PAIN MEDICINE CASE REPORTS

ISSN 2768-5152

Volume 10, Number 5, pp. 385-388

Persistent Sacroiliac Joint Pain After Joint Fusion Resolves With Radiofrequency Ablation of Lateral Sacral Nerve Branches: A Case Report

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Background: Radiofrequency ablation (RFA) is a well-documented technique for the conservative treatment of sacroiliac joint (SIJ) arthropathy; however, its use in treating pain post-SIJ fusion are limited. Our paper will focus on the novel use of RFA to treat persisting SIJ arthropathy after surgical fusion of the SIJ.

Case Report: Our patient is a 79-year-old woman with a past medical history of right SIJ arthropathy postfusion. She had a diagnostic right sacral nerve block performed that provided 100% pain relief for 24 hours, so RFA was pursued. RFA of the lateral branches of S1, S2, and S3 nerves was performed, and she had complete resolution of her pain.

Conclusion: Lateral branch block with subsequent RFA has utility in treating post-SIJ fusion pain, but has not been explored in the literature and may be a topic of future exploration in regard to treating this condition.

Key words: Low-dose naltrexone, LDN, chronic pain, precipitated opioid withdrawal, case report

BACKGROUND

The sacroiliac joint (SIJ) is an articulation between the sacrum and the ilium. This joint serves as the connection between the pelvis and the spine. SIJ arthropathy is an important cause of low back pain (LBP). The incidence of SIJ arthropathy-implicated LBP has been estimated to be anywhere between 15% and 30%. This percentage is thought to be even higher at up to 40% in postlumbar fusion LBP, particularly in multilevel fusions (1,2). The mechanism of this association is thought to be related to changes in biomechanics in which excess strain is placed on the joint. SIJ arthropathy most commonly presents as low back/buttock pain with radiation to the groin and upper thighs (1,2).

Treatment of SIJ arthropathy can be categorized as surgical and nonsurgical. Nonsurgical treatment options include nonsteroidal anti-inflammatory drugs, physical therapy, intra-articular steroid injections, and radiofrequency ablation (RFA) of the lateral sacral nerve branches. After 6 months of nonsurgical treatment failure, a surgical option can be pursued (1-3). Surgical success varies by technique and the implant type, but reported data for improvement has been reported to be in the 80% range (4).

SIJ fusion is a surgical procedure aimed at relieving pain and stabilizing the SIJ. The procedure involves permanently fusing the joint to eliminate motion that may contribute to pain. With post-SIJ fusion, some patients may continue to experience residual or recurrent pain. This could result from incomplete resolution of the underlying condition, complications, such as hardware irritation, infections, hematoma, hardware migration, suboptimal implant placement, and lack of radiographic evidence of fusion (5,6). We report the case of a patient with SIJ pain who failed SIJ fusion and had not previ-

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Disclaimer: There was no external funding in the preparation of this manuscript.
Conflict of interest: Each author certifies that he or she, or a member of his or her immediate family, has no commercial association (i.e., consultancies, stock ownership, equity interest, patent/licensing arrangements, etc.) that might pose a conflict of interest in connection with the submitted manuscript.
Patient consent for publication: Consent obtained directly from patient(s).
This case report adheres to CARE Guidelines and the CARE Checklist has been provided to the journal editor.
Accepted: 2026-02-12, Published: 2026-07-31

ously been treated with RFA of the lateral sacral nerve branches prior to surgical fusion.

CASE PRESENTATION

Our patient is a 79-year-old woman with a past medical history of hypertension, degenerative disc disease, right SIJ arthropathy postfusion in 2021, and L4-L5 transforaminal lumbar interbody fusion/anterior lumbar interbody fusion in 2022. In the clinic, her primary symptoms were chronic right lower back and buttocks pain in the SIJ area. She also endorsed some numbness in the L5/SI dermatome. Postfusion, she reported that she didn't experience any pain relief. Physical exam findings were notable for a positive flexion, abduction, and external rotation test.

The patient was hesitant to have another surgery on her back and was interested in nonsurgical intervention. With her history of SIJ fusion, steroid injections were not considered. It was decided that a right sacral lateral branch nerve block would be performed, and if significant pain relief was achieved, then RFA would be pursued. She had positive diagnostic blocks with 100% relief for 24 hours after the procedures; thus, RFA was planned. Consent for publication was obtained. Follow-up after the procedure was done at 2 weeks with regular visits continuing 3-12 months after as needed.

Methods

The right SIJ was identified under fluoroscopy. The hardware from previous fusions was identified. The fluoroscopic beam was then adjusted as needed to visualize the target structures. At the right L5 dorsal ramus level, a needle entry point was identified. Injection of 1 mL of 1% lidocaine was performed at the skin level. Next, a 20G 10-cm 10-mm active-tip Neurotherm-insulated needle was inserted at that level. Gun-barrel view was used under fluoroscopy to direct needle placement immediately lateral to the junction of the sacral superior articular process and sacral ala.

