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Hanging and it's Medicolegal Importance

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ABSTRACT

Violent deaths of common occurrence which may be classed as asphyxial deaths such as hanging, ligature strangulation, throttling, suffocation drowning etc. Hanging is the ligature compression of the neck by the weight of one's own body due to suspension. Ligature materials such as nylon rope, electric wire, *duppatta*, *dhoti*, shirt, belt etc. are used for suspension. Hanging is a most common method of committing suicide all over the world, is highly lethal and more than 70% of those who attempted suicide would die. Hanging gives painless death to the victim and no cost involvement so the people prefer it as common and suitable method of suicide. Sometimes homicidal hanging is also seen and accidentally seen in children. According to WHO (world health organization) and research report the suicide by hanging is more common method in male rather than women.

Key words: Hanging, Medico-legal, Typical, Ligature, Post-mortem.

INTRODUCTION

Ayurveda is a complete science of life and *Agad Tantra Evam Vidhi Ayurveda* is a branch of *Ashtanga Ayurveda* which deals about toxicity as well as medical ethics and medico-legal cases and tells about what should done by a doctor in any medico-legal cases. Hanging is also a medico-legal case. Hanging is the ligature compression of the neck by the weight of one's own body due to suspension.^[1] Hanging is a most common method of committing suicide all over the world, is highly lethal and more than 70% of those who attempted suicide would die. Hanging gives painless death to the victim and no cost involvement so the people prefer it as common and suitable

method of suicide.^[2] According to WHO (world health organization) and research report the suicide by hanging is more common method in male rather than women.^[3] Ligature materials such as nylon rope, electric wire, *duppatta*, *dhoti*, shirt, belt etc. are used for suspension.^[4] Hanging may be typical, atypical depends on the position of knot or complete, partial hanging depends on the degree of suspension.^[5]

AIMS AND OBJECTIVES

1. To explain Hanging, its definition, types and post-mortem findings.
2. To explain medico-legal aspect of hanging.

Definition^[6]

Hanging is defined as the mode of violent asphyxial death in which complete or partial suspension of body by a ligature tied around the neck and force of constriction on the neck being applied weight of the body hanged.

Classification^[7]

1. Depending on degree of suspension
 - a) **Complete hanging** - Body is completely suspended without any part of the body touching the ground.

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b) Partial hanging - The body is partially suspended, the toes or feet touching the ground, or is sitting, kneeling, lying down, prone or any other posture, with only the head and chest of the ground. The weight of head (5 to 6 kg), chest and arms act as the constricting force. The whole body weight is not necessary and only a comparatively slight force is enough to produce death.

2. Depending on position of the knot

a) Typical hanging - The ligature runs from the midline above the thyroid cartilage symmetrically upward on both sides of the neck to the occipital region and the knot is over the central part of back of neck.

b) Atypical hanging - the knot is anywhere other than on the occiput, that means on the right or left side or front of the neck.

Ligature used for hanging

It refers to any material used for suspension of body from neck such as nylon rope, moonj rope, electric wire, iron wire, cycle chain, saree, shirt, dupatta, belt, neck-tie etc.^[8] The doctor should note whether the mark on the neck corresponds with the material alleged to have been used in hanging and if it is strong enough to bear the weight and the jerk of the body. He should also note its texture and length, to know whether it was sufficient to hang.^[9]

Symptoms in order of occurrence^[10]

1. The loss of power and subjective sensation, such as the flashes of light and ringing and hissing noises in the ears.
2. The loss of consciousness is almost instantaneous therefore hanging is regarded as a painless form of death.
3. The convulsion of limbs may be seen due to anoxia.

Cause of Death^[11]

1. Asphyxia: Constricting force of ligature causes compressive narrowing of laryngeal and tracheal lumina, leading to asphyxia.

2. Venous congestion: Jugular veins are blocked by the ligature which results in stoppage of cerebral circulation; occurs if ligature is made up of broad and soft material.
3. Combined asphyxia and venous congestion: Commonest cause.
4. Cerebral anemia: It occurs when ligature is made of thin cord.
5. Reflex vagal inhibition leading to sudden cardiac arrest.
6. Fracture/dislocation of cervical vertebrae: It is seen in judicial hanging.

