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Cost-Effective CT & MRI Contrast Agents





Reply:

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REPLY:

We would like to thank Wu and colleagues for their critical analysis of our recently published study. As the authors point out, our meta-analysis found a strong association between deep cerebral venous anomalies and nonaneurysmal perimesencephalic SAH.¹ As demonstrated in our meta-analysis, patients with aneurysmal SAH might also have deep cerebral venous drainage anomalies, thus making the presence of this imaging finding, especially in the case of a subarachnoid hemorrhage extending beyond the perimesencephalic cisterns, nonspecific. However, in case of a typical perimesencephalic hemorrhage with negative DSA findings for aneurysm, the identification of deep cerebral venous drainage is an additional imaging finding in favor of nonaneurysmal perimesencephalic SAH.

Contrary the suggestion of Wu et al, the literature does not recommend abandonment of DSA in the initial phase of perimesencephalic hemorrhage.² In a recently published study of 230 patients with CTA negative for hemorrhage, Heit et al³ found that DSA identified vascular pathology in 13% of patients. Among patients with perimesencephalic hemorrhage, an aneurysm was found in 3% of cases and vasculitis was found in 1.5% of cases. While admittedly the diagnostic yield of angiography was low (4.5%), the risks of DSA are even lower and the importance of establishing the correct diagnosis is high.^{4,5} We do agree, however, that second-look DSA does not appear to have a sufficient diagnostic yield for the detection of a causative aneurysm in case of negative findings on 6-vessel DSA with 3D rotational angiography.⁶ If some authors maintain the futility of DSA in cases of typical perimesencephalic hemorrhage, the drainage venous pattern may still be evaluated with cross-sectional imaging (ie, CTV or MRV).7

One of the most interesting aspects of studying venous anomalies and disease in perimesencephalic hemorrhage is that we may be slowly arriving at a better understanding of the nature of the disease. The association between venous anomalies and nonaneurysmal perimesencephalic hemorrhage suggests that this could be secondary to a venous rupture/leak. In case of primitive venous drainage, the direct connection of the thin-walled perimesencephalic veins with the dural sinuses may predispose to sudden increases in venous pressure with engorgement and rupture of the veins as a result.⁸⁻¹⁰ However, because the anatomic venous drainage pattern is not likely to change after bleeding, it is surprising that the incidence of rebleeding is very low in patients after the initial perimesencephalic SAH.¹¹ Matsumaru et al¹² speculated

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that the spontaneous healing of the venous rupture by fibrous tissue reaction would reinforce the wall of the vein, decreasing the risk of rupture.⁹

REFERENCES

- Rouchaud A, Lehman VT, Murad MH, et al. Nonaneurysmal perimesencephalic hemorrhage is associated with deep cerebral venous drainage anomalies: a systematic literature review and metaanalysis. AJNR Am J Neuroradiol 2016;37:1657–63 CrossRef Medline
- Kalra VB, Wu X, Matouk CC, et al. Use of follow-up imaging in isolated perimesencephalic subarachnoid hemorrhage: a metaanalysis. *Stroke* 2015;46:401–06 CrossRef Medline
- Heit JJ, Pastena GT, Nogueira RG, et al. Cerebral angiography for evaluation of patients with CT angiogram-negative subarachnoid hemorrhage: an 11-year experience. AJNR Am J Neuroradiol 2016; 37:297–304 CrossRef Medline
- Fifi JT, Meyers PM, Lavine SD, et al. Complications of modern diagnostic cerebral angiography in an academic medical center. J Vasc Interv Radiol 2009;20:442–47 CrossRef Medline
- Kaufmann TJ, Huston J 3rd, Mandrekar JN, et al. Complications of diagnostic cerebral angiography: evaluation of 19,826 consecutive patients. *Radiology* 2007;243:812–19 CrossRef Medline
- Potter CA, Fink KR, Ginn AL, et al. Perimesencephalic hemorrhage: yield of single versus multiple DSA examination: a single-center study and meta-analysis. *Radiology* 2016 May 27:152402. [Epub ahead of print] CrossRef Medline
- van der Schaaf IC, Velthuis BK, Gouw A, et al. Venous drainage in perimesencephalic hemorrhage. Stroke 2004;35:1614–18 CrossRef Medline
- Song JH, Yeon JY, Kim KH, et al. Angiographic analysis of venous drainage and a variant basal vein of Rosenthal in spontaneous idiopathic subarachnoid hemorrhage. J Clin Neurosci 2010;17:1386–90 CrossRef Medline
- Watanabe A, Hirano K, Kamada M, et al. Perimesencephalic nonaneurysmal subarachnoid haemorrhage and variations in the veins. *Neuroradiology* 2002;44:319–25 CrossRef Medline
- Yamakawa H, Ohe N, Yano H, et al. Venous drainage patterns in perimesencephalic nonaneurysmal subarachnoid hemorrhage. *Clin Neurol Neurosurg* 2008;110:587–91 CrossRef Medline
- 11. Malhotra A, Wu X, Borse R, et al. Should patients be counseled about possible recurrence of perimesencephalic subarachnoid hemorrhage? World Neurosurg 2016 Aug 10. [Epub ahead of print] CrossRef Medline
- Matsumaru Y, Yanaka K, Matsumura A. Is perimesencephalic nonaneurysmal hemorrhage of venous origin? *Stroke* 2004;35:2753–54; author reply 2754 CrossRef Medline

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