

Internal carotid dissection after the motorcycle accidents

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Dear Editor,

Extracranial carotid artery dissection (CAD) is one of the major consequences of blunt head and neck trauma, and a main etiology of ischemic stroke in young adults; the carotid lesions are described in accidents of motorcycle drivers with or without the helmet [1-5]. Blunt cervical vascular injury is a non-penetrating trauma to the carotid or vertebral arteries caused either by direct neck injury or by the shearing of these cervical vessels; the estimated incidence of vascular lesions is low, only near 1% of the blunt trauma [5].

More common neck effects of motorcycle trauma include subluxation of the occipital-atlantoaxial complex and hemorrhages in the muscles or carotid and vertebral arteries [4]. Since, the clinical picture varies, the diagnosis depends on computed tomography (CT), and magnetic resonance imaging (MRI); additionally, the digital subtraction angiography should be performed whenever, either precocious or tardive neurological manifestations develop [1-5]. The treatment of cases with confirmed diagnosis includes intensive care, stent placement or other endovascular approach, intravenous heparin, oral aspirin or clopidogrel [1,3,5].

Ashrafi M and colleagues reported the case study about the internal carotid artery dissection that occurred in a 19-year-old man, due to a motorcycle collision accident [1]. His evaluation at the Emergency room revealed abrasions in the extremities and right shoulder; he complained of neck pain but the imaging studies showed no abnormality. Two days later he evolved presenting weakness, lethargy, dizziness, left hemiparesis, horizontal gaze to right, besides anisocoria with right pupil 4 mm and left pupil 2 mm.

Computed tomography of the brain revealed an infarct in the right frontotemporoparietal area and right-to-left midline shift, while angiography showed normal carotid arteries (internal, external, and common); therefore, he underwent decompressive craniotomy. Digital subtraction angiography showed occlusion of the proximal cervical right internal carotid, and intimal dissection in the distal cervical left internal carotid, corrected by stent. Four months after the accident, he presented the visual acuity of hand motion in the right eye, left-sided seventh nerve palsy, and left hemiparesis more severe at the lower limb; the authors highlighted the importance of the earliest angiography study in these cases. In this setting, it seems appropriate to perform some short additional comments on novel literature data aiming to strengthen the importance of the mentioned case study [2-5].

A review of motorcyclist accidents between 2007 and 2017 included 315,258 individuals with a mean age of 41 years, 92.5% men, and 66% of them with helmet [2]. The non-helmeted drivers had more severe head trauma (28.5 % vs. 13.3 %), longer intensive care support (38 % vs. 30.2 %), besides the mortality rates (6.2 % vs. 3.9 %). The authors highlighted the public health rules focusing on the mandatory use of helmets. A 73-year-old male had brain trauma in a motorcycle accident, and decompressive craniectomy with subdural hematoma removal was performed; then, two weeks later he had regained consciousness with spontaneous eye opening and voluntary movements [3]. His neurological condition worsened twenty-four days after the admission, associated with CT images of subarachnoid hemorrhage and cerebral hematoma; digital subtraction angiography showed sphenoid sinus pseudoaneurysm with a

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carotid-cavernous fistula. After the intra-arterial approach, and utilizing coil and liquid embolic material by the balloon-assisted technique, these lesions presented immediate and complete resolution. The authors emphasized the rare occurrence of pseudoaneurysm and fistula in lesions at the cavernous carotid segment related to fractures in the superior wall of sphenoid sinus. A review of 142 studies about descriptions of body areas affected by motorcycle accidents included the role of impact with the helmet or motorbike components and evaluated the main mechanisms and factors related to fatalities registered in this trauma outcome [4]. The cervical spine was the main affected region in the fatal cases, more often due to head hyperextension; while the preventive role of the helmets persisted not totally cleared. The lesions may follow the neck hyperextension and rotation with the carotid traction, or full flexion of the neck compressing the artery at the upper cervical vertebrae. Furthermore, the helmet buckle has been described causing fractures in the neck cartilage, and the pressure by the helmet strap on the neck tissues can cause the carotid damage. The authors highlighted the mandatory search for arterial dissection in the neck as the *causa mortis*, in necropsy studies of patients who evolved with more delayed symptom presentations. A Japanese study among 311,692 patients aged ≥ 13 years with blunt trauma (by car, motorcycle, or bicycle accident, simple fall, or from a height) between 2004 and 2019 included 454 cases with lesions to common, internal, or external carotid arteries; vertebral arteries; and external, or internal jugular veins (BCVI), presenting to emergency care [5]. The BCVI group ($n = 454$) included common or internal carotids and vertebral arteries, or others; patients with common or internal carotid lesions had higher mortality (45%). The authors suggested more research on trauma mechanisms and the BCVI relationships.

Motorcycle accidents have been frequent and represent a risk condition of neck injuries with a variable range of severity, including physical incapacitation and fatalities. Case studies can enhance the awareness and suspicion index of the healthcare workers.

Keywords: Accident, Carotid artery, Dissection, Motorcycle

Compliance with Ethical Standards

Conflict of interest: The authors declare that there is no conflict of interest.

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