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Ultrasound-Guided Diagnostic Block and Radiofrequency Ablation Technique for Sacroiliac Joint Pain

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Abstract:

Background: Sacroiliac Joint pain is among the most prevalent causes of low back pain that must be distinguished from other types of LBP. Treatment of sacroiliac pain could be obtained by many methods involving intraarticular steroid injection or pulsed radiofrequency. Objectives: This study purposed to determine Ultrasound-Guided Radiofrequency ablation technique influence and to compare its efficacy with local steroid injection for Sacroiliac pain. Study Design: A clinical comparative study. Methods: Number of 20 patients were randomly allocated in two groups. Group I was subjected to pulsed intraarticular PRFA and group II was subjected to intraarticular steroid injection ultrasounded-guided. The Oswestry Disability Index (ODI) II and Visual Analogue Scale (VAS) were measured before intervention and on follow up immediately post intervention, 1, 3 and 6 weeks later. Results: Patients who received pulsed intraarticular RFA showed decreased pain after therapy with an average of mean ± SD of 3.5 ± 0.53 immediately post and from 4 - 6 with a mean ± SD of 4.9 ± 0.88 six weeks after. Following therapy, patients who received SIJ intraarticular steroid injection reported, on average, less discomfort of 3.5 ± 0.53 immediately post and from 5 - 7 with a mean ± SD of 5.8 ± 0.63 six weeks after. Conclusions: SIJ intraarticular steroid injections and SIJ pulsed RFA ,both provided considerable pain reduction in SIJ-afflicted individuals. SIJ pulsed RFA offered longer-lasting pain alleviation and a substantial decrease in the ODI.

Keywords: Radiofrequency Ablation; Sacroiliac Joint Pain

1. Introduction

Due to its complexity and the possibility that radicular pain syndromes are associated with the SIJ, SIJ is among the most overlooked causes of low back pain (LBP). SIJ is the body's biggest axial joint, connecting the spine to the pelvis and transmitting stress between the lumbar spine and lower limbs **[4].**

Recent research indicates an increase in the occurrence of LBP related with the SIJ, with estimates placing the SIJ as the cause of pain in 15 percent to 30 percent of patients **[5].**

LBP may be diagnosed in a variety of ways. The clinical examination of a patient with sacroiliac joint dysfunction thus begins with an evaluation of the patient's gait, leg-length discrepancy, and lower lumbar region. Using the Fortin finger test, the SI joint should be located during a physical examination. The test is positive if the source of discomfort is within two millimeters of the posterior superior iliac spine **[9].**

Symptoms of SIJ-regional pain include lumbar spine, SIJ, and hip joint pain, as well as stomach discomfort. SIJ dysfunction is distinguished by pain and stiffness in the SIJ. SIJ dysfunction is often the result of aberrant joint motion and malalignment. Symptoms of SIJ-regional pain include lumbar spine, SIJ, and hip joint pain, as well as stomach discomfort. SIJ dysfunction is distinguished by pain and stiffness in the SIJ. SIJ dysfunction is often the result of aberrant joint motion and malalignment **[2].**

Imaging, namely CT and MRI, may be used to identify sacroiliitis linked with trauma or ankylosing spondylitis (AS); the latter seldom appears symptomatically in adults over the age of 50 **[3].**

Despite the fact that no one physical examination technique is indicative, a mixture of particular observations and provoking procedures may be crucial for diagnosing SIJ problems. Specific provocative SIJ examination tests include compression, FABER, thigh thrust, distraction and Gaenslen tests. SIJ discomfort is commonly detected when at least three of five provocative manoeuvres are positive. One of the three positive tests should be the thigh thrust or compression test. By completing these provocative motions, there is an 85 percent likelihood that an intra-articular joint injection will be effective prior to testing **[8].**

