

Successful endovascular recanalization of a partially occluded basilar artery fenestration

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Abstract

A 76-year-old man with a history of arterial hypertension, obstructive sleep apnea, dyslipidemia, family history of cardiovascular events, prestroke and overweight presented 90 minutes after acute onset of right-sided sensorimotor hemiparesis, hemiataxia and dysarthria (National Institutes of Health Stroke Scale (NIHSS) 9/42).

Magnetic resonance imaging (MRI) revealed a pontine ischemia and MR angiography showed a thrombus in the middle to distal portion of the basilar artery. Owing to the location, an occlusion of one lumen of a fenestrated basilar artery was suspected. Fearing the risk of peripheral dislocation, intravenous thrombolysis was withheld after an interdisciplinary discussion and direct endovascular thrombectomy (Solitaire stent retriever) was successfully performed by passing the stent retriever specifically through the affected lumen and between the thrombus and the vascular wall, which would normally be avoided. Angiography after complete reperfusion (Thrombolysis in Cerebral Infarction grade 3) confirmed a fenestration in the middle to distal portion of the basilar artery where the thrombus was initially located (blue and green arrow). Follow-up MRI after 24 hours showed only minimal ischemic damage in the left pontine area, and the patient was discharged home with ambulatory physiotherapy for residual minimal gait disturbance (NIHSS 0).

Keywords

Basilar artery, endovascular, fenestration, ischemic stroke, thrombectomy

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Introduction

A 76-year-old man with a past medical history of arterial hypertension, obstructive sleep apnea, dyslipidemia, family history of cardiovascular events, prestroke and overweight presented 90 minutes after acute onset of right-sided sensorimotor hemiparesis, hemiataxia and dysarthria (National Institutes of Health Stroke Scale (NIHSS) 9/42).

Magnetic resonance imaging (MRI) revealed pontine ischemia and MR angiography showed a thrombus in the middle to distal portion of the basilar artery. Owing to the location, we suspected an occlusion of one lumen of a fenestrated basilar artery. Fearing the risk of scattering the thrombus into peripheral emboli, we withheld intravenous thrombolysis after an interdisciplinary discussion and performed direct endovascular thrombectomy (Solitaire stent retriever). Here, it was important to pass the stent retriever specifically through the affected lumen and between the thrombus and the vascular wall, which would normally have been avoided. Angiography after complete reperfusion (Thrombolysis in Cerebral Infarction grade 3) confirmed a fenestration in the middle to distal portion

of the basilar artery where the thrombus was initially located (Figure 1). Follow-up MRI after 24 hours showed residual minimal ischemic damage in the left pontine area (Figure 2), and the patient was discharged home with ambulatory physiotherapy for minimal gait disturbance (NIHSS 0).

Because the basilar artery results from a fusion of the primitive longitudinal neural arteries, it is known that incomplete fusion leads to fenestrations in about 0.5%–5% of cases depending on the modality of the workup.¹ In the rising age of endovascular therapy for acute ischemic stroke, it is crucial to recognize anatomical variants of cerebral blood supply, differentiate them from changes seen with thrombi² and account for them in endovascular procedure management because

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Figure 1. (a) Digital subtraction angiography showing a thrombus attached to the wall of the middle to distal portion of the basilar artery (red arrow). (b) After complete reperfusion, a fenestration of the basilar artery where the thrombus was initially located (blue arrow) was confirmed.

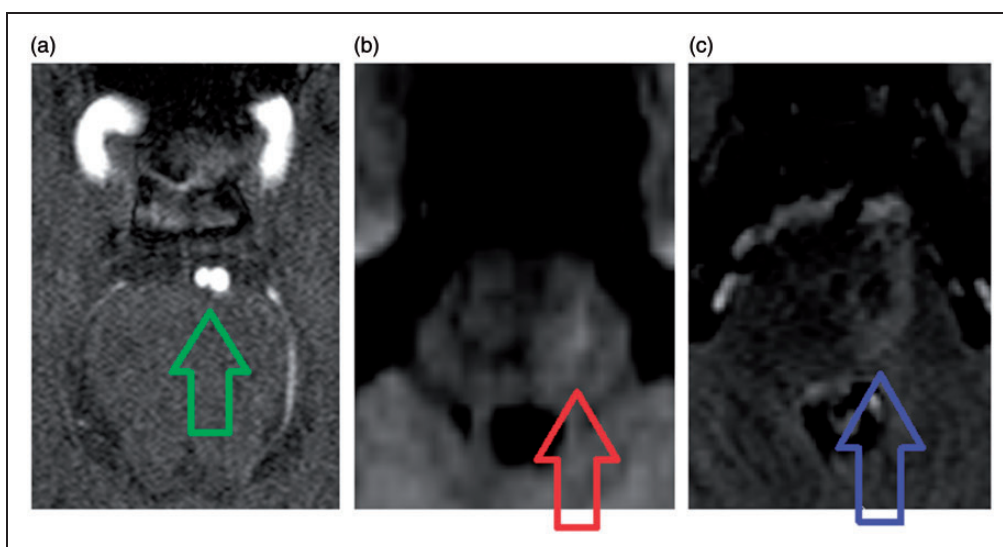


Figure 2. (a) The fenestration was also visible on follow-up magnetic resonance angiography (green arrow). (b) A small left-sided pontine ischemia is seen on follow-up magnetic resonance diffusion-weighted imaging B1000 (red arrow). (c) A small pontine ischemia is seen on follow-up fluid-attenuated inversion recovery imaging sequence (blue arrow).

the consequences of basilar artery occlusion may be catastrophic.³ In this case, thorough workup revealed no apparent cause of the ischemic stroke and antecedent medication with acetylsalicylic acid was changed after three months of double-platelet aggregation inhibitor therapy to clopidogrel monotherapy with no recurrence at 20 months' follow-up.

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References

1. Sogawa K, Kikuchi Y, O'uchi T, et al. Fenestrations of the basilar artery demonstrated on magnetic resonance angiograms: An analysis of 212 cases. *Interv Neuroradiol* 2013; 19: 461–465.
2. Palazzo P1, Ruff M, Lyerly MJ, et al. Basilar artery thrombus vs. fenestration: A differential diagnostic challenge in acute ischemic stroke. *J Neuroimaging* 2014; 24: 607–609.
3. Mattle HP, Arnold M, Lindsberg PJ, et al. Basilar artery occlusion. *Lancet Neurol* 2011; 10: 1002–1014.