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Treatment of Brachioradial Pruritus with Interlaminar Cervical Epidural Steroid Injection: A Case Report

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Background: Brachioradial pruritus (BRP) is a neuropathic dysesthesia described as itching in the upper extremities. The pathophysiology of BRP has not yet been elucidated and is postulated to be multifactorial including spine pathology and sun exposure.

Case Report: In a case of BRP refractory to gabapentin and physical therapy with radiographic evidence of cervical spine and disc degenerative disease and a history of symptoms of compressive neuropathy, we performed an interlaminar cervical epidural steroid injection that resulted in resolution of symptoms.

Conclusion: This case suggests a role for neuraxial steroids in the treatment of BRP and requires further investigation.

Key words: Brachioradial pruritus, cervical epidural steroid injection, degenerative spine disease, neuropathic dysesthesia

BACKGROUND

Brachioradial pruritus (BRP) is a neuropathic dysesthesia described as itching in the upper extremities that is often accompanied with sensations of tingling, burning, and stinging (1). Although BRP primarily affects the dorsolateral forearm, symptoms may occur along the upper back, upper chest, and neck (1). BRP is most frequently reported to affect middle-aged fair-skinned women (1). The pathophysiology of BRP has not been elucidated and is thought to be multifactorial. Postulated mechanisms include compressive neuropathy due to cervical degenerative spine (2) or disc disease (3), sunlight exposure (4), and genetic (5). While relief of symptoms with application of ice has been suggested as a diagnostic criterion (6), diagnosis of BRP remains a challenge and may be delayed due to lack of any associated cutaneous findings (1). A range of treatments for BRP has been reported (7). In particular, targeted cervical nerve root block for BRP has only been described twice – once positive (2) and once negative (8). We describe a case of BRP successfully treated by interlaminar cervical epidural steroid injection.

CASE

The patient provided written informed consent (Health Insurance Portability and Accountability Act authorization). A 68-year-old woman with a history of cervical degenerative disc and spine disease, 20 pack-years as a former smoker, generalized anxiety disorder, and osteopenia presented to the pain management clinic complaining of right posterior upper arm and forearm itching. She had no eliciting factors, including trauma, and no contributing family history.

The patient noted a 15-year history of intermittent right arm tightness, itching, and burning that initially resolved spontaneously and subsequently responded to physical therapy. She was evaluated by dermatology and found no relief with oral loratadine and topical clobetasol. Beginning in 2015, she also noted associated neck pain and developed sleep disturbance due

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to nighttime symptoms. In 2017, she noted difficulty in lifting objects; however, on physical exam she had normal motor strength testing and a negative Spurling's test. Her symptoms again improved with physical therapy and a home exercise regimen.

By late 2018, her symptoms returned along with a sharp pain in her right arm. She had difficulty performing household chores and noted pain relief with application of ice to the affected areas. Cervical magnetic resonance imaging (MRI) at the time demonstrated multilevel osteophyte complexes, multilevel facet joint hypertrophy, multilevel ventral thecal sac effacement (near complete effacement at C5-C6 and C6-C7), as well as multilevel neural foraminal narrowing (moderate to severe bilaterally at C4-5 and on the right at C5-6 and C6-7) (Fig. 1). On physical exam, she had a positive cervical distraction test. Motor strength testing was remarkable for decreased strength on the right side with wrist extension (3+/5), shoulder abduction (4/5), shoulder external rotation (4-/5), and shoulder flexion (4-/5). Decreased strength was also noted on the left side with shoulder external rotation (4+/5) and left shoulder flexion (4+/5). She was referred once again to physical therapy and prescribed gabapentin 200 mg nightly with improvement in her pain and weakness, but experienced no relief in pruritis.

