



Clinical Report

Anterior Displacement of the Geniculate Ganglion

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We present the case of a 34-year-old Japanese woman with cholesteatoma of the middle ear. During the operation, this patient showed an unusual position of the geniculate ganglion. We reviewed the computed tomography (CT) images targeting the ear of the present case after the operation. We found that the shortest ranges from the ampullated end of the superior semicircular canal to the geniculate ganglion fossa were 5.1 mm on both sides. We did not find any cases with obvious dislocation of the geniculate ganglion among the 67 cases for which we had performed tympanoplasty. Displacement of the geniculate ganglion is either extremely rare or typically unnoticed because this abnormality is asymptomatic. We speculated that the unusual position of the geniculate ganglion was due to an incomplete development of the tympanic tegmen. When surgical treatment such as decompression of the facial nerve or tympanoplasty is performed, close attention should always be paid to the anatomy of the facial nerve from the labyrinthine segment to the geniculate ganglion. In the present case, although connective tissues existed around the anterior epitympanic recess, we left this lesion to avoid iatrogenic facial palsy.

KEYWORDS: Displacement, geniculate ganglion, facial nerve, surgical treatment

INTRODUCTION

The geniculate ganglion forms in the facial nerve primordium between stage 13 (28 days) and 15 (33 days) embryos^[1]. Ossification of the geniculate segment of the fallopian canal is a complex process that begins at gestational week 20 and forms the eventual roof of the geniculate ganglion at gestational week 35^[2]. Although the presence of radiographic geniculate ganglion dehiscence is not rare^[2], displacement of the geniculate ganglion does not seem to have been reported. We present a case showing an unusual position of the geniculate ganglion, which may have been due to incomplete development of the tympanic tegmen.

CASE REPORT

Informed consent was obtained from the patient.

A 34-year-old Japanese woman initially presented with a 1-month history of bloody discharge and pain involving the right ear. The patient had undergone an operation for left middle ear cholesteatoma 12 years earlier. Clinical examination revealed a granulomatous mass in the flaccid part of the right tympanic membrane. Audiometry demonstrated normal hearing on both sides. Computed tomography (CT) targeting the ear revealed a soft tissue mass at the epitympanum, extending to the mastoid cells of the right ear (Figure 1). Preoperative diagnosis of the present case was cholesteatoma of the right middle ear, and extirpation of the mass was performed using a transmastoid approach. Cholesteatoma was found occupying the right mastoid antrum and epitympanum and was completely resected along with the head of the malleus and the incus. During the operation, we noticed that the position of the geniculate ganglion was unusual, and we left the inflammatory connective tissues, which filled the anterior epitympanic recess, in place to avoid injury to the geniculate ganglion. Histologically, the diagnosis was finally confirmed as cholesteatoma of the middle ear. In a review of the CT images, we reconfirmed that the geniculate ganglion and labyrinthine segment of the facial nerve was displaced antero-superiorly on both sides.

Analysis of Ct Targeting the Ear

CT images were analyzed by two otolaryngologists, with an experience of 19 years and 13 years. CT was performed using scanners with 64-detector rows (Toshiba Aquilion TSX-101A; Toshiba Medical Systems Corporation, Tochigi, Japan), with the following scan parameters: detector collimation, 0.5 mm; tube voltage, 120 kV; tube current, 250 mA; and rotation time, 1.0 s. We used a DICOM Viewer equipped with a measuring instrument on the screen displays (SDS Viewer; TechMatrix Corporation, Tokyo, Japan). In the present case, we found that the shortest ranges from the ampullated end of the superior semicircular canal to the geniculate ganglion fossa were 5.1 mm on both sides (Figure 2). Then, we prepared other CT images targeting the ear of 67 patients for whom we had performed tympanoplasty between 2011 and 2013 at our hospital. We did not find any cases with obvious dislocation of the geniculate ganglion. The mean shortest length from the ampullated end of the superior semicircular canal to the geniculate gan-



Figure 1. a-d. Axial computed tomography of the right temporal bone (a, b). Coronal computed tomography of the right temporal bone (c, d). The cochlea (white arrowhead) is displaced superiorly, and the geniculate ganglion (white arrow) and labyrinthine segment of the facial nerve (black arrows) are displaced antero-superiorly

geniculate ganglion fossa on the 67 CT images was 3.5 ± 0.6 mm (range, 2.1-4.6) on the right side and 3.6 ± 0.6 mm (range, 2.3-4.7) on the left side. There was no statistically significant difference in this value between the right and left sides.

