causes, 120 (88.2%) had inflammatory non-infectious causes, and four (2.9%) had degenerative causes.

Conclusion: Based on our results, inflammatory non-infectious causes are at the top of the list of sacroiliitis causes, but we should always consider infectious causes, including brucellosis.

Keywords: Sacroiliitis, Ankylosing spondylitis, Brucellosis

1. Introduction

1.1. Background

Pelvic pain is a common complaint among patients attending rheumatology and infectious clinics (1) and sacroiliitis is a one of the most important causes of unresolved low back or pelvic pain. Its etiologies are variable. Based on the causes of sacroiliitis, its treatment strategies and its prognosis are different. Common etiologies include sacroiliac arthritis (2-5), ankylosing spondylitis (6-8), osteitis condensans ilii (9, 10), gout (11, 12), osteoarthritis, tumors (13), septic arthritis (14-20), and brucellosis (21-26). Sacroiliitis is frequently a neglected diagnosis among clinicians especially when history taking and physical examination is done carelessly. Knowledge about the common causes helps physicians decide about the diagnostic tools required for accurate diagnosis and suitable treatment of the patients.

1.2. Statement of problem

Although etiologies of sacroiliitis are very different, history taking and physical examinations are very helpful for determining the etiologies of sacroiliitis (4). The etiologies are different based on the patients' ages, gender, chronicity of symptoms, symmetric or asymmetric symptoms, and existence of systemic symptoms. Also, some laboratory tests are helpful in evaluating these patients. Finally, radiologic imaging gives important information to physicians and usually helps them reach a definite diagnosis (2-4, 27-34). Physicians' knowledge about the common etiologies of sacroiliitis in each area, and important findings during history taking and physical examination help

Corresponding author:

Dr. Mohammad Bagher Owlia, Department of Rheumatology, Faculty of Medicine, Shahid Sadoughi University of Medical Sciences. Tel: +98.353824100, E-mail: Bagherowlia@gmail.com

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their decision about the diagnostic tests required for the diagnosis and treatment strategies needed based on each specific patient.

1.3. Objectives

The general objective of this study was to evaluate patients with sacroiliitis who attended infectious and rheumatology clinics in Yazd. The specific objectives included the following:

- 1) To determine the etiologies of sacroiliitis
- 2) To determine the frequency of unilateral and bilateral sacroiliitis
- 3) To determine the etiologies of sacroiliitis according to the erythrocyte sediment rate (ESR)
- 4) To determine the etiologies of sacroiliitis according to C-reactive protein (CRP)
- 5) To determine imaging findings (MRI, X-ray, and bone scan) in patients with sacroiliitis

2. Materials and Methods

2.1. Study design and setting

This descriptive, cross-sectional study was done in 2014 on patients with sacroiliitis who attended the rheumatology and infectious clinics of Shahid Sadoughi Hospital in Yazd. All patients with histories that favored sacroiliitis were included in the study.

2.2. Laboratory tests and imaging

Complete physical examinations were done for all of the patients. Based on the results of history and physical examination, further imaging and laboratory tests were requested for definite diagnosis. X-ray imaging and magnetic resonance imaging were done, if required. Also, aspiration under the guide of ultrasonography was done by a radiologist in a case of collection, which were in favor of infection and the samples were sent for smear and culture.

2.3. Wright, coombs wright, and 2 Mercurioethanol (2ME)

For diagnosis of brucellosis wright, coombs wright, and 2ME, tests were requested. Wright test titer $\geq 1:80$, coombs wright $\geq 1:160$, and 2ME titer $\geq 1:40$ were considered as positive test results.

2.4. Infectious sacroiliitis

For diagnosis of infectious sacroiliitis, complete blood count, ESR, CRP, and blood culture were used. In patients who were suspected to have tuberculosis who had previous contact with tuberculosis-infected patients or had a history of infection with tuberculosis, PPD test, chest X-ray, smear and culture, broncoalveolar lavage, and biopsy were done when indicated.

