Arteriovenous Malformation Associated with a Large Cyst

—Case Report—

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Abstract

A 37-year-old male presented with an arteriovenous malformation in the left temporal lobe associated with a large cyst. The cyst was drained and the nidus completely excised. The histological findings suggest that repeated subclinical hemorrhages from neovascular channels of the cyst membrane was responsible for the growth of the cyst.

Key words: arteriovenous malformation, intracranial cyst, surgical resection

Introduction

Vascular malformations of the central nervous system are classified as arteriovenous malformations (AVMs), venous angiomas, capillary telangiectases, and cavernous angiomas.⁵⁾ The usual manifestations are epileptic seizures, focal neurological signs, and intracerebral or subarachnoid hemorrhage. Cavernous angioma and AVM are occasionally associated with large cysts with mass effect but without hemorrhage. Cystic cavernous angioma is benign and can be completely removed by surgery.^{3,6,7)} In contrast, only four cases of AVM associated with a large cyst have been reported.^{1,4,8)}

We describe a rare case of AVM in the left temporal lobe associated with a large cyst.

Case Report

A 37-year-old male was admitted with a 1.5-year history of generalized seizure. Neurological examination revealed right superior quadrantanopia. Plain skull x-ray films were normal. Computed tomography (CT) demonstrated a large hypodense lesion in the left temporal lobe with slight postcontrast anterior peripheral enhancement (Fig. 1). T₁-weighted magnetic resonance (MR) imaging revealed a

Fig. 1 Precontrast CT scan (*left*) showing a large hypodense mass in the left temporal lobe. Postcontrast CT scan (*right*) showing the anterior part of the lesion was enhanced.

large hyperintense mass in the left temporal lobe, and T₂-weighted MR imaging showed a flow-void lesion in the anteromedial part of the hyperintense mass (Fig. 2). Cerebral angiography revealed an avascular mass and a small AVM in the left temporal region. The largest diameter of the nidus was 2.0 cm. The AVM was fed by the branches of middle cerebral artery and drained into the straight sinus through the basal vein (Fig. 3).

He underwent a left frontotemporal craniotomy. A large cyst which contained about 25 ml of degraded bloody fluid was found immediately below the cor-

Fig. 2 Axial T₁-weighted MR image (left) showing a large homogeneous hyperintense mass in the left temporal lobe. Axial T₂-weighted MR image (right) showing a flow-void lesion in the anteromedial part of the hyperintense mass.

Fig. 3 Left carotid angiogram, lateral view, showing a small AVM in the left temporal region supplied by branches of the middle cerebral artery and draining into the basal vein.

tex. After drainage of the cyst, the nidus in the anteromedial wall of the cystic cavity was completely excised.

Histological examination of the nidus revealed abnormal venous and arterial structures. The cyst wall had numerous thin-walled vascular channels and deposits of hemosiderin in the fibrous tissue (Fig. 4).

His postoperative course was uneventful. He has had no further seizures, and is now doing well after the operation.

Discussion

Table 1 summarizes the clinical findings in the four reported cases of AVM associated with a large cyst, including the present case. There were two females and two males, ranging in age from 14 to 37 years.

Three patients presented with seizures and one with headache. Our patient had focal neurological sign, *i.e.*, visual field loss. Three of the cystic AVMs, including our case, were located in the temporal lobe and one in the parietal lobe. All nidi were small and located in the cyst wall. Three cysts contained xanthochromic fluid and one degraded bloody fluid. All patients underwent total removal of the cysts and nidi, with good results. AVM with a large cyst can thus be completely treated by surgical intervention.

Daniels *et al.*²⁾ described intracerebral AVMs accompanied by cystic, slit-like cavities in patients with a history of severe headache. They attributed the cavity formation to hemorrhage from the AVM and liquefaction of the hematoma. These slit-like cavities could be due to old hemorrhage from the AVM nidus. The four cases of AVM with a large cyst had no history which suggested any previous episode of

Fig. 4 Photomicrographs of the cyst wall showing thin-walled vascular channels (arrowheads) and hemosiderin deposition (arrows) in fibrous tissue. HE stain, left: $\times 40$, right: $\times 200$.

Table 1 Clinical findings in cases of AVM with a large cyst

Author (Year)	Age/Sex	Signs and symptoms	Location of lesion	Surgical findings	Outcome
Boyd <i>et al.</i> (1985) ¹⁾	18/M	seizure	rt temporal	cyst with xanthochromic fluid, nodules	good
Itakura <i>et al.</i> (1989) ⁴⁾	33/F	seizure	rt temporal	cyst with xanthochromic fluid, nidus	good
Yamaguchi <i>et al.</i> (1993) ⁸⁾	14/F	headache	lt parietal	cyst with xanthochromic fluid, nidus	good
Present case	37/M	seizure, quadrantanopia	lt temporal	cyst with degraded bloody fluid, small nidus	good

acute bleeding from the AVM. Therefore, an AVM associated with a large and round cyst, which has a mass effect, is different from those with a slit-like cavity.

The mechanism of formation of the large cysts associated with AVM remains unknown. Boyd *et al.*¹⁾ demonstrated that a cyst associated with an AVM develops as a result of multiple small hemorrhages during a prolonged period. Itakura *et al.*⁴⁾ suggested that round cyst formation may result from exudation of fluid from part of the AVM. However, no detailed histological evaluations of surgical specimens, particularly the cyst wall, have been conducted. In our case, the cyst wall contained numerous thin-walled vascular channels and deposits of hemosiderin in fibrous tissue. These findings are quite similar to those of the membrane of giant cysts associated with cavernous angiomas, which consists of a neocapillary network.⁶⁾ We suggest that a minor intracerebral hemorrhage occurs from AVM and is surrounded by a capsule. Repeated subclinical hemorrhages from the neovascular channels of the cyst wall is primarily responsible for the growth of the cyst.

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