Perimesencephalic hemorrhage with negative angiography: case illustration

Peter F. Morgenstern, MD, and Jared Knopman, MD

Department of Neurological Surgery, NewYork-Presbyterian Hospital/Weill Cornell Medical Center, New York, New York

<http://thejns.org/doi/abs/10.3171/2014.12.JNS142513>

KEY WORDS perimesencephalic hemorrhage; aneurysm; angiogram-negative subarachnoid hemorrhage; vascular disorders

A 44-year-old woman presented with headache and perimesencephalic subarachnoid hemorrhage (PM-SAH). Initial digital subtraction angiography (DSA) and CT angiography (CTA) showed no underlying pathology (Fig. 1A). On Day 9 DSA revealed a 1.7-mm aneurysm of the basilar trunk (Fig. 1B), but CTA on Day 14 failed to demonstrate this aneurysm. The aneurysm was clipped via a subtemporal craniotomy. Postoperative DSA confirmed no residual filling (Fig. 1C), and the patient recovered well.

PM-SAH portends a better prognosis and lower probability of aneurysmal pathology and recurrent hemorrhage than aneurysmal SAH. Aneurysms can be found in PM-SAH but are typically identified on initial DSA or CTA.¹ Some argue that a single angiographic evaluation is sufficient in patients with PM-SAH. Small aneurysms are found in few patients and disappear

on follow-up studies,⁵ suggesting that identification of the aneurysm may not confer a benefit. This information and concurrent improvements in the sensitivity of CTA have prompted some to consider replacing DSA with CTA in cases of PM-SAH and eliminating repeat studies.³ Advocates of this approach cite unnecessary risks of DSA and radiation exposure in the setting of a “benign” hemorrhage pattern.

This case illustrates that a negative DS angiogram does not definitively exclude aneurysmal etiology in PM-SAH. Furthermore, we recommend a conservative approach, utilizing rotational 3D DSA on initial and repeat studies to identify small intracranial aneurysms. This modality remains slightly more sensitive than CTA and conventional DSA at this time.^{2,4} Prospective studies are needed to ascertain whether detection and treatment of these aneurysms confer a benefit.

SUBMITTED November 4, 2014. **ACCEPTED** December 9, 2014.

INCLUDE WHEN CITING Published online May 29, 2015; DOI: 10.3171/2014.12.JNS142513.

DISCLOSURE The authors report no conflict of interest concerning the materials or methods used in this study or the findings specified in this paper.

CORRESPONDENCE Peter Morgenstern, Department of Neurological Surgery, NewYork-Presbyterian Hospital/Weill Cornell Medical Center, 525 E. 68th St., Box 99, New York, NY 10065. email: pfmorgenstern@gmail.com.

FIG. 1. **A:** DS angiogram on admission fails to demonstrate an etiology of SAH. **B:** Repeat DS angiogram on hospital Day 9 demonstrates a 1.7-mm aneurysm distal to the origin of the anterior inferior cerebellar artery (arrow). **C:** Postoperative DS angiogram demonstrates no residual filling of the aneurysm.

References

1. Alén JF, Lagares A, Lobato RD, Gómez PA, Rivas JJ, Ramos A: Comparison between perimesencephalic nonaneurysmal subarachnoid hemorrhage and subarachnoid hemorrhage caused by posterior circulation aneurysms. *J Neurosurg* **98**:529–535, 2003
2. Kayhan A, Koc O, Keskin S, Keskin F: The role of bone subtraction computed tomographic angiography in determining intracranial aneurysms in non-traumatic subarachnoid hemorrhage. *Iran J Radiol* **11**:e12670, 2014
3. Li K, Wei X, Lv F, Li Q, Xie P: Subarachnoid hemorrhage: role of subtraction CT angiography in etiological diagnosis and pretreatment planning. *J Neurosurg Sci* **58**:223–229, 2014
4. Li Q, Lv F, Yao G, Li Y, Xie P: 64-section multi-detector CT angiography for evaluation of intracranial aneurysms: comparison with 3D rotational angiography. *Acta Radiol* **55**:840–846, 2014
5. Nayak S, Kunz AB, Kieslinger K, Ladurner G, Killer M: Classification of non-aneurysmal subarachnoid haemorrhage: CT correlation to the clinical outcome. *Clin Radiol* **65**:623–628, 2010

Author Contributions

Conception and design: both authors. Acquisition of data: Morgenstern. Analysis and interpretation of data: Morgenstern. Drafting the article: Morgenstern. Critically revising the article: both authors. Reviewed submitted version of manuscript: both authors. Approved the final version of the manuscript on behalf of both authors: Morgenstern. Study supervision: Knopman.