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Successful mechanical thrombectomy of the left superior cerebellar artery

Úspešná mechanická trombektómia ľavej hornej cerebelárnej artérie

Dear editor,

Endovascular treatment is recommended as standard therapy of acute ischemic stroke with large vessel occlusion (LVO). The effectiveness of mechanical thrombectomy (MT), performed in comprehensive stroke centers, was confirmed for posterior circulation with primary and secondary distal medium vessel occlusions (DMVO) [1,2] with a similar safety profile compared to the proximal LVO group [3]. When symptoms are pronounced, the benefit of the procedure outweighs the risks [4]. Swollen cerebral and cerebellar infarcts are critical conditions that warrant immediate, specialized neurointensive care and often neurosurgical intervention. A decompressive craniectomy is a necessary option in many patients [5]. The safety and effectiveness of MT for cerebellar arteries have not been established yet. Only limited information can be found in the literature [6–8]. Overall, posterior inferior cerebellar artery (PICA) strokes are more common than superior cerebellar artery (SCA) strokes, and anterior inferior cerebellar artery (AICA) strokes are the least common [9].

A 22-year-old woman, smoker, and contraceptive user suffered a stroke in October 2020. According to information from her parents, she had a sudden loss of consciousness. Her initial National Institutes of Health Stroke Scale (NIHSS) in the primary hospital was 25 and her Glasgow Coma Scale (GCS) was 10. Her dominant neurological signs were: quadriparesis (dominant on the right side), mydriasis on the left side, nausea, and vomiting. CTA confirmed a distal basilar artery occlusion. The patient received a full dose of intravenous thrombolysis, and she was then transferred to an endovascular center. After transport to the endovascular center, her clinical status improved only partially. Her actual admission NIHSS was 10. Dysarthria, nausea and vomiting, and right hemiataxia were still present. Intracranial hemorrhage was excluded by CT and the patient was transferred to the catheterization room.

The procedure was performed under general anesthesia to prevent aspiration. The right common femoral artery was punctured under ultrasound guidance and a 6F short sheath was placed by the Seldinger technique. The patient was not heparinized. Over the guidewire, the sheath was replaced by a 6F 80 cm long introducer, which was placed into the left subclavian artery and a 6F guiding catheter was positioned coaxially into the left vertebral artery. All catheters were flushed with saline solution continuously.

The left vertebral artery angiogram positively confirmed basilar artery recanalization, but the left SCA occlusion was still present (Fig. 1A). The microcatheter Excelsior SL-10/90 (Stryker Neurovascular, Fremont, CA, USA) was navigated into the left SCA by Hybrid 008.J guidewire (Balt, Montmorency, France), and Actilyse (Boehringer Ingelheim Pharma GmbH, Ingelheim am Rhein, Germany) at a dose of 2 × 1 mg was injected into the left sac. The next angiogram proved no SCA recanalization. The same microcatheter was placed again into the left SCA and the thrombectomy device pRESET LITE 3 × 20 mm (Phenox, Bochum, Germany) was delivered into the left SCA occlusion (Fig. 1B). MT was performed in conjunction with aspiration via 6F aspiration catheter Sofia Plus 6F (MicroVention, Tustin, CA, USA) placed in the basilar artery. The first-pass effect and complete SCA recanalization were achieved (Fig. 1C, D). Time from onset to SCA recanalization was 4 h and 40 min. Cumulative fluoroscopy time was 10 min and 9 s. No hemorrhagic transformation occurred on follow-up imaging. The patient recovered completely. Her modified Rankin Scale score at discharge and at 3 months was 0. Patent foramen ovale and thrombosis of the right external iliac vein were diagnosed during her hospital stay. The foramen ovale was treated by occluder implantation and the right external iliac vein thrombosis was addressed by standard medical treatment (low molecular weight heparin). No recurrence of symptoms occurred in the next follow-up period. Follow-up CTA confirmed patency of the SCA.

