Cor et Vasa

Available online at www.sciencedirect.com

ScienceDirect

journal homepage: www.elsevier.com/locate/crvasa

Kasuistika | Case report

A case of successful interventional treatment in acute basilar artery occlusion

Ivo Petrov, Marko Klissurski, Sevim Halibryam, Galina Georgieva-Kozarova, Vesela Stoynova

City Clinic Cardiology Center University Hospital, 127 Okolovrasten pat Street, 1407 Sofia, Bulgaria

ARTICLE INFO

Article history:
Received: 23. 11. 2015
Received in revised form: 20. 1. 2016
Accepted: 26. 1. 2016
Available online: 15. 3. 2016

Klíčová slova:
Akutní uzávěr bazilární tepny
Angiografie mozku
Mechanická trombektomie
Supraselektivní trombolýza

SOUHRN

Popisujeme případ úspěšné rekanalizace a příznivý klinický výsledek u pacienta s akutním uzávěrem bazilární tepny (basilar artery occlusion, BAO) a intervenční léčby (interventional treatment, IT). Sedmašedesátiletý muž byl přijat v komatózním stavu, s kvadruplegií a decerebrační rigiditou. Při příjmu byly zjištěny hodnoty skóre 11 na stupnici GLCS (Glasgow-Liege Coma Scale), 24 na stupnici National Institutes of Health Stroke Scale (NIHSS) a 5 na modifikované Rankinově škále (modified Rankin Scale, mRS). Před IT byl pořízen nekontrastní CT sken. Pro podezření na BAO bylo okamžitě provedeno angiografické vyšetření mozku, které prokázalo BAO mediálního a distálního segmentu. Léčba se prováděla intraarteriální katetrizací včetně balonkové angioplastiky a trombolýzy s aplikací 20 mg přípravku Actilyse (do 4 hodin od nástupu symptomů). Následné angiografické vyšetření potvrdilo optimální výsledek výkonu, po němž bylo na JIP pacientovi infuzně podáno během dalších tří hodin 10 mg přípravku Actilyse. Vzhledem ke zlepšení neurologického stavu byla o 12 hodin později provedena extubace. První den došlo k obnově vědomí a dokázal mluvit; další neurologický deficit nebyl zjištěn. Kontrolní CT neprokázalo nové známky ischemické cévní mozkové příhody. CT angiografie prokázala úplnou rekanalizaci distálního segmentu bazilární tepny a středně významnou reziduální stenózu v mediálním segmentu. Sedmý den po výkonu byl pacient propuštěn z nemocnice s hodnotami skóre NIHSS 7, GLCS 20 a mRS 3. Podle našeho názoru byla v našem případě léčba úspěšná díky rychle stanovené klinické diagnóze, rychlé dostupnosti katetrizačního sálu a časně provedené mechanicko-farmakologické rekanalizaci.

Keywords:
Acute basilar artery occlusion
Cerebral angiography
Mechanical thrombectomy
Supraselective thrombolysis

ABSTRACT

We describe a case of successful recanalisation and favorite clinical outcome of a patient with acute basilar artery occlusion (BAO) and interventional treatment (IT). A 67-year old patient presented in a comatose state, with quadriplegia, and decerebrate posturing. His initial Glasgow-Liege Coma Scale (GLCS) score was 11, Institutes of Health Stroke Scale (NIHSS) 24, and modified Rankin Scale (mRS) 5. Non-contrast CT was performed before IT. Due to suspicion of BAO, an immediate cerebral angiography was performed. It demonstrated BAO in the middle and distal segment. Intra-arterial catheter based treatment was performed including balloon angioplasty and thrombolysis with 20 mg Actilyse (within four hours of symptoms onset). An optimal angiographic result was achieved. After the procedure the patient was treated in ICU with another 10 mg Actilyse infused over the next 3 hours. Because of neurological condition improving, the patient was extubated 12 hours later. On the first day, he regained consciousness, being able to speak, without new neurologic deficit. Control CT did not demonstrate new signs of ischemic stroke. CT angiography showed complete basilar artery recanalization in the distal part and a moderate residual stenosis in the middle segment. On the 7th day the patient was discharged with NIHSS 7, GLCS 20, mRS 3. We believe that the success in our case was a result of the prompt clinical diagnosis, fast access to the cathlab and early mechanical-pharmacological recanalization.

