



Forensic Pathology

Suicidal ligature strangulation utilizing doubled cable ties - A case report

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ABSTRACT

The Botswana Police Pathology unit records show that a total of 368 cases of suicide were reported between 2016 and 2019. A total of 367 of these cases were suicide by hanging while only 1 was of suicide by self-strangulation. Literature shows that suicidal ligature self-strangulation is uncommon and, in most cases, common household items such as scarves, belts, neckties and rope are used. We report an instance where a 25-year-old African male used two black plastic ligatures, each with self-locking mechanisms to commit suicide by self-strangulation. The ligatures were found *in situ* completely encircling the neck of the victim. The ligature material deployed in this case was unique. The victim's bedroom door was found locked and secured from the inside. Examination of the crime scene, autopsy findings and toxicological analysis confirmed the manner of death. Literature review revealed that double cable tie self-ligature strangulation is rare. We describe the mechanism of death, review of the literature and associated factors.

Introduction

The 2016 World Health Organisation (WHO) mortality data revealed that suicide by hanging was the most common method used in committing suicide in most countries [1]. Forensic pathology data from Botswana also suggests that suicidal hanging is the most common method used in Botswana. Suicide by self-strangulation is rare [2], but “atypical” strangulation has been documented and described. Strangulation is a type of mechanical asphyxia produced by constriction of the neck using ligature material, without suspending the body [3]. Many authors and criminal investigators believe that self-strangulation without an auxiliary mechanism is not possible and that ligature strangulation must therefore represent homicide [4]. It is based on this controversy that we report on the case that took place in Botswana in order to add to the growing body of literature of deaths by self-strangulation. The evaluation of the manner of death in strangulation is therefore a complex objective with most cases being classified as homicides. Suicidal self-strangulation is rare and requires the use of a ligature that can be locked by some mechanism [5]; in this case report a self-locking cable tie was utilized. Elastic bands, elastic bandage, and rubber tube have also been reportedly utilised in self-strangulations. Determination of the manner of death as either suicide or homicide in self-strangulation is very difficult to make because many inexperienced investigators and forensic pathologists believe that it is impossible to carryout self-strangulation as a means of suicide [4,6,7]. This is attributed to the misconstrued information that strong pressure is

needed to occlude the airways and blood vessels on the neck. Polson [8] demonstrated that only 3.2 kg is needed to occlude the airways whereas an approximate of 2 kg force is enough to occlude the venous system. Minimal pressure can stimulate vasovagal inhibition. Sorokin et al. [9] described that if the ligature is only tightened manually by the individual and there is no locking mechanism/auxiliary mechanism then the tension applied will be lost upon loss of consciousness with associated muscle relaxation, flowing by resumption or cerebral blood flow and the regaining individual consciousness.

This article reports a self-strangulation suicide in which two (2) black plastic ligatures with self-locking mechanisms were found *in situ* completely encircling the neck of the victim. The ligature material deployed in this case is unique. The deceased was found lying in a prone position in his bedroom with the door locked and secured from the inside. A detailed scene examination, history of declined pact para-suicide, autopsy findings and toxicological analysis were used to determine the manner of death.

Scene description

The victim is reported to have been found lying in a prone position on the floor next to the bed, with two (2) black plastic lock-cable ties *in situ*. The cables had sunk deep into the skin as a result being pulled too tightly around the neck. It is also alleged that there was some blood emanating from his nose and mouth. Additional items recovered adjacent the body

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included a 2 L fizzy drink plastic bottle containing a pinkish liquid (the liquid appeared to have also spilled onto the floor tiles), a small empty yellow box container labelled as "RATTEX" and a small white plastic sachet. Two unused black lock-cable ties and two red shoelaces tied together were also retrieved from the scene. Multiple black ropes were discovered to have been tied to a metal pole which was erected inside the victim's bedroom; each rope had a ready-made noose. Items found inside the bathroom included some empty plastic containers, a bath tab soiled with some dry pinkish substance, a cooking pot, a foam bath plastic container which was labelled as "JIK" with some liquid inside and another plastic bottle container labelled as "Sunlight dish washing liquid". Upon removal, the body revealed some blood stains on the floor that appeared to have emanated from the mouth and nostrils (Fig. 1).

Autopsy findings

External examination of the body showed that the clothing was intact, wet and clean. Two (02) black coloured plastic 'lock tie' cables were present, both cable ties had sunk deep into the skin as a result being pulled too tightly around the neck (Fig. 2). There were also some dry blood stains observed on the victim's face.

