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PII: S2665-9107(21)00021-9

DOI: <https://doi.org/10.1016/j.fsir.2021.100190>

Reference: FSIR100190

To appear in: *Forensic Science International: Reports*

Received date: 11 January 2021

Revised date: 10 March 2021

Accepted date: 19 March 2021

Please cite this article as: Marcello Benevento, Gabriele Mandarelli, Davide Ferorelli, Silvia Trotta, Giampiero Bottari, Cristina Caterino and Biagio Solarino, Complex suicide by drowning and self-strangulation: an atypical “holy” way to die, *Forensic Science International: Reports*, (2021) doi:<https://doi.org/10.1016/j.fsir.2021.100190>

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Complex suicide by drowning and self-strangulation: an atypical “holy” way to die

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Abstract

About 1.5-5% of suicides are committed in a complex way. The present paper reports the case of a 72-year-old man who committed suicide by throwing himself into the sea after tying a large stone with a rope and tying the other end with a slipknot around the neck. The postmortem analysis revealed asphyxia as that the cause of death, resulting in a combination of strangulation and drowning. Even if the prevalence of different means of suicide changes widely among different reports, there is a lack of evidence of such a combination in the scientific literature. Surprisingly, in the catholic tradition, several martyrs died by combination of drowning and strangulation. The gospels of Luke and Matthew also describe this particular combination of lethal means, which was also represented in several Renaissance paintings showing the martyrdom of saints.

Here we describe the forensic pathological findings of the case that we report, and we make some hypotheses to interpret the possible influence of literary and iconographic representations in the choice of lethal means.

Keywords: complex suicide; self-drowning; self-strangulation.

Highlights:

- A complex suicide with drowning and strangulation is reported for the first time
- The detection of multiple lethal methods can complicate diagnosis
- Knowledge of the cultural background of the victim may help to explain such cases

Introduction

The annual mortality rate for suicide has been estimated by the World Health Organization (WHO) to be 10.7 per 100,000 individuals worldwide, representing one recurrent variety of unnatural death. [1] Due to varying reliability in the recording of deaths, as well as the economic and cultural differences, suicide rates diverge as much as ten-times within and between countries. [2]

The prevalence of different suicide methods varies widely among different states, regions, genders, and is also influenced by socio-economic conditions. Among the main drivers in the choice of suicide method are: the availability and lethality of harmful tools, and socio-cultural acceptability. [3] [4] [5] [6] For example, suicides in the US most commonly occur using firearms, (61% of male and 36% of female suicides), while in European males, who normally do not possess firearms, the most common method is by hanging (33% in Finland to 91% in Poland). In Swiss males, who take their firearms home while performing military service, the most common suicide method is by firearm (34%), just like in the US. [7] In Italy, hanging is the most common suicide method, followed by fall from height, drowning, and use of firearms. [8]

According to Marcinkowsky (1974), suicides should be divided into simple and complex, depending on the number of suicide methods employed. [9] [10] About 1.5-5% of all committed suicides show a combination of multiple self-harm approaches, and are defined as complex suicides. [11] Complex suicides have been classified into:

1. primary or planned complex suicide: the victim chooses a complex suicide from the beginning, maybe to ensure that one of the suicide methods will, at least, succeed;
2. secondary or unplanned complex suicide: the victim switches from one method to another after the first has failed, has proved to be excessively painful, or has required too much time to cause death. [12] [13]

However, the so-called “complicated suicide” occurs when the first suicide method fails, but death results owing to a subsequent traumatizing event that occurs by accident. [14] [15]

According to the incidence of each suicide method, planned complex suicides have been further divided into “typical” i.e. associations of two common methods, and “atypical” ones that present rare combinations or a coincident use of more than two suicide means. The frequency of each suicide method used in complex suicide does not differ from the one measured for non-complex suicide. [16]

Because the presence of several different wounds is strongly associated with homicide, the high variety of injuries often found in complex suicides can make the differential diagnosis between homicide and complex suicide difficult. [17] To establish the manner of death in such cases it is essential to achieve a complete reconstruction of the events, a careful inspection of the scene of death, as well as a thorough autopsic, toxicological and histopathological examination. Hence complex and complicated suicide frequently represent a difficult challenge for forensic pathologists. [18]

