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Case Report

BASILAR ARTERY REOCCLUSION WITHIN 24 HOURS AFTER MECHANICAL THROMBECTOMY SUCCESSFULLY TREATED WITH NEW INTERVENTION

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SUMMARY – Acute basilar artery occlusion (BAO) may cause ischemia in the region of brainstem, parts of the thalamus, occipital lobes, and cerebellum, resulting in severe disability or mortality rate above 70%. Recurrent BAO has been described in only a small number of cases. We present a case of repeated mechanical thrombectomy (MT) for the tip of basilar artery (BA) reocclusion within 24 hours. A previously healthy 37-year-old male presented with occipital headache, nausea, vomiting, right-sided hemiparesis, within 30 minutes from the onset and NIHSS 18. The patient was vaccinated against COVID-19 with Pfizer-BioNTech vaccine seven days before the onset. On initial computed tomography (CT) scan, the pc-ASPECTS was 10 and CT angiography (CTA) showed the tip of BA thrombosis. Intravenous thrombolytic therapy was administered, followed by MT, achieving mTICI 3 and NIHSS 5 after the procedure. Within 24 hours from the first MT, there was neurological deterioration followed by coma. Urgent CT/CTA was performed and re-thrombosis of BA was confirmed with pc-ASPECTS 10. MT was repeated with mTICI 2b. Stroke etiology was undetermined. After 17 days, the patient was discharged and referred to continue rehabilitation treatment. After 90 days of stroke, his NIHSS was 2 and mRS 1. We can consider that early recurrent BAO can be successfully treated with repeated MT.

Key words: *Basilar artery occlusion; pc-ASPECT score; Mechanical thrombectomy; Thrombolysis*

Introduction

Acute basilar artery occlusion (BAO) may cause ischemia in the region of brainstem, parts of the thalamus, occipital lobes, and cerebellum, resulting in severe disability or mortality rate above 70%. The possible manifestations of stroke in these regions are a disturbance of the state of consciousness up to coma, quadriplegia, dysphagia, dysarthria, 'locked-in syndrome' and very often death[1,2]. Headaches occur in approximately 2% of cases. Nausea and vomiting can occur with strokes in the brain-stem or cerebellum[3]. Patients with acute BAO have a fatal outcome in 85%-97% of cases, if they are untreated[4]. The use of intravenous thrombolytic therapy (ITT), as well as mechanical thrombec-

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tomy (MT) significantly increase the chances for a favorable outcome in such patients[5]. The risk of repeated stroke in survivors of BAO is estimated at 10%-15%[6]. Recurrent BAO is described in only a small number of cases, and the etiology of such strokes in most of those cases is not clearly established[7,8]. Repeated ITT is safe and effective in recurrent stroke, while data on repeated MT in large vessel occlusions are still scarce and limited to a few case reports[9,10]. Since MT can damage the endothelium of a blood vessel, there is reasonable suspicion that this method of treatment may lead to repeated acute occlusion of a previously recanalized artery[11].

Case Report

A previously healthy 37-year-old male presented with occipital headache, nausea, vomiting, as well as weakness of the right limbs, which had occurred 30 minutes before presenting to the neurological emergency room. The patient was vaccinated against COVID-19 with Pfizer-BioNTech vaccine seven days before the onset. At admission, the patient was somnolent, and neurological examination revealed dysarthric speech, convergent strabismus, miotic pupils, right-sided central facial palsy, with right hemiplegia (National Institutes of Health Stroke Scale [NIHSS]

