Huge Facial Schwannoma Extending Into the Middle Cranial Fossa and Cerebellopontine Angle Without Facial Nerve Palsy

—Case Report—

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Abstract

A 46-year-old male presented with a huge facial schwannoma extending into both the middle cranial fossa and the cerebellopontine angle but without manifesting facial nerve palsy. Neurological examination on admission revealed no deficits except for speech disturbance. Computed tomography showed a multicystic tumor extending into the middle cranial fossa and the cerebellopontine angle, with destruction of the petrous bone. The tumor was totally grossly removed. Histological examination identified schwannoma. Total facial nerve palsy appeared postoperatively, but hearing acuity was preserved at a useful level. Facial nerve palsy is one of the most typical symptoms in patients with facial schwannoma, but is not always manifested even if the tumor extends into both the middle cranial fossa and the cerebellopontine angle.

Key words: schwannoma, facial nerve, middle cranial fossa, cerebellopontine angle, facial nerve palsy

Introduction

Facial schwannomas extending into both the middle cranial fossa and the cerebellopontine angle occur in only 3% of all cases, and almost always present with facial nerve palsy and hearing loss persisting for 4 months to 17 years (mean 7.3 years).^{2,6)} Normal facial nerve function and hearing acuity occur in 27.3% and 51% of all patients with facial schwannomas, respectively.⁴⁾ Preoperative diagnosis of facial schwannomas manifesting no facial nerve paresis is quite difficult.⁹⁾ We describe an unusual case of huge facial schwannoma extending into both the middle cranial fossa and the cerebellopontine angle without associated facial nerve palsy.

Case Report

A 43-year-old male had become gradually reticent since age 28 years in 1983. He was divorced by his wife in 1993 and had been treated under a diagnosis of depression at a psychiatric clinic since 1995. He was referred to our department with speech distur-

bance on March 27, 1998.

Neurological examination disclosed only speech disturbance. He had no other deficits, including no sign of facial nerve palsy and no hearing distur-

Fig. 1 Skull radiograph, anteroposterior view, showing erosion of the roof of the left petrous bone (arrowheads) and enlargement of the ipsilateral internal auditory canal (arrow).

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Fig. 2 Computed tomography (CT) scan showing a multicystic lesion extending into both the middle cranial fossa and the cerebellopontine angle (left). The cyst wall was enhanced with contrast medium (center). Bone window CT scan demonstrating erosion of the middle and lateral portion of the left petrous bone (right).

Fig. 3 T₁-weighted magnetic resonance images, coronal (left) and sagittal views (center, right), with meglumine gadopentetate demonstrating the multicystic mass lesion continuously extending into both the middle cranial fossa and the cerebellopontine angle.

bance. He comprehended only simple orders and spoke few words. Skull radiography showed erosion of the roof of the left petrous bone and enlargement of the ipsilateral internal auditory canal (Fig. 1). Computed tomography (CT) showed a huge cystic mass extending into both the left middle cranial fossa and the cerebellopontine angle (Fig. 2 left). The cyst wall was enhanced with contrast medium (Fig. 2 center). Bone window CT demonstrated erosion of the middle and lateral portion of the left petrous

bone (Fig. 2 right). Magnetic resonance (MR) imaging with meglumine gadopentetate (Magnevist®; Schering AG, Berlin, Germany) revealed a multicystic and dumbbell-shaped tumor located in both the middle cranial fossa and the cerebellopontine angle (Fig. 3). Cerebral angiography showed no abnormality except for vascular compression by the tumor.

