

HANGING WITHOUT A KNOT: PECULIAR EVENT OR SIMULATED SUICIDE?

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ABSTRACT

Among the methods of self-harm with suicidal purpose, hanging is the most common; classically, the subject fixes the end of a cable to a support placed at a higher height, on which the traction force given by the weight of the suspended body is applied, while the other end is passed around the subject's neck and secured with a knot. We present the case of a 56-year-old man found dead in his own home by his wife with an exercise rope fixed to a window and passed around his neck without a knot, with a discontinuous transversal groove, which, due to the absence of a knot and the furrow situation, had initially raised suspicions of being a simulated suicide.

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1. Background

WHO defines suicide as "an act of self-elimination, deliberately initiated and performed by the person concerned, with full knowledge or expectation of its fatal outcome". [1] Suicide is currently a major public health problem with approximately one million deaths worldwide according to WHO estimates, with 10 to 20 times as many for suicide attempts. [2] This represents almost one death by suicide every 40 seconds and one suicide attempt every 3 seconds. Suicide by hanging is one of the leading causes of death, with over one million deaths a year [3]. Classically, a hanging is defined as complete if the body is entirely suspended, whereas an incomplete one is when a portion of the weight of the subject is unloaded on a support base, and in these cases the subject can appear standing, kneeling, sitting, or semi-laid down. Depending on the position of the knot, hanging is subdivided into typical, when it is placed at the nape, and; atypical when the position of the knot is lateral or anterior, while only in rare cases the absence of a knot is found. [4]

2. Case Report

The case presented is that of a 56-year-old man who had been on antidepressant drug therapy for about a month because of a drop in mood, reporting a general malaise to his family members. The dead body of the man was found by his wife and son inside the kitchen, kneeling on the sofa and with a gymnastic rope around his neck fixed to the window grate, 180 cm above the ground.

In an attempt to revive him, his wife had cut the rope and laid the body on the ground, so the 118 personnel, as well as the law enforcement who intervened on the site, found themselves facing an altered crime scene.

Autopsy Findings

On assignment by the Judicial Authority, we conducted the autopsy on the corpse at the Tor Vergata University Morgue in Rome.

The body of the examined subject, 184 cm long, presented at the neck: a furrow with a transversal orientation (Figure 1,2), located 161 cm from the calcaneal plane, which extended from the left occipital region to the right anterior paramedian portion of the neck, corresponding to the full part of the loop, while the sulcus discontinuity, located on the left side of the neck, extended from the paramedian portion of the thyroid cartilage to the left mastoid region and was located 162 cm from the calcaneal plane. The facial features were congested. All the fingernail beds were deeply cyanosed.

There were also sub-palpebral petechiae, blood infiltration of the right thyroid muscles, with blood infiltration of the right common carotid artery's wall, involving the adventitia and the intima layers, associated with a complete bilateral fracture of the great horns of the hyoid bone and simultaneous infiltration periosteal soft tissue blood (Figure 3).

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Figure 1. The furrow with a transversal orientation



Figure 2. The body of the examined subject presented at the neck



Figure 3. complete bilateral fracture of the great horns of the hyoid bone and simultaneous infiltration periosteal soft tissue blood

The autopsy investigation did not show the presence of fractures or blunt force injuries to other osteoarticular structures, nor lesions affecting the intrathoracic and/or intra-abdominal anatomical structures.

A fragment of epidermal tissue in correspondence with the sulcus was then taken and analyzed through microscopic analysis which showed intense edema and congestion of the explorable vessels, with focal hemorrhagic extravasations and infiltration of the dermal tissues.

To further exclude the hypothesis of the homicidal hanging of an unconscious person, or simulated suicide, toxicological investigations were carried out on the biological samples taken during the autopsy, specifically blood, bile, and gastric contents, which tested negative for alcohol and drugs of abuse; the presence of sertraline, an antidepressant drug taken by the subject in the previous months, was also investigated in the blood and tested negative.

3. Discussion

The Hanging is a form of violent mechanical asphyxia in which the force applied to the neck derives from the gravitational traction of the weight of the body or a part of it [5].

