Varied CT Appearance of Aneurysms of the Vein of Galen in Infancy*

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Summary. An aneurysm of the vein of Galen can have a varied CT appearance in infancy. The classical picture is a spherical posterior third ventricular mass with the density of circulating blood contiguous with a dilated straight sinus and with uniform contrast enhancement. With varying degrees of thrombosis of the aneurysm which may occur in late infancy, the mass can change in density and the dilated straight sinus disappear. With total thrombosis, a precontrast hyperdense rim develops with a low density center. The rim enhances but the low density center does not change with contrast infusion. Our experience in three patients with this spectrum of CT findings will be demonstrated and correlated with clinical findings and angiography.

Key words: Computed tomography - Aneurysm, cerebral - Malformation, arteriovenous, - Vein of Galen

Introduction

In the past few years there have been several articles dealing with the CT appearance of aneurysm of the vein of Galen (AVG) [1-4]. These publications have depicted a stereotyped CT image of a spherical posterior third ventricular lesion with the density of circulating blood, marked contrast enhancement, draining into a CT demonstrable dilated straight sinus and enlarged torcular Herophili. We wish to corroborate this appearance as classical of a high flow fistula with a patent straight sinus and to present two additional cases that demonstrate other possible CT appearances depending upon the degree of thrombosis of the aneurysm or of its venous tributaries. The postoperative CT changes in the retained aneurysmal sac will also be described.

Case Reports

Case 1

This newborn was a full term 7 lb. 3 oz. female who was transferred to North Carolina Memorial Hospital on the fourth day after birth because of an increasing need for oxygen to prevent cyanosis. Chest radiographs revealed mild cardiomegaly. The child appeared to improve over a period of several days while on oxygen. She then developed progressive congestive heart failure. The head circumference and the fontanels were normal but a bruit was discovered over the occiput (day 7) and therefore a CT scan was obtained (Fig. 1a, b) followed by cerebral angiography (Fig. 1c). This showed a midline arteriovenous malformation confirming the CT diagnosis of AVG. She underwent surgery on day 8 but a cardiopulmonary arrest ensued during the procedure and she could not be resuscitated. Autopsy confirmed an AVG (Fig. 1d).

Case 2

This patient was a 3-month-old male, normal until 2 weeks prior to admission, when a sudden increase in head circumference with intermittent downward gaze of the eyes developed. Initial nonenhanced CT scan (Fig. 2a) showed a large round mass obliterating the
Fig. 1 a--d. Case 1 a Precontrast scan shows fusiform mass in posterior third ventricular area. Its density is greater than surrounding brain. b Postcontrast CT scan shows marked enhancement and confirms continuity of the mass with straight sinus (S). Torcular is enlarged (T). c Left carotid angiogram demonstrates aneurysm, straight sinus (S) and pericallosal (arrow heads) and posterior cerebral artery feeders. On vertebral angiography (not shown) superior cerebellar artery feeders were also seen. d Mid-sagittal section of brain correlates well with angiographic appearance (white arrows, dissected Galenic aneurysm; B, blood clots; white arrow heads outlining dilated straight sinus)

Fig. 2a and b. Case 2. a Precontrast scan demonstrates spherical posterior third ventricular mass, isodense with surrounding brain. b On postcontrast scan the mass enhances, straight sinus is not definitely seen and torcular is not dilated

posterior third ventricle and extending from the falx-tentorial junction upwards to the inner free margin of the falx, and extending also into the atrium of the left lateral ventricle. Fluid within the sac had a density of approximately 23 Hounsfield units (HU). The hematocrit at this time was 30. An enhanced scan (Fig. 2b) revealed marked uniform enhancement of the mass. A dilated straight sinus was not appreciated nor was there an enlarged torcular Herophili. Moderate hydrocephalus was present. Three-vessel angiography revealed an AVG with major feeders from the choroidal branches of the right posterior cerebral artery (Fig. 3a, b). The deep venous system did not fill (Fig. 3c). The venous drainage of the aneurysm could not be demonstrated. Three days later surgical obliteration of the aneurysm was performed using