The right-side posterior S1, S2, and S3 sacral foramina were identified. An entry point was marked at each level about 5 mm lateral to the most lateral portion of the foramina. The skin overlying the marked points was anesthetized with 1% lidocaine using a 27G needle.

Afterward, a 20G 10-cm 10-mm active-tip Neurotherm-insulated needle was inserted at that level and was advanced under fluoroscopic guidance until the targeted point was reached.

At the S1 level, three 20G 10-cm 10-mm active-tip Neurotherm-insulated needleswere inserted in close proximity to each other at the lateralmost portion of the foramen (Fig. 1).

A lateral view was used to confirm the needle tips were at the appropriate depth and not in the corresponding foramen.

Impedance was checked and was between 250 and 300 ohms. Next, at all 4 levels (right L5 dorsal ramus and 3 needles lateral to S1 foramen), sequential sensory stimulation was applied at 50 Hz up to 3 V and motor at 2 Hz up to 3 V with appropriate response. Next, 0.5 mL of 2% lidocaine was injected at each level. A lateral view was obtained again to confirm the needles did not move. Next, RF lesioning was performed at each level to a temperature of 80°C for 90 seconds.

Lastly, approximately 1 mL of a solution containing 9 mL 0.25% bupivacaine and 40 mg triamcinolone was

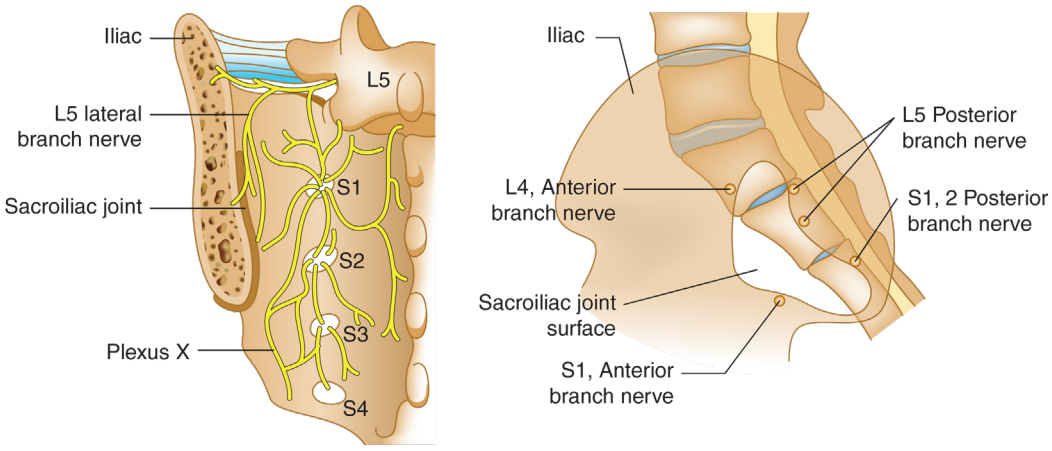

Fig. 1. Innervation of the sacroiliac joint.

given at each of the 4 levels. The needle was flushed with 0.5 mL of 1% lidocaine and then removed. This same process that was used at the S1 level was repeated at the S2 and S3 levels (Figs. 2 and 3).

DISCUSSION

The posterior SIJ is innervated by several nerve branches, which contribute to both sensory and motor functions. The main contributors are the posterior primary rami of the sacral nerves, specifically from S1, S2, and S3 (7). These rami supply the posterior aspect of the joint, offering sensory innervation to the joint capsule and surrounding tissues. This sensory innervation is crucial for pain perception and proprioception (8,9). In addition to the sacral rami, the superior gluteal nerve, which arises from the lumbosacral plexus (L4-S1), also provides some sensory fibers to the superior part of the SIJ. While the role of the lumbosacral trunk—formed by the L4 and L5 roots—is more associated with other structures, it may also send some fibers to the SIJ (8). A diagram of the SIJ innervation is provided in Fig. 4.

The reported failure rate of SIJ fusion surgery requiring revision has been estimated to be ~30%, with minimally invasive surgical techniques yielding lower rates of failure (10). Some notable causes of surgery failure include hardware irritation, infections, hematoma, hardware migration, suboptimal implant placement, and lack of radiographic evidence of fusion (5,6). Although no definitive number is available for the percentage of people still experiencing pain postfusion, patient improvement rate has been estimated to be > 80% (5). There is a lack of reported evidence for treatment options for persistent pain after SIJ fusion. The treatment of failed SIJ fusion is primarily managed with an additional salvage surgery and continuing symptom management with medications (11). In our case report, the use of RFA postfusion as a treatment strategy to avoid additional invasive procedures proved to be successful.

