CASE REPORT

Prolonged delirium secondary to hypoxic ischemic encephalopathy following complete hanging

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ABSTRACT

Background: Delirium is a common disorder, and can occur in children and adults. It is short lasting, with duration ranging from hours to days. However, prolonged delirium can occur in people with brain damage. Hypoxic ischemic encephalopathy (HIE) is a condition that occurs when the entire brain is deprived of adequate oxygen supply. HIE results in neurological injury and long term dysfunction. Outcome of HIE ranges from significant changes in personality, impairment in memory, cognition and attention, to coma and vegetative states. Only a quarter of patients survive to be discharged from hospital. There are very few case reports of prolonged delirium secondary to HIE following hanging.

Case description: A 27 year old Asian man with alcohol dependence syndrome developed prolonged delirium (more than two months) following HIE subsequent to hanging.

Discussion: Prolonged delirium has been reported in 1/3rd cases of delirium. Risk factors for prolonged delirium are increasing age, severe delirium, increasing number of medical conditions. Prolonged delirium was found to be associated with poor functional outcome and increased mortality.

Conclusion: Our case report highlights the importance of early detection and management of prolonged delirium.

Key words: prolonged delirium; hypoxic ischemic encephalopathy; hanging

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INTRODUCTION:

Delirium is defined as transient, usually reversible cerebral dysfunction, characterized by concurrent disturbances of consciousness, attention, perception, thinking, memory, psychomotor behaviour, emotion and sleep wake cycle. The usual duration of delirium ranges from hours to days; but, can sometimes last up to six months.¹² Hypoxic ischemic encephalopathy (HIE) is a condition that occurs because of lack of delivery of oxygen to the brain. The causes of HIE are myocardial infarction, cardiac arrest, shock, asphyxia, respiratory paralysis and carbon monoxide poisoning. Neurological impairments of HIE can range from mild cognitive deficits to severe motor and cognitive deficits that affect independence in many activities of daily living.²³ Hanging is a common mode of committing suicide with a high incidence among suicidal cases.³⁴ Hanging can be classified as complete or incomplete. When the whole body hangs off the ground and the entire weight of victim is suspended at the neck the hanging is said to be complete and if some part of the body is touching the ground and the weight of the victim is not fully suspended by neck it is called incomplete hanging.⁴⃣

We report a case of prolonged delirium following HIE, subsequent to complete hanging.

CASE REPORT:

A 27 years old Asian man, farmer by occupation, married, from low socio economic status, was referred by neurologist and brought by his wife to our psychiatry outpatient department with the complaints of disrobing of clothes, wandering on roads; abnormal visual perceptions and disturbed sleep for 22 days following complete hanging. Symptoms were sudden in onset and progressive in nature. History revealed complete suicidal hanging with a rope from ceiling fan for five to 10 minutes, which was precipitated by a quarrel with wife in intoxicated state. After this suicidal attempt, in an unconscious state he was taken to a general hospital, on the way he developed generalized tonic clonic convulsions several times continuously. His Glasgow coma scale (GCS) score was seven at the time of admission; but later he regained full consciousness.
He was referred to our hospital (psychiatric department) after 7 days of hanging, where he was admitted. On general examination, a ligature mark of 1.5 cm diameter (thickness) was seen at the level of laryngeal prominence obliquely directed to the nape of neck. A detailed neurological examination did not show any localized sensory or motor deficits. On mental status examination he was unkempt in appearance, restless, poor rapport with increased psychomotor activity and hoarse voice owing to hanging. His cognitive functions showed impaired attention and concentration. Memory was impaired in immediate and recent modalities; he was disoriented in time and place. He manifested delusions of persecution and visual hallucinations.

There were no features suggestive of depression prior to the suicidal attempt. However, he used to consume alcohol since 10 years; for previous two years he was consuming daily in increased quantity. He used to neglect his day to day activities and spend most of the time on alcohol consumption. The last drink was on the day of suicidal attempt. A provisional ICD-10 diagnosis of alcohol dependence syndrome (F1x.2) with delirium, not induced by alcohol and other psychoactive substances (F05) was made.

Complete blood picture, random blood sugar, thyroid function tests, liver function tests, renal function tests and serum electrolytes were within normal limits. In view of prolonged delirium (of 22 days duration), hypoxic ischemic encephalopathy (HIE) (P91.63- ICD 10) was suspected. The neurologist reviewed the patient and advised computed tomography (CT) scan of brain which manifested cerebellar atrophy. Magnetic resonance imaging (MRI) brain was also advised by the neurologist; however, the patient did not get the film and report to us. Electro encephalography showed diffuse slow wave activity. Neurologist also diagnosed the case as HIE.

