



## Case Report

# Unusual Case of Long Drop Hanging with Sub-occipitomastoid Ligature Knot and Cut Throat Injury over the Laryngotracheal Region: Forensic and Medico-legal Implications

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## ABSTRACT

**Background:** Suicide ranks as the primary cause of mortality among Indian individuals between 15 and 34 years old. The investigation of crime scenes is essential to distinguish between suicide and homicide cases. People who suffer cut-throat injuries are more likely to have been murdered than to have killed themselves. Suicidal incised wounds most commonly appear in the anterior neck area next to the laryngo-tracheal region and often show signs of hesitential cuts.

**Case Presentation:** The victim, a 25-year-old male, average build, used a razor blade to create an incised wound in his laryngo-tracheal region before ending his life through hanging. The deceased committed suicide in his parents' house by using a bedsheet as a soft ligature that was attached to a ceiling fan with the help of a chair. Fatal asphyxia resulted from neck constriction and soft tissue trauma due to the specific length and placement of the ligature. The knot of the ligature was located at the sub-occipitomastoid area on his neck. The investigation of this unique case focuses on understanding how neck trauma played a role in causing death.

**Conclusion:** This research presents an atypical suicide case involving self-inflicted damage to the laryngo-tracheal area combined with a ligature knot positioned at the sub-occipitomastoid region. Forensic experts conducted an extensive examination that involved analyzing the crime scene structure, body placement, and blood splatter patterns to establish the manner of death. No defensive injuries combined with hesitation marks and knot placement, along with bloodstains on fingertips and seminal discharge, indicated suicide as the cause of death. The case demonstrates how autopsy results combined with detailed scene examination are essential to differentiate between suicide and homicide in difficult cases.

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## Introduction

The World Health Organization (WHO) reports that suicide results in about one million deaths annually and that suicide attempts occur twenty times more frequently. The global suicide mortality rate is 16 deaths per 100,000 people. According to WHO mortality statistics, hanging remains the leading method of suicide throughout most nations, as reported by Gross and coworkers [1]. India experiences the highest number of deaths from suicide among people aged 15 to 34. According to Jose and team [2], suicide rates reach their highest level at 38 deaths per 100,000 people within the 15–29 age bracket, while the 30–44 age group follows with 34 deaths per 100,000 [3]. National Crime Records Bureau (NCRB) data from India shows that hanging was responsible for 41.8% of suicides in 2014 before rising to 45.6% in 2015. Hanging results from a ligature around the neck, which creates fatal asphyxia through the body's weight-induced constriction [4].

Laryngo-tracheal trauma presents a high fatality risk due to its infrequent occurrence and nonspecific symptoms, which delay diagnosis. The initial phase of effective management involves stabilizing the airway before proceeding with surgical procedures to regain speech and swallowing abilities [5]. Cricoid cartilage fractures occur rarely from high-impact trauma like strangulation but hold clinical importance because they can cause airway obstruction plus laryngeal stenosis. Medical professionals and forensic investigators find these injuries significant because they might indicate homicidal violence, which requires detailed evaluation and extended management according to Celo and coworkers [6].

Suicide cases seldom show incised neck injuries without hesitation marks, which pose forensic interpretation challenges. The death investigation of a 79-year-old woman who inflicted a self-inflicted neck wound demonstrates why comprehensive scene investigation and contextual analysis are vital for determining the manner of death [7]. Attempted hanging survivors frequently develop serious laryngeal injuries that remain undetected, such as complete transection. When managing airway injuries from strangulation, early tracheostomy becomes essential because endotracheal intubation risks creating false passages, which worsen the airway obstruction [8]. Judicial hangings commonly cause laryngeal transection and Hangman's fractures, but similar injuries are infrequent in cases of suicidal hangings [9]. A case of long-drop hanging with a nylon rope and a sub-occipital knot produced dual injuries,

demonstrating how the knot location affects anatomical damage [10].

