CRYONEUROTOMY AS A NOVEL ADJUNCT TO BOTULINUM TOXIN TREATMENT FOR THE SPASTIC ELBOW: A CASE STUDY

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INTRODUCTION

The spastic flexed elbow can be a problematic secondary complication of stroke. Cryoneurotomy (CryoN) involves the introduction of an ice ball at -60°C through a cryoprobe with the purpose of causing myelin disruption and Wallerian degeneration of the targeted nerve. With preservation of the peri and epineurium, 2,3 A nerve stimulator is used for localization with ultrasound guidance. The small focus of the ball is felt to cause less damage than alcohol/phenol to surrounding structures. CryoN has been shown to be effective in the spastic adducted hip. 4

OBJECTIVE

Present a case where post-stroke elbow flexor spasticity is successfully treated with CryoN of the musculocutaneous nerve (MSCN) to the brachialis.

CASE

Four months post-stroke, a 54-year-old man with right spastic hemiplegia began 5 rounds of BoNT injections into the brachialis, brachioradialis, and biceps muscles with partial improvement in elbow range of motion (ROM) and Modified Ashworth Scale (MAS).

At 16 months, a lidocaine nerve block to the brachialis branch of the musculocutaneous nerve (MSCN) demonstrated temporary improvements in active ROM, MAS and Modified Tardieu Scale (MTS) (Fig. 4).

At 24 months, CryoN of this motor branch with a Westco Lloyd SL Neurostat was performed. (Fig. 5)

RESULTS

Following CryoN, improvements in ROM, MAS, and MTS were observed with ongoing gains seen at the 9-month follow-up (Table 1). The paresis angle improved to -19° as the patient's post-CryoN AROM (161°) exceeded the maximum pre-CryoN PROM (142°). 5 Maximal PROM improved by 35 degrees to full ROM. Improvements in the muscles innervated by the MSCN allowed for redistribution of BoNT to the finger flexor muscles.

CONCLUSION

CryoN using published protocols for muscle selection and nerve localization 6-8 resulted in improvement of the patients ROM, MAS score, and MTS values with no detectable adverse events. The increase in AROM of 89° at 3 years post-stroke exceeded patient and physician expectations. CryoN also allowed for redistribution of BoNT to other muscles for potential future gains in other problematic areas. Ongoing follow up will determine whether elbow range continues to improve, plateau, or regress to baseline due to the potential for nerve regeneration.

REFERENCES