

# Assessment of injury pattern and analysis of its outcome in patients presenting to emergency department after near hanging

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## ABSTRACT:

**Background:** *The common modes of suicide were ingestion of agricultural chemicals, hanging, self-immolation, and drowning. The present study was conducted to assess injury pattern and analysis of its outcome in patients presenting to emergency department after near hanging.*

**Materials & Methods:** *136 cases of near hanging presenting to emergency department of both genders were included and injuries diagnosed, inpatient course, mortality, and functional disability at the time of discharge was recorded. Injury severity was assessed using the ISS and the abbreviated injury score for each anatomic body region.*

**Results:** *Age group 1-14 years had 46, 15-45 years had 70 and 45- 65 years had 30. Base deficit was 5.4, ISS score was 8.7, GCS 13-15% was seen in 8, 9-12% in 35, 3-8% in 90 and missing in 13. Mortality was seen among 42 subjects. The injuries reported was abrasions in 42%, brain in 28%, spinals in 10%, chest in 8%, larynx/pharynx in 5%, extremity in 4% and vascular in 3%. The mean ventilator days was 3.6, ICU stay days was 3.9, hospital stay days was 5.4. Functional outcome complete independence (FIM<sub>tot</sub>=12) was seen in 87%, complete disability (FIM<sub>tot</sub>= 3) in 4%, severe disability feeding (FIM<3) in 8%, severe disability expression (FIM<3) in 10%, severe disability locomotion (FIM<3) in 11% and discharged to rehabilitation in 18%.*

**Conclusion:** *Hanging injuries are associated with a high overall mortality rate. The majority of survivors have little to no functional disability.*

**Key words:** *Hanging injuries, Suicide, disability expression*

## I. INTRODUCTION

Suicide is a major public health problem more so in the low- and middle-income countries. Every year, around a million people die of suicide.<sup>1</sup> India accounts for one the highest rates of suicide in the world. In India, the common modes of suicide were ingestion of agricultural chemicals, hanging, self-immolation, and drowning. The major cause of morbidity and mortality in hanging is due to hypoxic brain injury.<sup>2</sup>

In 2005, >320,000 patients were admitted to US hospitals with nonfatal self-inflicted injuries; and the frequency of this problem is increasing in the elderly. Psychiatric disease, drug abuse, and opiate dependency may predispose to higher suicidal mortality.<sup>3</sup> Some patients may use methods of suicidal behavior that may not cause death immediately, such as strangulation without full compression of cerebral perfusion, a jump from a height, or forearm vessel laceration. However, very little is known of the emergency medical management and immediate survival of patients that survive such an attempt.<sup>4</sup> Mortality is decreased by hospital treatment in patients with near-hanging despite having low initial Glasgow coma score (GCS) score. Early evaluation, diagnostic, and management priorities should focus on potential injuries to the airway (larynx and trachea), cervical and upper thoracic spine, cervical vascular structures, and central nervous system. The outcome is improved by early medical intervention and aggressive resuscitation.<sup>5</sup> The present study was conducted to assess injury pattern and analysis of its outcome in patients presenting to emergency department after near hanging.

## II. MATERIALS & METHODS

The present study comprised of 136 cases of near hanging presenting to emergency department of both genders.

Data such as patient demographics, prehospital and emergency department course, injuries diagnosed, inpatient course, mortality, and functional disability at the time of discharge was recorded. Injury severity was assessed using the ISS and the abbreviated injury score for each anatomic body region. Functional Independence Measure (FIM) was recorded among survivors, a score ranging from 1 to 4 for each of 3 categories: feeding, locomotion, and expression. Functional outcome of each case was recorded and entered in case history proforma. Results were assessed and statistically analyzed. P value less than 0.05 was considered significant.