The location of the ligature knot determines how we understand different postmortem results in cases of hanging deaths. The position of the ligature knot affects the direction of dribbling of saliva, the orientation of the ligature mark, and the head tilt. The sub-occipitomastoid knot sits between the occipital bone and the mastoid process. In cases where the knot is located between the occipital bone and mastoid process, saliva dribbles from the mouth's lateral angle opposite to the knot side and stains the chest or clothing without reaching the mandibular border [11].

People who harm themselves often choose methods like using firearms, hanging themselves, or swallowing poisonous substances. Suicide attempts often manifest as incised wounds to the arms or wrists, whereas cut throat injuries in suicide cases remain exceptionally uncommon. These injuries typically show hesitation marks when they appear. Cut throat injuries constitute acute medical emergencies because they can damage vital neck structures and potentially cause massive hemorrhage along with air embolism or airway obstruction that may result in death [12]. A comprehensive forensic investigation that includes case history assessment, scene examination, injury pattern analysis, ligature positioning inspection, examination for defensive injury absence, and psychosocial background evaluation is mandatory to determine the manner of death accurately.

## Case Presentation

### Case History

On 26 November 2018, local police received a report at approximately 12:30 p.m. Law enforcement received a call about a body hanging from a ceiling fan in a residence within Nirmali village, where Nirmali Police Station operates under Supaul District, Bihar. Authorities identified the deceased as a 25-year-old male with a moderate body build. The law enforcement officers who arrived first noticed a neck injury and floor blood patterns with a bloodied razor blade next to the body (Figures 1 and 2).



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**Figure 1.** Image showing the ligature knot positioned at the sub-occipitomastoid region.



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**Figure 2.** Image showing the chair used for suicide and floor blood spatter patterns

The police initially classified this as a homicide investigation because the victim sustained a sharp-force wound and the situation appeared suspicious. The investigation team specializing in forensic analysis was

summoned to evaluate the scene to establish the exact cause and manner of death. Early investigation findings showed the victim had a romantic connection with a woman who lived near him. His parents were away at a wedding ceremony when the incident occurred. He

stayed by himself in the house and faced emotional distress stemming from a disagreement with his girlfriend, who refused to talk to him on their last phone conversation. He attempted to end his life by cutting his neck with a razor blade as he suffered from psychological turmoil and emotional distress. Unable to succeed in his initial suicide attempt with the razor blade, he resorted to hanging himself.

### Crime Scene Examination

The police alerted forensic experts, who then proceeded to the location. The building where the incident occurred featured two levels and provided access through two separate doors on its ground floor. The locked entry point was from the inside, whereas the other door stayed unlocked. Investigators found no evidence of forced entry, which indicates that no outsiders participated in the incident.

A construction room on the first floor without doors and windows housed the deceased body. Two beds, a plastic chair, and assorted household items occupied the room (Figure 2). The forensic team carried out a detailed and orderly investigation at the scene. The victim's body hung from a ceiling fan, which was positioned directly above one of the room's beds. The victim's feet barely touched the mattress while his hands remained suspended freely. The examination revealed partially open eyelids together with a protruding tongue, while blood-stained saliva emerged from the mouth, and semen was present in the underwear. Venous obstruction caused the appearance of petechial hemorrhages on both the feet and legs.

A multicolored bedsheet formed a sliding-type ligature knot around the neck to facilitate the hanging. The leftover portion of the bedsheet was seen lying across the bed. The sliding-type ligature knot created by the bedsheet was located on the left side of the neck in the sub-occipitomastoid region. An inverted 'V' shaped ligature mark led to a neck structure laceration because of applied traction (Figure 1).

The anterior neck region displayed several superficial incised wounds, which were located above the thyroid cartilage and spread toward the left side alongside the hanging. The pattern of these wounds showed typical hesitation marks that indicate they were self-inflicted. The anterior body and clothing exhibited bloodstains flowing downward, while a splatter pattern appeared on the thighs as well as the shoes and floor.

