False Aneurysms of the Middle Meningeal Artery

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In contrast to the relative frequency of aneurysms of the cerebral artery, meningeal vessels rarely are so involved. Developmental aneurysmal malformations of meningeal vessels have been reported by several authors. Lacerations of meningeal arteries usually unleash violent, lethal hemorrhage, so that development of an aneurysmal sac is unlikely.

This paper concerns the development, subsequent to head injury, of middle meningeal aneurysms. These curious lesions are associated with a typical history, present a comparable clinical course and have an easily recognizable angiographic appearance. Untreated, they usually give rise to fatal hemorrhage. If diagnosed promptly, operative results are uniformly excellent.

Report of Case

G.N., a 23-year-old factory worker, was admitted to Metropolitan Hospital, New York on June 1, 1962 complaining of excruciating headache. Six days previously he fell down a short flight of stairs, striking his head against a step, and was unconscious for approximately 1 hour. Upon awakening, he complained of severe bifrontal headache, radiating posteriorly into the vertex.

Examination revealed a conscious, coherent male threshing restlessly about in bed. Vital signs were normal (blood pressure 120/60, pulse rate 64, and respiratory rate 14). The patient became ambulatory, but was distressed by headache and pain in the suboccipital regions. There was slight elevation of the margins of each optic disc. Roentgenograms of the skull showed a hair-line fracture extending through the left temporal squama (Fig. 1).

Course. During subsequent days, drowsiness of mild degree alternated with periods of motor agitation. Mild bradycardia was present. The patient occasionally was slightly confused; and 5 days after entry, during visual confrontation tests, a homonymous field cut was picked up. The following day, right hyperreflexia and left retinal hemorrhage were noted. Bilateral serial cerebral angiography was performed.

Cerebral Angiography. Left carotid percutaneous injection was performed first. In the lateral view, early in the sequence, slight staining of a marble-size sac could be seen immediately posterior and just below the bifurcation of the left internal carotid artery. In later films a slender feeding vessel entered the posterior part of the now well-filled sac and extended proximally toward the external carotid artery (Fig. 2). In the anteroposterior view, complete filling of the sac occurred late in the arterial phase. The aneurysm was visible below and lateral to the middle cerebral complex, which was markedly elevated. The prominent feeding artery took origin from the first division of the external carotid artery (Fig. 3).

Right brachial angiography failed to reveal pathological findings.

Operation. On June 6, 1962, a left, horseshoe-shaped temporoparietal scalp flap was reflected with its base centered over the ear. A linear fracture could be seen extending tangentially from the parietal to the low temporal region. A bony flap was cracked back, exposing dura mater covered with thin pinkish-yellow granulation tissue. On its lower aspect was a marble-sized, dome-like nonpulsatile mass attached by a broad base to the underlying dura mater. During attempts to tease away this firmly attached tissue, the dome ruptured and vigorous arterial bleeding

Fig. 1. Lateral film of skull of G.N. obtained shortly after hospital entry, showing the tangential linear temporal fracture.
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Fig. 2 (left). Lateral view of left carotid angiogram, 2 sec. after beginning of injection. At the posterior margin of the smooth-contoured sac the feeding meningeal artery is clearly visible. In later films this vessel can be followed proximally to the external carotid artery.

Fig. 3 (right). Anteroposterior projection showing low, lateral position of the aneurysm and effect of the extradural mass upon the middle cerebral candelabra. Note absence of anterior cerebral shift.

resulted. It was controlled with some difficulty by electrocoagulation. A well-organized 50 cc. clot was removed from the left temporal fossa, just inferior to the aneurysm.

In order to rule out the possibility of subdural bleeding of consequence, a dural flap was reflected and the middle cerebral candelabra was dissected into the sylvian sulcus. Except for flattening of the frontotemporal gyri, there were no signs of injury.

Microscopic Examination. Tissue removed from the dural “dome” revealed organized strands of young fibrous tissue in the form of a ragged sac, with no vestige of arterial wall or of capsular formation.

Postoperative Course. Coma of moderate depth persisted for 3 days, at which time a series of generalized seizures occurred, and in their wake he manifested right-sided paresis and aphasia, both of which cleared by the 8th day. The patient was ambulatory 2 days later. Because of continuing complaints of headache a pneumoencephalogram was performed 1 month after hospital admission. This study was normal in all respects. Further recovery was uneventful.

Review of Literature

A search of the very extensive world literature concerned with head injury has revealed 7 cases, of striking similarity, published in the last 10 years. This small number indicates chiefly that correct diagnosis of middle meningeal aneurysm is unlikely unless serial cerebral angiography is employed. All cases reported display certain clinical features in common. Angiographic appearance of the lesion is unique, and not easily susceptible to confusion. A brief summary of the clinical course and findings in each reported case is presented in Table 1.

Discussion

A history, or suspicion, of head injury; delayed neurological recovery, or fairly abrupt deterioration in clinical status; linear fracture line in the temporal region; and a classic