D45 The Bisected Man: An Uncommon Pattern of Injury in a Fatal Motorcycle Crash

Luigi Papi, University of Pisa, Institute of Legal Medicine, Pisa 56100, ITALY; Federica Gori, MD, University of Pisa, Pisa 56100, ITALY; Sara Turco, MD, Pisa, ITALY; Alice Chiara Manetti, MD, University of Pisa, Forensic Pathology, Toscana, Pisa 56126, ITALY; Costanza Filomena, Florence 50036, ITALY*

Learning Overview: The goal of this presentation is to present an unusual case of a fatal motorcycle crash.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by evidencing the importance of the medicolegal and engineering evaluation in an uncommon motorcycle fatality crash.

Powered two-wheel riders are one of the most vulnerable groups of road users. The object most frequently struck in an accident is a passenger car, followed by the roadway itself, either as a single-vehicle accident or as an attempt to avoid a collision with another vehicle.[1]

The most common sites of injuries in motorcycle crashes are the head—even when a helmet is worn—and the limbs, but lesions of the thorax and the abdomen are described as well.[1-3] Typical lesions described in motorcycle accidents are basicranium fractures, like the so-called "motorcyclist's fracture" or the "ring fracture" around the magnum foramen.[4] Other typical lesions are the "fuel tank injury," produced by the impact of the inguinal region against the fuel tank.[5] The upper limbs frequently present hematoma of the palms and fracture of the wrists due to the impact against the handlebars, which are strongly grabbed during the crash.

History: This case report concerns the death of an 18-year-old man involved in a fatal motorcycle collision against a very large loaded truck, the size of which exceeded the transversal size of the lorry. The collision between the motorcycle rider and the loaded truck caused the transection of the rider's body at the abdominal level.

The external examination revealed a severe lesion of the abdomen with partial extrusion of the intestine and the mesentery. This lesion was accurately measured to compare its characteristics with the truckload: it was 39cm long and 25cm away from a transversal plane passing through the hips. It extended from one hip to the other, and had a transverse major axis. On the upper part of the laceration, there was a net-shaped excoriation. The area also presented multiple linear excoriations. The upper limb presented millimetric excoriations and lacerations and the compound and exposed fracture of the left wrist. The lower limbs presented diffuse excoriations. After the removal of the helmet, which was correctly worn, no external lesions were documented on the head.

The autoptic examination revealed several thoracic fractures, involving all the ribs bilaterally. There was a gastric laceration in the abdomen, though no gastric material ran into the abdominal cavity. There was a huge laceration of the liver, spleen, and left kidney. The thoracic aorta was lacerated. There was the complete transverse fracture of the bodies of the first dorsal vertebra and the second lumbar vertebra. The brain section revealed the subarachnoid hemorrhage of the left temporal lobe, cerebellum, and pontomesencephalon. The cervical examination revealed the linear fracture of the body of the fifth vertebra.

A combined engineering and medicolegal evaluation was performed to investigate the exact dynamics of the road accident. The two vehicles were examined, highlighting the damages of the left anterior part of the motorcycle and some stains on the loaded truck, that were the same color as the motorcycle. The lateral loaded truck side protrusion and the height from ground level were measured, as well as the distance of the seat and the handlebars of the motorcycle from the ground. The comparison of all these data with the injury pattern of the body allowed the reconstruction of the chain of events that ended with the crash of the motorcycle against the loaded truck.

This case is unusual because of the devastating injuries of the body of motorcyclist involving the thorax and the abdomen. The autoptic examination compared with the engineering evaluation allowed the reconstruction of the dynamic of the crash, confirming that the transection of the body matched with the action of the loaded truck.

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Motorcycle, Traffic Accidents, Forensic Sciences