Hydrocephalus due to Dilatation of the Dural Sinuses

Case Report

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The study of macrocephalic children, observed under clinical, radiological, and anatomopathological points of view, reveals a large number of causes of hydrocephalus. At the Neurology Department of the São Paulo University Medical School, we had the opportunity of examining a case in which hydrocephalus was caused by huge dilatation of the dural sinuses. Hydrocephalus due to aneurysmal dilatation of the dural sinuses has not been described previously in the literature.

Case Report

The patient was a 7-month-old white boy, admitted to the Neurology Department on

FIG. 1. Angiograms: arterial (A and B) and venous phase (C and D). The cerebral vessels are distended and displaced forward (A); the right anterior cerebral artery is displaced toward the left side (B). One vessel, probably the right posterior cerebral artery, is larger than the other arteries, and its boundaries are lost in the tumor mass (A, C). During the venous phase (C, D) the contrast medium remains in the interior of the tumor.
November 7, 1963, due to progressive enlargement of the head. Birth conditions were normal, as well as his development until the age of 4 months when he was dropped from an approximate height of 1.5 meters, with no apparent ill effects. Later, his family observed progressive increase in the size of the skull, especially in the right parieto-occipital region.

Examination. The patient was in good general condition. Circumference of the skull was 55 cm, and a hard, nonpulsatile bulging was observed in the right parieto-occipital region. The anterior fontanel was full and tense. The superficial veins of the scalp were turgid, and grooves were palpated in the underlying bones. Slight paresis of the left arm was present. The psychomotor development was retarded. Roentgenograms showed a large asymmetrical skull. Examination of the cerebrospinal fluid, obtained from the cisterna magna and lateral ventricles, was normal. Right carotid angiography (Fig. 1) revealed a huge, homogenously-contrasted, space-occupying lesion, taking up approximately two thirds of the right side of the skull.

Course. On the day after admission the patient was febrile, and icterus developed on the fourth day. Blood cultures revealed Proteus mirabilis. The septicemia was not controlled despite intensive antibiotic therapy, and the patient died 15 days after admission.

Postmortem Examination. General evidences of septicemia were observed. On opening the skull, the right cerebral hemisphere was found to be displaced to the left. On the upper side of the right half of the tentorium cerebelli, a large cystic mass was present (Fig. 2), which expanded upwards through the parieto-occipital lobe, reaching the subcortical layer of the convex portion of these lobes. The mass was punctured in an attempt to obtain bacteriologic cultures, and a large amount of fluid blood was drawn. After removal of the brain, dissection of the mass showed that its cavity originated in the confluence of the superior, right-lateral, and straight-dural sinuses. The walls of this mass were formed by delamination of the right half of the tentorium and adjacent falx cerebri. The external surface was smooth; the inner surface was partially covered by blood clots, but was also smooth and shiny when they had been removed. The cavity was unilocular, and the walls were between 1 and 2 mm thick. The cut surfaces of the brain showed a greatly dilated left-lateral ventricle, moderate dilatation of the right ventricle, and distortion of the brain stem, with collapse of the aqueduct.

Discussion

No previous reference in the literature was found on this unusual occurrence of an intracranial venous aneurysm, originating in the dural sinuses. A traumatic etiology for the process is suggested by the clinical history of previous head injury. However, we cannot disprove a hypothesis of a congenital defect in the walls of the dural sinuses, with the trauma being either incidental and unrelated to the process or merely an aggravating factor to the previously existing dural malformation.

Arteriovenous malformations within the dura mater, at the level of the tentorium cerebelli, have been described previously, but the clinical and anatomical characteristics are totally different from the condition presented by our patient.

Arteriovenous fistulae at the level of the vein of Galen and ampulla were cited by Gibson, et al., as producing internal hydrocephalus due to deficient absorption of
Hydrocephalus due to Dural Sinus Dilatation

Hydrocephalus due to dural sinus dilatation of the confluence of the superior, right lateral, and straight dural sinuses, with delamination of the tentorium, produced a lesion occupying approximately two-thirds of the right hemiscranium. The cerebral hemispheres and brain stem were displaced by the mass, and internal hydrocephalus was present due to compression of the brain stem. The history suggested a traumatic etiology, but congenital factors cannot be excluded.

Summary

We have reported a case in which aneurysmal dilatation of the confluence of the superior, right lateral, and straight dural sinuses, with delamination of the tentorium, produced a lesion occupying approximately two-thirds of the right hemiscranium. The cerebral hemispheres and brain stem were displaced by the mass, and internal hydrocephalus was present due to compression of the brain stem. The history suggested a traumatic etiology, but congenital factors cannot be excluded.

References
