

Successful Radiofrequency Ablation of L4 and L5 Dorsal Rami for Unilateral Sacroiliitis: A Case Report

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Abstract

Case Report

In this case report, we present the successful treatment of a 67-year-old man with chronic sacroiliac joint pain and left unilateral sacroiliitis observed on computed tomography using L4 and L5 dorsal rami radiofrequency ablation.

Keywords: Sacroiliac joint pain, Radiofrequency ablation, L4 and L5 dorsal rami, Sacroiliac joint injection, Sacroiliitis.

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INTRODUCTION

Sacroiliac joint (SIJ) pain is a debilitating condition that can significantly affect a patient's quality of life. SIJ pain accounts for 15–25% cases of axial low back pain and remains challenging to manage owing to the absence of a standard treatment approach (Cohen, S. P. 2005).

No universally accepted "gold standard" exists for the diagnosis of SIJ pain. Among the currently available techniques used for SIJ pain treatment, many healthcare professionals and researchers consider intra-articular injections guided by fluoroscopy as the closest to a gold standard. Although there is controversy regarding the definitive injection response, it is generally acknowledged that successful injections can help confirm the diagnosis of SIJ dysfunction. Radiological guidance is essential to ensure proper intra-articular injection using computed tomography/fluoroscopy, computed tomography (CT), magnetic resonance imaging, or ultrasound. (Foley, B. S. and Buschbacher, R. M. 2006).

CASE REPORT

A 67-year-old man presented to our clinic with a chief complaint of left buttock pain. The patient had underlying medical conditions including hypertension and alcoholic liver disease. The patient reported a Visual Analog Scale (VAS) of 7 for pain. He complained that the pain worsened while lying down, making it difficult for him to sleep.

Despite treatment with medications such as nonsteroidal anti-inflammatory drugs, tramadol, acetaminophen, and pregabalin, the patient's pain did not alleviate. Lumbar radiographs and pelvic CT revealed erosion in the left SIJ, leading to the suspicion of sacroiliitis. (Braun, J. 2000) (Figure 1) The HLA (Human Leukocyte Antigen)-B27 test was negative, and the patient's erythrocyte sedimentation rate, C-reactive protein, and white blood cell levels were within the normal range. No signs of fever were observed. Therefore, the cause of sacroiliitis was believed to be a car accident that occurred four years prior, rather than ankylosing spondylitis or an infection (Rotem, G. 2020).

For diagnostic purposes, a triamcinolone (10 mg) injection was administered into the SIJ. Resultantly, the patient's VAS score decreased to 3, and the pain subsided to the extent that he could sleep through the night for the first time in four years. Subsequently, the pain remained well-managed for seven months. However, it eventually recurred, requiring another repeat of SIJ injections. Despite three injections at two-week intervals, the effectiveness of the treatment diminished with each repetition. Therefore, we performed nerve blocks targeting the nerves that contribute to SIJ pain.

First, the left L4 medial branch and L5 dorsal rami blocks were performed with 1% mepivacaine for diagnostic purposes. The block reduced the VAS score from 7 to 2, indicating efficacy. One week later, the blocks were repeated, and they demonstrated effectiveness again. Consequently, a decision was made to proceed with conventional radiofrequency ablation of the left L4 and L5 dorsal rami.

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The patient was placed in the prone position on the operating table in an operation theatre, with a pillow placed under the upper abdomen to reduce thoracolumbar lordosis. Electrocardiography, pulse oximetry, and non-invasive blood pressure were monitored throughout the procedure. The area around the L5-S1 vertebral body was sterilized using 10% povidone-iodine and 75% alcohol. After anesthetizing the needle entry site and expected subcutaneous needle trajectory using 2% lidocaine, two disposables 22-gauge, 100 mm, radiofrequency cannulas with a 10 mm active tip were advanced using the tunnel vision technique towards the junction of the transverse and superior articulating processes on the posterior side of the L5 and superomedial aspect of the sacral ala just lateral to the superior articular process of S1. Needle depth was confirmed using a lateral image (Figure 2).

Subsequently, we performed nerve stimulations. At 50 Hz, sensory stimuli were

administered up to 1.5 V until the patient complained of hip discomfort. Before lesioning, the absence of leg contractions was verified by stimulation at 2 Hz up to 2 V.

Before radiofrequency ablation (RFA) lesioning, 0.75% ropivacaine (0.5 mL) was administered at each level. Local anesthetic injection was able to reduce pain during RFA lesioning. RFA lesioning procedures at each level were repeated twice. Thermal RFA was carried out at 80 °C for 90 seconds for 2 cycles with needle rotation to maximize lesion size.

After the procedure, the patient experienced a reduction in pain, with the VAS decreasing from 7 to 2. The patient was discharged without any complications. Sustained pain relief was observed during the 2-week and 9-month follow-up visits, leading to the decision to transition to open follow-up.

