Arteriovenous malformation in the basal ganglia

Case report

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The author reports the successful surgical treatment of an arteriovenous malformation of the basal ganglia. Follow-up angiography verified that the single supplying artery had been clipped. The operative approach to the malformation is discussed.

KEY WORDS • arteriovenous malformation • basal ganglia
• nucleus lentiformis • operative approach

Only in the last 20 years have neurosurgeons undertaken surgical treatment of arteriovenous malformations (AVM) situated in the basal ganglia. We are reporting another instance of this rare condition. This AVM was primarily in the head of the nucleus caudatus but extended into the lentiform nucleus. The single supplying artery was clipped.

Case Report

One month before admission this 22-year-old man suddenly lost consciousness and remained in a coma for 2 days; he subsequently showed mental alteration.

Examination. When admitted to our clinic the patient was drowsy but conscious, and complained of severe headaches. He was disoriented as to time and space and did not recognize his mother and sister. He could not remember anything, not even where he was going. His neck was stiff. There was no neurological lateralization. The patient’s blood pressure was variable, increasing unexpectedly as high as 210 mm Hg, but receding after a few hours to 140 mm Hg. The optic discs and visual fields were normal. An electroencephalogram showed abnormalities in the left hemisphere. Bilateral carotid angiography was performed. The right side was normal. On the left side an abnormal branch of the middle cerebral artery was demonstrated, 1 cm distal to the bifurcation (Fig. 1 upper left). The artery followed the course of a normal lenticulostriate artery, but was larger, and in the region of the head of the caudate nucleus it ramified into a cluster of abnormal blood vessels. This mass of vessels drained through a single vein into the thalamostriate and then into the internal cerebral veins. The cluster of pathological blood vessels extended into the region of the Taveras triangle, that is, to the region of the lentiform nucleus (Fig. 1 upper right). Stretching of the insular part of the middle cerebral artery was also noticeable.

In determining the position of this AVM we adopted the method suggested by Lapras, et al. (Fig. 1 lower).

Operation. A frontotemporal osteoplastic trephination was performed. The carotid artery was approached between the frontal
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and temporal lobes, and followed distal to its bifurcation. At 1 cm distal to the carotid bifurcation, on the medial cerebral artery, a large branch of the middle cerebral artery was found; this corresponded to the artery supplying the AVM as seen in the arteriogram. This vessel was clipped.

Postoperative Course. The patient passed through a period of lethargy, with right hemiplegia. The vegetative functions were normal. No changes in the blood pressure could be ascertained. There was progressive recovery after the sixth day. The patient became conscious and normally oriented. He began to remember his past life and family, and the hemiplegia improved. He was discharged 20 days after the operation and at that time his mental reactions were slow, but he was oriented and showed no changes in blood pressure. There was still a paresis of the right arm and numbness of the right side of the face. Two months after operation he was found to be without subjective complaints and mentally normal; a slight weakness of the right arm persisted. Examination 1 year after operation showed that he was normal in all ways and back at his job as a technical designer. Left carotid angiography demon-
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Fig. 2. Left carotid arteriograms showing obliteration of the AVM and no revascularization.

strated obliteration of the AVM and no revascularization (Fig. 2).

Discussion

The significant preoperative clinical findings were the severe mental alteration and the wide variations in blood pressure. As soon as the malformation had been eliminated from the circulation, all these manifestations vanished; we can only assume that the AVM had caused them. Arteriovenous malformations with simply one feeder are rare, but we are convinced that this was the fact in this instance.

Lapras, et al., 4 recommended approaching an AVM in the head of the caudate nucleus through the frontal horn of the lateral ventricle, in front of the foramen of Monro. They advised against clipping or ligating the supplying arteries of the malformation because of the difficulty in identifying them arteriographically or at operation, and, further, because with a transventricular approach the proximal part of these arteries may be saved. We have had no personal experience with this approach but consider their arguments convincing.

However, in this case we decided to clip the supplying artery for the following reasons. There was apparently only one supplying vessel, and this was easily identified angiographically and surgically, so that the possibility of mistaking it was slight. Also, the capillary part of this left-sided AVM extended into the region of the lentiform nucleus, making a transventricular approach seem less advisable. We also considered the youthful age of the patient a favorable factor that would influence adaptability of the blood vessels to changes in the regional circulation. The full rehabilitation of the patient and the angiographic findings 1 year later confirm this judgment.

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