International Journal of Scientific Reports
*Borkar MS et al. Int J Sci Rep. 2015 Nov;1(7):287-292*
http://www.sci-rep.com
pISSN 2454-2156 | eISSN 2454-2164

DOI: http://dx.doi.org/10.18203/issn.2454-2156.IntJSciRep20151256

**Research Article**

# Correlation of survivors of near hanging with Glasgow coma scale

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**Received:** 30 September 2015
**Accepted:** 25 November 2015

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## ABSTRACT

**Background:** A patient, who survives an attempt to hang himself, at least for some time, is said to be a case of "near-hanging". This study attempts to correlate survival in near- hanging with Glasgow Coma Scale and to study the clinical profile of hanging the 25 patients of near hanging who were admitted in the MICU of Government Medical College, Aurangabad from January 2014 to July 2015.
**Methods:** Detail clinical history was taken and thorough examination was done. Patients were assessed by applying Glasgow coma scale. NCCT Brain and spine was done of all these patients before admitting to MICU to rule out cervical injury.
**Results:** Males were 76% and female 24% in this study.20 of the 25 patients required mechanical ventilation. 18 patients survived, of whom 13 had been ventilated. All the 5 who did not need ventilation survived.
**Conclusions:** Only 1 patient survived out of the 8, whose Glasgow - coma scale was less than 6, (87.5 % mortality). 100 % patients who were ventilated but had a Glasgow Coma Scale of 6 or more survived.

**Keywords:** Hanging, Glasgow coma scale, Asphyxia

## INTRODUCTION

Hanging is a form of violent, mostly painful asphyxia, due to a ligature round the neck suspending the body. The weight of the body acts as the constricting force. Compression of the neurovascular bundles in the neck is the commonest cause of death. Asphyxia due to airway obstruction needs more compression, so is a less common cause.[1]

The term 'near-hanging" is used for victims who survive, at least for some time, either because the ligature breaks or they are discovered early or an attempt is made to rescue them.[2]

Hanging can cause 1. Cerebral ischemia and hypoxia due to pressure on the carotids. 2. Cerebral congestion and rise in the intracranial pressure due to compression of the jugular veins. 3. Compression of the airway passages by the root of the tongue that is pulled upward by the ligature. 4. Vaso-vagal attack due to pressure on carotid sinus or vagus. 5. The high cervical cord may get injured due to fracture of the spine. This is more likely to happen in judicial hanging. 6. There may be a variable combination of the above.[1]

If the pressure on the larynx is high for a short period, signs of asphyxia are seen like respiratory distress, cyanosis and convulsions. For the jugular vein to be constricted, a force of 2 kg is needed, for the carotids about 3 to 5 kg, trachea 15 kg and vertebral artery 18 kg.[3]

Complications of hanging include 1. Pulmonary complications (aspiration pneumonia, development of adult respiratory distress syndrome, pulmonary oedema) 2.Secondary cerebral injury (Diffuse, due to cerebral oedema and generalized cerebral hypoxia and focal due to arterial dissection or arterial spasm or subarachnoid

haemorrhage). 3. Other complications that can occur are hyperthermia, status epilepticus, and lower oesophageal rupture.[2]

Some factors such as systolic blood pressure < 90, Glasgow coma score (GCS) < 8, anoxic brain injury on CT scan, and Injury Severity Score > 15 have been found to be significantly associated with mortality in near-hanging.[4]

## METHODS

25 patients of near hanging were admitted in the MICU of Government Medical College, Aurangabad from January 2014 to July 2015. Detail clinical history was taken including occupation, reason that provoked hanging, time to reach the hospital, material used for attempting hanging. Thorough examination was done. Patients were assessed by Glasgow coma scale. NCCT Brain and spine was done of all these patients before admitting to MICU to rule out cervical injury. Out of these 25 cases, 20 required mechanical ventilation. It was observed that 18 patients survived, out of whom 13 were ventilated. These survivors were rated on the Glasgow coma scale. Fisher's exact test was used to correlate the survivals with the score.

## RESULTS

Age of our patients was between 12 years to 60 years (table no 1). Maximum number of patients (44%) was between age group of 21 to 30 years, followed by 28% in the age group of 12 to 20 years. Total males were 76% and females were 24% (Table 1).

