Case Report

Weighted Drowning with Self-Restraint: Forensic Autopsy Differentiation of Augmented Suicide from Homicide

Siddhant Kakan[1], Mohan Pawar[2], Jamebaseer Farooqui[3], Anoushka Pande[4], Ajay Gomase[5]

[1]Junior Resident, Department of Forensic Medicine and Toxicology, Dr. Balasaheb Vikhe Patil Rural Medical College, Loni, Maharashtra, India.
[2]Professor & Head, Department of Forensic Medicine and Toxicology, Dr. Balasaheb Vikhe Patil Rural Medical College, Loni, Maharashtra, India.
[3]Professor, Department of Forensic Medicine and Toxicology, Dr. Balasaheb Vikhe Patil Rural Medical College, Loni, Maharashtra, India.
[4]Junior Resident, Department of Pathology, Dr. Balasaheb Vikhe Patil Rural Medical College, Loni, Maharashtra, India.
[5]Junior Resident, Department of Forensic Medicine and Toxicology, Dr. Balasaheb Vikhe Patil Rural Medical College, Loni, Maharashtra, India

Abstract

Background: Drowning deaths that provide physical restraints are a great setback to forensic reasons, ascertaining the mode of death. In the optional shading of suicide, victims can make the occasions more lethal using the techniques of self-restraint or weights, resembling the patterns of homicidal drowning, which require careful medico-legal inquiries to avoid erroneous decision-making. **Case Presentation:** A 26-year-old man was found dead, face down in a well, with an orange-colored ligature that created a running noose around the neck and was tied to heavy agricultural machinery (about 15 kg). Tied with a white cloth, his wrists were loosely bound at two levels, with a neck ligature. Forensic autopsy showed typical signs of drowning, such as emphysema aquosum, washerwoman hands and feet, and the presence of gastric fluid (2.5 litres). Importantly, there were no signs of struggle or defensive injuries, as well as no ligature injuries on the neck or wrists. **Results:** Externally, eyeballs and tongue were protruded, the anterior trunk and upper limbs showed marbling, and significant skin peeling was seen due to decomposition. The primary cause of death was asphyxial drowning with flabby organs and certain 2.5 litres of watery fluid in the stomach, which were confirmed by examining them internally. Progressive features of decomposing indicated a postmortem period of 18-36 hours. The lack of ligature appearance, even in the case of open bindings, was a sign of the extreme looseness of fastening, which was that of augmentation rather than official tying. **Conclusion:** The forensic autopsy was able to distinguish between augmented suicidal drowning and a staged homicide using the key findings of the absence of ligature marks, lack of defensive injuries, and characteristic drowning pathology. The present case emphasises the importance of thorough medico-legal investigation as a tool of diagnosis in forensically unclear drowning caused by restraints and weighted deaths.

Keywords: weighted drowning, augmented suicide, forensic autopsy, ligature marks, self-restraint, asphyxia death, drowning differentiation, homicide exclusion.

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Introduction

Suicide is still a serious international public health concern, with drowning being a major and underreported mode of self-destruction, especially in coastal and rural areas.[1] Although typical drowning cases exhibit established pathological symptoms, the forensic identification of the cause of death is of an extremely high order in cases where the dead body bears physical restrains and weighted materials.[2] In this case, the physical restrains and the weighted materials may create an extraordinarily high level of forensic ambiguity since it forces the forensic pathologist to strictly tell whether the case is actually a suicide.

These cases are commonly referred to as complex suicides in the literature on forensic law, and there were several cases of suicidal drowning involving self-restraint and weighting, which are analysed in this article as the key autopsy findings that enabled the elimination of homicide as a possible cause of death in a highly ambiguous medico-legal context.

Case Presentation

A 26-year-old male was discovered face down in a well located in a rural agricultural area of Shirdi, Maharashtra, India. Local police brought the body to the forensic medicine department to establish the exact cause and manner of death. According to the investigating officer's inquest report, the deceased had been missing for approximately 24-48 hours before discovery. Family members reported no prior history of suicidal attempts or psychiatric illness during preliminary investigation.