Fatal Period

If the hanging is associated with a drop of many feet as in judicial hanging, death may be instantaneous from a fracture of cervical vertebrae usually C2-C3 and associated injury to the spinal cord although the heart may continue to beat for 15 to 20 minutes thereafter. If there is no injury to spinal cord and blockage of air passage is not complete, 5 to 8 minutes are the common fatal period.^[12]

Postmortem Appearances

They are discussed under external appearances, ligature mark and internal appearances.^[12]

1. External appearances

Neck is elongated. Head is tilted to the side, opposite to site of knot. Face is usually cyanosed and cyanosis presents at lips, tongue, nose, ears and nails.^[13] Eyeballs appear prominent due to congestion and pupil dilated.^[12] The eye on the same side may remain open is called *le facie sympathique*.^[14] Tongue is drawn in or protruded and bitten. It is usually swollen and blue. Bloody froth may be seen at the mouth and nostrils with saliva dribbling out of the angle of the mouth. Hands are clenched specially in violent hanging.^[15] Occasionally haemorrhage into the middle ears is seen due to the excessive congestion. Engorgement of the penis with blood occurs from hypostasis, it may be semierect and semen may be found at the tip. Urine and faeces may escape due to relaxation of the sphincter. If the body has been

suspended for some time, post-mortem hypostasis is seen in the legs, feet, hands and forearms, while the upper part of body will be pale. Petechial haemorrhages may be found in the skin of the legs in two to four hours. If the body is removed within four hours after death and is placed in supine position, post-mortem hypostasis in the limbs will fade and new areas of lividity will appear along the back and buttocks.^[14]

2. Ligature mark

This is a pressure mark on the neck at the site of ligature. A typical ligature mark present upper half of the neck, above the thyroid being oblique bilaterally symmetrical extending to the angles of the mandible then to mastoid and finally to occipital protuberance. It is possible in complete hanging when the knot is tied on posterior part of neck.^[16] No mark if the ligature is soft and it cut down immediately after death and a slight mark if intervened by a thick and long beard or clothes on the neck.^[17] Abrasions and bruises of skin may be seen at the site of knot and in the bed of the groove. Along the edges there may be areas of hyperaemia and occasionally a few ecchymoses. Fibers from the ligature may be found adhering to the skin.^[18] In case of fixed knot, the ligature mark is produced as inverted "V" shaped impression with apex of V corresponding with the site of knot. In case of slip knot, the running noose may tighten around the neck producing mark over neck except at knot. The ligature mark may be horizontal to oblique if:

1. Hanging is from low point of suspension.
2. In partial hanging when body leans forward.
3. If ligature is winded twice or more times round the neck.

Factors Affecting Ligature Mark

- a) Composition of ligature: If hard or thick and rough ligature is used, the mark may be pronounced. If soft material is used, it may leave barely visible mark.
- b) Width of material: Broad ligature material may leave broad mark with less grooving whereas thin

ligature material may have deep, narrow grooved impression

- c) Weight of body: Heavier the body, greater will be the prominence of mark.
- d) Rescue hanging: If person survives then ligature mark becomes less prominent and heals with turning into pale scar like mark.^[19]

3. Internal appearances

Subcutaneous tissue underneath the ligature mark is dry, white, firm and glistening. Platysma and sternomastoid may show hemorrhages, and are sometimes ruptured. Hyoid bone may be fractured in persons, more commonly above the age of 40 years. The fracture is usually due to ligature forcing the hyoid bone backwards, which results in increased divergence of greater horns (anteroposterior compression fracture), but it can be a traction fracture. Transverse carotid intimal tears may be seen in obese victims, long drops and posteriorly placed knots (**Amussat's sign**). Vertebral artery rupture, intimal tear and subintimal hemorrhage (most frequent) may be present. Larynx and trachea are congested. Fracture of superior horn of the larynx may be present.^[20] There may be fracture of tracheal rings and thyroid cartilages and costal cartilages. Lungs are congested exude bloody froth on squeezing the cut section. Respiratory passages contain bloody froth. Right chamber of heart, pulmonary vena cava are full of blood, left chambers being empty. Abdominal viscera are congested. Brain is usually pale and sometimes congested. Pleura, pericardium, meninges, brain and abdominal viscera may show petechial hemorrhages.^[21]

Medico-Legal Importance

Hanging may be suicidal, homicidal or accidental. Suicidal manner is more common than homicidal or accidental.^[22]

1. **Suicidal hanging:** Hanging is a common method of asphyxia suicide in many countries. Person can be between 10 and 80 years of age, more common in males. Point of suspension remains approachable to the victim. Partial hanging is almost always

suicidal in nature. A history of a previous attempt may be present, and generally committed in a secluded place (victim's home is the most frequent site). Suicidal note may be left behind. There should be a motive for committing suicide. Fibers of ligature material may be present in the clenched hand.^[22]

2. Homicidal Hanging: Very rare. Not ordinarily possible in an adult victim, unless intoxicated or made unconscious or the victim is either a child or a debilitated person. Homicide should be suspected where:

- There are signs of violence/disorder of furniture
- Clothing of deceased is torn or disarranged
- There are injuries, either offensive or defensive.

