Meningioma of the Internal Auditory Canal: A Case Report

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Meningioma of the internal auditory canal is very rare. There are only 15 previous reports of intracanalicular meningioma. The authors add a case report of a patient with meningioma of the internal auditory canal. A 31-year-old woman presented with a one-year history of headache, dizziness, hearing loss and left facial paralysis. An MRI of the temporal bone demonstrated a tiny isointense intracanalicular tumor with inhomogeneous enhancement. In the operative field carried out by translabyrinthine approach, the tumor was found in the IAC without intracranial involvement. Pathology revealed a meningioma. The patient was followed up for 2 years without recurrence.

Keywords: Meningioma, Internal auditory canal

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Meningiomas are the second most common tumors located in the cerebello-pontine angle (CPA)(1,2). Although acoustic schwannoma account for the great majority of internal auditory canal (IAC) lesions, alternative pathological entities such as meningioma, facial nerve schwannoma, hemangioma, lymphangioma, hematomata, lipoma, lymphoma, metastases and arachnoid cyst should also be considered(1-14). It was unclear whether a meningioma could originate from within IAC and grow out into CPA or whether they always originated in the CPA and involved the IAC later. There have been only 14 previous reports of intracanalicular meningioma(1,2,7-14). With the introduction of MRI with gadolinium, a tumor as small as 2 mm in the IAC could be detected. The authors report a case of IAC meningioma without intracranial attachment or extension.

Case Report

A 31-year-old female presented with a two-year history of headache, dizziness and hearing loss. She had a one year history of progressive left-sided hearing loss and followed by left facial nerve paralysis. Physical examination revealed a complete lower motor neuron facial nerve paralysis. An audiologic workup revealed left deafness. A caloric test revealed no vestibular response on the left side. The remainder of the neurological examination showed no abnormal findings.

On T1-weighted Magnetic Resonance Imaging (MRI) images showed a tiny isointense intracanalicular tumor with inhomogeneous enhancement after gadolinium injection, displaced and almost obliterated the normal content of CSF compared to the contralateral IAC (Fig. 1). A pre-operative diagnosis of acoustic schwannoma was made.

At surgery, carried out by the translabyrinthine approach, the IAC was explored and a tan, multilobulated, soft tumor was found in the IAC, not extending into the CPA and without intracranial attachment. The seventh, and eighth nerve were infiltrated with tumor and the bone around IAC was destroyed. The lateral end of the tumor was carefully dissected to ensure complete removal, and the tumor was completely excised. Postoperatively, she did well without CNS
complication and she was followed up for 24 months without recurrence.
Pathology revealed a meningioma (Fig. 2).

Discussion
Most lesions of the IAC and CPA are acoustic schwannoma and meningioma. Other rare lesions are harmatomas\(^{13}\), hemangiomas\(^{4}\), facial nerve schwannomas\(^{8}\), lipomas and arachnoid cysts.

Meningiomas are thought to arise from the epithelial lining cells of arachnoid villi. They arise most frequently along the dural venous sinuses adjacent to the sigmoid sinus, jugular foramen, torcula, or the superior and inferior petrosal sinuses\(^{(1,2,5,7-13)}\). Arachnoid granulations also occur less commonly along the dural lining of foramina of the cranial nerves, including the IAC, thus meningiomas may originate within the IAC. Meningiomas can arise within IAC 10-20\%\(^{9}\).
In the era before MRI, meningioma were most often discovered when they had grown quite large, and their site of origin was uncertain (2). It was unclear whether a meningioma could originate from within the IAC and grow out into the CPA or whether they always originate in the CPA and involves the IAC secondarily. With MRI tumor as small as 2 cm could be detected in the IAC.

Meningioma most commonly arise during the fourth to sixth decades, and occur more frequently in women (F:M ratio 2-5:1) (2,5,8,11,12). Monosomy of chromosome 22 is the most characteristic genetic anomaly, when either copies of the gene are missing or damaged, unregulated growth can occur, leading to tumor formation (2).

The clinical symptomatologies of intracanalicular meningioma are very similar to those in patients with acoustic schwannoma and other lesions that occupy the IAC such as headaches, dizziness, dysequilibrium and hearing loss (Table 1). But some evidence may facilitate the diagnosis of meningioma more than acoustic schwannoma such as hearing loss has been noted to be less frequent with meningioma than AN, whereas facial nerve involvement is more common in IAC meningiomas than in AN (1,5,11). For CPA meningioma, enhanced MRI demonstrated a sessile, broadly based, homogeneous enhancing lesion. Computed tomography (CT) scan showed a dural tail, calcification 25-36%, hyperostosis of petrous bone 15-25% (1,5,9), bone invasion and an aggressive lesion more than acoustic neuroma such as deep invasion of the temporal bone, the tumor extended to the fundus of the IAC, the tumor invaded the labyrinth and the cochlear of the inner ear, extension from IAC along facial nerve canal to involve horizontal and vertical part of facial nerve, involvement of the ampullated end of the posterior semicircular canal and involvement of the vestibule of the inner ear (1,4).

