

## FACTORS INFLUENCING OUTCOME OF PATIENT WITH HANGING

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### ABSTRACT

**Aim:** Suicidal hanging is an uncommon medical emergency with significant neurological morbidity. The aim of the study is to identify factors that have a bearing on the final outcome. **2. Materials and Methods:** Prospective analysis of 61 cases of suicidal hanging admitted to our ICU from Oct - 2013 to Oct - 2015 was performed. Three clinical variables (at presentation) namely Glasgow Coma Scale (GCS) at presentation, time lapse (in hours) from the incident to arrival at our hospital and the presence of Hypotension (defined as a systolic blood pressure  $\leq 90$  mm Hg) at admission were recorded and tested individually for an association with the outcome. Outcome at discharge was defined as good (complete neurological recovery) or poor (death or incomplete neurological recovery). Statistical analysis was done using Odds ratio and Chi-square test of significance for categorical data. **3. Results:** Out of 61 patients 45 required ICU admission (mean age 31 years). 58/61 survived giving a survival rate of 95.1%. Of those who survived, 54 patients had complete neurological recovery at the time of discharge from hospital. Among those who presented <3 hours of the incident, 1 had an adverse outcome as compared to 3/7 patients who presented 3 hours or more after the incident. A low GCS (GCS <7) at presentation was also statistically associated with a poor outcome. 87% of patients with GCS <7 at presentation required mechanical ventilation. Hypotension was present in approximately 33% of patients at presentation. Of these only 1 had an adverse outcome. **Conclusions:** Suicidal hanging is an unusual medical emergency that is common among young individuals in developing countries. Our study about suicidal hanging indicates that a delayed presentation to a medical facility and a low GCS at presentation predict a poor outcome.

**Keywords:** Glasgow comascale, Hypotension

## 1. INTRODUCTION

There is worldwide concern over an observed rise in the rate of suicide, especially among young adult males. Hanging is a prominent cause of suicidal death in India as a method chosen by young adults to attempt suicide. Hanging victims present, not infrequently to Emergency Department (ED) of hospitals and need specialized care in Intensive Care Units (ICU). Unfortunately, suicidal hanging (SH) is one medical emergency about which there is very little information available in medical literature. Whereas a number of reports describe post-mortem findings in near-hanging, there is virtually no published data on clinical aspects of the problem and means of prognosis to guide the clinician. We therefore

decided to do prospective study on our experience on the management of a series of patients whose presentation to our hospital with attempted hanging raised several clinical questions. Our aim is to assess the efficacy of our management strategy and also to identify some clinical variables that have a bearing effect on the final outcome.

## 2. MATERIALS AND METHODS

A prospective study was conducted at the Intensive Care Unit (ICU) of Annamalai Medical College & Hospital, a tertiary-care referral hospital in Chidambaram catering to acute cases of all specialties. Suicidal hanging admitted to this ICU over a three years period from Oct - 2013 to Oct - 2015 were included. 61 Suicidal hanging patients

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characteristics and clinical details at presentation. Details of ICU management as well as outcome of hospitalization were also recorded. We have taken three clinical variables (recorded at presentation) that we considered prognostically important in this condition. Glasgow Coma Scale (GCS) at presentation, time lapse (in hours) from the incident to arrival at our hospital and the presence of hypotension (defined as a systolic blood pressure  $\leq$  90 mm Hg) at admission. All three were recorded and were later tested individually for an association with the outcome. Outcome was classified as good if the patient had a complete neurological recovery at the time of discharge from hospital. A *poor or adverse* outcome was defined as death in the ICU or incomplete neurological recovery at the time of discharge from the ICU. Data from all patients was tabulated on a spreadsheet and statistical analysis was done using the Odds ratio (OR) and Chi-square test of significance for categorical data.

All patients with Suicidal hanging were managed as per our protocol with little or no variation over the period of the study. Management comprised of neuroprotective measures, and therapy for cerebral edema as needed. Intubation with cervical stabilization was done for the institution of mechanical ventilation in the presence of respiratory insufficiency or airway compromise or for airway protection among patients with GCS  $\leq$  10. CT imaging of the brain was not done immediately even in those with a profound depression of sensorium at admission.

### 3.RESULTS

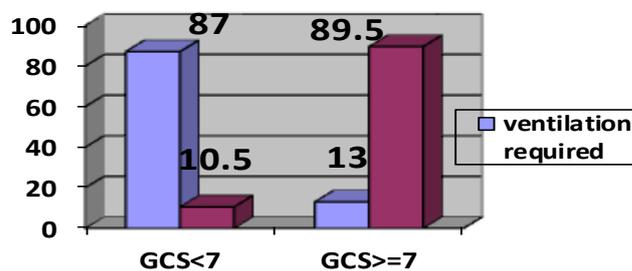
Patients with suicidal hanging commonly seen in young adults (mean age 31 years) with more predilection on male patients (44) out of 61 patients, 58 patients survived giving survival rate of 95 %

Out of those who survived, 55 patients had good neurological outcome characterized by complete neurological recovery at the time of discharge from hospital. None of the patients had any form of cervical cord injury. We evaluated the association of final outcome with delay in presentation to our hospital. Information on the incident to arrival at our hospital was available for all 61 patients. Among the patients, those who presented after 3 hours had adverse outcome. All patients presented to our hospital within 4 hours of incident. Out of 61, 24 were treated at nearby primary hospital and was referred here for tertiary care. Among the patients with poor outcome, 4 patients (66%) reached our hospital 3 hours after hanging. This represents a statistical significance between the duration of arrival and prognosis.

