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# Neuroimaging Highlight

Editors: Richard Farb, David Pelz

## The Happy Thrombus Sign

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A 45-year-old, right-handed man presented to a peripheral emergency department with acute onset vertigo and weakness. Upon awakening in the early morning, he developed sudden-onset vertigo, nausea and vomiting, headache, and left-sided numbness and weakness. He was referred to the Neurology service with the diagnosis of an acute ischemic brainstem stroke.

The patient was a smoker but had no other vascular risk factors. General examination was non-contributory. On neurological examination, the patient had homonymous hemianopsia, dysarthria, and impaired abduction of the left eye. Sensation was diminished on the left face, arm and leg. There was mild pyramidal distribution weakness in the left arm and leg. Coordination testing revealed left-sided dysmetria.

Magnetic resonance imaging demonstrated foci of acute infarction in the left lateral medulla, both thalami, the right hippocampus, the posterior limb of the right internal capsule, and the left cerebellum. Magnetic resonance angiography revealed intraluminal thrombus within the proximal left vertebral artery and associated embolic occlusion of the proximal right posterior cerebral artery.

As the patient arrived 12 hours after stroke onset and had been neurologically stable, intravenous heparin administration and oral acetylsalicylic acid was started. However, the patient acutely deteriorated two days later with extensive symptoms and signs of posterior circulation ischemia, including anarthria, aspiration of secretions, and quadriplegia. Urgent computed



**Figure 1:** A) Initial angiogram of the left vertebral artery (small arrow) demonstrates vessel cut-off in the mid basilar artery (large arrow). B) After 5 mg tPA delivered intra-arterially by microcatheter, the basilar artery lumen (large arrow) is restored. The distal branches including the left posterior cerebral artery (short arrow) and right superior cerebellar artery (arrow head) are now visualized.

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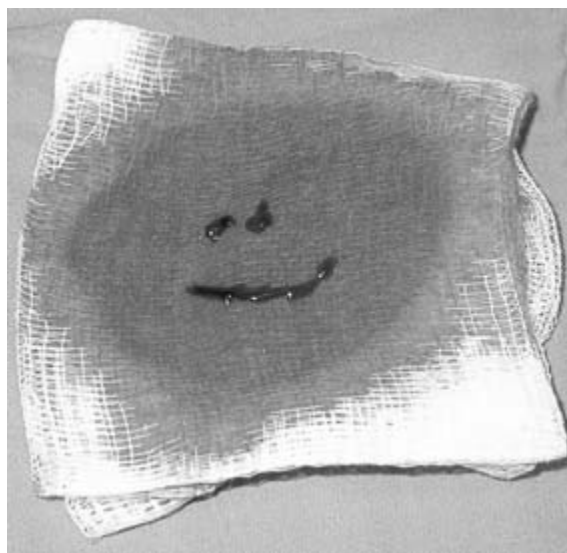
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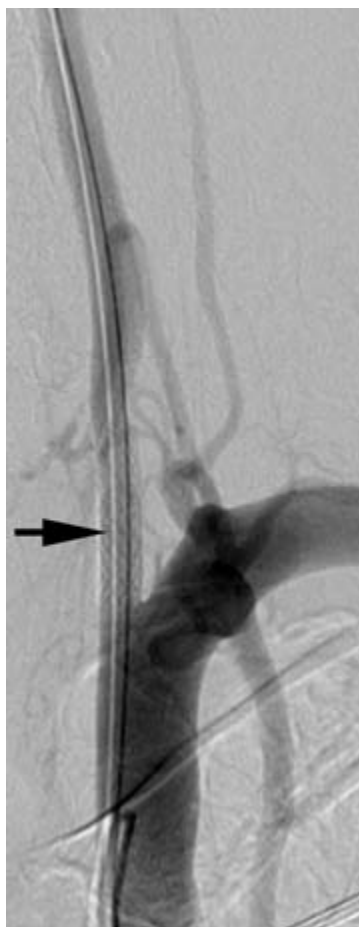


**Figure 2:** A) Injection of the left subclavian artery through a 6F catheter (long arrow) demonstrates focal stenosis of the proximal left vertebral artery (small arrow). There is a long filling defect in this vessel (large arrow) representing post-stenotic thrombus. B) After thromboaspiration through the 6F catheter, the left vertebral artery is now patent but the proximal stenosis remains.



**Figure 3:** The aspirate was emptied onto surgical gauze with a clockwise rotation, revealing a large volume of thrombus.

**Figure 4:** ) The left vertebral artery stenosis was treated with a 4mm x 18mm balloon-expandable stent (arrow).



tomogram angiography demonstrated new thrombus in the basilar artery and persistent thrombus in the proximal left vertebral artery. The patient proceeded directly to the angiography suite for endovascular intervention. Angiography confirmed the CTA findings and identified stenosis at the origin of the left vertebral artery. The basilar embolus was successfully lysed with 5 mg tPA delivered intra-arterially by microcatheter (Figure 1) and the thrombus within the left vertebral artery was aspirated through a large bore catheter (Figure 2). The aspirate was emptied from the syringe onto gauze in a clockwise motion.

We found a large volume of clot, whose serendipitous appearance we term the “happy thrombus sign” (Figure 3). Encouraged by this auspicious finding, we placed a balloon-expandable stent across the vertebral artery stenosis (Figure 4). The patient’s neurological status returned to his baseline

admission deficits within several hours. At follow-up two months later in Neurology Outpatient clinic, the patient was doing well with only left dysmetria. His modified Rankin score was 2.

Basilar artery occlusion almost invariably leads to death or long-term disability without treatment<sup>1</sup>. With either intra-arterial therapy or intravenous tPA, recanalization can be achieved in more than half of these patients, and 45% to 55% of survivors regain functional independence<sup>1,2</sup>.

#### REFERENCES

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