Original Article

Efficacy of percutaneous steroid injection in sacroiliac joint dysfunction (a prospective case study)

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ABSTRACT

Background: The sacroiliac joint dysfunction is a very common cause of chronic low back pain. The aim of this study is to provide a prospective case study to show the efficacy and safety of sacroiliac joint injection with corticosteroids. Methods: Thirty-five patients were treated with percutaneous injection of a mixture of methylprednisolone acetate 40 mg and local anesthetic into a symptomatic sacroiliac joint. Diagnostic block was done for all cases. The patient outcome was obtained by showing the difference between the visual analog scale (VAS) before the injection (Pre-VAS) and at 1 month (Post-VAS 1) and 6 months (Post-VAS 3) after treatment. Results: Over six months of follow-up, there was statistically significant clinical improvement in the patients. There is a significant difference between Pre-VAS and Post-VAS 1 and between Pre VAS Post-VAS 2 as P value was 0.000 in both relationships. No adverse events of neurologic injury, infection, or any other complication were reported. Conclusion: Patients complaining of sacroiliac joint dysfunction induced pain who received treatment with percutaneous sacroiliac joint injection of corticosteroids experienced significant clinical improvement. This modality of treatment was effective and safe in the management of chronic low back pain due to sacroiliac joint dysfunction.

Keywords: Sacroiliac, Corticosteroids, Percutaneous, VAS, injection.

Introduction

The sacroiliac joint (SIJ) is considered an amphiarthrosis (fibrocartilage connecting two hyaline cartilage surfaces). The superior part of the sacroiliac joint is defined as a synarthrosis (fibrous tissue connecting the articular surfaces). The inferior third of the SI joint has been described as a true synovial joint. In adults, the joint is C- or S-shaped. On cross-sectional imaging, the joint space is orientated along a posteromedial-to-anterolateral plane, which is usually 0.5 to 4 mm [1].

The diagnosis of SIJ pain is a diagnosis of exclusion. Other causes of chronic low back pain (LBP) such as spinal stenosis, disc prolapse, and facet syndrome should first be excluded. Many physical tests such as Patrick's test, Gaenslen's test, distraction test and pain with pressure application to the sacroiliac ligaments have been described to diagnose SIJ pain [2].

SIJ Injection has been done as a diagnostic test and also as a therapeutic procedure. SIJ injections consist of the infiltration of local anesthetic and/or corticosteroids into the joint. Although SIJ injections are performed in the outpatient clinic without image guidance. This procedure is not recommended because of inability to confirm accurate needle placement [3].

The aim of this study is to present our experience using sacroiliac steroid injection in the management of chronic low back pain due to sacroiliac joint dysfunction. Efficacy, safety and technique would be reported.

Materials and Methods

Study design:

This was a prospective case study of patients with chronic LBP due to SIJ dysfunction treated with sacroiliac joint infiltration with local anesthetic and corticosteroids. The study aims and design was approved by the medical and ethical committee of the neurosurgery department, Faculty of Medicine, Cairo University.

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Study Population

One hundred out of 1021 patients with chronic LBP were evaluated for eligibility at neurosurgery outpatient clinic between October 2016 and November 2017 according to the general inclusion and exclusion criteria set (Table 1). Patients with chronic LBP who met inclusion and exclusion criteria were recruited. Thirty-five patients met the inclusion criteria and were involved in the study.

Table 1: General inclusion and exclusion criteria set

Inclusion criteria	Exclusion criteria
-Low back pain and tenderness (over sacroiliac joint) > 6 months -Failure of conservative treatment -Absent contraindications -Positive diagnostic block	-Bleeding disorders -Undergoing anticoagulation therapy -Pregnancy -Presence of infection -Any psychiatric condition -Pediatric population

Demographic information such as age and sex were obtained from patient charts. Baseline information was obtained from each patient using a visual analog scale (VAS). One week before the injection, the patient provided informed consent, a baseline assessment, and blood samples to assess platelet count, white blood cell count and International Normalized Ratio (INR) to confirm that all values were within normal.

