Acoustic Neurinoma with a Large Organized Hematoma
—Case Report—

Yuji TOMONO, Sadayuki TAKEUCHI, and Tadao NOSE

Department of Neurosurgery, Institute of Clinical Medicine, University of Tsukuba, Tsukuba, Ibaraki

Abstract
A 66-year-old female presented with a large organized hematoma within an acoustic neurinoma. She had suffered from diminished hearing for 20 years and had headache 1 week before presentation. Computed tomography demonstrated an inhomogeneously high density cerebellopontine angle mass, and magnetic resonance imaging showed a mass with heterogeneous intensity and gadolinium-diethylenetriaminepenta-acetic acid enhancement of only the peripheral surface of the mass and the inner parts of the internal auditory meatus. At operation the majority of the mass was soft and featureless with a firm capsule, and a yellowish soft tumor was removed from the perimeatal area. Histological examination showed the mass was an acoustic neurinoma with a large organized hematoma. Extensive hemorrhage from an abnormal vascularity in the tumor had repeated followed by granulomatous organization.

Key words: acoustic neurinoma, intratumoral hemorrhage, organized hematoma

Introduction
Microscopic bleeding is a common finding in neurinomas, but spontaneous massive hemorrhage is unusual, and organization of the hematoma in a tumor is even more rare. We present a patient with an acoustic neurinoma that included a large organized hematoma, and discuss the pathogenesis of the hematoma and its organization.

Case Report
A 66-year-old female was admitted to our hospital with a history of diminished hearing on the left and tinnitus for 20 years. One week prior to admission she consulted a physician complaining of headache. Computed tomography (CT) of the brain revealed a tumor in the left cerebellopontine angle (CPA). She was referred to our hospital.

Neurological examination on admission revealed left deafness and gaze nystagmus toward the right. A caloric test recorded diminished response, and the auditory brainstem response was null on the left. CT demonstrated a 3.5 cm diameter round mass lesion in the left CPA, appearing as an inhomogeneous high density mass with a high density rim suggestive of calcification. Only part of the peripheral area was enhanced following contrast administration. Bone-window CT showed expansion of the left internal auditory canal (Fig. 1). T₁-weighted magnetic resonance imaging (MRI) showed a mass with heterogeneous intensity and gadolinium-diethylenetriaminepenta-acetic acid enhancement of only the peripheral surface of the mass and the inner parts of the internal auditory meatus.

Fig. 1 left: Precontrast CT scan demonstrating the inhomogeneous hyperdense CPA mass with a high density rim. right: Bone-window CT scan showing enlargement of the internal auditory canal (arrow) and calcification.
resonance (MR) images showed the tumor mainly as a high signal intensity area with a few low intensity areas. T2-weighted MR images showed the mass mostly as low intensity. The peripheral surface of the mass and the inner surface and orifice of the internal auditory canal were enhanced following gadolinium-diethylenetriaminepenta-acetic acid (Gd-DTPA) administration (Fig. 2).

An operation using a left suboccipital approach exposed a yellow-white, firm mass with glossy surface in the CPA cistern. The interior of the mass was gray, soft, and featureless. The tumor capsule was divided from the cerebellum and pons following internal debulking. A yellowish soft tumor protruding from the internal auditory meatus with a membranous extension around the firm tumor was then observed. The tumor was removed totally, and the facial nerve was preserved. The postoperative course was uneventful except for transient mild facial paresis.

Histological examination of the soft tissue mass revealed the typical features of neurinoma with a palisading pattern (Fig. 3 upper). Necrotic tissue and degenerative fibers were seen in the central part of the firm mass. Neurinoma cells could be seen in the most outer layer (Fig. 3 middle). Areas of relatively recent hemorrhage with hemosiderin-laden macrophages were also observed (Fig. 3 lower). There was no finding to suggest vascular malformation or vascular enlargement. The mass was diagnosed as an acoustic neurinoma with a large organized hematoma.

Discussion

CT frequently shows a neurinoma as a low density lesion with marked contrast enhancement. MR imaging usually shows the tumor as a low intensity area on T1-weighted images and high intensity area on T2-weighted images, with strong enhancement with Gd-DTPA. In this patient, the areas protruding from the internal auditory meatus and covering the firm tumor showed these usual characteristics of an acoustic neurinoma. However, most of the tumor appeared as high density on CT scans, inhomogeneous high intensity on T1-weighted MR images, inhomogeneous low intensity on T2-weighted images, and showed little Gd-DTPA enhancement. Hematoma in the acoustic neurinoma had probably been organized and formed an intratumoral large mass.

Massive hemorrhage in a neurinoma is rare. Previously, the onset has usually been acute with symptoms of headache, nausea, vomiting, and/or new neurological signs.1,2,4,6,8,9,11) Lee et al.10) considered that organization of an intracerebral hematoma occurs after at least 13 days. Boyd and Merrell9 found the duration between bleeding and calcification is 3 years in patients with chronic subdural hematomas. Although our patient had an episode of headache a week prior to the admission, the histological findings suggested that the hemorrhage had been present for a while. There was no change of symptom in her history to suggest an acute hemorrhage.

The hemorrhage in neurinoma may originate in
the focal sinusoidal dilatations, or cavernous or telangiectatic formations which often occur in the blood vessels incorporated in neurinoma, and are liable to spontaneous thrombosis often with resulting hemorrhage.\(^6\) Massive or repeated hemorrhage may also occur from such abnormal vascularities in the tumor.\(^9\)

Most hematomas in the brain or tumors liquefy gradually and are absorbed or form cysts. However, organization is not so rare in chronic subdural hematomas,\(^3\) and has occurred in intracerebral hematomas.\(^10\) The mechanism of organization of a hematoma without absorption may involve repeated bleeding and capsule formation as major factors. The MR imaging and histological findings of old and new hemorrhages support this view.

Ito et al.\(^7\) described a calcified CPA organized hematoma discovered after subtotal resection of an acoustic neurinoma, and suggested that the symptoms of acute hemorrhage were masked by symptoms following the first surgery. In our patient, repeated hemorrhage may have also occurred from the tumor. We suggest that repeated intratumoral bleeding had occurred according to the histological finding of old and new hemorrhages. Since no symptom suggesting massive hemorrhage had occurred except for the episode of headache, we suppose that each bleeding had not been so large. We could not identify the cause of such repeated hemorrhages by hematological or histological examination. No vascular abnormality was confirmed by the histological examination,\(^12\) but abnormal vascularity could have existed in the tumor and been destroyed as a result of extensive hemorrhage.

The conclusive evidence for diagnosis was the MR imaging appearance of the intrameatal enhanced tumor. Although massive hemorrhage in acoustic neurinoma is relatively rare and organization is still rarer, we suggest that MR imaging characteristics be carefully considered in diagnosis.

References

6) Goetting MG, Swanson SE: Massive hemorrhage...


*Address reprint requests to:* Y. Tomono, M.D., Department of Neurosurgery, Institute of Clinical Medicine, University of Tsukuba, 1-1-1 Tennodai, Tsukuba, Ibaraki 305, Japan.