The bed frame edge showed bloodstains, and floor surface exhibited similar blood patterns. The investigators discovered a steel razor blade covered in

blood located between the bed frame and the floor. The examination demonstrated that the blade was used to cause unintentional and superficial incised injuries on the fingertips, which indicated the person hesitated or lost control while inflicting harm on him.

The anterior neck contained an oblique incised wound positioned at the midline level of the laryngeal prominence. Medical analysis determined that the injury happened before death. The injury measured approximately 1.5 inches long by 0.2 inches wide by 0.3 inches deep and crossed the thyroid cartilage anteriorly. The combination of cardiogenic and neurogenic shock due to asphyxia from ligature neck compression resulted in death.

The study was conducted in accordance with the ethical standards of the Bihar State Forensic Science Laboratory as well as national ethical guidelines. Informed consent was obtained from the legal representatives and relatives of the deceased individual included in the study. This report pertains to a death investigation case, and all data related to the deceased were anonymized and used solely for research purposes.

### Discussion

The deceased applied a soft ligature from a segment of bedsheet, attached it to a ceiling fan, and used a plastic chair to assist in achieving suspension. The ligature knot was located in the sub-occipitomastoid region of the neck. A research study conducted by Badkur and coworkers demonstrates that the occipitomastoid area is the primary location for ligature knot placement in hanging cases and they found that the occipitomastoid area is where ligature knots are placed most often in hanging cases, at a rate of 32%, while the mental region is the least common site, occurring in merely 2% of cases [13].

Suicidal throat incisions in right-handed individuals typically begin on the left side of the neck and deepen at their starting point before angling to the right with superficial ending cuts. Approximately 60% to 80% of self-inflicted injuries exhibit hesitation wounds, which occur when individuals hesitate during the act. The deceased presented an incised wound located in the laryngo-tracheal region, indicating self-infliction. Multiple superficial hesitation marks covered the lower portion of the wound, which extended obliquely from left to right, while the deepest area appeared on the left side, suggesting repeated attempts and psychological distress.

A razor blade was the weapon used to cause the



throat injury, which forensic investigators found next to a bloodstained area at the scene. The bloodstained blade, along with the minimal blood spatter pattern and the droplet characteristics, indicate the wound was self-inflicted using minimal force. The absence of defensive wounds on the body strengthens the conclusion that the death resulted from suicide.

The previous research conducted by Kanchan and coworkers has documented similar findings in cases of suicidal cut-throat injuries and Bharadwaj and associates document comparable symptoms in self-inflicted cut-throat situations [14, 15]. Kundu and team examined cases of cut throat injuries in 2013 and found that 66.7% resulted from suicide, while 21.7% were homicidal and 11.6% were accidental. The analysis of these possibilities demands precise forensic evaluation [16].

Autopsy findings combined with thorough forensic examination and crime scene analysis serve as essential components for establishing the manner of death. Under Section 293 of the Criminal Procedure Code, forensic science laboratory reports are accepted as valid evidence, which enhances their importance in judicial processes. The combination of superficial incised wounds, lack of defensive injuries and other forensic evidence strongly supports a suicide conclusion in this case.

## Conclusion

The initial suspicion of homicide based on cut-throat injuries requires thorough scene investigation, case history analysis, and forensic autopsy to establish the manner of death. The determination of suicide in this case was based on factors including body positioning, blood spatter distribution and nature, the absence of defense marks and struggle signs, hesitation wounds, and laryngo-tracheal region incised injuries. The combination of crime scene investigation findings and autopsy results, alongside forensic evidence was crucial for arriving at this determination.

## Conflicts of Interest

The authors report there are no competing interests to declare.

## Ethics approval and consent to participate

The study was conducted in accordance with the ethical standards of the Bihar State Forensic Science Laboratory as well as national ethical guidelines. Informed consent was obtained from the legal representatives of the deceased individual included in the study. This report pertains to a death investigation

case, and all data related to the deceased were anonymized and used solely for research purposes.

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