

CASE REPORT

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Suicidal hanging resulting in complete decapitation: a case report

Received: 16 March 1998 / Received in revised form: 9 July 1998

Abstract This paper reports the case of a 22-year-old man, weighing 87.5 kg, who committed suicide by jumping from a bridge over a canal with a nylon rope tied around his neck. The drop height was between 3.70 and 5.30 m before the rope tightened and the subject was completely beheaded. The head sank straight under the bridge, while the torso floated 205 m downstream. Pertinent autopsy findings were a sharp decapitation wound with circumferential skin abrasion and cervical spin transection between C1 and C2. Decapitation is a complication of extreme rarity in the event of a suicidal hanging and is always related to a drop of several metres with a poorly extensible line used as the hanging ligature.

Key words Hanging · Decapitation · Suicide

Introduction

Hanging is one of the most frequent manners of suicide everywhere in the world [1–4]. Death usually occurs rapidly and is caused by ischaemic cerebral damage due to compression of neck arteries, in some cases in combination with airway obstruction. Instantaneous death by decapitation represents an unexpected complication of extreme rarity in the event of a suicidal hanging. We present here a case in which jumping from a bridge with a 3.77 m nylon rope around the neck resulted in complete beheading of a 22-year-old man.

Case report

In November 1997 the decapitated corpse of an adult male was found partially submerged, entangled by brushwood on the bank of

a ship canal, in an uninhabited area close to Strasbourg, France. The initial suspicion of a homicide followed by body dismemberment was rapidly refuted by the discovery some hours later of a strong rope hanging loosely from the parapet of a road bridge spanning 6.50 m over the canal, ca. 205 m upstream from the corpse. The upper end of the nylon rope, 3.77 m in length and 1.3 cm in diameter, had been attached by a dual reef knot to the upper bar of the metallic handrail, whereas the free end had been fashioned as a slip knot that was completely tightened. Close examination of this knot disclosed the presence of hair strands and of epidermis fragments, as well as some small blood-like stains. Divers of the French Gendarmerie located the victim's head lying on its left side on the 6.70 m deep, slimy bottom of the canal under the bridge, directly below the lower end of the line. Further forensic investigations were carried out at the Medicolegal Institute of Strasbourg.

Autopsy findings

The autopsy revealed the body of a young Caucasian male of medium to stout build, measuring 1.85 m and weighing 87.5 kg (head included). Except for the neck injury, no other external signs of violence were visible. The head weighed 5007 g with an external volume of 4480 ml (as measured by immersing completely in water), thus the overall density was estimated at 1.12. There was a marked cadaveric hypostasis on the left side, consistent with its position on the bottom of the canal. A cyanotic congestion of the lips was present, contrasting with the absence of discolouration at the limb extremities of the torso.

The head and torso showed a good anatomical fit, without apparent loss of substance. Examination of the decapitation wound revealed a sharply defined, almost circular transection located at the uppermost part of the neck. The path was slightly oblique to the rear and top and passed just above the thyroid cartilage in its front portion, 1–2 cm below the mandibular gonions to the sides and 6 cm below theinion to the rear. The wound edges showed a regular and concentric, almost circumferential skin abrasion, 0.5–1.5 cm in width (Fig. 1). The soft tissues of the neck were transected above the thyroid notch and exhibited multiple fresh hemorrhages, especially in the anterior muscles. Both superior horns of the thyroid cartilage were broken, the hyoid bone and the lacerated epiglottis remained attached to the head. The cervical spine was severed between C1 and C2, with a fracture of the dentate process (odontoid peg) and both superior articular facets of C2. There was neither hydroaeric congestion of the lungs nor congestion of other viscera.

Post-mortem blood and urine tested negative for alcohol, pharmaceuticals and drugs of abuse. A complimentary screening for diatoms in lung samples according to Ludes et al. [5] was completely negative whereas numerous diatoms of different taxa were present

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Fig. 1 Decapitation wound (head) with 0.5 to 1.5-cm wide, circumferential skin abrasion

in water samples taken from the canal, confirming the absence of a significant inhalation of the immersion medium.

