AJNR

Celebrating 35 Years of the AJNR: September 1987 edition

AJNR Am J Neuroradiol 2022, 43 (9) 1375
doi: https://doi.org/10.3174/ajnr.P6844
http://www.ajnr.org/content/43/9/1375.citation

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September 1987 edition

Transluminal Angioplasty of the Vertebral and Basilar Artery

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Transluminal angioplasty of brachiocephalic vessels for atherosclerotic lesions is now being performed in selected cases. We have thus far treated 17 cases of vertebral artery stenosis and one case of basilar artery stenosis by intravascular balloon dilatation techniques. Clinical presenting symptoms included vertebral basilar insufficiency, repeated transient ischemic attacks (TIAs), and multiple strokes. We performed successful transluminal angioplasty in 16 patients with marked narrowing (>70%) of the dominant vertebral artery from atherosclerosis. One patient with basilar artery stenosis with tandem atherosclerotic lesions was also treated by angioplasty techniques. Repeat angiography at 3- to 12-month intervals has revealed continued patency at the angioplasty site. Complications occurred in our one patient with basilar artery angioplasty, who suffered a brainstem infarction after treatment, and in one patient who had a TIA after bilateral vertebral artery angioplasty. Two other patients had residual vertebral stenosis but remained asymptomatic after the procedure. All other patients who had successful dilatation were asymptomatic at 6 months to 2 years (mean, 15 months) of follow-up.

These initial studies indicate that vertebral artery angioplasty may be effective for treating high-grade atherosclerotic lesions and for improving blood flow to the posterior circulation. Angioplasty of the basilar artery is technically more difficult and has a higher degree of risk because of the many perforating branches supplying the brainstem.

Percutaneous transluminal angioplasty (PTA) is being performed with increasing frequency in the innominate, subclavian, external, and internal carotid vessels [1–11]. Thus far, this technique appears to be effective for the treatment of hemodynamically significant atherosclerotic lesions. This is particularly important for vessels located in areas that are more difficult to treat surgically, such as the proximal vertebral and basilar arteries. We report our experience with transluminal angioplasty in 17 cases of hemodynamically significant atherosclerotic lesions of the vertebral artery and in one case of stenosis involving the basilar artery.

Received September 5, 1986; accepted after revision March 19, 1987.

Presented at the annual meeting of the American Society of Neuroradiology, San Diego, January 1986.

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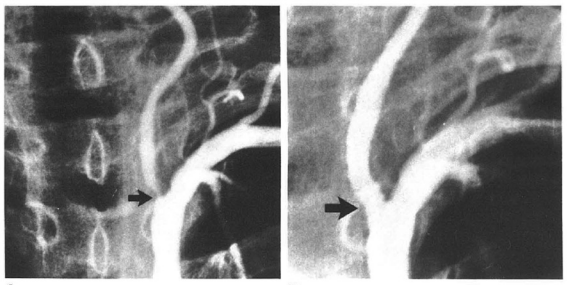
AJNR 8:745–749, September/October 1987
0195–6108/87/0805–0745

Subjects and Methods

Patients included 10 men and seven women ranging in age from 46–77 years old (mean, 62.5). Percutaneous transluminal angioplasty (PTA) of the vertebral artery was performed in 13 patients who presented clinically with symptoms of vertebral basilar insufficiency, including dizziness, diplopia, bifacial numbness, vascular headaches, weakness, and ataxia. Two patients presented with symptoms of multiple transient posterior circulation ischemic attacks, which included transient cortical blindness, memory disturbance, and nystagmus. Two patients presented with multiple embolic strokes and had symptoms of homonymous hemianopsia, poor eye-hand coordination, visual agnosia, and vertical gaze nystagmus. All patients were managed in the acute stage of presentation by systemic heparinization or were placed on strict therapeutic doses of oral anticoagulants, including Coumadin, aspirin, and/or dipyridamole (Persantine). Only patients who failed to respond to conventional medical therapy were accepted for PTA.

In 15 patients, PTA was performed on the dominant proximal vertebral artery for athero-



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Chiari II Malformation: MR Imaging Evaluation

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The purpose of this study was to explore the value of high-detail MR imaging in the diagnosis of the Chiari II malformation. Twenty-four patients with known Chiari II malformation as diagnosed by CT scanning were evaluated with cranial MR scans. Two patients also had spine scans. The sagittal-plane images were the most informative, and abnormalities of the telencephalon, diencephalon, mesencephalon, rhomboencephalon, upper spinal cord, and mesencephalon were shown extremely well.

We found MR to be an easy and accurate method for demonstrating the abnormalities of the Chiari II malformation, and it is our procedure of choice.

The Chiari II malformation is a complex developmental deformity characterized by an elongated small cerebellum and brainstem with caudal displacement of the medulla, parts of the cerebellum, and pons through an enlarged foramen magnum into the cervical spinal canal [1]. A meningomyelocele is a nearly constant accompanying feature, as is hydrocephalus. In addition, numerous other malformations of the neuraxis including polymicrogyria, subependymal heterotopias, beaked colicular plate, aqueduct stenosis, diastematomyelia, diplomyelia, hydromyelia, and syringomyelia have been reported [1].

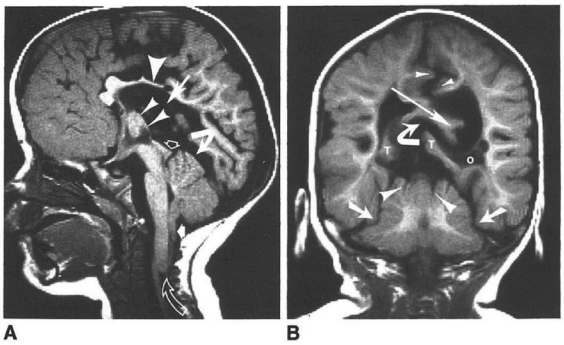
We had the opportunity to evaluate 24 patients with Chiari II malformation with high-detail MR imaging. Most abnormalities previously described as seen by CT [2–5] were also seen by MR. In this article we review these abnormalities and report on other associated features of the Chiari malformation that either have a greater frequency than has previously been reported or that have not been described before.

Subjects and Methods

Twenty-four patients with meningomyeloceles and known Chiari II malformations as diagnosed by CT scanning were investigated with MR imaging. Three patients were less than 1 year old, five were 1–5 years old, five were 6–10 years old, and 11 were 10–20 years old. In 21 of the patients ventricular shunts had been inserted previously; in one patient a lumbar subarachnoid-peritoneal shunt had been placed. Sagittal and axial head images were obtained in all patients. The majority of the sagittal images (16) were 3 mm thick; the rest were either 4 or 5 mm thick. Eighteen patients had coronal scans (5–10 mm thick). Spin-echo techniques were used. Since the anatomy of the lesions was the prime consideration, mild T1-weighted images were obtained in all cases with a repetition time of 500, 600, or 800 msec and an echo time of 17 msec. T2-weighted images were not obtained routinely. In all patients, an attempt was made to include the upper cervical spine on the sagittal images. In addition, two patients had separate T1-weighted sagittal images of the spine, and one of the two had T2-weighted sequences as well.

Results

The results are categorized by the involvement of the different embryologic parts of the brain and are summarized in Table 1.



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