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Trauma

Traumatic middle meningeal artery and fistula formation with the cavernous sinus: case report

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Abstract

Background: In this study, we present a young patient with traumatic middle meningeal fistula treated with detachable balloon through the middle meningeal artery.
Case Description: The case of a 22-year-old man with exophthalmos due to an arteriovenous fistula between the middle meningeal artery and the cavernous sinus at the base of the middle cranial fossa is reported. Complete embolization was performed with a detachable balloon and resulted in complete relief of the symptoms.
Conclusion: The middle meningeal fistula can be caused by head trauma; selective external carotid angiogram is necessary for correct diagnosis, and endovascular embolization is an effective way.

Keywords: Middle meningeal artery; Fistula; Cavernous sinus

1. Introduction

Traumatic carotid cavernous fistula of Barrow type C is an uncommon complication of head trauma [2-8,10]. This vascular lesion might be missed unless it exhibits clinical manifestations or is incidentally discovered during radiological examination such as MRI or conventional angiography [2-8,10]. Here we present a case of traumatic middle meningeal artery, which subsequently established a fistula with the cavernous sinus. We also discuss the methods used for diagnosis and treatment of this lesion.

2. Case report

A 22-year-old man sustained blunt head trauma in a basketball game and was admitted to a local hospital. Results of physical examination at the time of administration were normal. Skull radiographs showed no skull fracture. He was managed conservatively. One month later, intracranial bruits developed; and the patient subsequently demonstrated blurred vision, left exophthalmos, diplopia, and blepharoptosis. Magnetic resonance imaging revealed the dilated left superior ophthalmic vein (Fig. 1). Cerebral angiography demonstrated that the fistula was located exactly at the foramen spinosum and drained into the ipsilateral cavernous sinus through a dural sinus on the floor of middle cranial fossa (Figs. 2 and 3). There was also a dilated cortical vein draining into the superior sagittal sinus.

2.1. Intervention

The procedure was performed with an 8F guiding catheter (Cordis, USA) catheterized into the left external carotid artery. Afterward, a Magic-BD microcatheter carrying a #3 detachable balloon (Balt, Montmorency, France) was advanced through the guiding catheter up to the fistula via the dilated left middle meningeal artery. An immediate obliteration of the DAVF was achieved after the balloon was deflated with 0.3 mL contrast injection (Figs. 4 and 5). The procedure was ended.

Abbreviations: DAVF, dural arteriovenous fistula; MRI, magnetic resonance imaging.

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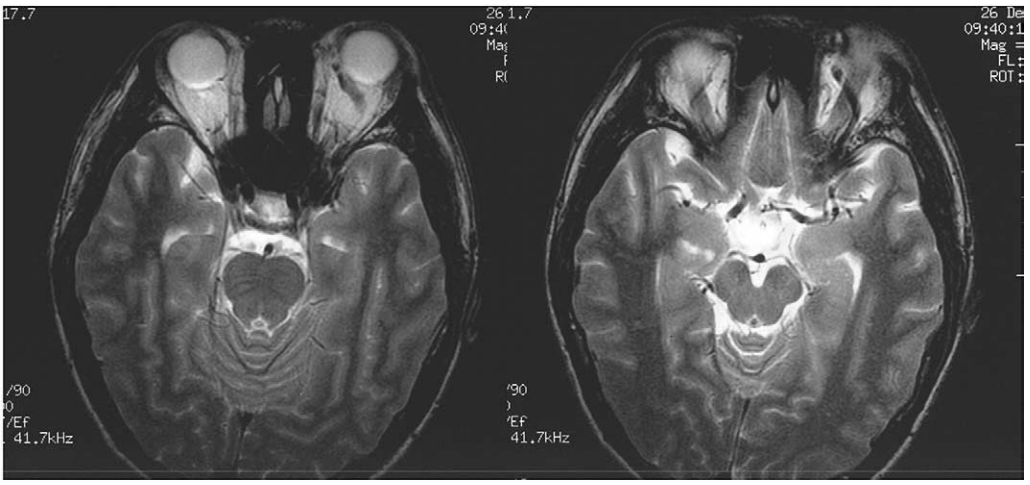

Fig. 1. Axial T2-weighted MRI showing the left dilated ophthalmic vein.

2.2. Postprocedure course

The postprocedure course was uneventful. The patient was discharged home on postprocedure day 2 without any neurologic abnormalities. One-month clinical follow-up demonstrated no intracranial bruits.

3. Discussion

The present case demonstrated an unusual DAVF caused by laceration of the meningeal artery and opening of a venous lake adjacent to the cavernous sinus. Many cases of middle meningeal fistula in association with head trauma have been reported [1-12]. However, we are not aware of a reported case treated by detachable balloon and without skull fracture. In the present case, 1 month passed between head injury and the appearance of intracranial bruits. The case can be considered one of chronic DAVF based on this relatively asymptomatic interval. A delayed onset of symptoms is mainly attributable to disruption of dural venous drainage and increased intracavernous pressure [2-4,6,10]. Neurosurgeons should be aware of the possibility of DAVF in the middle meningeal artery in patients without skull fracture. In our case, initially, the common carotid angiography was performed (Fig. 2); and the lesion was misdiagnosed as Barrow type A. However, the selective external carotid angiograms demonstrated a DAVF of Barrow type C in the middle cranial fossa.

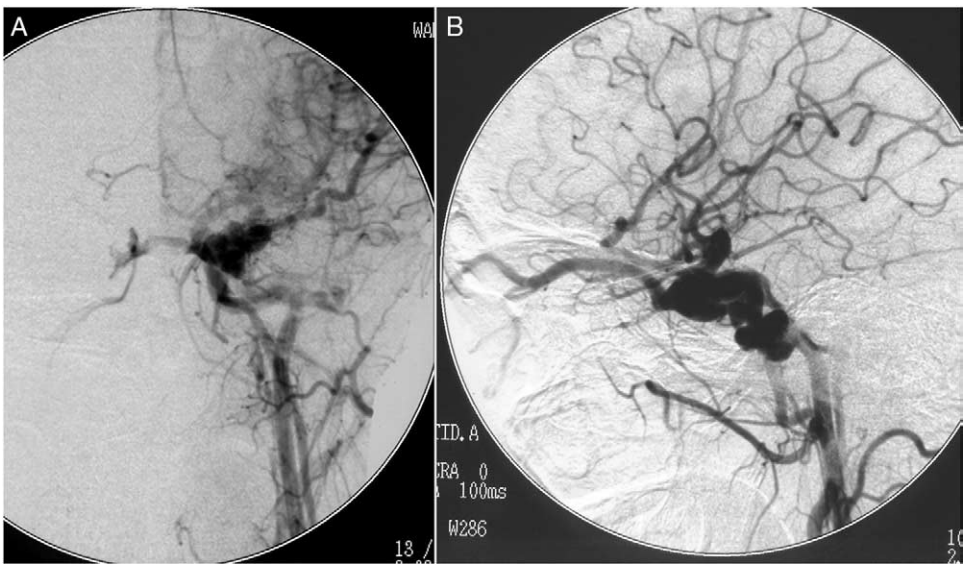

Fig. 2. Angiograms of left common carotid artery—frontal (A) and lateral (B)—demonstrate a caroticocavernous fistula like Barrow type A.