

# Study of attempted suicidal hanging and to identify the predictors of its outcome.

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## ABSTRACT

### BACKGROUND:

Suicidal hanging presents as an uncommon medical emergency. Paucity of data from Central India on epidemiology, predictors of outcome of hanging prompted us to undertake this study.

### AIM:

The aim was to study the epidemiology, clinical profile, outcome, complications and to identify the clinical variables that have a bearing on the final outcome of attempted suicidal hanging.

### MATERIAL AND METHODS:

An observational study of 22 consecutive cases of attempted suicidal hanging admitted to ICCU, GMCH, NAGPUR from January 2011 to December 2012 was performed. Patient were studied for basic demography, prior suicidal and psychiatric history, injury patterns and outcome, which was defined as good if there was full neurological recovery and poor if patient did not survive or there was any residual neurological deficit. Clinical variables like delay in presentation to hospital (in minutes), presence of SBP < 90 mmHg on admission, GCS on presentation, presence of aspiration pneumonia and need for ventilatory support, were identified, recorded and tested individually for an association with the outcome. Statistical analysis was done using the Odds Ratio (OR  $\pm$  95 % Confidence Interval) and Fishers exact test was used to determine the statistical significance.

### RESULTS:

Total 22 patients were studied, with 54.5% being males and 45.4% being females. The mean age of presentation was 29.09 years. Most of the patients were housewives or students. Common stressors included disturbed interpersonal relationship, previous psychiatric illness & others. The commonest injury observed was abrasion (36.3%) followed by subconjunctival haemorrhage. No cervical spine injury was observed. Out of the total 22 patient, 14 (63.6%) patients survived, 7 (31.8%) succumbed while 1 patient was discharged against medical advice. Out of the studied variables, a low GCS on admission, presence of hypotension and need for ventilatory support were found to predict a statistically significant outcome.

### CONCLUSION:

Hanging is an important and avoidable cause of suicide in young population, which poses a huge economic, emotional and social burden. Our study indicates that a low GCS, SBP < 90 mmHg on admission and need of ventilatory support, predict a poor outcome. However, inspite of initial dismal presentation early aggressive resuscitative measures can save precious lives.

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### INTRODUCTION

There is progressive increase in the rate of suicide all over the world. In India, common modes of suicide include poisoning, hanging, drowning and self immolation. Patients of hanging present to the emergency department with cardiovascular, respiratory, neurological and psychiatric problems apart from cervical spine and soft

tissue injury. Prompt management even in patients with initial dismal prognosis results in excellent outcome.

Despite being an important cause of suicide there is paucity of data regarding epidemiology, prognostic outcome indicators and treatment, most studies being limited to case reports or post mortem studies. Our aim was to study the epidemiology, clinical profile, outcome, complications and to identify clinical variables that have a bearing on the final outcome of attempted suicidal hanging.

### MATERIAL AND METHODS

An observational study was conducted at ICCU Government Medical College and Hospital, Nagpur, a tertiary referral centre. Consecutive cases of attempted suicidal hanging admitted to ICCU over a period of 2 years from 1st January 2011 to 31st December 2012 were studied. Patient variables collected included age, gender, circumstances of hanging, stressor, prior suicidal attempts, past history of psychiatric illness, any chronic illness and alcohol intake. Patient's symptoms were recorded and vital signs like blood pressure, SpO<sub>2</sub>, local injury pattern, subconjunctival haemorrhage, respiratory distress, Glasgow Coma Scale (GCS) was recorded. All patients underwent x-ray cervical spine. CT spine and MRI brain were done if indicated. All patients were treated with standard protocol of airway protection, neck stabilisation, ventilatory support whenever needed, steroids, antibiotics and other supportive treatment. Complications in form of subconjunctival haemorrhage, aspiration, pulmonary oedema, local injury, anoxic brain damage were recorded.

