Short report

Removal of an arteriovenous malformation from the basal ganglion

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SUMMARY A case is reported in which an arteriovenous malformation was removed from a portion of the basal ganglion and region of the lenticulostriate arteries. The patient made an excellent recovery. The importance of stereoangiography and the operating microscope are emphasised.

Except for isolated reports (Moyes, 1969; Moody and Poppen, 1970; Morello and Borghi, 1973), arteriovenous malformations in the region of the basal ganglion and internal capsule are considered to be inoperable because of the high morbidity and mortality from surgical removal. We recently totally removed an arteriovenous malformation from the right basal ganglion area. The patient had a transient postoperative hemiparesis that resolved completely over several months.

Case report

A 29 year old man had subarachnoid haemorrhages one year and again three weeks before admission. After the last haemorrhage he remained comatose for approximately two weeks and then exhibited a gradual recovery with an improving left hemiparesis and a residual left upper quadrantanopsia. His recent memory was impaired.

An arteriogram showed an arteriovenous malformation approximately 15 mm in diameter in the region of the anterior perforated area and basal ganglion, on the right side. It was associated with a venous aneurysm and a large draining varix involving the vein of Rosenthal. It appeared to be fed by the lenticulostriate arteries (Fig. 1). A stereoscopic angiogram showed the malformation slightly lateral to the lenticulostriate arteries, receiving tributaries from these arteries but not directly involving them.

The arteriovenous malformation was approached through a frontotemporal craniotomy centred over the sphenoidal ridge which was removed to the superior orbital fissure. The Sylvian fissure was opened in order to dissect the internal carotid, anterior choroidal, posterior communicating, and middle cerebral arteries. Gentle upward retraction on the middle cerebral artery exposed the arteriovenous malformation which was intimately related to the lenticulostriate arteries. Using the operating microscope, the arteriovenous malformation was mobilised around its margins and removed from the region of the basal ganglion, anterior perforated area, and medial temporal lobe (Fig. 2). All major lenticulostriate, anterior choroidal, and posterior communicating arteries were preserved. Postoperative arteriography showed that the lesion was entirely removed with preservation of a normal arterial pattern (Fig. 3).

The patient made a progressive improvement after operation. The left quadrantanopsia was converted to a left homonymous hemianopsia, perhaps because of interruption of the blood supply of the right optic tract. Recent memory defects showed gradual improvement. However, the patient did demonstrate evidence of a communicating hydrocephalus which was successfully treated with a ventriculoperitoneal shunt. Subsequently he was able to return to work.

Discussion

The case illustrates that certain arteriovenous malformations can be removed from the region of the basal ganglion without leaving the patient with a disabling neurological deficit. Previous

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(a)

(b)

Fig. 1 (a) Anteroposterior angiogram of arteriovenous malformation. (b) Lateral angiogram of arteriovenous malformation.

Fig. 2 *Resected arteriovenous malformation showing prominent venous varix.*

Fig. 3 *Postoperative arteriogram demonstrating total removal of arteriovenous malformation.*

reports have indicated mixed results with such surgery. Generally, these lesions are considered inoperable. However, the use of stereoscopic angiography in the preoperative evaluation of the lesion was essential in demonstrating that the malformation, although close to, did not directly involve major arteries to this critical area of the brain. The use of the operating microscope and microsurgical techniques made the resection possible.

References

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