Postmortem hanging/postmortem suspension

Person may be murdered and the body suspended to simulate suicide. Look for signs of dragging to the place of suspension. Beam or branch of tree shows evidence of the rope having moved from below upwards, as the body has been pulled up. In true suicidal hanging, the rope moves from above downwards.^[22]

Lynching - It is homicidal hanging. It may be killing by beating by mob to punish a person in cases of robbery, caste marriage, thieves, vehicle drivers for causing death etc.^[23]

Judicial hanging - In India, legal death sentence is carried out by hanging the criminal. The face of condemned person is covered with a dark mask. He is made to stand up on a platform above trap doors which open downward through the mechanism of a lever.^[24] Convulsion and fracture of cervical vertebrae usually seen C2-C3 level, and sometimes at C3-C4 with injury of spinal cord and medulla.^[25]

3. Accidental hanging: Hanging deaths in children < 6 years are usually accidental. It has been reported among children while 'playing hanging' (e.g. pretending to be a cowboy) or playing 'Lasso'

or getting suspended from playground equipment, and sometimes even in adults (e.g. autoerotic hanging).^[22] Workmen in falling from scaffolding may be hanged by becoming entangled in ropes. Suspension of neck from steering wheel. Fall from a height or tree or slipping from ladder and then suddenly getting suspended from neck to an object in between.^[25]

Table 1: Ante-mortem versus Post-mortem hanging^[26]

SN	Ante-mortem hanging	Post-mortem hanging
1.	Hanging having taken place during life.	Victim first killed and then suspended.
2.	Ligature mark prominent, high up of the neck, tissues underneath pale, hard and leathery, margins red and congested, ecchymosed with slight abrasions.	Less prominent, tissue underneath shows no appreciable changes.
3.	Dribbling of saliva from the angle of mouth and cyanosis always seen.	Not seen
4.	Laceration of carotid arteries with blood extravasation seen.	Only laceration may be present.
5.	Signs of struggle or poisoning - not seen.	Usually seen
6.	Post-mortem staining seen at the lower extremities.	May be seen (if dead body hanged soon after death)
7.	Suicide note may be present	Absent
8.	Point of suspension reachable by the victim.	May or may not be reachable.

Table 2: Showing whether hanging was suicidal, homicidal or accidental^[26]

Features	Suicidal	Homicidal	Accidental
Incidences	Highest	Rare	Extremely rare
Circumstantial	1. Suicidal	1. Marks of	1. Common

Evidences	note 2. No signs of struggle or violence marks 3. When two individuals (couple) arrange simultaneous suicide called Dyadic suicide	violence on the body 2. Marks of struggle 3. Footprints of several persons at or near the place of occurrence	among children during play 2. An athlete who is in the habit of exhibiting hanging 3. Persons with masochistic tendency
Place of hanging	Usually - Ceiling fans, doors, window found bolted from inside	Usually outside the house beam or branch of tree	Not specific, it can anywhere
Ligature	On one side of the neck	On the back or front of the neck	May not be found on the neck
Examination of the beam or branch of tree	Ligature used for hanging moves from upwards to below due to the victim's own body weight	Ligature moves from below to upwards due to the body being pulled up.	No such phenomenon may be observed.

DISCUSSION AND CONCLUSION

Hanging is an ideal method for suicide with an estimated lethal rate 70%. It may be typical, atypical or complete, partial. In complete hanging both feet are not touching the ground and the body is partially suspended the toes or feet touching the ground in partial hanging. In typical hanging knot of ligature is on the backside of the neck and atypical hanging knot of the ligature is anywhere other than on the backside of the neck, usually location for the knot is near the mastoid process or angle of mandible. Occasionally, it may be under the chin. It has been scientifically accepted that pressure on the neck can result in occlusion of neck structures for respiratory functioning, developing asphyxia. Experimentally, it

has been proven that pressure/force of 2 kg and 4-5 kg on the neck can occlude jugular vein and carotid arteries respectively, 15 kg can occlude trachea and 30 kg can occlude vertebral arteries. All these can bring about gross decrease in cerebral blood flow leading to cerebral anoxia, asphyxia and death. In hanging, death is usually due to asphyxia or cerebral anoxia or vagal inhibition leading to cardiac arrest or injury to the spinal cord as observed in judicial hanging wherein death is due to fracture-dislocation of the C2-C3-C4 vertebrae. Accidental hanging may occur accidentally at work place for example in factories, entrapment in belt. Some cases are accidental and entanglement with cords and ropes can occur, for example with restraint harnesses or window-blind cords in children. Non-judicial hanging is mostly a suicidal act of males. Occasionally, a homicide is staged to resemble a suicidal hanging, and the pathologist must be alert to the presence of injuries not capable of being explained by hanging. Post-mortem toxicological analysis should be performed in all hangings in order to determine whether the individual was capable of self-suspension.

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