Case Report

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Abstract:
Hanging is one of the most common methods of committing suicide in India. Instantaneous death occurs in cases of hanging. However, 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 four cases of delayed deaths following suicidal hanging in which the victims survived for variable duration after their rescue from hanging.

Key words: delayed death, suicidal hanging, early rescue and resuscitation, new life.

Introduction:
Hanging is a common mode of committing suicide among suicide cases [1]. Hanging is a form of asphyxial death, which is caused by suspension of body by ligature that encircles the neck, the constricting force being the weight of the body [2]. The death occurs within few minutes of hanging [3]. The process is invariably fatal unless the body is brought down in time and ligature released [4]. In hanging, cause of death can be asphyxia, venous congestion, combined asphyxia and venous congestion, reflex vagal inhibition, fracture or dislocation of cervical vertebrae. Death delayed for several days is rare [5]. If a person survives in attempted hanging, he/she may have secondary effects as hemiplegia, epileptiform convulsions, amnesia, dementia, cervical cellulitis/retropharyngeal abscess, parotitis [6]. Mainly respiratory and neurological complications such as pulmonary or neurogenic oedema resulting in post obstructive pulmonary distress, aspiration pneumonitis, ARDS, seizures, hypotension, neck vessel compression and cerebral hypoxia, and multiorgan failure can arise as fatal complication of hanging [7]. Here we present four cases of delayed death of suicidal hangings where victims succumbed to death due to one or more fatal complications after surviving for variable time duration.

Case 1
A 38 year old female was admitted to the hospital on 21/09/2012 by her relatives in an unconscious state. She had a history of partial hanging with the help of sari to a hook in the roof, 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 she died 48 hours after admission. Postmortem findings showed nutmeg appearance of lungs with pulmonary congestion and oedema and cerebral oedema. The liver showed centrilobular hemorrhage on microscopy. The opinion as to the cause of death was, “Hypotension and cerebropulmonary oedema as a complication of partial hanging”.

Case 2
A 17 year old male student attempted suicidal hanging with the help of towel to ceiling fan on 23/12/12, at the hostel room. It was noticed by his friends, who brought him down from suspension immediately and admitted him to the hospital in semi-comatose state. A faint and incomplete ligature mark was noted on the neck anterolaterally. On 2nd day, tracheostomy was
done to relieve respiratory distress. Even after that the condition was worsening, so he was put on ventilation. During hospital stay, his respiratory and neurological condition worsened day by day and he succumbed to death after seven days. The patient suffered refractory hypotension with severe bronchospasm along with excessive tracheobronchial secretions just before his death. Postmortem examination revealed congested and oedematous lungs which on histopathology showed aspiration pneumonitis. The cause of death was given as, “aspiration pneumonitis as a complication of hanging”.

Case 3
A 30 year old male was found in hanged condition by his wife on 21/12/2012 with the help of sari to the ceiling fan, at his residence. He was then rushed to hospital in unconscious state. A faint and incomplete ligature mark was noted on the neck. As per the relatives, there was history of two episodes of generalized tonic clonic seizures while bringing him to the hospital. He also developed decerebrate posture. Initial clinical evaluation suggested hypoxic ischemic encephalopathy. MRI showed hypoxic ischemic insult of frontoparietal and temporal lobes. On next day, he developed labored breathing and was put on ventilation. Tracheostomy was done on 4th day of hospital stay. The neurological and respiratory conditions worsened day by day and he died on 17th day of hospital admission, despite all resuscitative measures. Postmortem examination revealed congested and oedematous lungs which on histopathology revealed aspiration pneumonitis and oedematous brain which on histopathology showed hypoxic brain injury. Final opinion as to the cause of death was given as, “complications following hanging”.

Case 4
A 34 year old male was found in hanged condition with the help of sari to ceiling fan on 13/03/2013. He was then brought to hospital in unconscious state. A faint and incomplete ligature mark was noted on the neck. On the same day he had one episode of generalized tonic clonic seizure. Clinical evaluation showed left hemiparesis and hypoxic insult to brain was suspected. The CT scan showed fracture of antero superior part of C4 vertebra. On next day, he was shifted in ICU and put on ventilation. Despite of all resuscitative measures, his respiratory and neurological condition worsened and he died on ninth day of hospital admission. Postmortem examination revealed Fracture of antero superior part of C4 vertebra, congested and oedematous lungs, which on histopathology revealed aspiration pneumonitis. Cause of death was given as, “complications arising from fracture of the cervical vertebra sustained during the attempt of hanging”.

