Peripheral Nerve Stimulator for Isolated Median Nerve Neuropathy

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Introduction

- The median nerve is formed by the lateral (C7-T1) and medial (C8 and T1) cords of the brachial plexus. At the elbow, from lateral to medial, are the biceps tendon, brachial artery, and the median nerve. The median nerve lies anterior to the brachialis and deep to the lacertus fibrosus.
- The most common type of median nerve mononeuropathy is due to compression at the level of the wrist; however, various other forms exist, mostly due to compression at the elbow, known as pronator syndrome, or compression at the level of the forearm, known as anterior interosseous syndrome.
- Diagnosis includes comprehensive functional assessment, motor/sensory exam, MRI, Ultrasound, EMG, inflammatory lab panel
- Treatment includes removal of compression, splint/immobilization, corticosteroid injections, neuropathic pain medications, and PT/OT, surgical decompression.
- In this case report, we show successful treatment with peripheral nerve stimulation in a patient who was not adequately treated with conservative therapies.

Case Description

- 66 year old year old male with a PMH of anxiety, OA, pseudogout, DM c/b neuropathy, HTN, HFpEF, chronic aortic arch dissection s/p complete arch replacement 10/2021, HTN, CKD III, PE/DVT on anticoag, HLD, and obesity c/b OSA
- Presents for evaluation of left forearm pain that began following AAA surgery 2021-10-25.
- Has had pain that comes in attacks 10-15 times per day. The symptoms are isolated to this forearm and hand (2nd and 3rd digits), with no complaints in his neck.
- He has had associated weakness of his L forearm and hand which interferes with daily activities (L hand dominant), no swelling.
- Sharp, electric like pain with five to sixty minute duration. Exacerbated by cold and air with no alleviating factors.

Methods

Pre-procedure:

- Electrophysiological evidence of a chronic focal mononeuropathy of the left median nerve that most likely localizes to the forearm. There is borderline electrophysiological evidence of a left ulnar sensory neuropathy of uncertain localization, and electrophysiological findings consistent with an underlying sensory polyneuropathy.

Intra-procedure:

- The left upper forearm to the elbow was cleaned and prepped with chloraprep. A SPRINT PNS device 17 gauge stimulating probe and introducer sleeve were assembled.
- Using ultrasonography with sterile probe cover, the brachial artery and medial nerve bundle corresponding to the median nerve was identified proximal to the cubital fossa. The entry site was anesthetized with 1.5 cc of 2% Lidocaine. Care was taken to assure that local anesthetic was not administered close to the target electrode implantation site to prevent an altered response to stimulation.
- The SPRINT PNS device 17 gauge stimulating probe needle was inserted and advanced along the intended course. Test stimulation was delivered to assist in identifying the optimal lead location. Amplitude was adjusted until muscle tension was observed and was comfortable to the patient. Several parameters were tested until the patient indicated muscle tension overlapping the distribution of the patient's typical region of pain in his first 3 digits.
- The stimulating probe was removed from the introducer sleeve and a percutaneous lead was guided through the sleeve and delivered to the location in similar proximity to the nerve where the probe was tested. The introducer was removed and the lead was deployed, secured and implanted. The exposed end of the percutaneous lead was coiled to allow for strain relief then threaded through and secured into the connector block. Excess lead was trimmed to length. The cable was inserted into the stimulator and the stimulator was positioned on the lateral arm above the lead exit site at which point the final stimulation response again confirmed optimal lead placement.

Post-procedure:

- Optimized stimulation parameters were programmed into the stimulator. The patient were instructed on the proper management of the site and use of the SPRINT PNS device and patient remote control.

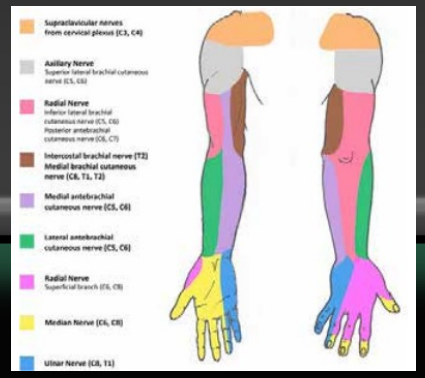

Figure 1

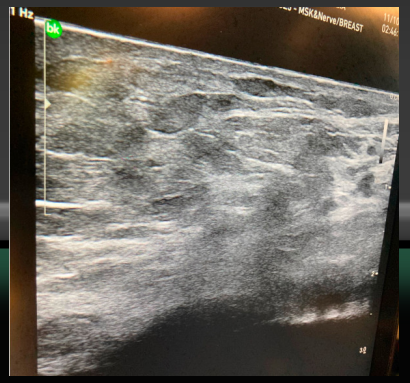

Figure 2

Results/Conclusions

- Patient returns for 2 month follow up s/p L ulnar nerve PNS placement (Sprint PNS system).
- Reports >50% pain relief from baseline. Also reports increased functional gains of dressing and making bed, decreased pain medication and increased ability to participate in PT/HEP. Pain scale monitored via pain diary.
- Reports continuous tingling sensation from the PNS is tolerable/pleasant. Continue Venlafaxine and 8% Capsaicin Cream
- PNS successfully improved qualitative and quantitative assessment of treatment resistant median nerve mononeuropathy in our patient. Not only improving subjective pain experience, but also improving functionality and overall well-being.
- Moving forward, more research can be done to elucidate further benefits of PNS for mononeuropathies of the extremities for those patients with which conservative therapies have failed.

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