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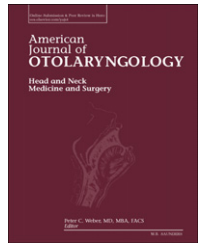

# Facial nerve hemangiomas at geniculate ganglion: preservation of nerve integrity is correlated with duration of facial palsy☆

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ABSTRACT

**Objective:** To study preservation of nerve integrity in 16 cases with facial nerve hemangiomas at geniculate ganglion (GG).

**Methods:** 16 cases with facial nerve hemangiomas at GG, who presented with facial palsy, were included in the study. Preservation of nerve integrity was attempted by the same surgeon during surgical removal, and those who failed to preserve nerve integrity underwent nerve grafting. The patients were divided into longer duration group (>12 months) and shorter duration group (≤12 months) according to duration of facial palsy, and preservation of nerve integrity in the couple of groups was compared.

**Results:** Nerve integrity was preserved in 2 of 10 cases (20%) among longer duration group, while it was preserved in 5 of 6 cases (83.3%) among shorter duration group ($p < 0.05$). All the cases with nerve integrity preserved recovered to grade III or better, among which 3 cases recovered to grade I or grade II, while only 3 of 9 cases (33.3%) with nerve grafting recovered to grade III at the best.

**Conclusions:** Preservation of nerve integrity was correlated with duration of facial palsy in cases with hemangiomas at GG. Patients with nerve integrity preserved showed better outcomes of facial nerve.



## 1. Introduction

Facial nerve hemangiomas were uncommon and reported to be 0.7% among the tumors in temporal bones [1]. Internal auditory canal (IAC) and geniculate ganglion (GG) were most commonly affected [2]. Whereas symptoms of IAC and GG hemangiomas were quite distinctive. Most of patients with IAC hemangiomas initially complained of sensorineural hearing loss other than facial nerve deficit symptoms, while almost all patients with GG hemangiomas presented with facial palsy even when the tumors were of extremely small size [3,4].

GG hemangiomas were believed to arise from geniculate capillary plexus and compressed facial nerve outside [5]. During clinical practice, it was difficult to remove the lesions

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totally without sacrificing facial nerve in most cases, since hemangiomas were found to be intimately adhered to facial nerve [6]. Nevertheless, nerve integrity was significant for better outcomes of facial nerve, since the patients who lost nerve integrity and underwent nerve grafting recovered to not better than grade III (House–Brackmann grading system [7]) [8].

In the current paper, we report a series of 16 cases with GG hemangiomas, and mainly aim to study the correlation between preservation of nerve integrity and duration of facial palsy.

## 2. Materials and methods

The study included a consecutive series of 16 patients with GG hemangiomas, all of which were surgically removed in a referral center between 1998 and 2011 by the same surgeon. All patients had pathological confirmation. The lesions not involving GG of facial nerve were not included in the study. There were 12 female and 4 male, and the mean age was 43.4 ± 12.0ys (range, 19–60ys).

Hemangiomas were totally removed in all cases, and nerve integrity was preserved if possible. Intraoperative facial nerve monitoring was used to help identify facial nerve and the lesions. For the patients with longer duration of complete facial palsy, there was no response for electrical stimulation of facial nerve, and the facial nerve was sacrificed. Facial nerve was also destructed for those patients whose facial nerve was infiltrated by the lesions or intimately adhered to hemangiomas. Nerve grafting was performed on those whose facial nerve had to be sacrificed. Surgical approach was mainly determined by tumor location and preoperative hearing. Middle cranial fossa approach was used to remove hemangiomas at GG or GG and labyrinthine segment with serviceable hearing, and middle cranial fossa combined with transmastoid approach was used to remove hemangiomas at GG and tympanic segment with serviceable hearing. Extralabyrinthine approach [9] was utilized for the lesions at GG without serviceable hearing.

The patients were divided into two groups according to duration of facial palsy, longer duration group (>12 months) and shorter duration group (≤12 months). Preservation of nerve integrity among the two groups was recorded and compared.