Case

In June 2020, in a small town in southern Italy, a 72-year-old man was found floating in the sea near the beach with a slipknot around his neck. The sea was shallow and full of rocks, while the beach was sandy, with several large white stones all along the seaside but far from the shore. The body, the rope, and the clothes were completely wet. [FIGURE 1] The body presented large wounds, congestion and petechiae on head and face. There was a hematoma on the right eyebrow, with a small cut on its lateral edge, and some little ecchymosis on the chin. The slipknot was on the anterior part of the neck, and the mark was deepest on its posterior part. There was a single transverse ligature mark that completely encircled the neck without gaps. The ligature mark was 6 cm higher than the jugular notch on the anterior part, and 10 cm lower than the external occipital protuberance on the posterior one. The anterior part of the mark traced the shape of the slipknot. A red-tinged froth exuded from the mouth. The body did not show any sign of maceration. The police found that the victim left his home around two hours before the body was found.

At one extremity of the 42 cm long rope a noose with a simple slipknot was tied around the neck, while three loops were fixed by a triple bowline knot on the other. The loops varied in circumference and diameter, ranging from 65 to 95 cm and 20 to 30 cm, respectively. [FIGURE 2]

The autopsy was carried out after 24 hours. The hematoma on the right eyebrow and the ecchymosis on the chin showed signs of vitality, while the wounds on the nose, chin, and left side of the head and face showed the absence of soft tissue hemorrhages along with the lack of a significant microscopical vital reaction. Internal examination showed a bite mark on the left edge of the tongue, and hemorrhages in the right ala and left superior horn of thyroid cartilage, sternocleidomastoid and paravertebral muscles [FIGURE 3]. We found froth and water in the airways. The lungs presented anthracosis and emphysema *aquosum*, and they almost covered the heart and met in the middle. The gastric content was 200 ml of fluid, with scarce food residues. The brain parenchyma was congested and edematous. The lesions to the head were maybe inflicted by the rocks on the seabed.

Nevertheless, the manner of death remained unclear until the police found a large white stone lying on the sea-bottom just a few meters far from the shore as they were coming away from the beach. The police investigation also found out that the victim suffered from depression. According to the testimony of his wife, the victim left home around 10.00am, the body was found almost one hour later. At that time, in summer, the beach was very crowded, but no one heard or saw anything strange.

Toxicological findings included: alcohololaemia 0,01 g/L; negative results for any of the tested substances (cocaine, opiates, barbiturates, buprenorphine, methadone, cannabinoids, oxycodone, meperidine, tramadol, levorphanol, methorphan, levamisole, atropine, paracetamol, haloperidol, bipyridine, lidocaine, and pesticides).

According to the autopsy findings and post-mortem analysis, death was caused by asphyxia, resulting in a combination of strangulation and drowning. Thanks to the ancillary information and the results of the post-mortem examination, and toxicological findings, the manner of death was established as suicide (ICD-10-CM: X71.3 and X70).

Discussion

This report shows a rare type of complex suicide carried out by a combination of drowning and self-strangulation. The hypothesis that the present was a case of homicide has been excluded because:

a) there were no signs of victim's resistance or signs of binding the arms, wrists, or legs; *b)* toxicology tests proved negative for alcohol and drugs that could have impaired the defense of a presumably reluctant victim. Moreover, the beach was crowded but no one witnessed any aggression. From a pathological point of view, the ligature mark was single and unequal, having the shape of the slipknot on the anterior part while the posterior one was deep and uniform. This means that the noose was tightened from the front of the victim: carrying out a strangulation in such a way would be uncomfortable for any hypothetical murderer.

Furthermore, the victim presented an history of depression which has long been associated with suicide. [19] [20] [21] Several studies demonstrated that older adult males have the highest suicide mortality rates compared with other age-gender groups. [22] [23] [24]

Considering all the data and findings, this case can be defined as a primary complex suicide. A possible hypothesis is that the victim prepared the rope, tied the stone, and threw himself into the sea to combine self-drowning and self-strangulation.

