

## Image in intervention

# Mechanical thrombectomy for rescue treatment of severe thrombosis of the superior sagittal sinus with the use of Penumbra and AngioJet catheters

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Thrombosis of the superior sagittal sinus (SSS) is a rare pathology, yet associated with high morbidity and mortality (5–20%). Routine management comprise anticoagulation with heparin and/or systemic fibrinolysis. Still, patients with life-threatening thrombosis of SSS, not improving after standard treatment or with contraindications for fibrinolysis, require endovascular management [1, 2].

Here we present a case of mechanical thrombectomy as rescue treatment for severe thrombosis of SSS in 21-year-old female patient. She developed acute neurologic symptoms 17 days after uncomplicated physiological labour. These comprised severe headache followed by left-sided hemiparesis and lethargy. Computed tomography (CT) angiography revealed thrombosis of SSS and infarction in the right hemisphere, with foci of haemorrhagic transformation and cerebral oedema. Considering contraindications for thrombolysis and expanding oedema, we decided to address thrombosis using mechanical thrombectomy. Catheter angiography revealed patent cerebral arteries and confirmed occlusion of the SSS (Figure 1 A). Using femoral vein access, we cannulated right internal jugular vein and over the 0.014" Traxcess® (Microvention, Aliso Viejo, CA, USA) guidewire, we introduced the Penumbra 5MAX™ ACE catheter (Penumbra Inc., Alameda, CA, USA) into the SSS. Several passages of this reperfusion catheter removed thrombi from the SSS (Figure 1 B). Then, through this catheter we introduced the 4 Fr AngioJet™ rheolytic catheter (Boston Scientific, Natick, MA, USA) and removed thrombi from proximal part of the SSS, confluence of sinuses and right transverse sinus, achieving good outflow (Figures 1 C, D).

After endovascular procedure patient was transmitted to the intensive care unit. She was anticoagulated with heparin. During her hospital stay there were several seizure episodes that required administration of antiepileptic agents. From the 8<sup>th</sup> postprocedural day she was conscious, free of seizures and without neurologic deficits. She was discharged with the recommendation of anticoagulation with warfarin and antiepileptic therapy with sodium valproate for 9 months. There were no new neurologic events revealed at follow-up 4 months after the procedure.

