Rupture of an Aneurysm of the Internal Carotid Artery During Arteriography with Filling of the Subarachnoid Space and Demonstration of a Temporal Lobe Mass

Case Report

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Several cases of rupture of an intracranial aneurysm during arteriography have been reported. The following case is an example of aneurysm rupture at the time of contrast injection with x-ray demonstration of flow from the aneurysm to form a temporal lobe mass; delayed films showed extravasation of contrast medium into the subarachnoid space over the hemisphere.

Case Report

A 55-year-old white woman who had been in excellent health all her life was found by her family sitting in bed laughing in an uncontrollable manner. Shortly thereafter she became unconscious and was described as being "stiff all over."

Examination. On admission to the emergency room the patient's blood pressure was 225/80, pulse 80, respiration 25, temperature 99.6°. She was noted to have decerebrate posturing with some semipurposeful movement of the left side. Her pupils were small, equal, and unreactive. There was a flame-shaped hemorrhage in the right fundus, poor retinal venous pulsations, and sharp disc margins. All deep tendon reflexes were hyperactive. Plantar responses were extensor bilaterally. Routine laboratory studies of blood and urine were normal. Skull and chest x-rays studies were normal. An echoencephalogram revealed a 6 mm right-to-left shift.

Arteriography. The patient was taken immediately to the x-ray department, and a right common carotid injection was carried out by hand using a Teflon catheter needle. The injection was made with moderate pressure. The lateral Polaroid film was obtained first and showed three aneurysms. (Fig. 1 upper left). Shortly thereafter the sequence of frontal and lateral films was obtained. Following the injection the patient suddenly became apneic, her pupils dilated, and she died.

The films revealed filling of the anterior and middle cerebral arteries on the right with some spontaneous filling of the contralateral internal carotid artery and the anterior and middle cerebral arteries. Three aneurysms were demonstrated, one at the origin of the anterior communicating artery and two arising from the supracavernous portion of the internal carotid artery. One of these was seen to be actively discharging contrast medium into the area of the temporal lobe (Fig. 1 right). The pericallosal artery showed displacement toward the left side, while the middle cerebral artery and the Sylvian vessels were elevated and an avascular area interposed between the hemispheres and the inner table (Fig. 1 lower left). Delayed films showed the contrast medium covering the hemispheres and retained in the temporal lobe (Fig. 1 lower right).

Discussion

A number of spontaneous subarachnoid hemorrhages during angiography have been reported. This case illustrates the jet effect of the bloodstream that resulted in the formation of an intracerebral hematoma, shift of midline structures, and filling of the subarachnoid space with blood and contrast medium. The film sequence in this particular case is such that both frontal and lateral films were carried out before the termination of the procedure and show injection in both planes. Excellent visualization of the jet of blood escaping from the aneurysm and the effect of this jet can be seen on the films. Late films reveal the subsequent movements of the contrast material in the subarachnoid space.
Fig. 1. Upper Left: Right lateral Polaroid film showing three aneurysms: one arising at the origin of the anterior communicating artery and two arising from the supracavernous portion of the internal carotid artery (arrows). Upper Right: Rupture of aneurysm. The stream of contrast medium originating from the anterior communicating artery aneurysm is clearly seen. Lower Left: Anteroposterior view showing contrast media overlying the hemisphere and in the temporal lobe. The pericallosal artery is displaced to the left and the middle cerebral artery and Sylvian vessels are elevated. Lower Right: Delayed film showing retention of contrast medium in the temporal lobe and covering the right hemisphere.

The suggestion has been made that rupture of an aneurysm during arteriography may be a result of the force of injection of contrast media. Bakay and Sweet have shown, however, that no significant alteration in carotid pressure occurs from routine angiography. In their study, 10 to 12 cc of 35% diodrast or physiological saline were rapidly injected through a No. 18 needle into the common carotid artery. Pressure recordings were made in the cervical internal carotid artery cephalic to the point of injection. Both systolic and diastolic pressure measurements were completely unchanged.
during and after fluid injection, and in no case was there even a minimal increase of pressure. Prior to these studies Bakay and Sweet had been reluctant to perform arteriography shortly after an internal subarachnoid hemorrhage for fear of causing a second hemorrhage. They concluded that this was an unnecessary precaution.

In view of the great number of arteriograms done in this country after subarachnoid hemorrhage and the small number of cases of coincidental aneurysmal rupture reported, it would appear that Bakay and Sweet are correct.

Summary

We have reported a fatal case of intracranial aneurysmal rupture during common carotid angiography using a Teflon catheter needle. The angiographic films just prior to death clearly demonstrated the incident of rupture and subsequent distribution of the contrast medium.

References