



DEATH DUE TO DELAYED COMPLICATION IN HANGING - A CASE REPORT

Forensic Medicine

Dr. Devinder Kumar Atal	Professor and Head, Department of Forensic Medicine and Toxicology, Shri Atal Bihari Vajpayee Govt. Medical College, Chhainsa, Faridabad – 121004
Dr. Praveen Dixit*	PG Resident, Department of Forensic Medicine and Toxicology, SHKM GMC Nalhar Nuh - 122107. *Corresponding Author
Dr. Mamta Kumari	PG Resident, Department of Forensic Medicine and Toxicology, SHKM GMC Nalhar Nuh - 22107.
Dr. Sahil Sharma	Senior Resident, Dept. of Forensic Medicine, Hamdard Institute of Medical Sciences and Research - 110062.
Dr. Aravindan U	PG Resident, Department of Forensic Medicine and Toxicology, SHKM GMC Nalhar Nuh - 122107.

ABSTRACT

Hanging is one of the most common methods of painless suicide in India. Hanging is a form of asphyxia which is caused by the suspension of the body by a ligature encircling the neck, where the constricting force is the weight of the body. In most cases of hanging cases, the death of the individual occurs immediately or the usual average period is about 3 to 5 minutes. Causes of death in case of hanging are asphyxia, venous congestion, cerebral ischemia, carotid compression or fracture of vertebrae resulting in penetration into the spinal cord. In this article, the authors report a rare case of a 19-year-old male individual, who attempted suicide by hanging, survived for 7 days in ICU in an unconscious state and then died after the best efforts of the ICU team. Delayed death in hanging can be due to aspiration pneumonia, oedematous or haemorrhagic swelling of pharyngeal tissues or aryepiglottic folds, emphysema, infections, oedema of the larynx, lungs and brain pathology like an abscess, hypoxic encephalopathy, infarction and softening. In post-mortem examination, the doctor must remove the ligating material after carefully preserving the knot, and look for any marks of injury or struggle that may suggest the violence leading to strangulation. Prolonged resuscitative measures must be tried in all the victims of attempted hanging, and a guarded prognosis must be described.

KEYWORDS

Hanging, ligature, suicide, asphyxia, delayed causes.

INTRODUCTION

In India, Hanging is a prevalent cause of suicide, contributing to about 25% of total suicidal death.¹ Hanging (Self-suspension) is defined as a form of asphyxia, caused by the suspension of the body by a ligature which encircles the neck, and the constricting force is the weight of the body.² Hypoxia is a broad term that refers to a lack of oxygen in the tissue or a reduction in cellular oxygen utilisation for any reason.³ In hanging, the death occurs within three to five minutes.⁴ It is always lethal unless the body is brought down quickly and the ligature is loosened or removed. Causes of death in case of hanging are asphyxia, venous congestion, cerebral ischemia, carotid compression or fracture of vertebrae resulting in penetration into the spinal cord.⁵ If a person survives an attempted hanging, hemiplegia, epileptiform convulsions, amnesia, dementia, cervical cellulitis / retropharyngeal abscess, and parotitis are all possible complications.⁶ Aspiration pneumonia, infection, oedema of the larynx and lungs, hypoxic-ischemic encephalopathy, infarction of the brain, abscess of the brain, and cerebral softening are all delayed causes of death in hanging.⁷

In the present case, a 19-year-old male individual survived for seven days after hanging and died due to delayed complications of hanging.

CASE REPORT

A 19-year-old unmarried male individual was brought to the emergency department of our hospital in an unconscious state with an alleged history of hanging at his home. He hanged himself by a dupatta to a ceiling fan, with the door of the room closed from the inside. Relatives of the patient broke the door and cut the ligating material and then immediately took him to the hospital. He remained unconscious throughout the admission. He expired after seven days of survival.

After that, a medicolegal post-mortem examination of the deceased was carried out in the Department of Forensic Medicine and the following findings were observed:

External autopsy findings:

Bilateral eyes and mouth were closed. The anterior part of the tongue showed bite marks.

Ligature mark:

Ligating material was not received along with the body. A faintly

visible brownish-black parchmentized abraded ligature mark of width varying from 0.5cm to 1.5cm was present over the front of the neck above the level of thyroid cartilage, then going obliquely upwards and backwards over the sides of the neck and was absent over back of neck over an area of 12 cm. The ligature mark was situated 3 cm below to left mastoid process, 4 cm below to left angle of mandible, 7 cm below to centre of chin, 6.5 cm below to right angle of mandible and 9 cm below to right mastoid process. The total length of ligature mark was 18 cm. Total circumference of neck was 30 cm. The mark was dry and hard. On layer dissection, underlying muscles were pale and intact. The base of the mark was pale, glistening white with marginal ecchymosis. On deep dissection, corresponding laryngotracheal structures were found congested. Hyoid bone was found intact.



(Figure showing Ligature Mark)



(Figure showing congestion all over the Brain)

The brain was found congested and oedematous. Both lungs were congested and oedematous. All other organs were found congested. The cause of death was opined as hanging and its complications. Viscera was preserved in 10 % formalin solution and were sent for histopathological examination report. Histopathological examination of the brain suggested hypoxic brain injury and findings of the lungs suggested pneumonitis.