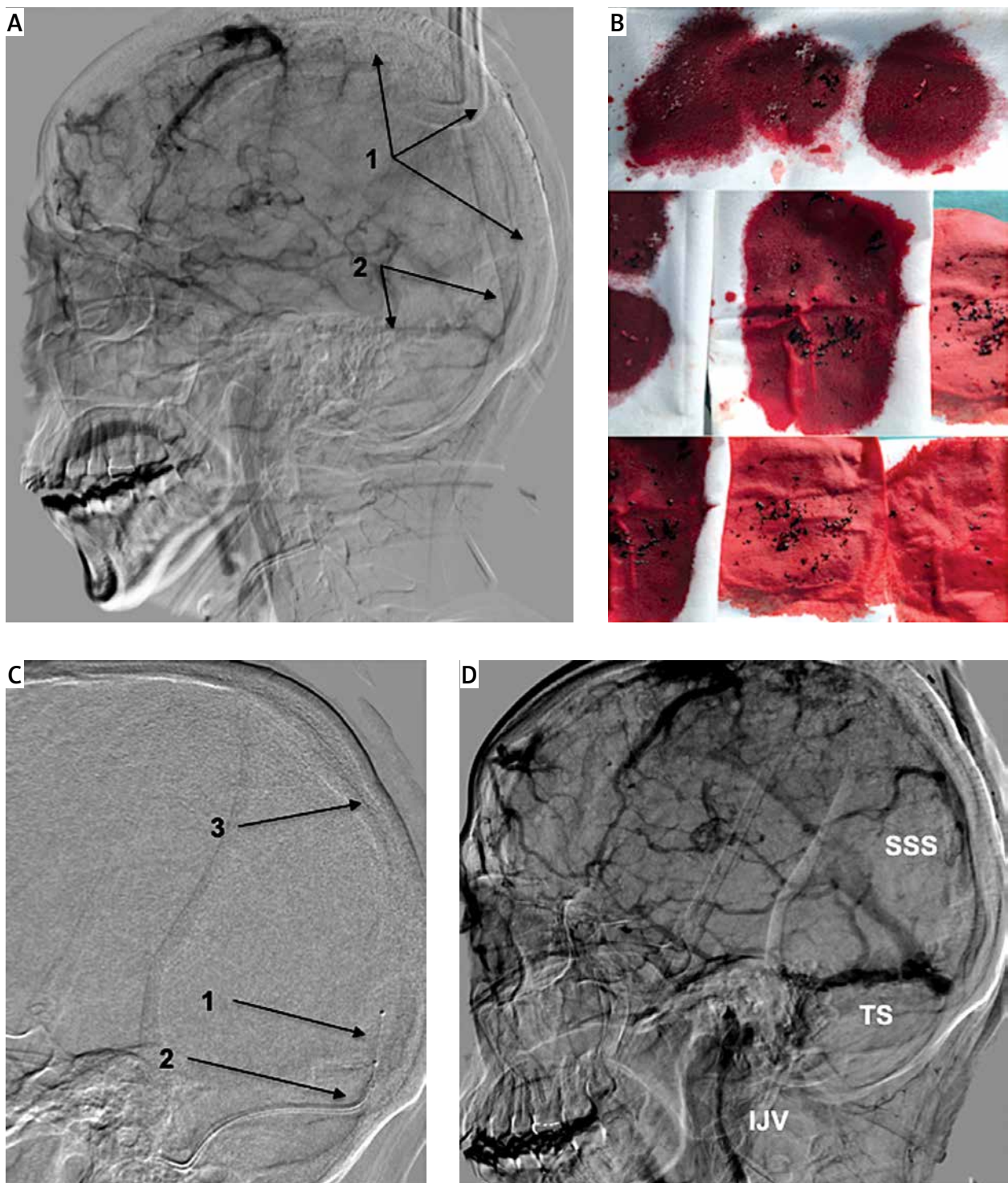
Patients with rapidly progressing thrombosis of SSS resulting in stroke or mass effect require an aggressive endovascular management. Mortality in patients with severe thrombosis of the SSS who are managed using mechanical thrombectomy is at the level of 15%, thus acceptable since otherwise most of them die [1, 2]. However, no randomised controlled trials comparing local intravenous thrombolysis with mechanical thrombectomy of the SSS have been conducted. Therefore, mechanical thrombectomy is primarily recommended in patients with contraindications for thrombolysis, particularly those presenting with haemorrhagic infarction of the brain. There is also debate how to improve these results and which device should be used for this endovascular procedure. The AngioJet™ remains the most commonly used catheter for this purpose, still it is rather inferior to other devices, primarily due to its stiffness [1–3]. Penumbra catheters seem to be a better option, but they have also some limitations [4, 5]. We have used both catheters, Penumbra 5MAX™ ACE for recanalisation of distal SSS and AngioJet™ to remove thrombi from proximally located sinuses, which in our opinion was an optimal strategy.

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**Figure 1.** **A** – Occlusion of the superior sagittal sinus (1) and transverse sinus (2); **B** – thrombi removed using the Penumbra catheter; **C** – composed technique of thrombectomy device: the 4 Fr Angiojet Distal catheter (1) and 5 Max ACE reperfusion catheter (2), traxcess microwire (3); **D** – venography after intervention (superior sagittal sinus (SSS), transverse sinus (TS), internal jugular vein (IJV))

Finally, it should be emphasized that this procedure, although life-saving, should be performed exclusively in the centres with high expertise in neurovascular interventions.

#### **Conflict of interest**

The authors declare no conflict of interest.

## References

1. Borhani Haghighi A, Mahmoodi M, Edgell RC, et al. Mechanical thrombectomy for cerebral venous sinus thrombosis: a comprehensive literature review. *Clin Appl Thromb Hemost* 2014; 20: 507-15.
2. Siddiqui FM, Dandapat S, Banerjee C, et al. Mechanical thrombectomy in cerebral venous thrombosis: systematic review of 185 cases. *Stroke* 2015; 46: 1263-8.
3. Dashti SR, Hu YC, Yao T, et al. Mechanical thrombectomy as first-line treatment for venous sinus thrombosis: technical consideration and preliminary results using the AngioJet device. *J Neurointervent Surg* 2013; 5: 49-53.
4. Mammen S, Keshava SN, Moses V, et al. Role of penumbra mechanical thrombectomy device in acute dural sinus thrombosis. *Indian J Radiol Imaging* 2017; 27: 82-7.
5. Matsuda Y, Owai Y, Kakishita K, et al. A novel combined approach using a Penumbra catheter and balloon catheter for cerebral venous sinus thrombosis. *BMJ Case Rep* 2018; doi: 10.1136/bcr-2017-013730.