

Osteoma of the Internal Auditory Canal

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Abstract: Osteomas of the internal auditory canal are extremely rare benign lesions which are usually diagnosed incidentally. The etiology of sporadic cases is unknown. Herein, we report on a case of internal auditory canal osteoma in a 39-year-old woman suffering from vertigo, hearing loss and tinnitus on her right ear. The patient underwent decompression of the right internal auditory canal and osteoma ablation via retrosigmoid approach. Postoperatively, the patient improved, both vertigo and facial weakness disappeared. Moderate cephalgia is still present. The patient has been under the regular follow up over the period of two years.

Keywords: Osteoma, exostosis, internal auditory canal, vertigo, unilateral hearing loss.

INTRODUCTION

The latest WHO classification of osseous tumors defines osteoma as a benign tumor composed of compact bone arising on the surface of the bone and, when developing in the medullary cavity, it is known as enostosis [1].

Macroscopically, the osteoma is a well-circumscribed tumor with a broad attachment to the underlying bone. Most osteomas are smaller than 2 cm.

Osteomas are slowly growing tumors affecting predominantly the calvarial, facial and jaw bones. The most common localization of the temporal bone osteomas is the mastoid cortex and the external auditory canal. Osteomas observed in the internal auditory canal are extremely rare.

We present a case of osteoma of the internal auditory canal, when one patient's only reported symptoms was vertigo.

CASE REPORT

A 39-years old woman with accidental history of a right temporal bone fracture was treated by neurologists over a period of three years for right side cephalgia and instability.

The instability was getting worse and the patient started to suffer from vertigo with nausea and vomitus (frequency of attacks two times a day). She was treated with Betahistin 24mg three times per day, for

more than two years, with no effect. The patient had right side sensoryneural hypacusis, sensation of pressure in her right ear and tinnitus during the last year, and she was complaining about right side facial numbness and weakness over the last five months.

Otoscopic finding was normal. Pure tone audiogram revealed slight right side hypacusis, pure tone average – PTA (threshold measured at frequencies of 0.5, 1, 2 a 4 kHz) was 36 dB. Objective tests of BAEP, caloric test, oVEMP and cVEMP were all symmetrical and normal.

NMR in T2 weighted 3DFT CISS described a local narrowing of the right internal auditory canal by osseous mass spreading into the lumen without enhancement after Gadolinium (Figure 1). The examination has confirmed direct relationship between the osteoma and the right acousticofacial bundle.

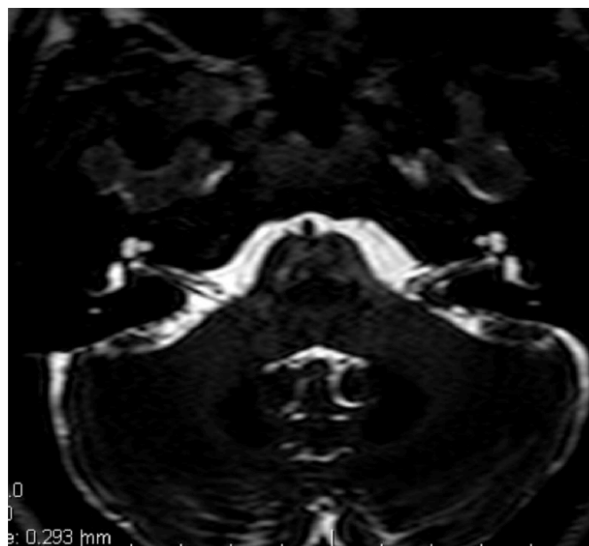


Figure 1: Preoperative enhanced axial T2 weighted NMR scan shows the right internal auditory canal stenosis.

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SURGERY

Minimal retrosigmoid approach, i.e. craniotomy of 2 cm exactly at the edge of the sigmoid sinus was performed in supine position with the patient's head in semiflexion. Controlled hyperventilation up to pCO₂ 25 mmHg prepared conditions for the retrosigmoid dura incision. Anteriorly C based dural flap was created. Because of the hyperventilation, the cerebellar hemisphere was found in the state of depression, that was very important for atraumatic opening of the PCA (pontocerebellar angle) cistern by cutting of the arachnoidea close to the lower cranial nerves. CSF

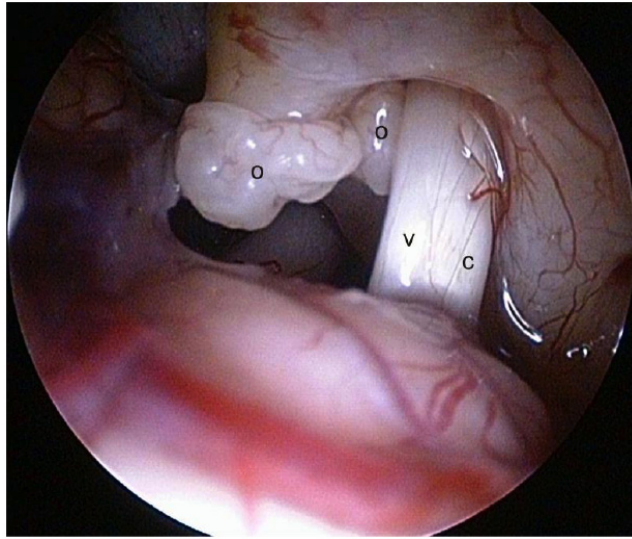


Figure 2: Intraoperative endoscopic view: the compact mass - osteoma (o) arising from the superior portion of the right internal acoustic canal.

