

Original Contributions

EPIDEMIOLOGY AND PROGNOSTIC FACTORS IN CASES OF NEAR HANGING PRESENTING TO A REFERRAL HOSPITAL IN ARAK, IRAN

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Abstract—Background: Hanging is a common method of suicide in many countries, and it has a higher success rate than other commonly employed modes of attempted suicide, such as self-poisoning. **Study Objectives:** The aim of this study was to determine the epidemiology and characteristics of near-hanging patients admitted to the main referral hospital in Arak, Iran. **Methods:** All patients with the diagnosis of hanging admitted between January 2000 and 2009 were included in the study. Data regarding demographics, radiographic studies, injuries, Glasgow Coma Scale score (GCS) on arrival, and outcomes, were examined. **Results:** During the 9-year study period, 43 cases of near hanging were identified. All patients were male, with a mean age of 24.2 years (range: 12–38 years). The median GCS at presentation was 6 (range: 3–12), and 83.8% of patients had a GCS of 8 or less. Cervical spine fracture of C2 was observed in two cases (4%). The imaging studies revealed that 62.7% of patients had an abnormal brain computed tomography scan, with brain edema being the most common finding ($n = 16$, 37.2%), followed by subdural hematoma ($n = 10$, 23.3%). Ophthalmologic examination demonstrated retinal bleeding in 24 patients (55.8%). There were four inpatient deaths among the study group, and 39 patients survived to discharge, yielding a mortality rate of 9.3%. Findings on presentation associated with subsequent mortality included a systolic blood pressure < 90 mm Hg, GCS < 5 , retinal bleeding, and pulmonary edema. **Conclusion:** Mortality among patients who present alive to the hospital after near hanging is low, including those with a low GCS on arrival. Ophthalmoscopic examination, as well as radiological exam-

ination of the brain and cervical spine, should be performed in cases of near hanging. © 2012 Elsevier Inc.

Keywords—suicide; Glasgow Coma Scale; near hanging; hanging; prognostic factors; mortality; injuries

INTRODUCTION

Hanging is a common method of both attempted and successful suicide in many countries, and has a higher success rate than other commonly employed modes of suicide such as self-poisoning and self-mutilation (1). Studies from England report around 2000 hangings per year, making hanging the most common means of suicide in that country, and reports from both Australia and New Zealand show significant increases in hanging suicides over the last 30 years (2,3). In contrast, previous studies in Iran have revealed that poisoning is the most common method of suicide, with a tendency toward ingestion of highly toxic chemical agents such as aluminum phosphide rather than pharmaceuticals, resulting in high associated mortality rates (4–9). Hanging is also associated with high mortality rates, which are estimated to be around 70%, however, little is known about the epidemiology and outcome of hanging and near hanging in Iran (10,11).

Despite the associated 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 (2,12). Salim et al. examined prognostic indicators after hanging and concluded that a systolic pressure of <90 mm Hg, Glasgow Coma Scale score (GCS) <8, hypoxic brain injury on computed tomography (CT) scan, and injury severity score of more than 15 predicted a poor prognosis (12). Others have argued that the strongest independent predictor of in-hospital mortality is GCS <15 on presentation, whereas a number of authors have highlighted profoundly depressed GCS or cardiopulmonary arrest at the scene or in-hospital as poor prognostic indicators (13–15). Although suicide by hanging is relatively common in Iran, very few studies are available on the epidemiology and characteristics of near hanging in the Iranian population. The aim of this study was to determine the epidemiology and outcome of near-hanging patients admitted to the main referral hospital in Arak, Iran.

MATERIALS AND METHODS

Vali-Asr Hospital is located in Arak, the capital of Markazi province, central Iran, and functions as the referral hospital for trauma and poisoning patients within the Markazi Province of Iran (population 1,000,000) and three surrounding provinces. Patients discharged from Vali-Asr Hospital between January 2000 and December 2008 with a diagnosis of hanging or near hanging (based on International Classification of Diseases, 9th and 10th Revision codes) and typical telltale signs of hanging and ligature marks, were evaluated. All patients were treated by our Emergency Medicine team under the supervision of our forensic medicine specialist, who retrospectively reviewed the identified patients' records and extracted data using a standardized data collection form. For the purposes of the study, "near hanging" was defined as the application of external pressure to the neck from a ligature tightened by an individual's body weight through suspension of all or part of the body, resulting in physiological derangement but not immediate death. Extracted data included demographic information, time of the attempt, the precipitating event or events, non-complete suspension (toes or feet in contact with the ground) vs. complete suspension (no contact with the ground), the occurrence of post-suspension convulsion(s), vital signs, GCS on arrival, ophthalmoscopic examination findings, requirement for intubation, radiological imaging findings, arterial blood gases, post-acute evaluation for amnesia, and outcome. Cases were categorized as suicidal, homicidal, judicial, attention-seeking, or accidental on the basis of the history provided by the patients or their companions with regard to the precipitating event. Those patients who regained consciousness were evaluated by our forensic medicine

Table 1. Demographic Characteristics of the Studied Patients

	Frequency	Percentage (%)
Sex		
Male	43	100
Female	0	0
Type of suicide		
Attempted suicide	39	90.7
Accidental	2	4.7
Attention-seeking	2	4.7
Outcome		
Survived	39	90.7
Non-survived	4	9.3

team to identify homicide attempts, and fatalities were investigated by judiciary evaluation. The data were then analyzed by SPSS software (Version 12; SPSS Inc., Chicago, IL) using Fisher's exact test and Student's *t*-test. A *p*-value of <0.05 was considered statistically significant. Appropriate permission was obtained from the local institutional ethics committee.

RESULTS

There were 43 near-hanging cases identified during the 9-year study period. All were males, and the majority of patients were in the third decade of life (79%), with a mean age of 24.2 years (range 12–38 years) (Table 1). Demographic information is presented in Table 2. Most cases were attempted suicides (90.7%). Ninety-five percent of patients (*n* = 41) were incompletely suspended during hanging, and just two cases were completely suspended (4.7%). All patients demonstrated wedge-shaped ligature marks, supporting the provided history of attempted hanging. Eighty-three percent of patients were transported to the Emergency Department by family members (*n* = 36), 11.6% by friends, and 4.7% by ambulance services. It was not possible to reliably determine transportation times on the basis of the history provided; however, the mean distance traveled was 1.7 kilometers.

On arrival, 72% of cases demonstrated stridor (*n* = 31), and we observed hoarseness in the first verbal communication after recovery of consciousness in 28% of patients (*n* = 12). Twenty-two patients (51.2%) suffered from convulsions, with a single episode in 16 patients and multiple episodes in 5 (one patient presented in status epilepticus). The median GCS at presentation was 6 (range 3–12) with

Table 2. Distribution of Cases According to Age

Age Group, Years	Frequency	Percentage (%)
< 13	2	4.7
14–20	4	9.3
21–30	34	79.1
31–40	3	7
Total	43	100

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