Cervical Radiofrequency Ablation for Refractory Cervicogenic Headaches in Pediatric Patients

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Background

Cervicogenic headaches (CHA) often present with a combination of neck pain secondary to cervical facet inflammation, myofascial spasms and associated occipital headaches. It is secondary to concussions, other traumatic injuries, systemic arthropathies and myofascial injuries. Their features overlap with clinical features of migraines and patients can often present with both symptoms.

Mechanism of Cervicogenic Headaches

High cervical facet joint inflammation and associated myofascial spasms results in cervicogenic headaches. Activation of sensory branches of C2 and C3 both centrally and peripherally can result in occipital neuralgia. Convergence of sensory C2 and nucleus caudalis of the trigeminal nerve results in an exacerbation of migraines.

Purpose

We propose a treatment approach for medically refractory cervicogenic headaches in an algorithmic fashion with interventional techniques in the pediatric and adolescent population. Based on risk benefit assessment patients receive the following blocks and move to the subsequent ones based on efficacy.

1. Greater and lesser occipital nerve blocks with steroids (GONB)
2. Cervical facet / medial branch blocks with steroids (CMBB)
3. Cervical percutaneous radiofrequency lesioning. (RFA)

These procedures have minimal outcome studies in the pediatric and young adult population.

Case I:

A 16 year old female with suspected ankylosing spondylitis and chronic migraines presents with 4 years of bilateral occipital and neck pain. Cervical radiographs were normal. Cervical MRI revealed no disc herniation, foraminal narrowing, or facet hypertrophy. Exam was consistent with significant bilateral occipital nerve tenderness, cervical facet tenderness, and cervical paraspinal muscle spasms. Patient had failed conservative management of medications, physical therapy, and psychotherapy.

Case II:

21 year old female with 9 year history of post concussive cervicogenic headaches with neck pain and occipital neuralgia, which was refractory to medical management. Patient has failed 9 years of treatment with medications (incl. neuropathic), physical therapy, psychology pain coping skills. Imaging was normal and exam consistent with cervical facet arthropathy and occipital neuralgia.

Case III:

19 year old male injured during martial arts on the right side of his neck resulting in refractory right cervicogenic headaches and occipital neuralgia, which remained refractory to a multidisciplinary conservative pain approach. Imaging was normal and exam consistent with cervical facet arthropathy and occipital neuralgia.

Pain Interventions:

In all the 3 cases, GONB and Bilateral CMBB were performed with excellent short term duration of pain relief in the head and neck. Short term pain relief with CMBB served a diagnostic role implicating the facet joint arthropathy as a source of pain and good outcome with the RFA.

Given lack of long term pain improvement and significant disability Cervical RFA was performed at C2-3, C3-4, and C4-5. These patients had no complications with the procedure.

Response:

Significant pain relief for 12 months after the procedure with full return to normal physical activity and no medications.

Discussion

This case series highlights the use of RFA in the adolescent population with refractory cervicogenic headaches and neck pain. To date, there are no published reports of RFA being used in pediatrics. Meta analysis of studies in adult patients have revealed limited evidence to support RFA for CHA due to paucity of robust studies. Adult studies have reported an average 5.5 months of over 75% pain relief. Complications such as paresthesias along the greater and lesser occipital nerve, ataxia, numbness, hypersensitivity range from 2-55% following cervical RFA with many of these complications self resolving within 7-10 days.

Conclusion

In adolescent patients with medically refractory CHA, an algorithmic interventional approach based on risk benefit assessment can be considered. Percutaneous radiofrequency ablation gives long term pain relief without the use of medications. However high impact physical activity should be avoided. The procedure is well tolerated. Further investigations on RFA in adolescent patients with CHA are needed to guide patient selection, treatment, and longitudinal follow up.

References: