

Use of the pipeline embolization device for the treatment of recurrent intracranial aneurysm after previous stent-assisted embolization

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Aneurysmal subarachnoid haemorrhage remains an important cause of stroke mortality and morbidity.¹ With the advance of endovascular treatment,² increasingly more ruptured intracranial aneurysms are being treated with endovascular embolization. Endovascular treatment has a unique form of recurrence and complication,³ and the recurrence of intracranial aneurysm treated by stent-assisted embolization is a significant challenge. The pipeline embolization device (PED), a dedicated flow-modifying device, has been available in Hong Kong since September 2008. The PED (eV3, Irvine, CA, USA) is a woven wire mesh tube made of 25% platinum and 75% cobalt-nickel alloy; it is designed to provide 30–35% metal coverage of the inner surface of the target vessel with a pore size of 0.02–0.05 mm² (approximately three times more than other commonly used intracranial stents).⁴ Here, we illustrate the PED treatment of a recurrent intracranial aneurysm after stent-assisted embolization.

A 46-year-old man presented with the sudden onset of severe headache; computed tomography of his brain showed diffuse basal cistern subarachnoid haemorrhage. Computed tomographic angiography showed a left internal carotid artery aneurysm (5.4 mm height and 2.9 mm neck). He was treated with endovascular embolization, which was complicated with coil protrusion. Emergency stent (Neuroform3; Boston Scientific, Natick, MA, USA) deployment to avoid further coil dislodgement was undertaken and embolization continued to occlude the aneurysm. On 1-year follow-up angiography, the aneurysm had recurred with a wide neck (3.5 mm height, 3.8 mm neck). After discussing different treatment and management options, the patient decided to undergo treatment with the PED. He was given 75 mg clopidogrel and 160 mg aspirin daily for 5 days before the procedure. Under

general anaesthesia and right femoral arterial puncture, a guiding catheter was inserted into the cavernous segment of his left internal carotid artery. A 3-F microcatheter was placed across the neck of the aneurysm under microguidewire guidance. The PED, mounted on a delivery wire and constrained within a sheath, was inserted into the rotating haemostatic valve and introduced into the hub of the microcatheter. Under heparinization, by pushing the delivery wire, the PED was advanced through the whole length of the microcatheter. The PED delivery wire was then held in place while the microcatheter retracted, supplemented by delivery wire rotation, to initiate deployment. Mainly through forward pressure on the delivery wire, the device was further deployed to create a tight mesh. Finally, the microcatheter was advanced to compress the proximal end of the PED, and the delivery wire was retracted. Check angiography showed aneurysm contrast stasis and layering within the dependent portion, forming an eclipse sign on the subtracted venous phase image.⁴

The patient did not experience new focal neurological deficit after the procedure. He was prescribed 75 mg clopidogrel and 160 mg aspirin daily for 3 months and 160 mg aspirin for another 3 months. On 3-month follow up angiography, the patent aneurysm sac had decreased in size. The aneurysm is expected to gradually thrombose after 6 to 12 months.⁵

In conclusion, the availability of the PED enhanced the set of tools available for the endovascular treatment of recurrent wide-necked intracranial aneurysm.

Video image

Additional video images may be found in the online version of this article.

Angiography showed a recurrent left internal carotid artery aneurysm with a wide neck (3.5 mm height, 3.8 mm neck).

By pushing the delivery wire, the pipeline embolization device (PED) was advanced through the whole length

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Check angiography showed aneurysm contrast stasis and layering within the dependent portion, forming an eclipse sign on the subtracted venous phase image. Visit http://www.cshk.org/surgical_practice/multi-media_article/Feb_2011_issue_MM12_video.htm

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