

## CASE REPORT

## Endovascular coil retrieval using a TrevoProVue stentriever

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**SUMMARY**

A 65-year-old man with a left cavernous internal carotid artery cerebral aneurysm experienced a premature detachment of the first framing coil (10 mm×40 cm Penumbra Complex Standard) during a coil embolization procedure. The coil herniated into the anterior cerebral artery and pericallosal artery. Multiple attempts to retrieve the coil using both a 2 and 4 mm Microsnare (Amplatz GooseNeck) failed. A Trevo ProVue retrievable stent was then used to retrieve the coil without any adverse events. This case report highlights a novel use of a stent for the removal of a foreign body from the cerebrovascular system.

**BACKGROUND**

Foreign bodies in the cerebrovascular system lead to vascular blockage and stroke. Coil herniation and migration is a known complication of endovascular coiling of cerebral aneurysms. Tools that are commonly available to retrieve foreign bodies from the cerebrovascular system include Microsnares (Amplatz GooseNeck; Covidien, Mansfield, Massachusetts, USA) and Alligator (Covidien).<sup>1</sup> The Merci device (Stryker, Kalamazoo, Michigan, USA), which is indicated for thrombectomy in acute ischemic stroke, has also been used as a foreign body retriever.<sup>2</sup> In this report an additional option for the retrieval of coil herniation and migration without significant side effects is offered to practitioners.

**CASE PRESENTATION**

A 65-year-old man with a large left cavernous internal carotid artery cerebral aneurysm presented for primary coiling of his aneurysm. Prior to the procedure the patient was asymptomatic but, owing to the continued enlargement of the aneurysm on serial imaging, primary and stent-assisted coiling were presented and discussed. Flow diversion was not an offered option as our institution does not use this method of endovascular treatment for aneurysms. Primary coiling was initially attempted and was then switched to stent-assisted coiling after the initial attempt at primary coiling failed.

A 10 mm×40 cm Complex Standard Penumbra coil (Penumbra, Alameda, California, USA) was advanced into the aneurysm lumen. During repositioning the coil prematurely detached and then herniated outside the aneurysm into the anterior cerebral artery, as far distally to the left pericallosal artery. The coil could not be retrieved with negative suctioning applied to the microcatheter (PX SLIM, Penumbra).

Multiple attempts to retrieve the coil using 2 and 4 mm Microsnares (Amplatz GooseNeck) proved unsuccessful. The Trevo ProVue stentriever was then used in an attempt to retrieve the coil. Initially, and due to the large size and volume of the coil, the proximal segment of the coil broke and was retrieved in a smaller piece. The remaining large segment, which was lodged distally in the pericallosal artery, was retrieved in one piece after the Trevo ProVue was positioned and deployed distally and across the remaining coil. After coil retrieval a cerebral angiogram demonstrated only mild vasospasm of the distal pericallosal artery with no evidence of vascular injury or branch occlusion (figure 1).

**OUTCOME AND FOLLOW-UP**

Examination at the time of discharge showed the patient to be neurologically intact with no deficits in speech, vision or strength discrepancy between the right and left side. The patient was seen in the clinic 2 days after discharge and again 4 weeks later. During both visits the patient had a normal neurological examination without any residual effects from the procedure.

**DISCUSSION**

The Soutiner microsnare has been reported to be used in the retrieval of a broken tip from an intravascular ultrasound catheter from the distal portion of the coronary artery when another conventional snare instrument failed.<sup>3</sup> However, only a limited number of medical approaches, surgical procedures, and/or endovascular retrieval devices have been used to attend to the problem of stretched, displaced, and migrated coils.<sup>4</sup> Although the Alligator retrieval device has been used when migration occurs, it was not used in this case because the volume and mass of the coil required a more robust tool to achieve the retrieval.<sup>5</sup>

