

## Original Research Article

# Insight into pathophysiology and management of partial hanging

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### ABSTRACT

**Background:** Many methods are available for committing suicide. Hanging is one of the methods to commit suicide. The incidence of hanging for committing suicide is increasing. This is a retrospective study carried out at KDN Gohil Hospital, Navsari (Gujarat) to know about the outcome of this type of suicidal attempts and to review the management of such type of patients. Management of this type of injury is not found in many standard textbooks, so this small study will help to compare mortality rate and management protocol with other larger studies.

**Methods:** All patients with history of hanging and accidental strangulation were brought to hospital, after they were released from strangulating agent were included in this study. Various aspects of agents used for hanging, the characteristic findings and management protocol of the patients were studied retrospectively.

**Results:** Results in the form of survival rate and occurrence of complications. Out of 30 patients 24 patients survived and 6 died. Non had cervical spine injury. One patient had laryngeal injury and developed laryngeal stenosis.

**Conclusions:** Suicidal hanging is different from judicial hanging. Most of the time suicidal hanging survival are high; once the patient is brought to the hospital alive in time. Early endotracheal intubations, management of hypotension, ventilator support and anti-oedema drugs are main steps of management.

**Keywords:** Hanging, Partial hanging, Suicide methods

### INTRODUCTION

Organophosphorus poisoning, self-burning and hanging by a rope or rassi are common methods of committing suicide in India as well as in this part of country.<sup>1</sup> This is a retrospective study of cases admitted in KDN Gohil Hospital, Navsari, (Gujarat) from 1995 July to 2008 October. Those patients who are brought alive from the site of incident of hanging are included in this study. Committing suicide by hanging has become common method because of easy availability of rope or rassi, Sari, Duppta the person who wants to commit suicide can find out the hanging point and place very easily.<sup>1</sup> Most of the hanging incidents occur in home or back yard. Fan, beams, hooks, door knobs and trees are commonly used hanging points. Small proportion of hanging cases occur

in closed environment of hospitals, prisons, and police custody. This is about 10% only.<sup>1</sup> Majority of cases occur in community in open places.<sup>1</sup> But hanging is different from strangulation. In hanging the body is wholly or partially suspended by the neck so that constricting force applied to the neck is the weight of the body. Hanging can be classified as either complete or incomplete (near hanging).<sup>2</sup>

When the whole body hangs off the ground and the entire weight of the victim is suspended at the neck, the hanging is said to be complete. Incomplete hanging-Partial hanging or a near hanging imply that some part of the body is touching the ground and the weight of the victim is not fully supported by neck.<sup>2</sup>

In incomplete hanging the bodies of victims are partially suspended or the victims are in sitting, kneeling, reclining or any other posture.<sup>2</sup> Hanging may be classified as homicidal, suicidal, autoerotic or accidental also.

Strangulation: When there is a compression of the neck by a ligature, the ligature not being attached to suspension points as in hanging. There is no effect of body weight on constricting force on the neck.<sup>3</sup>

In clinical practice the distinction between the two groups is important, because strangulation is usually homicidal and non-judicial hanging is usually suicidal.

## METHODS

This is a retrospective study carried out at K.D.N. Gohil Hospital, Navsari (Gujarat) from July 1995 to October 2008. The cases of partial hanging who were brought alive to the hospital after being released from hanging points, were considered for this retrospective study. All such patients were included in the study irrespective of age, sex or seriousness of the condition.

All patients were admitted in surgical ICU of the hospital and managed there till they were out of danger. As all cases were medico legal cases, police were informed on admission of each such patient. Record of each patient was made very thoroughly and preserved properly.

As this was retrospective study permission from hospital management was taken for publication.

All patients of hanging who were brought to hospital alive after releasing from hanging point were admitted in surgical I.C.U. of the hospital. Totally 30 cases of hanging were admitted during this period. Out of these 30 cases admitted 18 patients were male and 12 patients were female. The youngest patient was a 15 yrs. boy. All patients were immediately attended. Vital parameters were measured, and all patients were given Nasal Oxygen, detail history was taken and through physical examination was done. Particular attention was given to neck. Any encircling mark on the neck was noted, whether it is circular in one plane or oblique that is noted. Whether it was above the larynx or on the larynx/trachea that is noted. Colour of the string mark was noted. Those patients whose spO<sub>2</sub> was lower than 80% were immediately intubated (total 8 such patients) and O<sub>2</sub> started via T piece.

Those patients who did not improve after intubation and oxygenation, they were put on mechanical ventilator. IV fluids were started after taking blood samples for routine tests. Broad spectrum antibiotic cefotaxim 1 gm IV 8 hrly given. Patients with hypotension were managed with IV fluids and vasopressor agents (4 such patients).

