

CASE REPORT

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Cervical Fracture, Decapitation, and Vehicle-Assisted Suicide

REFERENCE: Byard R, Gilbert J. Cervical fracture, decapitation, and vehicle-assisted suicide. *J Forensic Sci* 2002;47(2): 392–394.

ABSTRACT: Two cases of vehicle-assisted suicides are described in males aged 33 and 24 years, respectively. In both cases the victims had tied ropes between stationary objects and their necks and then attempted to drive their vehicles away. The speed with which the vehicles were driven resulted in forces great enough to cause fracture-dislocation of the cervical spine in Case 1 and virtual decapitation in Case 2. Although inadvertent alteration of the death scene in Case 1, with removal of the rope, complicated the initial assessment, the extent of soft tissue and bony injuries was such that ligature strangulation appeared unlikely.

KEYWORDS: forensic science, ligature, suicide, motor vehicle

Suicide using a ligature tied between the neck and a stationary object while attempting to drive a vehicle away is a very uncommon method of self destruction (1,2). Two deaths where extensive soft tissue and bone trauma resulted from this method of suicide are described to illustrate characteristic features of such cases. The degree of neck trauma present was far greater than is characteristic of homicidal ligature strangulation or hanging, except where the body has fallen some distance.

Case Reports

Case 1

A 33-year-old male was found sitting in the driver's seat of his vehicle in a public car park with the window open and the driver's seat collapsed backwards. The car was a standard sedan and had been parked, wedged against a gate, for two days. There was evidence of a collision between the vehicle and the gate. A parchmented ligature mark was present circumferentially around the neck of the deceased with no other evidence of trauma. No rope was present around the neck or tied inside the vehicle; however, an unattached short length of rope was found between the driver's seat and door, and rope fibers were observed along the posterior edge of the window frame. There was no evidence of theft.

The autopsy revealed an adult male with a parchmented ligature mark around the neck (Fig. 1) associated with bruising within the

anterior neck muscles, separation of the hyoid bone from the thyroid cartilage with fractures of both, transection of the right common carotid artery and lower pharynx. There was also fracture-dislocation of the third cervical vertebrae through the subjacent intervertebral disc with transection of the upper cervical spinal cord. The vertebral column was held together only by portions of the posterior longitudinal ligament (Fig. 2). The body also showed changes of early decomposition in keeping with death two days before. The underlying injuries were far more severe than was usual for simple ligature strangulation. Death was due to transection of the upper cervical spinal cord. The scene and autopsy findings were highly suggestive of a ligature being tied around the neck and a nearby stationary object. There was a history of depression, a previous suicide attempt, recent suicidal ideation, and marital separation.

Due to disturbance of the death scene, an appeal was made through the media for any information about the case that resulted in the handing in to police of a long nylon rope that had been found in the car park lying between the vehicle and a wooden post. The rope had snapped at both ends after being pulled taut and had recoiled, being located a distance of approximately 30 m from the deceased's vehicle. The individual who found the rope had not associated it with the parked vehicle, and was completely unaware of the deceased sitting inside, as apparently had a number of people who had used the car park over the preceding two days.

Case 2

A 24-year-old male was found on a farm sitting in the driver's seat of his vehicle with the window open. The car was a utility vehicle and was located approximately 80 m from a post that had a rope tied to it. A separate frayed portion of the same rope, with a loop at one end, was found between the vehicle and the post. A set of tire marks near the post indicated that there had been rapid vehicle acceleration. The head of the deceased was almost completely severed from the body, with no other evidence of trauma.

The autopsy revealed an adult male with a horizontal encircling abrasion around the neck associated with virtual decapitation, with the head being attached to the body by a thin strip of fibrous tissue, the ligamentum nuchae (Fig. 3). Death had been caused by ligature transection of the neck. The scene and autopsy findings indicated that the ligature had been tied around the neck and a nearby post. Rapid acceleration of the vehicle had caused decapitation with slipping of the looped rope from around the neck and breaking of the rope. There was a history of recent emotional disturbance.

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Received 22 May 2001; and in revised form 23 July 2001; accepted 24 July 2001.

Discussion

In a recent review of motor vehicle-assisted suicides cases were classified into seven categories (3). Death were caused by: 1) carbon monoxide toxicity, 2) trauma from the owner's motor vehicle; 3) trauma from another person's motor vehicle; 4) drowning; 5) self immolation; 6) hanging or ligature strangulation; or 7) trauma from the owner's motor vehicle as a backup to suicide by other means. There was considerable difference in the numbers of cases in each of the categories, with carbon monoxide toxicity from inhaled exhaust fumes accounting for a clear majority of cases.

Cases of ligature strangulation using a vehicle have only rarely been described in the literature and have involved an individual tying a rope around a stationary object and the neck, and then attempting to drive away (1). This has resulted in sustained pressure on the neck with death from ligature strangulation. The point has correctly been made that these cases are not hangings, as the force applied to the neck is not the weight of the body (4), but derives instead from the vehicle's forward movement. Given the forces in-

involved, it is likely that both the upper airway and blood vessels would be rapidly occluded.