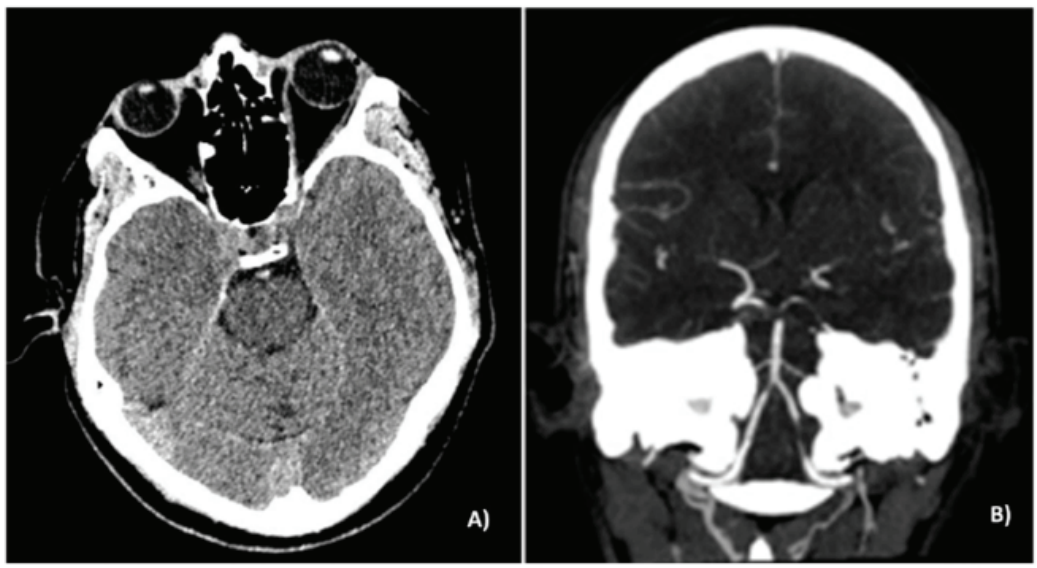

Fig. 1. Initial computed tomography (CT) scan with CT angiography: pc-ASPECTS 10 with hyperdense basilar artery sign (A) and filling defect in the distal aspect of basilar artery and left posterior cerebral artery (B).

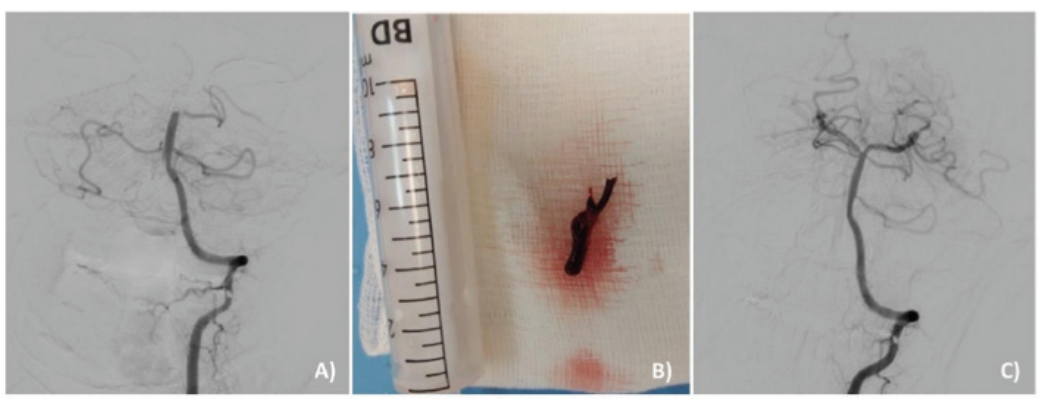

Fig. 2. Pre-interventional digital subtraction angiography (A); evacuated clot (B); post-interventional digital subtraction angiography with full recanalization, mTICI 3 (C).

18). Initial computed tomography (CT) scan did not show acute parenchymal lesions (posterior circulation Acute Stroke Prognosis Early Computed Tomography Score [pc-ASPECTS] 10), while CT angiography (CTA) showed thrombosis of the tip of basilar artery (BA) and left posterior cerebral artery in the length of about 7 mm (Fig. 1).

Intravenous thrombolytic therapy was administered with the onset to treatment time of 64 minutes (door to needle time 34 minutes), followed by MT with aspiration catheter through the right common femoral artery (CFA) with the onset to groin puncture time of 106 minutes (door to groin puncture time 76 minutes). Full reperfusion of BA was achieved at 129 minutes after onset with modified Thrombolysis in Cerebral Infarction (mTICI) 3 (Fig. 2).

