MR Imaging in Pretruncal Nonaneurysmal Subarachnoid Hemorrhage
Is It Worthwhile?

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Background and Purpose—The cause of pretruncal (perimesencephalic) nonaneurysmal subarachnoid hemorrhage is not known. MRI of the brain or spine is often performed to exclude any other vascular abnormalities. Its diagnostic value is not known.

Methods—We used MR imaging of the brain with routine sequences, gadolinium enhancement, and additional thin T1-weighted axial sections following a triple dose of contrast.

Results—We performed MR imaging of the brain in 18 patients with a pretruncal nonaneurysmal subarachnoid hemorrhage. The focal nature of the subarachnoid hemorrhage exclusively in front of the brain stem was confirmed in 14 patients studied within 7 days of the ictus. No vascular abnormalities were found in 17 cases, including 14 patients with gadolinium enhancement. An incidental capillary telangiectasia was found in 1 patient. Fluid-attenuated inverse recovery MR additionally documented blood in the sulci due to cerebrospinal fluid recirculation of blood. Five patients underwent MR imaging of the spine, and no arteriovenous malformations were found.

Conclusions—MR imaging did not reveal a source of pretruncal subarachnoid hemorrhage. The cost of MR imaging probably outweighs the benefit in the evaluation of this variant of subarachnoid hemorrhage. (Stroke. 1998;29:2514-2516.)

Key Words: subarachnoid hemorrhage ■ angiography ■ magnetic resonance imaging
The distribution of blood was prepontine and interpeduncular cisterns in 7 patients, additional extension into the premedullar cistern in 3, prepontine cistern only in 3, and interpeduncular cistern only in 1 patient. Additional findings on MRI were hyperintense lesions in the cerebellum and thalamus in 1 patient. Additional fluid-attenuation inverse recovery (FLAIR) images were available in 6 patients and showed cerebrospinal fluid signal abnormality along the sulci in 2 patients (Figure 2). Fifteen patients (63%) underwent an additional 4-vessel cerebral angiograms but were all normal (except for junctional dilatation at the top of the basilar artery and an infundibular widening of the posterior communicating artery in 1 patient each). MRI of the cervical spine was normal in all 5 patients.

**Discussion**

This subset of subarachnoid hemorrhage is defined by acute or gradual onset of severe headache, normal level of consciousness, absent localizing neurological signs, a limited amount of blood in front of the brain stem, and a normal 4-vessel cerebral angiogram. Serious concern remains about an undiagnosed vascular malformation in patients with an angiogram-negative subarachnoid hemorrhage. A second cerebral angiogram is usually performed only after review of the first study when there is uncertainty about its quality. We have recently emphasized the possibility of missing a cerebral aneurysm in pretruncal subarachnoid hemorrhage. This concern is further fostered by a recent report showing that cervical medullary arterial venous fistulas are a frequently unrecognized cause of subarachnoid hemorrhage. Therefore, MRI of the brain and cervical spine is performed in many academic institutions to exclude any other vascular abnormalities.

Our series is the first large study of MR imaging in pretruncal nonaneurysmal subarachnoid hemorrhage. Axial and sagittal views demonstrated the extension of the hemorrhage in the cisterns exclusively in front of the brain stem but failed to show a vascular lesion in 17 of 18 patients. Our previous finding of a capillary telangiectasia on MRI in 1 case suggested a venous etiology of this disorder. However, we were unable to confirm this finding, which strongly suggests that this abnormality has been incidental. FLAIR images additionally showed recircula-

![Figure 1](image1.png)

**Figure 1.** Composite of T1-weighted MR images (sagittal view) of different patterns of pretruncal subarachnoid hemorrhage. Left, interpeduncular cistern; middle, prepontine cistern; right, involvement of all pretruncal cisterns.

![Figure 2](image2.png)

**Figure 2.** MR image (axial views; FLAIR images) of a patient with a pretruncal subarachnoid hemorrhage with an increased signal in the prepontine cistern and sulci.
tion of subarachnoid blood over the sulci. To our knowledge, this is a new observation in this subset of subarachnoid hemorrhage, but it should not be mistaken for a more diffuse pattern of subarachnoid hemorrhage indicating a possible aneurysmal source. Small lesions were found in the cerebellum and thalamus, likely representing emboli associated with repeated vertebral angiograms.

Our study sample consisted of only 18 MR brain scans. Thus, the 95% confidence interval by the binomial distribution for 1 of 18 (5.6%) is relatively wide (0.1% to 27.3%). Nonetheless, we believe that routine MRI of the brain and spine unnecessarily adds to the cost of evaluation. Perhaps MRI of the spine should be performed only in patients with clinical leads of a ruptured spinal arteriovenous malformation. MRI of the brain may also be useful only to confirm subarachnoid hemorrhage in patients with ambiguous CT scans, such as blood predominantly in the prepontine cisterns, but in all our patients imaged with high-resolution CT scans, the subarachnoid hemorrhage was clearly identified. Nonetheless, over time, newer technologies of MRI will be developed; therefore, MRI as a research tool to investigate the cause of this puzzling but benign variant of subarachnoid hemorrhage may remain useful.

References

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