SIJ pain is most effectively treated with a multidisciplinary approach incorporating both conservative and interventional pain management techniques (cognitive–behavioral therapy, pharmacological treatment, exercise therapy, rehabilitation treatment and manual medicine, and, if necessary, psychiatric evaluation) **[11].**

Frequently, steroid and local anaesthetic intraarticular injections serve both therapeutic and diagnostic purposes. To summarize these studies, the majority of researchers, but not all, have shown that SIJ injections guided by radiography provide good to excellent pain relief that lasts between six months and a year. In addition, several studies have shown that intraarticular SIJ steroid injections give long-lasting pain relief, and double-blind studies have validated the effectiveness of periarticular corticosteroid treatment **[6].**

After conservative treatment has failed, radiofrequency (RF) is often utilised to treat persistent LBP in individuals. Interference from radiofrequency (RF) with continuous nociceptive input results in a heat lesion that damages or kills neurons. It may be

continuous or pulsed. Pulsed RFA offers short bursts of RF current which leads to considerably lower maximum temperatures that results in less pain and more safety for adjacent structures **[7].**

2. Patients and methods:

This comparative clinical study was carried out between June 2020 and June 2022. A complete number twenty patients with pain of SIJ were enrolled at this research, clinically diagnosed by 3 or more positive tests that is considered a generator of SIJ pain.

The patients will be randomly allocated by using simple random numbers into two groups.

Group (1): including 10 patients, with Sacroiliac joint pain, will be treated by Intraarticular Pulsed RF Ablation, Ultrasound guided.

Group (2): including 10 patients, with sacroiliac joint pain, will be treated with ultra-sound guided steroid injections.

Patients were included with SIJ pain on history and at least 3 positive provocative tests if VAS pain score ≥ 3/10 Insensitive to opioid analgesic treatment and/or oral anti-inflammatory.

Exclusion criteria included age less than 18 or more than 85, BMI greater than 35 kg/m2, pending litigation over the patient's suffering, a diagnosis of severe anxiety or depression, an allergy to local anaesthetics or steroids, pregnancy, and a high number of comorbidities.

According to the protocol authorised by the local ethics council of the Benha Faculty of Medicine, signed informed consent was obtained from all patients.

The demographic characteristic of the patients was recorded, careful and detailed clinical examination was done.

Laboratory investigations of CBC, ESR, INR and Coagulation Assay were done with plain X- Rays and MRI of both Sacroiliac joints.

Assessment of pain preoperatively, immediately postop, and at 1, 3, 6 weeks after intervention by VAS was recorded. As the primary outcome of this study was pain reduction, VAS was used in which a straight line from 0 to 10 with one end meaning no pain and the other end meaning the worst pain imaginable.

ODI II, which is an index derived from the Oswestry LBP Questionnaire to quantify disability for LBP by examination of perceived level of disability in 10 everyday activities of daily living. As the secondary outcome of this study was improvement of daily life activities ,ODI was used to detect improvement of doing activities of daily life ADL. It was recorded preoperatively and at 1,3 and weeks after intervention.

Statistical analysis:

The tabulation, organization and data analysis will be done utilizing Chicago version 21. Of SPSS (IBM).

Explanatory variables included demographics, Laboratory investigation and Radiological examination results with clinical outcomes will be compared between the two groups using the appropriate tests of significance including ANOVA analysis for quantitative data and chi-square test for qualitative ones. The significance level adopted at $p<0.05$.

3. Results:

Age, Sex and BMI were insignificantly different between both groups (P= 0.163, P= 0.656 and P= 0.897 respectively).

Regarding provocative tests in group I, all patients had positive FABER, 70% had positive thigh thrust, 80% had positive Distraction, 80% had positive Compression and 60% had positive Gaenslan's.