The patient had neurological improvement after the procedure, with mild right-sided hemiparesis, NIHSS 5. On the next day, after 17 hours from the first MT, there was sudden neurological deterioration, which led to coma with decerebrating movements, for which the patient was immediately intubated. Urgent control CT scan was performed, and there was no visible parenchymal damage, pc-ASPECTS 10 (Fig. 3A). Because of suspicion of recurrent BAO, CTA was performed, and BAO was confirmed, 2 cm in length, and small filling defects in both posterior cerebral arteries (Fig. 3B, C). A new endovascular procedure with MT was performed with aspiration catheter through the left CFA. Successful recanalization was achieved again (mTICI 2b) (Fig. 3D).

After the intervention, the patient had a favorable neurological recovery and was extubated the next day. On follow-up, magnetic resonance imaging showed bilateral acute ischemic lesions in the cerebellum, as well as acute ischemic lesions in the inner part of the

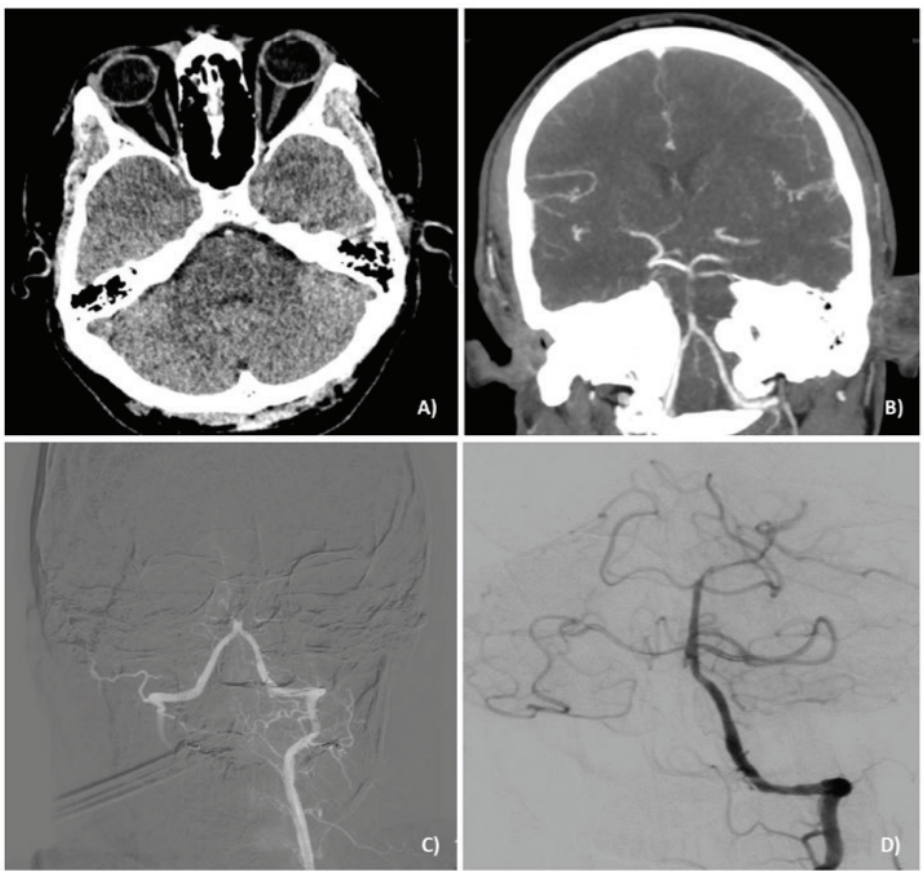

Fig. 3. Control computed tomography scan with angiography, pre- and post-interventional digital subtraction angiography: hyperdense basilar artery sign with pcASPECTS 10 (A); filling defect in the middle part of basilar artery (B); pre-interventional digital subtraction angiography of basilar artery reocclusion performed 17 hours after first basilar artery occlusion (C); post-interventional digital subtraction angiography with mTICI 2b recanalization (D).

