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Transcanal endoscopic approach to lesions of the suprageniculate ganglion fossa

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ABSTRACT

Objective: The aim of this paper would be to describe the first case series of exclusive transcanal endoscopic approach to treat lesions with limited extension at the supragenicular fossa. This endoscopic approach allowed a complete removal of supragenicular disesases with low complication rates using a minimally invasive surgical route.
Methods: This is a retrospective chart analysis and a surgery video recording review of these patients were performed in August 2015. From November 2011 to November 2015, 29 patients were submitted to an endoscopic transcanal lateral skull base surgery. From those 29 subjects, in 6 patients an exclusive endoscopic transcanal supragenicular approach was performed to remove lesions located into the geniculate fossa. Surgical indications, pre-operative assessment, results were collected and the surgical technique were described.
Results: The final study group was composed of 6 patients. 3 male and 3 female; median age is 25.3 years old. In all 6 subjects it was possible to remove the lesions using an exclusive endoscopic transcanal supragenicular approach. No intraoperaoperative complications were observed in any patients. The mean follow up period was 15.16 months.
Conclusion: Exclusive endoscopic transcanal supragenicular approach is definitely a minimally invasive technique and should be consider an optimal solution to treat lesions located in the supragenicular fossa in some patients. We introduce a minimally invasive approach to the geniculate ganglion region in order to allow complete removal of supragenicular disesases with low complication rates using a minimally invasive surgical route.

1. Introduction

Surgical excision of lateral skull base pathology is often challenging even to the most experienced surgeons given the number and proximity of critical structures located within the temporal bone. The supragenicular fossa (SGF) is a pyramidal shaped space delimited inferiorly by geniculate ganglion, superiorly by the middle cranial fossa dura (MFC), and posteriorly by the ampullated ends of the lateral and superior semicircular canals. The epitympanum and the anterior petrous apex superior and anterior to the internal auditory canal serve as the lateral and medial boundaries of the SGF respectively (See Fig. 1, Panels A–D).

Lesions involving the SGF are uncommon and include, but are not limited to cholesteatoma, meningioma, facial nerve ossifying hemangiomas and schwannomas. SGF pathology

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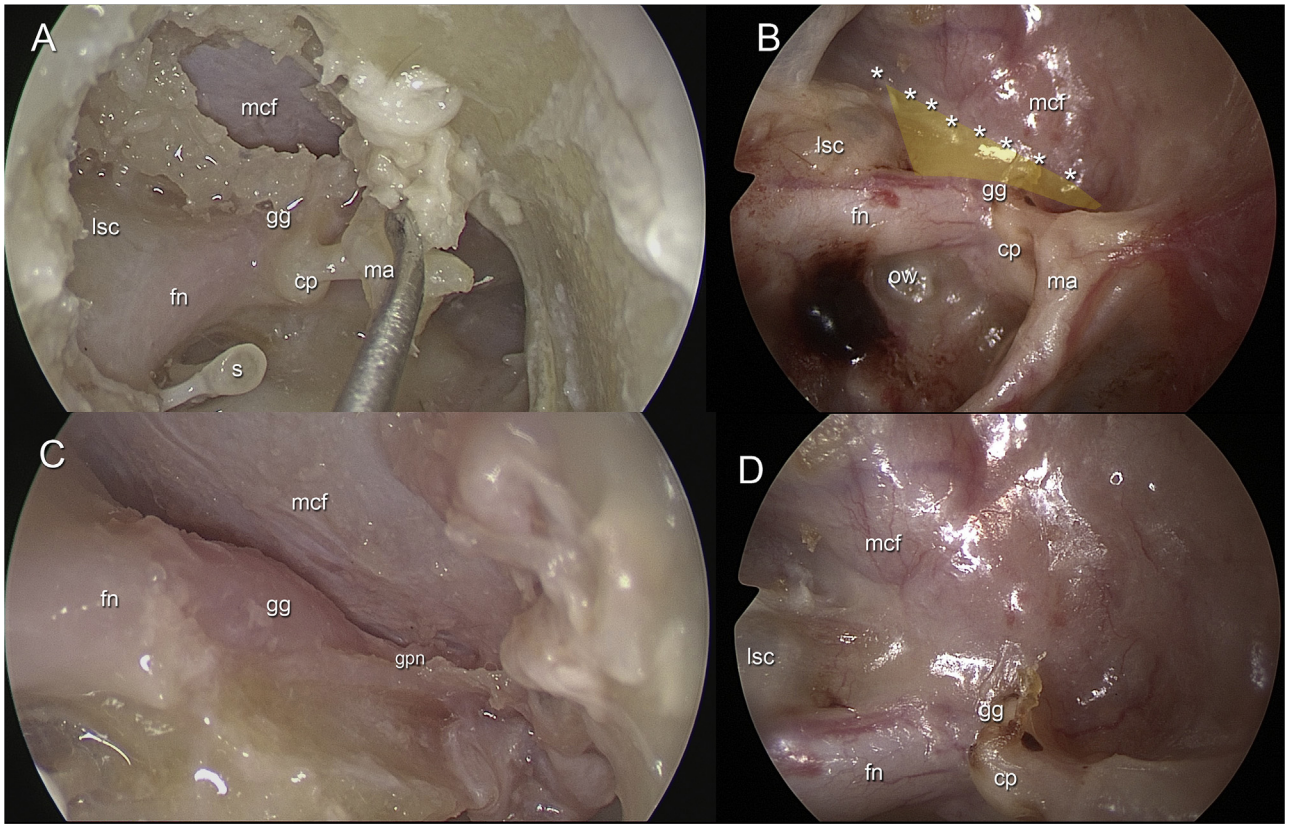

