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MR of Basilar Artery Dolichoectasia

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Demonstration of dolichoectasia of the basilar artery by CT [1–5] and angiography [6–8] has been well described. We present a case of basilar artery dolichoectasia demonstrated by MR imaging. This has not been previously described in the literature. The important MR features of dolichoectasia of the basilar artery are flowing blood through the residual lumen and fresh blood clot surrounding the lumen.

Case Report

A 20-year-old man from Honduras who had been in the United States for 7 months presented with tonic-clonic movements during sleep, witnessed by his mother. There was no incontinence, previous seizure disorder, or history of head trauma. During the ensuing 5 months he has had parietooccipital headaches with increasing frequency. The headaches last approximately 30 min and cause blurred vision. No additional episodes of tonic-clonic movements have been noted. Physical examination and laboratory work were unremarkable; EEG was normal. MR imaging, CT, and cerebral angiography were then performed, which showed dolichoectasia of the basilar artery (Figs. 1–3).

Discussion

Dolichoectasia is the term used to describe abnormal elongation and distension of the intracranial arteries. It most commonly affects the basilar artery but may involve other arteries of the circle of Willis. Histologically, there is irregularity and thickening of the media without evidence of arteriosclerosis [9].

This case provides an excellent demonstration of dolichoectasia by MR. The residual lumen of the basilar artery is black (signal void) due to the rapidly flowing blood. The only tissues that produce a high signal on T1-weighted images are blood clot (after a period of 24 hr to several days) and fat. The fat signal fades on T2-weighted images (Fig. 1B) while the blood clot stays bright. These features are caused by the short T1

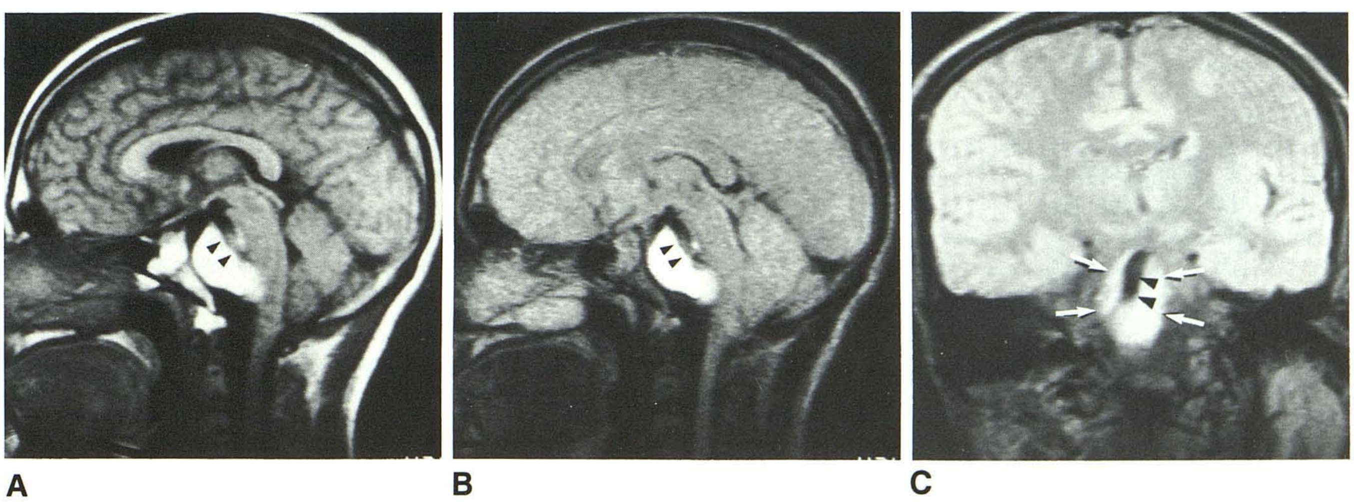

Fig. 1.—*A*, Spin-echo T1-weighted MR image (TR = 530, TE = 30). Note high signal from extraaxial mass within prepontine cistern that displaces brainstem posteriorly. Note linear region of low signal posteriorly (*arrowheads* in *A* and *B*), indicating flowing blood within residual lumen of aneurysm.
***B*, Spin-echo T2-weighted MR image (TR = 2060, TE = 90). Mass remains mostly higher signal, confirming the presence of blood clot.**
***C*, Spin-echo coronal MR image (TR = 2240, TE = 30). Note residual lumen of aneurysm (*arrowheads*) surrounded by clotted blood. True aneurysm wall is defined by margin of thrombus (*arrows*).**

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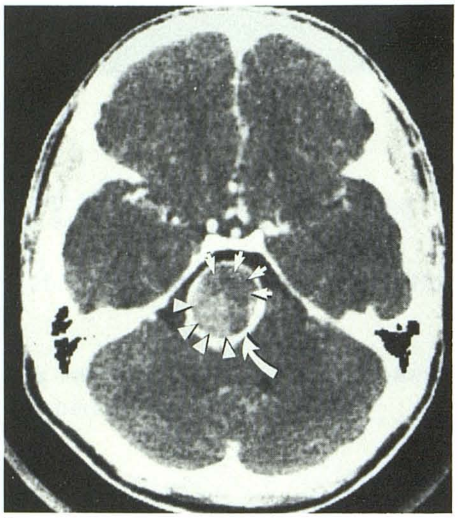

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Fig. 2.—Postinfusion CT scan shows lumen (*arrowheads*), clot (*short arrows*), and rim of calcification (*curved arrow*).

Fig. 3.—Left vertebral arteriogram, anteroposterior view, subtraction film. Arteriography clearly shows the residual, nonthrombosed, aneurysm lumen.

and long T2 of nonacute hemorrhage. If the clot had been imaged in the acute phase, it would have shown low signal [10].

According to Sipponen et al. [10] and Gomori et al. [11], at low magnetic fields (0.5 T or less) acute hematomas are isointense while subacute and chronic hematomas are hyperintense relative to parenchyma. The MR intensities are slightly different at higher field strength. Gomori et al. [11] stated that acute (less than 7 days old) hematomas are hypointense or slightly isointense to gray matter on T1-weighted images but show marked central hypointensity on T2-weighted images at 1.5 T. The T1- and T2-weighted images then show a peripheral ring of hyperintensity within about a week. The entire hematoma displays high-intensity signal after approximately 2 weeks. Similar findings were made for subdural hematomas.

The findings described by Sipponen et al. [10] hold true in our case, since the examination was performed at 0.5 T.

If there is calcification (as in this case) within the dolichoectatic basilar artery, it will be less diagnosable by MR than by CT [12]. In addition, if the aneurysm has bled, it will be impossible to appreciate small amounts of subarachnoid hemorrhage on MR; this will be easier to see with CT [12].

In our case, the examination was performed with a Technicare superconducting magnet operating at a field strength of 0.5 T. The examination consisted of 1-cm sections in multislice mode with a gap of 0.125 cm. Images were obtained with T1 and T2 weighting using spin-echo technique and four acquisitions. The images were acquired on a 128 × 256 matrix, with interpolation for 256 square display.

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