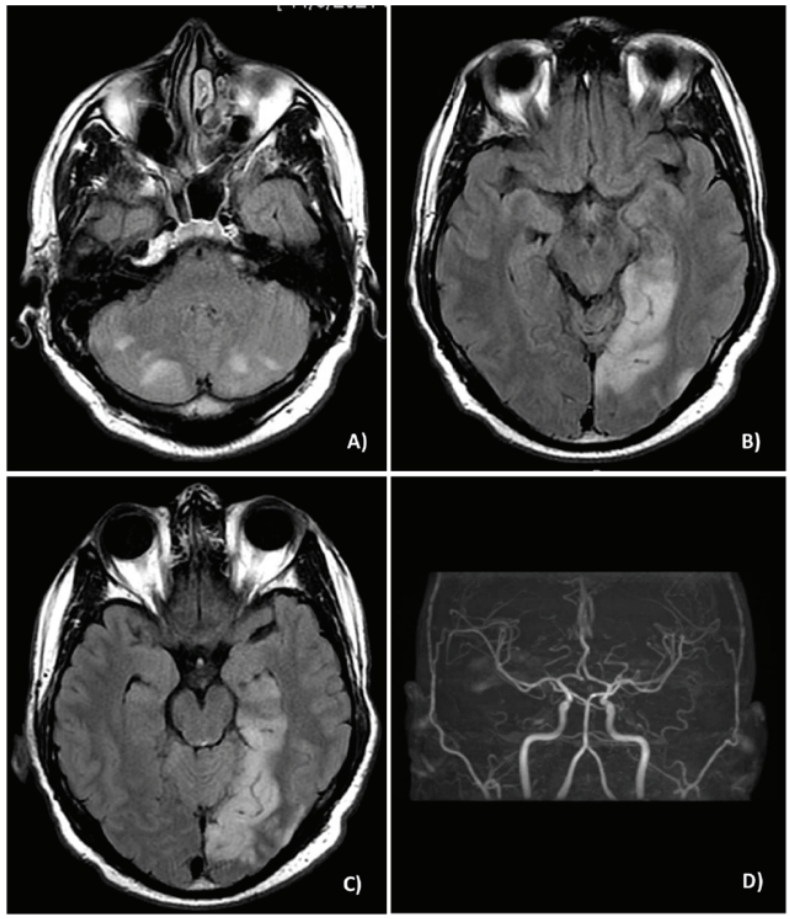

Fig. 4. Magnetic resonance imaging (MRI) showing hyperintense changes in both hemispheres of the cerebellum (A), left inferior (B) and middle temporal gyrus (C) on the FLAIR sequence; MRI angiography without stenotic changes and signs of occlusion of large vessels (D).

left temporal lobe and left pulvinar. Magnetic resonance angiography (MRA) did not detect reocclusion of intracranial arteries, and based on the findings of the MRA axial section sequence of fat-suppressed T1-weighted images, no intra- or extracranial dissection of cerebral arteries was observed (Fig. 4).

In the further course of hospitalization, the patient underwent thorough cardiological examination. Transcranial doppler bubble test was negative. Echocardiography was normal without the existence of a right-left shunt. There was no atrial fibrillation detected on 24-hour Holter monitoring. Laboratory analyses, including thrombophilia markers and immunologic analyses, were negative. The existence of neuroinfection, including syphilis, was excluded. Embolic stroke of undetermined source (ESUS) was considered the cause of repeated stroke, and aspirin was prescribed for secondary prevention. After 17 days, the patient was discharged and referred to continue rehabilitation treatment. At discharge, he had NIHSS 5, but modified Rankin Scale (mRS) 3. At follow-up, 90 days after the stroke, the patient was independent and neurological examination showed discrete dysarthria and mild weakness of the right leg, NIHSS 2 and mRS 1.