Methods

Patients were diagnosed with sacroiliac joint dysfunction by clinical evaluation, imaging, diagnostic injection and exclusion of other causes of chronic LBP. Patients underwent a single injection of local anesthetic and corticosteroids into a symptomatic SIJ using fluoroscopic guidance. The diagnostic injection was done for all cases with 1 mL of lidocaine 2%. When the patient pain improved with local anesthetic, methylprednisolone 40 mg was injected in the joint before removing the needle. This was done on both joints if the dysfunction was bilateral.

Technique of SIJ injection

- Prone position.
- Wide sterile preparation of the skin over the sacrum and buttocks was done.
- The joint was visualized using fluoroscopy. The x-ray beam was angled medial to lateral and till the anterior and posterior projections of the inferior third of the joint were superimposed on each other.
- The inferior third of the joint was identified, and the skin was marked to identify the entry point for the needle trajectory.
- Local anesthetic (lidocaine 2%) was infiltrated in the skin and the underlying soft tissues. A 22-gauge spinal needle was then directed to the inferior third of the joint aided by fluoroscopy (Figure 1).
- 0.2 to 0.5 mL of contrast material (e.g., Omnipaque 300) was injected to confirm needle placement.
- A mixture of 40 mg of methylprednisolone plus 1 mL of 0.5% bupivacaine was injected.

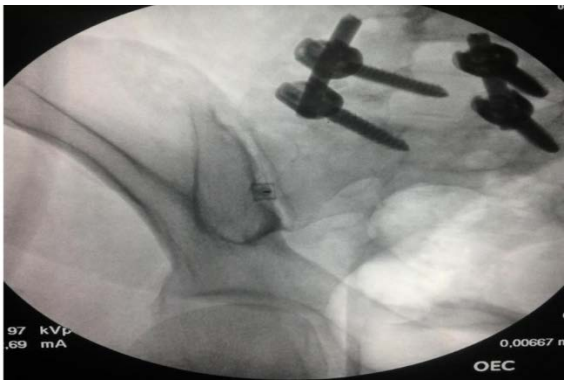

Figure 1: Antero-posterior fluoroscopic view of the latest position of the spinal needle.

Follow-up questionnaires were then done postoperatively.

Statistical Analysis

Data were statistically analyzed in terms of mean ± standard deviation (± SD), median and range, or frequencies (number of cases) and percentages when appropriate. Comparison of VAS between males and females was done using Student t-test for independent samples. Comparison of VAS between pre- and post-treatment values was done using a paired t-test. Correlation between various variables was analyzed using Pearson moment correlation equation for linear relation of normally distributed variables and Spearman rank correlation equation for non-normal variables/non-linear monotonic relation. *P*-values less than 0.05 were considered statistically significant. All statistical calculations were done using computer program IBM SPSS (Statistical Package for the Social Science; IBM Corp, Armonk, NY, USA) version 22 for Microsoft Windows.

Outcome Measures

The patient outcome was assessed by obtaining the VAS before and after the procedure. The Pre-VAS (before the procedure) was compared with the Post-VAS 1 (one month after treatment) and Post-VAS 2 (6 months after treatment).

Results

The age, duration of symptoms, Pre-VAS, Post-VAS 1 and Post-VAS 2 (Table 2)

The average age in the study was 42.86 years old. The average duration of symptoms was 8.60 months. The average Pre-VAS was 8.34. The average Post-VAS 1 was 4.49. The average Post-VAS 2 was 5.11.

Table 2: The age, duration of symptoms, Pre-VAS, Post-VAS 1 and Post-VAS 2

	N	Minimum	Maximum	Mean	SD
Age	35	16	71	42.86	14.490
Duration of symptoms	35	3	36	8.60	6.463
Pre VAS	35	8	9	8.34	0.482
Post VAS 1	35	2	8	4.49	2.133
Post VAS 2	35	2	8	5.11	2.311

VAS: Visual analog scale, N: Number, SD: Standard deviation

The relationship between sex and Pre-VAS, Post-VAS 1 and Post-VAS 2 (Table 3)

There was no significant difference between the sex and (Pre-VAS, Post-VAS 1 and Post-VAS 2) as the *P* value was 0.568, 0.262, 0.126, respectively (*P*-values more than 0.05).