They were followed up for 4.25 ± 1.7ys (range, 2–7ys). Tumor recurrence was judged by high-resolution CT scan of temporal bone. Preoperative and postoperative hearing was measured by clinical audiometer. Fisher's exact test was introduced for statistical analysis, and SPSS 17.0 software was involved.

## 3. Results

All of the patients presented with facial palsy of variable degree. One case developed conductive hearing loss due to tumor invasion into middle ear, and the other one had dead ear, since cochlea was invaded by the lesions.

After surgery, facial nerve integrity was preserved in 7 of 16 cases (43.8%). Duration of facial palsy ranged from 3 months to 70 months, 25.4 ± 1.9 months on average. Among longer duration group, facial nerve integrity was preserved in 2 of 10 cases (20%). In contrast, facial nerve integrity was preserved in 5 of 6 cases (83.3%) among shorter duration group. The difference was significant ($p < 0.05$).

All of the 7 cases with nerve intact recovered to grade III or better, among which 3 cases (42.9%) recovered to normal or near-normal level, while the 9 cases who underwent nerve grafting recovered to grade III at the best, among which 6 cases (66.7%) recovered to grade IV or V.

CT scan revealed no recurrence of hemangiomas during follow-up. After surgery, hearing maintained normal in 14 cases, improved in one case and remained absent in another one.

## 4. Discussions

GG hemangiomas usually produced facial nerve deficit symptoms at an early stage. Other symptoms may include sensorineural hearing loss, vertigo, conductive hearing loss, which were caused by cochlea erosion or middle ear invasion. Unlike schwannomas [10], GG hemangiomas tended to be restricted at GG region and rarely grew along fallopian canal. In the case series, 14 of 16 cases (87.5%) had hemangiomas restricted at GG region other than growing along labyrinthine segment, IAC, tympanic segment or even mastoid segment.

The differential diagnosis of GG hemangiomas mainly included schwannomas of facial nerve and meningiomas. GG hemangiomas were characterized by the appearance of "honeycomb bone" and bone spicules with irregular borders on CT, which were caused by intralesional calcification [11] [Fig. 1], while schwannomas appeared as local enlargement of fallopian canal with well-defined margins. Unfortunately, intralesional calcification was only present in 39%–50% of the patients [6,12][Table 1]. Another valuable point was that GG hemangiomas produced facial nerve deficit symptoms at a smaller size [1,5].

Meningiomas at GG region were quite rare. Hemangiomas were difficult to be identified from meningiomas on CT, but the two tumors were different on T2 images of MRI. Hemangiomas were isointense on T1 images and hyperintense on T2 images, while meningiomas remained isointense on both T1 and T2 images [13].

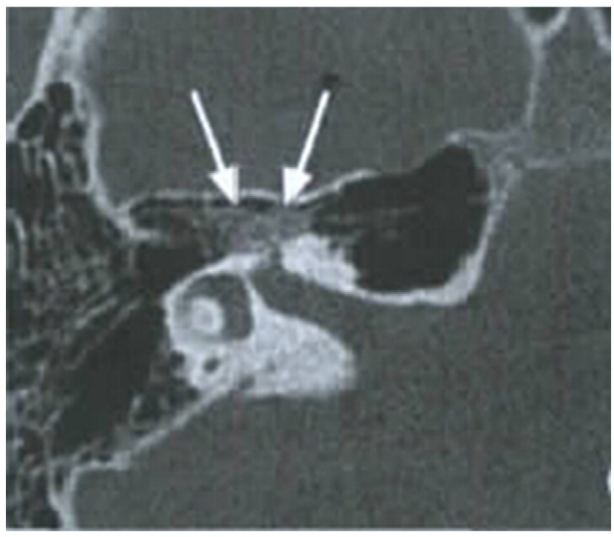

**Fig. 1 – Hemangioma at geniculate ganglion. Intralesional calcification is visible.**