E3 Bilateral Internal Carotid Arteries Dissection in Motorcycle Accidents: A Case Report and Review of the Literature

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Learning Overview: After attending this presentation, attendees will understand the importance of suspecting and evaluating cervical and intracranial vessel injuries in all patients involved in motorcycle accidents. Bilateral Internal Carotid Artery Dissection (ICAD) due to blunt head and neck trauma has an estimated incidence of 1%–1.7%.[1] It may also occur in motorcycle collisions, resulting in a life-threatening event if not promptly diagnosed and treated. Mortality rates for this injury are reported from 20% to 40%, while permanent neurologic deficits range from 40% to 80%.[2]

Impact on the Forensic Science Community: This presentation will impact the forensic science community by showing that while bilateral ICAD in motorcycle accidents is very rare, timely diagnosis and treatment may prevent death or permanent neurological deficit. Early recognition is difficult and often delayed due to commonly associated severe multisystem injuries and the latent interval before the onset of clinical symptoms.

A case of a 44-year-old man involved in a high-speed motorcycle accident (frontal collision with a car) who sustained severe injuries, including bilateral ICAD, was reported. He was admitted to the emergency department unconscious, with severely altered vital sign parameters and bone and visceral injuries to the thorax and the pelvis. An initial brain Computerized Tomography (CT) scan was unremarkable. Because of his prolonged altered state of consciousness, a second cerebral CT scan and CT angiogram were performed. These studies revealed bilateral ICAD with thrombosis, treated non-operatively with fibrinolytic and anticoagulants, five days after the accident. The patient survived and regained consciousness. After multiple orthopedic and urological surgeries, he was discharged to initiate neuromotor rehabilitation and language therapy for the following two months. The bilateral ICAD has caused cerebral ischemic damage, resulting in upper and lower right limb hemiparesis and bradyphasia.

The literature review was conducted by the PubMed database with the goal of highlighting the importance of the traumatic mechanism of ICAD, risk factors, and its consequences for patient care and management. Papers regarding typical motorcycle accident injuries (n=24 potentially relevant results), and bilateral ICAD due to blunt trauma (n=18) were searched. The cross-search revealed motorcyclists are frequently exposed to direct traumatic injuries due to impact with: (1) rigid structures of the motorcycle (tank, handlebars, etc.); (2) collision vehicle; or (3) road pavement or other fixed obstacles on the scene at the time of projection to the ground. Typically, motorcyclists sustain abrasions, extremity fractures or avulsions, head and neck trauma frequently with skull base fractures, encephalic and spinal cord lesions, crushing thoraco-abdominal injuries, and perigenital and genital injuries. They may also suffer blunt force indirect injuries caused by rapid and sudden deceleration occurring at the moment of collision. This often causes traction and tearing of the organs held in place by vascular structures and/or ligaments. Among case reports of bilateral ICAD due to blunt trauma, none of these described this peculiar lesion in motorcycle victims, while the majority of cases occurred in horseback-riding, snowboard, or automotive vehicular collisions.

In the case reported, from a medical-legal standpoint, the man suffered both typical injuries due to direct trauma (such as abrasions, head, neck and thoraco-abdominal trauma, multiple pelvic fractures, and perigenital and genital injuries) and indirect trauma (such as bilateral ICAD).

Results from the literature review indicate that the early diagnosis of traumatic ICAD is important in order to prevent further complications. It should always be suspected in cases of motorcycle accidents as well as in blunt neck trauma with hyperextension or cervical spine fractures, especially in the presence of neurologic deficits not explained by head trauma.

Reference(s):

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2. Thomas Busch, Ivan Aleksić, Horia Sîrbu, Judy R. Kersten, Harald Dalichau. Complex Traumatic Dissection of Right Vertebral and Bilateral Carotid Arteries: A Case Report and Literature. *Cardiovascular Surgery*, 8, no. 1 (January 2000): 72-74. https://doi.org/10.1016/S0967-2109(99)00075-7.

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