RUPTURED CONGENITAL ANEURYSM OF ANTERIOR CEREBRAL ARTERY

REPORT OF A CASE WITH SUCCESSFUL SURGICAL REMOVAL

BY

NORMAN WHALLEY

Newcastle-upon-Tyne

This paper describes a case of intracerebral hæmorrhage due to rupture of a congenital aneurysm situated on the right anterior cerebral artery. After a series of acute cerebral vascular incidents the clinical picture was that produced by a rapidly expanding frontal lesion. After full investigation, including air encephalography, the diagnosis of ruptured anterior cerebral aneurysm was made and the aneurysm was successfully extirpated at operation. Dandy (1944) met twenty-five examples of aneurysms involving the anterior cerebral artery and anterior communicating artery, six of which he exposed at operation. In one of these cases he was able to excise the aneurysm, which was arising from the right anterior cerebral artery, after clipping the internal carotid artery.

Case History

A railway worker, aged 47 years, had been suffering from severe frontal headaches for fourteen days when on April 2, 1947, he collapsed in the bathroom at his home. Although not unconscious, he was dazed and cyanosed, and complained of intense headache and inability to move his left arm and leg. A few minutes later he experienced another severe exacerbation of headache, following which he lapsed into unconsciousness for half an hour.

On admission to hospital he was conscious, complained of stiffness in his neck, and had a left hemiparesis. The blood pressure was 150/90 mm. Hg. The next day (April 3) the hemiparesis was beginning to recover and no other abnormal signs were detected. During the next sixteen days he experienced two transient attacks of severe headache and dizziness, the second attack culminating in unconsciousness for three hours. The blood pressure at this time was 130/90 mm. Hg. In spite of these two attacks the hemiparesis continued to recover. There was no history of trauma to the head.

On May 5, 1947, he was transferred to the Neurosurgical Unit of the Newcastle-upon-Tyne General Hospital, because of persistent frontal headache. By this time the hemiparesis had recovered completely, and the only abnormal findings on clinical examination were

bilateral low grade papillœdema and mental slowness in response to questioning. Apart from this, behaviour was normal and he was polite and cheerful. The blood pressure was within normal limits. It was thought that this man had suffered a series of small subarachnoid hæmorrhages possibly due to rupture of a congenital aneurysm, associated with some extravasation of blood into the brain tissue itself. Lumbar puncture on May 13, 1947, suggested previous subarachnoid hæmorrhage: the resting pressure in the left lateral position was 160 mm. of cerebrospinal fluid. The fluid was clear and pale yellow in colour: there were 20 lymphocytes per c.mm. and 60 mg. of protein per 100 c.cm. Culture of the fluid proved to be sterile. (Lumbar puncture had not been performed before admission to the Neurosurgical Unit.) The Wassermann reaction was negative in blood and cerebrospinal fluid.

By May 27, 1947, the headaches had become more severe and the papillœdema had increased; on this date air encephalography was performed by the lumbar route. The radiographs showed slight displacement of the ventricular system to the left, and the presence of two intracerebral cysts filled with air, which were clearly in communication with the anterior horn of the right lateral ventricle (Fig. 1). These cysts were situated in the right frontal lobe of the brain, and had resulted in slight depression of the anterior horn of the right lateral ventricle. The cysts were in communication with each other by means of a narrow isthmus (Fig. 2).

On June 1, 1947, the patient experienced another severe exacerbation of headache. Consciousness was at first unimpaired, but the next day (June 2) headache was severe and the patient developed incontinence of urine and fœces, was drowsy, and became brusque, offhand, and impolite in his dealings with the nursing staff—a complete change from his normal behaviour. The left plantar response by this time had become extensor in type.

A decision was made to explore the right frontal lobe, the preoperative diagnosis being intracerebral hæmangioma following intracerebral hæmorrhage. Although it was impossible to state with certainty the source of the hæmorrhage, it was considered most likely to be due to rupture of a congenital aneurysm situated on the right anterior cerebral artery.

FIG. 1.—Antero-posterior radiograph after air encephalography, to show slight displacement of ventricular system to the left, and the presence of two intracerebral cysts filled with air.