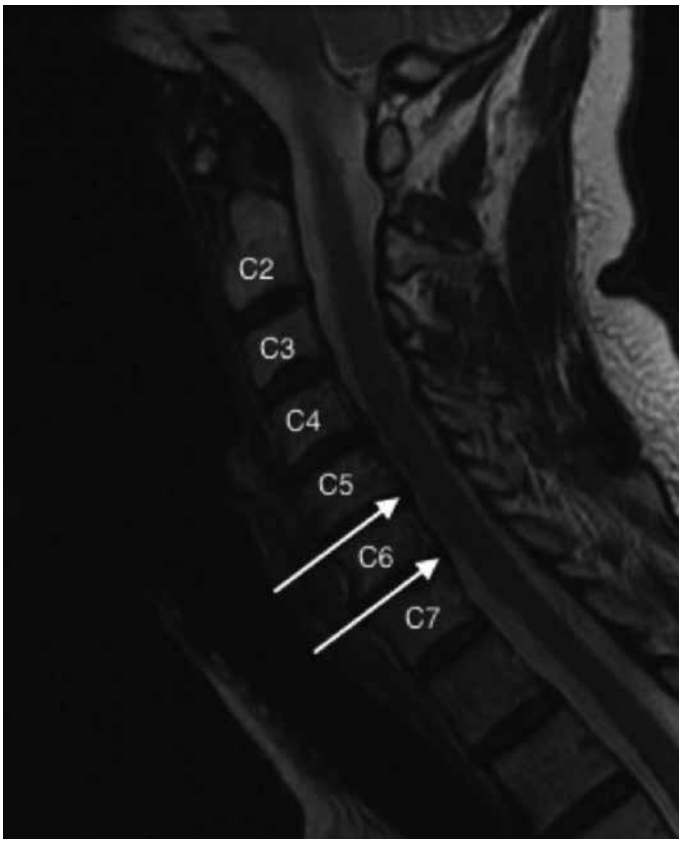

Fig. 1. Magnetic resonance imaging of the cervical spine demonstrating near complete thecal effacement at cervical levels C5-6 and C6-7 (arrows).

In the fall of 2020, she was eventually diagnosed with BRP due to recurrent right arm itching despite compliance with physical therapy and medication management. She was referred to the pain management clinic for further management. On initial presentation, she denied any pain, burning, or tingling. She also denied any history of edema or changes in skin color, temperature, sweating, or hair growth. There was no history of seasonal changes in her symptoms related to sun exposure. Laboratory studies were unremarkable. On exam, she had no overlying skin changes, temperature changes, allodynia, or tenderness to palpation in her upper extremities or neck. Cervical facet loading and Spurling's test were negative and Hoffman's sign was not present bilaterally. Motor strength testing was normal. The etiology of the patient's BRP was thought to be secondary to cervical spine disease. The patient preferred to avoid medication management and therefore was offered a cervical epidural steroid injection.

Two weeks after presentation, she underwent a cervical interlaminar epidural steroid injection at C7-T1. Under sterile conditions, the skin was anesthetized with 1% lidocaine after which an 18-gauge, 3.5-inch Touhy needle was advanced under fluoroscopic guidance using a coaxial approach preferentially towards the symptomatic right side at the C7-T1 interlaminar space (Fig. 2). After loss of resistance to saline was obtained, aspiration was negative and contrast medium injection under live fluoroscopy demonstrated epidural spread without intrathecal or vascular uptake. Ten mg of dexamethasone and 1.5 mL of normal saline were then injected into the epidural space. No immediate complications were noted.

On follow up at 2.5 weeks and 3 months following her intervention, the patient was satisfied with the outcome and reported 100% relief of pruritus with a rare "prickly" sensation in her right upper arm. She also noted resolution of nighttime symptoms and improved sleep. She discontinued gabapentin approximately one week

post intervention without an increase in pruritus. The patient was instructed to monitor for recrudescence of symptoms and offered repeat cervical epidural steroid injection if needed in the future.

DISCUSSION

As in our case, BRP may be due to compressive neuropathy and may respond to treatments targeted to cervical spine disease. A review of MRI of the cervical and thoracic spine of 25 patients with BRP revealed that 24 patients had spine pathology that correlated with symptom localization (9). These patients also had a decrease in intraepidermal nerve fibers in forearm biopsies from symptomatic skin (6.0 fibers/mm) vs nonsymptomatic skin (12.2 fibers/mm) by immunohistochemical staining to a pan-neuronal marker (protein gene product 9.5) (9). Similarly, Wallengren et al (10) reported a 23% to 43% decrease in cutaneous innervation of patients with BRP as compared to healthy controls by immunohistochemical staining to protein gene product 9.5, calcitonin gene-related peptide for sensory nerve fibers, and vanilloid-receptor for capsaicin-sensitive nerve structures. Interestingly, these changes were shown to normalize during symptom-free periods (10). The role of central nerve compression in BRP remains unclear – it may trigger retrograde degeneration of peripheral nerves, or it may predispose patients to UV radiation-induced peripheral nerve damage. In either scenario, spontaneous firing of damaged nociceptors may underlie the mechanism of BRP.

