



## Letter to the Editor Regarding “Utility of Coaxial Angioplasty-thrombectomy for Acute Tandem Occlusion of Intracranial and Extracranial Arteries”

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**Keywords** ▶ tandem lesion, partial deflation, long delivery shaft

Dear Editor:

I have read the technical note entitled “Utility of Coaxial Angioplasty-thrombectomy for Acute Tandem Occlusion of Intracranial and Extracranial Arteries” by Miyauchi Y et al. published in *JNET Journal of Neuroendovascular Therapy* (2020;14(2): 76-80).<sup>1)</sup> I want to congratulate the authors for this technical note and make some contributions.

In the technical note, for tandem lesions, it has been indicated that a Sterling MR 5.0 × 40 mm (Boston Scientific, Natick, MA, USA) was navigated over the Solitaire’s (Medtronic, Minneapolis, MN, USA) delivery wire, the stent strut of which was deployed to the intracranial occlusion site. After the Sterling MR was removed, a Penumbra ACE68 (Penumbra, Alameda, CA, USA) was then navigated alternately across the extracranial lesion over the Solitaire’s delivery wire.

We treated a patient with tandem lesions as follows (**Fig. 1**). A balloon guide catheter was guided to the common carotid artery. A microcatheter was advanced using a microwire through the intracranial thrombus, and the Solitaire

was deployed through the microcatheter. The microcatheter was then removed. A Jackal RX 3.0 × 40 mm (Kaneka Medix, Osaka, Japan) along with the Penumbra ACE68 was navigated over the Solitaire’s delivery wire, the stent strut of which was anchored tightly to the intracranial occlusion site. After angioplasty using the Jackal RX for the extracranial lesion, the Jackal RX was deflated partially to eliminate the ledge between the delivery wire and Penumbra ACE68 (**Fig. 2**). At this time, the Jackal RX was deflated gradually keeping its diameter same to that of the Penumbra ACE68. The Penumbra ACE68 was navigated to the distal position of the extracranial lesion immediately. After removal of the Jackal RX, the Penumbra ACE68 was advanced over the Solitaire’s delivery wire just proximal to the Solitaire’s stent under continuous aspiration with the Penumbra ENGINE (Penumbra). The Solitaire was fully withdrawn in the Penumbra ACE68, referred to as the “Solumbra technique.”<sup>2)</sup> When good reversed flow from the Penumbra ACE68 was observed, internal carotid artery (ICA) angiography was performed via the Penumbra ACE68. If the intracranial arteries were successfully recanalized, a microwire was advanced to the ICA top to keep the true lumen. Cervical common carotid arteriography was performed to check the elastic recoil of the proximal ICA, after the Penumbra ACE68 was withdrawn in the balloon guide catheter.

The key points of our procedure are as follows: usage of the Jackal RX 3.0 × 40 mm and partial deflation of the Jackal RX. The Jackal RX’s effective length is 155 cm longer than that of the Penumbra ACE68 (132 cm), so these devices were induced together. On the other hand, it was difficult to push out the Sterling MR from the tip of the Penumbra ACE68 because the Sterling MR’s effective length is 135 cm. To compare the method of exchange of the Sterling MR for the Penumbra ACE68, our method is expected to shorten the puncture to recanalization time. At