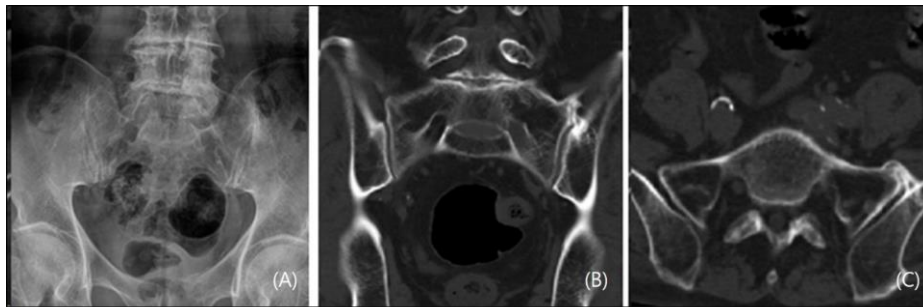


Figure 1: (A) Lumbar spine radiograph. (B) Coronal and (C) axial views of pelvis computed tomography (CT) demonstrating subchondral erosions at left sacroiliac joint (SIJ)

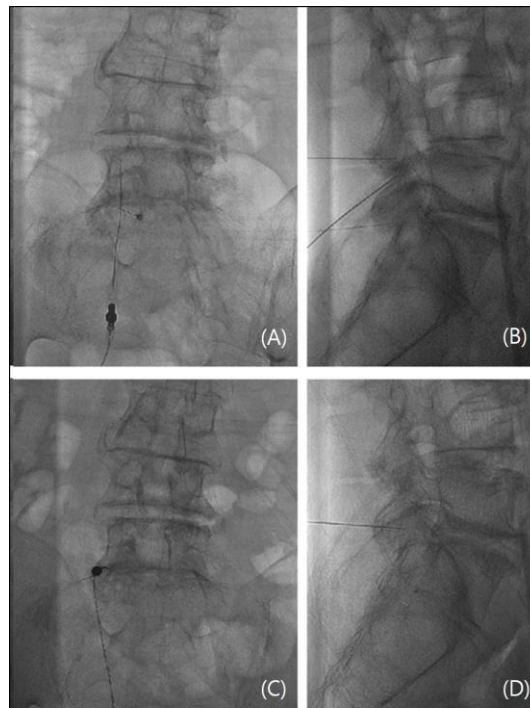


Figure 2: The tips of the radiofrequency cannulas were located at the left L4 and L5 dorsal rami. Oblique and lateral fluoroscopic images of (A,B) L4 and (C,D) L5 levels

DISCUSSION

Unlike the relatively well-established nerve innervation of the lumbar facet joint, SIJ innervation is not firmly established (Dreyfuss *et al.*, 2004). In 1957, Solonen proposed that the SIJ innervation is attributed to nearby nerves, including the lumbosacral trunk (ventral rami of L4 and L5), superior gluteal nerve (ventral rami of L4, L5, and S1), and dorsal rami of the S1 and S2 nerves. Ikeda (1991) described that the anterior part of the SIJ is supplied by the ventral rami of the L5 and S2 nerves originating from the sacral plexus, whereas the posterior part of the SIJ is innervated by the dorsal rami of the L5 and the lateral branches of the sacral nerves. Szadek *et al.*, (2008) demonstrated that the anterior SI ligaments receive innervation from small branches arising from the ventral rami of L4 and L5, thus forming the lumbosacral trunk. The majority of posterior sensory innervation is believed to be transmitted from the S1, S2, and S3 dorsal rami via the lateral branches and the medial branches from the L4 and L5 dorsal rami (Dreyfuss *et al.*, 2009).

Radiofrequency nerve ablation can be a valuable treatment option for patients who do not respond well to conservative therapies and cannot achieve long-term symptom relief. However, when considering the use of radiofrequency nerve ablation for SIJ pain, determining the target nerves becomes crucial. Targeting unnecessary nerves has drawbacks that encompass not only extended time and increased costs, but also compromise of procedural specificity by denervating the most frequently affected facet joint at its lowest point (Cohen, S. P. 2009).

The patient initially experienced adequate pain relief (>50% on the VAS) with SIJ injections; however, with repeated injections, the relief became inadequate (<50% on the VAS). This may be attributed to narrowing of the SIJ, rendering SIJ injections less effective. Therefore, we decided to perform radiofrequency ablation of the nerves innervating the SIJ. (Ab Aziz, S. N. F., 2022) In the study by Gevargez (2002), posterior interosseous sacroiliac ablation was performed, and in the study by Ferrante (2001), ablation was conducted around the SIJ. In contrast to previous studies that performed ablation towards the sacrum or S1–S3 lateral branches, in this case, effectiveness was observed when blocking the dorsal rami of L4 and L5, both in diagnostic blocks and radiofrequency ablation. This may be attributed to the CT examination revealing erosion on the anterior upper side of the SIJ, suggesting that the lateral branches of S1–S3 may not need to be blocked to achieve the desired effect.

Because the SIJ is the largest joint in the spine, it is likely to have varying nerve innervation across different parts of the joint. This is supported by research exploring the segmentation of the SIJ into four sections, each linked to a specific pattern of referred pain.

(Kurosawa, D., 2015) In future, with more detailed understanding, selective radiofrequency ablation based on the specific affected regions of the SIJ may become feasible, offering a less invasive approach.

CONCLUSION

In conclusion, our study highlights the potential effectiveness of radiofrequency ablation targeting the dorsal rami of the L4 and L5 muscles in the management of SIJ pain. This approach demonstrated positive outcomes in our case and offers an alternative for patients with SIJ pain. Further research is needed to refine and expand the understanding of selective radiofrequency ablation based on the specific location of the SIJ pathology.

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