Deaths due to this mechanism have occurred in males rather than females. Although it is recognized that the reported numbers are small, this may be due to the propensity for males to choose more violent means of self destruction than females (4,5). For example, males have tended to use hanging and firearms in suicide attempts, in contrast to females who have favoured carbon monoxide inhalation and drug ingestion. There is, however, some indication that female hangings are increasing, at least in certain populations (7). Simple hanging deaths in motor vehicles are rare events due to the technical difficulties of finding a suspension point and a position to enable the weight of the body to be supported around the neck by a ligature (8). Facial petechiae are more likely to occur with these in-



FIG. 1—A parchmented ligature mark around the neck in a 33-year-old man (Case 1), who committed suicide by tying a rope between a post and his neck and driving away in a vehicle.

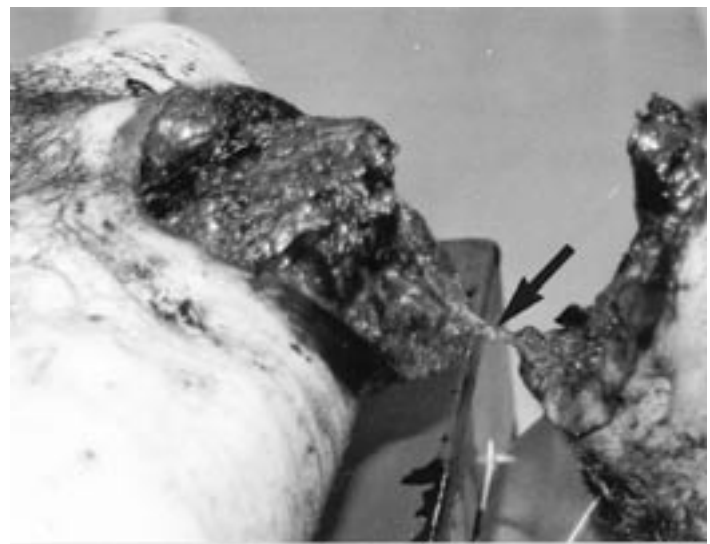


FIG. 3—Virtual decapitation of a 24-year-old male due to ligature transection of the neck. The head is attached to the body by remnants of the ligamentum nuchae (arrow).

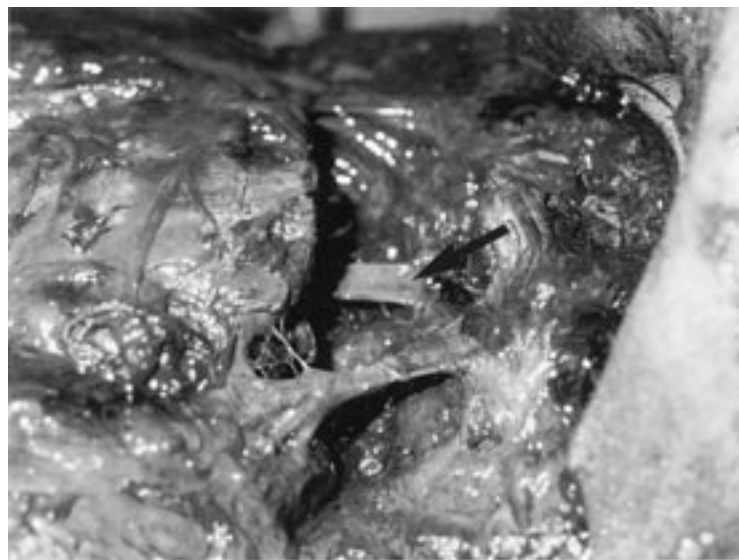


FIG. 2—Fracture/dislocation of the cervical vertebrae in Case 1 with vertebrae attached by remnants of the posterior longitudinal ligament (arrow) and surrounding soft tissues.

complete suspensions, with little evidence of trauma to the soft tissues of the neck being found at autopsy.

The reported cases demonstrate suicides where ropes were tied around stationary objects and then to the victims' necks. The unusual features of both of the cases were: 1) the use of a motor vehicle as an integral component of the suicide attempt, and 2) the extensive soft tissue and bone trauma that occurred, in one case resulting in virtual decapitation. The extent of the trauma suggested that rapid acceleration had occurred with the ligatures causing death by severing the airway, major neck blood vessels and spine, rather than by simple asphyxia due to sustained pressure.

The complicating factor in Case 1, of disturbance of the death scene with removal of the rope, led to initial suspicions of foul play. The explanation of the individual who had taken the rope was, however, quite consistent with observations at the scene and subsequent autopsy findings. Sudden breaking and recoil of the taut rope gave further support for rapid acceleration of the vehicle, as had also occurred in Case 2. The relatively minor external injuries in Case 1 also initially raised the possibility of inflicted ligature strangulation, as they did not accurately reflect the extent of the underlying trauma.

The reported cases illustrate an uncommon method of suicide utilising motor vehicles and ligatures to cause rapid death from neck fracture and decapitation. The marked cervical trauma found in both cases indicated that tightening of the ligatures was associated with significantly more force than is found with typical ligature strangulation or hanging.

Acknowledgments

We would like to thank Mr Wayne Chivell, the South Australian State Coroner, for permission to publish details of these cases.

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