Case Reports

MR Imaging of a False Carotid Aneurysm

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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.14-6 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.
**Figure 1.** Coronal multislice, multiecho 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 facial spasm, or be reactionary to severe limb pain. Spasms last seconds to 1–2 minutes, and recur in stereotyped fashion daily, or even several times per hour. Temporary remissions may occur. Attacks can be triggered by hyperventilation, anxiety, physical activity or sensory stimuli, but usually are spontaneous. A classic “tetanic” posture can be assumed during a spasm, with arm adduction at the shoulder; elbow, wrist, and metacarpophalangeal flexion; and, interpahlanegleal extension. Variant postures with extension, fisting or clawing also exist. Flexion or extension occurs in the lower limb, usually with inversion of the foot.¹⁻⁴

Case Report
This 33-year-old woman was healthy until ten years ago when a prolonged bleeding time was discovered during evaluation for tonsillectomy. Neither patient nor family had a clinical bleeding disorder. The patient had recurrent bouts of pyelonephritis and keratoconjunctivitis. Progressive thrombocytopenia, resistant to steroid therapy, improved after splenectomy seven years ago.

Soon thereafter, retrobulbar neuritis of the right eye occurred, followed by five recurrences of retrobulbar neuritis, in either eye, over the ensuing seven years. Typically, her vision would painlessly diminish to “finger counting” at five feet, with quadrantic or altitudinal visual deficits, central scotomas, and afferent pupillary defect. The optic disc would pale without papilledema or vascular abnormalities. Her vision repeatedly responded to steroids, so she was kept on a chronic daily dose of 15 mg. prednisone.

During the second episode of retrobulbar neuritis, further evaluation included a normal EEG, CT Scan, and temporal artery biopsy. Lumbar puncture revealed 1 RBC, 7 WBC (all lymphocytes), glucose = 68 mg/dl, protein = 48 mg/dl (normal electrophoresis, 9% gamma globulin), with cultures and VDRL negative.

The patient was felt to have systemic lupus erythematosus with lupus anticoagulant, leading to prolonged partial thromboplastin time (patient PTT = 31.6–48.0 sec., control = 29.0 sec.). Elevated ANA titers ranged to 1:640 and hypocomplementemia was present. Venous and arterial thromboses later occurred in the left leg and a small intestinal obstruction was surgically relieved. There was never any arthralgia, myalgia, rash, alopecia, or Raynaud’s phenomenon.

Four months ago, the patient began to have acute episodes of painful flexor stiffening of her right arm and hand. Flexion occurred at the elbow, wrist, metacarpophalangeal, and interphalangeal joints. Occasionally the right leg was involved also, but the face was spared. These spells lasted 30–60 seconds, occurring 12–15 times daily, usually spontaneously. At times, they happened when she stretched her arm and neck, as when bathing in the shower. Right hand numbness and clumsiness remained between episodes. There was no associated clonic movement, march, or impairment of consciousness.

On examination, there was a left monocular temporal deficit and mild bilateral optic disc pallor. Acuity
MR imaging of a false carotid aneurysm.
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Stroke. 1986;17:1317-1319
doi: 10.1161/01.STR.17.6.1317

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