Pontine cyst presenting as trigeminal pain

Case report

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The clinical, operative, and autopsy findings associated with a large, solitary, benign cyst of the pons and cerebellar peduncles that simulated a neoplasm of the fifth cranial nerve are described. The cyst manifested itself clinically by fifth cranial nerve signs and symptoms alone. A developmental origin is suggested for this non-neoplastic cyst.

KEY WORDS • pontine cyst • trigeminal pain

Solitary benign cysts of the central nervous system are rare and to our knowledge have not been described previously in the brain stem. This report presents the clinical and pathological features of a large cyst of the pons and cerebellar peduncles that manifested itself clinically by fifth nerve symptoms and signs alone.

Case Report

A 52-year-old woman was admitted on February 6, 1973, for evaluation of constant tenderness on the right side of her face and decreased ability to chew on the right side of her mouth, both of 1 month's duration. She also had experienced intermittent right temporal headaches of increasing frequency and severity for 8 months.

Examination. The general physical examination was normal. The neurological examination revealed a diminished right corneal response and diminished perception of touch and pinprick in the distribution of the second and third divisions of the right trigeminal nerve. The objective function of the motor component of the right trigeminal nerve was normal. Routine laboratory tests, including complete blood count, sedimentation rate, electrolytes, blood urea nitrogen, and urinalysis, were normal. Skull films, brain scan, and four-vessel angiography were also normal. Pneumoencephalography showed absence of the right ambient cistern and ventricles, which were neither dilated nor shifted. The cerebrospinal fluid contained 24 mg% of protein, a glucose level of 65 mg%, and 4 lymphocytes.

Operation. A right subtemporal craniotomy was performed. The middle fossa was normal but the right cerebellopontine angle was filled by a distended pons and brachium pontis. When the tentorium had been cut, an extremely thinned right fifth nerve became apparent. A No. 20 needle inserted in the brachium pontis just behind the fifth nerve released crystal-clear fluid under pressure. The lateral pons then became quite slack and...
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the cerebellopontine angle assumed a more normal appearance. Two small biopsies were taken from the region of the needle site, and these showed only loose-meshed neural tissue containing recent hemorrhages, most likely of operative origin.

Postoperative Course. Initially the patient's reactions were sluggish; she was disoriented and had a right third nerve palsy. She improved over the next 2 days except for persistent mild confusion. On the fourth postoperative day she experienced a respiratory arrest, which responded to intubation and routine measures of resuscitation. Over the next 4 days she remained stable, but attempts to wean her from the respirator were not successful. On the tenth postoperative day she suddenly became unresponsive to pain, her left pupil became unreactive, and the oculocephalic reflexes were lost. A ventricular tap revealed small ventricles under moderate pressure. A one-film ventriculogram demonstrated that the right lateral ventricle was shifted approximately 2 cm to the left. She died shortly thereafter.

Postmortem Examination. The general autopsy showed bilateral acute bronchopneumonia, acute tracheobronchitis, mild pulmonary congestion, and mild atherosclerosis of the aorta.

Examination of the brain revealed a small epidural hemorrhage and a thin layer of subdural hemorrhage at the craniotomy site. The cerebral gyri were flattened and the sulci narrowed. The right inferior-medial temporal lobe had herniated through the incision in the tentorium and caused mild compression of the midbrain. The right lateral pons and brachium pontis were enlarged and protuberant. The fifth cranial nerve was thinned and flattened, but the remaining cranial nerves appeared normal.

Coronal sections of the cerebral hemispheres showed no focal abnormalities and no ventricular enlargement. Transverse sections of the pons revealed an empty cyst occupying much of the right brachium pontis, a portion of the right brachium conjunctivum, right pontine tegmentum, and part of the lateral basis pontis (Fig. 1). The cyst was largest at the level of the mid-pons where it measured 1.3 x 1.7 cm. The cyst walls were smooth and shiny. The surrounding tissue was of normal color and texture, except medial to the root of the fifth nerve where there was a small area of softening and recent hemorrhage. In contradistinction to the pneumoencephalogram, which revealed no abnormality of the fourth ventricle, at autopsy the cyst was found to have caused lateral deviation of the rostral portion of the fourth ventricle. The remaining portion of the brachium conjunctivum and the dentate nucleus were elevated. At no point was there a connection between the cyst and the ventricular system or the subarachnoid space. No abnormalities were present in the midbrain or medulla.