Drowning is defined as a primary respiratory impairment from submersion in a liquid. [25] The whole process ordinarily takes seconds or a few minutes to cause death. [26] Even if there are no established diagnostic features for drowning, many findings (fluid aspiration inside the lungs, the internal and external airway foam, the fluidity of gastric content) suggested that the victim was still breathing when he submerged. [27] [28]

Strangulation is a type of mechanical asphyxia produced by constriction of the neck through a ligature, with a force different from bodyweight. [29] Mechanical airways occlusion normally requires pressure of almost 15 kg (147 N), due to the resistance of the trachea cartilage. [30] A pressure of 3.2 kg (31.36 N) is enough to occlude the artery system of the neck, while that exerted by 2 kg (19.6 N) is sufficient to close the venous system. [31] The vagal reflex requires even weaker pressure, causing bradycardia or cardiac arrest. In the presented case, local neck injuries, facial congestion, facial hemorrhage, and the tongue edge lesion suggested strangulation. [32] [33]

The three loops on the free extremity of the rope appeared suitable for tying an object (e.g. a stone), but unnecessary for homicidal strangulation. A large stone was found on the sea bottom near the body and was recovered by police, it weighed 14.3 kg. According to the Italian Soil Protection Department, the shore stones of that particular region are prevalently made of limestone sedimentary rock, which density ranges from 2.1 to 2.7 kg/L. [34] [35] So, the lower limit of the stone's volume is about 5.32 L. As seawater density is SICURO??? around 1 kg/L, according to Archimedes' principle, a buoyant force around 52.14 N was exerted on the stone, while the weight force exerted by the stone was at least 140.73 N. Finally, a resulting weight force about 88.59 N (corresponding to a mass of 9.04 kg) was exerted on the victim's neck. Additionally, the buoyant force pushing the victim's body towards the surface, helped tighten the noose. Hence, as long as the stone wasn't touching the bottom, the self-strangulation could have been effective even in water. [FIGURE 4]

The most important issue for pathologists is to establish manner of death, however, it is difficult to present a conclusive answer in this case. Whether death occurred due to self-strangulation or drowning as well as the events sequence is a question that still remains unanswered. The presence of signs of both mechanisms suggests that they may have acted almost simultaneously and with comparable causal relevance.

The combination of self-strangulation and drowning is unusual. Our literature review did not find any other similar case. According to an international study, considering suicide methods, mortality per 100,000 people for suicide by drowning ranges from 0.02 in Mexico to 0.96 in Ireland. [36] Muccino et al. reported that drowning incidence among the different countries ranges from 3 to 26% of the total amount of suicides. [37] Self-strangulation is so seldom that many authors believe that it is not even possible, even if some examples have been described in the forensic literature. [17] [39] [40] With regard to complex suicide, Italian records stated that in Milan the most frequent combination is plastic bag suffocation and inert gas inhalation (22.6%, 12/53 cases) while in the Ligurian region, wrist cutting followed by hanging (unplanned

in each case) was the most recurrent combination (42.1%; 8/19 cases). [13] [14] Therefore the presented case represents an atypical complex suicide.

Regarding the present case, a hypothesis about the decision-making process is that the victim used a sort of ballast to keep himself underwater. Perhaps considering the shallow water and the instinct to re-emerge, he tied his neck with a slipknot to accomplish self-strangulation.

Surprisingly, even if in the scientific literature we did not find any other case similar to the one here reported, in the catholic tradition there are many references to people who threw themselves or were thrown by others, into the water with a stone tied to the neck. Indeed, in Luke and Matthew's gospels, Jesus Christ mentions such a cruel mechanism of death: *“Things that cause people to stumble are bound to come, but woe to anyone through whom they come. It would be better for them to be thrown into the sea with a millstone tied around their neck than to cause one of these little ones to stumble.”* (Luke 17:1-2); [41] *“If anyone causes one of these little ones—those who believe in me—to stumble, it would be better for them to have a large millstone hung around their neck and to be drowned in the depths of the sea.”* (Matthew 18:6). [42] It is also handed down that even three classical holy martyrs (Saint Florian, Saint Pantaleon from Nicomedia, and Saint Rufino) died that way, due to Roman oppression and persecution. Some of those episodes have been portrayed. [FIGURE 5]

Considering that catholic tradition is widespread in Italy, it is conceivable that the victim was aware of these Gospel passages or martyrs' stories, or, at the very least, had heard about them. Several predictors of suicide, including psychiatric disorders, have been evidenced in the scientific literature. [43] However, there is not an unequivocal opinion about practicing religion and suicide, in fact several studies report religion to be protective against suicide, others found it to be a risk factor, and others a neutral factor. [44] [45] [46] [47] This may be due to the complex relationship between spirituality and behavior. Indeed, a 2016 review showed that different religious affiliations provide a different degree of protection or risk (e.g. religion can connect to the community and help the socialization, but adhering to a minority group, or feel guilty about something might conduct to isolation). [48]