Address: Assoc. Prof. Ivo Petrov, MD, PhD, City Clinic Cardiology Center University Hospital, 127 Okolovrasten pat Street, 1407 Sofia, Bulgaria,
e-mail: petrovivo@ hotmail.com
DOI: 10.1016/j.crvasa.2016.01.014

Please cite this article as: I. Petrov, et al., A case of successful interventional treatment in acute basilar artery occlusion, Cor et Vasa 58 (2016) e287–e291 as published in the online version of *Cor et Vasa* available at http://www.sciencedirect.com/science/article/pii/S0010865016000163

Introduction

The prognosis of acute BAO is usually very poor if early recanalization is not achieved [1–3]. Recanalization strategies today include systemic (intravenous) and local (intra-arterial) thrombolysis with rt-PA or urokinase [4], as well as mechanical stent retriever thrombectomy or vacuum thrombaspiration [5–9]. The rate of recanalization depends on the site of BA occlusion, medication, and technology used [5,6,10]. The best technical approaches – MRI, DWI and vascular imaging – could additionally pinpoint the best candidates for IT [11–13].

Case description

We present a case of 67-year-old man with arterial hypertension, previous stroke history, and permanent atrial fibrillation (AF). The patient was brought to the emergency room (ER) in a comatose state, with tetraplegia and deviation of the eyes and head towards left. The symptoms occurred 3 h earlier, according the relatives' history. He was discharged from another hospital at the same day, treated 3 days for a mild ischemic stroke (involving territory of the left middle cerebral artery). The patient had residual modified Rankin scale (mRS) of 3 and denied taking anticoagulant as secondary prevention. The arterial BP of the patient in the ER was 210/107 mmHg, and he was vomiting. His Glasgow-Liege Coma Scale score was 11 points, National Institutes of Health stroke scale was 24 points, and mRS 5. He presented decerebrate rigidity posturing on painful stimuli. Prominent trismus of the mandibula was observed. The right limbs were flaccid and plegic, while the left limbs were spastic and severely paretic as a sequel of previous stroke.

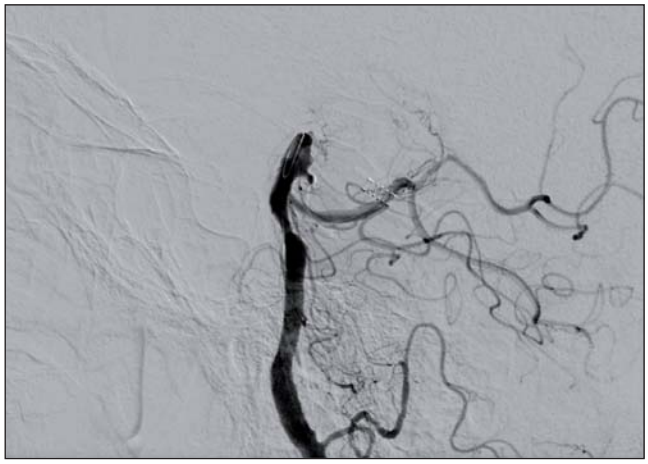

Fig. 1 – Basilar artery occlusion in the middle and distal segment.

On admission, the vascular risk factors, neurological deficit graded by NIHSS, and radiological findings were recorded. Emergency non-contrast CT of the head was performed and intracerebral hemorrhage was excluded. The patient had permanent pace-maker what was a contraindication to perform MRT, DWI, and MR angiography. The laboratory examinations, including CBC, broad biochemistry panel, and coagulation, were unremarkable. The patient was sedated and intubated in the ER.

