Case Reports

MR Imaging of a False Carotid Aneurysm

WILLIAM C. HANIGAN, M.D., PH.D.,* ROBERT M. WRIGHT, M.D.,† WILLIAM A. BERKMAN, M.D.,‡ AND THOMAS E. SZYMKE, M.D.§

SUMMARY Two months after a gunshot wound to the head of a 12-year-old boy, MR imaging outlined an asymptomatic false aneurysm of the carotid artery. The scan’s ability to image in multiple planes with noninvasive visualization of pulsatile vessel flow suggests its use for follow-up examinations of traumatic injuries to the head or neck.

FAILURE TO RECOGNIZE delayed traumatic arterial injuries involving the head or neck can lead to prohibitive morbidity or mortality.1-3 Follow-up angiography in the asymptomatic patient may not be indicated and the use of the enhanced CT scan may miss associated aneurysms.4 This report describes the usefulness of the MR scan as a follow-up examination following a penetrating intracranial injury.

Case Material

The patient is a 12-year-old right-handed male who sustained an accidental 22 caliber gunshot wound to the right maxillary region. He became unconscious immediately and was evacuated to a local hospital. Supportive care at this hospital, including a frontal ventriculoperitoneal shunt for control of intracranial hypertension, was successful but the child remained bedridden with a severe behavioral disorder and a dense left hemiparesis. He was transferred to our institution for further rehabilitative care two months after the injury.

Plain skull radiographs performed after transfer showed the indwelling ventriculoperitoneal shunt with a bullet fragment in the right occipital region. A follow-up CT scan was unsuccessful due to artifact from the bullet fragment. An MR scan demonstrated a false aneurysm involving the high cervical carotid artery (fig. 1). Detailed physical examination of the head, neck and mouth failed to reveal any thrills, bruits, pulse discrepancies or enlarging masses.

Cerebral arteriography was performed outlining the aneurysm at the level of the first cervical vertebrae (fig. 2). Compression of the right internal carotid artery demonstrated good cross-filling by both the vertebral and left carotid arterial systems. The patient underwent a successful balloon trapping of the aneurysm with intraoperative EEG monitoring. Two weeks after the procedure the MR scan demonstrated complete thrombosis of the aneurysm (fig. 3).

Six months after injury the patient has made a good recovery. He is able to walk with standby assistance and shows significant improvement in behavior and cognitive function.

Comment

The possibility of an arterial injury should be suspected in any case involving a penetrating wound to the head or neck.1-4 6 In this patient, however, the length of time following injury associated with the absence of symptoms or signs suggesting arterial damage did not lead to a high index of suspicion. The MR scan, performed as a follow-up examination for imaging the intracranial contents, fortuitously outlined the false aneurysm.

Although the usefulness of the CT scan in imaging acute head injuries has been documented, increasing clinical evidence has shown that the MR scan may be an effective follow-up procedure.7 8 In addition, recent studies have demonstrated the sensitivity of the scan for imaging intracranial vascular abnormalities without contrast media, as well as qualitative flow imaging in blood vessels as small as 3 mm.9 10 11

As expected, mortality is significantly reduced when a false aneurysm is diagnosed and treated prior to clinical presentation.2 4 Since enhanced CT scans may miss delayed aneurysm formation and selective angiography, because of its low yield, may not be indicated in the asymptomatic patient, the MR scan may offer a valuable alternative examination.6 12 Its ability to noninvasively outline vascular flow abnormalities with multiple imaging planes is demonstrated in this patient.

From the Department of Neurosciences,* University of Illinois College of Medicine at Peoria; Department of Radiology,† Saint Francis Medical Center, Peoria, Illinois; Department of Radiology,‡ Methodist Medical Center of Illinois, Peoria, Illinois; and the Institute of Physical Medicine and Rehabilitation,§ Peoria, Illinois.

Address correspondence to: Dr. William C. Hanigan, Department of Neurosciences, UICOM-P, 530 N.E. Glen Oak Avenue, Peoria, Illinois 61637 USA.

Received March 4, 1986; accepted April 1, 1986.
**FIGURE 1.** Coronal multi slice, multi echo MT scan (Siemens Magnetom*, Camden, New Jersey) with a 1 cm section at the level of the carotid bifurcation. A repetition time of 1.9 seconds was used with a 35 millisecond echo. The false aneurysm is seen (arrowheads) with a high signal intensity indicating partial thrombosis in the vessel wall (asterisk). The internal carotid artery fills the false aneurysm on the right (white arrow). The basilar artery, bilateral proximal posterior cerebral arteries, and superior cerebellar arteries are seen in this section (dark arrows).

**FIGURE 2.** Subtracted PA cerebral arteriogram demonstrates the false aneurysm arising from the right internal carotid artery at the level of the first cervical vertebrae (arrow). The bullet fragment and ventriculoperitoneal shunt are seen in this view (double arrows).

**FIGURE 3.** The postoperative coronal MR scan using similar parameters and at the same level as figure 1, shows a high signal intensity indicating total thrombosis of the false aneurysm (arrowheads).

**References**

8. Hanigan WC, Wright SM, Wright RM: Clinical utility of MR
PAINFUL TONIC SPASMS are a distinct, descriptive clinical entity. We believe this is the first case of known association with a contralateral putaminal infarct. These movements consist of a sudden, vigorous muscle spasm, preceded or accompanied by pain in the same limb(s). Usually unilateral, the arm is affected oftener than the leg, although both may simultaneously be involved. Facial grimacing can occur directly from mechanical brief, painful, flexor contractures of the upper, and occasionally the lower limb. These were not focal seizures but were controlled with carbamazepine, which has been used for the “painful tonic spasms” well-associated with multiple sclerosis. The putaminal infarct we describe is probably related to a lupus anticoagulant and systemic lupus erythematosus.

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Stroke Vol 17, No 6, 1986

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Stroke. 1986;17:1317-1319
doi: 10.1161/01.STR.17.6.1317

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