## III. RESULTS

**Table I Patients characteristics**

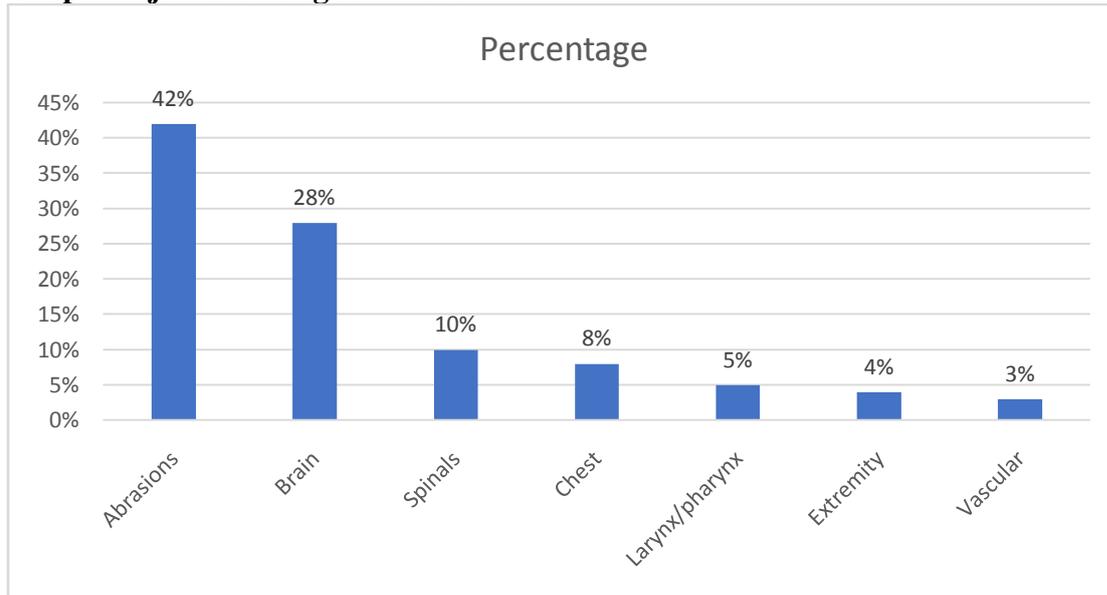
Characteristics	Number	P value
Age group 1-14 years	46	0.04
15-45	70	
45- 65	30	
Base deficit	5.4	-
ISS	8.7	-
GCS 13-15%	8	0.05
9-12%	35	
3-8	90	
Missing	13	
Mortality	42	-

Table I shows that age group 1-14 years had 46, 15-45 years had 70 and 45- 65 years had 30. Base deficit was 5.4, ISS score was 8.7, GCS 13-15% was seen in 8, 9-12% in 35, 3-8% in 90 and missing in 13. Mortality was seen among 42 subjects. The difference was significant ( $P < 0.05$ ).

**Table II Injuries among survivors**

Injuries	Percentage	P value
Abrasions	42%	0.01
Brain	28%	
Spinals	10%	
Chest	8%	
Larynx/pharynx	5%	
Extremity	4%	
Vascular	3%	

Table II, graph I shows that injuries reported was abrasions in 42%, brain in 28%, spinals in 10%, chest in 8%, larynx/pharynx in 5%, extremity in 4% and vascular in 3%. The difference was significant ( $P < 0.05$ ).

**Graph II Injuries among survivors****Table III Outcome measures for survivors**

Parameters	Value
Ventilator (Days)	3.6
ICU stay (Days)	3.9
Hospital stay (Days)	5.4
Functional outcome	
Complete independence (FIM <sub>tot</sub> =12)	87%
Complete disability (FIM <sub>tot</sub> = 3)	4%
Severe disability Feeding (FIM<3)	8%
Severe disability Expression (FIM<3)	10%
Severe disability Locomotion (FIM<3)	11%
Discharged to rehabilitation	18%

Table III shows that mean ventilator days was 3.6, ICU stay days was 3.9, hospital stay days was 5.4. Functional outcome complete independence (FIM<sub>tot</sub>=12) was seen in 87%, complete disability (FIM<sub>tot</sub>= 3) in 4%, severe disability feeding (FIM<3) in 8%, severe disability expression (FIM<3) in 10%, severe disability locomotion (FIM<3) in 11% and discharged to rehabilitation in 18%.

#### IV. DISCUSSION

Approximately 800,000 people die due to suicide every year and most suicides occur in low- and middle-income countries. Hanging is a common cause of suicide world-wide, along with poisoning and self-immolation in rural regions of India. Hanging and self-inflicted strangulation is a relatively common method of attempted suicide and accidental injury worldwide.<sup>6</sup> In the United States, hanging has become the second or third most frequent method of suicide attempts among adolescents and young adults. Suicide is more common in young adults and leads to a significant social, emotional, and economic burden on Indian society.<sup>7</sup> Near-hanging victims can present to the emergency department (ED) with a wide range of symptoms, from patients who are completely stable to acute respiratory failure and shock, to anoxic brain injury. Poor prognosis is associated with a Glasgow Coma Scale (GCS) <8, systolic blood pressure <90 mm Hg, head CT imaging consistent with anoxic brain

injury and hanging time longer than 5 minutes.<sup>8</sup>The present study was conducted to assess injury pattern and analysis of its outcome in patients presenting to emergency department after near hanging.