It is almost always self-inflicted, either intentionally or accidentally. Homicidal hanging is extremely rare [6], although there may be cases in which the hanging is used as an expedient to mask homicide, through the suspension of the corpse.

In self-inflicted hanging, the presence of a noose is a common finding, most often secured by a slipknot, to produce a sliding noose, or with a fixed simple knot. More rarely, the lace can be used without any knots [7], with a free loop like the one seen in our case. On such occasions, the forensic investigation is fundamental in resolving the doubts that may arise about the dynamics of death; the discovery of a subject with a rope around his neck without a knot and a transversal groove could arise suspicion about death by strangulation with simulated suicide.

The orientation of the furrow represents one of the main discriminants between strangulation, mostly homicidal, and hanging, commonly of suicidal nature; commonly, in the latter, the furrow has an oblique course from top to bottom, with a depth that decreases near to the extremities, while in strangulation there is more typically a transversal course of the groove, whose depth is almost uniform without discontinuity, given by the traction of the two ends of the lace which constricts the neck along the entire circumference. The continuity of the furrow represents another element that allows a differential diagnosis between strangulation and hanging in which a discontinuity of the furrow is produced at the level of the sliding knot.

Furthermore, in the case of strangulation, due to the homicidal nature of the act, it is possible to find signs of a struggle on the victim's clothes (lacerations of the tissues) and the body (scratches or bruises on the neck). To date, few cases of hanging with a transversal groove have been described in literature, which occurs above all in atypical hangings with a lateral position of the knot, or when the mean used is fixed at a height that is not too high compared to the subject (such as in cases of incomplete hanging with fastening of the rope to a radiator); even rarer are the cases of hanging without a knot, of which only two cases have been reported to date. [8, 9]

In our case, with the exception of his wife, who had found the body and cut the rope, laying the body on the ground in an attempt to revive it, no one had seen how the body was suspended. Considering the high degree of contamination of the crime scene (altered position of the body, doors, and windows of the house found open by the investigators), the judicial authority had found itself faced with a case of possible simulated suicide, thus delegating to the forensic pathologists the task of resolving all the doubts related to the nature of the subject's death.

During the forensic investigations, a furrow with ecchymotic edges of hard consistency, hemorrhagic infiltrates, and skin with a parchment-like appearance and a hard consistency was found; these characteristics demonstrated the vitality of the lesions found, resulting in harmony with time since death and compatible with the found rope. The vitality of the lesions was also confirmed by the histological analysis of the skin sample taken at the level of the sulcus, which showed a hemorrhagic infiltration of the epithelial layers, extending to the cutaneous and hypodermic tissues.

Another relevant element was the fracture of the hyoid bone with blood infiltration of the thyroid-hyoid muscles, the surrounding soft tissues, and the vessel wall of the right common carotid artery, all clear signs of the viability of the lesion.

On the skin surface of the corpse, in addition to the lesions at the neck level, no other harmful signs attributable to a potential perpetrator were highlighted, nor were "defense" lesions detected.

It should be mentioned that no signs of a break-in were found, except the kitchen window, opened by the son to ask for help.

The thanatochronological elements obtained from the autopsy examination, along with the positive anamnesis for depression, the negative toxicological investigation for drugs or substances, together with the results of the investigations conducted on the spot by the judicial authority, made it possible to define a suicide-type event by atypical and incomplete hanging.

4. Conclusions

The Hanging with the use of a knotless noose can cause lesions and signs to the neck that can lead to considerable confusion to identify the causes of a subject's death, especially when the crime scene is altered before the intervention of the personnel in charge of the investigations. In these cases, an accurate forensic examination is essential to ascertain the nature of the lesion and the pathophysiological mechanism of death, to exclude the possibility of a concealed homicide, also through special investigation methods of the crime scene that can make up for the alteration of the place. [10]

In our case, in which the rope used did not present a sliding knot and, together with the transverse orientation of the groove and the alteration of the crime scene, the role of the forensic pathologist was of fundamental importance to exclude a suspect of a simulated suicide.

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