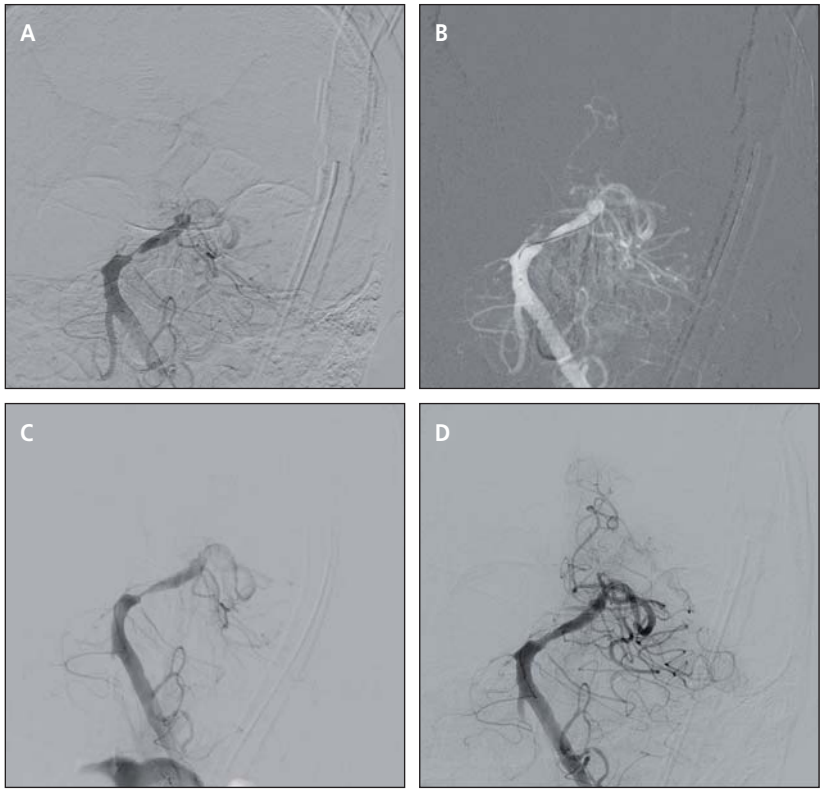

Fig. 2 – (A) Early recanalization after guidewire placement. (B) Balloon positioning (subtraction). (C) BA stenosis after second balloon dilatation. (D) Excellent angiographic result of TICI 3.

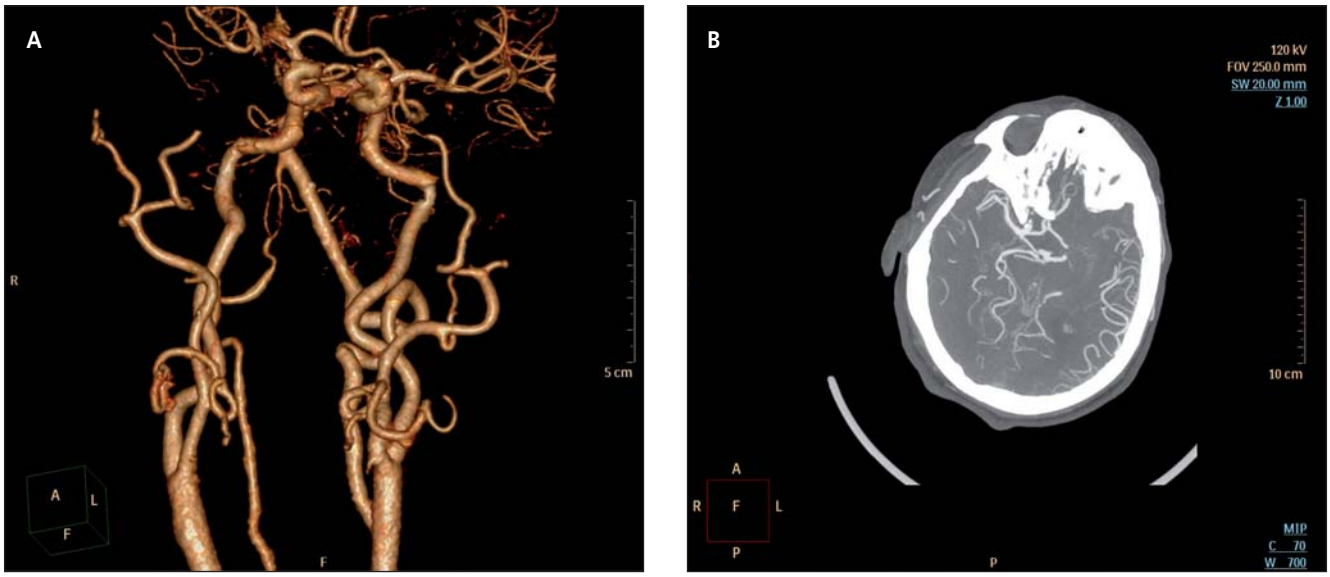

Fig. 3 – (A) Postprocedure CT angiography (reconstruction). (B) Postprocedure CT angiography.

After discussion within multidisciplinary team – neurologist (M.K.), interventional cardiologist (I.P.), and anesthesiologist (S.H.), a decision to perform an immediate cerebral pan-angiography and interventional intra-arterial treatment was taken, because of clinical evidence of the acute basilar artery occlusion (BAO) [14] within the optimal time window. According to our interventional stroke protocol [15], we performed cerebral angiography and intraarterial catheter based treatment.

