

## Delayed Death in Hanging

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### Abstract

Hanging is one of the most common methods of suicide in India in which death of the individual occurs almost immediately. However, a few cases have been reported in literature in which death has occurred after a certain period of time or the patient has survived after prolonged resuscitative measures. Here we present three cases of delayed deaths due to suicidal hanging in which the victims survived for variable time duration after they were rescued from hanging.

**Keywords:** Suicidal hanging; Delayed deaths; Cerebral hypoxia; Asphyxia; Hypotension; Pulmonary edema; Convulsions

### Introduction

Hanging is a common mode of committing suicide among suicide cases [1,2]. The death occurs within few minutes of hanging [3]. In hanging, death is usually due to asphyxia or cerebral anoxia or vagal inhibition leading to cardiac arrest or injury to the spinal cord [4,5]. Mainly respiratory and neurological complications such as pulmonary or neurogenic edema resulting in post-obstructive pulmonary distress, aspiration pneumonitis, ARDS, seizures, hypotension, neck vessel compression and cerebral hypoxia and multi organ failure can arise as fatal complications of hanging [12,18,21-23]. Here we report 3 cases of delayed deaths due to suicidal hanging with the victims eventually succumbing to one or more of the fatal complications after surviving for different time duration.

### Case reports

**Case 1:** Deceased was a 43 year old woman who survived 9 months after hanging with mechanical ventilatory support. She was found hanging at her house by her relatives, who brought her down from suspension immediately and she was rushed to the hospital in an unconscious state. She was clinically diagnosed to have suffered hypoxic ischemic encephalopathy and severe bronchospasm due to partial hanging. The patient was on a mechanical ventilator for 9 months. During her stay in the hospital the patient developed generalized tonic clonic seizures. On the day of her death, the patient suffered refractory hypotension with severe bronchospasm along with excessive tracheobronchial secretions.

**Case 2:** A 23 year old girl was admitted to the hospital by her relatives in an unconscious state. She survived 48 hours after partial hanging at her residence. The patient was in shock and an incomplete ligature mark was noted on the left side of the neck. Despite rigorous treatment, her neurological status worsened and on 7/4/2010 at 3pm and she was declared dead at the hospital as a result of hypotension and pulmonary oedema due to partial hanging.

**Case 3:** Deceased was a 55 year old woman known to be suffering from depression, who attempted suicidal hanging in a hospital ward. After immediate resuscitation, she survived for 24 hours. She was clinically diagnosed to have succumbed to cerebral hypoxia.

### Discussion

The incidence of hanging in India is approximately 25% of total

cases of suicide [6-9]. Though the 3 case reports of delayed deaths involve females, the patient population in existing literature on hanging is predominantly male, with an average age of 40 years and a history of substance abuse [14,15]. Death in suicidal hanging is secondary to hypoxia and cerebral ischemia due to compression of airway and major blood vessels of neck caused by ligature applied round the neck and the force of compression being the body weight [6,7,10,11]. This is in contrast to the cause of death in judicial hanging which is usually due to fatal injury to the cervical spine, brain stem and the larynx [13]. A patient may be saved by aggressive resuscitative measures if rescued within a few minutes of suicidal hanging.

The clinical features of a patient of hanging involve respiratory and central nervous system [9]. The common respiratory signs are respiratory distress, hypoxia, pulmonary edema etc; and signs related to CNS are like restlessness, unconsciousness, muscular rigidity, convulsions, amnesia, hemiplegia etc [3,8,9].

Development of pulmonary edema has played a major role as one of the causes of death in the 3 cases we have reported. The pathophysiology of type I post-obstructive pulmonary edema as in post hanging is thought to be influenced by both hydrostatic forces and increased permeability of alveolar epithelium following sudden upper airway obstruction [16]. Though the exact mechanism involved in the development of pulmonary edema has not been elucidated Postulates include pulmonary capillary membrane damage leading to increased capillary permeability, hyperemia in the lungs due to abrupt fall in intrapulmonary pressure following sudden removal of airway obstruction and pulmonary vasoconstriction mediated by vasoactive substances like histamine, serotonin and kinins; the release of which is triggered by cerebral hypoxia [17-19].

Though the onset of pulmonary edema is usually rapid, factors such

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as severity and duration of airway obstruction, degree of neurological injury and management modalities involved when addressing the neurological and pulmonary complications all may determine the time of onset and rate of development of pulmonary edema. Most often it is inadequate oxygenation and cerebral perfusion that results in the eventual death of the patients as seen in the 3 cases we have reported. Other rare cause of delayed death in hanging include cerebral infarction following a traumatic thrombosis of the sub totally ruptured carotid arteries wherein the patient was asymptomatic for 4 days [25].

Studies have shown that hanging time, presence of cardiopulmonary arrest at the scene and on arrival, P/F ratio at presentation and the GCS on arrival represented prognostic factors of outcome in hanging [12,24]. Though majority of survivors of hanging have little to no functional disability, the presence of severe disability is mainly attributed to intracranial and thoracic injury [26]. However, there are no studies that clearly extrapolates the chances of disability leading to eventual mortality.

## Conclusion

Despite favourable or unfavourable prognostic factors, delayed death must in anticipated in all cases of hanging as there is no predictable or fixed time duration that can be used as a framework to say with certainty that the patient is 'out of danger'.

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