Crime Scene Findings

At the scene of recovery, the deceased was found submerged in the well with an orange-coloured ligature material fashioned into

Address for correspondence: Dr. Siddhant Kakan, Junior Resident, Department of Forensic Medicine and Toxicology, Dr. Balasaheb Vikhe Patil Rural Medical College, Loni, Maharashtra, India.
E-mail: drpsysid@gmail.com

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a running noose configuration around his neck [Figure 1]: Body recovered in well). The deceased is seen submerged in the water, face down, with visible orange ligature material around the neck area. The free end of this ligature was securely attached to heavy metal farming equipment weighing approximately 15 kilograms, which had pulled the body into a face-down position in the water. His wrists were loosely bound together using a white cloth material that was connected to the orange neck ligature at two distinct levels: between both wrists and at the neck region [Figure 2] Primary and secondary ligatures). The primary ligature encircles the neck and is attached to heavy farm equipment, as shown in Figure 3. Secondary ligature is tied between both hands. The material of ligature 1 is nylon rope, and that of ligature 2 is white cloth. No suicide note was recovered from the scene. The well was located in an isolated area with no witnesses to the incident. Crime scene photographs documented the body's position, the configuration of the bindings, and the attached weighted equipment [Figure 3] Weighted equipment). The primary orange ligature is securely tied to the heavy metal farm equipment (approx. 15 kg) used to weigh the body.

External Examination

The body was described as that of a well-built adult male with moderate muscular development and a height of 170 cm. Rigor mortis was not observed at any point of the body, which was in line with the post-mortem period being estimated to be more than 36 hours. Post-mortem lividity was fixed in the areas of the body that were under dependence, such as the anterior wall of the chest and the abdomen, which was similar to the face-down position in which the body had been found.

The changes in decomposition were numerous, with both eyeballs and the tongue significantly protruding, indicating elevated intracranial pressure and asphyxia. The anterior trunk and the two upper limbs were covered with extensive marbling (venous network patterning), typical of extensive decomposition, along with high environmental temperatures (early July), which were worsened by post-mortem gnawing on the right upper arm; the marbling appeared [Figure 4: Decomposition changes]. Due to long-term submergence, Washerwoman had marks on her hands. Primary and secondary ligatures were present. There was an evident presence of washer's pagoda hands and feet, which had maceration and wrinkling of the palmar and plantar of the feet, and the feet were immersed in water for more than 12 hours, which is characteristic in the case of prolonged exposure. The skin was peeling around the periorbital area and on the upper trunk, signs of early dermal separation characteristic of decomposition.

The neck orange ligature was tied in a running noose, with the free end tied to the farm machinery. Importantly, there was neither any evidence of a ligature nor a bruise or abrasion on the skin of the neck, despite the presence of the ligature material being observable. This was a very important discovery, indicating a very liberal practice of ligature use without any pressure applied to the tissue.

Figure 1: Body recovered in well, Figure 2: Primary and secondary ligatures

Figure 3: Weighted equipment, Figure 4: Decomposition changes

Figure 5: Ueno's sign schematic, Figure 6: Comparative suicide pact case

In both wrists, a loose binding made of white cloth, attached to the ligature around the neck, was observed. Ligature marks, abrasions, or contusions were not found on either wrist, which once again pointed to the routine of only minor pressure use at the time of binding. Examination of the whole-body surface also did not reveal any defensive injuries on the hands, forearms, or any other part of the body. No struggle or assault evidence were found, as no contusions, lacerations, or abrasions were found. The fingernails had no subungual haemorrhages or foreign material that could be taken as a sign of defensive action.

[Figure 5] Ueno sign schematic) - The sign of haemorrhage in the mastoid air cells and middle ear of drowning. Mechanism: In active drowning, sharp changes of compartmental pressures in the nasopharynx occur due to violent inspiratory efforts that are

passed down the Eustachian tube. This culminates in the tearing of mucosal vessels in the middle ear and mastoid air cells—medico-legal importance: The evidence of antemortem submersion, asphyxial death.

Internal Examination: When the body cavities were opened, all the internal organs revealed a flabby, softened condition, indicative of early decay and long-term water occupation. Generalised pallor in the viscera and a lowered tissue integrity as a result of autolytic processes.

Respiratory System: Both lungs showed the typical appearance of emphysema aquosum, i.e., overdistension of the pulmonary parenchyma with air and fluid, giving it a balloon-like and sponge-like appearance. The lungs were markedly enlarged and occupied the entire thoracic cavity, with palpable crepitus. Sections of both lungs that were cut indicated the presence of frothy fluid pouring out of bronchi and bronchioles, and subpleural bleeding. The blood-tinged, frothy fluid found in the trachea and major bronchi was typical of drowning pathophysiology. The two lungs weighed about 1,200 grams.

Cardiovascular System: The heart weighed approximately 320 grams and showed no abnormal structure. The chambers contained no blood, and the coronary arteries showed no atherosclerosis. The myocardium was pale and early autolytic without recent or old myocardial infarction.

