Evaluation of Vertebrobasilar Vasospasm following Subarachnoid Hemorrhage Using Multislice CTA

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Purpose
Vertebrobasilar spasm is one of the leading causes of mortality and morbidity in patients with subarachnoid hemorrhage (SAH). The optimal means for the assessment of vasospasm have not been established. The purpose of this study is to evaluate the role of multislice CT angiography (CTA) in the detection and quantification of vertebrobasilar vasospasm with correlation to transcranial doppler (TCD) findings in patients with SAH.

Materials & Methods
Forty-one whole brain CTA studies were performed to 34 patients on a multislice CT scanner. Scans parameters were as follows: 1 mm collimation, 0.625Q pitch (pitch 5:1 equivalent, in monoslice spiral scanners), using 120 kV and 250 mAs. A quantity of 100 ml contrast material was injected intravenously at a rate of 3 ml/sec following a delay of 15 seconds. Postprocessing of the entire vertebrobasilar system imaged was performed in all cases using 3D MIP reconstruction, Mastercut and Volume Rendering methods. The vessel diameter was measured at different extra and intracranial locations along the vertebral and basilar arteries perpendicular to their long axis using curved reformatted MPR. CTA findings were correlated with the TCD performed within 24 hours and with the patient's clinical status.

Results
CTA demonstrated narrowing of the vertebral or basilar arteries compatible with spasm in 12 patients in agreement with the TCD findings. In two patients in whom the TCD suggested arterial spasm, CTA disclosed arteriovenous malformation in the posterior fossa with large tortuous vessels. Only in one patient was no vascular narrowing or other vascular pathology detected in the presence of positive findings on TCD. In one patient, CTA disclosed a spastic basilar artery while TCD findings were found to be within normal limits. Another 19 patients had normal findings on both CTA and TCD.

Conclusion
CTA is a noninvasive method that can be used for the assessment of vertebrobasilar vasospasm in patients with SAH. While TCD measures flow velocity only, CTA
demonstrates the morphology of blood vessels and enables accurate measurement of their diameter. Thus, it may be superior to TCD in the evaluation of vertebrobasilar spasm and in differentiating it from hyperemic and other high flow states.