DISCUSSION

Hanging is known as a painless mode of death with a very narrow failure rate.^{8,9}

It is a very common mode of suicide particularly in young adults.¹⁰ Its incidence in India is approximately 25% of total cases of suicide.¹¹

Near hanging refers if a patient survives a hanging injury long enough to reach the hospital. Most of the cases develop respiratory and neurological complications immediately after the rescue. Pulmonary oedema is the commonest complication which usually occurs immediately following their rescue from acute airway obstruction or suicidal hanging.¹²

Hypoxic ischemic encephalopathy is an important complication in the survival of hanging patients. Hypoxic brain injury or global cerebral ischemia occurs due to reduced cerebral blood flow. At the time of hanging, the oxygen supply is decreased to the brain because of pressure on the carotid, severe enough to damage brain cells. This hypoxia leads to encephalopathy. Necrosis of brain cells leads to inflammatory reactions, which ultimately cause swelling and oedema. Brain oedema together with lung congestion and infection leads to respiratory failure.¹³

A case was reported by Hausmann and betz in which the victim survived for 4 days after attempted suicide by hanging. The cause of death was opined as cerebral infarction following a traumatic thrombosis of the subtotal carotid arteries rupture.¹⁴

In another study conducted by Verma SK& Aggarwal BBL, an accidental hanging of an adult male individual was reported who got trapped in the lift of a building and was accidentally hanged. He survived for 39 days in the hospital and then died.¹⁵

In a case report series, by Kumar RR and Punitha R, 3 cases of delayed death in hanging were reported. In the first case, a 22 years old male survived for 3 days and died due to hypoxic encephalopathy and pulmonary oedema. In the second case, a 30 years old female survived for 6 days and died due to pulmonary oedema and haemorrhage. In the third case, a 53 years old male individual survived for 36 hours and died as a result of hypoxic encephalopathy and aspiration pneumonia.¹⁶

Debbarma S and Deka SJ conducted a study on 8 cases in which delayed death in hanging was included. In 6 cases, histopathology of the lungs and brain showed pulmonary oedema and hypoxic injury whereas 2 cases reported pneumonia in the lungs and congestion of the brain.¹⁷

Fremington K. Marakand BalaramanR reported a case of an 18year old unmarried girl who attempted suicide by hanging with a shawl. She died on the 28th day after being rescued from hanging. The authors noticed the brain and lungs were congested and oedematous.¹⁸

The findings of our study are very similar to the findings that were observed by authors of various studies.

CONCLUSION

The fatal period in hanging varies from 5 to 10 min. Irreversible cerebral or neuronal damage can occur if there is a delay in the removal of ligature, which ultimately leads to coma and death due to delayed complications.

Upper airway obstruction can produce non-cardiogenic pulmonary oedema.

Hence irrespective of the condition after resuscitation in survivors of hanging patients even with clear chest must be treated with aggressive oxygen therapy and put on ventilator to prevent pulmonary oedema.

So, in every case of attempted hanging, the delayed death must be

anticipated, as the patient is never out of danger. Finally, removal of ligature within golden time, early rescue, better assessment of prognostic factors, good family counselling and extensive resuscitation keeping in mind the delayed causes of death in hanging can give new life to the victim.

Removal of ligature within golden minutes may regain consciousness and the person may survive.

Conflict of interest: None

REFERENCES

1. Trivedi JK, Srivastava RK, Tandon R. Suicide: an Indian perspective. *Journal of the Indian medical Association*. 2005 Feb 1;103(2):78-80.
2. Vij K. *Textbook of forensic medicine & toxicology: Principles & practice*. 6th ed. New Delhi, India: Elsevier; 2014.
3. Modi JP, Modi N. *A Textbook of Medical Jurisprudence and Toxicology*. Noida: Lexis Nexis. 2016;315-6.
4. Gordon I, Shapiro HA, Berson SD. *Forensic medicine a guide to principles*. 1998;95-127.
5. Guharaj PV. *Forensic Medicine*. 2nd edition, Hyderabad: Hyderabad university press; 2009, p.177
6. Bardale R. *Principles of forensic medicine & Toxicology*. 1st edition, Jaypee brothers medical publishers (P) Ltd: 2011, p.289.
7. Reddy KSN, Murty OP. *The essentials of Forensic Medicine and Toxicology*. 34th ed. New Delhi: Jaypee Brothers Medical Publishers. 2017, p.316.
8. Maled V. Delayed death in hanging. *Indian Journal of Forensic Medicine and Pathology*. 2016 Jan;9(1):29.
9. Pradeep KG, Kanthaswamy V. Survival in hanging. *Am J Forensic Med Pathol*. 1993;14(1):80-1
10. Lowy A, Burton P, Briggs A. Increasing suicide rates in young adults. *BMJ: British Medical Journal*. 1990 Mar 3;300(6725):643.
11. Trivedi JK, Srivastava RK, Tandon R. Suicide: an Indian perspective. *Journal of the Indian medical Association*. 2005 Feb 1;103(2):78-80.
12. Oswalt CE, Gates GA, Holmstrom FM. Pulmonary edema as a complication of acute airway obstruction. *Jama*. 1977 Oct 24;238(17):1833-5.
13. Aggarwal NK, Kishore U, Agarwal BB. Hanging-delayed death (a rare phenomenon). *Medicine, Science and the Law*. 2000 Jul;40(3):270-2.
14. Hausmann R, Betz P. Delayed death after attempted suicide by hanging. *International journal of legal medicine*. 1997 Jun;110:164-6.
15. Verma SK, Agarwal BB. Accidental hanging with delayed death in a lift. *Medicine, science and the law*. 1999 Oct;39(4):342-4.
16. Kumar RR, Punitha R. Delayed causes of death in hanging: an autopsy study. *J Punjab Acad Forensic Med Toxicol*. 2014; 14(1):32-5.
17. Debbarma S, Deka SJ. Study of delayed death in hanging. *Indian J Forensic and Community Medi*. 2016; 3(4):280-3.
18. Marak FK, Balaraman R. Delayed death in hanging. *Journal of Indian Academy of Forensic Medicine*. 2008;30(3):149-50.