DISCUSSION

Because the course of the labyrinthine portion of the facial nerve is adjacent to the basal turn of the cochlea, just beneath the floor of the middle cranial fossa, we speculated that this unusual position of the geniculate ganglion in the present case was due to incomplete development of the tympanic tegmen. The tegmental process of the petrous part starts to develop as a cartilaginous process of the otic capsule behind the geniculate ganglion and between the anterior and lateral semicircular canals, while the lateral part of the tympanic tegmen develops from the squamous part of the temporal bone [3]. Poor development of the tympanic tegmen at the petrous part may cause superior displacement of the cochlea; therefore, the ge-

niculate ganglion may be displaced anteriorly and superiorly. This unusual position of the geniculate ganglion may be defined as an inner ear abnormality. Displacement of the geniculate ganglion is either extremely rare or typically unnoticed because this unusual position will cause no symptoms. The average measurement of the single-celled anterior epitympanic recess was 3.3 mm (range, 1.0-5.5) in the anteroposterior dimension and 3.4 mm (range, 1.0-7.0) in the transverse dimension [4]. The distance from the ampullated end of the superior semicircular canal to the geniculate ganglion or geniculate ganglion fossa ranged from 2.06 to 4.88 mm in a temporal bone histopathologic study [5], and the results appear to be consistent with our results obtained from the CT images of 67 patients for whom we had performed tympanoplasty. In such a narrow space, close attention should always be paid to the anatomy of the facial nerve from the labyrinthine segment to the geniculate ganglion when a surgical treatment such as decompression of the facial nerve or tympanoplasty is performed. In the case with anterior displacement of the

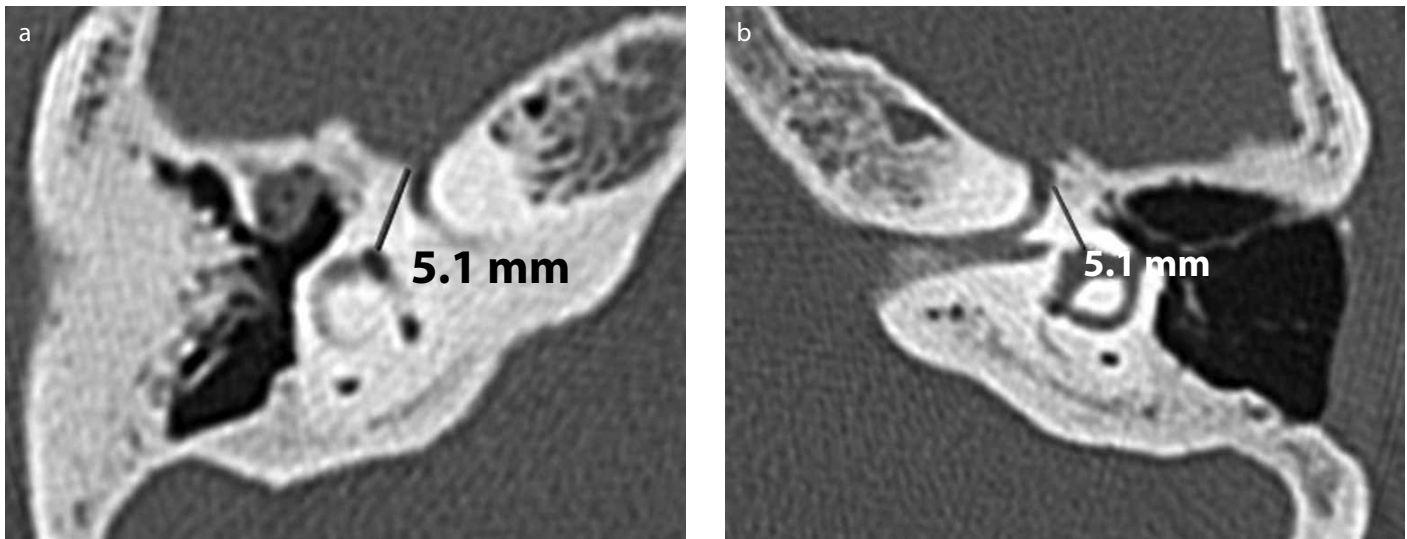


Figure 2. a, b. Axial computed tomography of the right temporal bone (a) and the left temporal bone (b). The shortest ranges from the ampullated end of the superior semicircular canal to the geniculate ganglion fossa were 5.1 mm on both sides

geniculate ganglion, the horizontal part of the facial nerve would be exposed for a longer distance in the anterior epitympanic recess than in the usual position. A careful preoperative evaluation of the position of the geniculate ganglion seems important to avoid iatrogenic facial palsy.

Informed Consent: Written informed consent was obtained from the patient who participated in this study.

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