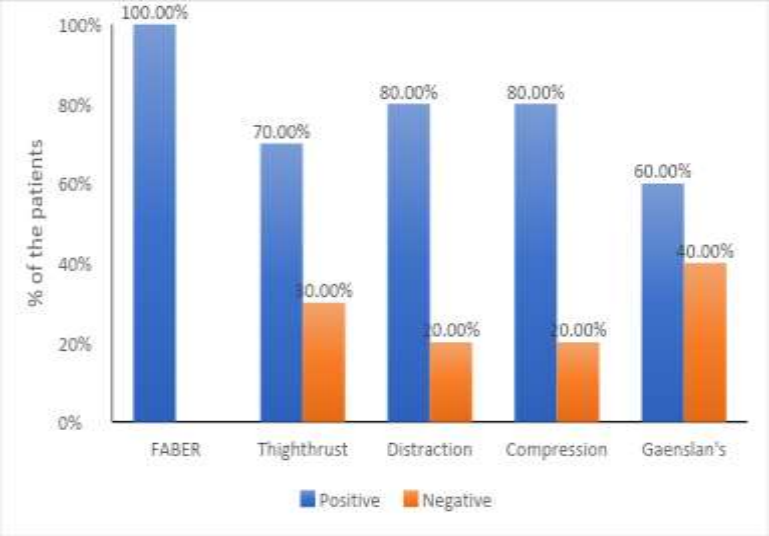

Fig. (1) Provocative Tests in group I

Regarding provocative tests in group II, all patients had positive FABER, 70% had positive thigh thrust, 80% had positive Distraction, 80% had positive Compression and 60% had positive Gaenslan's.

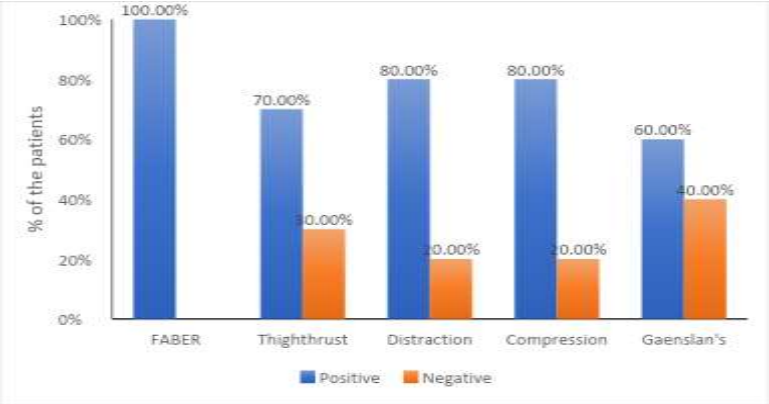

Fig. (2) Provocative Tests in group II

Regarding laboratory investigation, platelet count and WBC were considerably different between groups (P<0.001), while RBC count and ESR were insignificantly different between the studied groups.

VAS in group I range from 7 – 10 with a mean ± SD of 8.1 ± 0.99 preoperatively, ranged from 3 - 4 with a mean ± SD of 3.5 ± 0.53 immediately post, ranged from 5 - 7 with a mean ± SD of 5.8 ± 0.79 one week after, ranged from 4 - 7 with a mean ± SD of 5.5 ± 0.85 three weeks after and ranged from 4 - 6 with a mean ± SD of 4.9 ± 0.88 six weeks after.

VAS in group I was significantly lower in immediately post, 1 week after, 3 weeks after and 6 weeks after as compared to preoperative (P=0.001).

