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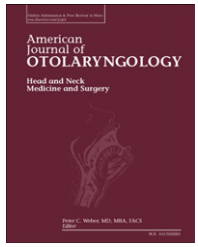

Stripping surgery in intratemporal facial nerve schwannomas with poor facial nerve function☆,☆☆

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ABSTRACT

Objective: To report stripping surgery in intratemporal facial nerve schwannomas (FNS) with poor facial nerve function.
Methods: We attempted stripping surgery to completely remove intratemporal FNS with nerve intact in 17 patients, and succeeded in 12 cases. Clinical features of the tumors and the surgical approach were discussed.
Results: Multi-segment involvement was present in 10 cases (58.8%). The tumors were completely removed in all cases, and facial nerve integrity was preserved in 12 patients (70.6%). Six of 12 cases (50.0%) with nerve intact obtained acceptable facial nerve recovery, two of which recovered to Grade II, compared to 2 of 5 cases (40%) with nerve grafting.
Conclusions: Multi-segment involvement was more common in FNS. Stripping surgery could remove tumor completely with nerve intact in majority patients, and it seemed to obtain better outcomes of facial nerve.

1. Introduction

Facial nerve schwannomas (FNS) are unusual entities, and they are the most common tumors of facial nerve [1]. FNS can involve any segments of facial nerve from cerebellar pontine angle segment to extratemporal main trunk.

There are over 600 reported intratemporal FNS in the literatures [2,3]. Most reports contain relatively small case numbers, and those containing larger case series are limited. Kertesz et al. [4] reported 88 facial nerve neuromas, but focused on anatomical and radiological features with neither clinical nor management details discussed. McMonagle et al. [3] and

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O'Donoghue et al. [5] analyzed the clinical and management details of 53 and 48 cases with FNS, respectively, but the great majority had normal or near-normal facial nerve function (House–Brackmann [6] Grade I or Grade II). There have not been a study about a large series of intratemporal FNS with poor facial nerve function (Grade IV or worse), to our knowledge.

We aim to present a large series of intratemporal FNS with poor facial nerve function and present our experience of stripping surgery.

2. Materials and methods

A consecutive series of 17 patients of intratemporal FNS with poor facial nerve function, who were surgically treated in a tertiary referral center, were included in the study, and those patients with favorable facial nerve function (Grade III or better) who received expectant treatment other than surgical treatment were not involved. All diagnoses were confirmed pathologically. The stripping procedure was accomplished by the same surgeon. Intraoperatvie facial nerve monitoring and electrical stimulation were introduced to aid identification of facial nerve from the tumor tissues, and the key procedure was meticulous microdissection between nerve fibers and the tumor tissue under high magnification. The separation of fascicle and the tumors must be gentle to avoid facial nerve damage. Facial nerve was sacrificed when it was impossible to separate facial nerve from the tumors, and sural or greater auricular nerve was used as graft to fill the nerve deficit. Whether greater auricular nerve or sural nerve was used as the graft material was dependent on the length of nerve graft required. Greater auricular nerve was the preferred choice, since it was convenient to harvest, but sural nerve was adopted when longer nerve graft was required.

The surgical approach was mainly determined by tumor location. If the tumors were located at labyrinthine segment, geniculate ganglion, tympanic segment, or mastoid segment, transmastoid approach would be used. Middle cranial fossa combined with transmastoid approach was adopted when internal auditory canal was also affected. For adequate exposure of the region at geniculate ganglion or labyrinthine segment, incus was removed and placed back after tumor removal. The incus should be repositioned exactly to minimize hearing damage.

There were 9 female and 8 male among the case series, and mean age was 35.65 ± 1.53 years (range, 17 to 66 years). They were followed up for 43.94 ± 2.14 months (range, 15 to 80 months), with MRI examination to assess tumor recurrence. Hearing was measured by clinical audiometer. Their clinical features and outcomes of facial nerve are discussed.

3. Results

Summary of the cases is listed in Table 1.

3.1. Clinical presentation

All patients presented with severe facial palsy due to our inclusive criteria. Insidious onset of facial palsy was present in 9 of 17 patients (52.9%), and recurrent facial palsy was observed in one case. Seven of total 17 patients (41.2%) had hearing loss, among which 5 had conductive hearing loss and one had sensorineural hearing loss with another suffering mixed hearing loss.

Otalgia was common, which was complained of in 4 cases (23.5%). Tinnitus and vertigo affected 3 cases (17.6%) and 3 cases (17.6%), respectively. Other symptoms, dysgeusia and xerophthalmia, were also observed in one patient, respectively.

3.2. Anatomical location

Tympanic segment was most commonly affected, which was involved in 10 cases (58.8%), followed by geniculate ganglion (8 cases, 47.1%), labyrinthine segment (8 cases, 47.1%), mastoid segment (6 cases, 35.3%), and internal auditory canal segment (3 cases, 17.6%). Extratemporal main trunk was also involved in 3 cases (17.6%). There was multi-segment involvement in 10 cases (58.8%) compared to single-segment involvement in 41.2% of cases.

3.3. Surgery and nerve graft

We successfully accomplished stripping surgery in 12 patients (70.6%), and 5 patients in which stripping surgery was impossible underwent complete tumor removal and nerve grafting with sural or great auricular nerve as the graft materials. Greater auricular nerve and sural nerve were used in 3 and 2 cases, respectively. Hearing of 5 patients with conductive hearing loss before surgery was improved after surgery. Among 11 cases in which geniculate ganglion or labyrinthine segment of facial nerve was exposed by transmastoid approach, hearing of 5 cases remained unchanged, and hearing of 5 cases (45.5%) declined but not more than 15 dB, with one case recovering from 60 dB to 45 dB due to tumor removal.

3.4. Outcomes of facial nerve and tumor recurrence

Generally, 12 of 17 cases (70.6%) recovered to Grade IV or better, among which 8 of 17 cases (47.1%) finally gained satisfactory recovery (Grade III or better). Six of 12 cases (50.0%) with nerve integrity achieved recovery of Grade III or better, among which two patients recovered from Grade IV or V to Grade II, while only 2 of 5 cases of nerve grafting recovered to Grade III, without better recovery. There was no tumor recurrence during the follow-up. Figs. 1 and 2 show a patient with preoperative facial nerve function of Grade V recovered to Grade II 29 months later after accepting stripping surgery.

4. Discussions

Facial palsy is the most common symptom of FNS due to interruption of the motor component, while near half of FNS patients have normal facial nerve function [3]. The most common onset of facial palsy is insidious, and recurrent episodes are rarely observed. In our series, all the patients firstly presented with facial palsy, since those who had normal facial nerve function were excluded in the study. Insidious onset of facial palsy was observed in majority cases, and recurrent facial palsy affected one patient.

Hearing loss is quite common in FNS, which has an incidence of 49.0% [3]. In our study, 41.2% of the patients had hearing loss, including conductive hearing loss sensorineural hearing loss and mixed hearing loss. Conductive hearing loss was caused by either mass intrusion into middle ear cavity or ossicular erosion, sensorineural hearing loss was resulted in by cochlear compression, and mixed hearing loss was attributed to both mass intrusion and cochlear nerve