Occlusions of cerebellar arteries are quite uncommon. Overall, PICA strokes are

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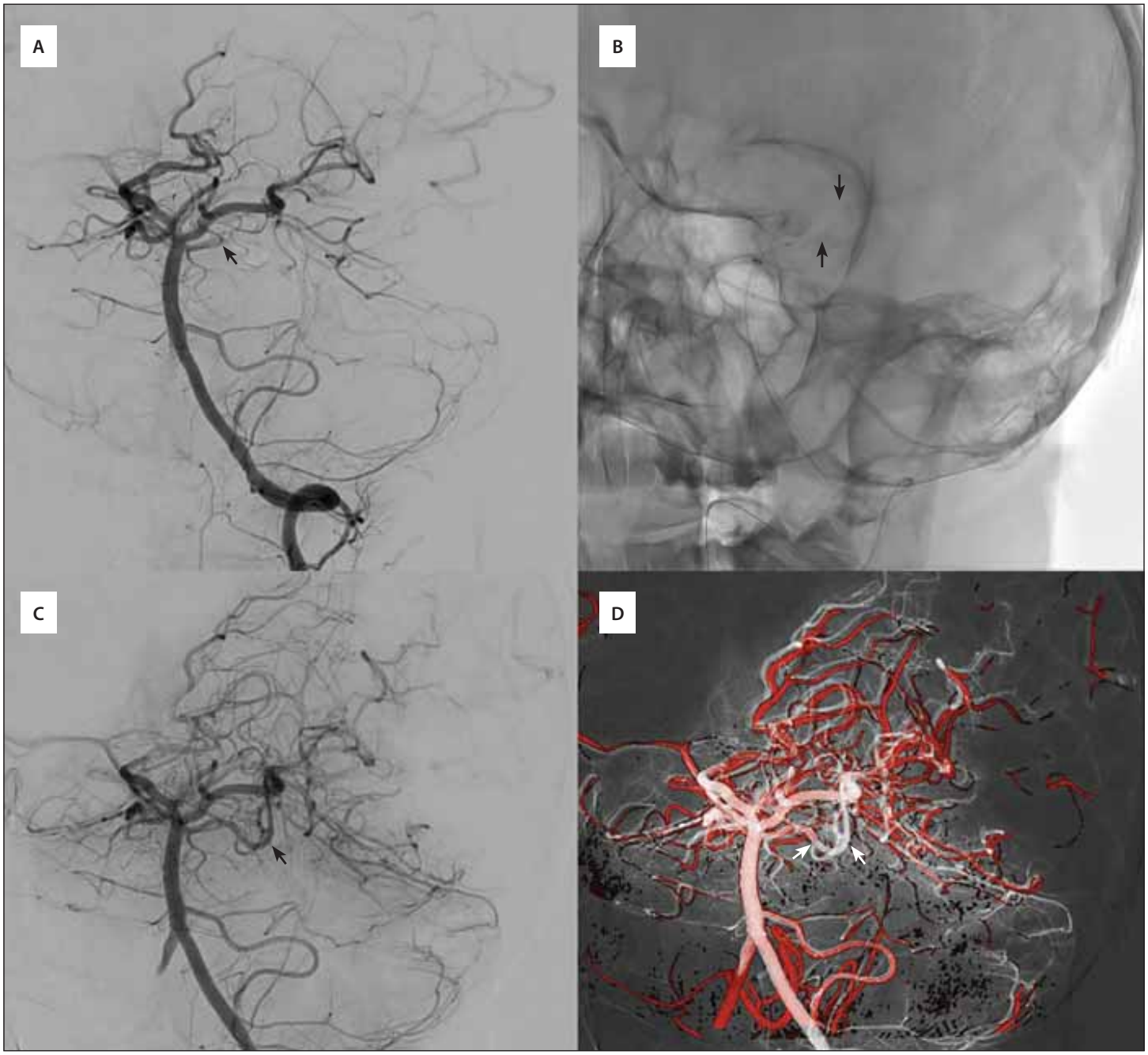

Fig. 1. Digital subtraction angiography. (A) Occlusion of the left SCA; (B) the thrombectomy device placed in the left SCA (left anterior oblique view); (C) the left vertebral artery angiogram after the left SCA recanalization; (D) fusion of 3D roadmap (red color) before recanalization and the left vertebral artery angiogram after the left SCA recanalization (white color).

SCA – superior cerebellar artery

Obr. 1. Digitálna subtrakčná angiografia (A) Oklúzia ľavej SCA; (B) trombektomické zariadenie umiestnené v ľavej SCA (ľavá predná šikmá projekcia); (C) angiogram ľavej vertebrálnej artérie po rekanalizácii ľavej SCA; (D) fúzia 3D roadmap-u (červená farba) pred rekanalizáciou a angiogramu ľavej vertebrálnej artérie po rekanalizácii ľavej SCA (biela farba).

SCA – a. cerebelli superior

more common than SCA strokes and AICA strokes are the least common [9]. Thanks to technical improvement, DMVO recanalization is carried out more often. The safety and effectiveness of MT for cerebellar arteries have not been established yet. Only limited information can be found in the literature [6–8]. Yin et al described MT for a mural thrombus covering the opening of the SCA [6].

In our case, the probable source of the embolism was thrombosis of the right external iliac vein, thanks to the patent foramen ovale. Basilar artery occlusion was dissolved by standard intravenous thrombolysis, but DSA confirmed residual left SCA occlusion. SCA supplies important neurological structures: posterolateral midbrain (and upper lateral pons): cranial nerves nuclei (IV, V) and fascicle (IV); sympathetic tract; spinothalamic tract; medial lemniscus; superior cerebellar peduncle; superior cerebellum, including superior vermis; and dentate nucleus [9]. Therefore, endovascular treatment

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was contemplated. The patient's parents were informed about the options of endovascular treatment. Their informed consent was achieved over the telephone.

The procedure was performed under general anesthesia to prevent SCA perforation and patient aspiration. Initially, super-selective intra-arterial thrombolysis was used because of the potential risk of SCA injury during more aggressive manipulation. MT was used after intra-arterial thrombolysis failure. A low-profile microcatheter and thrombectomy device were used achieving complete SCA recanalization. The patient recovered promptly after endovascular treatment with no residual neurological deficits. No hypercoagulation hematology disease was diagnosed. The foramen ovale was treated by occluder implantation to prevent another paradoxical thromboembolism originating from deep vein thrombosis. No recurrence of symptoms occurred in the next follow-up period. Follow-up CTA confirmed the patent SCA.

Acute embolism of the SCA after intravenous thrombolysis of the basilar artery is rarely reported. Endovascular treatment of SCA occlusion is technically feasible thanks to advanced endovascular devices. The patient recovered completely.

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