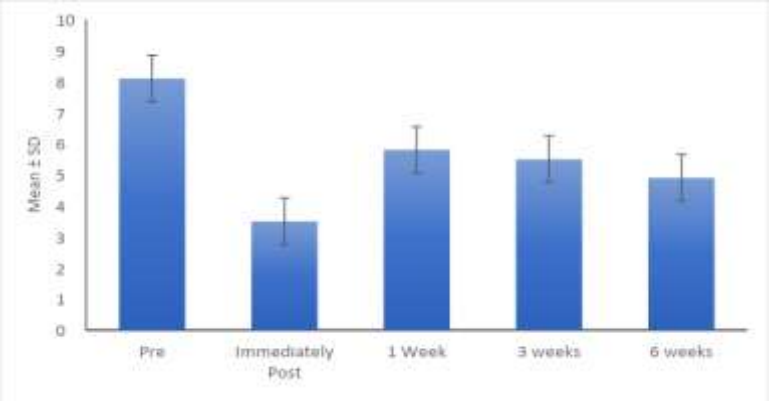

Fig. (3) VAS of group l

VAS in group II range from 7 – 9 with a mean ± SD of 7.7 ± 0.67 preoperatively, ranged from 3 - 4 with a mean ± SD of 3.5 ± 0.53 immediately post, ranged from 4 - 5 with a mean ± SD of 4.2 ± 0.42 one week after, ranged from 4 - 6 with a mean ± SD of 5.2 ± 0.63 three weeks after and ranged from 5 - 7 with a mean ± SD of 5.8 ± 0.63 six weeks after.

VAS in group II was significantly lower in immediately post, 1 week after, 3 weeks after and 6 weeks after as compared to preoperative (P=0.001).

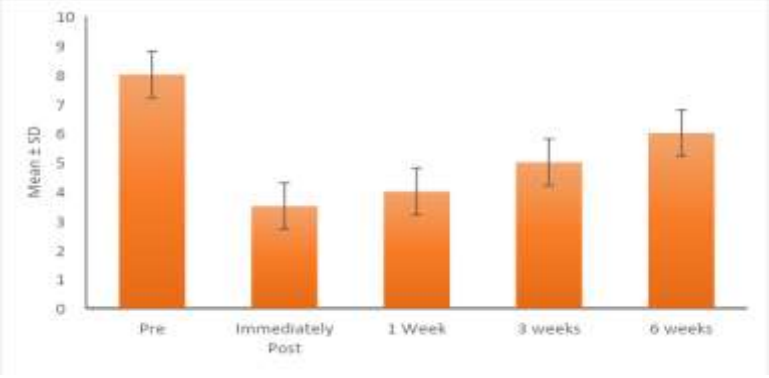

Fig. (4) VAS of Group II.

VAS was considerably lower in group II than group I one week after, but was considerably higher in group II in comparison with group I six weeks after. VAS was insignificantly different between both groups at preoperative, immediately post and three weeks after.

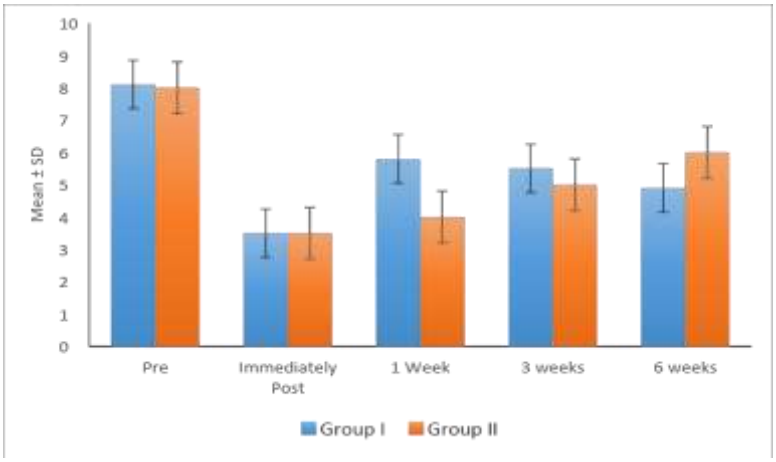

Fig. (5) VAS between the studied groups.