Table 3: The relationship between sex and (Pre VAS, Post VAS 1 and Post VAS 2)

Sex		Pre VAS	Post VAS 1	Post VAS 2
Female	Mean	8.38	4.21	4.71
	N	24	24	24
	SD	0.495	2.126	2.156
	Minimum	8	2	2
	Maximum	9	8	8
	Median	8.00	4.00	5.00
Male	Mean	8.27	5.09	6.00
	N	11	11	11
	SD	0.467	2.119	2.490
	Minimum	8	2	2
	Maximum	9	8	8
	Median	8.00	5.00	8.00

N: Number, SD: Standard deviation

The relationship between Pre-VAS and Post-VAS 1, Post-VAS 2 (Table 4)

There was a significant difference between Pre-VAS and Post-VAS 1 and Post-VAS 2 as *P*-value was 0.000 in both relationships (*P*-values less than 0.05).

Table 4: The relationship between pre VAS and immediate post-VAS, post-VAS 1, post-VAS 2, post-VAS 3

	Pre VAS - Post VAS 1	Pre VAS - Post VAS 2
P value	0.000	0.000

VAS: Visual analog scale

The frequency of previous operation (Table 5)

There were six patients in the study with history of previous lumbar spine surgery.

Table 5: The frequency of previous operation

	Frequency	Percent (%)
Negative	29	82.9
Positive	6	17.1
Total	35	100.0

The side of the procedure (Table 6)

There were 14 patients in the study complaining of left sacroiliac joint dysfunction. The right joint was affected in 17 patients. Bilateral affection was in 4 patients.

All patients had chronic LBP. All patients had local tenderness over the affected sacroiliac joint. Diagnostic block was done in all cases. There were no complications in the study.

Table 6: The side of the procedure

	Frequency	Percent (%)
Bilateral SIJ	4	11.4
Left SIJ	14	40.0
Right SIJ	17	48.6
Total	35	100.0

SIJ: sacroiliac joint

Discussion

Chronic LBP is highly prevalent, expensive, and is considered one of the commonest causes of disability. The SIJ dysfunction is a cause of low back and lower extremity pain. SIJ dysfunction is an under-appreciated reason for chronic LBP [4].

More investigators nowadays have recommended the use of fluoroscopic and magnetic resonance (MR) guidance to perform the procedure, which markedly improves the injection accuracy. Reported clinical efficacy of SIJ steroid injection has been variable. Some authors reported little or transient patient pain relief. Others reported marked decrease in LBP [5].

Corticosteroids are used to decrease inflammation that may be the cause of pain. As cortisone is long-acting and is slow releasing, it provides effective pain relief. Although it may take several days to decrease the inflammation, the pain-relieving effects of cortisone injection can be weeks or even months [6].

Maugars et al. conducted a study on 22 patients and the number of total injections was 42. The procedure was corticosteroid injection in a symptomatic SIJ in patients with seronegative spondylarthropathy. The number of total procedures was 24. The response was good in 19 procedures (79.2%) and in 34 of 42 joints (81%). This improvement continued in 14 patients after a mean period of follow up of 9.6 months. They concluded that this procedure is safe and effective in the management of sacroiliac joint dysfunction [7].

Woong et al. conducted a randomized controlled study to show the efficacy of prolotherapy and steroid injection in sacroiliac joint dysfunction. The numbers of patients were 25 and 23 for the steroid and prolotherapy groups, respectively. The pain and disability scores were significantly improved in both groups at 2-weeks follow-up. There was no significant difference between both groups. In the prolotherapy group, the cumulative incidence of ≥ 50% pain relief was 58.7 % at 15 months and it was 10.2% in the steroid group. There was a statistically significant difference between both groups ($P < 0.005$) [8].

A systematic review has been conducted by Hans et al. to assess the efficacy of therapeutic SIJ injections. The review involved eleven studies. They showed that the evidence for cooled radiofrequency rhizotomy is fair. The evidence for efficacy of

traditional radiofrequency rhizotomy and pulsed radiofrequency is poor. The evidence for steroid efficacy (intra-articular or peri-articular) is limited [9].

Conclusion

Our study showed that fluoroscopic guided percutaneous injection of corticosteroids is very effective and safe in the management of chronic low back pain due to SIJ dysfunction.

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