Asphyxiation signs were marked by facial congestions, massive bilateral subconjunctival haemorrhage (Fig. 3), subconjunctival vascular makings and petechial haemorrhages on the mouth mucosa (Fig. 4). Removal of the two ligatures revealed 2 patterned grooves, measuring 32 cm, and completely encircling the neck with a maximum width of 1 cm, one above and one below the level of the thyroid cartilage in front, and below the occipital protuberance behind. The superior mark was anatomically located 6 cm and 7 cm below the right and left earlobes respectively and the inferior mark was 9.5 cm and 8 cm below the right and left earlobes respectively. The surface was pale with vertical parallel striations. Multiple small blisters were noted between ligature marks on the victim's skin. The circumference of the neck was 36 cm. The ligatures were black in colour, each with self-retaining plastic lock-tie mechanism with parallel vertical grooves on the inner surface which was in contact with the neck. The outer surface was smooth. Each cable tie measured 39 cm in length, and each had a noose with a circumference of 33 cm already made. The nooses were found to have completely encircled and constricted the neck by 3 cm. There were no peri-ligature injuries; these are usually associated with homicidal strangulation rather than suicidal and are normally marked by the presence of either nail marks or pressure imprints or bruises from the fingers above and below the ligature mark.

A bloodless- layered dissection of the neck revealed that the strap muscles were contused. Thyroid cartilage, hyoid bone, jugular and carotid vessels were intact. A 0.1 cm superficial incised was noted on the right middle finger. A pinkish discolouration appearing as a dry liquid stained the left upper lip. The colour of the dried stain resembled that of the pinkish liquid recovered from the scene. Livor mortis was cyanotic-



Fig. 2. Two black cable ties seen *in situ* on the victim's neck.



Fig. 3. Massive subconjunctival haemorrhage within the victim's left eye.



Fig. 4. Showing the victim's tongue clenched between the teeth and the victim's mouth showing mucosal petechial haemorrhage.



Fig. 1. Blood stain on the floor under where the victim's body was lying.

purple and well expressed at the back indicating that the victim might have been discovered three or four hours after his death. Bluish discolouration (cyanosis) was present on the nails. An internal examination revealed a tongue that was clenched between the teeth; the tip was dark red, with notable teeth imprints, there was also presence of tonsillar bleeding and some pinkish fluid coating the tongue. The presence of the pinkish fluid on the tongue and the pinkish stain on the lips of the victim raised suspicion that the victim might have ingested or tried to ingest the pinkish liquid recovered at the scene. Severe congestion with speck bleeding in pharynx-larynx was also noted. All internal organs were

congested with marked widespread sub-epicardial and sub-visceral petechial haemorrhages. The stomach contained approximately 400 mL of pinkish non smelling fluid; whose consistency resembled that of soft food. Chemical analysis of the liquid in the viscera and the pinkish liquid recovered from the scene revealed the presence of brodifacoum (a pesticide used kill rodents).

Discussion

Literature revealed that suicide by self-strangulation is rare and that it requires the use of a ligature that can be locked by some mechanism [5,11], in our case a self-locking cable tie was used. It has also been revealed that deep knowledge of neck anatomy is needed during the investigation of cases suspected of suicide by ligature strangulation, this will allow for adequate understanding of the clinical features of the strangled victim. While there are certain autopsy finding which can be used right away to confirm the manner ligature self-strangulation such as prominent congestion and the massive degree of petechial haemorrhage, facial congestion, scleral haemorrhage, absence of fracture of the hyoid bone, and tonsillar bleeding [11,12], other findings like the absence of defensive injuries, minimal or absence of injuries of deep structures of the neck [9,10], should also be checked to confirm suicidal actions. Cases of suicide by self-strangulation using one ligature [9,11,13] have been reported; this case is unique in that it reports the use of two ligatures in the form of lock tie cables.

Autopsy findings of the present case included extensive congestion of the face and head, massive degree of subconjunctival ecchymosis/petechial haemorrhages, tonsillar bleeding, insignificant haemorrhage of the neck structures including absence of defensive injuries all characterise suicidal action; this is unlike in hanging where an incomplete occlusion of the vasculature occurs. Suicidal neck compression generally has minimal injuries of deep structures of the neck when compared to the case of homicidal neck compression. Our findings were found to be consistent with suicidal neck compression. There was no fracture of the hyoid bone, which in strangulation normally indicates homicide until proven otherwise [13].

A distinctive correlation of between the circumstantial evidence, absence of struggle at the crime scene, status of the victim's clothing, absence of defensive wounds on the victim, type of ligature material used and post-mortem findings led to the conclusion that the victim died from mechanical asphyxia due to compression of neck by ligature strangulation. It is difficult to tell whether the victim pulled the ties around his neck at the same or one after the other but what is evident is that he applied enough pulling force to kill himself. The pesticide was only detected in the stomach contents and was absent in blood and other viscera, which as a result, ruled it out as a possible cause of death. Its presence in the stomach contents further supports the fact that the deceased had a strong determination to commit suicide.

Conclusion

Cases of suicide by self-strangulation are very rare in Botswana (in fact this is the first to be reported), therefore a detailed and accurate medico-legal evaluation of the circumstantial evidences, thorough death scene investigation, meticulous post-mortem examination and toxicological analysis is recommended before concluding the manner of death.

Declaration of competing interest

The authors declare that they have no affiliations with or involvement in any organisation or entity with any financial interest or non-financial interest in the subject matter or materials discussed in this manuscript.

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