Intracranial Arterial Spasm Associated with Craniocerebral Trauma

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Intracranial arterial spasm frequently accompanies spontaneous subarachnoid hemorrhage, and is usually seen in that setting. Similar arterial spasm has also been reported in association with craniocerebral trauma, but this relationship has not been widely recognized in the United States.

The first three cases identified at our hospital were discovered by chance among control patients in a retrospective survey of intracranial spasm and spontaneous subarachnoid hemorrhage. Since then we have encountered five additional cases. Four of the five had more than one cerebral arteriogram, and these form the basis of the present report.

Case Reports

Case 1. A 60-year-old Negro man, a chronic alcoholic, was found unconscious on October 26, 1968. No reliable history of the present illness could be obtained. He was referred to the Durham Veterans Administration Hospital on the following day.

Examination. The patient's blood pressure was 130/80. He was responsive only to pain, showed decorticate posturing bilaterally, and had a Babinski reflex on the right. The right pupil was approximately 5 mm in diameter and the left was 1 mm. Both pupils were unresponsive to light. A right carotid arteriogram on October 27 showed evidence of an extracerebral mass; no intracranial arterial spasm could be seen on the right side (Fig. 1 upper left).

Operation. A right parietal craniotomy with subtemporal craniectomy was performed immediately, and a tenacious subacute subdural hematoma was evacuated. Tantalum dust was placed on the underlying arachnoidal surface as a postoperative radiographic marker.

Postoperative course. The patient did not improve, and a left carotid arteriogram was carried out on October 29 (Fig. 1 upper right) at which time the patient's systemic blood pressure ranged between 125/70 and 165/100. Intracranial arterial spasm was present in the intradural portion of the left internal carotid artery, as well as the left anterior and middle cerebral arteries. A second right carotid arteriogram on November 7 (Fig. 1 lower left) showed reaccumulation of subdural fluid over the right cerebral hemisphere. The left anterior and middle cerebral arteries were also demonstrated in another view by manual compression of the left common carotid artery during injection of the contrast medium. Spasm in the left vessels was less noticeable than previously, but mild spasm had developed in the intradural portion of the right internal carotid artery and in the right anterior and middle cerebral arteries. The patient's blood pressure on November 7 varied between 130/80 and 160/90. A lumbar puncture showed clear, slightly yellow, cerebrospinal fluid at a pressure of 350 mm. The recurrent right subdural fluid was evacuated surgically.

From October 28 through November 2 the patient was given methylprednisolone sodium succinate,* 40 mg intramuscularly every 6 hours, and on October 31 he received a single intramuscular injection of 40 mg of methylprednisolone acetate.† Glycopyrrolate‡ was also given intramuscularly on a dosage schedule of 0.1 mg twice a day from October 28 through November 17.

Four electroencephalograms were per-

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† Depo-Medrol, The Upjohn Company, Kalamazoo, Michigan.
‡ Robinul, A. H. Robins Company, Richmond, Virginia.
formed. On November 1, there was slowing to theta frequencies over the right cerebral hemisphere, particularly in the temporal area. Subsequent EEG's on November 20, 26, and May 7 showed generalized bilateral slowing, most noticeable on the right, and especially in the right temporal region.

An electrocardiogram on October 28 showed prolongation of the QT interval and abnormal T wave patterns. Although similar EKG findings were present on November 5, 8, 13, 22, and February 12, they were progressively less marked.

The patient's course was complicated by hyponatremia and pneumonia. His neurological status never improved significantly. Bilateral carotid arteriograms were again performed on May 8 (Fig. 1 lower right). These were normal, with no evidence of arterial spasm. The patient's systemic blood pressure at that time was 105/60.

The patient died on June 8, 1969. At au-

Fig. 1. Case 1. Upper Left: Right carotid arteriogram, October 27, 1968, showing a subdural hematoma, but no cerebral arterial spasm. Upper Right: Left carotid arteriogram, October 29, 1968, showing marked spasm of the intradural portion of the left internal carotid artery, and of the left anterior and middle cerebral arteries. Lower Left: Right carotid arteriogram, November 7, 1968. Right subdural fluid has reaccumulated, and mild spasm has developed in the right anterior and middle cerebral arteries and in the intradural portion of the right internal carotid artery. Lower Right: Left carotid arteriogram, May 8, 1969. Spasm is no longer present.