The deceased was subsequently identified as a 22-year-old man with a recent history of love disappointment and loss of his job, who was about to be drafted into the military service. According to the death scene reconstruction, the young man apparently attached one end of the line to the handrail of the bridge and the other around his neck, then he threw himself over the parapet. The drop height was between 3.70 and 5.30 m, depending on the subject's position on jumping. As the poorly stretchable rope suddenly tightened, the subject was beheaded by the constricting knot. Owing to its higher density the head sank directly below the bridge, whereas the decapitated torso remained floating and was dragged downstream by the flow.

Discussion

Suicidal hanging is generally associated with soft-tissue injuries only, and osseous lesions of the cervical spine are very unusual. For instance in a series of 107 cases investigated by Saternus [6], soft tissue lesions (e.g. muscle or epidural hemorrhages, disc tearing) were found in 65 %, but cervical fractures were never present. Although more

frequent in judicial hangings due to the generalization of the 'long drop' method (a fall of 4–10 feet depending on weight and strength of the prisoner) introduced in 1871 by the British hangman W. Marwood, these fractures were absolutely not the rule. In a study of neck injuries produced by 34 judicial hangings between 1882 and 1945, James and Nasmyth-Jones found only 7 cases of cervical fracture [7].

Decapitation represents the most extreme type of those cervical injuries associated with hanging. It seems of excessive rarity whatever the circumstances of hanging – judicial or suicidal. The annals of capital punishment in Britain provide some examples of this unexpected event: De Zouche Marshall reported the case of a subject weighing 72.5 kg who was completely beheaded by the rope following a 4.40 m drop, during a judicial hanging performed in Ireland in 1870 [8]. In 1885, another culprit called Robert Goodale also underwent decapitation when being hanged at Norwich Castle by the British executioner James Berry [7] (see also the recent review from R. Clark (1996) at <http://www.abolition-now.com/uk-dp/hanging.html>).

In suicidal hangings, the occurrence of a decapitation is always the consequence of a drop of several metres, generally associated with a relatively thin ligature of poor stretchability (e.g. wire, nylon rope) [9–12]. Between 1947 and 1994, Rabl et al. [11] reviewed 10 cases in the forensic literature, of which 5 were quoted as 'complete decapitation' (head completely severed from the trunk) and 5 as 'incomplete' (rupture of cervical spine and subtotal wrenching of most anatomical structures of the neck, without complete separation); the drop height ranged from 2.40 to 10.0 m and the ligature diameter from 0.5 to 2.0 cm. Two fatalities closely resembling the case discussed here have been recently reported. In the first one a 46-year-old man weighing 73 kg jumped from a bridge over a river with a tow rope around his neck and the fall height was estimated at 4.50 m. He was almost completely decapitated, the head remaining attached to the torso only by a 7-cm wide, posterior skin shred [13]. In the second case the death scene was quite similar but the 70–75 kg victim used a wire rope of very low elasticity and jumped from a height of 6.50 m, resulting in complete beheading. The head sank straight to the bottom of the river, while the decapitated torso floated some metres downstream (this case was presented by R. Urban et al. at the 25. Treffen Oberrheinischer Rechtsmediziner held in Strasbourg, France, 5–6 May 1995).

Apart from these observations of decapitation related to 'authentic' hanging (i.e. where the force tightening the ligature results from the passive action of gravity onto the victim's body), a fascinating variant is represented by the use of a motor vehicle to perform strangulation. At least two cases have been reported, in which subjects were completely beheaded after attaching one end of a rope to a fixed point and the other around their neck, then getting into their car and driving away [14,15].

Whatever the procedure employed, the transection of soft tissues always occurs at the uppermost part of the

neck and the cervical spine generally breaks between C1 and C2, sometimes between C2 and C3. As in our observation, the presence of a concentric skin abrasion at the rim of the decapitation wound appears as a frequent and characteristic finding [10,11] which may be of value for the differential diagnosis with a post-homicidal decapitation performed with a sharp cutting instrument. As shown by biomechanical experiments, traction forces of 12000 N or more may be necessary to produce total decapitation of a victim, irrespective of the diameter of the ligature used [11]. In the example of a 76 kg subject completely beheaded after a drop of 3.50 m, the loading of the neck was estimated at about 13500 N [10], a value greatly exceeded in our case (87.5 kg subject, 3.70 to 5.30 m drop).

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