

A case report of meningioma extending to the middle ear

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Abstract

Extracranial meningioma with extension into a middle ear is very uncommon. A 74-year-old female was admitted to our hospital with right ear bleeding when removing earwax. In this case, magnetic resonance imaging, computed tomography, her past history and operative findings would consider as infiltrative growth from the right sphenoid ridge meningioma to the right middle ear via the right petrous pyramid and bilateral optic nerve. She underwent only partial extirpation with decompression for optic nerve, rather than total extirpation including middle ear and temporal bone, due to wide invasion of the middle cranial fossa and cavernous sinus.

Introduction

Meningioma has been known to be a common intracranial tumor, accounting for 13% to 19% of all primary brain tumors.¹ In contrast, extracranial meningioma are uncommon, and particularly those with extension into a middle ear.² Some researchers^{2,3} have reported the pathways along which extracranial meningioma. It can extend, with diverse clinical findings according to route. Especially, ear and temporal bone meningiomas have been reported to show a variety of clinical findings such as cochlear and vestibular symptoms, moreover cranial nerve palsy.⁴⁻⁷ We describe a case of meningioma extending to the middle ear and, based on the past history, clinical findings, audiogram, computed tomography (CT), magnetic resonance imaging (MRI) and operative findings, the symptoms of our case appeared to result from the extension of an extracranial meningioma from the sphenoid ridge to the middle ear via the petrous pyramid.

Case Report

A 74-year-old female presented at our hospital with a complaint of right ear bleeding dur-

ing the process of cleaning earwax two weeks earlier. In her past history, she underwent craniotomy 4 years before for the sphenoid ridge meningioma with right visual impairment. In physical examination, a dark-red mass was seen through the right tympanic membrane with a perforation (Figure 1). The perforation was considered to have occurred during the removal of earwax. However, it would be no related to the dark-red mass. A pure tone audiogram showed a mixed hearing loss with a 30-40 dB air-bone gap in right ear, and the left and right bone conduction were almost equal (Figure 2). She had no other ear symptoms such as tinnitus, vertigo/dizziness and facial nerve palsy. MRI (Figure 3) and CT (Figure 4) showed that the right sphenoid ridge meningioma had invaded widely into the right middle cranial fossa and involved the extension along the petrous apex and bilateral optic nerve canals, but the internal auditory canal, facial nerve canal, jugular fossa, cochlea, vestibule, semicircular canal, facial nerve canal and ossicles were intact. The nasal fiberscopy revealed that nasal cavity and nasopharynx were intact, but did not show any tumors. The patient underwent only partial extirpation with decompression for optic nerve, rather than total extirpation including the middle ear and temporal bone, due to the wide invasion of the middle cranial fossa and cavernous sinus. Histopathological examination revealed it to be fibrous meningioma (Figure 5).

Discussion

The most common sites of meningiomas are the sphenoid ridge and the dome of the cerebrum, followed by the falx cerebri and parasagittal sinus. In the arising processes of the

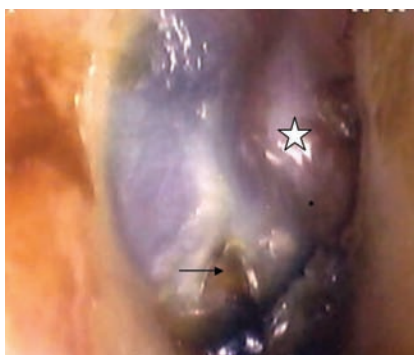


Figure 1. A dark-red mass (asterisk) was observed behind in anterior portion of the right tympanic membrane with a perforation (arrow).

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extracranial meningioma, Hoyer² reported that extracranial meningiomas could be subdivided into the following four main groupings: i) Primarily intracranial tumors with extracranial direct extension. ii) Tumors originating from arachnoid cell rests of cranial nerve sheaths with extracranial growth. iii) Extracranial growth without any apparent connection with foramina or cranial nerves presumably from embryonic rest of arachnoid cells. iv) Benign appearing intracranial meningiomas with extracranial metastases. Pathways for meningioma extension into the middle ear as suggested by Rietz³ were the tegmen tympani, greater superficial petrosal groove, anterior and poste-

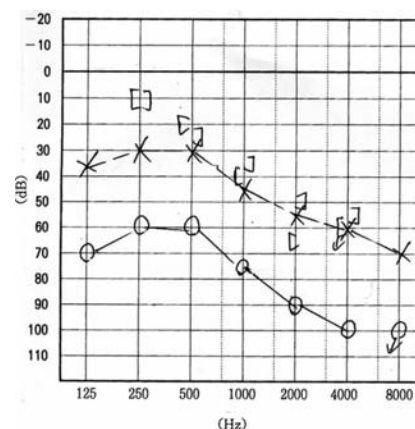


Figure 2. Pure-tone audiogram.