In patients with symmetric symptoms and a history of seasonal variation, BRP may be conservatively managed by decreasing sun exposure (4). Topical treatment with capsaicin has shown mixed results (9,11). In BRP recalcitrant to treatment, topical amitriptyline and ketamine has been reported to provide relief attributed to the prevention of spontaneous depolarization by amitriptyline and inhibition of nerve impulses by ketamine in peripheral damaged nociceptors (12). Analogously, intradermal botulinum toxin type A has been shown to provide long-term relief (5-6 months) in a patient who failed topical and oral therapy due to inhibition of nerve impulses from damaged nociceptors (13). Oral treatment for BRP ranges from nonsteroidal anti-inflammatory drugs, gabapentinoids, tricyclic antidepressants, and anticonvulsants (1). Aprepitant, a neurokinin-1 receptor antagonist, is reported to improve excoriated papules and erosions with poor control of pruritus symptoms (14).

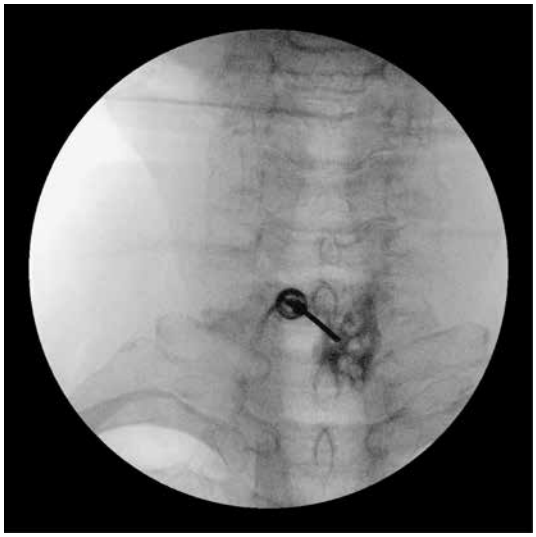

Fig. 2. C-arm-guided fluoroscopy demonstrating epidural contrast medium spread at C7-T1 preferentially targeted to the symptomatic right side.

However, as in our case, when a patient has either failed conservative management or chooses to avoid it, targeted cervical nerve root block has been described. In a patient with mild midcervical spondylosis on MRI with somatosensory-evoked potential slowing on the right C5 and C6 levels, a nerve root block of C5 and C6 with only levobupivacaine did not provide benefit (8). Instead, treatment with an anticonvulsant, lamotrigine, resulted in symptomatic relief thought to be due to targeting central sensitization of pruritus (8). Conversely, Weinberg et al (2) reported near complete symptom relief for 2 patients with BRP, of which one had only mild neuroforaminal stenosis noted on MRI undergoing cervical nerve root block with dexamethasone and local anesthetic. In a third patient with noted moderate and severe neuroforaminal narrowing, Weinberg et al (2) reported only moderate relief with cervical nerve root block but symptom resolution with oral mexiletine.

In adding to the census, we report in our case a patient with radiographic evidence and prior symptoms of compressive neuropathy who responded positively to a cervical epidural steroid injection. As with Weinberg et al, injection of dexamethasone resulted in symptom relief for our patient. While topical steroids decrease pruritus by inhibiting the release of proinflammatory cytokines (15), they have also been reported to directly inhibit transmission of thin unmyelinated axons (16). Centrally, spinal circuits of pruritus are still under study, but thought to require signal transmission from the dor-

sal root ganglion to gastrin-releasing peptide positive interneurons before ascending the spinothalamic tract (17). The role of neuraxial steroids in modulating spinal pruritus circuits and providing relief, either through anti-inflammatory effects or direct signal transmission inhibition, requires further investigation.

CONCLUSION

There currently are no guidelines for patient selection for minimally invasive interventions for the treatment of BRP. Literature review and our case suggest that patients with BRP and a history of symptoms of compressive neuropathy may respond favorably to cervical epidural steroid injections; however, further research is required.

Author Contributions

AB: This author prepared the manuscript.

TH: This author contributed to the manuscript and gathered necessary information for the manuscript.

SG: This author contributed to the manuscript and provided guidance.

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