RUPTURE OF AN INTRACRANIAL ANEURYSM
DURING CAROTID ARTERIOGRAPHY

A CASE REPORT*

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Rupture of an intracranial aneurysm coincident with the injection of contrast medium into the carotid artery is rare. The following report concerns such a complication in which the extravasation of radiopaque medium about the aneurysm is shown on the arteriogram.

CASE REPORT

A 61-year-old negro male was admitted to the hospital on Jan. 28, 1958. One week previously, he noted the sudden onset of a sensation of pressure in the right occipital region which was followed by vomiting. He was confused for the next 36 hours. When his confusion cleared, he complained of a stiff neck, generalized weakness, pain in both legs, and was unable to open the right eye. These symptoms persisted until admission to the hospital.

He had been admitted to another hospital in 1944 with the complaints of occipital headache, nausea, and vomiting. At that time examination revealed a blood pressure of 150/74, stiff neck, and increased tension of the right eye to palpation. Three lumbar punctures were done and each yielded grossly bloody cerebrospinal fluid. There was no mention of the presence of xanthochromia. He was treated with analgesics and sedation and discharged after 18 days of hospitalization.

Examination on Jan. 28, 1958 showed an oriented but lethargic negro male. Blood pressure was 130/80, pulse rate 78, and respiratory rate 20. Rectal temperature was 98.2°F. There was an incomplete paralysis of the right third cranial nerve. The pupillary reaction to light was preserved whereas the extraocular component was lost. There was marked nuchal rigidity, with right facial paresis of central type, and weakness of the left arm.

Routine blood and urine studies revealed no abnormalities. Blood and cerebrospinal fluid serologic tests for syphilis were negative. Roentgenograms of the skull were normal. Lumbar puncture showed an opening pressure of 370 mm. of cerebrospinal fluid. It was grossly bloody and xanthochromic with a protein content of 50 mg. per cent.

Bilateral percutaneous carotid arteriography, using local anesthesia, was attempted on the day following admission. The right common carotid artery was punctured without difficulty. During palpation of the left common carotid artery prior to puncture, the patient lost consciousness. A single injection of 8 cc. of 50 per cent Hypaque was made into the right common carotid artery. There was no visible filling of the right internal carotid system with contrast medium. The blood pressure, 5 minutes later, was 70/50 mm. of Hg. He was treated with 120 mg. of Levophed given intravenously in 300 cc. of 5 per cent dextrose for the next 1½ hours. His level of consciousness quickly improved and, 1 hour after manipulation of the left common carotid artery, his mental status was comparable to that prior to the attempted arteriogram and his blood pressure was 130 mm. Hg.

His general physical condition continued to improve, and, 2 days later, a second attempt at carotid arteriography using local anesthesia was made. His level of consciousness

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was unaltered when the needle was inserted into the right common carotid artery. However, he lost consciousness when the left common carotid artery was punctured. The blood pressure and pulse did not change. Bilateral carotid arteriograms were obtained using 5 cc. of 50 per cent Hypaque for each injection. The first injection on the right showed an aneurysm on the internal carotid artery (Fig. 1). A second injection on the right, made 10 minutes later, showed an extravasation of contrast medium about this aneurysm (Fig. 2). The left arteriogram, made between the two right-sided injections, revealed an aneurysm on the internal carotid artery (Fig. 3).

It was decided to attempt an intracranial clipping of the ruptured aneurysm under hypothermia. Three hours after the rupture of the aneurysm, a right frontal craniotomy was performed...
performed. The cerebral cortex was pale. There was a moderate amount of fresh blood in the subarachnoid space. The aneurysm was visualized and there was no bleeding. Rupture occurred when the neck of the aneurysm was exposed. Olivecrona clips were placed on the right carotid artery above and below the aneurysm. The rectal temperature at this time was 32.5°C.

Postoperatively he moved only the right extremities following strong stimulation. He died 48 hours later.

Autopsy. The significant findings were limited to the brain. A medial-defect aneurysm, 8 mm. in diameter, was present on each internal carotid artery just proximal to the origin of the posterior communicating artery. The Olivecrona clips were in place. There was a medial-defect aneurysm, measuring 2 mm. in diameter, on each middle cerebral artery at the first cortical bifurcation, which could not be seen on the arteriograms (Fig. 4). The aneurysm of the left internal carotid artery was adherent to the third nerve. The right hemisphere of the brain showed early ischemic infarction in the area supplied by the anterior and middle cerebral arteries.

COMMENT

Rupture of intracranial aneurysms during cerebral arteriography has been reported by Jamieson4 and Jenkinson et al.5 In each of these cases, extravasated contrast medium outside the ruptured wall of the aneurysm is demonstrated on the arteriograms. Gallagher and Yamamoto3 and Abbott et al.1 have reported single cases of rupture of an aneurysm during arteriography. However, there is no evidence that rupture occurred coincident with the injection of contrast agent in either case.

The mechanism of rupture of the aneurysm is not clear. Increased intracarotid pressure associated with the force of injection was considered as a possible cause. This is unlikely, as Bakay and Sweet2 have shown that no significant alterations in intracarotid pressure occur during the injection of contrast medium.

The sudden onset of unconsciousness on two occasions associated with compression of the left common carotid artery prior to puncture may have been on the basis of cerebral ischemia caused by either carotid occlusion or an abnormal carotid-sinus reflex.
It is interesting to speculate on the reason as to why there was no filling of the cerebral arteries with contrast medium beyond the ruptured aneurysm (Fig. 2). A mechanical factor of diminished vascular resistance through the defect of the rupture may have permitted the contrast medium to flow out of the defect in preference to flow into the distal arteries. Either compression of the arteries by a hematoma or spasm of these vessels above the aneurysm may have prevented filling with the contrast agent.

REFERENCES