2.5. Non-infectious etiologies

For non-infectious causes, fat suppressed MRI, and pelvic X-ray were done. A rheumatologist assessed all of the patients for axial and peripheral joints arthritis, history of psoriasis or inflammatory bowel diseases, family history of ankylosing spondylitis or psoriasis, or reactive arthritis, or uveitis, or inflammatory bowel diseases, and inflammatory back pain in the patient, and uveitis, enthesitis, and dactylitis.

2.6. Exclusion criteria

Patients with histories of trauma to the sacroiliac joint and patients who avoided to complete and sign the written informed consent were excluded from the study.

2.7. Statistical analysis

Data was analyzed using IBM SPSS version 21.0 using descriptive statistics (mean and standard deviation, frequency, and percentage), the independent samples t-test, and ANOVA tests. For assessment of association between qualitative variables, the chi-squared and exact fisher tests were used, when needed.

3. Results

The study included 136 patients. Among the study participants, 64 (47.1%) were male, and 72 (52.9%) were female. The mean age of the participants was 34.28 ± 10.36 , and the age range was from 16 to 74. Also, 36 patients (26.5%) were single, and 100 patients (73.5%) were married. Among them 116 (85.3%) lived in urban areas, and 20 (14.7%) lived in rural areas. Based on our results, 134 (98.5%) had low back pain, 133 (97.8%) had pelvic pain, 98 (72.1%) had morning stiffness for more than 30 minutes, 92 (67.6%) had shoulder arthritis, 90 (66.2%) had upper and lower extremities arthritis, 86 (63.2%) had knee pain, 54 (39.7%) had neck pain, 14 (10.3%) had fever, 13 (25%) had small

joint of hand and foot arthritis, 13 (9.6%) had muscle pain, 3 (2.2%) had chronic diarrhea, and 3 (2.2%) had psoriatic skin lesions. The use of unpasteurized dairy products was reported in 73 (53.7%) of the participants. Sacroiliac joint involvement was on the left side in 32 (23.5%), on the right side in 20 (14.7%), and bilateral in 84 (61.8%) of the patients. MRI was used for definite diagnosis in 15 (11%) of the patients. Also, bone scans were done for 10 (7.4%) of the patients. Leukocytosis was reported in 7 (5.1%) of the patients, positive CRP in 47 (34.6%), high ESR in 26 (20.6%), positive ANA in 4 (2.9%), and positive RF in 10 (7.4%) of the patients. Also, positive anti-CCP was reported in 4 (2.9%), positive wright test in 12 (8.8%), positive coombs wright test in 12 (8.8%), and positive 2ME was reported in 12 (8.8%) patients. No patients were diagnosed with infiltrative diseases, and only 4 (2.9%) were diagnosed with degenerative diseases. Infectious etiologies were reported in 12 (8.8%) of the patients, all of whom had brucellosis. Inflammatory non-infectious diseases were reported in 120 (88.2%) of the patients. Details are shown in Table 1. Table 2 compares the causes of sacroiliitis based on gender, marital status, and place of residence. As shown in Table 2, there were no significant associations between the etiologies of sacroiliitis and demographic characteristics ($p > 0.05$). Table 3 shows the association of patients' symptoms with etiologies of sacroiliitis.

Table 1. Frequency of patients with non-infectious inflammatory etiologies of sacroiliitis

Diagnosis	n	%
Undifferentiated SpA	63	52.5
Typical ankylosing spondylitis	33	27.5
Rheumatoid arthritis	7	5.8
Psoriatic arthritis	6	5
Osteitis condensans ilii	5	4.2
Inflammatory bowel diseases	3	2.5
Systemic lupus erythromatous	2	1.7
Sjögren	1	0.8
Total	120	100

Table 2. Association of etiologies of sacroiliitis and demographic characteristics

Demographic characteristics		Infectious causes	Non-infectious inflammatory causes	Degenerative causes	p
Gender	Male	7 (10.9%)	57 (89.1%)	0 (0%)	0.147
	Female	5 (6.9%)	63 (87.5%)	4 (5.6%)	
Marital status	Single	5 (13.9%)	31 (56.1%)	0 (0%)	0.241
	Married	7 (7%)	89 (89%)	4 (4%)	
Place of residence	Urban areas	10 (8.6%)	103 (88.8%)	3 (2.6%)	1
	Rural areas	2 (10%)	17 (85%)	1 (5%)	
Total		12	120	4	

