

CASE REPORT

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Fatal Thrombosis of Internal Carotid Artery Following Minor Blunt Trauma to the Neck

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ABSTRACT: Fatal traumatic thrombosis of the left internal carotid artery occurred in a 38-year-old man following minor blunt cervical trauma during an altercation. There was no external injury observed on the head, face, or neck. Neurologic deficit developed soon after the injury, which progressed to right hemiplegia. His condition deteriorated and he expired on the sixth hospital day. The gross and microscopic findings of the internal carotid artery are presented and the significance of minor cervical blunt trauma and the possible mechanism for the vascular lesion are discussed.

KEYWORDS: pathology and biology, injuries, thrombosis, arterial thrombosis, internal carotid artery, head and neck injury, blunt trauma

Case Report

A 38-year-old male was struck on his left face and neck by his lover's husband during the confrontation. The husband had discovered that his wife had been romantically involved with another man. The husband waited outside of his wife's place of employment. He saw his wife go into the lounge at the train station and start talking with the victim and then begin kissing each other. The two then left the lounge and the husband followed them out. It was at this point that the husband confronted the victim.

According to the witness, she was walking through the train station when she heard a man (the husband) yell, "I warned you (expletive deleted), stay away from my wife." The husband grabbed and shoved the victim backward. He fell striking his head on the wall.

The husband took his right hand and struck the victim on the left side of face and neck "a few times." He then grabbed the victim's neck with his two hands from the front and started choking him. At this time the assailant's wife grabbed her husband and restrained him. The victim looked dazed, very weak, and seemed to try to stand on his left leg. The husband told police that he did not mean to hurt him, he just wanted to teach him a lesson.

Hospital Course

On admission, the victim's right hand was shaking. He was responsive to verbal stimuli. The patient appeared alert but did not verbalize and had progressive right hemiplegia. Ca-

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rotid angiography revealed a filling defect in the proximal portion of the left internal carotid artery and also showed complete occlusion in the intracranial portion of left internal carotid artery. A computed tomography (CT) scan revealed massive infarction of the left cerebral hemisphere. The patient remained in critical condition and expired on the sixth hospital day.

Autopsy Findings

There was no evidence of external injury on the head, face, or neck. There was a single, small subgaleal hemorrhage which was located in the parieto-occipital area. No skull fracture was present. No epidural or subdural hemorrhage was observed. The brain weighed 1600 g. The left cerebral hemisphere revealed massive infarction with marked swelling and severe midline shift to the right side. There were prominent uncal and cingulate gyrus herniations. There was extensive Duret hemorrhage in the tegmentum of mesencephalon and pons. The left internal carotid artery was almost completely occluded in the proximal aspect by the recent thrombus, measuring 4 cm in length (Fig. 1).

The upper portion of the left cervical internal carotid artery was patent without thrombosis. The intracranial portion of the left internal carotid artery was also thrombosed with complete occlusion extending to the left middle cerebral artery. There was a small, soft tissue hemorrhage around the bifurcation of left common carotid artery, extending to proximal internal carotid artery. This was the only evidence of internal injury in the neck area.

Microscopic examination revealed occasional areas of early atherosclerotic change in the proximal left internal carotid artery where the thrombus was located (Fig. 2). No obvious injury could be identified in the wall of the left internal carotid artery.

Discussion

Thrombosis of the internal carotid artery as a result of blunt trauma to the head and neck is a rather rare lesion. The neurological deficits are signs of cerebral hemisphere disturbance as a result of carotid artery insufficiency including hemiparesis or monoparesis, aphasia, hemianopsia, convulsions, and alteration in level of consciousness. The hemiparesis or monoparesis has been present in most reported cases. Reports indicate a significant delay between the injury and the onset of neurological symptoms, and it is very rare to develop the neurological deficit soon after the injury to the head or neck, which occurred in this case. In

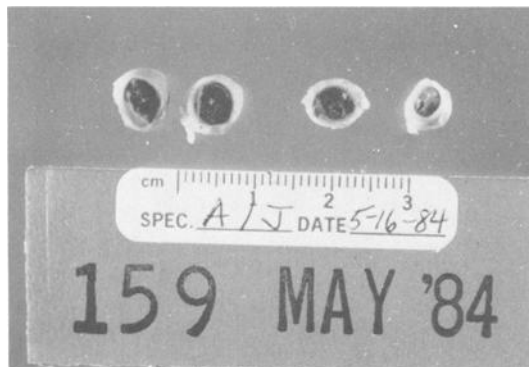


FIG. 1—Left internal carotid artery shows almost complete occlusion of the lumen by the recent thrombus.

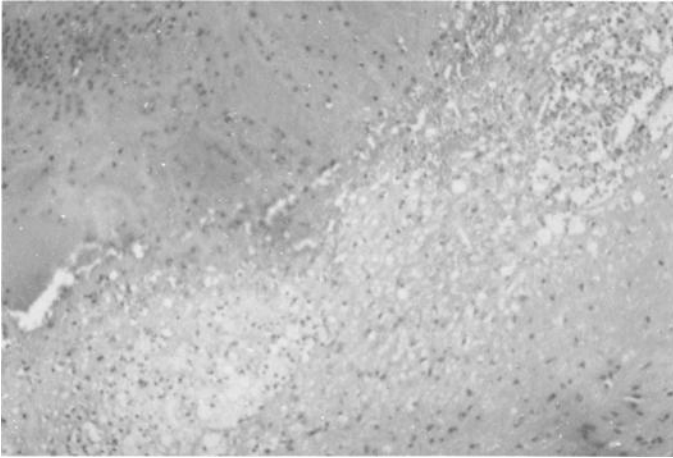


FIG. 2—High-power photomicrograph of the thrombosed left internal carotid arterial wall shows early atherosclerotic change.

90% of the cases, symptoms appeared more than 1 h after injury and symptoms may be delayed up to 48 h and rarely up to two weeks after injury [1,2]. It is suggested that the neurological deficit develops soon after injury as a result of the spasm which may completely occlude the internal carotid artery causing subsequent thrombosis [3].

The atherosclerotic change was found in the lower part of the internal carotid artery in this reported case as pointed out by Garg et al. [3] and this arterial change is considered to have contributed to the possible intimal damage and the thrombosis of the internal carotid artery [1].

The common injuries of internal carotid artery as a result of blunt trauma included intimal tear, intramural hematoma, and mural fibrosis. The intimal tear was the most common injury and was present in approximately 40% of the cases, and in about 15%, no obvious arterial damage could be identified.

The exact mechanism whereby thrombosis occurs in the internal carotid artery following blunt trauma to the head and neck has not been established. However, several possible mechanisms have been suggested. A direct blow to the neck may cause injury and subsequent thrombosis of the underlying internal carotid artery. A severe, sudden hyperextension of the neck associated with lateral flexion to the opposite side also may cause damage and thrombosis by stretching the artery over the transverse process of high cervical vertebrae [1-6]. Blunt intraoral trauma and basal skull fracture involving the petrous bone also may cause injury and thrombosis of internal carotid artery.

Conclusion

A case of fatal thrombosis of the internal carotid artery as a result of minor blunt trauma to the neck is reported. The neurological deficit appeared soon after attack by the assailant even though there is usually a significant delay in the onset of neurological symptoms following injury.

There was little evidence of external or internal injury at postmortem examination. No obvious damage could be identified in the wall of internal carotid artery. This case report should alert the forensic pathologist about traumatic thrombosis of internal carotid artery with little evidence of external or internal injury.

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