Total recanalization of a spontaneously thrombosed arteriovenous malformation

Case report

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PONTOUS thrombosis of a cerebral arteriovenous malformation (AVM) is rarely encountered in the literature. Recanalization after such a spontaneous thrombosis has only been described once in the case of a partially recanalized AVM. In the present case report, the authors describe the first case of angiographically demonstrated asymptomatic total recanalization of a spontaneously thrombosed AVM and stress the importance of follow-up care for “cured” AVMs.

KEY WORDS • arteriovenous malformation • spontaneous thrombosis • recanalization

This 59-year-old man was admitted to the emergency department of Showa General Hospital because of a sudden onset of severe headache and vomiting followed by loss of consciousness. Nothing in his family or medical history was contributory.

EXAMINATION. On admission, the patient spoke coherently. There was no evidence of seizure or motor laterality. He complained of dysesthesia in his left leg without definite hypesthesia. The hematological data, including those for coagulation, did not indicate abnormality.

A computerized tomography (CT) scan revealed a local subarachnoid hemorrhage (SAH) in the left side of the basal cistern and a small hematoma in the inferior aspect of the left frontal lobe (Fig. 1). On the 2nd day of hospitalization, a left carotid arteriogram demonstrated an AVM approximately 2 cm in size in the inferior aspect of the frontal lobe, which was consistent with the hematoma recognized on CT scan (Fig. 2). The nidus received its blood supply from several branches of the left anterior cerebral artery and intracranial branches of the left ophthalmic artery. Blood drained from the nidus into the superior sagittal sinus via a single cortical vein.

A second arteriogram was obtained on the patient’s 24th hospital day for the purpose of performing transarterial embolization. However, embolization was not attempted because the arteriogram revealed partial thrombosis. A third arteriogram was obtained on the 45th hospital day, which revealed complete thrombosis of the nidus (Fig. 3), and the patient was discharged from the hospital with no focal neurological deficits.

Nine months after the ictus, a fourth arteriogram was obtained, indicating continued thrombosis of the nidus.

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However, a fifth arteriogram obtained 33 months after the ictus revealed asymptomatic total recanalization of the AVM (Fig. 4).

Operation. The patient underwent a left frontobasal craniotomy for removal of the AVM 3 years after the ictus. The nidus was not observed on the brain surface. A single red cortical vein drained into the superior sagittal sinus. Although several feeders were identified originating from the cribriform plate and a branch of the left pericallosal artery, the nidus was located in the pure brain parenchyma of the inferior aspect of the frontal lobe. After cauterizing the feeders, resection of the nidus was achieved.

Postoperative Course. The postoperative course was uneventful. There was no further evidence of the AVM on angiography. Pathological findings of the excised AVM were unspecific.

Discussion

More than 20 angiographically demonstrated spontaneous thromboses of AVMs have been reported to date. However, recanalization after complete thrombosis is extremely rare. In fact, only one case of partial recanalization has been reported.

The present case may be the first documented instance of total recanalization. An examination of the literature revealed that in approximately half of the cases of spontaneous thrombosis, there was a hematoma that might compress the nidus and facilitate thrombosis. Hemodynamic changes due to surgical manipulation in the remote site, such as insertion of a ventriculoperitoneal shunt or removal of a subdural hematoma, have also been suggested as the cause of thrombosis. Anatomical features of such AVMs show that most nidi were small, generally within 2 cm, and had a single feeding and/or draining vessel.

The case under discussion includes the presence of a hematoma and the AVM is associated with a single, short draining vessel that flows into the anterior superior sagittal sinus. As a result, the pressure gradient of the superior sagittal sinus may directly reflect the hemodynamics of the nidus. The spontaneous thrombosis and recanalization that occurred in the present case may be related to the par-

Fig. 1. Admission computerized tomography scan showing localized subarachnoid hemorrhage in the left side of the basal cistern and a hematoma in the inferior aspect of left frontal lobe.

Fig. 2. Left carotid arteriograms obtained on the 2nd hospital day. Anteroposterior (left) and lateral (right) views, showing a 2-cm diameter arteriovenous malformation (arrow) fed by the anterior cerebral and left ophthalmic arteries.

Fig. 3. Left serial carotid arteriograms obtained on the 45th hospital day. Anteroposterior (upper left) and lateral (upper right, lower left and right) views showing spontaneous thrombosis of the arteriovenous malformation.

Fig. 4. Left carotid arteriograms obtained 33 months after initial onset. Anteroposterior (left) and lateral (right) views showing total recanalization of the arteriovenous malformation (arrow).
ticular anatomical features presented above.

Some of the AVMs that appear thrombosed on angiography show enhancement on CT imaging. This may suggest that there is hyperemia around the thrombosed nidus or a potentially patent flow of the nidus, which is not demonstrated with angiography.

Whether by surgical or nonsurgical means, total obliteration has been considered the goal of AVM treatment. Once obliteration was confirmed by angiography, additional follow-up angiograms were not obtained in most cases of treated AVMs, and the true incidence of recanalization is not certain.

The intervals between spontaneous thrombosis and recanalization were approximately 31 months in the present case and 16 months in Nukui and colleagues' case of recanalization. At present, we conclude that spontaneously thrombosed AVMs require careful follow up for at least 3 years; otherwise surgical extirpation is recommended.

References

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