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Cutaneous Burn Following Lumbar Radiofrequency Ablation: A Case Report

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Background: Radiofrequency ablation (RFA) procedures are commonly utilized interventions for treating axial low back pain. While RFA is widely regarded as safe, it can lead to skin complications on rare occasions. We present a case of a patient who developed a rash in the days following an RFA.

Case Report: A 61-year-old woman with hyperlipidemia, migraines, and vertigo presented to the pain clinic with 90% relief 2 days after receiving bilateral RFA to the L3-L5 medial branches, completed without intraoperative complications. She developed skin blistering and sloughing at the procedural sites, more pronounced on the right, without signs of infection. In 2024, she had received RFA to the L2-L5 area and developed no skin complications. At the pain clinic, she was treated with topical silver sulfadiazine, bacitracin, and meloxicam.

Conclusion: This case identifies a rare sequela to a generally safe procedure. We examined potential causes of burn damage that might have occurred during the procedure and seek similarities to other cases that have been presented.

Key words: Skin, cutaneous, burn, damage, rfa, radiofrequency, ablation, facet, dermatology, dermatologic

BACKGROUND

Radiofrequency ablation (RFA) procedures are commonly utilized interventions to treat axial low back pain. While this type of intervention is widely regarded as safe, it can lead to skin complications on rare occasions. We present a case of a patient who developed a burn injury in the days following a repeat RFA. The patient's informed consent was obtained for presenting this case report. The report does not include any identifiable patient information and is exempt from review by the institutional review board.

Degeneration of the zygapophyseal joints of the spine, also known as the facet joints, is a frequent source of axial low back pain. These small joints are formed by the superior articulating process (SAP) of the vertebra below, the inferior articulating process (IAP) of the vertebra above, and a joint capsule containing synovial fluid (1,2). Facet arthropathy typically results in axial low back pain that does not extend below the upper legs. When radiation does occur, it usually follows a non-dermatomal pattern. This condition often coexists with degenerative disc disease, since altered motion and structural degeneration disrupt spinal biomechanics and contribute to facet joint changes (3). Standard management of facet-mediated pain begins with diagnostic medial branch nerve blocks, which temporarily numb the medial branch nerves innervating the suspected joints. Typically, blockade of the medial branch nerve occurs with the injection of 0.5 cc of local anesthetic, administered under fluoroscopic guidance. If 2 successful blocks provide more than 50% axial back pain relief in the hours following the injection, RFA of the medial branch nerves is a reasonable next step to achieve more sustained pain control (2,3).

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CASE

The patient is a 61-year-old woman with a medical history of hyperlipidemia, migraines, and vertigo. She previously underwent RFA at L2-L5 in 2024 for lumbar spondylosis and saw 50% pain relief for 6 months. She presented to the clinic with complaints of chronic low back pain. Her pain was described as radiating from the lower back distally down into her heels and worsened by prolonged sitting or standing. She had tried physical therapy 3 times a week for over a month, as well as hot and cold compresses and massage therapy, without significant relief. A lumbar MRI was ordered, which revealed multilevel degenerative disc disease and bilateral facet arthrosis at L4-L5 and L5-S1.

During a follow-up 2 months later, she continued to report persistent axial low back pain. While the pain still radiated, most of it was now located in her lumbar spine. On physical examination, the pain was worsened with spinal extension. Lumbar facet loading was positive bilaterally, whereas straight leg raise and slump tests were negative bilaterally. Additionally, she was diffusely tender to palpation overlying the lower lumbar vertebrae. Based on her clinical presentation and imaging findings, a diagnosis of lumbar spondylosis and plantar fasciitis was considered. Although her pain was likely multifactorial, the clinical findings were most consistent with a facetogenic source. Physical exam maneuvers exacerbated her pain, and the radicular symptoms had improved since the last visit. Because of the limited relief of her axial low back pain provided by conservative measures, she was scheduled for repeat bilateral L3-L5 medial branch RFA.

She later underwent bilateral L3-L5 medial branch RFA under fluoroscopic guidance. The patient was prepped sterilely, a grounding pad was placed overlying the right buttock, and 1% lidocaine was used to provide soft tissue anesthesia. Active-tip RFA probes of 10 mm were successfully directed over the bilateral medial branches of the associated L3, L4 and L5 nerves. Appropriate sensory and motor responses were obtained at each site, and one mL of 2% lidocaine was injected at each site. Then, lesions were performed at 80°C for 120 seconds. Following each lesion, 1 mL of solution containing one mL of 40 mg/mL triamcinolone acetonide and 5 mL of normal saline was injected at each site. The patient tolerated the procedure well without intraoperative complications. She was stable throughout and was discharged in good condition.