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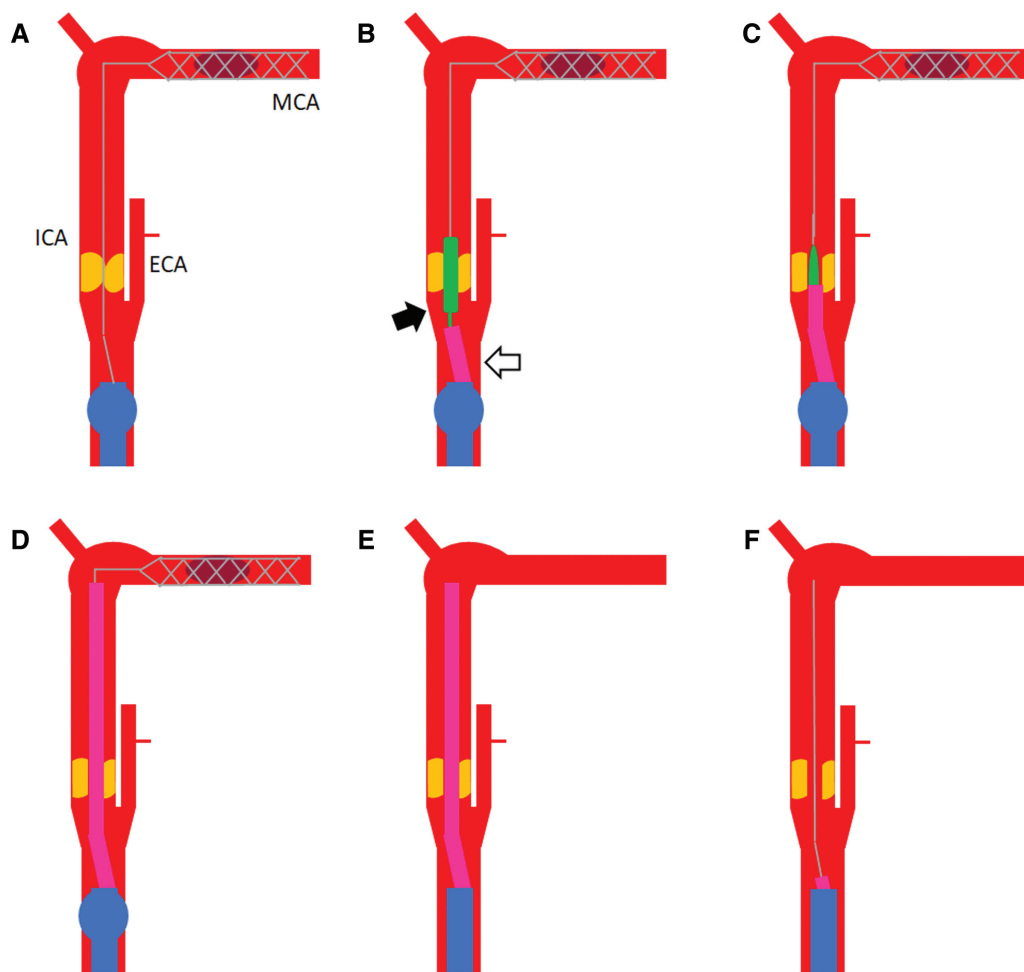
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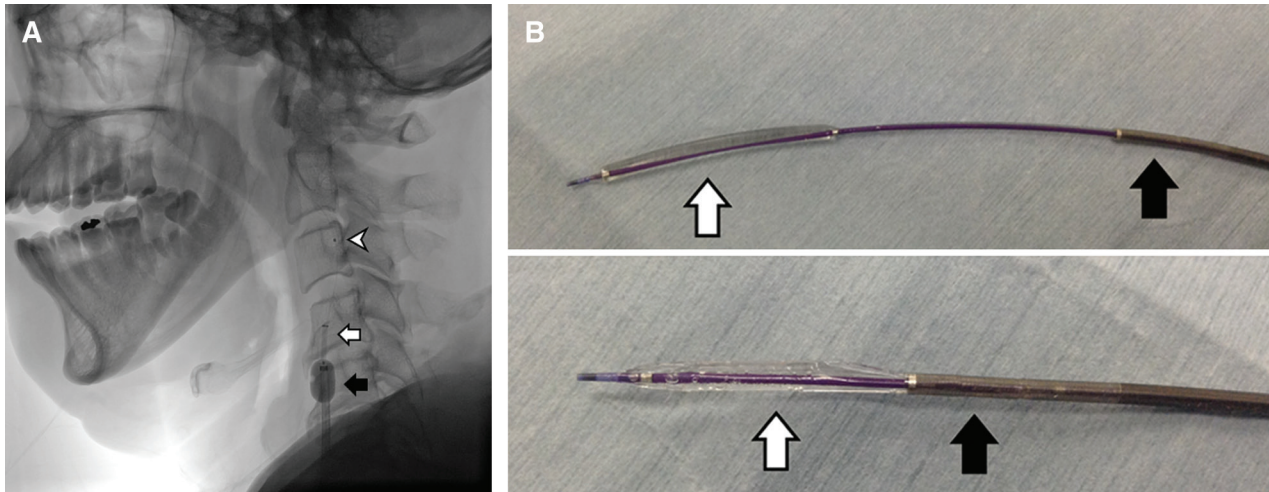
**Fig. 1** Schemas of our treatment strategy. (A) The solitaire is deployed to the MCA, and the microcatheter is removed. (B) The Jackal RX (black arrow) and Penumbra ACE68 (white arrow) navigate along the Solitaire's delivery wire, and angioplasty is performed. (C) The Penumbra ACE68 is advanced along the Jackal RX, the balloon of which is partially deflated. (D) The Jackal RX is removed, and the Penumbra ACE68 is advanced to just proximal to the Solitaire's stent under continuous aspiration. (E) The Solitaire is fully withdrawn in the Penumbra ACE68 "Solumbra". (F) If intracranial arteries are successfully recanalized, a microwire is advanced to the ICA top, and the Penumbra ACE68 is withdrawn in the balloon guide catheter. ECA: external carotid artery; ICA: internal carotid artery; MCA: middle cerebral artery