FIG. 2.—Air encephalogram to show the two intracerebral cysts situated in the right frontal lobe, resulting in slight depression of the anterior horn of the right lateral ventricle. The cysts are in communication with each other by the narrow isthmus.

Operation.—On June 5, 1947, under general anaesthesia, a right frontal osteoplastic flap was turned, so as to give adequate access to the right frontal lobe of the brain. The dura mater was tense, and when the right frontal lobe was tapped, the anterior cyst was entered and clear, pale yellow cerebrospinal fluid was released under great pressure. The release of this fluid resulted in a marked reduction of brain tension and the dura mater was then opened. The frontal lobe was incised in order to inspect the interior of the more anteriorly placed cyst. The cyst wall was seen to be lined with grey shaggy material, clearly not tumorous, and since visibility was decidedly poor in the deeper reaches of the cyst, and there was a strong possibility of an aneurysm being present in its medial wall, it was considered advisable to resect the anterior half of the frontal lobe in order to get an adequate exposure. This procedure gave excellent access to the infero-medial aspect of the cyst, and by gentle retraction of the adjacent brain a mass of dark brown altered blood clot was brought into view. This mass of blood clot was projecting upwards and laterally into the cyst from its infero-medial wall. It was roughly hemispherical in shape and approximately one inch in diameter. It was now clear that this clot was capping an aneurysm of the right anterior cerebral artery. The right anterior cerebral artery was exposed proximally and distally to the clot, and silver clips were applied to the artery proximally and distally to the aneurysm; the aneurysm was then excised. Before the right anterior cerebral artery was clipped, the left anterior cerebral artery was identified and protected with lintine squares. The more posteriorly placed cyst was left undisturbed, since free communication existed between it and the anterior cyst and adequate drainage was therefore possible. After absolute haemostasis had been ensured the dura mater was closed; the bone flap replaced, and the scalp reformed in layers without drainage.

The post-operative course was uneventful, the patient being well when he was discharged to his home on June 20, 1947. He has been seen regularly since as an out-patient. He has remained well, and in full employment in his original occupation.

Pathological Report.—The specimen was kept intact and forwarded to the University Department of Pathology, Newcastle-upon-Tyne, and Dr. Greig Thomson reported as follows:

"The specimen is an ovoid structure $2.4 \times 1.2 \times 0.9$ cm. (Fig. 3). The exterior is largely smooth and has a greyish colour, with at one end some brownish staining, presumably haemosiderin. Section shows an outer wall of red and recent clot 0.2 to 0.4 cm. thick, surrounding a luminated structure 0.5 cm. in maximum diameter containing some blood clot. This is obviously an aneurysm springing from a vessel at the extreme edge of the specimen. The vessel has an external diameter of 0.25 cm., and much of its wall shows yellow atheromatous thickening.

Histological examination indicates clearly that the specimen is an aneurysm. The wall is formed of connective tissue, generally thin, and often old and hyaline, and at one point this appears to be replaced by granula-

tion tissue containing haemosiderin granules, suggestive of previous leakage. A small amount of muscle is seen in the wall adjacent to the vessel from which the aneurysm springs. About one half of the lumen of the aneurysm

FIG. 3.—Aneurysm removed at operation. The specimen has been sectioned to show the lumen of the aneurysm with clot (left), and its external appearance (right).

is filled with blood clot, most of which is recent, open texture, and unorganized. Inflammatory changes are absent. In spite of atheroma in the artery bearing the aneurysm, the appearance is that of a congenital type of aneurysm."

Summary

A case is reported of repeated haemorrhage into the frontal lobe and lateral ventricle from an aneurysm of the right anterior cerebral artery. At operation cysts were found in the frontal lobe, in the base of which an aneurysm and clot were found and successfully removed. No disability resulted from this procedure.

This patient was admitted to the Neurosurgical Unit of the Newcastle-upon-Tyne General Hospital under the care of Mr. G. F. Rowbotham. I would like to express my gratitude to him for permission to undertake the investigation, the operative treatment, and the publication of the case record.

REFERENCE

- Dandy, W. E. (1944). "Intracranial Arterial Aneurysms." Ithaca, New York. Comstock Publishing Company Inc. p. 125.