Discussion:
The incidence of hanging in India is approximately 25% of total cases of suicide[8]. Out of four cases discussed, 3 were male and 1 was female belonging to age group 30-40 years. Nithin MD et al reported three cases of delayed death, in which all were female victims, of ages between 20-50 years. The patient population in existing literature on hanging is predominantly male, with an average age of forty years and history of substance abuse[9].

Victim of hanging usually die within period of three to five minutes[10]. It may vary considerably when the compression around neck is released early and quickly[11]. In all the cases reported, the victims were found in hanged condition by their near and dear ones at the early stage. They rescued and brought the victims to hospitals immediately. 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 around neck and force of compression being the body weight \[11\]. A weight of 15 kg is required to compress the trachea to cause asphyxia \[2\]. The jugular veins are closed by tension in the rope of 2 kg. A tension of 4 to 5 kg on ligature blocks carotid arteries, and 20 kg blocks vertebral arteries \[5\]. The brain cannot withstand lack of oxygen for a period exceeding five minutes, beyond which permanent cerebral damage results \[4\]. Very rarely, the victims of hanging survive after prolonged period of unconsciousness \[12\]. Delayed death occurs due to, aspiration pneumonia, infections, oedema of lungs, oedema of larynx, hypoxic encephalopathy, infarction of brain, abscess of brain, cerebral softening \[5\]. Hocking (1961) has reported a case of a man who died seven days after hanging. Death was due to complications arising from fracture of the larynx sustained during the attempt \[4\]. Aggarwal et al reported a case where a 20 year old female survived for nine days in hospital after hanging episode and died due to cerebral anoxia \[13\]. In another case reported from Delhi, an adult male survived for 39 days after he was accidentally hanged while helping passengers trapped in lift \[14\]. Virendra Kumar also reported a case, where a young female survived for 15 hours after attempted hanging, and died due to hypoxic encephalopathy due to neck compression \[15\]. Here we discussed four cases of suicidal hanging which succumbed to death, after variable durations ranging from 48 hours to 17 days. Causes of death being various complications following hanging.

The previous authors observed that, clinical feature of patient of hanging involve respiratory and central nervous system. The common respiratory signs are respiratory distress, hypoxia, pulmonary oedema etc.; and the signs related to CNS are like restlessness, unconsciousness, muscular rigidity, convulsions, amnesia, hemiplegia etc. \[9\]. We found that in all cases respiratory distress was evident prominently for which either tracheostomy was done or else ventilation was provided. Neurological signs like convulsion was evident in two cases, while decerebrate posturing and hemiparesis was evident in one case.

Development of pulmonary oedema has played a major role as one of the causes of death in the 4 cases we have reported. Though the exact mechanism involved in the development of pulmonary oedema 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 \[9\]. A patient may be saved by aggressive resuscitative measures if rescued within few minutes of suicidal hanging. Fishman et al has described two cases of ARDS following attempted suicide by hanging. Both had bilateral pulmonary oedema and were managed with tracheal intubation and positive pressure ventilation. Both survived without any neurological deficits \[15\]. Most often it is the inadequate oxygenation and cerebral perfusion that result in the death of the patient \[9\]. Studies have showed that hanging time, presence of cardiopulmonary arrest at the scene and on the arrival, P/F ratio at the presentation and GCS on arrival represented prognostic factors of outcome in hanging \[7\]. Preventing re obstruction and providing adequate ventilation and oxygen are mandatory after relief of upper airway obstruction. Treatment includes supplemental oxygen and support cares, but positive end expiratory pressure and mechanical ventilation may be required for prolonged period \[17\].

**Conclusion:**
Fatal period in attempted hanging is not fixed. It may vary considerably with amount of constricting forces as well as time of releasing the compressing force around neck. Also in every case of attempted hanging, the delayed death must be anticipated, as the patient is never out of danger. Finally early rescue, better assessment of prognostic factors and extensive and clever resuscitation can give new life to victim.

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