Gastrointestinal System: On opening the stomach, some 2.5 litres of watery, clear to slightly turbid fluid were retrieved. This contended gastric fluid is a typical manifestation in drowning that symbolises aspirated and ingested water in the damage of drowning. The gastric mucosa was found to be filled with petechial bleeding. No hard food particles have been detected, and it was assumed that the person died some hours after the last meal. The oesophagus had the same watery fluid without traumatic injuries.

Nervous System: The brain weighed 1,350 grams. There was moderate cerebral vascular congestion—no identified trauma of the scalp, skull, or brain parenchyma. Meninges were intact, but there was no haemorrhage or cerebrovascular accident.

Musculoskeletal System: The strap muscles, sterna cleavage, and muscles of the cervix, examined through detailed dissection, showed no haemorrhage. The hyoid bone and the thyroid cartilage were normally intact (with no fracture or dislocation). The spinal cord and cervical vertebrae were not injured. Such a finding was essential in ruling out strangulation or neck trauma.

Decomposition Thinking and Time Since Death.

Skin peeling combined with extensive marbelling, washerwoman changes (maceration), and the softening of inner organs, combined with environmental temperatures in the lower part of July, Shirdi region (usually 35-40 °C), enabled the estimate of a time elapsed since death to be between 18 and 36 hours before body recovery. This increase in the rate of decomposition was attributed to high ambient temperatures and to the aquatic environment, which accelerates putrefaction.

Toxicological Analysis: Toxicological analysis was performed on samples of visceral tissue, blood, and body fluids collected and preserved in standard containers. In-depth screening of typical poisons, organophosphorus pesticides, carbamate insecticides, alcohol, and abused drugs (opioids, cannabis, benzodiazepines) was done. Toxicological screening that was conducted all gave negative results, making drug-facilitated incapacitation and poisoning as contributory factors impossible.

Discussion

Physical confinement or weighing of the body makes the examination of a drowning murder case unique, owing to the presence of a specific forensic issue during investigation. As existing evidence-based reports point to, the cases of drowning should never be determined only through the results of an autopsy, as they are still subject to serious doubts, and require ample pooling together of Crime scene investigation results, witness accounts, and detailed post-mortem analysis.[5] The current case illustrates the paramount role that autopsy examination could play in separating augmented suicidal drowning from cases of homicidal drowning or accidental death. A historic case of suicidal self-waterboarding was documented by Galante et al. (2021), who reported that a 22-year-old male died in a bathtub with his hands tightly tied with nylon ropes and padlocks in place, as well as his head covered with a soaked canvas bag in a bathtub (on the histological examination, emphysema aquosum was observed, and no defense wounds or blunt force injuries were detected). Forensic genetic analysis established the only DNA of the victim on all the ligature materials, which proved the determination of suicide. Authors also pointed out that complex bindings in self-tying can be possible in suicide deaths, especially when the person is keen to make sure that no shift of the heart occurs when performing the self-tying. In the current case, the loose character of the bindings, being entirely devoid of ligature marks, indicated strongly that they were self-applied and not forced by the hands of another human being.[6]

Arjun et al. (2024) reported an intricate instance of suicide whereby hanging was involved with a self-inflicted wrist incision in a 41-year-old woman, and it is mentioned that complex suicide constitutes 1.5-5% of all suicides and often causes controversy when it comes to determining the manner of death. Although the current case does not presuppose multiple techniques (only drowning was employed), the purposeful introduction of weights (15 kg farming equipment) and restraining elements to guarantee the success of the operation and exclude any chances of survival or rescue may be viewed as augmented suicide.

A survival analysis study conducted by Bhaskaran et al. (2022) investigating predictors of subsequent suicide attempts in high-risk people admitted to an acute psychiatry unit of suicide intervention in India identifies the complexity of psychosocial and clinical factors driving suicidal behavior.[7] These underlying risk factors and behavioural patterns can be used to contextualise the unusual augmented presentations associated with weighted drowning in the Indian population. The missing ligature patterns, despite evidence of bindings, are essential to the forensic identification of the case. In the case of ligatures whose knots are tightened loosely, as in self-binding to augment the skin, there is little or no pressure on the skin below them and therefore no common injuries of ligatures like abrasions, bruising, or

parchment questions. By contrast, homicidal restraint is generally associated with forceful tying tied with great pressure, which leaves deep marks, skin cuts, and bleeding under the tissue base. The cutaneous appearance in the current case revealed entirely emaciated skin around the neck ligature area as well as the wrist ties, which were highly suggestive of loose, self-inflicted shackles to enhance augmentation, as opposed to subduing the individual.