In present study, age group 1-14 years had 46, 15-45 years had 70 and 45- 65 years had 30. Base deficit was 5.4, ISS score was 8.7, GCS 13-15% was seen in 8, 9-12% in 35, 3-8% in 90 and missing in 13. Mortality was seen among 42 subjects. Ganesan et al<sup>9</sup> studied the profile of patients presenting with near-hanging and their outcome to our adult ED. Medical records of patients with age more than 15 years presenting with near-hanging to the ED was reviewed retrospectively. The analysis of 2 years data from August 2014 to July 2016 revealed 77 patients reached the ED with near-Hanging. The mean age of the patients – 31.1 years. Approximately, 43% were complete hanging, while rest were partial hanging. Majority of the patients used dressing materials for hanging themselves. Out of 77 patients, 64 were discharged alive while 2 patients died in the hospital and 11 were left against medical advice. We found that injuries reported was abrasions in 42%, brain in 28%, spinals in 10%, chest in 8%, larynx/pharynx in 5%, extremity in 4% and vascular in 3%. Siegl et al<sup>10</sup> included 64 patients who were evaluated in the resuscitation room because of an unsuccessful suicide attempt. Patient variables were recorded including method of suicide attempt, injuries, hemodynamic status, and treatment. Most patients were male [57 patients (89%)], and the most frequent methods were ingestion of harmful devices or substances [15 patients (23%)]; hanging [9 patients (14%)]; and strangulation [9 patients (14%)]. There were 2 patients who died in the ED: 1 from a self-inflicted gunshot to the head and the other from self-inflicted herbal poisoning. The frequency of emergency airway intervention was greater in patients after unsuccessful attempted suicide [18 patients, 28% (95% confidence interval [CI], 17.2%, 39%; endotracheal intubation, 17 patients; emergency tracheotomy, 1 patient] than all ED patients [1458 patients (16%); (95% CI, 14.9%, 16.4%;  $P = 0.005$ )]. Following attempted survived suicide, 24-hour ED mortality was 3% and 4% within the control group; the difference is insignificant ( $P = 0.9596$ ). However, ED mortality showed a trend toward earlier death within the suicidal group.

We observed that mean ventilator days was 3.6, ICU stay days was 3.9, hospital stay days was 5.4. Functional outcome complete independence (FIM<sub>tot</sub>=12) was seen in 87%, complete disability (FIM<sub>tot</sub>= 3) in 4%, severe disability feeding (FIM<3) in 8%, severe disability expression (FIM<3) in 10%, severe disability locomotion (FIM<3) in 11% and discharged to rehabilitation in 18%. Martin et al<sup>11</sup> found that there were 655 patients identified (84% male) with a mean age of 30.3 years and mean injury severity score (ISS) of 9. There were 92 (14%) deaths in the emergency department (ED) and 119 (18%) deaths after admission, for an overall mortality rate of 33%. Excluding ED deaths, survivors had significantly higher Glasgow coma scores (GCS) at the scene (8 vs. 4) and in the ED (9 vs. 3), a lower ED base deficit (4 vs. 9), and lower ISS (6 vs. 15) compared with non-survivors. The strongest independent predictor of hospital mortality was ED GCS <15; the mortality rate was 1.5% for patients with an ED GCS of 15 versus 29% for any GCS<15. Of patients who survived to discharge, 84% were functionally independent (total FIM= 12), and 10% had severe functional disabilities in feeding, expression, or locomotion (FIM=3). Patients with severe disability had a higher incidence of intracranial (38% vs. 19%) and chest injury (19% vs. 5%) but surprisingly demonstrated equivalent rates of vascular (0% vs. 2.6%) and spinal injury (11% vs. 12%) compared with those without severe disability. Independent predictors of functional outcome were ISS and ED GCS. There was no severe functional disability at discharge among patients with an ED GCS of 15 compared with a 15% severe disability rate if the ED GCS was <15.

## V. CONCLUSION

Hanging injuries are associated with a high overall mortality rate. The majority of survivors have little to no functional disability.

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