the timing of removal of microcatheter or navigation of the Penumbra ACE68 with the Jackal RX, the Solitaire's delivery wire cannot be held. But the possibility of stent displacement is low because the stent strut was anchored tightly. Hyperperfusion is a major and serious complication of percutaneous transluminal angioplasty (PTA) to ICA stenosis.<sup>3)</sup> The best size of PTA balloon has been reported to be 2.5–3 mm in staged carotid artery stenting to avoid hyperperfusion and elastic recoil.<sup>4,5)</sup> However, difficulties in a lesion crossing the Penumbra ACE68 after PTA by a 3 mm diameter balloon can be caused even with slight elastic recoil because the Penumbra ACE68 has a 2.03 mm external diameter. In this case, our method is favorable for lesion crossing of the Penumbra ACE68 by short-interval

PTA and lesion crossing and decreasing ledge by means of a partially deflated balloon.

We use the "Solumbra technique" when the Solitaire is retrieved. On the other hand, Miyachi et al. reported that the Solitaire and ACE68 were retrieved as a single unit. We believe the "Solumbra technique" is better in this situation at two points. First, stent strut of the Solitaire does not contact with the extracranial lesion to avoid difficulty of passage and dropping out thrombus. Second, the Penumbra ACE68 can keep true lumen of extracranial lesion during thrombectomy for intracranial lesion.

We believe that the technique reported by Miyachi et al. is very smart, but the choice of PTA balloon can lead to further progress.



**Fig. 2** (A) Photograph of the illustrative case. The Penumbra ACE68 (white arrow) is advanced along the Jackal RX, the balloon of which is partially deflated (approximately 1 atm) (arrow head). The balloon guide catheter is placed at the common carotid artery (black arrow). (B) Picture of the devices. The Jackal RX (white arrow) and Penumbra ACE68 (black arrow) can be used coaxially. The balloon of the Jackal RX  $3.0 \times 40$  mm is inflated at nominal pressure (upper section). The balloon of the Jackal RX is partially deflated to decrease ledge (lower section).

## Disclosure Statement

Neither the first author nor coauthors have conflicts of interest to declare concerning this letter.

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