A total occlusion (acute thrombosis) of the basilar artery was found in the middle and distal segments (Fig. 1). Posterior cerebral arteries were not visible. With right femoral approach, a guiding catheter Simmons 2 was positioned in the middle left vertebral artery. The BAO was recanalized with a "014 Runthrough wire support of a low profile Sprinter 1.25/15 mm balloon. After three Sprinter NC balloon inflations with incremental sizes, from 1.25 to 3.5 mm, a full recanalization of the basilar artery and flow restoration in the left PCA was achieved. Additionally, 20 mg Actilyse were administered through the guiding catheter. The catheter based intraarterial treatment was performed 4 h after the onset of acute BAO stroke (symptom onset to treatment time was ≤240 min) with an excellent angiographic result of TICI 3 (Fig. 2a–d). After the procedure the patient was treated in the intensive care unit, being intubated and on artificial ventilation, where another 10 mg Actilyse were infused. His general and neurological condition ware stabilized and he was extubated after 12 h. On the first day, the patient regained consciousness, being adequate and able to speak, with no new deficit in the right limbs, except for mild arm ataxia. On the control brain CT, there were no any new signs of ischemic stroke or symptomatic intracerebral hemorrhage, as well as other complications. Cerebral CT angiography (Fig. 3) showed complete basilar artery recanalization in the distal part, a moderate residual stenosis in the middle segment, and aplasia of the left posterior communication artery. The patient started rehabilitation program and on day 7th he was discharged home with NIHSS 7, GLCS 20, and mRS 3.

Discussion

According to Arnold et al. [16], low NIHSS score on admission and early vessel recanalization were independent predictors of favorable outcome. Recanalization was successful more often with treatment within 6 h of symptom onset and when admission CT showed a hyperdense BA sign [16]. There are reported cases of successfully treated BAO up to 48 hours, even though the time of intervention is also very important factor in BAO prognosis [17]. Authors demonstrated that quadriplegia and coma were associated with poor outcome or death. Despite or patient was presented in a severe comatose state with quadriplegia and high NIHSS he had a favorable clinical course. According to some authors the Glasgow coma scale does not predict outcome after intra-arterial treatment for BAO [18].

With initial plain CT of the brain we excluded intracerebral hemorrhage. The patient had no anticoagulant treatment for his permanent AF, so we assumed that an embolic occlusion of the basilar artery at the site of atherosclerotic plaque was the most probable etiology. We decided not to perform CT angiography because we had clinical evidence of BAO in accordance to Caplan [14], and proceeded directly to cerebral pan-angiography. Thus, we had spared the double contrast media dosing to the patient and proceeding with the gold-standard angiography we could better localize occluded vessel segment. The symptoms onset occurred within 3 h of presentation to our ER, and since there were no contraindications for intervention, we proceeded with immediate intra-arterial mechanical thrombo-fragmentation, angioplasty, and thrombolysis with Actilyse in the optimal time window [17]. We used conventional intra-arterial technique for recanalization with excellent cost-benefit ratio [6].

The general anesthesia and sedation with propofol was an optimal choice in the management of a comatose, vomiting patient who did not obey commands. The final prognosis was not negatively influenced by that emergency approach. Ideally, MRI with DWI evaluation of the

infarct core area would have given us more information concerning salvageable volume of brain tissue. However, the patient's permanent pacemaker device was a contraindication.

Another practical efficient observation, which we also had seen in other patients with MCA occlusions, is the safe and efficacious intra-arterial small dose application of Actilyse for 2 h after the IAT. We could name it "post-bridging thrombolysis" or "reversed-bridging thrombolytic therapy", in contrast to the so-called bridging therapy where t-PA is given only before the interventional mechanical thrombectomy [9,19,20]. We had no complications with that type of management.

We believe that early interventional therapy should be undertaken in every case of acute BAO, irrespective of the initial deficit within optimal time window. Despite stentrievers and thrombaspiration devices are the golden standard for mechanical treatment [5,8,21,22], in some cases balloon angioplasty and low dose supraselective thrombolysis could be lifesaving alternative approach in cases of acute BAO.

Conflict of interest
No conflict of interest.

Funding body
None.

Ethical statement
I declare, on behalf of all authors, that the research was conducted according to Declaration of Helsinki.

Informed consent
I declare, on behalf of all authors, that informed consent was obtained from all patients participating in this study.