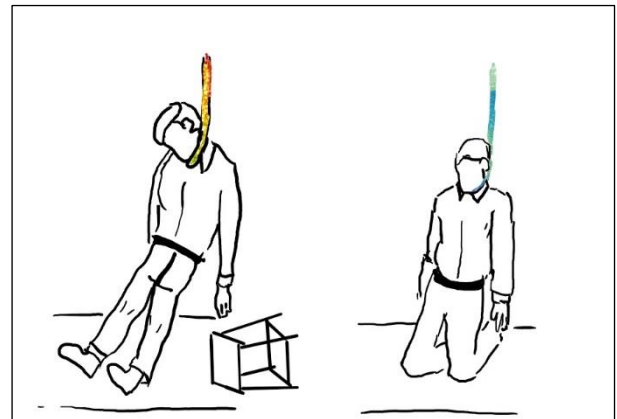
Those who were drowsy were subjected to CT Scan examination of head. Those having brain edema were

given injection mannitol IV 8 hourly after controlling blood presser. X-ray chest and cervical spine X-rays for taken in all cases.

While taking history the method of hanging, its sites and time was inquired in detail. About the agent of hanging detail inquiry was done and noted.

Exact time of releasing from the hanging point and time taken in transportation to hospital were noted as it has important bearing on survival. Most of the patients were brought to be hospital within 30 min to 2 hrs.

12 patients had consumed alcohol before hanging themselves. All were male patients.



**Figure 1: Partial hanging (part of the body touching the ground).**



**Figure 2: Complete hanging.**

## RESULTS

Table 1 and 2 show various agents involved in cases of hanging and accidental strangulation. Table 3 shows the outcome of all the admitted patients

**Table 1: Various agents involved in suicidal cases of hanging and accidental strangulation.**

Agents	Number
Rope	12
Nylon rassi	10
Dupatta	4
<b>Total</b>	<b>26</b>

**Table 2: Various agents involved in accidental cases of hanging and accidental strangulation.**

Agents	Number
Dupatta	1
Sari	2
Cotton Rassi	1
<b>Total</b>	<b>4</b>

**Table 3: Outcome of all the admitted patients.**

<b>Total number of patients</b>	30
<b>Survived</b>	25
<b>Died</b>	5
<b>Survival rate</b>	84%

During the management of these patients, they were carefully observed and treated, and they were managed according to the condition.

**Table 4: Complications and management of hanging patients.**

Complications	No. of cases	%
<b>Endotracheal intubation</b>	8	24
<b>Ventilator support</b>	3	10
<b>Hypotension correction</b>	4	12
<b>Brain edema</b>	3	10
<b>Laryngeal injury and stenosis</b>	1	3

All patients who survived were discharged after psychiatric consultation. One patient had laryngeal injury and later on she developed laryngeal stenosis. She was referred to Surat for surgery of larynx. None had cervical spine injury (Table 4).

## DISCUSSION

Hanging cases are seen all over India as it is one of the common methods of committing suicide. Though cases are seen in small hospitals also there is not enough

statistics available in India. The published data on its occurrence, management and complications are limited.<sup>4</sup>

Suicidal hanging is distinctly differed from judicial hanging. In judicial hanging ligature is encircling the neck and knot is placed directly below the occiput. In judicial hanging the drop is sudden and equal or more than victim's height. So, when fall of the victim occurs there is tightening of the knot and complete suspension of the body by its weight constricting the neck. This leads to fracture of usually C2 through both pedicles and body of C2 is displaced anterior to the vertebral body of C3.<sup>5</sup> This leads to complete transection of the cord and death. (Hangman's fracture).

Suicidal hanging is usually not associated with any significant drop and frequently leads to incomplete suspension. Here part of the body is in touch with ground (Figure 1). This is known as partial hanging or incomplete hanging. In complete hanging the body part is not touching the ground. So partially hanged patient who are brought to hospital have different pathophysiology operating. When death occurs following partial hanging, death occur in one of the following ways.

- When neck is mechanically constricted asphyxia, venous occlusion or arterial occlusion may occur. Only 2 kg. Pressure is required to block the jugular veins; arterial occlusion requires 2.3 to 30 kg pressure. About 15 kg pressure is required to obstruct trachea.<sup>6,7</sup>
- Many times, pressure of the strangulating agent causes pressure on the carotid sinus and that triggers the vasoactive centers and leads to cardiac arrest.
- Fracture of the cervical spine are very rare in suicidal hanging because the drop is not enough to cause tension on the noose.<sup>7,8</sup>

Those patients who are brought alive to the hospitals but die later on in the hospital have certain complications. Complications which are frequently seen in those patients are bronchopneumonia, pulmonary edema and respiratory distress syndrome.<sup>9,10</sup>

Overall survival rate of patients who are brought alive to the hospital with partial hanging is optimistic. Here in this study the survival rate of partially hanged patients is about 84%, which compares well with other study.<sup>4</sup> Complication rate is also similar to what other author have noted.<sup>9-10</sup> There are certain factors which decide the outcome. Following points such as are considered important for good outcome.

- Height of drop
- Time elapsed between hanging and releasing victim from the constricting agent
- Time spent in transportation
- Hypotension and hypoxia on arrival
- Promptness of intubation in patients with altered level of consciousness
- Co-morbidity.

## CONCLUSION

Over all prognoses of partially hanged patients is good. In this study the survival rate is about 84% with complications rate comparable to other such studies.

So early release from the hanging point, quick transport to hospital, proper blood pressure control and early intubation and ventilator support are points to remember in managing partially hanged patients who are brought alive to hospitals. So, it can be said if partial hanging cases are properly managed then outcome is not dismal.

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