We studied clinical variables namely systolic blood pressure on admission, time lapse in bringing patient to hospital (in minutes), Glasgow Coma Scale on admission, presence of aspiration pneumonia and need for mechanical ventilation and tested them for any statistically significant association with the outcome. Outcome was defined as good if there was complete neurological recovery and poor if the patient died or there was any residual neurological deficit.

### STATISTICAL ANALYSIS

Data from all patients was tabulated on a spreadsheet and statistical analysis was done using the Odds ratio (OR) and Fishers exact test of significance for

categorical data. Statistical significance in univariate analysis was assumed if the 95% confidence interval of OR did not include the value of 1 and p value was found to be less than 0.05.

### RESULTS

A total of 22 patients with attempted suicidal hanging were studied of which 54% were males. The mean age of presentation was 29 years (range 13 to 60 yrs). 45% patients were under 25 years of age. Out of the total 22 patients, 32% were housewives, 27% students and the remaining included 1 truck driver, 1 truck cleaner and 1 retired pensioner.

Family related problems & previous psychiatric illness were the most important causes of underlying stressors leading to suicidal hanging. (See Table 1). The circumstances of hanging were as follows: Out of 22 patients 19 patients presented within 20 minutes to 3 hours of hanging (mean 75 minutes), rest 3 patients were admitted initially elsewhere and then brought to our hospital after 2, 10 and 15 days respectively. The duration for which they were found hanging could be noted in 6 patients and was in range of 5 to 15 minutes. The commonest ligature used was duppatta (4 patients) followed by rope (2 patients) and wire in 1 patient. 50% patients presented with unconsciousness, 11 (50%) had altered sensorium and 9 (40.9%) had breathlessness. All 4 patients who presented with CRA on admission, succumbed. Amongst the local injury pattern ligature mark was seen in 90% of the cases (See Table 2.) There was no cervical spine fracture or any tracheal or pharyngeal injury. Post mortem studies of all non-survivors did not reveal any spinal, hyoid bone or tracheal fracture. Maximum patients were in 8-11 GCS score at the time of hospitalization. (See table 3.)

Out of 22 patients one patient was discharged against medical advice, 14 patients (63.6%) survived with full neurological recovery and 7 patients (31.8%) died. The average length of stay of the survivors in ICCU was 29 hours (range 2-48 hrs) and 41 hours (range 1-72 hrs) in non survivors. The total length of hospital stay of survivors was 1-7 days (mean 4.2 days).

A low GCS (< 8) at presentation, SBP < 90, and need of ventilatory support was associated with poor outcome (see Table 4).

## DISCUSSION

WHO estimates that about 170 000 deaths by suicide occur in India every year. Suicide death rates in India are among the highest in the world<sup>1</sup>. Poisoning (34.8%), Hanging (31.7%) and self-immolation (8.5%) are the common modes used to commit suicide<sup>2</sup>. Hanging is a significant problem among young population. Suicidal hanging is distinctly different from judicial hanging<sup>3</sup>. In classical judicial hanging which involves drop from a distance  $\geq$  body height; death is due to cervical spine fracture or transection of the spinal cord. In near hanging, which involves drop from a minimal height ( $<$  body height), injury occurs due to compression of neck structures. The pathophysiology of morbidity and mortality includes venous obstruction and cerebral hypoxia, laryngeal oedema, carotid sinus stimulation causing increased vagal tone, local injuries, pulmonary complications & secondary cerebral injury<sup>4, 5</sup>. Thus, patients may present with neurological, cardiovascular and pulmonary complications apart from injury.

We studied 22 patients over a 2 year period. The mean age was 29.09 years with history of prior suicidal attempt in 13.6% and prior psychiatric history in 13.6% of patients, with a mortality of 31.8%.

