TRAUMATIC INTERNAL CAROTID ARTERY THROMBOSIS SECONDARY TO NONPENETRATING INJURIES TO THE NECK

A PROBLEM IN THE DIFFERENTIAL DIAGNOSIS OF CRANIOCEREBRAL TRAUMA

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In patients who have concomitant injuries of the head and neck the physician’s attention is directed to the cranium when neurologic symptoms are present. This is particularly true when the trauma to the neck is of a blunt nonpenetrating type, and the neurologic manifestations simulating severe craniocerebral injury are not recognized as arising from thrombosis of the internal carotid artery. We wish to report 2 such cases recently encountered which demonstrate the challenge that this type of lesion presents to the physician in diagnosis and treatment.

While only an occasional case of thrombosis of the carotid artery secondary to nonpenetrating injuries of the neck has been reported in the literature, the presence of embolism or thrombosis associated with penetrating wounds of the neck or cheek has been more frequently recognized, especially in war wounds of the last century. In addition, since cerebral angiography has been used more widely in the diagnosis of neurological abnormality, certain patients with no apparent trauma are found to have a spontaneous carotid artery thrombosis.

Verneuil (1872) was probably the first to report a case of thrombosis following a nonpenetrating injury of the neck:

His patient had been found under a railroad car in an agitated and shock-like state. Examination disclosed a contusion to the vertex of the skull, ecchymosis of the groin, and a 5–6 cm. perineal laceration. During the next 24 hours a right hemiplegia and profound coma developed, and the “contour of the left sternocleidomastoid muscle was effaced by a swelling.” A diagnosis of hemorrhage of the brain was made. Postmortem examination 5 days after the injury demonstrated the following findings. The brain appeared grossly normal. Thrombus formation in the left internal carotid artery was found about 2 cm. distal to the bifurcation of the common carotid artery. While the external wall of the vessel was intact, the intima and the media at this point were torn so that their edges were rolled under, forming a nidus for thrombus formation. The thrombosis extended into the most peripheral branches of the middle cerebral artery. Cut section of the brain revealed softening of the left cerebral hemisphere. Verneuil postulated that there had been a sudden wrenching of the neck with no blow directly to the artery because there was no contusion or hematoma. He emphasized the importance of the differential diagnosis “between diverse accidents that can follow traumatic lesions of the head.”
In 1935, Greco\textsuperscript{11} reviewed the literature on injuries to the carotid artery in the neck with thrombosis, and listed 22 cases in which this phenomenon occurred secondary to penetrating wounds of the face and neck. To these he added another case of thrombosis of the internal carotid artery that followed a nonpenetrating injury to the neck:

While riding his bicycle, a 23-year-old male was struck by a horse-drawn carriage which knocked him down, but he did not lose consciousness. He was dazed and had no recollection how the trauma had occurred. Although the patient was able to continue his bicycle ride, shortly after the episode he had transient generalized malaise and blurring of vision. These symptoms subsided only to recur again an hour later with headache and vomiting; later he became unconscious. Bradycardia and a right hemiplegia developed about 16 hours after the accident. Examination revealed superficial abrasions over the left chin and lower lip. No anisocoria was noted; the right cremasteric and right patellar reflexes were absent, but a right extensor planar reflex was elicited. Palpation of the carotid vessels in the neck was not performed. Lumbar puncture was normal. A diagnosis of possible left middle meningeal hemorrhage was made. Left temporoparietal craniotomy revealed no abnormality except minimal pulsation of underlying brain. Postmortem examination 60 hours after injury disclosed encephalomalacia of the left cerebral hemisphere. A small hematoma was found over the left carotid sheath just to the left of the thyroid cartilage. No extravasation of blood into the neck was seen. At the origin of the internal carotid artery a linear transverse laceration was noted which had involved the intimal and medial layers of the vessel and there was retraction of their margins for a distance of 8 mm. Strongly adherent thrombus at this site had greatly reduced the lumen of the vessel, and at the level of the foramen lacerum the vessel was completely occluded by this process. The thrombus extended into the branches of the internal carotid artery.

Moniz,\textsuperscript{19} in 1941, presented a case of severe trauma to the head which was so marked that traction on the carotid artery apparently tore the intima and resulted in a thrombosis to the vessel.

In 1944 Northcroft and Morgan\textsuperscript{22} presented a case of traumatic thrombosis:

A young soldier was walking along the road when a lorry passed him. A loose rope hanging from the vehicle wound around the patient's neck, throwing him to the ground, and then rapidly unwound itself without dragging the patient. He did not lose consciousness, and was able to walk to a nearby dispensary where a single stitch was placed in a superficial scalp laceration in the right parietal area. A contusion was observed on the left side of his neck. On the following day the swelling in the left sternocleidomastoid area was larger; right Jacksonian seizures and a right hemiplegia developed. Roentgenograms of the skull showed no fracture. A left extradural hemorrhage was considered. A burr hole in the left side of the skull revealed only "healthy brain." The left lateral ventricle was tapped and the pressure was normal. The patient died 19 hours after operation. Postmortem examination revealed external marks of the rope on the neck. Two-thirds of the left sternocleidomastoid muscle was found to be ruptured. The left internal carotid artery contained a thrombus which extended into the middle cerebral, part of the left anterior cerebral, and the left posterior communicating arteries.