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Case Report

Ultralarge Diameter (8 mm) Derivo2 Flow Diverter for Embolisation of Giant Fusiform Carotid Aneurysm — A Case Report

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Abstract

Since their introduction into clinical practice two decades ago, flow diverting stents became a powerful device in endovascular treatment of different cases of complex intracranial aneurysms, especially large and giant ones. These devices provide higher coverage of the parent vessel (30–50%) compared to conventional intracranial stents, decreasing blood flow into the aneurysm and producing eventual aneurysmal thrombosis. Compared to stent-assisted coiling results in literature, they showed comparable morbidity and mortality [2,3]. However, regarding endovascular treatment of complex intracranial aneurysms arising in very large diameter vessels, (≥5.3 mm - LDV), only few devices are available on the market. We present here a case of embolization of complex large carotid aneurysm using a largest available FD stent on the market, DERIVO2, 8x50 (Acandis GmbH & Co. KG, Pforzheim, Germany).

Keywords: *Cerebral aneurysm; Giant aneurysm; Fusiform aneurysm; Derivo embolization device*

Introduction

Flow-diverting stents (FDs) have become an important endovascular option for the treatment of complex intracranial aneurysms, especially large, giant, and fusiform aneurysms that are difficult to manage with conventional coiling or microsurgical techniques. These devices provide higher metal surface coverage across the aneurysm neck, reducing blood flow into the aneurysm sac and promoting gradual thrombosis while preserving the parent vessel patency [2,3]. Compared with stent-assisted coiling, flow diversion has demonstrated comparable morbidity and mortality outcomes, with increasing use in reconstruction of challenging aneurysms [2,3].

Despite continuous advances in FD technology, treatment of aneurysms arising from large-diameter vessels remains technically demanding because only a limited number of devices are available for vessels measuring ≥5 mm [4]. Adequate wall apposition and successful navigation through tortuous anatomy are essential for effective flow diversion. The DERIVO2 flow diverter (Acandis GmbH & Co. KG, Pforzheim, Germany) is available in diameters up to 8 mm and lengths up to 50 mm, expanding treatment possibilities for giant and fusiform aneurysms involving large parent arteries [1,5]. We present a case of successful embolisation of a giant fusiform carotid aneurysm using an ultralarge 8×50 mm DERIVO2 flow diverter.

Case Presentation

A 65-years old patient underwent CT head examination for planocellular carcinoma of the upper lip. The examination also discovered a presence of giant fusiform aneurysm on the C5C6 segments of the right ICA, sized 28x15 mm, with strong fetal PCA arising from the aneurysmal body. Size of ICA was 8,5 mm proximally and 6,5 mm distally of the aneurysm.

Patient was prepared with dual anti-platelet therapy for 5 days (Plavix 75 mg 2x1, Aspirin 100 mg 1x1).

The procedure was realized under general anesthesia.

Triaxial system was navigated into the cervical portion of the right ICA. Intermediary catheter (Sofia 5 Microvention) was introduced through the long sheet (NeuronMax, Penumbra) up to the beginning of aneurysmal dilatation. However, the advancing of microcatheter (Neuroslider 39, Acandis GmbH&Co KG) was not possible because of its rigidity, so we raised Sofia 5 to M1 segment of MCA and then Neuroslider through Sofia to the landing point.

FD DERIVO2 8x50 (Acandis GmbH & Co. KG, Pforzheim, Germany) was delivered without any complication opening regularly until final landing point. Control angiograms showed already a “flow-diverting” effect. PCA was filling normally from ICA, but on the control angiograms of the posterior circulation there was also a good filling of right PCA. This finding was not present before the intervention – the flow change occurred immediately.

Figure 1A and B. Preprocedural 3D DSA angiography shows a large fusiform aneurysm of the right ICA including C4-C7 segments. A strong fetal PCA is arising from the aneurysmal dilatation. Supraclinoid portion of ICA measured up to 6,5 mm, while the size of ICA proximally of the aneurysm was up to 8,5 mm.

