Symptomatic Lipoma of the Internal Auditory Canal: CT and MRI Findings

A Case Report

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Key words: lipoma, internal auditory canal, computed tomography, magnetic resonance imaging, hearing loss

SUMMARY – We describe the case of a 39-year-old man in whom diagnostic work-up for combined right-sided hearing loss revealed a lipoma of the internal auditory canal (IAC). This very rare diagnosis has significant implications for therapeutic management because lipomas, unlike other lesions in the IAC, should not be surgically removed in most cases. We emphasize the importance of the combined use of magnetic resonance imaging and computed tomography to reliably establish the diagnosis of a lipoma, differentiate it from other potential lesions of the internal auditory canal, and exclude additional pathologies in the petrosal bone.

Case Report

A 39-year-old man with a six-year history of bilateral conductive hearing loss and high-pitched tinnitus of unknown aetiology was referred to our department of otorhinolaryngology by his primary care physician because of acute worsening of right-sided hearing loss. He denied any otorrhoea, ear pain or vertigo. Weber test was lateralized to the left, whereas Rinne test was negative on the right side and positive on the left side. Otoscopy was normal bilaterally. Threshold pure tone audiometry (PTA) revealed conductive hearing loss on the left at 40–50 dB and combined multi-frequency hearing loss on the right side at 85 dB. A one-week treatment with dexamethasone did not change symptoms or PTA findings.

On subsequent 3 Tesla MRI, a well-defined lesion with a maximum diameter of 7 mm was found in the internal auditory canal (ICA) on the right side. The lesion was hyperintense on T1- and T2-weighted sequences, did not enhance with administration of a gadolinium-based contrast agent, and showed a marked signal drop on an additional fat-saturated T1-weighted sequence (Figure 1). A complementary CT scan was performed, where the lesion showed fat density (–68 Hounsfield units), no

calcifications and no bone erosion (Figure 2). Based on the imaging findings, the diagnosis of a lipoma of the IAC was established. The lipoma was the most likely explanation for the sensorineural component of the patient's hearing loss and tinnitus, but the conductive hearing loss remained unexplained. A follow-up examination was planned three to five years after diagnosis.

Discussion

Although nowadays reported more often thanks to high-resolution imaging and increased awareness of their existence, lipomas of the IAC are very rare^{1,2}. They are thought to be congenital malformations arising from the primitive meninx that forms the subarachnoid space and meninges³. Incidentally discovered asymptomatic lipomas of the IAC have been reported⁴. However, most cases are symptomatic with ipsilateral sensorineural hearing loss, tinnitus, or vertigo similar to other lesions in the IAC⁵, with a mean age of 40 years at the time of diagnosis⁴.

Lipomas are hyperintense on T1-weighted images and do not enhance with contrast administration. Probably the most elegant way to distinguish them from other lesions in the IAC

Figure 1 Coronal slices of the right internal auditory canal showing a well-defined, T1-hyperintense mass (left) with a signal loss on fat-saturated T1 (middle) and without contrast enhancement (right). Sequences from left to right: non-enhanced T1 FSPGR (repetition time TR, 4.7 ms; echo time TE, 1.8 ms; slice thickness, 1.0 mm), fat-sat T1 (TR, 645 ms; TE, 10 ms; slice thickness, 2 mm), gadolinium-enhanced T1 (parameters as for T1 FSPGR).

Figure 2 Axial slices of contrast-enhanced multi-detector computed tomography with two different reconstruction kernels (left: U30u for soft tissue; right: U70u for bone) showing a fat-density mass without contrast enhancement in the right internal auditory canal, diagnosed as a lipoma. Imaging parameters were as follows: tube current, 250 mAs; tube voltage, 120 kV; reconstructed slice thickness, 1 mm.

is the use of a fat-saturated MR sequence on which the signal drop confirms the presence of fat within the lesion. In addition, CT can demonstrate the presence of fat (typically between -100 and -10 Hounsfield units) and rule out contrast enhancement, calcification and bone erosion⁶.

Imaging is necessary to establish the diagnosis and distinguish lipomas from other le-

sions of the IAC. Vestibular schwannomas and meningiomas appear hypo- to isointense on T1-weighted, iso- to hyperintense on T2-weighted MR images, and show avid contrast enhancement⁷. Other lesions include haemangiomas and cholesterol granulomas, which can be differentiated from lipomas by the absence of fat. Meningiomas and haemangiomas may also show calcification on CT.

This differentiation of lipomas from other lesions of the IAC has implications for therapeutic management. Whereas vestibular schwannomas are often surgically removed, there is sufficient evidence that lipomas should only be removed in case of intractable symptoms^{2,8}. The reason is that lipomas tend to entirely surround the vestibular or the facial nerve, which makes surgical removal unfavourable with regard to functional outcome^{5,9}. Furthermore,

virtually all lipomas of the IAC are stable in size in the long term^{5,6}. Therefore, current recommendations include annual follow-up for adolescent patients and a single follow-up MR scan three to five years following diagnosis for adults⁴.

We recommend the combined use of MRI and CT to reliably diagnose lipomas of the IAC and exclude additional pathologies in the petrosal bone and the IAC.

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