

Computed Tomography with Cystic Acoustic Schwannomas

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Acoustic schwannomas account for 5 to 10% of all intracranial neoplasms or approximately 80% of cerebellopontine angle tumors, and are most common in the middle age with a female preponderance. Symptoms and signs directly depend on tumor size. Progressive unilateral hearing loss with or without tinnitus predominates as an initial symptom, but many patients seek medical attention only after other symptoms intervene. Computed tomography (CT) scanning usually presents typical findings and has been established as the single most useful diagnostic test with high sensitivity and specificity, particularly for solid tumors exceeding 1.5 cm in diameter^{1-4,6-12}).

Although acoustic schwannomas may show central necrosis or accompany cystic arachnoid loculations, they are most often solid and true cystic acoustic schwannomas are infrequent. In a short period of 1 month, however, we experienced 3 successive patients with a large cystic acoustic schwannomas with atypical CT features.

Report of Cases

Patient 1: A 59-year-old female presented with a 1-year history of progressive loss of hearing in the right ear. Since 2 months prior to admission she had occasionally nauseated and noticed unsteady gait. Neurological abnormalities were limited to sensorineural hearing loss, hypesthesia in the cheek, minimal facial weakness and mild limb ataxia, all on the right side.

Plain films and tomograms of the skull were normal, even in retrospect. Whole body scintigram with ⁶⁷Ga citrate was normal, whereas a bone scintigram with ^{99m}Tc-HMDP showed an abnormal uptake in the right 10th rib.

CT scan showed a large low density lesion in the right cerebellopontine angle, associated with deformation and contralateral shift of the fourth ventricle. A thin shell-like ring enhancement of the lesion was seen after contrast medium injection (Figure 1).

A large acoustic schwannoma was totally removed through a right retromastoid approach. The tumor was entirely cystic. Its wall was composed of the whitish-yellow, soft tumor tissue, 2 to 3 mm in thickness. The content of the cyst was the clear, golden yellow fluid that clotted on standing at a room temperature. The patient underwent a right facial-hypoglossal anastomosis

Key words: Acoustic tumor, Acoustic schwannoma, Schwannoma, Cystic schwannoma, Computed Tomography.

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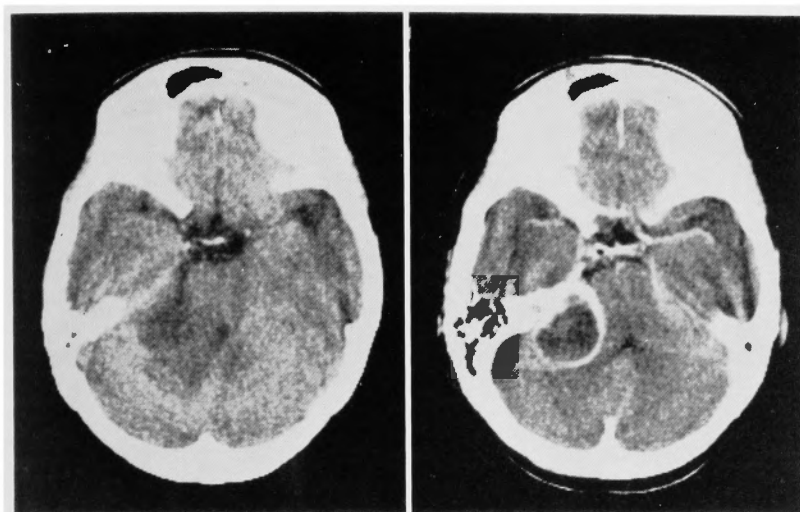


Fig. 1. Patient 1. Computed tomography scan without (left) and with (right) contrast medium enhancement, showing a large low density lesion with rim enhancement in the right cerebellopontine angle region.

3 weeks later. At a follow-up examination 6 months later, function of the right facial nerve is recovering.

Patient 2: A 60-year-old female was admitted with a 2-year history of progressive left hearing difficulties. Neurological abnormalities were limited to left facial numbness and hearing loss. Plain films and tomograms of the skull showed an asymmetrical widening of the internal auditory meatus (7 mm in diameter on the left and 5 mm on the right), but no focal erosion of the petrous bone was found. CT scan showed a round, mixed low-and-high density mass in the left cerebellopontine region. The high density area with a horizontal fluid level was present in the dependent portion. Contrast medium injection showed a thin peripheral enhancement and a nodular enhancement in the most lateral part of the cyst wall (Figure 2).