Tumor extirpation was performed through a subtemporal transtentorial approach on April 1, 1998. A

huge multicystic tumor covered by the dura mater of the middle cranial fossa was found by uncapping the flattened temporal cortex. Tentorial incision and unroofing of the internal auditory canal were performed after removal of the part of the tumor located in the middle cranial fossa. The upper surface of the petrous bone was eroded by the tumor, whereas the roof of the geniculate ganglion was intact. The trochlear and trigeminal nerves were compressed anteriorly and medially by the soft and multicystic tumor located in the cerebellopontine angle, and continuously extending from the middle cranial fossa through the internal auditory canal. The tumor in the internal auditory canal was solid and did not extend to the geniculate ganglion. The facial nerve was embedded in the tumor just after emerging from the brain stem. The tumor was totally extirpated under facial nerve monitoring, but the facial nerve could not be preserved. The acoustic nerve coursed on the caudal side of the tumor in the cerebellopontine angle and so was preserved anatomically (Fig. 4). Histological examination of the specimen showed schwannoma composed primarily of Antoni type A (Fig. 5).

Complete left facial nerve palsy appeared postoperatively, but the patient's hearing acuity on the operative side was preserved despite mild conductive hearing disturbance (Fig. 6). His speech disturbance improved within a week. He refused reconstruction of the facial nerve and was dis-

Fig. 4 Intraoperative photograph (left) and schematic drawing (right) after unroofing of the internal auditory canal and extirpation of the tumor in the canal. The tumor does not extend to the geniculate ganglion through the canal, and the roof of the geniculate ganglion is also intact. The acoustic nerve is preserved anatomically.

Fig. 5 Photomicrograph of the tumor specimen showing compact elongated cells (Antoni A pattern). HE stain, $\times 200$.

Fig. 6 Postoperative audiograms showing mild conductive hearing loss on the left.

charged one month later. He returned to his job as an orange farmer in July 1998. MR imaging showed no recurrence at 19 months after the surgery.

Discussion

Huge facial schwannoma without associated facial nerve palsy is extremely rare. The reasons for non-manifestation may be neuronal tolerance induced by the extremely slow growth of the tumor; abundant tumor blood flow also supporting the facial nerve, thus maintaining nerve function; and the tumor location at the horizontal portion, between the internal auditory canal and geniculate ganglion, where the many dehiscences in the surrounding petrous bone could easily protect the facial nerve from the compression force of the tumor.^{3,7)} In the present case, the tumor originated from the cisternal and horizontal portions. Compression of the facial nerve and the acoustic nerve was relieved by destruction

of the facial and the auditory canals in the petrous bone, and the main extension of the tumor toward the middle cranial fossa. The tumor may have caused the speech disturbance by compression of the left frontotemporal region, which contributes to speech and comprehension. His poor verbal response could also have resulted from his depression.

Facial nerve function after tumor extirpation is occasionally preserved in patients with a small schwannoma which only partially involves the nerve.⁸⁾ The tumor can be removed with preservation of the major part of the nerve. However, a nerve graft or faciohypoglossal anastomosis is required in almost all patients with a large tumor.^{2,4,8)} In the present case, the facial nerve could not be preserved since the nerve was embedded in the tumor.

Differential diagnosis of dumbbell-shaped tumor located in the middle cranial fossa and cerebellopontine angle includes trigeminal schwannoma and acoustic schwannoma. CT and MR imaging are useful to distinguish facial schwannoma from other schwannomas, by evaluating the cross site of extension between the middle cranial fossa and the cerebellopontine angle. Trigeminal schwannomas extend to the middle cranial fossa via the petrous apex. Acoustic schwannomas rarely extend to the middle cranial fossa,⁶⁾ but rather via the tentorial hiatus. Facial schwannomas spread across the facial canal at the middle of the petrous bone, and are characterized by midpetrous bone destruction on bone CT.¹⁾ Widening of the internal auditory canal suggests a tumor originating from the canal, such as acoustic or facial schwannoma. Moreover, enhancement of the geniculate ganglion and distal facial nerve on MR imaging by contrast medium indicates facial schwannoma.⁵⁾ In the present case, enlargement of the internal auditory canal and erosion of the middle portion of the petrous bone by radiography and bone CT, respectively, lead to the preoperative diagnosis of facial schwannoma despite the normal facial nerve function.

Facial nerve palsy does not always manifest in patients with facial schwannoma even if the tumor

extends into both the middle cranial fossa and the cerebellopontine angle. CT and MR imaging are useful for the diagnosis of facial schwannomas.

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