Case Reports and Technical Note

Incarceration of the Basilar Artery in a Fracture of the Clivus

Case Report

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We are reporting a case of occlusion of the basilar artery within a longitudinal fracture of the clivus. There have been two previous reports of traumatic incarceration and occlusion involving the vertebral-basilar system. In one, the basilar artery was occluded; in the other, the left vertebral artery was involved.

Case Report

A 23-year-old man was rendered immediately unconscious in an automobile accident. Following tracheostomy and repair of a scalp laceration at a neighboring hospital he was referred to us 2 hours after the accident.

Examination. The patient was a deeply comatose. His blood pressure was 110/70, pulse rate 76, and respirations regular at 15 per min. A well-repaired semicircular scalp laceration extended from the frontal region to the posterior parietal area on the right. There was no bleeding in the auditory canals. The pupils were constricted, nonreactive to light, and slightly unequal. The eyes were centrally fixed and without vestibulo-ocular reflexes (doll's head eye movements). Ophthalmoscopic examination was normal. Neither corneal, palatal, nor gag reflexes could be elicited. Minimal spontaneous movement was present only in the right arm. Muscle tone and deep tendon reflexes were all slightly increased. Painful stimulation of the trunk or head produced extensor spasms. Bilateral Hoffman's reflexes were present but the Babinski response was absent. Abdominal and cremasteric reflexes could not be elicited.

X-rays of the skull demonstrated only a linear right frontal fracture. Carotid angiography was normal with the posterior cerebral arteries filling via the posterior communicating arteries. Vertebral angiography was not carried out. The cerebrospinal fluid was grossly bloody, under a pressure of 280 mm of fluid.

A diagnosis of brain stem contusion was made and supportive therapy begun. The patient's neurological status deteriorated and by the 4th hospital day his pupils dilated maximally, and the vital signs began to fluctuate widely. At about this same time, his response to painful stimulation also changed; decerebrate rigidity no longer occurred with stimulation of nerves above the pons whereas stimulation of the trunk or extremities in any manner induced immediate extensor spasms. The blood pressure varied from 200/120 to 110/60 mm Hg and the pulse rate from 80 to 160. The temperature fluctuated from 93° to 107°, frequently varying 10° in an hour. Central neurogenic hyperventilation appeared with forced inspiration and expiration at a basal rate of 30. Superimposed upon this resting rate were fluctuations which correlated with changes in other vital signs; for example, during periods of hyperthermia the respiratory rate would increase to as much as 70. These findings persisted until death occurred of pneumonitis on the 35th hospital day.

Postmortem examination. There was a linear right frontotemporal skull fracture extending to the petrous bone. In the base of the skull was a longitudinal fracture of the clivus which ran from the dorsum sellae to the foramen magnum. The upper portion of the basilar artery was firmly trapped within this fracture line. It was completely occluded from just cephalad of the origin of the anterior inferior cerebellar arteries to and including the left superior cerebellar artery. The right superior cerebellar artery was patent as were both posterior cerebral arteries. Circulation of blood to the left cerebellar hemisphere was supplied solely through a large anterior inferior cerebellar artery, since the left poste-

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rior inferior cerebellar artery was anomalous and thread-like (Fig. 1).

Marked changes were apparent in the brain stem. The rostral portion of the pons from the brachium pontis to the cerebral peduncles was softened. There was no evidence of pontine hemorrhage. Dorsally the cerebellar hemispheres were normal save for a 2X3 cm area of softening of the superolateral aspect of the left hemisphere. Superficial softening and moderate brownish discoloration was present in the right frontal lobe deep to the right frontotemporal fracture. The cerebral hemispheres were otherwise normal. The total weight of the brain was 1,585 gm.

Serial coronal sections revealed softening of the pons, principally occupying the rostral basis pontis. Necrosis was more marked on the left and extended cephalad into the central portion of the left cerebral peduncle to the level of the inferior colliculi. On the right no necrosis was apparent beyond the rostral border of the pons. Extension of the infarct dorsally into the midline of the tegmentum was present, but the lateral teg-

mental area was grossly intact, as was the caudal pons and medulla oblongata (Fig. 2).

Histological examination. The pontine lesion was consistent with an ischemic infarction of 4 to 5 weeks' duration. Complete destruction of the nuclei and tracts of the

Fig. 1. Interior of base of the skull as viewed from above. The basilar artery is seen to disappear superiorly and inferiorly into the irregular longitudinal fracture line.

Fig. 2. Cross section of the pons at the level of the locus coeruleus. The extent of the infarction is seen. H. & E.