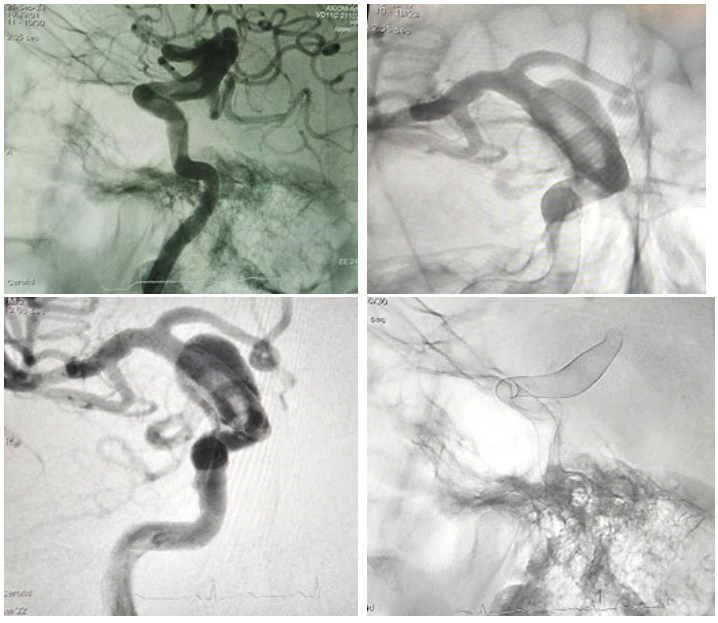

Figure 2 A, B, C, D. SA after deployment of FD stent. Images show a good wall apposition and already visible “flow diverting “effect in the fusiform aneurysmal body. D. Stent is clearly visible on fluoroscopy.

Patient was awakened successfully, in good condition. His postoperative course went well, and he was discharged the day 3.

Control CT examination showed no signs of ischemia or hemorrhage.

Discussion

Although the design of FDs has continually evolved, there is only a limited number of devices with diameters ≥5 mm (Derivo embolization device, Acandis, Pforzheim, Germany, Flow Redirection Endoluminal Device-FRED Microvention, Tustin, CA, Silk Balt Extrusion, Montmorency, France, Surpass Streamline SS; Stryker Neurovascular, Fremont, CA) .(4) Among the other features, the efficacy of flow diversion depends on wall apposition, which is often challenging to achieve if the target vessel, usually ICA, has a tortuous course.

Consequently, this limitation is relevant when a FD is intended for large-caliber vessels where the maximum unconstrained opening diameter of the device may be less than that of the parent artery (4).

The DERIVO2 device (DED2) is a flow-diverter available in lengths between 10 and 50 mm and diameters between 2.5 and 8 mm. Depending on FD size, microcatheter required for the delivery is ranging from 0.0165'' to 0.039''. The DED2 consists of 64 nitinol wires. It is completely clearly visible under fluoroscopy, but transport wire also has radiopaque tip, proximal transport wire marker and point of no return. The device is repositionable up to 90% of its length.

In our case, a delivery of 39-microcatheter was not possible because of its size and consequent rigidity, as well as a tortuous anatomy of ICA. It could be realized only through the large intermediary catheter previously positioned to the distal landing point.

As for the device itself, in spite of its size, there were no difficulties with its placement and deployment. We used “push and pull” technique to achieve a good wall apposition.

The availability of such wide and long devices may be very useful in large and fusiform aneurysms arising in large diameter vessels, allowing a successful treatment of these difficult lesions, for the long time considered as untreatable

Conclusion

This preliminary experience with very large DERIVO2 device showed that the deployment was easy and safe. More flexible delivery microcatheter would be very useful, for the course of such parent vessel is usually tortuous and difficult to overcome. More cases are needed to establish a safety and long-term efficacy of these such large FD stents.

Conflict of Interest

The authors declare that they have no conflict of interest.

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