**Table 1: Age wise distribution.**

| Age Distribution | Male | % | Female | % | Total | % |
|---|---|---|---|---|---|---|
| 12-20 | 4 | 21.05 | 3 | 42.86 | 7 | 28 |
| 21-30 | 8 | 42.11 | 3 | 42.86 | 11 | 44 |
| 31-40 | 4 | 21.05 | 0 | 0.00 | 4 | 16 |
| 41-50 | 2 | 10.53 | 0 | 0.00 | 2 | 8 |
| 51-60 | 1 | 5.26 | 0 | 0.00 | 1 | 4 |
| Total | 19 | 100.00 | 6 | 100 | 25 | 100 |

**Table 2: Gender wise distribution.**

| On Ventilator | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Male | % | Female | % | Total | % | Survived | % | Death | % |
| Ventilator | 15 | 78.95 | 5 | 71.43 | 20 | 80 | 13 | 65 | 7 | 35 |
| Non Ventilator | 4 | 21.05 | 1 | 14.29 | 5 | 20 | 5 | 100 | 0 | 0 |
| Total | 19 | 100 | 6 | 100 | 25 | 100 | 18 | 72 | 7 | 28 |

**Table 3: Relation of mechanical ventilation and survival.**

| Duration of Ventilators | Patients | Survived | % | Death | % |
|---|---|---|---|---|---|
| 0-7 days | 13 | 11 | 84.61 | 2 | 15.38 |
| 8-14 days | 4 | 1 | 25 | 3 | 75 |
| 15-21 days | 0 | 0 | 0.00 | 0 | 0 |
| 22-30 days | 1 | 1 | 100 | 0 | 0 |
| >30 days | 2 | 0 | 0.00 | 2 | 100 |
| Total | 20 | 13 | 65 | 7 | 35 |

Out of 25 patients, 20 patients required mechanical ventilation, (80%), of whom 15 were males (75%) and 5 were females (25%). 6 patients did not require ventilation (24%). Out of 20 ventilated patients, 13 survived (65%) and 7 died (35%). Out of 19 male patients, 15 required ventilation (78.95%) and out of 6 female patients, 5 required ventilation (71.43%).

100% mortality was observed in patients who were ventilated for more than 30 days. 11 patients (84.61%) survived, who were ventilated for 0 to 7 days (Table 3). Out of 25 patients, 6 patients (24%) hanged themselves under the influence of alcohol. The following reasons were observed in this order- psychiatric illness (20%), family problems (16%), love affairs (12%), and spouse dispute (12%), farmers who could not repay loan (8%) (Table 4). Only 1 patient survived out of 8 with Glasgow-coma score less than 6 (87.5% mortality) and 100% patients survived with Glasgow Coma Scale 6 or more than 6 (Table 5). Most common type of ligature used was rope (65.38%) (Table 6). 23.08 % victims were farmers, however 4 out of these 6 attempted hanging due to family disputes and quarrels and two did it because they could not repay loans (Table 7). All 13 patients who had GCS less than 8 required ventilation and only 7 out of 12 patients who had GCS more than 8 required ventilation. There was only one patient who survived though his GCS was only 4 (Table 8).

The two-tailed P value for male and female survival equals 0.0324 (less than 0.05), which suggests that the association between rows (groups) and columns (outcomes) is considered to be statistically highly significant, that is the percentage of female survival was significantly less than percentage of male survival (Table 9). 100% patients with GCS 6 and above survived. There were 5 patients between 6-8, all survived. The lowest GCS of the patient who survived was 4 (Table 10).

**Table 4: Reason for hanging.**

| Reason of Hanging | Male | % | Female | % | Total | % |
|---|---|---|---|---|---|---|
| Family Problems | 3 | 75 | 1 | 25 | 4 | 16 |
| Spouse dispute | 1 | 33.33 | 2 | 66.66 | 3 | 12 |
| Farmer for Loan | 2 | 100 | 0 | 0.00 | 2 | 8 |
| Love affairs | 3 | 100 | 0 | 0.00 | 3 | 12 |
| Alcohol influence | 6 | 100 | 0 | 0.00 | 6 | 24 |
| Psychiatric illness | 3 | 60 | 2 | 40 | 5 | 20 |
| No reason found | 1 | 100 | 0 | 0.00 | 1 | 4 |
| Battered wife | 0 | 0.00 | 1 | 14.29 | 1 | 4 |
| Total | 19 | 76 | 6 | 24 | 25 | 100 |