Table 3. Association of patients' symptoms with etiologies of sacroiliitis

Symptoms	Infectious etiologies	Non-infectious inflammatory etiologies	Degenerative etiologies	p
Fever and B symptoms*	12 (100%)	2 (1.7%)	0 (0%)	<0.001
Knee arthritis	9 (75%)	74 (61.7%)	3 (75%)	0.612
Pelvic pain	12 (100%)	117 (97.5%)	4 (100%)	1
Generalized body pain	12 (100%)	1 (0.8%)	0 (0%)	<0.001
Chronic diarrhea	0 (0%)	3 (2.5%)	0 (0%)	1
Shoulder arthritis	5 (41.7%)	83 (69.2%)	4 (100%)	0.053
Psoriatic skin lesions	0 (0%)	3 (2.5%)	0 (0%)	1
Morning stiffness	1 (8.3%)	95 (79.2%)	2 (50%)	<0.001
Low back pain	12 (100%)	119 (99.2%)	3 (75%)	0.065
Neck pain	0 (0%)	54 (45%)	0 (0%)	0.001
Small joint of hand and foot arthritis	1 (8.3%)	32 (26.7%)	1 (25%)	0.439
Wrist and ankle arthritis	11 (91.7%)	76 (63.3%)	3 (75%)	0.140

* Including chills, weight loss, anorexia

Based on the findings provided in this table, fever, B symptoms, and generalized body pain were more common among patients with infectious etiologies of sacroiliitis. Morning stiffness and neck pain were more common among the patients with non-infectious inflammatory causes. Other symptoms were not significantly different in different etiologies of sacroiliitis. Frequency of unpasteurized dairy use during the past year was 12 (100%) in patients with infectious etiologies, 59 (49.16%) in patients with non-infectious inflammatory etiologies, and 2 (50%) in patients with degenerative etiologies. The frequency of unpasteurized dairy use was higher among patients with infectious etiology of sacroiliitis (0.002). Table 4 compares the results of X-ray imaging of the sacroiliac joint in the participants based on the etiologies of sacroiliitis. As shown in this table, the findings of X-ray imaging were not significantly different for the different etiologies of sacroiliitis. Table 5 shows the results of laboratory tests in patients with different etiologies of sacroiliitis. Leukocytosis, positive wright test, positive coombs wright test, and positive 2ME test were significantly more common among patients with infectious causes of sacroiliitis. Also increased ESR and CRP levels were more common among patients with non-infectious inflammatory causes of sacroiliitis. Table 6 compares the mean age and mean duration of disease in patients with sacroiliitis based on the etiology of sacroiliitis. Based on the findings presented in this table, patients with degenerative etiologies were significantly older than the other patients. Also, the durations of the diseases were significantly shorter in patients with infectious etiologies.

Table 4. Comparison of x-ray findings according to etiologies of sacroiliitis

X-ray finding	Infectious etiologies	Non-infectious inflammatory etiologies	Degenerative etiologies	p
I	0 (0%)	25 (100%)	0 (0%)	0.434
II	2 (6.9%)	25 (86.2%)	2 (6.9%)	
III	2 (3.6%)	52 (92.9%)	2 (3.6%)	

I: Irregularity, II: Erosion, III: Sclerosis, IV: Ankylosis

Table 5. Result of laboratory test results based on the etiologies of sacroiliitis

Variables	Infectious etiologies	Non-infectious inflammatory etiologies	Degenerative etiologies	p
Leukocytosis	6 (85.7%)	1 (14.3%)	0 (0%)	<0.001
Increased CRP level	9 (19.1%)	38 (80.9%)	0 (0%)	0.003
Increased ESR level	6 (21.4%)	22 (73.6%)	0 (0%)	0.031
Positive ANA	0 (0%)	4 (100%)	0 (0%)	1
Positive RF	0 (0%)	10 (100%)	0 (0%)	0.705
Positive anti-CCP	0 (0%)	3 (75%)	1 (25%)	0.150
Positive wright test	12 (92.3%)	0 (0%)	0 (0%)	<0.001
Positive coombs wright test	12 (92.3%)	0 (0%)	0 (0%)	<0.001
Positive 2ME test	12 (92.3%)	0 (0%)	0 (0%)	<0.001