Penney et al. studied 44 cases over a 5 year period, found 90 % were male and 80 % were less than 40 years of age. Half the patients had psychiatric history and 40% had made a previous suicidal attempt with 88 % survival<sup>6</sup>. S.Karnath et al. studied 37 patients of near hanging over a six and half year period. The mean age was 27 years with nearly equal sex distribution with survival rate of 92 %<sup>7</sup>. Hanna et al. studied 13 cases of near hanging over a 52 month period in United Kingdom of which 12 were male with a mean age of 31 years<sup>8</sup>. A study in Queensland on 161 patients found 82% male with 10 % having a previous hanging attempt and 42 % patients having previous psychiatric disorder<sup>9</sup>. We did not find any cervical spine injuries, however laryngeal crepitus, local abrasion, contusion and subconjunctival haemorrhage were observed. Post mortem reports also did not reveal any vertebral or laryngeal fractures. Other researchers have also observed neck abrasions, anoxic brain damage, laryngeal, hyoid bone and cervical spine fracture, and carotid dissection<sup>10,11</sup>.

We observed that Systolic Blood Pressure  $<$  90 mmHg on admission GCS  $<$  8 on presentation and need for ventilatory support were associated with higher mortality. Similar result was observed in a recent study where GCS  $<$  7 at presentation was statistically associated with poor outcome<sup>7</sup>. Other predictors of poor clinical outcome described in the case series include a long hanging time, cardiorespiratory arrest at presentation and presence of cervical spine injuries<sup>12</sup>, drop height greater than body height<sup>13</sup>, need for airway control, Cardiopulmonary Resuscitation (CPR) and cerebral oedema on CT Scan<sup>14</sup> and Pao<sub>2</sub>/ Fio<sub>2</sub> ratio  $<$  100 at admission<sup>15</sup>.

Thus our clinical experience of patients with attempted hanging is consistent with existing knowledge and reiterates optimistic final outcome with a standard management protocol. The number of cases in this series is small and could not lead to a more refined statistical analysis. A more detailed study with a larger sample size is required to throw more light on the various aspects of this study.

## CONCLUSION

Most of the patients who attempt hanging are dead by the time they receive medical attention. Of those patients who survive till they reach hospital, if resuscitated aggressively, can have an excellent outcome in spite of initial dismal presentation.

Hanging appears to be an important problem which poses a huge emotional, social and economical burden in younger population especially students and housewives. Strategies to increase awareness regarding mental health and preparing families to identify early markers of depression and other psychological stress will go long way in decreasing the incidence of self-harm in this young population.

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TABLE .1.showing underlying stressor and its frequency.

Family related	03
Chronic illness (HIV,RhHD)	02
Financial loss	02
Love affair	01
Prior psychiatric illness	03
Prior suicidal attempt	03
Under influence of alcohol	02
Failure in examination	01
Unknown	05

TABLE.2.showing frequency of local injury pattern.

LOCAL INJURY	NO. OF CASES
LIGATURE MARK	20 (90.90 %)
ABRASION	7 (31.81%)
CONTUSION	1 (4.54%)
CHEMOSIS	1 (4.54%)
LARYNGEAL CREPITUS	3 (13.63%)
SUBCONJUCTIVAL	6 (2.72%)
HEMORRHAGE	

**TABLE 3. Distribution of patients on the basis of GCS on admission.**

GCS	NO. OF PATIENT
<3	4 (18.1%)
4-7	8 (36.36%)
8-11	9 (40.90%)
>11	1 (0.045%)

**TABLE 4: showing association of outcome to clinical parameter.**

PARAMETER	SURVIVOR	NON SURVIVOR	Odds Ratio	95% CI
<b>Delay In Minutes</b>				
≤ 90 minutes	11	3	4.88	0.68-34.96
> 90 minutes	3	4		
<b>Systolic blood pressure</b>				
<90 mmHg	2	5	15	1.68-138.15*
>90 mmHg	12	2		
<b>Glasgow coma scale</b>				
<8	4	7	31.66	1.46-685.30*
≥8	9	0		
<b>Aspiration pneumonia</b>				
Yes	4	5	5.62	0.74-42.35
No	9	2		
<b>Ventilatory Support</b>				
Yes	1	7	135.0	4.86-3744.41*
No	13	0		

\*Statistically significant