**Table 5: Glasgow - coma scale.**

| GCS | Patients | Survived | % | Death | % | Ventilator | Nonventi |
|---|---|---|---|---|---|---|---|
| 3-5 | 8 | 1 | 12.5 | 7 | 87.5 | 8 | 0 |
| 6-8 | 5 | 5 | 100 | 0 | 0 | 5 | 0 |
| 9-11 | 11 | 11 | 100 | 0 | 0 | 7 | 4 |
| 12-15 | 1 | 1 | 100 | 0 | 0 | 0 | 1 |
| Total | 25 | 18 | 72 | 7 | 28 | 20 | 5 |

**Table 6: Type of the ligature material.**

| Type | Male | Female | Total | % | Death | % |
|---|---|---|---|---|---|---|
| Saree | 4 | 1 | 5 | 19.23 | 1 | 20.00 |
| Rope | 14 | 3 | 17 | 65.38 | 3 | 17.65 |
| Dupatta | 0 | 2 | 2 | 7.69 | 2 | 100.00 |
| Scarf | 1 | 0 | 1 | 3.85 | 1 | 100.00 |
| | 19 | 6 | 25 | 96.15 | 7 | 28.00 |

## DISCUSSION

This study attempts to correlate survival in near- hanging with Glasgow Coma Scale and to study the clinical profile of hanging in the 25 patients of near hanging who were admitted in the MICU of Government Medical College, Aurangabad from January 2014 to July 2015.

**Table 7: Occupation of victims.**

| Profession | Male | Female | Total | % |
|---|---|---|---|---|
| Farmer | 5 | 1 | 6 | 23.08 |
| Student | 3 | 2 | 5 | 19.23 |
| Labourer | 3 | 0 | 3 | 11.54 |
| Housewife | 0 | 3 | 3 | 11.54 |
| Private Employee | 3 | 0 | 3 | 11.54 |
| Self Employed | 5 | 0 | 5 | 19.23 |
| | 19 | 6 | 25 | 100.00 |

**Table 8: Analyse a 2× 2 contingency table.**

| GCS | On Ventilator | Not on Ventilator | Total |
|---|---|---|---|
| ≤8 | 13 | 0 | 13 |
| >8 | 7 | 5 | 12 |
| Total | 20 | 5 | 25 |

Fisher's exact test
The two-tailed P value equals 0.0149
The association between rows (groups) and columns (outcomes) is considered to be statistically highly significant.

The number of males was significantly higher, (76%) in this study. 20 of the 25 patients (80%) required mechanical ventilation .Rope was the commonest ligature used. Total 18 patients survived, and of whom 13 had been ventilated. All the 5 who did not need ventilation survived. Only 1 patient survived out of the 8, who's Glasgow - coma scale was less than 6 (87.5 % mortality). 100 % patients who were ventilated but had a Glasgow Coma Scale of 6 or more survived.

**Table 9: Analyse a 2× 2 contingency table.**

| | Total | Survived | Death |
|---|---|---|---|
| Male | 19 | 16 | 3 |
| Female | 6 | 2 | 4 |
| Total | 25 | 18 | 7 |

Fisher's exact test
The two-tailed P value equals 0.0324
The association between rows (groups) and columns (outcomes) is considered to be statistically highly significant.

Even if the GCS is as low as 4, patients can survive and intensive efforts should be taken.

Though the commonest method of attempted suicide for which patients are brought to the MICU of Govt. Medical College, Aurangabad is consumption of insecticide or herbicidal poison, we get cases of near-hanging periodically. During 2014-2015, 25 cases of near-hanging were admitted to the MICU of the Medicine Department of Government Medical College, Aurangabad. . None of them had fracture of the cervical spine, their age ranged from 12 to 60 years; maximum (44%) patients were in the age group of 21 to 30 years. Majority (88%) of the patients fell in the age group of 12 to 40. The youngest patient was 15 years old and the oldest was 52. In this study, 19 were males and 6 were females.[11]

**Table 10: Analyse a 2× 2 contingency table.**

| GCS | Survived | Death | Total |
|---|---|---|---|
| ≤8 | 6 | 7 | 13 |
| >8 | 12 | 0 | 12 |
| Total | 18 | 7 | 25 |

Fisher's exact test
The two-tailed P value equals 0.0052
The association between rows (groups) and columns (outcomes) is considered to be statistically highly significant.