GCS SCORE	ventilation		Chi-square	Df	P value
	YES	NO			
<7	20(87.0%)	3(13.0%)	35.07	1	0.0005
$\geq$ 7	4(10.5%)	34(89.5%)			

The chi-square test was applied to test the association between GCS score and ventilation required. The proportion of patients with GCS code below 7 required ventilation was 87.0% while it was only 10.5% among the patients with GCS score 7 and above. The difference in proportion was statistically significant ( $X^2=35.07$ ,  $df=1$ ,  $P=0.0005$ ). Hence, it was concluded that there is an association between GCS score and requirement of ventilation.

Graph : percentage of patients who required ventilation with their GCS score



On evaluation of GCS with final outcome, low GCS at presentation had statistically poor outcome. When the GCS was 7 and above the survival was 100%, while it was 87 % when GCS was below 7 which was significant. The proportion of patients with GCS below 7/15 who required mechanical ventilation was 87 % while it was only 10.5% among patients with GCS above 7 which is proved to be statistically significant. Our study indicates that hanging patients with poor GCS and delayed presentation requires ventilator support, hence immediate referral to a tertiary care hospital is mandatory for the survival of the patients.

Mann-Whitney U test shows that the mean rank of age, GCS at arrival, delay to reach the health facility and ICU stay in days was higher among survivors compared to non-survivors. Age of the patients, delay to reach the health facility and ICU stay were statistically not significant between survivors and non-survivors. ( $U=71.0$ ,  $p=0.593$ ;  $U=79.5$ ,  $p=0.801$ ;  $U=65.0$ ,  $p=0.459$  respectively). However, the mean rank of GCS at the time of admission among the survivors was high and it was statistically significant with non-survivors. ( $U=9.0$ ,  $p=0.003$ ). It may be concluded that GCS at admission is associated with survival status of patients.

Regarding the association of blood pressure at the time of presentation and outcome in hanging patients, hypotension at presentation is not a frequent finding at admission and did not have bearing effect on the outcome.

<b>Ranks</b>							
<b>Characteristics</b>	<b>Prognosis</b>	<b>N</b>	<b>Mean Rank</b>	<b>Sum of Ranks</b>	<b>Mann-Whitney - U</b>	<b>Z-value</b>	<b>P value</b>
AGE	DEATH	3	25.67	77.00	71.0	0.535	0.593
	LIVE	58	31.28	1814.00			
	Total	61					
GCS_ARRI	DEATH	3	5.00	15.00	9.0	2.674	0.003
	LIVE	58	32.34	1876.00			
	Total	61					
TIME_MINUTES	DEATH	3	28.50	85.50	79.5	0.251	0.801
	LIVE	58	31.13	1805.50			
	Total	61					
ICU STAY IN DAYS	DEATH	3	23.67	71.00	65.0	0.741	0.459
	LIVE	58	31.38	1820.00			
	Total	61					

#### 4.DISCUSSION

Suicidal hanging (or near hanging) is distinctly different from judicial hanging. Cervical spine injury is rare because the body of the victim rarely ever, falls from a great height. Instead, death usually occurs as a result of asphyxial cerebral injury and local complications related to the noose around the neck. In a recent review of literature, cervical spine injury was identified in only 4 out of 689 patients (0.6%) with near hanging. Injuries to soft tissue structures of the neck, fracture of laryngeal cartilages and hyoid bone, cricotracheal separation, carotid artery dissection or carotid occlusion have all been reported in literature. Life threatening systemic complications like acute pulmonary edema, adult respiratory distress syndrome, hyperthermia and multi organ failure have also been reported. Patients who attempt hanging as a means of suicide are invariably young and otherwise healthy individuals. The hanging patients who present to hospital need skillful medical management. All though 95.1% survived, the possibility of permanent neurological damage or delayed neuropsychiatric sequelae among survivors remains an outcome feared more than death itself. A good neurological outcome is therefore highly desirable. The results of our study indicate that early and appropriately directed care is essential. Delay in presentation of 3 hours or more after the incident is associated with higher incidents of poor outcome. In our study all the patients arrived our hospital before 4 hours. Maximum number of patients presented to our emergency department within 1 hour. Significant number of patients were taken to nearby primary care hospitals.

Almost 87% of our patients required the placement of an endotracheal tube either for airway protection or for

institution of mechanical ventilation as part of a cerebral protective strategy. Visualization of the laryngeal structures for intubation was not a problem even though a number of reports have commented upon fracture of anterior neck bones including laryngeal cartilages. Almost 75% of our patients had a significant alteration in sensorium (GCS ≤ 10) at presentation and close to 40% had a GCS <7. A profound depression of sensorium on arrival (GCS <7) was prognostically significant. Among patients with GCS <7, 87% of patients required ventilation while it was only 10.5% among patients with GCS >7 this difference in proportion was statistically significant. Among the patients with poor outcome, 6 had GCS <7 at the time of presentation which was significant (3 expired 1 had quadriplegia, 1 had organic amnesic syndrome 1 had convulsion).

Even hypotension at presentation was not a frequent finding at admission and did not have a bearing on the final outcome. Among the patients with poor outcome, 4 patients (66.7%) arrived our hospital after 3 hours of hanging which was significant.

#### 5.CONCLUSION

Suicidal hanging is an unusual medical emergency that is common among young individuals in developing countries. Our study indicates that a delayed presentation to a medical facility and a low GCS at presentation predict a poor outcome.

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