Stellate Ganglion Pulsed Radiofrequency Neuromodulation for Raynaud’s Phenomenon

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Introduction

Patients with scleroderma can present with a variety of complications. Raynaud’s phenomenon, a vasospastic response to stress or cold in the extremities, has been often associated with scleroderma. It is thought to occur through deficiency of vasodilatory mediators, abnormal integration of cardiovascular components via brainstem, overactivity of α2c receptors, and possibly altered coagulation. Patients with Raynaud’s phenomenon often present with lancinating pain, digital ulcers, calcinosis, and sclerodactyly.

Current Treatments

Discussion

PRF resulted in a reduction of sympathetic overactivity without producing a complete or prolonged sympathetic block in this patient. The mechanisms of PRF are unknown, but it is thought to alter cellular transcription of TNF-α or other cytokines. PRF of the dorsal root ganglion has been used to reduce pain associated with chronic radiculopathy and complex regional pain syndrome, where excess TNF-α have been demonstrated. The role of these molecules at the stellate ganglion in Raynaud’s Phenomenon is unknown.

Case series of PRF of the stellate ganglion have been published for post-traumatic stress disorder and hot flashes, but there are no reports of PRF for Raynaud’s Phenomenon.

There are case reports from Japan and Germany indicating successful treatment with polarized light irradiation and serial stellate ganglion blocks respectively.

Conclusion

Stellate ganglion PRF may be helpful in managing symptoms of severe Raynaud’s phenomenon. Further research is needed to elucidate the mechanism(s) of action of PRF.

References


Case Presentation

A 55 year-old male with scleroderma and refractory Raynaud’s phenomenon presented with lancinating left arm pain and chronic ischemic ulceration of digits 2, 3 and 4. He first received a diagnostic left stellate ganglion block (SGB) resulting in 60% pain relief and signs of ulcer healing at 3 weeks follow-up.

At 7 weeks, he continued to have pain and ulceration, so we proceeded with a second block combined with pulsed radiofrequency (PRF). Under oblique fluoroscopic guidance, a 22g 5cm/5mm probe was advanced to the uncinate process of C7 on the left side. After sensory and motor stimulation confirmed no radicular nerve contact, the ganglion was pulsed at 42°C for 4 minutes. The needle was repositioned slightly and pulsing was repeated. After contrast confirmed appropriate positioning, a combination of clonidine, dexamethasone and bupivacaine was injected. Temperature in the left limb increased by 2°C.

Outcome

The patient experienced complete resolution of pain and the ulcers healed. Eleven months later, the patient returned with similar symptoms in the right hand, and reported no recurrent pain or ulceration on the left since the PRF. He underwent right SGB via ultrasound which reduced pain significantly, but the ulcers returned 2 months later. He is scheduled for PRF of the right stellate ganglion.

Pharmacological

-Aspirin
-Sildenafil
-Dipyridamole -Prazosin

-Syringan (for recurrent attacks)
-Calcium Channel Blockers - Prostaglandin Derivatives - Topical Nitrates

Surgical

-Pharmacological Surgical

-Stellate Ganglion Block
-Sympathectomy

Spinal Cord Stimulator (not approved)