In the catholic tradition, the combination of drowning and strangulation is roughly described as a painful and slow way to die (even if it is not true). However, trying to feel less pain does not seem to be one of the major drivers in the choice of suicide method. For example, in Iranian females, one of the common methods of suicide is self-immolation, which appears a very painful and slow way to die. [6]

Conclusion

This report highlights problems and possible medico-legal solutions in case of complex suicide. A careful pathological examination may be not enough to understand the sequence of events. Toxicological and histological examinations, a thorough examination of the crime scene, and the full acquisition of ancillary information are essential, especially to rule out the possibility of homicide.

Declaration of interest: none.

Acknowledgements

We thank Dr. Samantha Austen for grammar and language revision. This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Author contributions

Marcello Benevento with the contribution of all the authors: Writing – Original Draft

Gabriele Mandarelli and Davide Ferorelli: Writing – Review and Editing

Biagio Solarino: Supervision

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Figures

FIGURE 1



Figure 1 - The body on the beach.

FIGURE 2



Figure 2 - The rope.

FIGURE 3

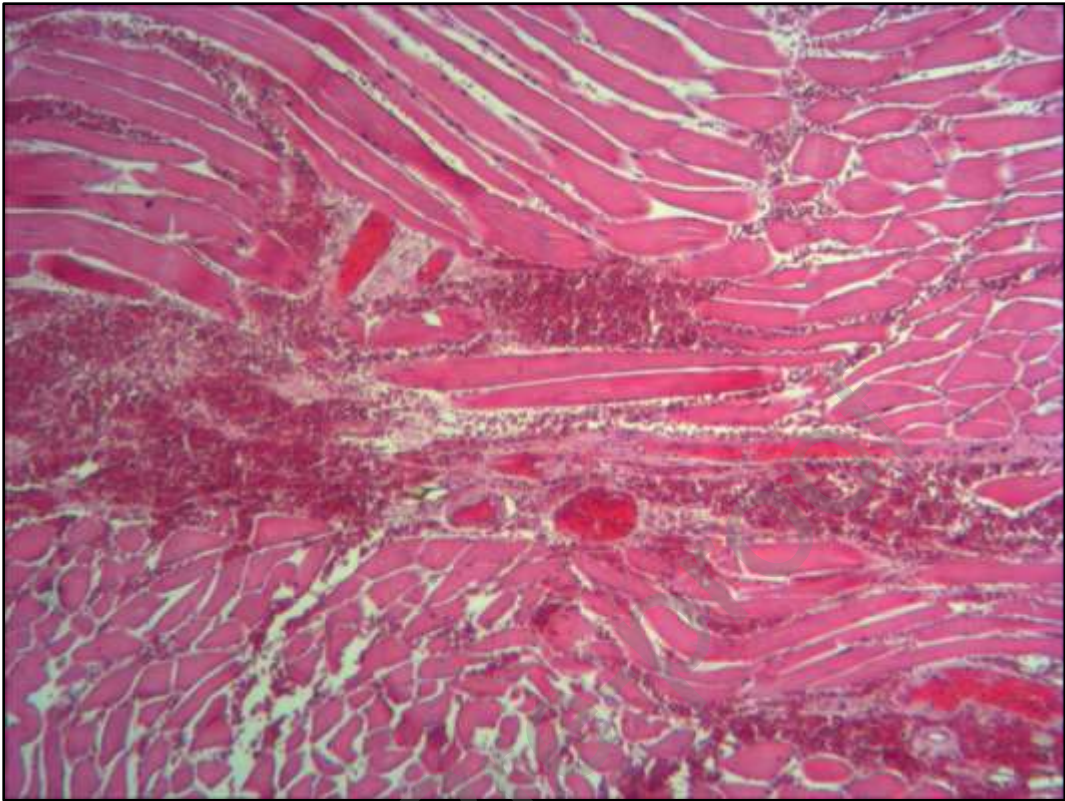


Figure 3 – Left sternocleidomastoid muscle, H&E stain.

FIGURE 4



Figure 4 - Simulation of the stone tied with the three loops.

FIGURE 5



Figure 5 - Albrecht Altdorfer (1480-1538), "The Martyrdom of St Florian".

Declarations of interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper. This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

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