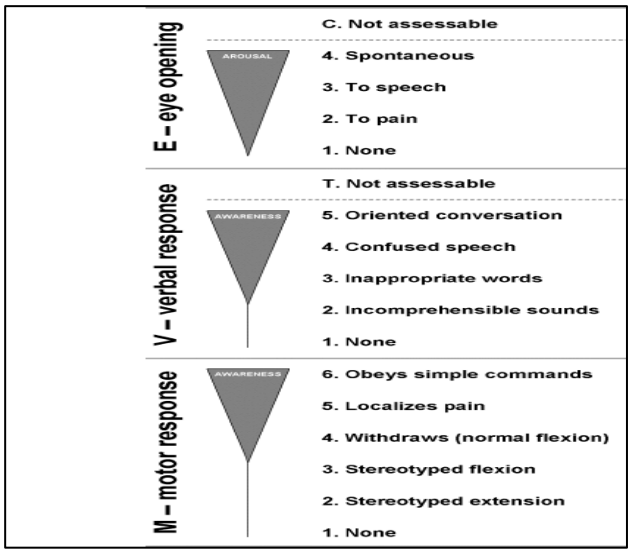
In our study, the reasons given were, family disputes and quarrels in 7, under influence of alcohol in 6, psychiatric illness in 5, rejection in love in 3 cases, 2 of the 6 farmers committed suicide because they had a loan they could not repay whereas 4 attempted because they had family problems. A rope was the most common ligature used (65.38%), saree in 19.23 %, dupatta in 2 cases and scarf in 1.

23.08% cases were farmers, 19.23% were students and the rest were self-employed, labourers, housewives. Personal difficulties like quarrels, alcohol addiction, and psychiatric illness were the main causes that precipitated the extreme step.

As per the study done in southern parts of Kerala, they found manual labourers (32.5%) were the most common victims followed by housewives (15.46%). Only 3 of them were farmers. Majority of the victims were in the

age group of 21-40 years (41.4%). According to their study 61 patients (33.70%) had psychological problems. Soft materials like saree, shawl, lungee etc. were used by 48.6% of the subjects in this study.

**Table 11: The Glasgow Coma Scale used in the study taken from Lancet, published in 1974.**




20 of the 25 victims had to be put on ventilator due to respiratory insufficiency. Out of these 13 (65.00%) survived and 7 (35.00%) died. All the 5 patients who did not need invasive artificial ventilation survived. Total mortality was 28.00%.

The patients were on ventilator therapy from 1 to more than 30 days. Majority of the patients (55%) who survived and recovered did so in the first week itself. In the second week only 1 patient (5.00%) survived and recovered. In the third week no patient died, but no one recovered. In the fourth week 1 patient recovered. 100% deaths occurred when ventilated more than 30 days.

A GCS score of 3 at presentation has been described as a predictor of poor clinical outcome independently in three case series, whereas the same was not found to have any predictive value in a large series published by Nair et al. Similarly, while a GCS score of <7 at presentation was found to have a significant association with poor clinical outcome in series published by Karanth et al, a score of 8 on arrival was found not to have significant association with clinical outcome in series published by Ali et al. Nonetheless, considering that survival rates of up to 32% described even in patients with GCS scores of 3 at presentation, aggressive resuscitation of all such patients, irrespective of their GCS score is advocated.[10] Though hanging has high fatality rate, survival is possible even after prolonged periods of suspension, and the term near hanging refers to patients who initially survive the attempt. In our study only 1 patient survived out of 8 with Glasgow-coma less than 6 suggestive of 87.5% mortality and 100% patients survived even though they had to be ventilated with Glasgow Coma Scale more than 6.

Two patients with GCS less than 6 in our study had shock, both died. Three patients developed ventilator associated pneumonia and died. One patient who survived developed residual neurological deficit in the form of quadriperesis and hypoxic brain damage. In our study, we did not find any patient of Post Obstructive Pulmonary edema (POPE) but in another study, they found significant number of cases with POPE.[8,9]

## CONCLUSION

Health seeking behavior of people is dependent on the perception of people regarding the quality of health care services in health centers. The perception of the people has to be changed to attract them more to government hospitals and health centers. It can be done through improving the quality of care, proper maintenance of facilities and also by inculcating a caring and sympathetic attitude in health professionals while dealing with the patients. Even if the Glasgow coma scale of the near-hanging patients is as little as 6, patients survive. Hence all possible efforts should be taken in patients who present in a critical condition and need ventilation to improve survival.

*Funding: No funding sources*
*Conflict of interest: None declared*
*Ethical approval: Not required*

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**Cite this article as:** Borkar MS, Patil SB, Sikariya KK, Kashid AA, Chimote HN, Malani VM. Correlation of survivors of near hanging with Glasgow coma scale. Int J Sci Rep 2015;1(7):287-92.