RFA of the sacral lateral nerve branches is an interventional pain procedure that is performed by introducing needle electrodes into close proximity to target tissues and cauterizing them using heat generated through radio waves. The procedure is done under fluoroscopy, sometimes with ultrasound assistance to identify sacral tubercles as needle insertion sites. The method of electrical current administration leads to variations in technique. Examples of this include delivering currents in pulses rather than continuously (pulsed RF) and using a water source within the electrode to serve as an active cooling method (water-cooled RFA) (12). Additionally, the type of electrode varies as the cautery can be either monopolar or bipolar. By cauterizing the lateral nerve branches of the sacral nerves, the region causing pain is denervated and can no longer produce pain signals. The procedure is minimally invasive and can be used to

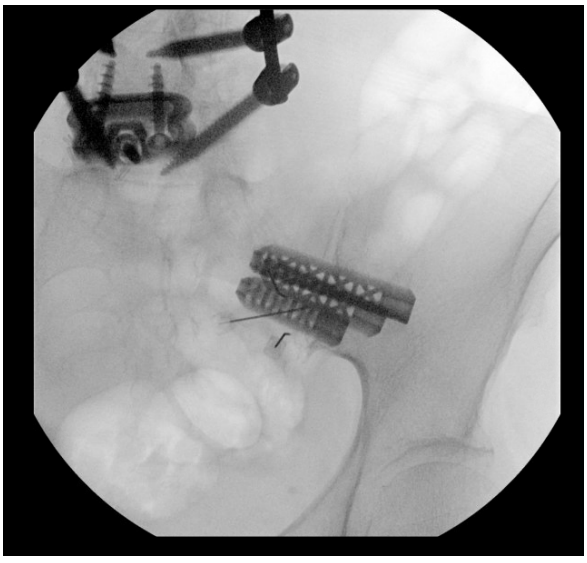

Fig. 2. Radiofrequency ablation at S2.

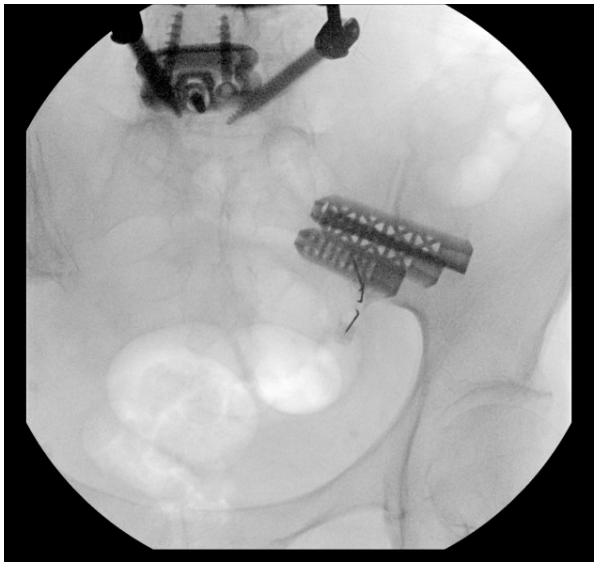

Fig. 3. Radiofrequency ablation at S3.

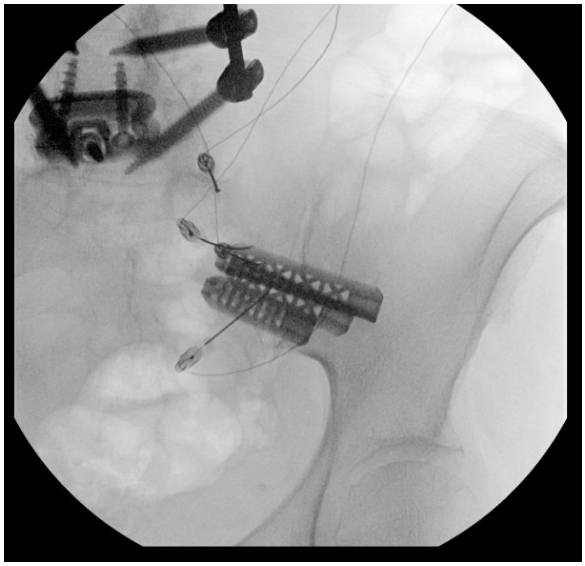

Fig. 4. Radiofrequency ablation at L5 and S1.

potentially avoid undergoing surgery. RFA for SIJ pain has as high as an 89% success rate of reducing SIJ pain for 6 months after the procedure (7).

Despite the great body of evidence demonstrating RFA as an effective source of treatment for LBP. Insurance companies still often deny claims for the procedure, as some still consider it experimental or not guideline based. The use of RFA to treat LBP has been shown to provide pain relief, improve quality of life, and functional status (13). This can lead to lower opioid use and avoidance of surgery. Although this improves patient quality of life and satisfaction, whether or not it is a cost-effective treatment remains a point of contention.

CONCLUSIONS

RFA is a well-documented interventional pain procedure that has been used to successfully treat LBP including that which is caused by SIJ dysfunction. Its value in treating SIJ pain is, however, primarily documented in the literature as a nonsurgical technique to be trialed prior to undergoing surgical fixation. Its utilization in treating SIJ pain postfusion is an area of investigation that may guide future treatment of persistent SIJ arthropathy pain after fusion.

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