A 42-year-old woman was referred to our institution with sudden onset of ataxia, facial paresis, horizontal gaze palsy, and progressive dysarthria. The patient worsened within a few minutes, with appearance of left hemiparesis. The National Institutes of Health Stroke Scale Score was 13.

On computer tomography scan 2 hours after stroke onset, no brain stem lesion or intracranial bleeding was visible. Computed tomographic angiography revealed a mid basilar vessel occlusion, which suggested embolic basilar artery occlusion. A 4-vessel angiogram with a 5F diagnostic catheter confirmed the basilar artery occlusion and depicted more precisely the location of the thrombus (Figure 1A).

To treat the patient, a 6F guiding catheter was inserted into the right vertebral artery. A 0.021-inch Rebar 27 microcatheter (ev3, Irvine, Calif) coaxially loaded over a 0.14-inch Silver-speed microwire (ev3, Irvine, Calif) was placed directly into the thrombus. Tissue plasminogen activator (40 mg/30 min) was administered intra-arterially. No recanalization was noticed on the control angiogram. After the unsuccessful intra-arterial thrombolysis, we performed stent-assisted mechanical recanalization with the Solitaire FR revascularization device (ev3, Irvine, Calif). The Solitaire FR is a new self-expanding, fully retrievable nitinol stent based on the Solitaire AB that is commonly used for stent-assisted treatment of intracranial aneurysms. A Rebar 27 microcatheter was navigated past the thrombus into the left P1 segment. The stent was placed and deployed from the left P1 segment into the basilar artery, with the middle third of the device residing within the thrombus formation. The subsequent angiogram showed flow restoration of the basilar artery with a narrowing in the middle part of the vessel due to compression of the thrombus into the arterial wall (Figure 1B). To withdraw the thrombus, the unfolded Solitaire stent and the Rebar microcatheter were slowly pulled into the guide catheter with constant aspiration with a 50-mL syringe from the guide catheter. Withdrawal was possible with minor effort and was observed under Figure 1.

Figure 1. A, Digital subtraction angiography after vertebral injection demonstrates a mid basilar vessel occlusion. B, The angiogram after placement of the stent from the left P1 segment (white arrow) into the basilar artery showed flow restoration of the basilar artery with a narrowing in the middle part of the vessel due to compression of the thrombus into the arterial wall (black arrows). C, Postprocedure angiography after removal of the stent showed complete recanalization of the basilar artery occlusion. The P2 segment of the right posterior cerebral artery is filled by the right carotid internal artery.
continuous fluoroscopy. It was evident that the device gently followed the course of the vessels without vessel displacement. Postprocedural angiography showed complete recanalization of the basilar artery occlusion (Figure 1C). Thrombus material was found in the stent (Figure 2).

The duration of the procedure, including intra-arterial thrombolysis, was 50 minutes. After the procedure, the neurological examination performed by an experienced neurologist showed a National Institutes of Health Stroke Scale Score of 0. Control magnetic resonance imaging 1 day after treatment revealed a small hyperintensity on diffusion-weighted images that was not clinically relevant (Figure 3). The patient was discharged 4 days after the endovascular procedure.

Successful recanalization is associated with improved outcome after acute ischemic stroke. Mechanical thrombectomy techniques are widely used for treatment in case of failed recanalization after thrombolysis or in patients with contraindications for thrombolytic therapy. A variety of devices have been developed; however, recanalization rates remain decent, and the clots may adhere to the intima and become refractory to mechanical disruption or clot retrieval.

Recent studies have reported positive outcomes with self-expanding stents in patients with acute intracranial occlusions. The first prospective trial of stent-assisted recanalization in acute ischemic stroke demonstrated a 100% recanalization rate in 20 patients. The study suggests that stent-assisted revascularization yields high recanalization rates with a reasonable safety profile.

The application of self-expanding stents in acute stroke appears to have several advantages compared with other interventional techniques. First, stenting has a high reported rate of successful recanalization. Second, whereas other techniques often take hours to achieve recanalization, self-expanding stent implantation appears to produce immediate recanalization. However, there are important disadvantages to the use of stenting to treat acute stroke. The clot is only pressed to the vessel wall and not removed from the vessel, so there are concerns about early rethrombosis. Furthermore, placement of an intracranial stent may induce late in-stent stenosis. Finally, implantation of a permanent intracranial self-expanding stent requires aggressive antiplatelet therapy after placement.

The Solitaire FR revascularization device is the only intracranial stent that is fully recoverable. Therefore, this device combines the advantages of prompt flow restoration and mechanical thrombectomy. Studies must demonstrate whether this promising new technique can serve as the treatment of the future in interventional acute stroke.

Disclosures

None.

References

Treatment of Acute Cerebral Artery Occlusion With a Fully Recoverable Intracranial Stent: A New Technique
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