Table 6. Comparison of age and duration of disease based on etiology of sacroiliitis

Variable	Infectious etiologies	Non-infectious inflammatory etiologies	Degenerative etiologies	p
Age (years)	35.58 ± 17.03	33.53 ± 9.01	52.75 ± 7.71	0.001
Duration of symptoms (months)	3.91 ± 5.96	40.48 ± 37.90	43.25 ± 39.67	0.005

4. Discussion

In this study, we evaluated 136 patients with sacroiliitis over a period of two years. The mean age of the participants was about 34 years. Sacroiliitis is frequently neglected because it is asymptomatic in a large percentage of patients, and it also is associated with non-specific symptoms in a large percentage of patients.

4.1. Prevalence of different etiologies of sacroiliitis

In this study, non-infectious inflammatory etiologies were the most common (88.2%) causes of sacroiliitis, and infectious (8.8%) and degenerative (2.9%) causes were less frequent. In a study in Canada, degenerative and inflammatory etiologies were reported in 23.8% and 7.9% of the patients with low back pain (35). The percentages are different from those in our study. The difference in study population and also the participants' age may be the causes of this difference.

4.2. Demographic differences

Klauser et al.'s study confirmed the equal distribution of the sacroiliitis based on the patients' gender. Their study was done on a population of children. These results show that the prevalence of sacroiliitis is equal in males and females (36). Despite this, some differences in the gender distribution of sacroiliitis were reported based on the etiology of sacroiliitis. Xiong et al. reported a younger age for the presentation of ankylosing spondylitis in males than in females (37). Also Van Onna et al. reported that only 38% of the patients with sacroiliitis on their MRI imaging were males (38). These findings may show less radiological findings in MRI in males than in females. Further studies are needed in this regard. These findings were confirmed by Leclerc-Jacob et al., who reported higher rates of sacroiliitis in females and in older patients (39). Kobak et al. reported the presence of sacroiliitis in 14.3% of patients with sarcoidosis (40). All of the patients with sacroiliitis in this study were females. Therefore, it seems that the patients with sacroiliitis were 30 to 35 years old at the time of presentation, and the condition was distributed equally among males and females. However, radiological findings, especially MRI findings, were more prominent in females.

4.3. Side of the sacroiliitis

Most of the patients in our study had bilateral sacroiliitis. Gheita et al. reported bilateral sacroiliitis in only 20% of the patients (21). Their study was done on asymptomatic patients with brucellosis. Therefore, it seems that the rate of bilateral sacroiliitis may be higher among symptomatic patients. However, the results of Leclerc-Jacob et al. confirmed our findings and showed bilateral sacroiliitis in 14 of 17 patients. Our results showed that non-infectious inflammatory etiologies include about 88% of the causes of sacroiliitis and should be considered for the diagnosis of these patients. Despite this, infectious causes should be considered during workups of these patients.

4.4. Study limitations

In this study, we only assessed symptomatic patients, and, as mentioned above, some patients who are asymptomatic may also have radiologic findings in favor of sacroiliitis. Therefore, our results cannot be generalized to asymptomatic patients. Another limitation in our study is that the results of X-ray, MRI, and bone scan findings are dependent on the radiologist. This limitation also limits the generalizability of our findings.

5. Conclusions

Sacroiliitis is a common missed diagnosis and non-infectious inflammatory etiologies are the most common causes of sacroiliitis. However, based on the patients' histories, physical examinations, and laboratory tests, infectious diseases should be considered for the management of these patients.

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Conflict of Interest:

There is no conflict of interest to be declared.

Authors' contributions:

Both authors contributed to this project and article equally. Both authors read and approved the final manuscript.

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