Traumatic Cerebral Aneurysm Due to Speargun Injury*

Case Report

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Except in unusual cases, treatment of penetrating wounds of the brain consists of craniotomy and debridement, with primary closure of the dura and scalp. With expeditious treatment, complications are surprisingly few; infections such as meningitis and brain abscess are the most frequent problems. Traumatic cerebral aneurysms, however, do not even appear among the complications listed in a series of 879 casualties sustaining penetrating wounds of the brain during the Korean conflict, and very few cases have been reported from civilian practice. The following report describes the successful treatment of a traumatic cerebral aneurysm complicating a most unusual penetrating wound of the brain.

Case Report

A 6-year-old Filipino girl was accidentally shot in the right frontal region of the head with a rubber-band-powered speargun (Fig. 1), used for fishing in Bulacan Province, Luzon, Republic of the Philippines. The steel arrow penetrated the right frontal lobe and could not be extracted because the barb on its tip caught on the inner table of the calvarium, and the child was therefore brought to the hospital.

Examination. The child was obtunded but responded to those who spoke her dialect. Except for a slight left facial weakness, the rest of the neurologic examination was normal. The child was somewhat malnourished, weighing only 24 lbs. The steel arrow had been cut off leaving a 2-in. length of the shaft extending from the right frontal region. Radiographs of the skull (Fig. 2) indicated that the arrow had penetrated at least 2 inches into the right frontal lobe.

Received for publication November 14, 1968.

*The views expressed herein are those of the author and do not necessarily reflect the views of the U.S. Air Force or the Department of Defense.
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First Operation. A small craniectomy was done to remove the arrow. The missile track, which extended 2 inches into the frontal lobe, was debrided and an intracerebral hematoma was evacuated. Hemostasis was secured without difficulty, and the dural defect was repaired with a patch of cadaver dura. Primary skin closure was done after excision of the wound of entrance.

Postoperative Course. A transient postoperative fever subsided prior to the patient's discharge from the hospital 5 days later. Dilantin, 50 mg twice daily, was prescribed prophylactically. Slight facial asymmetry persisted as the only neurologic abnormality. Three weeks later, however, the patient was re-admitted because of three grand mal seizures.

Second Examination. The patient was dull, afebrile, and had marked meningismus. A left central facial weakness was present as were bilateral Babinski signs. The cranial wound was flat, pulsatile, and showed no signs of local infection. Radiographs of the skull showed the craniectomy defect but no osteomyelitis or retained bone fragments. The cerebrospinal fluid was under pressure of 150 mm of water and the fluid contained blood. Cultures of the blood and spinal fluid grew no organisms. A right carotid arteriogram (Fig. 3) demonstrated an aneurysm 7 mm in diameter arising from an ascending frontal branch of the middle cerebral artery.

Second Operation. The aneurysm was exposed through a right frontal craniotomy and excised. The lesion was 23 mm in diameter; when it was sectioned, a smaller aneurysm was found within. Pathologic examination proved the smaller aneurysm to contain arterial wall, whereas the larger lesion was characteristic of a false aneurysm. Another intracerebral hematoma, adjacent to the false aneurysm, was evacuated.

Second Postoperative Course. The postoperative course was uncomplicated, and the child was again discharged; a slight facial asymmetry was her only deficit. One month
later she was entirely normal, and had had no further seizures. Continued treatment with Dilantin was recommended.

Discussion

Many unusual weapons such as tomahawks, high-heeled shoes, and homemade cannons, have caused penetrating wounds of the brain. It is not surprising that a homemade speargun should be added to the list.

Carotid-cavernous fistulas, carotid artery thromboses, and carotid aneurysms are well-documented complications of cranial injuries, but traumatic aneurysms of distal cerebral vessels are rare. Damage to major blood vessels, implied by the common occurrence of intracerebral hematomas, must be a frequent concomitant to penetrating cerebral injuries. Thus, it is surprising that more traumatic aneurysms are not seen. An occasional traumatic aneurysm has been reported as a complication of craniotomy for removal of tumor, subdural taps, and depressed skull fracture.

In the present case, the initial clinical impression was meningoencephalitis, possibly brain abscess. However, the sudden onset of symptoms, the absence of fever when the patient had signs of meningeal irritation, and the presence of bloody cerebrospinal fluid, strongly suggested rupture of a traumatic cerebral aneurysm. Carotid angiography established the diagnosis, and successful excision of the offending lesion was accomplished.

In a review of the literature, Burton, et al., collected 11 cases of traumatic cerebral aneurysms. Six of the 11 patients died, four despite surgical intervention. Thus, this unusual complication is fraught with a high mortality, and awareness of the entity should

Fig. 1. The primitive speargun shown is a hand-made weapon constructed from mahogany and rubber bands. The arrow is fashioned from scrap iron and has a very sharp point and cutting edge on the barb.

Fig. 2. An oblique view of the radiograph of the patient's skull with the arrow in place. The sharp barb at the arrow tip is well shown.