ODI was considerably lower in group II than group I one week after, but was insignificantly different between both groups at preoperative, three weeks after and six weeks after

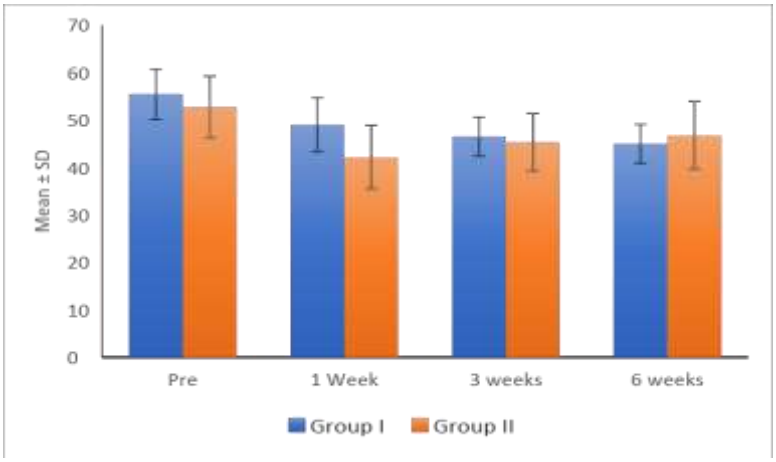

Fig. (6) ODI between both groups.

4. Discussion

The aim of this study is to:

(1) Evaluate the effectiveness of Ultrasound-Guided Radiofrequency ablation technique.

(2) To compare its efficacy with local steroid injection for Sacroiliac joint pain.

In both groups there were marked improvement in VAS immediately postintervention due to Intra-articular Sacroiliac injection of 4 milliliters of short acting 2% lidocaine pre-Pulsed Radiofrequency and pre-steroid injection.

ODI in group I ranged from 50 – 65 with a mean ± SD of 55.4 ± 5.27 preoperatively, ranged from 35 - 55 with a mean ± SD of 49 ± 5.68 one week after, ranged from 40 - 55 with a mean ± SD of 46.5 ± 4.12 three weeks after and ranged from 40 - 50 with a mean ± SD of 45 ± 4.08 six weeks after.

ODI in group I was significantly lower after 1 week, 3 weeks after and 6 weeks after as compared to preoperative (P=0.001).

ODI in group II range from 40 - 62 with a mean ± SD of 52.7 ± 6.52 preoperatively, ranged from 30 - 50 with a mean ± SD of 42.2 ± 6.7 one week after, ranged from 35 - 53 with a mean ± SD of 45.3 ± 6.02 three weeks after and ranged from 35 - 55 with a mean ± SD of 46.8 ± 7.08 six weeks after.

ODI in group II was significantly lower after 1 week, 3 weeks after and 6 weeks after as compared to preoperative (P=0.001).

ODI was considerably lower in group II than group I one week after, but was insignificantly different between both groups at preoperative, three weeks after and six weeks after.

The research demonstrated that ultrasound-guided pulsed radiofrequency is an effective therapeutic modality in Sacroiliac joint pain when compared to intrarticular steroid injection.

As PRF led to substantial improvement, not only in VAS pain score, but also in ODI.

In group I, which had Intraarticular PRF of Sacroiliac joint, there was improvement in VAS (p = <0.001*) over the follow-up period of 1 week with increased improvement 3 weeks later and marked improvement 6 weeks later.

The pain relief that the patients achieved, led to gradual improvement in the Oswestry Disability Index that motivated them to adopt a better lifestyle in order to get the desired alleviation.

These results are in agree with what was found by **Yudoyono et al. 2020**, whom concluded that PRF ablation provides high and longer clinical effectiveness in chronic SI joint pain management in elderly patients who have been properly screened.

5. Conclusion

From the results of this study we concluded that, PRF ablation and intraarticular steroid injection can be efficiently used to treat Sacroiliac joint pain.

PRF ablation leads to significant reduction in pain that continues for long time when compared to intraarticular steroid injection which shows marked improvement of pain that continues for short time. PRF ablation provides high and longer clinical effectiveness in chronic SI joint pain. PRF ablation and intraarticular steroid injection are less costy and more easier than surgical interventions after failure of other conservative therapies.

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