Arteriovenous Malformation Presenting as Hypertensive Putaminal Hemorrhage in an Elderly Patient

—Case Report—

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Abstract

A hypertensive 72-year-old male presented with a ruptured arteriovenous malformation (AVM) manifesting as hematoma indistinguishable from common putaminal hemorrhage on precontrast computed tomography scan. The AVM was located in the proximal sylvian region fed by branches of the anterior and middle cerebral arteries. The AVM was totally removed. Although bleeding from AVM in the elderly is uncommon, the cause of even common hypertensive hemorrhage should be identified by other imaging techniques such as magnetic resonance imaging and cerebral angiography to allow the optimum treatment.

Key words: arteriovenous malformation, elderly, hypertensive putaminal hemorrhage

Introduction

Hemorrhage from cerebral arteriovenous malformations (AVMs) occurs infrequently in elderly patients, because most AVMs become symptomatic by the fourth decade and many patients with untreated AVM do not survive to old age.¹⁻⁹ Furthermore, an AVM is less likely to be considered as the source of intracerebral hemorrhage in elderly patients who are prone to hemorrhage from hypertension and embolic stroke. In contrast, hypertensive putaminal hemorrhage is very common in the elderly. Patients with putaminal hemorrhage are not uncommonly treated surgically without further preoperative imaging studies such as postcontrast computed tomography (CT), magnetic resonance (MR) imaging, MR angiography, or cerebral angiography. Patients who receive conservative therapy do not usually undergo angiography.

We describe a hypertensive 72-year-old male who presented with an apparent hypertensive putaminal hemorrhage on CT scan, which was shown to be due to a ruptured AVM in the proximal sylvian region by cerebral angiography.

Case Report

A 72-year-old male suddenly became stuporous with left hemiplegia. He had been doing well before admission except for untreated hypertension. CT on the day of ictus disclosed a right large putaminal hemorrhage with intraventricular blood (Fig. 1).

His conscious level did not fall below Glasgow Coma Scale 12, so we decided to delay surgery unless deterioration occurred. However, cerebral an-

Fig. 1 Preoperative CT scans on admission showing an apparent hypertensive putaminal hemorrhage with slight intraventricular rupture.

giography performed a week later unexpectedly revealed a 4 cm diameter AVM in the proximal sylvian region fed by branches from both the anterior and middle cerebral arteries, and drained to the sphenoparietal sinus by the sylvian vein which was aneurysmally dilated (Fig. 2 *upper row, middle row*). The surgical grade was 2 according to Spetzler and Martin.¹⁰ MR imaging and postcontrast CT showed the AVM was located in the proximal sylvian region (Fig. 3 *upper row*).

The AVM was removed en bloc *via* the trans-sylvian approach. Postoperative angiography and CT confirmed complete removal of the AVM (Figs. 2 *lower row* and 3 *lower row*). He continues to do

Fig. 2 Preoperative right carotid angiograms, early phase (*upper row*) and late phase (*middle row*), showing numerous feeding arteries from the main trunks of both the anterior and the middle cerebral arteries. Note the huge aneurysm-like dilatation of the sylvian vein draining to the sphenoparietal sinus. Postoperative angiograms (*lower row*) showing complete removal of the AVM without sacrifice of any branches of the middle cerebral artery.

Fig. 3 Preoperative postcontrast CT scan (*upper left*) taken 1 week after ictus showing the AVM in the right proximal sylvian region. T₂-weighted MR image (repetition time 2000 msec, echo time 110 msec) (*upper right*) visualizing the nidus as a low intensity signal. Postoperative CT scans (*lower row*) showing no further damage except for a low density area caused by the initial hemorrhage.

well except for left hemiparesis.

Discussion

Symptomatic AVM in patients over 60 years of age is rare. Studies before CT was available showed that only 2% of all patients with AVM were in the seventh decade at first hemorrhage and less than 1% in the eighth decade.⁶⁻⁸ The introduction of CT did not change the incidence of elderly patients with AVM. The incidence of AVM in patients in the seventh decade and over was 6% without hemorrhage and 7% with hemorrhage. The oldest patient with hemorrhage was 85 years old.⁴ Hemorrhage was the mode of presentation for all patients over the age of 65, and the risk of rebleeding increased with advancing age. Another study found no patients developed seizures after the age of 50, but some suffered the first hemorrhage in advanced years, suggesting that AVMs in elderly patients are not

always benign lesions.²⁾ Recently, the incidence of symptomatic AVM in patients above the age of 60 years has been reported at 10%.⁹⁾

Detailed analysis of seven patients above the age of 60 years showed that five suffered intracerebral hemorrhage, one subarachnoid hemorrhage due to cerebral aneurysm, and one seizure.³⁾ The oldest patient was an 80-year-old female who had an occult AVM that bled in the frontal lobe. Hematoma was of subcortical type in all patients with no hemorrhage in the deep structures of brain. Two cases were angiographically occult AVM. The most recent series showed six of 65 patients (9%) were over the age of 65, and all had subcortical hemorrhage.⁵⁾ Two cases were angiographically occult AVM. The oldest patient was an 81-year-old female.

Angiographically evident AVM that bled in the basal ganglia in the elderly has not been previously reported. All previous cases have involved subcortical hematoma. Cryptic vascular abnormality in the hematoma wall of patients with subcortical hemorrhage is not infrequent, and may be diagnosed as AVM. Discussion of the surgical treatment of AVM should only consider angiographically confirmed AVM. Therefore, previous series contained fewer confirmed AVM. The conventional therapy for elderly patients who harbor cerebral AVMs is conservative treatment. However, most reported elderly patients have AVMs with location and size that can be treated by surgery quite easily. However, ours is the first case of ruptured deep-seated AVMs in the elderly.

The incidence of elderly patients with AVMs will increase in the future, because of greater life expectancy. Surgery could be used to treat some of these patients, although conservative or nonsurgical treatment such as the gamma knife are alternatives. The present case indicates that preoperative imaging studies are necessary to correctly diagnose the lesion and allow optimal therapy. Therefore, the cause of even common hypertensive hemorrhage should be identified by imaging techniques.

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