Discussion

We present a case of repeated BAO, successfully treated with MT twice within 17 hours. In the literature, several cases of recurrent thrombosis of a large blood vessel successfully treated with repeated MT without major complications and with a beneficial effect have already been described[7,10-12]. These case reports suggest that repeated MT could be considered

feasible and safe, if there are indications for it and if the repeated intervention is approached immediately after recognition of symptoms of reocclusion. However, repeated MT for the tip of BA reocclusion within 24 hours has not been described yet. In 2022, two studies were published about BAO treatment, conducted in the Asian population. In these studies, patients were treated with MT in an extended time window of up to 12 (ATTENTION) to 24 (BAOCHE) hours from the onset of symptoms. Patients were selected based on the pc-ASPECTS, which had to be greater than 6. These studies showed a statistically significant superiority of the endovascular treatment compared to the use of standard medical treatment (SMT) including ITT in BAO[13,14]. A meta-analysis by Xu *et al*. analyzing these two studies with BEST and BASICS studies showed definitive superiority of MT in the treatment of BAO compared to SMT[15]. All these results suggest that patients with BAO should be considered for MT within the first 24 hours of the onset if there are no clear contraindications. Considering that the second BAO in our patient occurred after 17 hours from the first MT, the pc-ASPECTS 10 on repeated CT scan was the main reason for deciding to repeat the endovascular procedure.

In our case, the etiology of recurrent BAO remained undetermined, arterial dissection was not proven and ESUS was considered as the mechanism of recurrent stroke (cryptogenic stroke). In the literature, there are data that could indicate a connection between the administration of the vaccine against COVID-19 and development of thromboembolic events. An English self-controlled case series study indicated an increased risk of cerebrovascular events (cerebral venous thrombosis, ischemic and hemorrhagic stroke) in those vaccinated (AstraZeneca and Pfizer-BioNTech) against COVID-19[16]. However, a recently published study conducted at our institution showed that outcomes after ischemic stroke were not significantly different in previously vaccinated *versus* unvaccinated patients[17].

It is concluded that early recurrent BAO can be successfully treated with repeated MT in properly selected patients.

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Sažetak

REOKLUZIJA BAZILARNE ARTERIJE U PRVIH 24 SATA NAKON MEHANIČKE TROMBEKTOMIJE, USPJEŠNO LIJEČENA PONOVLJENOM INTERVENCIJOM

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Akutna okluzija bazilarne arterije može uzrokovati ishemiju u regiji moždanog stabla, dijelovima talamusa, potiljačnim režnjevima i malom mozgu, s posljedičnom teškom onesposobljenošću i stopom smrtnosti preko 70%. Ponovljena okluzija bazilarne arterije opisana je u literaturi u malom broju slučajeva. Prikazujemo slučaj ponovljene mehaničke trombektomije kod ponovljene okluzije vrha bazilarne arterije u prvih 24 sata. Prethodno zdrav muškarac u dobi od 37 godina javio se 30 minuta od nastanka tegoba s potiljačnom glavoboljom, mučninom, povraćanjem i desnostranom hemiparezom, NIHSS 18. Bolesnik je bio cijepljen protiv COVID-19 cjepivom Pfizer-BioNTech sedam dana prije nastanka tegoba. Na inicijalnom CT pregledu mozga pc-ASPECTS je opisan s 10, a CT angiografija (CTA) ukazala je na trombozu vrha bazilarne arterije. Ordinirana je intravenska trombolitička terapija, a potom načinjena i mehanička trombektomija s posljedičnim mTICI 3 i NIHSS 5 nakon provedenih postupaka. Tijekom prva 24 sata od prve mehaničke trombektomije dolazi do neurološkog pogoršanja praćenog razvojem kome. Provedena je hitna CT/CTA dijagnostika gdje je utvrđena ponovna tromboza bazilarne arterije s pc-ASPECTS 10. Ponovljena je mehanička trombektomija s posljedičnim mTICI 2b. Etiologija moždanog udara je ostala neutvrđena. Nakon 17 dana bolesnik je otpušten i upućen na daljnji nastavak rehabilitacijskog tretmana. Nakon 90 dana od moždanog udara, NIHSS bio je 2, a mRS 1. Možemo smatrati da se rana ponovljena okluzija bazilarne arterije može uspješno liječiti ponovljenom mehaničkom trombektomijom.

Ključne riječi: *Okluzija bazilarne arterije; pc-ASPECTS; Mehanička trombektomija; Tromboliza*