References

[1] W. Hacke, H. Zeumer, A. Ferbert, et al., Intra-arterial thrombolytic therapy improves outcome in patients with acute vertebrobasilar occlusive disease, Stroke 19 (1988) 1216–1222.
[2] W.J. Schonewille, C.A. Wijman, P. Michel, et al., Treatment and outcomes of acute basilar artery occlusion in the basilar artery international cooperation study (BASICS): a prospective registry study, Lancet Neurology 8 (2009) 724–730.
[3] E.F.M. Wijdicks, J.P. Scott, Outcome in patients with acute basilar artery occlusion requiring mechanical ventilation, Stroke 27 (1996) 1301–1303.
[4] A. Furlan, R. Higashida, L. Wechsler, et al., Intra-arterial prourokinase for acute ischemic stroke: the PROACT II study – a randomized controlled trial. Prolyse in Acute Cerebral Thromboembolism, Journal of the American Medical Association 282 (1999) 2003–2011.
[5] T. Andersen, A.K. Soderquist, M. Soderman, et al., Mechanical thrombectomy as the primary treatment for acute basilar artery occlusion: experience from 5 years of practice, Journal of Neurointerventional Surgery 5 (2013) 221–225.
[6] S.M. Davis, G.A. Donnan, Basilar artery thrombosis: recanalization is the key, Stroke 37 (2006) 2440.
[7] P.J. Lindsberg, L. Soinne, R.O. Roine, T. Tatlisumak, Options for recanalization therapy in basilar artery occlusion, Stroke 36 (2005) 203–204.
[8] I. Mourand, P. Machi, D. Milhaud, et al., Mechanical thrombectomy with the Solitaire device in acute basilar artery occlusion, Journal of Neurointerventional Surgery 6 (2014) 200–204.
[9] S. Nagel, P.D. Schellinger, M. Hartmann, et al., Therapy of acute basilar artery occlusion: intraarterial thrombolysis alone vs bridging therapy, Stroke 40 (2009) 140–146.
[10] D. Cross III, C. Moran, P. Akins, et al., Relationship between clot location and outcome after basilar artery thrombolysis, American Journal of Neuroradiology 18 (1997) 1221–1228.
[11] J. Kashiwagi, H. Kiyosue, Y. Hori, et al., Endovascular recanalization of acute intracranial vertebrobasilar artery occlusion using local fibrinolysis and additional balloon angioplasty, Neuroradiology 52 (2010) 361–370.
[12] H.Y. Kim, C.S. Chung, S.Y. Moon, et al., Complete nonvisualization of basilar artery on MR angiography in patients with vertebrobasilar ischemic stroke: favorable outcome factors, Cerebrovascular Diseases 18 (2004) 269–276.
[13] W.J. Powers, C.P. Derdeyn, J. Biller, et al., 2015 AHA/ASA Focused Update of the 2013 Guidelines for the Early Management of Patients with Acute Ischemic Stroke Regarding Endovascular Treatment: A Guideline for Healthcare Professionals from the American Heart Association/American Stroke Association, Stroke 46 (2015) 3020–3035.
[14] L.R. Caplan, Top of the basilar syndrome, Neurology 30 (1980) 72–79.
[15] M. Klissurski, I. Petrov, City Clinic hospital protocol for neuro-interventional and/or intraarterial thrombolytic procedure with t-PA at cerebral infarction, 2013–2014, MEDICAL 16 (2015) 94–98 (in Bulgarian).
[16] M. Arnold, K. Nedeltchev, G. Schroth, et al., Clinical and radiological predictors of recanalisation and outcome of 40 patients with acute basilar artery occlusion treated with intra-arterial thrombolysis, Journal of Neurology, Neurosurgery, and Psychiatry 75 (2004) 857–862, http://dx.doi.org/10.1136/jnnp.2003.020479.
[17] B. Eckert, T. Kucinski, G. Pfeiffer, et al., Endovascular therapy of acute vertebrobasilar occlusion: early treatment onset as the most important factor, Cerebrovascular Diseases 14 (2002) 42–50.
[18] R.V. Chandra, C.P. Law, B. Yan, et al., Glasgow coma scale does not predict outcome post-intra-arterial treatment for basilar artery thrombosis, American Journal of Neuroradiology 32 (2011) 576–580.
[19] T. Pfefferkorn, T.E. Mayer, C. Opherk, et al., Staged escalation therapy in acute basilar artery occlusion: intravenous thrombolysis and ondemand consecutive endovascular mechanical thrombectomy – preliminary experience in 16 patients, Stroke 39 (2008) 1496–1500.
[20] T. Pfefferkorn, M. Holtmannspotter, C. Schmidt, et al., Drip, ship, and retrieve: cooperative recanalization therapy in acute basilar artery occlusion, Stroke 41 (2010) 722–726.
[21] P. Mordasini, C. Brekenfeld, J.V. Byrne, et al., Technical feasibility and application of mechanical thrombectomy with the Solitaire FR revascularization device in acute basilar artery occlusion, American Journal of Neuroradiology 34 (2013) 159–163.
[22] C. Roth, A. Mielke, R. Siekmann, et al., First experiences with a new device for mechanical thrombectomy in acute basilar artery occlusion, Cerebrovascular Diseases 32 (2011) 28–34.