Rupture of an Intracranial Aneurysm within the Subdural Space—in Association with Trauma

A Case Report

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The formation of a subdural hematoma of significant size as a result of the rupture of a cerebral aneurysm is an uncommon occurrence and clinical reports on the subject are sparse. This finding has been reported most frequently in the autopsy studies of bleeding aneurysms. For this reason we are presenting a clinical report with successful recovery following operation in a patient whose course was complicated further by the history of a recent head injury.

The reported incidence of subdural hematoma resulting from ruptured intracerebral aneurysms varies between 1 to 8 per cent. Walton on autopsy findings reported 1.9 per cent in a series of 312 cases. Among clinical reports, Voris had found 1 per cent in 100 cases; Laudig et al. reported 2.9 per cent in 143 cases; Golden et al. observed 2.1 per cent in 394 cases; McKissock and Walsh found 4.9 per cent in 249 cases; Dandy reported 1.6 per cent in 64 cases; and Strang et al. observed 0.5 per cent in 420 cases.

Case Report

O.J., a 61-year-old white, right-handed male, was admitted on July 12, 1962 to the New York University Neurosurgical Service at Bellevue Hospital in New York City (Serial #4983-62) as a transfer from another hospital with the following history. The patient was a known alcoholic. While intoxicated on July 8, 1962 he was supposedly injured. Details as to the exact time and place of the incident were uncertain but, immediately after it, he felt pain in both temples and came to find himself on the next morning (July 4, 1962) in a hospital. He was noted to be stuporous with clotted blood in both ears and with a contusion and abrasion of the left forehead. As his level of consciousness improved, he started to complain of bifrontal headache which persisted and became progressively more severe. Pertinent neurological findings were reported as mild confusion and a mild left hemiparesis, including the face. Roentgenograms of the skull revealed a recent linear fracture of the left temporal bone.

Examination on admission to Bellevue Hospital on July 12, 1962 revealed an elderly man. There were signs of healing superficial trauma of the forehead. Blood pressure was 140/80; pulse rate 88; temperature and respiration were normal. The patient was confused, irritable and partially disoriented as regards time, place and persons. Memory and calculation were poor; speech was intact. There was no papilledema. Visual fields and acuity were intact as tested by confrontation. The pupils were round, reacting and equal; extracocular movements were normal. The patient was unable to walk without assistance because of a mild left hemiparesis more pronounced in the lower extremity with an estimated functional loss of 30–40 per cent. Deep tendon reflexes were exaggerated on the left side and bilateral Babinski's sign was elicited. All sensory modalities were intact. There were no signs of meningeal irritation. Auscultation of the head for bruit was negative.

Course. Results of complete blood studies including hemogram, sugar, electrolytes, and serology were within normal limits; urine was normal; findings of liver-function test and bleeding studies were normal. Roentgenogram of the chest was negative, but films of the skull showed a recent linear fracture of the left temporal area. The pineal body was not visualized. Lumbar puncture yielded xanthochromic cerebrospinal fluid with initial pressure of 300 mm. of water. The chemistries of the cerebrospinal fluid were as follows: protein 59 mg. per cent, sugar 64 mg. per cent, Cl. 119 mEq./l, red blood cells 86/c.mm., lymphocytes 2/c.mm., serology normal.

On July 12, 1962 right carotid arteriography (Figs. 1 and 2) demonstrated an avascular area diagnostic of subdural hematoma and a pea-sized aneurysm adjacent to the inner table of the skull. A feeding vessel was seen crossing the avascular space. Radiologically, this was interpreted as an aneurysm on the periphery of one of the terminal branches (the Rolandic branch) of the right middle cerebral artery.

Operation. On July 13, 1962, right frontotemporal craniotomy revealed an extensive subdural hematoma covering the whole frontal and temporal surface of the brain. Just visible on the surface of the solid hematoma, a greyish-white spot was felt to be firmer than the surface of the surrounding hematoma and was in the position of the angiographic demonstration of the aneurysm. The hematoma was split away from the aneurysm and removed carefully until the rounded, firm, pea-sized structure was reached. A silk ligature was applied to its neck and the aneurysm was excised. Following this, the subdural hematoma was removed totally with its well formed membranes. The hematoma was solid, about 5.5 cm. in its thickest part. Two silver clips were applied, one over the cortex just at the site of the ligated feeding artery, and the other at a corresponding spot in the dura mater. The cortex was xanthochromic in color only at the site of the aneurysm.

Pathological Report (Figs. 3 and 4). The specimen consisted of a round mass adherent to a flat membrane.

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Fig. 1 (left). Lateral projection. Right carotid arteriogram demonstrating aneurysm on one of the terminal branches (arrow) of the right middle cerebral artery.

Fig. 2 (right). Anteroposterior projection. Right carotid arteriogram demonstrating the subdural hematoma within which the aneurysm (arrow) could be clearly seen.

Fig. 3. Clotted blood is evident in the upper left field, and a branch of an artery is visible in the lower right. Between these is a fibrinous and necrotic membrane, the origin of which is indicated by the segment to the left which has the histologic character of an arterial wall. Hematoxylin and eosin, X70.