On T1- weighted MRI both acoustic schwannoma and meningioma are mostly isointense, but occasionally hypointense relative to brain parenchyma. On T2- weighted MRI acoustic neuroma tend to be higher in intensity than meningiomas and more enhancement with intravenous gadolinium contrast than meningiomas, but this difference is too insignificant to be of clinical value (3,5,7-10). Bone invasion is an unusual finding with intracanalicular tumors, but may suggest meningioma like in the presented case.

Fig. 2 Histopathological analysis of the mass demonstrating meningioma. (Hematoxylin and eosin stain)  
A, B) The sections show nests of cells which oval nuclei, inconspicuous nucleoli, lightly eosinophilic cytoplasm and indistinct cytoplasmic border, a feature of meningotheial cells

Fig 3. The sections show the concentrically calcified structure (Psammoma body) among the tumor cell
Meningiomas have a much higher tendency to recurrence than acoustic schwannoma and varies between 0% and 30%\(^2,11\). The most important factor in determining the recurrence rate are associated with incomplete resection, presence of residual disease at the tumor resection, cauterizing adjacent dura may lead to a higher recurrence rate, wide dural excision should be performed\(^2,9\).

### References


### Table 1. Clinical findings of intracanalicular meningiomas and surgical approach

<table>
<thead>
<tr>
<th>Study</th>
<th>age/sex</th>
<th>major symptom</th>
<th>surgical approach</th>
<th>intraop. finding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Singh et al(^2) 1975</td>
<td>14/M</td>
<td>Lt deaf facial weakness 4 yr</td>
<td>MF</td>
<td>granular appear</td>
</tr>
<tr>
<td>Langman et al(^9) 1990</td>
<td>52/M</td>
<td>Rt SNHL, vertigo</td>
<td>TL</td>
<td>Mass at porus acousticus</td>
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<tr>
<td></td>
<td>54/M</td>
<td>Bilateral HL</td>
<td>TL</td>
<td>not reported</td>
</tr>
<tr>
<td>Zeitouni et al(^2) 1997</td>
<td>60/F</td>
<td>Dysequilibrium, HL 6 mo</td>
<td>TL</td>
<td>not reported</td>
</tr>
<tr>
<td>Ishikawa et al(^9) 1999</td>
<td>55/M</td>
<td>HL, Facial palsy 5 yr</td>
<td>TL</td>
<td>not reported</td>
</tr>
<tr>
<td>Dinh et al(^3) 2000</td>
<td>53/F</td>
<td>Rt HL, hemifacial spasms 1 yr</td>
<td>SO</td>
<td>tan to red mass</td>
</tr>
<tr>
<td>Caylan et al(^3) 2000</td>
<td>42/M</td>
<td>Rt HL, vertigo 2 yr</td>
<td>TL</td>
<td>hypervascular</td>
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<tr>
<td></td>
<td>46/M</td>
<td>Rt HL, Unsteadiness 2 mo</td>
<td>TL</td>
<td>high vascular</td>
</tr>
<tr>
<td>Devesa et al(^1) 2001</td>
<td>48/F</td>
<td>Lt HL, unsteadiness 9 mo</td>
<td>TL</td>
<td>friable and vascular</td>
</tr>
<tr>
<td>Hilton et al(^9) 2002</td>
<td>38/F</td>
<td>Lt HL 2 y, facial palsy 3 mo</td>
<td>TL</td>
<td>not reported</td>
</tr>
<tr>
<td>Asaoka et al(^6) 2002</td>
<td>66/M</td>
<td>Lt HL tinnitus 3 mo</td>
<td>MF</td>
<td>tan multilobe, hypervascular</td>
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<tr>
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<td>Lt SNHL 1 yr</td>
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<td>Fribal, hypervascular</td>
</tr>
<tr>
<td></td>
<td>67/F</td>
<td>Lt HL, facial palsy 3 yr</td>
<td>TL</td>
<td>Hypervascular, calcification</td>
</tr>
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เนื้องอกเยื่อหุ้มสมองของช่องหูชั้นใน: รายงานผู้ป่วย

วันดี ไข่สมค์, สิริพร หิรัญแพทย์, ชวบูลย์ เดชสุขม

เนื้องอกเยื่อหุ้มสมองของช่องหูชั้นใน (Meningioma of the internal auditory canal) เป็นโรคที่พบได้น้อยมาก มีผู้ป่วยที่รายงานเพียง 15 คน คณะผู้รายงานได้รายงานผู้ป่วยเพศหญิงหนึ่งราย อายุ 31 ปีมีอาการปวดและมีบินศีรษะ การได้ยินลดลงและใบหน้าซ้ายเป็นอัมพาตมา 1 ปี ส่งตรวจคลื่นแม่เหล็กพบว่ามีเนื้องอกขนาดเล็กที่ช่องหูชั้นในผู้ป่วยได้รับการผ่าตัด ผลชิ้นเนื้อทางพยาธิวิทยายืนยันว่าเป็น Meningioma การติดตามผู้ป่วยหลังผ่าตัด 2 ปี ยังไม่มีการเกิดขึ้น