INTRODUCTION

The vagus nerve is at risk for iatrogenic injuries along its course as it exits the skull base.

• Although surgery is the most common cause, other interventions may affect nerve function.

• This is the first report of iatrogenic vagal nerve injury after radiofrequency lesioning of the cervical facet.

RADIOFREQUENCY LESIONING OF THE CERVICAL FACET

• Radiofrequency lesioning of the cervical facet is the targeted thermocoagulation of the medial branch nerves, and is the treatment of choice for cervical facet joint arthropathy. 2,3 This procedure is performed under local or general anesthesia with fluoroscopic guidance.

• A low voltage high frequency alternating current is produced, resulting in excitation of neighboring ions and heat generation, causing surrounding protein denaturation and tissue necrosis. 4 Injury to peripheral nervous tissue interrupts nerve conduction, although regeneration often occurs in the presence of an intact ganglion. 5

• A radiofrequency electrode is inserted percutaneously and parallel to the medial branches in order to address the maximal length of nerve. Both a posterior oblique or parasagittal approach can be used. Multiple passes are made, with coagulation administered contiguously. 6

CASE REPORT

• A 62-year-old female with a history of right C3-C4 facet joint disease underwent unilateral radiofrequency denervation with fluoroscopically controlled placement of the electrode under general anesthesia. She awoke with dysphagia, aphony, and neck swelling. She had undergone prior steroid injections at C3 and C4 for management of her chronic neck pain. On initial office evaluation, she had moderate dysphonia with a phonation time of 6.5 seconds. A dense right vocal fold paralysis was noted. Her Voice Handicap Index (VHI) was 42. Aphony persisted through the first 3 months and gradually improved with intensive voice therapy.

• The patient presented ten months after injury for further evaluation. She complained of continued dysphonia, inspiratory stridor, and intermittent choking on water. She was noted to have inspiratory stridor that resolved after laryngeal massage, and a breathy vocal quality.

• Videostroboscopy demonstrated a continued right vocal fold paralysis in the paramedian to intermediate position. The left vocal cord had good mobility with evidence of paradoxical vocal fold adduction and muscle tension dysphonia accompanying her inspiratory stridor.

RESULTS

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<tr>
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<th>Duration</th>
<th>Configuration</th>
<th>Recruitment</th>
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The patient’s laryngeal EMG demonstrated a right superior laryngeal nerve and right recurrent laryngeal nerve injury, with polyphasic units, nascent units, and reduced recruitment. This is suggestive of a high partial vagal injury with evidence of active reinnervation.

CLINICAL COURSE

Given evidence of reinnervation, medical rather than surgical intervention was pursued. The patient underwent intensive voice therapy and respiratory training with significant improvement in voice quality and dysphagia one year later.

DISCUSSION

• To our knowledge, this is the first reported case of vagal nerve injury following radiofrequency denervation of the cervical facet joint.

• We postulate that insertions of the radiofrequency probe at the level of the high cervical vertebra resulted in a conductive thermocoagulative insult to the vagal nerve above the level of the superior laryngeal nerve. It is unlikely that the tip of the probe directly contacted the nerve, given the introduction of the probe posteriorly, its parasagittal and oblique trajectory, and use of fluoroscopic guidance. It is unlikely this paresis resulted from mass compression by hematoma, given the subclinical nature of the reported neck swelling.

• Mechanistically, radiofrequency lesioning can result in soft tissue damage through simple conduction. Damage to tissue is directly proportional to the square of the distance traveled by the current. At longer distances, partial rather than total necrosis occurs, at times limited to functional deficits from protein denaturation. The presentation of an improving partial vagal injury is well explained by thermal injury rather than direct trauma. 4

• Radiofrequency cervical facet denervation has a documented strong safety profile. Multiple randomized controlled studies in the past decade have focused on efficacy for pain control rather than other interventions may affect nerve function.

• Significant to otolaryngologic complications are associated with radiofrequency lesioning of the trigeminal ganglion, the glossopharyngeal nerve, and stellate ganglion. An abnormal finding after any percutaneous lesioning procedure in the head and neck, including injection of chemical sclerosing agents, and balloon occlusion, should be addressed expeditiously. Complications include temporary blindness, toxic effects from intravascular injection, hematomas, and anesthesia dolorosa. 7,8

• Laryngeal EMG allows confirmation of the level of the lesion, but more importantly can indicate prognosis. Radiofrequency lesioning is a temporary intervention, with anticipated nerve regeneration between several weeks to several months. 7 In this case, the presence of polyphasic and nascent units warrants conservative treatment, in anticipation of reinnervation. Our patient’s clinical course supports improved nerve function demonstrating that reinnervation can occur up to 18 months after injury.

REFERENCES


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