Familial arteriovenous malformations

Report of four cases in one family

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Familial arteriovenous malformations (AVM's) are uncommon entities, with only seven reported cases in the English literature. Some have been associated with hereditary telangiectasia. A family in which AVM's were found in four male members of two generations is reported. In addition, one patient had a large cyst associated with his AVM without previous evidence of acute hemorrhage, which is an uncommon presentation. The family is discussed and a brief review of the literature is presented.

KEY WORDS • arteriovenous malformation • cystic lesion • congenital anomaly

Case Reports

Case 1

This 18-year-old man with a 2-year history of episodic blurring of vision and dizziness experienced two generalized seizures on the day of hospital admission. On examination, he was found to be neurologically intact. A computerized tomography (CT) brain scan revealed a large cystic lesion, with two enhancing nodules, in the right temporal fossa (Fig. 1 left). This was thought to be a tumor. At surgery, the cyst was found to contain xanthochromic fluid. Only one of the nodules could be identified and it was removed. Under light microscopy, it proved to be an AVM (Fig. 1 right). A postoperative angiogram showed no residual malformation and, apart from his reliance on antiepileptic drugs, he was neurologically well.

A later examination disclosed a few pigmented spots on his lower lip of which he had apparently not been aware. However, no other cutaneous lesions or stigmata of a familial vascular disease were found.

Case 2

The father of the patient in Case 1 was a 45-year-old who had suffered from severe headaches since he was a teenager. These had increased in severity, developing into what were believed to be migraines, associated with vomiting, dizziness, and visual disturbances. They were apparently somewhat controlled with Cafergot (ergotamine tartrate and caffeine) and Gravol (dimenhydrinate). He had also had a single episode of uncontrolled twitching of the right side of his face. Neurological and general examination was normal. A CT scan showed an enhancing lesion in the right occipital area, and a subsequent angiogram revealed a large AVM in the same location (Fig. 2).

Comment. This man was one of seven siblings: six males and one female. His father had suffered from epilepsy and his mother had had severe headaches similar to his; both of his parents were dead. One brother suffered from what was thought to be a variant of narcolepsy. The rest of the family, as far as he knew, were normal. One of his brothers had six sons, all of whom were normal. The wife of our patient and her family had no relevant history.

Because of the findings of an AVM in two members of the same family, it was decided to investigate the three brothers of Case 1 with CT scanning. The 10-year-old brother of Case 1 had a normal scan; however, the scans in the other two revealed abnormalities.
Case 3

The 16-year-old brother of Case 1 also suffered from intermittent throbbing headaches and visual obscurations. In addition, he had experienced auditory hallucinations and episodes of high-pitched buzzing in his right ear. A CT scan showed an area of contrast enhancement in the posterior aspect of the right Sylvian fissure, and an angiogram revealed an AVM in the same location (Fig. 3). His neurological and general examination was normal.

Case 4

The 20-year-old brother of Case 1 was asymptomatic; however, CT scanning showed an abnormal vascular structure in the area of the left cerebellopontine angle (Fig. 4). He declined to undergo an angiogram.

Discussion

The true incidence of central nervous system AVM in the general population is unknown. Perret[10] found a 4% incidence in asymptomatic individuals at autopsy, and Olivecrona[9] estimated that 4% of all brain lesions were AVM’s. Relatively few familial cases have been reported, however. Even in the Cooperative Study reported by Perret and Nishioka in 1966,[11] no familial malformations were noted among 453 cases. On the other hand, familial instances of other vascular malformations, such as aneurysms[5] and hereditary telangectasia,[7] are sometimes recorded, although these also are by no means common.
Familial arteriovenous malformations

In at least two previous reports, the AVM's occurring in related individuals have been in association with hereditary telangiectasia. The proband in our family had a few pigmented spots on his lower lip, but no other stigmata of the disease. Neither his father nor any of his brothers showed any signs of AVM's; this does not, however, rule out the possibility of this disease.

The inheritance pattern (Fig. 5) suggests an autosomal dominant mode of transmission, perhaps with variable penetrance. Previous reports have also proposed an autosomal dominant inheritance, although any firm conclusion is difficult to draw due to the small numbers of cases.

The general findings in the previously reported cases are similar to those in our patients. The onset of symptoms has been at a young age, perhaps somewhat earlier than that associated with nonfamilial AVM's. The lesions are usually distributed randomly throughout the cerebral hemispheres, although none have been found in the posterior fossa; one lesion was discovered in the spinal cord.

The AVM in Case 1 was unusual in that it presented as a large cyst with two mural nodules. Although cystic AVM's are recognized as an end result of hemorrhage, there was no history to suggest a previous acute bleed from this AVM. Indeed, because of the large cyst, the diagnosis of an AVM was not entertained preoperatively.

A cystic AVM without previous evidence of hemorrhage has not, to our knowledge, been reported in the literature. It is possible that the cyst developed as a result of multiple small subclinical hemorrhages during a prolonged period of time. On the other hand, the fluid may represent a transudate from the abnormal vessels in the lesion.

Unfortunately, no more information is available from this family as they have chosen, at least for the present, not to pursue further investigation. Nevertheless, there certainly is strong evidence for a familial relationship. Whether or not their condition falls into one of the groups of inheritable vascular diseases remains to be seen.

References

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Fig. 4. Case 4. Enhanced computerized tomography scan showing an abnormal vascular structure (arrow) in the area of the left cerebellopontine angle.

Fig. 5. Inheritance pattern in this family. Black symbols: affected individuals; white symbols: normal individuals; crossed symbols: individuals suspected of having the disease. Numbers represent age at diagnosis.