A Transnasal Injection Technique for the Patulous Eustachian Tube

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Abstract

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss current and emerging management options for patients with symptoms consistent with patulous eustachian tube (P.E.T.).

Objectives: Evaluate a transnasal endoscopic approach to induce partial eustachian tube (E.T.) obstruction.

Study Design: Case report with video recording of injection technique used in clinic following cadaver dissection and literature review.

Introduction

Autophony may result from an abnormally patent eustachian tube to cause the abnormal perception of the sound of one’s own voice, breathing and chewing (1). Symptoms of aural fullness and fluctuating sensation of tympanic membrane (T.M.) movement on respiration also characterize PET which may be associated with weight loss, neuromuscular disorders, hormonal changes, and scarring with loss of tissue (e.g. irradiation) but remains without recognized inciting etiology in 1/3 of those affected. Symptoms of autophony are often relieved with reclining, lowering the head between the knees, or during a head cold – presumably from congestion aiding in E.T. closure. Diagnosis is aided by observation of TM movement during nasal breathing supplemented by nasopharyngoscopy demonstrating a concave longitudinal defect in the superior anterolateral wall of the tubal valve where it is normally convex. Impedance tympanometry may show fluctuations in tracings of respirations. CT imaging may be useful to r/o superior semicircular canal dehiscence syndrome and to assess for anomalies of the carotid artery that may influence surgical approaches to the ET. Treatment options include observation with reassurance, medical therapy (weight gain/hormone nasal drops/mucus thickening agents/hydration), as well as surgical therapy directed to the TM and middle ear (tympanostomy tube placement/mass loading the TM), botulinum injection to the peri-tubal muscles and eustachian tube surgery (obstruction by obturature or surgical narrowing).

Injection of material into the E.T. orifice to produce edema (boric acid and salicylic acid powder) or into the tissue of the E.T. (telfon / gelfoam in glycerin) became less popular after initial reports in the non-endoscopic surgical era described reports of stroke and death associated with misplaced injection into the adjacent carotid artery (2). Advances in technology have resulted in more recent reports of successful E.T. injection with contemporary endoscopic guidance under general anesthesia (3, 4, 5). Further advances in technology now permit use of flexible distal chip imaging endoscopes with side ports to direct injection to the larynx under local anesthesia (6). We report the technique we employed in the first application this technology to direct in-clinic treatment of PET with injection of the ET with hydroxy methyl cellulose.

Methods and Materials

Methods: Cadaver dissection was coupled with testing of equipment leading to treatment of a patient with patulous eustachian tube symptoms by carboxymethylcellulose injection deep in the anterior wall of the right E.T. by curving a 25 gauge sclerotherapy needle placed through the operative port of a flexible endoscope around the posterior septum from a left nostril approach.

Results

Results: Successful narrowing of the E.T. was technically accomplished but provided only short term (one day) relief of symptoms. Video presentation of the injection is available at the website (1):
https://wiki.uiowa.edu/display/protocols/Patulous+Eustachian+Tube++Management+of+the+Symptom+of+Autophony

Discussion

This application of flexible endoscopic technology opens less morbid and potentially more effective approaches to managing a common disorder that has shown varied results from multiple treatment approaches (7). We have demonstrated ease in injecting material into the eustachian tube by a technique that could also be applied to other strategies. This approach lends itself well to insufflation of caustic or sclerosing agents to cause scarring within the E.T. More aggressive surgical procedures such as laser therapy are now commonly delivered in an in-clinic setting under local anesthesia for laryngeal abnormalities. The capacity to deliver topical anesthesia and follow it by anesthetic injection to the E.T. would permit a laser assisted surgical approach to this region without requiring general anesthesia. Hydroxyapatite has been used successfully as a filler for E.T. injection under general anesthesia – and has been reported as a promising option for treating P.E.T (3). Improved delivery systems (endoscopes and needles) as well as development of appropriate injectables will likely make injection of P.E.T. a commonly performed clinic procedure done without the need for general anesthesia.

Conclusions

We identify a technique likely to be useful in management of the patulous eustachian tube that is still in need of further developments in equipment and injectables.

References

4. Poe DS. Diagnosis and management of the patulous eustachian tube. Otol Neurotol 2007;28:668