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Uncommon Symptomatic Cerebral Vascular Malformations

Mauro Bergui and Gianni Boris Bradac

Summary: We describe three cases of unusual vascular malformations in which the most relevant angiographic findings were the presence of a pathologic arteriovenous shunt through multiple small direct arteriovenous fistulas and the lack of a clearly identifiable nidus. All malformations were symptomatic. Such lesions are relatively rare, but they should be taken into consideration in the differential diagnosis of cerebrovascular malformations.

Case Reports

Case 1

A previously healthy 35-year-old woman had a 1-month history of partial seizures. On admission no neurologic deficits were found; electroencephalography revealed a left temporal focus. Computed tomography (CT) and magnetic resonance (MR) imaging showed small anomalous vessels deep in the left hemisphere, without signs of previous hemorrhage (Fig 1A). A diagnosis of DVA was suggested. Angiography revealed two vascular malformations in the left basal ganglia and parietal lobe. In the arterial phase, two abnormal blushes were recognizable and, probably because of the presence of an arteriovenous shunt, the deep venous system was opacified early in the arterial phase (Fig 1B and C).

A superselective angiographic study showed that the malformations were fed by perforating vessels from the middle cerebral and anterior choroidal arteries, respectively (Fig 1D), and by terminal branches of the middle cerebral artery (Fig 1E). Flow was shunted through multiple small fistulas connecting small dilated arteries with small dilated veins; normal brain parenchyma was apparently interposed between the vessels, a separate nidus was not clearly identifiable (Fig 1D and E). Findings on the right carotid angiogram were normal.

The location of the malformations, their extent, and the lack of an identifiable nidus suggested a conservative approach, and medical treatment was initiated (carbamazepine 1200 mg/d), resulting in complete control of seizures.

Case 2

A 35-year-old woman was studied with MR imaging and angiography 3 years after the sudden onset of diplopia and hemiparesis. At that time, a CT scan obtained at another hospital was reported to show a brain stem hematoma. The patient recovered nearly completely in a few months; an MR study showed some small linear signal void structures in the dorsal mesencephalon that seemed to converge into a large vessel lying on the floor of the fourth ventricle (Fig 2A). In the arterial phase of the angiogram, several tiny vessels were seen projecting on the mesen-
The cephalon and upper pons, along with a large venous collector corresponding to the vessel seen on the MR image; final drainage was primarily into the precentral cerebellar vein. A nidus was not clearly seen (Fig 2B and C). We interpreted this as a vascular malformation characterized by minute shunts between branches of the posterior cerebral and superior cerebellar artery into veins of the mesencephalon and pons. Because of the location of the malformation and the lack of signs of recent hemorrhage, the patient was discharged without therapy.

**Case 3**

A 39-year-old man was admitted because of a sudden right-sided motor weakness, aphasia, and headache. A CT scan showed a large left temporoinsular hematoma. The patient made a partial recovery without surgical intervention. Two months later, the hematoma had completely resorbed. An angiogram at this time showed a high-flow malformation in the temporinsular region, which was most likely responsible for the hematoma. Multiple tiny vessels from the middle cerebral and anterior choroidal arteries filled short dilated vessels, probably veins, converging in the basal vein, which filled early in the arterial phase (Fig 3A). In the venous phase, several medullary veins of the temporal lobe converged into the basal vein in a pattern typical of DVA (Fig 3B and C). Superficial venous drainage was poor. Moreover, two aneurysms of the left and one of the right carotid artery were detected. While waiting for stereotactic radiosurgery of the malformation, one aneurysm was occluded with platinum coils; similar treatment is planned for the others.
Discussion

In addition to the four types of vascular malformations that have well-defined radiologic and pathologic characteristics (1–4), combinations of different types of lesions, in particular, DVAs and cavernous angiomas, are also well known. Furthermore, other, more rare, malformations are known that do not fit any of these types. Rather, they have features of more than one single type and appear to be mixed forms in which several variations are present (19–23). The cases reported here did not have pathologic confirmation, but their MR and angiographic features are similar to some previously described cases that were confirmed histologically.

In two of our patients (cases 1 and 2), multiple tiny slightly dilated arterial feeders drained...
From a practical point of view, such malformations present a diagnostic and therapeutic problem, since they may be similar to DVAs on CT and MR imaging. Only an angiographic study, possibly superselective, can give precise information on flow velocity and arteriovenous shunting. In accord with Awad et al (21), we recommend an angiographic study when a symptomatic venous anomaly is suspected.

References

18. Wilms G, Bleus E, Demaerel P, et al. Simultaneous occurrence of
developmental venous anomalies and cavernous angiomas. 


