Neurinoma of the Greater Superficial Petrosal Nerve Developed Acute Facial Palsy: Case Report and Review of the Literature

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ABSTRACT

The authors report on a patient with a greater superficial petrosal nerve neurinoma. The patient developed severe acute facial palsy and the palsy improved soon after removal of the tumor. We review of the literature and describe its rarity and surgical treatment with regard to other facial nerve neurinomas originating from the main trunk of the facial nerve.

KEYWORDS: Greater superficial petrosal nerve, facial nerve neurinoma, facial palsy

Facial nerve neurinomas are benign, slow-growing neoplasms that can occur anywhere along the course of facial nerve. Symptoms of facial nerve neurinoma include facial palsy, facial pain, facial spasm, hearing disturbance, or a combination.^{1,2} The greater superficial petrosal nerve is the first branch that breaks away at the geniculate ganglion. It passes to the pterygopalatine ganglion and innervates the nasal and palatine mucosa and the lacrimal gland of the eye. We present a case of neurinoma originating from the greater superficial petrosal nerve in the middle cranial fossa. Surgical

treatment is discussed in relation to other facial nerve neurinoma.

CASE REPORT

A 65-year-old woman was referred to our hospital because of acute left facial palsy. She was initially diagnosed with Bell's palsy, for which she had been treated with steroids. Magnetic resonance imaging (MRI) showed an intracranial mass. She was ad-

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mitted to our hospital for surgical treatment in November 1999.

Examination

On admission, neurologic examination showed severe left facial palsy of House(Brackmann grade V.³ Electroneurography demonstrated 90% of degeneration of the left facial nerve. No loss of taste in the anterior two-thirds of the tongue was observed. Computed tomography (CT) scan showed an isodense mass in the left middle cranial fossa and erosion on the anterior aspect of the petrous bone (Fig. 1). The mass was enhanced slightly with contrast medium. MRI showed a well-circumscribed mass at the same location, 1.5×1.5×2-cm in size (Fig. 2). Left carotid angiography showed that the mass was hypovascular.

Operation

A left middle cranial fossa approach was performed. The dura was elevated from the base of the left middle cranial fossa. The tumor was located extradurally. The dura had not been infiltrated by the tumor. The base of the left middle cranial fossa around the tumor was drilled to facilitate removal of the tumor. The tumor was yellowish and soft. It was removed completely, piece by piece, and

Figure 1 Three-dimensional CT scan demonstrating bone erosion on the anterior aspect of the left petrous bone.

sharply dissected from the main trunk of facial nerve. The main trunk near the geniculate ganglion of the facial nerve had been compressed by the tumor. Intraoperative electrostimulation to the main trunk of the facial nerve during tumor dissection and after complete removal of tumor demonstrated that the left side of the face could move adequately. Because the tumor had also invaded the tympanum, we sealed the tympanum with a small piece of temporal muscle after complete removal of the tumor.

Postoperative Course

The histologic diagnosis of the tumor was neurinoma, mainly Antoni type A. The patient had a transient left hearing disturbance of 42.5 dB due to

Figure 2 Contrast-enhanced axial (A) and coronal (B) T₁-weighted MRI demonstrating a tumor in the left middle cranial fossa.

exudate in the tympanum after the operation. The patient had decreased lacrimation in the left eye. Left facial palsy has been gradually improving. Facial nerve function has returned to grade II 6 months after the operation. Hearing was also improved to 20.0 dB.

DISCUSSION

Neurinomas arising from the facial nerve are rare, comprising only 0.8% of all intrapetrous mass lesions.⁴ Facial nerve neurinoma can involve any segment of the nerve. Among 239 cases reviewed by Lipkin et al.,⁵ the tympanic segment was the most frequently involved. The greater superficial petrosal nerve is a branch of the facial nerve that functions in innervating the lacrimal gland and mucous membranes of the nasal cavity and palate. We diagnosed this case as greater superficial petrosal nerve neurinoma on the basis of the intraoperative findings and postoperative symptoms. Facial nerve neurinoma originating from a greater superficial petrosal nerve is very rare. There are only five previously described cases of greater superficial petrosal nerve neurinoma in the literature.^{2,6-10}

Although the most effective management of facial nerve neurinoma (decompression, total resection with cable grafting, or other facial reconstructive options) remains controversial¹¹ treatment in most cases consists of tumor removal with cable nerve grafting.^{1,12,13} In our experience, a 52-year-old woman with facial nerve neurinoma was surgically treated by total tumor resection and

cable grafting with the sural nerve. Facial nerve function returned to grade III 2 years after the operation. In the present case, we also planned cable grafting after total tumor resection. However, because the facial nerve could be identified by electrical monitoring and the tumor was removed completely without sacrifice of the main trunk of the facial nerve, we decided not to perform the cable grafting after all. If we could determine the origin of facial nerve neurinoma before the operation, it would be very useful in its management. However, except in special cases, this is difficult, as five of the six reported cases of greater superficial petrosal nerve neurinoma (including our case) had symptoms common to facial nerve neurinomas originating from other segments (Table 1). Kumon et al.¹⁰ reported a case of greater superficial petrosal nerve neurinoma that could be diagnosed before the operation. In that case, facial palsy was not present preoperatively. The tumor was located along the course of the greater superficial petrosal nerve and its extension was not related to the facial nerve, permitting an accurate preoperative diagnosis. In our case, the tumor was located near the geniculate ganglion, and facial nerve dysfunctions involving the main trunk were observed in both physiologic and electrophysiologic examinations. Stereotactic radiosurgery will be useful in the treatment of facial neurinoma, as it is also useful in the treatment of acoustic neurinoma.¹⁴ However, the restoration of facial nerve function and the long-term outcome after stereotactic radiosurgery for facial nerve neurinoma are unclear. Although greater superficial petrosal nerve neurinoma is very rare, we should keep in mind the possibility of preserving

Table 1 Cases with Greater Superficial Petrosal Nerve Neurinoma

Authors/Year	Age/Sex	Symptoms
Tremble and Penfield, 1936 ⁹	42/M	Facial palsy, hearing disturbance
Kleinsasser and Friedman, 1959 ⁸	19/M	Facial palsy, hearing disturbance
Furlow, 1960 ⁷	48/M	Facial palsy, hearing disturbance
Dolenc et al., 1996 ⁶	37/M	Facial palsy, hearing disturbance
Kumon et al., 1999 ¹⁰	21/M	Hearing disturbance
Present case	65/M	Facial palsy

facial nerve function of the main trunk with total tumor resection in cases such as ours.

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