Geniculate Ganglion Meningioma

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ABSTRACT

The geniculate ganglion is an unusual location for an intratemporal/intracranial meningioma. We present a case of meningioma intrinsic to the geniculate ganglion that presented peculiar features on high-resolution computed tomography (HRCT) and magnetic resonance imaging. On HRCT, we found erosion of the geniculate ganglion with enlargement of the facial canal associated with the appearance of some calcifications within the lesion. These latter findings were confirmed at histological examination. In our patient, the T1- and T2-weighted magnetic resonance images had an intermediate signal and a mild hyperintensity, respectively. Although intracranial meningiomas can have calcifications within the mass, none of the cases of geniculate ganglion meningiomas described in the literature presented with calcifications. To our knowledge, our case is the first with this combination. The presence of calcifications led us to suspect a meningioma of the geniculate segment, which was confirmed at histological examination.

KEYWORDS: Geniculate ganglion, meningioma, skull base surgery, facial graft

The geniculate ganglion is an unusual location for an intratemporal/intracranial meningioma. These tumors originate from ectopic arachnoid cell rests. Nager¹ described four sites in the temporal bone where arachnoid cells were seen to cluster: (1) the internal acoustic meatus, (2) the jugular bulb, (3) the sulcus of the greater and lesser superficial petrosal nerves, and (4) the geniculate ganglion. Primary geniculate ganglion meningioma can present with a progressive or acute facial nerve palsy and hearing loss. Only 16 cases of meningioma intrinsic to the geniculate ganglion have been reported in literature.²⁻⁶

We present a case of meningioma intrinsic to the geniculate ganglion that presented peculiar feature on high-resolution computed tomography (HRCT) and magnetic resonance imaging (MRI).

CASE REPORT

A 45-year-old woman presented with acute facial paralysis and progressive hearing loss. On physical examination, she had House-Brackmann (HB) grade VI facial nerve function. Pure-tone audiometry showed a mixed hearing loss. HRCT revealed expansion of the fallopian canal in the region of the geniculate ganglion with a subtle central high density and some calcifications (Fig. 1). On MRI, T1-weighted images showed a homogenous isointense mass involving the geniculate and tympanic portion of the facial nerve. The lesion showed intense enhancement after administration of gadolinium contrast (Fig. 2). On T2-weighted images, the mass displayed subtle hyperintensity (Fig. 3).

A middle fossa, transmastoid approach revealed that the tumor infiltrated the geniculate ganglion and proximal tympanic segment but spared the mastoid

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Skull Base 2010;20:185-188. Copyright © 2010 by Thieme

Medical Publishers, Inc., 333 Seventh Avenue, New York, NY 10001, USA. Tel: +1 (212) 584-4662.

Received: July 19, 2009. Accepted: August 4, 2009. Published online: October 30, 2009.

DOI: <http://dx.doi.org/10.1055/s-0029-1242196>.

ISSN 1531-5010.

Figure 1 (A) Axial HRCT images. The image shows temporal bone erosion at the site of the geniculate ganglion with a subtle high density in the middle with very thin bony spicula in peripheral medial position (arrows). In addition, the facial canal is enlarged. (B) Coronal HRCT images. Enlargement of the fallopian canal.

segment of the facial nerve. The patient underwent total tumor removal with a great auricular facial nerve cable graft.

Histological examination showed a benign neoplasm characterized by numerous vessels and fibrosis. Portions of the tumor contained calcified psammoma bodies (Fig. 4), leading to the diagnosis of meningioma. Many tumor cell clusters were also positive for epithelial membrane antigen (EMA).

At 1-year follow-up, the patient had no evidence of residual tumor, and the facial nerve had recovered to HB grade IV.

DISCUSSION

On HRCT, meningiomas of the temporal bone are seen to cause bony infiltration and erosion. In two cases, Falcioni et al⁵ found a mass in the area of the geniculate ganglion with erosion of the adjacent structures with a permeative-sclerotic appearance on HRCT. In our case, HRCT confirmed these aspects. We found erosion of the geniculate ganglion with enlargement of the facial canal associated with the appearance of some calcifications within the lesion. These latter findings were confirmed at histological examination. On MRI, the mass is usually described in the literature as hypointense on T1-weighted images and hyperintense on T2-weighted sequences, showing heterogeneous enhancement after gadolinium infusion. Other authors state that meningiomas are usually isointense on both T1- and T2-weighted images.⁶ In our patient, the T1-

and T2-weighted magnetic resonance images had an intermediate signal and a mild hyperintensity, respectively. These different signal intensities might be related to the various histological components of meningioma.

It is difficult to differentiate meningiomas from other tumors of this region, such as schwannomas and ossifying hemangiomas. Schwannomas have sharp margins on computed tomography and are larger than meningiomas or hemangiomas at presentation. Hemangiomas may be the common tumor of the geniculate ganglion, and the margin is not as sharp when compared with schwannomas. Usually, schwannomas are hypointense on T1-weighted images and hyperintense on T2-weighted images with heterogeneous and greater enhancement after gadolinium infusion than meningiomas. Meningiomas in the internal auditory canal tend to involve adjacent nerve tissue or bones. They do not always present with bone erosion and have nearly identical appearance to a vestibular schwannoma, in which bone invasion is unusual.

Although intracranial meningiomas can have calcifications within the mass, none of the cases of geniculate ganglion meningiomas described in the literature presented with calcifications. To our knowledge, our case is the first with this combination. The presence of calcifications within the mass and the bony erosion seen on HRCT, together with the results of the MRI images, led us to suspect a meningioma of the geniculate segment, which was confirmed at histological examination.

Figure 2 (A) Axial T1-weighted 3-D magnetic resonance imaging. The mass located in the geniculate ganglion region shows homogeneous isointense signal. The tumor appears to be in a more anterior-medial position with respect to the geniculate ganglion, along the course of the greater superficial petrosal nerve. (B) Axial T1-weighted 3-D magnetic resonance imaging. Intense enhancement postgadolinium. There is also facial nerve enhancement in the geniculate and proximal tympanic segment of the fallopian canal. (C) Parasagittal T1-weighted magnetic resonance imaging postgadolinium. This image obtained in parasagittal plane perpendicular to the tympanic segment of the facial nerve shows completely the nerve. The mass is located in the geniculate ganglion. There is enhancement of the vertical segment of the nerve probably secondary to ischemia and edema. On the right inferior corner of the image, the representation of the parasagittal slices.

It plays an important role in the preoperative diagnosis between the other tumors of this region of the temporal bone.

Surgery is the treatment of choice. The main surgical technique in patients without hearing loss is the transmastoid approach combined with the middle cranial fossa approach, which preserves hearing. The

translabyrinthine approach is recommended when the patient has total hearing loss. It is very difficult to find a cleavage plane between the tumor and facial nerve because of tumor infiltrations within the nerve. In such cases, it is necessary to remove the infiltrated nerve and to proceed to nerve grafting with the great auricular nerve, as in our case.

Figure 3 Axial T2-weighted 3-D magnetic resonance imaging, slice thickness of 750 μm . In the region of the anterior geniculate ganglion, there is a mass showing mild hyperintensity (arrows).

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Figure 4 Numerous vessels and fibrosis, calcified psammoma body (hematoxylin and eosin stain).