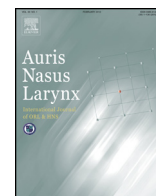




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Facial nerve hemangioma of the geniculate ganglion: An endoscopic surgical approach



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ABSTRACT

Facial nerve hemangiomas are rare benign tumors arising from the venous plexus surrounding the facial nerve. Surgical management of these tumors is controversial. The goal of surgery is complete tumor removal with restoration of facial nerve function and preservation of hearing, wherever possible. The approaches most used are the translabyrinthine and middle cranial fossa approaches. In this report, we describe the first facial hemangioma treated with an endoscopic transcanal approach, combined with a retroauricular transmastoid minicraniotomy for closure of the dural defect. A great auricular nerve graft was used to reconnect interrupted nerve segments. Histopathological examination confirmed the diagnosis of a hemangioma of the first genu of the facial nerve. With magnification of the structures, the transcanal endoscopic approach allowed a radical excision of the neoplasm permitting hearing function preservation, with the possibility to work with a minimally invasive approach with respect to the labyrinthine block and cochlea. Compared to a middle cranial fossa approach, the transcanal endoscopic approach avoided labyrinthine block removal and brain retraction.

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1. Introduction

Facial nerve hemangioma is a rare tumor (0.7% of all intratemporal tumors) [1]. Politzer first described vascular tumors of the temporal bone in 1901. Hemangioma involving the geniculate ganglion was first described by Pulec in 1969 [2], but in those studies, a small clinical series with only a few cases was reported. These lesions are benign extraneural tumors arising from the vascular plexuses surrounding the nerve, giving rise to the symptoms. They are slow growing and tend to produce significant facial nerve dysfunction in the early stages. Sudden or progressive facial paresis or paralysis with twitching are the most common presentations. Hearing loss occurs from disruption of the ossicular chain or from erosion into the cochlea. The geniculate ganglion (GG) is the most commonly involved segment of the facial nerve (FN) followed by the internal auditory canal (IAC), and the vertical segment of the FN near the takeoff point of the chorda tympani [3]. High-resolution computed tomography (CT) and magnetic resonance imaging (MRI) can detect a small sized facial nerve tumor and

are useful for early diagnosis. Their management continues to be debated and is the subject of controversy. We report a case of a geniculate ganglion hemangioma, with tympanic cavity extension, tegmen tympani erosion and diffusion into the middle cranial fossa, treated with a transcanal endoscopic approach, combined with a retroauricular transmastoid approach.

2. Case report

A 77-year-old man presented at our Department with a history of rotatory vertigo and headache for 1 month; no cochlear symptoms were referred and family history was unremarkable. A left-sided Grade II (House-Brackmann) facial palsy with synkinesis was noted. Microscopic examination of the tympanic membranes revealed normal findings. The results of others cranial nerves exam were normal and results of the remaining head and neck examination were unremarkable. Audiologic evaluation revealed bilateral, moderate, high-frequency sensorineural hearing loss (Fig. 1, Panel A). Tympanometric findings were normal, with the presence of acoustic reflexes bilaterally. Computed tomography (CT) revealed a soft tissue mass in the left middle ear, involving the GG, eroding the lateral semicircular canal and the tegmen tympani, with extension to the middle cranial fossa (MCF) and dural contact, with fine stippled calcifications occasionally having a moth-eaten appearance

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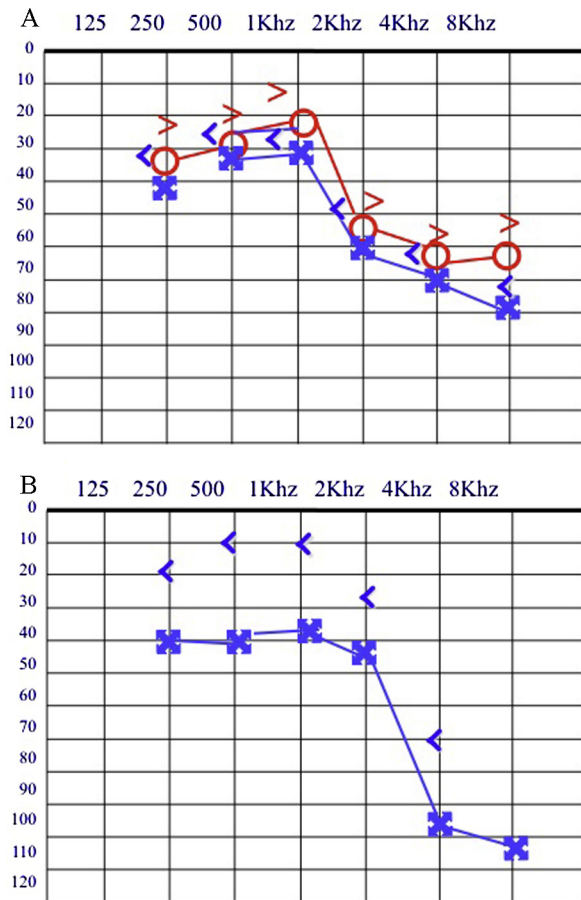


Fig. 1. Audiometric examination before surgery (Panel A) and 1 month after surgery (Panel B).