A large cystic tumor was totally removed through a retromastoid approach. The cyst wall was largely composed of a thin sheet of soft, yellowish white tumor tissue 2 to 3 mm thick, but contained a small nodule within and abutting the internal auditory porus. Aspiration of the cyst yielded initially the clear, amber-colored fluid that clotted immediately at a room temperature. In the most medial part of the cyst (namely the most dependent part as the patient was lying in the lateral position), however, the aged blood was found to have sedimented. The patient was discharged free of symptoms except for a left hearing loss. Histological studies of multiple specimens of the cyst wall found a typical schwannoma.

Patient 3: A 52-year-old female was admitted with a 2-month history of headache, nausea and staggering gait. She had had left hearing difficulties in the left ear since 4 years prior to admission. Neurological examination found loss of corneal reflex, decreased sensation in the face, sensorineural hearing loss, facial paresis and mild cerebellar ataxia, all on the left side. Papilledema was present on both sides. Results of routine laboratory examinations of the blood and

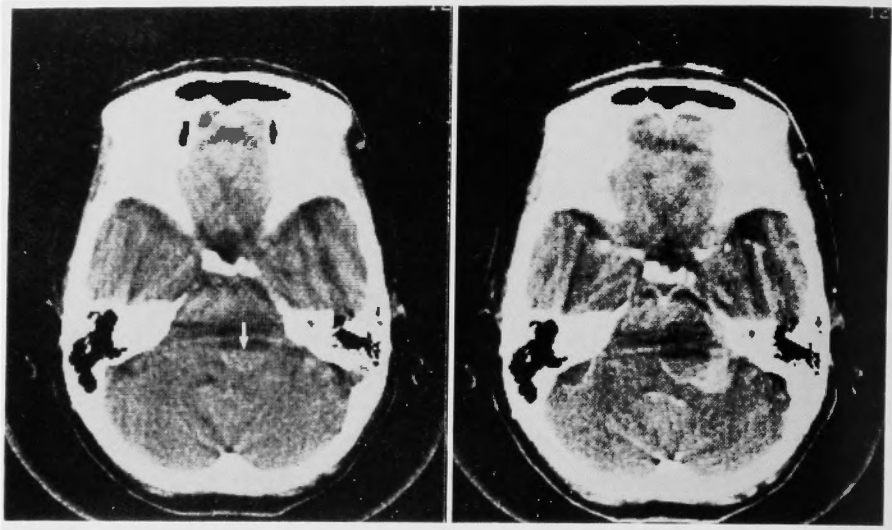


Fig. 2. Patient 2. Computed tomography scan without (left) and with (right) contrast medium enhancement, showing a cystic mass with enhancement of thin capsule and solid nodule in the left cerebellopontine angle region. Arrow indicates the layered blood within the cyst.

urine were within normal limits.

Plain films of the skull and tomograms of the petrous bone were normal. CT scan found a large low density mass with garland shaped enhancement in the left cerebellopontine angle region. The tumor was associated with marked peritumoral edema and symmetrical triventricular dilatation (Figure 3). A cystic VIIIth nerve tumor was radically removed through a retro-