This observation is also applicable to the given case, as moderate degradation was observed rather than severe putrefaction, which enabled the detection of emphysema aquosum (Armatys et al. 2023). But, the water-related deaths 28 years in northeastern Italy, critically assessed by Simonit et al. (2023), found that even though emphysema aquosum and external foam are the most trusted outcomes, determination by solely the outcome of autopsy cannot be established with definite certainty.[5] This is a crucial pointer to the incorporation of crime scene results, as well as toxicology and investigative contributions to the autopsy results.[8,9]

The present case forensic autopsy findings were all in line with asphyxial death that was caused by drowning. A very characteristic yet non-specific creation in drowning deaths is emphysema aquosum, which is over-distension of the lungs with air and fluid. Schneppe et al. (2021) critically examined macro-morphological results in water-related fatalities. They concluded that the presence of signs of drowning does not, on its own, indicate a high degree of diagnostic certainty, but that diagnostic value can be expected when the forensic physician systematically examines the affecting factors and the multimodal investigative data.[10] The fact that the amount of fluid in the stomach was approximately up to 2.5 litres served as a supplementary indication of the diagnosis since, in the case of drowning, the victim of a crime The washerwoman alteration (macerations of the plantar and palmar surface) manifested the long immersion, which is usually not less than 6-12 hours of being under the influence of water.

Skin peeling, marbelling, and internal organ softening in this case were attributed to the effects of hot temperatures in the Shirdi region in early July (35-40 °C) and in the aquatic environment. These changes that occurred after the death did not blur the diagnostic critical findings, although they made some of the examination complex. Time since death estimation ranging from 18 to 36 hours was consistent with the report on the time at which the missing person was last seen by the family and the degree of decomposition they witnessed.

Crime scene investigation was a necessary complementary role in the determination of the manner of death. The finding of the body in an isolated rural well, the lack of any indications of struggle on the scene, and the setup of the weighted system in the waist were in favour of suicide. The heavy farming equipment (15 kg) was also an intentional decision to keep it submerged and avoid the chance of it rising to the surface and being saved. Although this is an anomalous augmentation method, it has been taught as a means of ensuring a lethal attempt in the forensic literature as a technique used by serious suicidal people.[4]

Homicide was to be strictly ruled out in the differential diagnosis in this case. Other important inferences which ruled out homicidal drowning were: (1) absolutely no marks of ligature despite visible bindings, (2) none of the particular injuries on hands or forearms or other parts of the physique, (3) no contusions, laceration, and traumatic injuries indicating assault or struggle, (4) intact hyoid bone and thyroid cartilage, (5) no laceration on neck muscles, (6) negative screening on toxicology indicating no drugs induced incapacitation. The fact that the bindings were loose and the knot arrangement was simple showed that self-tying was possible.

The use of current forensic techniques, such as post-mortem computed tomography in conjunction with endoscopic autopsy, has increased the accuracy of the diagnosis in the drowning case, as both modalities were not utilised in the case in point. Still, a conventional autopsy with a comprehensive crime scene investigation and toxicology was adequate to determine the manner of death.

Conclusion

The case is an infrequent introduction of augmented suicidal drowning with self-restraint and weighting. Incorporating absent ligature marks, no defensive injuries, and typical pathology of drowning, the forensic autopsy was able to determine the difference between suicide and homicide. An investigative multidisciplinary approach involving autopsy, toxicology, and crime scene testing is vital in making a definite manner of death in cases where there is forensic ambiguity, such as cases involving asphyxia.

Recommendations: Forensic pathologists are encouraged to submit a systematic report on the existence or non-occurrence of ligature marks in all drowning cases of restraints because such evidence carries a significant distinction of self-inflicted and forcefully imposed ties. Focus on the rigidity of ligatures, and also note the pressure marks, since loose knots can indicate augmentation rather than homicidal restraint.

Strengths of the Study: This case report also presents a detailed documentation of the Autopsy of a peculiar presentation of augmented suicide, which would be a valuable source of reference to forensic practitioners who deal with similar cases. The combination of crime scene evidence, an in-depth examination of the autopsy, and a toxicology report proves how much manner of death is determined in a systematised way in forensically complex cases.

Limitations of the Study: The latter decomposition made some specific investigations difficult, and the lack of events witnessed, or a suicide note restricted the evaluation of the psychological autopsy. Other modes of inquiry, such as postmortem computed tomography, would have helped expand the diagnostic findings.

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Conflicts of interest

There are no conflicts of interest.

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