(Fig. 2, Panels A–C). Gadolinium-enhanced MRI showed a heterogeneous hyperintense mass on T2-weighted images that corresponded to the CT findings (Fig. 2, Panel D). The radiologic suspect was presumed to be a left facial nerve hemangioma. The patient underwent a transcanalar endoscopic technique for excision of the tympanic cavity component of the tumor, combined with a transmastoid minicraniotomy technique for closure of the dural defect.

2.1. Surgical technique

2.1.1. Endoscopic procedure

A 0 degree endoscope 15 cm in length was inserted through the external auditory canal to create a tympanomeatal flap. The tympanomeatal flap was elevated under endoscopic view, entering into the tympanic cavity. The flap was then pulled anteriorly and inferiorly, over the handle of the malleus uncovering the scutum. After creation of the tympanomeatal flap, the anatomical structures in the tympanic cavity were identified endoscopically. A blue vascular mass was noted, originating from the tympanic tract of the facial nerve and occupying the entire epitympanic space (Fig. 3, Panel A). The neoplasm lateralized the ossicular chain and extended cranially and infiltrated the dura of the MCF, through the GG and labyrinthine tract of the facial nerve, to the fundus of the IAC. An atticotomy was performed by piezosurgery, to access the epitympanum. Because of the location of the tumor, the incus and the head of the malleus were removed, allowing a wide access to the whole epitympanum (Fig. 3, Panel B). The mass extended anteriorly to the supratubal recess, and superiorly intracranially, involving the dura of the MCF. The tumor appeared inseparable from the facial nerve (Fig. 3, Panel C), so it was necessary to remove

the tumor along with the facial nerve, from the second genu to the GG, to obtain a radical exeresis (Fig. 3, Panel D). We were able to remove the neoplasm from the GG, preserving part of the ganglion because of a favorable margin between the nerve and the neoplasm at this location. Moreover, we were able to preserve the cochlea and the labyrinthine block. At the end of the surgical maneuvers, otoliquorrhea was seen, due to strong adherences of the anterior component of the mass and the dural plane of the MCF. Recognition was performed with a 45 degree endoscope to check the complete excision of the tumor and to check hidden areas. As a result of the endoscopic radical surgical excision of the tumor through the external auditory canal, and the presence of otoliquorrhea, a microscopic procedure was required to repair the dural defect.

2.1.2. Microscopic procedure

A retroauricular skin incision was made, and the plane of the temporal muscle fascia identified. A posterior periosteal flap was created and elevated to expose the mastoid bone. A classic mastoidectomy was carried out, and then an antrotomy, with an anterior atticotomy, was performed, using classic landmarks and maintaining the posterior wall of the external auditory canal. A minicraniotomy was then performed on the temporalis squama, to better expose the area of the dural fistula and to control the otoliquorrhea. A dural plastic patch made from Lyodura and positioned with the underlay technique, was realized, and reinforced with fibrin glue, bone paté and tragal cartilage. A great auricular nerve graft was used to connect proximal and distal facial nerve segments, placed in the trough abutting the proximal and distal segments. Stabilization of the graft was achieved with fibrin glue.

An ossiculoplasty was performed by remodeling the incus between the stapes and the handle of the malleus.

2.1.3. Postoperative care

The patient was prescribed bed rest for 3 days to preserve the dural plastic patch. No postoperative complications were noted, in particular, no resumption of liquorrhea, and no meningitis or vertigo were reported; postoperative facial palsy was of Grade III (House-Brackmann), stable after 3 months. The CT scan was normal after surgery, with no pneumocephalus. The patient was discharged on the 5th day and is now in follow-up with no signs of recurrence. Postoperative audiometry revealed good hearing conservation (Fig. 1, Panel B).

3. Discussion

Treatment of hemangioma of the geniculate ganglion aims for complete tumor removal with preservation of facial nerve function and hearing restoration, wherever possible. The management obviously depends on patient and tumoral characteristics, in particular dimensions, grade of facial nerve infiltration and dural involvement. A “wait and scan” policy can be performed, in order to correctly value the speed and pattern of tumoral growth, audiologic and facial nerve function evolution, even if, being these lesions not true vascular tumors (hemangiomas), they do not undergo involution. The treatment of choice continues to be surgical excision [3] and the optimal approach and management remain a surgeon’s preference.

Since there is a very close relationship between the facial nerve and tumor, even in the case of normal nerve function, some authors [3,4] have suggested a subtotal tumor removal preserving the integrity of the nerve, when the patient has a normal nerve function and tumoral tissue is found adhering to the facial nerve during surgery. However, complete tumor removal should be the first aim of surgery, particularly when facial nerve interruption and repair are required. The surgical approach used for treatment of hemangioma of the geniculate ganglion is mainly dependent on preoperative hearing

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