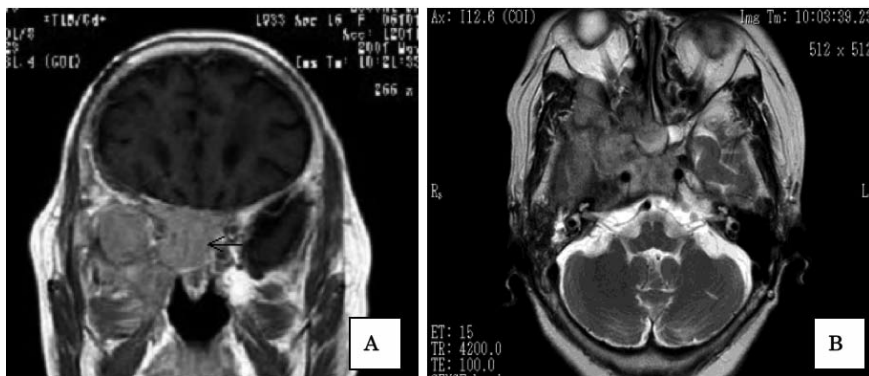


Figure 3. Magnetic resonance imaging (A: T1 coronal and B: T2 axial) showed that the right sphenoid ridge meningioma (arrow) had invaded widely into the right middle cranial fossa and involved the extension along the petrous apex and bilateral optic nerve, but the internal auditory canal, cochlea, vestibule, semicircular canal and jugular fossa were intact.



Figure 4. Computed tomography (A: axial and B: coronal) showed that the meningioma had invaded the petrous apex (arrow) and occupied the middle ear space, but the cochlear and vestibular organs, facial nerve canal and ossicles were intact.

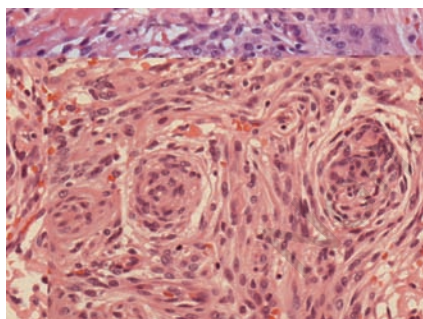


Figure 5. Histopathology of meningioma showed proliferating spindle cells with small oval nuclei and fibrous stroma (H&E staining X400).

rior surfaces of the petrous pyramid, internal auditory canal, and jugular fossa. Various clinical findings can present according to the route of by which the tumors extend. Rushing *et al.*,⁴ Thedinger *et al.*,⁵ Goel,⁶ Thompson *et al.*⁷ reported that ear and temporal bone meningiomas could show variety of clinical findings as cochlear and vestibular symptoms or cranial nerve palsy. Hamilton *et al.*⁸ revealed that hearing loss

was the most common clinical presenting feature in temporal bone meningiomas. The complaint of our patient was hearing loss alone, but no tinnitus, vertigo/dizziness and facial nerve palsy. A pure tone audiogram showed a mixed hearing loss in right ear, and almost equals left and right bone conduction. Her imaging findings showed that the right sphenoid ridge meningioma had invaded widely into the right middle cranial fossa and involved the extension along the petrous apex and bilateral optic nerve canals, but the internal auditory canal, facial nerve canal, jugular fossa cochlea, vestibule, semicircular canal, facial nerve canal and ossicles were intact. Therefore, bone conductive loss would be caused by aging change rather than tumor invasion for internal auditory canal, cochlea vestibule and ossicles. In her past history, she previously underwent craniotomy 4 years before for the sphenoid ridge meningioma with right visual impairment. From the above findings, past history and literatures, the symptoms of our case would appear to result from the extension of an extracranial meningioma from the sphenoid ridge to the middle ear via the petrous pyramid.

The patient underwent only partial extirpa-

tion with decompression for the optic nerve, rather than total extirpation including middle ear and temporal bone, due to the wide invasion of the middle cranial fossa and cavernous sinus. Some hospitals⁹⁻¹¹ reported that sphenoid wing and temporal meningiomas involved cavernous sinus or optic nerve like as our case. Mirone *et al.*¹⁰ presented that surgical management of patients with sphenoid wing meningiomas could not be uniform. It should be tailored on a case-by-case basis. Therefore, they recommend the optic canal decompression in all patients to ameliorate or preserve visual function.

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