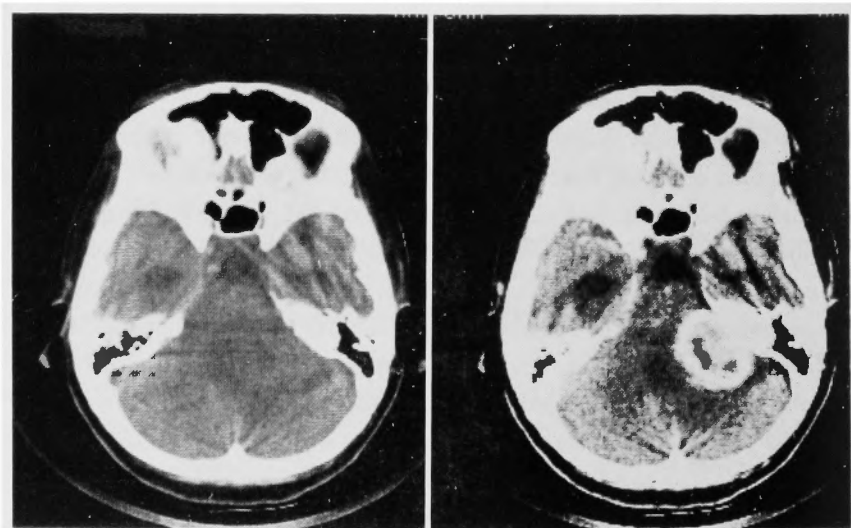


Fig. 3. Patient 3. Computed tomography scan without (left) and with (right) contrast medium enhancement, showing a large cystic tumor with garland-shaped enhancement in the right cerebellopontine angle region.

mastoid approach. The tumorous cyst wall was thicker than that seen in cases 1 and 2, but the content was the clear, golden yellow fluid that clotted on standing. Histological diagnosis was a typical schwannoma.

Discussion

With the advent of CT scanning radiological diagnostic approach in patients suspected of harboring an acoustic schwannoma has changed dramatically. CT scan is now performed prior to any invasive studies and often obviates the necessity of the latter, at least in the majority of cases with extrameatal tumors^{1-4, 6-12}). Typically noncontrast CT demonstrates globular, homogeneously hypodense to isodense mass with or without peritumoral edema. Adjacent cerebellum and brain stem are distorted and rotated. When the tumor is large the fourth ventricle is deformed and displaced, and the symmetrical triventricular hydrocephalus may ensue. Extraaxial nature of the mass is indicated if the CT images through the level above or below the mass show widening of the circumsephenoidal or peripontine cistern, whereas the tumor may completely obliterate the adjacent cisterns. Widening of the internal auditory meatus, erosion of the meatal lip and other erosive changes of the petrous bone are best evaluated using high level-wide window setting of thin CT slices.

Following intravenous infusion of contrast medium approximately 90% of acoustic schwannomas enhance more or less intensely. Enhancement is sharply margined and merges with the petrous bone at least in the region of the internal acoustic porus. When the enhancement is heterogeneous, the postcontrast CT scan may present thick marginal enhancement and central lucency, not unlike metastatic tumors or malignant gliomas. Patient 3 in the present series showed such a finding. Reviewing the literature, however, enhancement limited to a thin rim as observed in patients 1 and 2 belongs to an unusual CT finding with acoustic schwannomas (1, 7). Furthermore, a unique CT finding of layering of the blood in the schwannoma cyst seen in patient 2 has not been reported previously.

In all our three cases, the unenhanced hypodense center represented the true cyst and not the central necrosis or peritumoral loculation of the cerebrospinal fluid. In all cases the cyst was contained wholly within the tumor and completely surrounded by tumor tissues. The wall was very thin in patient 1 and thicker in patient 3, but rather homogeneous in thickness in both. Tumorous nodule was present only in patient 2. Multiple specimens were taken from the cyst wall and they showed findings of a typical schwannoma. No necrotic or angiomatous changes were found in all 3 cases.

The present cases indicate that the CT appearance of acoustic schwannoma may closely mimic that of other mass lesions involving the cerebellopontine angle, such as malignant gliomas, metastatic tumors, abscesses and several others⁷). Atypical CT features as observed in the present cases with cystic schwannoma may lead to an incorrect diagnosis and a delay in surgical removal of this highly curable lesion, particularly when the clinical history is atypical⁵), when the bony changes are minimal or absent, or in patients suspected of harboring an infectious process or malignancy elsewhere.

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和文抄録

嚢胞性聴神経鞘腫の3例—CT所見を中心に—

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聴神経腫瘍の診断に際して CT scan はもっとも有用な所見を与えるが、聴神経腫瘍の中には、転移性脳腫瘍、悪性神経膠腫、膿瘍等とまぎらわしいCT所見を示すものもみられる。今回我々は、このような

まぎらわしい ring enhancement を示した嚢胞性聴神経腫瘍の3例をあいついで経験した。これらの症例を文献的考察を加えて報告する。