The next day, the patient noticed a stinging sensation on both sides of her back upon removing her bandages. By the following day, she observed leaking and increasing irritation, especially on the right side. On clinic examination 2 days after the procedure, the procedural sites showed blistering and skin sloughing, which were more pronounced on the right. The skin was tender to palpation but showed no signs of infection, such as erythema, purulent drainage, or warmth. She denied fever, chills, sensory or motor deficits, or bowel/bladder changes. Despite the apparent burn injury to her skin, she reported approximately 90% relief in her low back pain since the RFA.

She was started on a daily regimen of 15 mg of meloxicam for 14 days and prescribed a topical cream of silver sulfadiazine 1% to be applied each day under a loose dressing. The application of the latter was demonstrated to her. Bacitracin was also applied during the visit. She was instructed on wound care management and advised to follow up regularly. At a telehealth follow-up 5 days after the RFA procedure, the patient's wound appeared more erythematous, with new blister formation and mild serous discharge. A 14-day program of 500 mg of cephalexin 4 times daily was initiated for the patient, and an urgent dermatology referral was placed. At a second video visit 14 days after the procedure, the wound showed marked improvement with decreased erythema and drainage, but the patient also reported some itching. The antibiotics and silver sulfadiazine were continued. By day 28, the patient had completed the antibiotic course and reported ongoing improvement with no pain but with persistent itching. At a dermatology visit on day 43, the burns were noted to be healing well without signs of infection, and topical 2.5% hydrocortisone cream was prescribed as needed for itching.

DISCUSSION

In our patient, the pain was likely multifactorial at initial presentation, as she reported low back pain radiating into both legs. MRI scans confirmed the presence of facet arthropathy and degenerative disc disease. Although the radiating component strongly implied radiculopathy or spinal canal stenosis as primary differentials, the persistence of axial low back pain despite conservative treatment suggested that the radicular pain generator might have resolved, leaving underlying facet arthropathy as a continued source of pain. Additionally, physical exam maneuvers underscored a facetogenic pain generator. As such, lumbar medial

branch RFA emerged as the most appropriate way to treat the patient's pain.

RFA is a procedure in which needle electrodes are heated to induce thermal injury to a nerve. Under fluoroscopic guidance, the needle electrodes are placed into the desired position, and then a low-intensity electrical current is released to stimulate motor and sensory nerves to ensure that the placement is safe and appropriate (4). Next, a high-frequency electrical current travels through the electrode to create a thermal injury at the intended site (5). Multiple studies have shown that this practice produces placement of electrodes parallel to that of the target to optimize the thermal lesion (2,6).

When done correctly, RFA is thought to be a generally safe procedure; however, it has known complications. In theory, RFA can cause atrophy of the multifidus muscle, as its innervation comes from the same medial branch nerves that are ablated to treat pain. Sensory sequelae have also been noted in studies, with some patients experiencing dysesthesia, cutaneous numbness, and pruritus, which tend to be transient in nature (7).

A few other published case reports show instances of skin burns following an RFA procedure. Won et al discussed a case of a skin burn following a lumbar medial branch nerve RFA. However, in this case, there was difficulty with the placement of an electrode, necessitating the use of hemostatic forceps for positioning. When the electrode was removed, part of the insulation layer of the needle was noted to be damaged, which was thought to lead to loss of control of thermal energy, thus causing skin damage (5). Francio et al (8) presented a cervical medial branch nerve RFA that caused burns at the site where the grounding pad was placed. There, the authors proposed 2 potential reasons for the burn: the grounding pad might have made insufficient contact with the skin, or the low adipose content of the patient's subcutaneous tissues might not have allowed thermal energy to disperse properly along the entirety of the grounding pad. Lyon et al discussed a case of skin burn after RFA of a tibial osteoid osteoma to necrose the tumor (9). They hypothesized that the burn was again due to a defect in the insulation around the electrode.

In our patient's case, the exact cause of her skin burns cannot be determined with certainty. However, based on the location of the burns, the likeliest explanation is improper placement or inadequate contact of the grounding pad. During RFA, grounding pads complete the electrical circuit by dispersing the same amount of energy that is delivered to the electrode tip. Because these pads cover a much larger surface area, the energy is normally spread out, minimizing the risk of localized heating. If the pad does not maintain full, even contact with the skin, the effective surface area is reduced. This problem leads to a higher concentration of electromagnetic energy at points of contact, increasing the risk of thermal injury to the skin (10). Although it was also possible that the insulation of the electrode was compromised, we cannot confirm this, as the needles were discarded after the procedure. After the RFA procedure, no complications were reported that would suggest equipment malfunction or operator error. Additionally, the location of the burn was more distant from the electrode insertion sites, further supporting grounding pad malfunction as the likelier cause.

CONCLUSIONS

In summary, our patient developed a burn injury to the skin after receiving an RFA for treatment of low back pain. While the exact cause of the burns is uncertain, their location and characteristics suggest a grounding pad malfunction, likely due to inadequate skin contact, as the most probable explanation. This case highlights a rare but important complication of RFA and underscores the need for meticulous attention to grounding pad placement during the procedure.

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