ANATOMICAL STUDY OF AN ARTERIOVENOUS MALFORMATION DRAINED BY THE SYSTEM OF GALEN

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Arteriovenous malformations in the region of the pineal gland reported in the literature are rare. French and Peyton in 1954 reviewed the literature and added 5 personal cases to 8 others reported previously. It seems that the first case of arteriovenous malformation drained by the great vein of Galen and accompanied by internal hydrocephalus was reported by Jaeger et al. in 1937. From 1940 until 1953, cases were reported by Russell and Nevin, Alpers and Forster, Oscherwitz and Davidoff, Boldrey and Miller, Olivecrona and Rüives, and Gillingham. In 1955, Rosenberg published an autopsied case. In 1956, a clinical and therapeutic study of 2 cases was made by Nayrac et al.

Thus far, we know of 16 cases and it is believed that this anatomical study might be useful in the understanding of the anomaly, since most of the authors have stressed the clinical, angiographic or surgical aspect of the question.

MATERIAL AND METHODS

As a routine procedure at Ste Justine Hospital all the brains of children are injected arterially at autopsy so they can be worked on more easily. This is achieved through the right internal carotid artery and the right vertebral artery. The brain is first washed with an isotonic solution containing gum acacia, sodium chloride and distilled water. Then it is fixed with the following isotonic solution: gum acacia, cobalt sulfate, formaldehyde, calcium chloride and distilled water. About 500 cc. of each solution are used (Koenig et al. method slightly modified).

The brain was first cut in four frontal sections and it was only after these slices were made that the huge pouch was discovered. In order to obtain antero-posterior sections, all the pieces were included in a gelatine block (12 gm. of gelatine mixed with a 1 per cent solution of phenol), then the block was hardened and preserved in a 10 per cent formaldehyde solution at 5°C.

It is interesting to note that the arteries, and the arteries only, appeared thrombosed; an artefact that has permitted an easy recognition of the calibers and course of these vessels.

REPORT OF A CASE

Ste Justine Hospital, No. 403919. The patient was a 2-day-old white male, first born, full term and delivered by forceps, who was admitted on Nov. 19, 1957. Cyanosis, noted since birth, increased gradually until death, accompanied by respiratory difficulties.
Examination at the time of admission revealed normal temperature, cyanosis and tachypnea. The weight was 3.5 kg. Moro’s reflex, and sucking and grasping reflexes were absent. The fontanelle was slightly tense although the child was dehydrated.

Three hours after admission, the respiratory rate was more rapid and tirage was noted. A clinical diagnosis of anoxia neonatorum and cerebral hemorrhage was made. Despite treatment with oxygen, vitamin K and respiratory stimulants, the condition progressed rapidly downhill. Exitus occurred 10 hours after admission.

Autopsy (No. 236–57) was performed 17 hours post mortem. Meningeal hemorrhage, a huge ductus arteriosus, dilatation of the right cardiac ventricle, and hepatic and pulmonary congestion were found.

A few weeks later the fixed brain was examined. Its weight was 410 gm. General congestion was noted together with subarachnoid suffusions on the left hemisphere. All the arteries were thrombosed and a huge arteriovenous aneurysm in the great cerebral vein of Galen and the arteries originating from the circle of Willis was found.

ANATOMICAL STUDY OF THE ARTERIOVENOUS MALFORMATION

The anatomical findings that are discussed here consist essentially in an intricate arterial network encircling the cerebral peduncles. This arterial network is drained in an enormous venous sack. Such anomaly concerns the posterior cerebral and the anterior cerebellar arteries. After a capricious and asymmetric course around the cerebral peduncles the vessels become anastomosed behind the middle line at the level of the lamina quadrigemina. They form there a network from which arise nine vessels which bring the arterial blood into the venous sack. The latter is the anterior continuation of the straight sinus (Fig. 1).

Fig. 1. Medial sagittal section showing the left side of the brain included in a gelatine block after coronal sections were made.