Fusiform middle cerebral artery aneurysm

Rupture of aneurysm of the cerebral artery is the commonest cause of spontaneous intracranial subarachnoid hemorrhage (SAH). However, rupture of the fusiform aneurysm is relatively rare. We came across a patient with a fusiform aneurysm of the right middle cerebral artery who presented with spontaneous subarachnoid hemorrhage. The patient underwent routine imaging studies followed by successful wrapping of the aneurysm. We describe this unique case in detail and review the literature.

Key Words: aneurysm, angiography, craniotomy, subarachnoid hemorrhage

Approximately 20% of all intracranial aneurysms arise from middle cerebral artery (MCA) bifurcation. The majority of these cases are saccular. Fusiform aneurysm in MCA is very rare and only slightly more than 100 cases have been described in the literature to date. Fusiform aneurysms have different underlying pathological features, hemodynamics, anatomic distributions, natural histories and treatments than do the saccular ones. We report a case of fusiform aneurysm of MCA in an elderly female detected for the first time in our institution.

Case report

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History

This 68-year-old lady, with a history of hypertension, was referred to our institution with the symptoms of irritability and weakness of left upper and lower extremities following a sudden fainting attack. These were accompanied by a sudden severe headache 3 days prior to presentation.

Examination

Upon arrival at our institution the patient had a Glasgow Coma scale of 12/15 with subtle left sided facial palsy and left sided hemiparesis. She had marked nuchal rigidity. The remainder of her examination was normal.

Imaging

A noncontrast computerized tomography (NCCT) scan of her head (Figure 1) obtained on arrival showed an irregular acute intracerebral hematoma in the right temporal lobe with mild perilesional edema. Subarachnoid hemorrhage was seen in the right sylvian cistern, sulci in the right temporal and parietal lobes.

The patient subsequently underwent cerebral angiography, which showed a tortuous and serpentine course of the right middle cerebral artery. There was irregular fusiform aneurysm of the MCA involving the distal M₁ segment (distal to the origin of lenticulostriate branches), genu and extending up to the trifurcation (Figure 2). M₂ segment was normal and the cortical branches were also normal.

Hospital course

Considering the age, presenting clinical status and nature of the aneurysm a decision was made by the neurosurgery team to wrap the aneurysm. At craniotomy the angiographic findings were confirmed (Figure 3) and the
aneurysm was successfully wrapped with cotton. At 3 months postoperatively there has been no evidence of subarachnoid hemorrhage.

Discussion

“Fusiform” is a morphological term used to describe the circumferential involvement of the artery by the aneurysm. Fusiform middle cerebral arterial aneurysms are either atherosclerotic or dissecting in nature. 2,3,4 These lesions are exaggerated arterial ectasia due to a severe and unusual form of atherosclerosis. 6

In the intracranial arteries the internal elastic lamina (IEL) containing the elastic tissue is the most important layer for determining the strength of the vessel wall. 4 Therefore, vessels are more prone to damage if the elastic tissue is defective. Hemodynamic stress is presumed to be the primary factor causing remodeling, degeneration and loss of IEL. 7 It is generally believed that loss of the arterial elastic membrane, arteriosclerosis and hypertension are the three main factors underlying the pathogenesis of arterial ectasia with subsequent formation of a fusiform aneurysm. Pathological study of the aneurysm has also revealed that the wall is composed of a thin layer of fibrous tissue without elastic interna, supporting the hypothesis that a defect in the IEL is the basic underlying process. 4

Fusiform aneurysms of anterior circulation usually occur in young male patients in contrast to our case. 2 The clinical symptoms of these lesions in order of frequency are SAH, features related to mass effect and ischemic symptoms. 2

On imaging, fusiform aneurysms usually arise from elongated, tortuous arteries. Patent aneurysms enhance strongly after contrast administration. Thrombosed aneurysms are hyperdense on NCCT scans. Tubular calcification with intraluminal and mural thrombi in ectatic parent vessels and the aneurysm wall are frequent. 5

At angiography, fusiform aneurysms often have bizarre shapes with serpentine or giant configurations. Intraluminal flow is often slow and turbulent. These aneurysms typically do not have an identifiable neck. 5

With regards to the treatment of fusiform MCA aneurysms, distal revascularization with proximal occlusion is the definitive treatment. 2,3,4 Other strategies for treating

Figure 1. Noncontrast computerized tomography scan at admission, demonstrating extensive subarachnoid hemorrhage in the right sylvian fissure with adjacent temporal lobe hematoma.

Figure 2. Selective right ICA angiograms, lateral (left) and anteroposterior (right) view, demonstrating a fusiform aneurysm of the M1 segment of right middle cerebral artery (arrow)

Figure 3. Intraoperative photograph showing the fusiform aneurysm (arrow)
these aneurysms include intravascular techniques, proximal occlusion of the parent artery or trapping of the aneurysm, microsurgical bypass of the involved arterial segment and reinforcement of the aneurysm. Reinforcement or wrapping is frequently used when other techniques are thought to be unsafe or the patient’s general condition does not permit a long procedure. It does not eliminate the aneurysm and is therefore associated with a high incidence of rebleeding or postoperative progression of symptoms. Hence close follow up is necessary for these patients.

**Conclusions**

In summary, we present an unusual case of fusiform MCA aneurysm in an elderly lady, which was treated by circumferential wrapping for the first time in our institution.

**References**