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Case report

A case report of pericallosal aneurysm successfully treated with flow diverter stents ☆

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ABSTRACT

Pericallosal artery aneurysm (PAA) is a relatively uncommon type of intracranial aneurysm that tends to rupture more frequently and cause higher mortality rates than other types of cerebral aneurysms. Surgery to address PAA is difficult due to its deep-seated location, the size of the aneurysmal sac, and the limited surgical field. In recent years, with the development of percutaneous interventions, endovascular treatment has become the preferred, minimally invasive intervention method for the treatment of pericallosal aneurysms. In this article, we present a case of PAA that was successfully treated with flow diversion therapy in a 51-year-old male.

Introduction

Pericallosal artery aneurysm (PAA) is rare and accounts for 1.5%-9% of all intracranial aneurysms [1]. PAA can occur spontaneously or in response to trauma [2]. Patients with PAA often present with a variety of symptoms, such as headache, focal neurological deficits, and seizures [3]. PAA is easy to misdiagnose, resulting in delayed treatment and the development of severe complications [2]. Flow diversion therapy (FDT) can be advantageous for the treatment of aneurysms at distal locations and with unfavorable anatomy, representing an alternative treatment for cases that are difficult to treat with endovascular coiling or surgery [4]. In this article, we discuss the safety and efficacy of this treatment modality.

Case report

A 51-year-old man presented with a headache with no focal neurological deficits and no significant medical history. The

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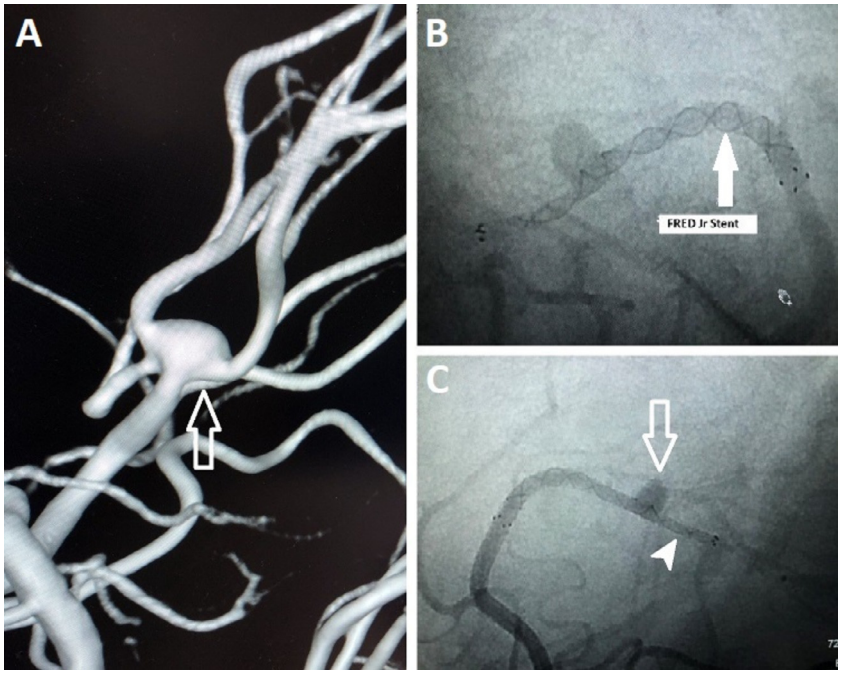

Fig. 1 – (A) Three-dimensional DSA image showed an aneurysm located in the distal branch of the pericallosal artery (arrow). (B) A stent was placed to occlude the aneurysm (arrow). (C) The post-treatment angiogram showed a grade C contrast filling of the aneurysm lumen (arrow), and the blood flow of the pericallosal artery after the intervention was normal (arrowhead).

patient underwent brain magnetic resonance imaging (MRI). Three-dimensional (3D) time-of-flight (TOF) magnetic resonance angiography showed an aneurysm located in the right pericallosal artery without signs of rupture. Cerebral digital subtraction angiography (DSA) was indicated in this patient in order to repair the aneurysm. The DSA images revealed that the aneurysm was located in the distal branch of the pericallosal artery, sized approximately 7 × 5 mm, with a neck size of 4.5 mm, a dome-to-neck ratio of 1.5, and a smooth margin (Fig. 1A). The diameter of the parent artery was 2.7 mm. In this case, we opted for the placement of a Flow Re-Direction Endoluminal Device Jr (FRED® Jr; MicroVention, California, USA) into the pericallosal artery and covering the aneurysm vesicle (Fig. 1). The post-treatment angiogram showed a grade C1 contrast filling of the aneurysm lumen (according to the O'Kelly Marotta grading scale [5]). The patient's overall status after the intervention was normal. After 3 months, his clinical re-examination revealed no abnormalities, and the brain MRI showed neither residual nor relapsed aneurysm, and no evidence of ischemia or intracranial hemorrhage was observed.

Discussion

PAAs are rare and typically have a wide neck and small size, ranging from 2 to 9 mm [4,6]. Most PAAs are located in the rostral region, along the corpus callosum [7]. PAA can be categorized as either spontaneous or traumatic [2]. PAA is more commonly associated with multiple cerebral aneurysms than other types of intracranial aneurysms [6]. Patients with PAA experience higher morbidity and mortality than patients with other types of intracranial aneurysms due to a higher rupture rate [3].

Most intracranial aneurysms are asymptomatic and remain unruptured. The rupture rate for PAA is approximately 4% [3]. Ruptured PAA can result in intracerebral hematoma (which is typically located in the frontal lobe), anterior interhemispheric fissure, pericallosal cistern around the corpus callosum, or subarachnoid hemorrhage [3]. Patients with ruptured PAAs can present with a variety of symptoms or signs, including focal neurological deficits or coma [1].

Some options that can be considered for the treatment of PAA include neurosurgical treatment and endovascular treatment, and small PAAs may be treated with observation [8,9]. Open surgery is an invasive procedure, and controlling the parent artery can be difficult. Endovascular treatment is a therapeutic option for aneurysms and can be performed using primary coils, stent-assisted coils, flow-diverting stent embolization, or balloon remodeling techniques, depending on the location and characteristics of the aneurysm sac [6,9,10]. The indications for FDT include very small or very large aneurysms, aneurysms with small and medium wide necks, and those that fail to respond to coil embolization [4,11]. A flow-diverting stent is placed in the parent artery at the level of the aneurysm neck to induce aneurysm thrombosis [12]. FDT can provide aneurysm occlusion for longer periods than coil embolization techniques. A meta-analysis performed by Sturiale et al. [9] showed occlusion rates of 80%–100%, with a morbidity rate of 9% and a mortality rate of 9%.

In this patient, the aneurysm was located in the distal anterior cerebral artery and was a wide-neck aneurysm. The size of the parent artery was small; therefore, we opted to use flow diversion embolization techniques for treatment. The interven-

tion was successful, with no complications, and the aneurysm sac disappeared after 3 months.

Conclusion

PAA accounts for a small percentage of intracranial aneurysms. Endovascular embolism represents a minimally invasive, feasible, and effective intervention with high rates of aneurysm occlusion. In general, aneurysm interventions using flow-diverting stents have many advantages for deep-seated locations.

Ethical Statement

Appropriate written informed consent was obtained for the publication of this case report and accompanying images.

Author contributions

Le VD and Nguyen MD contributed to this article as co-first authors. All authors have read the manuscript and agree to the contents.

Informed consent

Informed consent for patient information to be published in this article was obtained.

Declaration of Competing Interest

The authors do not report any conflicts of interest.

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