Aneurysm of the anterior choroidal artery with intraventricular hematoma and hydrocephalus

Case report

Isacco Papo, M.D., Ugo Salvolini, M.D., and Giuseppe Caruselli, M.D.
Neurosurgery Division and Radiology Service, Regional General Hospital, Ancona, Italy

An aneurysm of the intraventricular portion of the anterior choroidal artery is reported. Rupture of the aneurysmal sac had given rise to extensive intraventricular clotting, cisternal blockade, and the development of hypertensive tetraventricular hydrocephalus. A combination of pneumoencephalography, angiography, and tomography defined the exact nature and topography of the lesion. The vascular malformation was removed and a ventriculoatrial shunt inserted. The patient, who was severely arteriosclerotic and hypertensive, died from myocardial infarction 3 months after surgical treatment.

Key Words • aneurysm • anterior choroidal artery • hydrocephalus

While carotid-choroidal aneurysms as a group are relatively well known,\textsuperscript{5,6} those of the distal intraventricular portion of the anterior choroidal artery seem to be exceptional. We have been able to find only four well-documented cases.\textsuperscript{1,2,4,7} In Strully’s case,\textsuperscript{7} increased intracranial pressure led to ventriculography and the operative removal from the left lateral ventricle of a large thrombosed aneurysm originating from the distal intraventricular segment of the anterior choroidal artery. There had been nothing in the history to suggest previous subarachnoid hemorrhage. On the other hand, in the case of Caram, \textit{et al.},\textsuperscript{2} the symptoms did indicate hemorrhage; arteriography disclosed an aneurysm supplied by a branch of the anterior choroidal artery located deep in the right thalamus, and ventriculography showed ventricular dilatation and a mass projecting into the ventricle at the level of the right foramen of Monro. A large clot adhering to the floor of the lateral ventricle was removed; at the point of adherence there was a patch of hemorrhagic infarction and “disruption” affecting part of the caudate nucleus and thalamus and reaching the internal capsule; the aneurysm was not identified. At necropsy a partially thrombosed intrathalamic aneurysm, 0.3 cm in diameter, was found; 5 mm rostral to the aneurysm there were several small angiomatous formations which very probably caused the hemorrhage.

In the patient reported by Cressman and...
Hayes, the choroidal aneurysm was clearly of traumatic origin (impalement through the left eye by a radio aerial); angiography done immediately after the injury yielded a doubtful image of choroidal aneurysm but when repeated in 15 days revealed a typical aneurysm of the anterior choroidal artery; the patient died 2 days later from massive intracerebral and intraventricular hemorrhage. At necropsy neither the choroidal artery nor the aneurysm could be seen because of destruction of cerebral tissue, but the uncus and the perforated space in front of it had been torn by the original penetrating point.

Butler, et al., recently reported a case of saccular aneurysm of a terminal branch of the anterior choroidal artery revealed by carotid angiography in a 15-year-old girl who previously had had a cerebroventricular hemorrhage; the aneurysm was also seen in the vertebral angiography. At operation a hematoma deep within the temporal lobe extending into the lateral ventricle was evacuated; glomus choroideum fed by several prominent vessels was excised. Histologically the surgical specimen consisted of an excessive number of abnormal blood vessels within an otherwise normal plexus.

Case Report

On October 27, 1971, this 57-year-old woman with a 10-year history of arterial hypertension developed nuchal headache, vomiting, and paresthesias of the legs following a brief loss of consciousness. On admission to another hospital she was confused and had a stiff neck. The neurological examination was normal, but the fundus oculi showed pronounced arteriosclerosis. The blood pressure was 160/100. Spinal tap yielded bloody cerebrospinal fluid (CSF).

On admission to this hospital on December 22, 1971, the patient was alert but her mental reactions were very slow and she entered into contact with the environment only with the greatest difficulty after repeated stimulation. A fair degree of neck stiffness was still present. The arterial pressure was 190/110, and the fundus oculi showed clear signs of arteriosclerosis. The neurological examination was noncontributory. Spinal tap yielded xanthochromic fluid under a pressure of 80 cm CSF. Bilateral carotid angiography disclosed a sac-like aneurysmal formation in the zone of the right basal nuclei, probably originating from the anterior choroidal artery, plus signs of hydrocephalus (Fig. 1). Four days later,
Aneurysm of the anterior choroidal artery

combined pneumoencephalography, right carotid angiography, and tomography performed under narcosis showed tetraventricular hydrocephalus from a complete cisternal blockade, the presence of a large clot in the right lateral ventricle, and a saccular aneurysm originating from the intraventricular portion of the anterior choroidal artery (Figs. 2-5). The patient became increasingly torpid; she had a sudden fall in blood pressure (90/60), which returned to normal on infusion of fluids and corticoids; after ventricular drainage she was more alert.