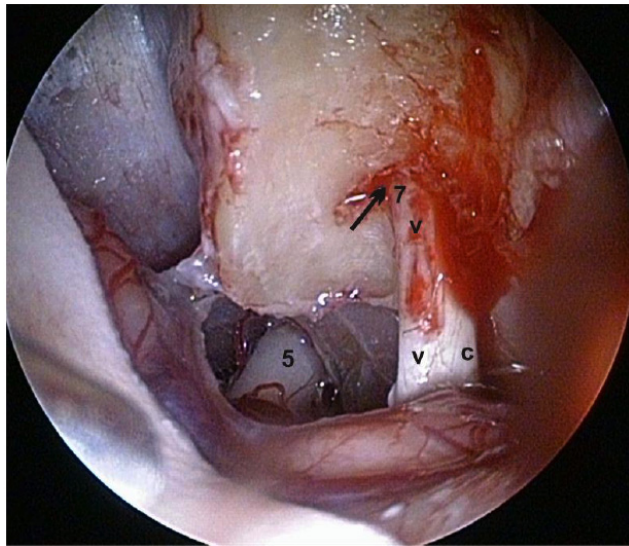


Figure 3: Internal auditory canal decompression via retrosigmoid approach. v-n.vestibularis, c-n.cochlearis, 7-n.facialis, 5-n.trigeminus.

(cerebrospinal fluid) was egressed and the cerebellum depressed sufficiently. The space for working in the PCA was much enlarged without any retractor. The posterior and superior walls of the internal acoustic canal and osteoma masses were removed with a drill - decompression of the internal auditory canal contents and osteoma ablation was accomplished (Figures 2, 3). Surgery finished with duraplasty using two layers of the resorbable dura patches, fibrin glue, fascia and bone paté.

Postoperative course was uneventful and pure tone audiogram showed improvement, PTA 27 dB. The BAEP, oVEMP, cVEMP and caloric test remained unchanged when comparing to the preoperative state. Vertigo, facial numbness and facial weakness disappeared shortly after the surgery. Postoperatively, tinnitus was observed during six month. Moderate cephalalgia is still present, but much improved. The patient is under the regular follow up over the period of two years.

DISCUSSION

The Internal auditory canal osteoma is very rare and until now only several cases have been reported in the literature [2-6].

Etiology is unknown, however, trauma, irritation, hormones, inflammation, developmental or genetic disorders have been reported as contributing factors to a lesion formation [1-6]. There is also another debatable cause published by Clarico [2]. He suggested that periosteum irritation may be caused by pulsation of a vascular loop of the anterior inferior cerebellar artery which can also induce a new bone formation [2,3].

Internal auditory canal osteomas can be classified by the anatomic localization due to their direction of growing. The tumors spreading towards the canal, narrowing the lumen are defined as intracanalicular lesions and those towards the middle cranial fossa are defined as extracanalicular lesions [3].

Intracanalicular osteomas can be symptomatic or asymptomatic. The asymptomatic osteomas are usually discovered incidentally. Reported symptoms are related to the acousticofacial bundle compression. The most frequent symptoms are: vertigo, loss of balance, hearing loss and tinnitus. The facial nerve involvement is less frequent. It is explained by the cognition, that the facial nerve is more resistant than

the vestibulocochlear nerve. Additional symptoms are: ear fullness, cephalalgia or otalgia [2-6].

Tumors invading the internal auditory canal (vestibular schwannoma, meningioma, facial nerve schwannoma, epidermoid, arachnoid cyst, etc.) and the other lesions involving bone tissue (Paget disease, fibrous dysplasia, osteitis of the petrous bone) are taken into account in differential diagnosis [3].

Asymptomatic lesions require no histologic verification or other treatment. For symptomatic patients when conservative treatment fails, surgery remains the only option.

Our patient was identified as having invalidizing vertigo. Objective audio-vestibular tests and the imaging proving changes suggesting osteoma of the internal auditory canal as a possible cause of her problem, helped us to reach the final diagnosis.

She underwent surgery *via* minimal transemissary retrosigmoid approach. Two osteomas were found, narrowing the internal auditory canal lumen and compressing the facial and cochleovestibular nerves. The tumors were removed, and decompression of the internal auditory canal was performed. Histology confirmed compact subtype of osteoma composed of lamellar bone.

Postoperatively vertigo, facial numbness and weakness disappeared shortly after surgery and haven't appeared during the follow up period of two years. The patient's hearing was improved, she was stopped complaining of tinnitus after several months. Moderate cephalalgia is still present, yet it has improved significantly.

Both high resolution CT and T2 weighted NMR 3DFT CISS are very good imaging methods for visualization of the entire internal auditory canal and revealing, e.g. osteomas that in specific localization may cause compression effect on the acousticofacial bundle. Presented symptoms can make it difficult to differentiate from more common causes of vertigo. In this case imaging found to be the only method to confirm the real cause of patient's difficulties and to determine the choice of management strategies for treatment.

CONCLUSION

Osteomas of the internal auditory canal are very rare, benign and slowly growing tumors. They are usually asymptomatic and generally do not require any treatment.

Symptomatic osteomas might manifest as sensoryneural hearing loss, vertigo and tinnitus, and thus mimicking symptoms of vestibular schwannoma or Menier's disease. Our case shows that there are other, not so frequent diseases, which should be taken into the consideration. Both high resolution CT and T2 weighted NMR 3DFT CISS are of a special importance for the evaluation of the internal acoustic canal and stating the real diagnosis.

Surgery is the treatment of choice in patients with severe symptoms. Accurate and effective internal acoustic decompression surgery was performed using the retrosigmoid approach. Minimally invasive technique, reducing the surgical injury and tissue damages with very low morbidity, is a safe surgery with good outcome.

CONFLICT OF INTEREST

No conflict of interest.

Any specific financial interests, relationship and affiliations relevant to the subject of the manuscript.

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