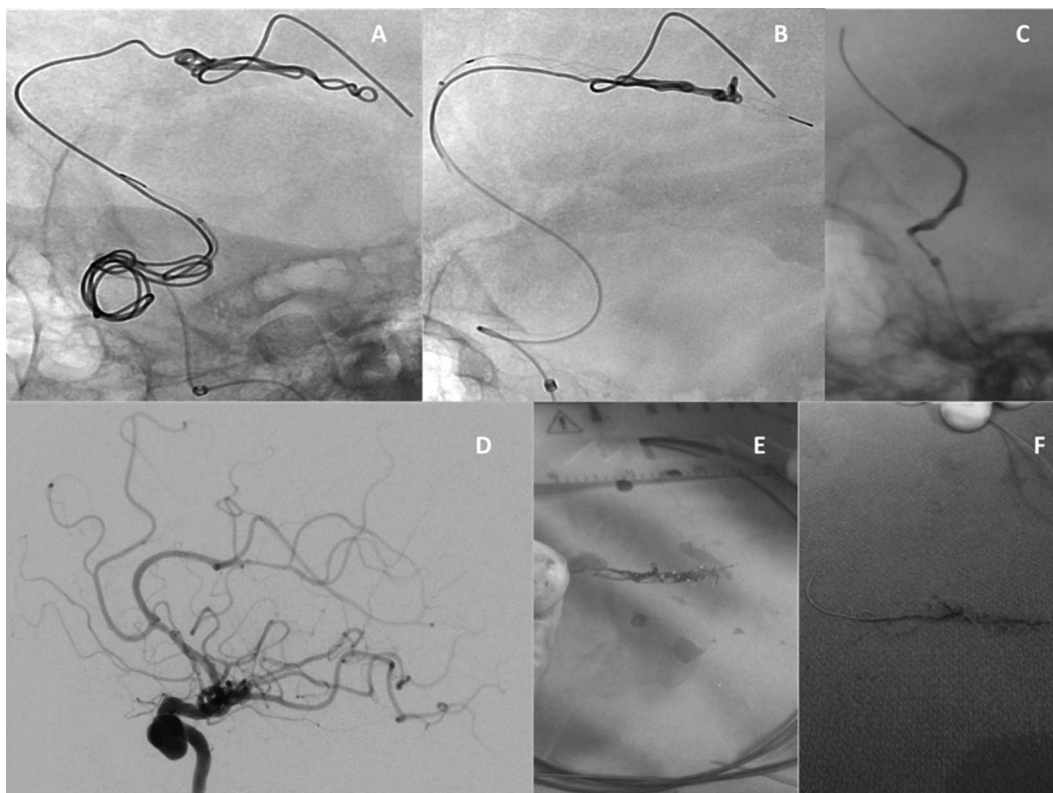
Stentriever such as the Trevo ProVue and Solitaire (Covidien) are indicated for thrombectomy in acute ischemic stroke. Because of their mechanical characteristics, they may be used as a reasonable additional tool (as we report here with the Trevo ProVue stentriever) to retrieve foreign bodies from the cerebrovascular system when other devices fail. Additional mechanical strains on the vessel using this method compared with clot retrieval using the same device are possible but were not seen in this case.

The continued advancement of aneurysm occlusion methods, coupled with no standardized



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**Figure 1** Digital subtraction angiography showing capture of (A) the proximal segment and (B) the distal segment in the coil and (C) retrieval of the coil (Penumbra Complex Standard) by retracting the stentriever (Trevo ProVue) back into the guide catheter with the coil ensnared. (D) Postoperative imaging shows mild vasospasm (arrow) and no evidence of vascular injury or branch occlusion. (E, F) The interwoven coil and Trevo ProVue after retrieval.

management of salvage approaches for retrieval, points to the necessity of sharing alternative techniques to aid practitioners in weighing the options when such complications occur.<sup>6</sup>

### Learning points

- ▶ An alternative migrated coil retrieval method is described to avoid neurologic complication.
- ▶ Distal migration during the procedure resulted in no residual neurological deficits.
- ▶ At 6-month follow-up the neurological examination was normal with no residual damage to the vessels.

**Contributors** MRK: management of the procedure, follow-up, acquisition of images, and collaboration in writing the manuscript. AS: collection of background literature, collection of consent form, collaboration in writing the manuscript, and

submission of the manuscript; ML: collection of background literature and collaboration in writing the manuscript.

**Competing interests** None.

**Patient consent** Obtained.

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