Operation. On January 4, 1972, under general anesthesia, controlled respiration, and ventricular drainage, a small right temporal flap was cut. The dura was distended but the temporal lobe appeared to be normal. A transverse incision was made in the Sylvian fissure on T-2, and the temporal horn was opened along its major axis. The ventricle, which was enlarged, was filled with old clots; the choroid plexus was infarcted and extensively hemosiderotic. The base of the aneurysmal sac was found at once, but the neck was hidden by the plexus. On dissection of the latter, the anterior choroidal artery was exposed distally and proximally to the aneurysm, which then was removed with a large part of the

![Image](image1)

**Fig. 2. Pneumoencephalogram.** Anteroposterior view (left) and posteroanterior view (right) showing diffuse enlargement of the ventricular cavities. Inside the right lateral ventricle an irregular filling defect is visible; the elongated “punched-out” opacity occupies the medial portion of the ventricular body up to the trigone, and almost the whole temporal horn in which only small amounts of gas remain.

![Image](image2)

**Fig. 3. Tomoencephalogram.** Left: Sagittal view showing marked dilatation of the fourth ventricle and aqueduct. Right: Sagittal view showing marked dilatation of the third ventricle; note cisternal blockade at the incisural level as well as the intraventricular filling defect.

*J. Neurosurg.* / Volume 39 / August, 1973 257
Fig. 4. Tomoangiogram after filling of the ventricular cavities with gas. The non-homogeneous opacity in the ventricular body and in the upper portion of the temporal horn is clearly outlined. The different segments of the internal carotid branch feeding the aneurysm are visualized; the aneurysmal sac is located inside the opacity in the middle of the temporal horn.
Aneurysm of the anterior choroidal artery

Fig. 5. Tomoangiogram. Note the origin of the artery supplying the sac which can now be identified as the anterior choroidal artery.

choroid plexus of the temporal horn. What remained of the choroid plexus was extensively cauterized; numerous clots at the level of the trigone and occipital horn were removed. The cerebral tissue in the region of the hippocampus showed clear signs of extensive old hemorrhagic infarction.

**Histological Examination.** The various sections examined showed a fibrous wall, devoid of endothelial investment, consisting of collagenous connective tissue rich in fibroblasts, infiltrated by lymphoid cells and containing histioid elements loaded with hemosiderin. On the inner side of the wall the connective tissue shaded off into fibri nous stratification with evidence of initial organization. In the fibrous wall constituting the aneurysmal sac, there was no suggestion of elastic fibers organized in limiting membranes positive to Weigert's resorcin-fuchsin. This was interpreted as evidence of a spurious aneurysm with intracavitary thrombotic phenomena.

**Postoperative Course.** The patient regained consciousness but remained torpid and akinetic; the arterial pressure presented numerous fluctuations. Tracheotomy was necessary to control tracheobronchial secretions. On January 10, a ventriculocorial shunt (from the left lateral ventricle) was set up under local anesthesia. A few hours later after another fall in pressure the patient became profoundly lethargic and developed a left hemiparesis. For about a week she remained in a state of akinetic mutism; then she slowly became more
responsive, but left hemiplegia and grave dementia remained virtually unchanged. Three months later she died at home from massive myocardial infarction.

Discussion

The abnormal mass removed at operation showed no normal vascular structure (endothelium, muscular or elastic fibers), and was probably a false aneurysm in a patient who had been severely atherosclerotic and hypertensive for a long time. A congenital origin for the primarily hemorrhagic lesion cannot, however, be ruled out. There was certainly nothing in the history to suggest an infective or traumatic etiology.

The intraventricular hemorrhage had given rise to extensive clotting along the whole course of the choroid plexus from the temporal horn to the foramen of Monro. Carton and Alvord emphasized that the formation of small localized intraventricular clots is probably the outcome of slight bleeding at low pressure. In our patient the hemorrhage had also caused cisternal blockade with severe hypertensive hydrocephalus, followed within a few weeks by frank dementia; it is important to note, however, that our patient presented pronounced mental changes right from the beginning.

From the diagnostic point of view, we agree with Caram, et al., that air studies (plus tomography in our case, which is our usual practice) associated with angiography are of surgical value. These procedures pinpointed the origin of the aneurysm and its intraventricular situation within a mass of clots.

The unfavorable course of our patient can be attributed to the systemic circulatory disease (arterial hypertension with myocardial arteriosclerosis and nephrosclerosis), which immediately after the second operation caused a fall in pressure and hence severe diffuse cerebral anoxia, controlled at the cost of major neurophysical sequelae, and later massive myocardial infarction.

References


Address reprint requests to: I. Papo, M.D., Ospedale Generale Regionale, Divisione di Neurochirurgia, Ancona, Italy.