Fig. 1. Right ear: transcanal anatomy of the anatomical boundaries of the supragenicular fossa from an endoscopic point of view. In this picture we are able to compare the endoscopic dissection with a surgical cholesteatoma case: Panel A dissection; Panel B surgical anatomical boundaries of SGF during cholesteatoma surgery: the yellow area between the anatomical boundaries is showing the supragenicular fossa. Panel C dissection; Panel D cholesteatoma case: endoscopic magnification of the geniculate ganglion and it relationship with the middle cranial fossa. (For interpretation of the references to color in this figure legend, the reader is referred to the web version of this article.)
fn: facial nerve; gg: geniculate ganglion; mcf: middle cranial fossa; lsc: lateral semicircular canal; ma: malleus; ow: oval window; cp: cochleariform process; *****: middle fossa plane; s: stapes; gpn: greater superficial petrosal nerve.

most commonly presents with facial weakness that is often progressive, but can present with recurrent paresis. Hearing loss is the second most common symptom and can be conductive, sensorineural, or mixed depending on the location and extent of the SGF lesion. Conductive hearing loss is frequently identified in cases of ossicular chain involvement, but a normal hearing is also frequently observed in cases of SGF pathology.

Management options for SGF pathology include observation, surgery, or in rare cases radiation [1,2]. Observation with serial imaging is often used in patients with normal facial function in the setting of hemangioma, schwannoma, and meningioma. Surgery is recommended in all patients with cholesteatoma in the SGF, or in patients with facial nerve paresis House-Brackmann Grade III or worse with hemangiomas, schwannomas, or meningiomas. The goal of surgery is for complete excision and ideally preservation of facial nerve function and hearing. The preauricular middle fossa approach or in some cases a pre-sigmoid petrosal approach have historically been used to address SGF pathology. The aforementioned approaches require either a pre or postauricular incisions and temporal lobe dural retraction with the middle fossa approach.

Transcanal endoscopic ear surgery (TEES) is a newer technique that is most commonly used to address middle ear and tympanic membrane pathology including cholesteatoma, tympanic membrane perforation, and ossicular pathology. TEES has more recently been used to address lateral skull base pathology as knowledge of endoscopic anatomy has advanced [3,4,5]. The technical advances in endoscopic ear surgery now permit the surgeon to access and excise pathology of the SGF using this minimally invasive approach through the external auditory canal without using a craniotomy and brain retraction. The objective of this study is to describe the technique and report the outcomes for utilizing TEES to address pathology of the SGF.

2. Materials and methods

From November 2011 to November 2015, 29 subjects underwent TEES for management of lateral skull base pathology at the Otolaryngology Department of the University Hospital of Verona and the Otolaryngology Department of the University Hospital of Modena. Seven of 29 patients underwent an Endoscopic Transcanal Supragenicular Approach (ETSA) to remove lesions involving the SGF bounded by the middle fossa dura, labyrinthine block, tympanic and geniculate facial nerve.

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