Microscopically, the major portion of the cyst was lined by a single layer of flattened epithelial-like cells with pale nuclei and cytoplasm which often contained large, single, PAS-negative vacuoles (Fig. 2 left). The cytoplasmic vacuoles often caused striking indentation of the nucleus. No blepharoplast or cilia were seen in these cells. In some sites the lining was absent, while in others it was multilayered (Fig. 2 right). In other portions of the cyst there were folds in the lining, some of which protruded into the lumen. Except for a few erythrocytes along its inner edge, the cyst was empty. In the tissue surrounding the cyst there were numerous engorged blood vessels, a slight increase in astrocytes, and several small focal recent hemorrhages. The cyst impinged upon portions of the spinal tract and nucleus of the right fifth nerve and the superior sensory nucleus of the fifth nerve. In a small portion of fibers lateral to the cyst there was pallor, a slight astrocytosis, and recent hemorrhages.

![Fig. 1. Transverse section of the pons and cerebellum showing large cyst of the right lateral pontine tegmentum and basis, brachium conjunctivum, and brachium pontis. Wiel stain.](image-url)
A small area of recent encephalomalacia was present in the right brachium conjunctivum and adjacent cerebellar folia.

Additional microscopic findings revealed loose-meshed tissue, neurons with eccentric nuclei and eosinophilic cytoplasm, slight endothelial proliferation, and a moderate astrocytosis in the outer portions of the cortex of the right medial temporal lobe and posterior frontal lobe. Sommer's sector also showed recent ischemic changes.

Discussion

This patient's clinical picture of headache, facial tenderness, decreased sensation to pain and touch, and decreased corneal reflex without other neurological signs suggested a mass lesion in the region of the gasserian ganglion. Neuromas, meningiomas, teratomas, and metastatic tumors are the most common mass lesions affecting the gasserian ganglion solely and were the major diagnoses entertained. The finding of a large, solitary benign cyst in the pons and cerebellar peduncles was completely unsuspected since neither the clinical presentation nor the diagnostic studies indicated a pontine lesion. The patient's fifth nerve signs and symptoms resulted from pressure by the cyst on the fifth nerve sensory nucleus and descending spinal nucleus and tract of the fifth nerve by the cyst. Why so few neurological signs were present with such an extensive lesion is not certain. We can only speculate that slow enlargement of the cyst caused gradual compression and distortion of surrounding structures without functionally destroying them.

Solitary benign cysts of the central nervous system simulating brain tumors have been reported by several authors. Most of the cysts in these reports had ependymal linings and, with the exception of one cerebellar cyst, all were located above the tentorium. To our knowledge, large benign cysts have not been reported previously in the pons.

The true nature of the cyst in our case is not clear. Microscopic sections revealed no evidence of an associated neoplasm or arteriovenous malformation, the more common causes of cystic lesions in the pons. The lack of significant astrocytosis, hemosiderin deposits, or compatible history makes it unlikely that the cyst developed subsequent to an intrapontine infarction or hemorrhage. There was no microscopic evidence that this was a parasitic cyst. The
origin of cells lining the cyst is not clear. In several sites the lining cells were multilayered, a characteristic found in embryonic and neonatal ependyma, suggesting the cyst may have been of developmental origin. The presence of numerous cytoplasmic vacuoles suggests a secretory function for the lining cells. They did not contain cilia and blepharoplasts, and we cannot positively identify them as ependymal cells. It is possible that the appearance of the lining cells underwent alteration because of long-standing pressure, making them no longer identifiable as ependymal cells.

It is apparent from reviewing the autopsy specimen that fluid had not reaccumulated in the cyst following surgery. More than a mere opening of the cyst was necessary to allow it to drain. A small piece of Silastic tubing attached to the tentorium, fitting snugly into the cyst with drainage into the subarachnoid space, may have prevented fluid reaccumulation. A definitive procedure for this particular benign cyst might have been drainage into the subarachnoid space.

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References


