Arachnoid Cyst of the Quadrigeminal Plate*
Case Report

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In infancy, cysts of the quadrigeminal plate are the lesions most likely to cause filling defects in the posterior portion of the third ventricle and partial aqueductal obstruction. As emphasized by Lourie and Berne, precise radiographic diagnosis is mandatory, since these lesions are surgically correctible. In addition to the usual ventriculographic signs of this lesion, the case herein reported had angiographic findings which were of considerable diagnostic significance.

Case Report

A 9-year-old girl entered the St. Louis Children's Hospital for the twelfth time on January 29, 1967, complaining of vomiting, headache, lethargy, stiff neck, and gait disturbance. In 1958, at the age of 14 weeks, her parents had noted that she had a large head (circumference 42 cm). Examination at that time showed a tense fontanel and a "setting sun" appearance of the eyes. Her eyes tended to deviate to the right, and upward gaze was rarely noted. Air ventriculography showed a large suprapineal recess, and no air passed through the aqueduct. After insertion of a right ventriculostriatal shunt, numerous revisions were carried out during the next year and a half with the eventual insertion of a left ventriculostriatal shunt. It was repeatedly noted that the patient tended to look to the right and that her upward gaze was limited. As she became older, ataxia was occasionally observed. In September, 1958, at the age of 21 months, a carbon dioxide pneumoencephalogram showed depression of the aqueduct, a filling defect in the posterior portion of the third ventricle, and downward displacement of the upper part of the fourth ventricle. Another shunt revision resulted in a clinical improvement, and she subsequently displayed normal intellectual and physical development.

Examination. When admitted on January 29, 1967, the child was alert and cooperative. She had difficulty with tandem gait and tended to fall either to the left or right. Both optic discs were elevated. Pneumoencephalography on February 1, 1967 (Fig. 1) revealed a posterior incisural mass which was interpreted to be a quadrigeminal plate cyst. The downward bowing of the anterior medullary velum raised the question of an intracerebellar mass. Radioactive iodinated serum albumin, administered intrathecally, showed normal concentration in the area under question. A right retrograde brachial arteriogram (Fig. 2 left) on February 2 demonstrated an enlarged meningeal artery along the tentorium running parallel to the

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course of the straight sinus. The mass in the region of the quadrigeminal cistern appeared to extend above and below the tentorium (Fig. 2 right). Posterior bowing and displacement of the precentral cerebellar vein (Fig. 3) suggested that the lesion was anterior and external to the cerebellum.

Operation. On February 6, 1967, a right occipital craniotomy revealed a shortened tentorium. A large fluid-filled cyst anterior to and below the tentorial edge displaced the anterior lobe of the cerebellum posteriorly. The cyst contained 2 oz of clear cerebrospinal fluid. Rupture of the floor of the cyst and the anterior medullary velum created a connection between the cyst and the fourth ventricle (Fig. 4). There was no tumor in the cyst wall. The final diagnosis was arachnoid

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**Fig. 2.** Right retrograde brachial arteriograms, arterial phase (February 2, 1967): *Left:* Lateral view, late arterial phase, showing enlarged meningeal artery (arrows). *Right:* Anteroposterior view showing that the posterior cerebral arteries (*hollow arrows*) and superior cerebellar arteries (*solid arrows*) are spread apart in their distal portions.

**Fig. 3.** Right retrograde brachial arteriograms (February 2, 1967). *Left:* Venous phase. Lateral view showing the internal cerebral vein (*large arrow*) displaced superiorly in its posterior portion. The precentral cerebellar vein (*small arrows*) is displaced and bowed posteriorly, indicating the extracerebellar location of the mass. *Right:* Arterial phase. Lateral view showing close opposition of the basilar artery to the clivus.
Cyst of Coopora Quadrigeminal

Postoperative Course. The patient has been free of the symptoms for which she entered. Her intellectual development has been normal. A left homonymous hemianopsia developed immediately after surgery but cleared within 2 months. The ventriculocognitive shunt subsequently became blocked, but revision has been unnecessary.

Discussion

In his review article, Kruyff proposed the following classification of cysts occurring in the area immediately posterior to the third ventricle:

1. An air-filled cyst due to ventricular herniation (or spontaneous ventriculostomy) secondary to a primary block in the ventricular system.
2. An air-filled dilated ambient or quadrigeminal cistern or cavum velum interpositum due to a primary block in the ventricular system or in the subarachnoid cisterns.
3. A cyst of the quadrigeminal plate, either spontaneous or post-traumatic, which arises without evidence of a primary block in the aqueduct or in the cisternal system. These frequently cause hydrocephalus due to complete or partial aqueduct obstruction.

Our case is in Category 3; it showed the classic radiographic signs of a posterior incisural mass, indentation in the posterior aspect of the third ventricle, anterior displacement of the aqueduct, and encroachment on the upper part of the fourth ventricle. Alexander, Lourie and Berne, and Kruyff reported similar findings in their cases. Subsequent air studies in our case (Fig. 1) showed these findings.

The right retrograde brachial arteriogram

Fig. 4. Artist's drawing of the cyst and its relation to the surrounding structures. The arrow indicates where surgical communication was established between the cyst and fourth ventricle through the anterior medullary velum.
(Fig. 2 right) demonstrated increased distances between the distal portions of the posterior cerebral arteries and the superior cerebellar arteries. These findings, together with the upward displacement (Fig. 3) of the internal cerebral vein, the vein of Galen, and the proximal portion of the straight sinus, indicated a long-standing incisural mass with supra- and infratentorial components. The basilar artery (Fig. 4) was closely apposed to the clivus, signifying downward and forward displacement of the brain stem. The presence of the large meningeal feeding branch (Fig. 2 left), at first suggesting a meningioma or other neoplasm, probably indicated that the blood supply of the cyst arose from the dura.

The displacement of the precentral cerebellar vein (Fig. 3) was of particular interest in this case. According to Huang and Wolf,² this vein arises in the depths of the precentral fissure and runs anterosuperiorly to reach the surface of the cerebellum. Here it lies behind and below the inferior colliculus of the quadrigeminal plate. It continues upward to join the posterior end of the vein of Galen. In the present case, the precentral cerebellar vein was displaced and bowed posteriorly, which indicated that the lesion in question was extracerebellar.

The differential diagnosis of quadrigeminal plate cysts should include pinealoma, meningioma, arteriovenous malformation of the vein of Galen, and glioma invading the quadrigeminal plate.⁴ Meningioma may be distinguished by its uptake on the gamma scan and by its characteristic angiographic stain. A laterally arising glioma should cause more lateral displacement of the aqueduct than would a midline cyst. Pinealomas and the above two lesions behave as solid rather than cystic masses and would be more likely to cause total occlusion of the aqueduct before stretching and bowing occur. An arteriovenous malformation and aneurysm of the vein of Galen should, of course, have a distinct angiographic appearance.

Summary

We have reported the case of a 9-year-old girl with hydrocephalus due to an arachnoid cyst of the quadrigeminal plate. In addition to the characteristic ventriculographic findings of a filling defect in the posterior part of the third ventricle with subtotal aqueductal obstruction and downward displacement of the fourth ventricle, there was angiographic evidence of an incisural mass with supra- and infratentorial components. There was also an enlarged tentorial meningeal artery which coursed parallel to the straight sinus. Posterior bowing of the precentral cerebellar vein confirmed the extracerebellar origin of the mass.

Operative rupture and connection with the fourth ventricle resulted in persisting improvement in the original symptoms and signs.

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References