On admission in our hospital (psychiatry department), the patient’s mini mental status examination (MMSE) score was 13/30. [5] The severity of delirium was quantified at different time points by administering Memorial Delirium Assessment Scale (MDAS) (Table 1). [6] MDAS is a 10 item, 4 point (0-3) clinician rated scale (0-30), designed to be administered repeatedly within the same day to allow for objective measurements of changes in delirium severity. The items assess disturbances in arousal, level of consciousness, cognitive functioning - memory, attention, orientation, disturbances in thinking and psychomotor activity.

On second day of admission our patient had confabulations and retrograde memory loss (for five years before the episode). He did not remember that his father had expired one and half year back. He also did not remember that his sister- in-law committed suicide four years back. However, he did remember that he had an eight old son, the name of his school and the colour of his school uniform. He also had anterograde memory disturbances.

The patient was started on oral risperidone 2mg/day, increased gradually to 6 mg/day over a period of two weeks. As he developed extra pyramidal symptoms with risperidone, he was changed over to quetiapine 25 mg/day, which was gradually increased to 200 mg/day over a period of two weeks. He was also treated with B-complex vitamin once daily and intramuscular haloperidol (5mg) during night.

Patient was admitted in our hospital for 45 days; however, he continued to be in the above mentioned state, except for marginal improvement in attention. He needed assistance for all the activities of daily living. A final diagnosis of ‘prolonged delirium secondary to hypoxic ischemic encephalopathy following complete hanging’ was entertained. The patient was discharged from our hospital against medical advice on the request of family members. He was advised to come for review after one week; however, he was lost to follow-up.

**DISCUSSION:**

Our case is unique in its clinical presentation of prolonged delirium (more than two months) due to HIE (ICD 10 P91.63), [7] following hanging. Points for diagnosis of delirium in our case include, i) impaired attention and concentration, ii) perceptual disturbances, iii) psychomotor disturbances, iv) disturbance in sleep wake cycle, v) irritability (emotional disturbance), and vi) disorientation for place and time. Differential diagnosis of dementia may be considered once delirium resolves and cognitive deficits persist; however, our patient was lost to follow-up before complete recovery from delirium. In amnestic disorder immediate memory is intact. [8] In our case, immediate memory on visual recall was 2/5; hence, amnestic disorder was ruled out.

Hypoxic ischemic encephalopathy is a diagnostic term that encompasses a complex constellation of

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**Table 1 Assessments at various time points in our case**

<table>
<thead>
<tr>
<th>Days after admission</th>
<th>MDAS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st day (admission)</td>
<td>20*</td>
</tr>
<tr>
<td>7th day</td>
<td>16*</td>
</tr>
<tr>
<td>14th day</td>
<td>18*</td>
</tr>
<tr>
<td>45th day (discharge)</td>
<td>10*</td>
</tr>
</tbody>
</table>

* Moderate severity of delirium (on Memorial Delirium Assessment Scale)
pathophysiological and molecular injuries to brain induced by hypoxia, ischemia and cytotoxicity. [9] Neurological and neurobehavioral consequences of hypoxic ischemic brain injury (HIBI) include seizures (event related and recurrent), disturbances of sensorimotor function, broad array of cognitive, emotional and behavioural disturbances. [10] The two principal means by which hanging induces brain damage are, i) cerebral ischemia, resulting from ligature induced obstruction of cerebral blood flow, and ii) to a lesser extent, cerebral anoxia resulting from asphyxia due to mechanical air way obstruction. [11] As many as one third individuals sustaining HIBI develop seizures in immediate post injury period. Seizures begin within 24 hours, but may recur after two weeks; the post hypoxic status epilepticus is associated almost invariably with a fatal outcome from HIBI.[12] Our patient survived in spite of status epilepticus which lasted for six hours. A study found that following hanging, a GCS score less than 10 (out of 15) at the time of admission was associated with adverse neurological outcome; however, our patient had a GCS score of 7 following hanging, and he survived.

In one study, 69.4% of patients with traumatic brain injury admitted to a rehabilitation unit met DSM IV criteria for delirium. In approximately one third of these patients, delirium had a protracted course. [13] Different studies have defined prolonged delirium as persistence of clinical features of delirium ranging from 4 weeks to 6 months. [14, 15, 16] In a case report of delirium secondary to HIE following cardiac arrest, the delirium persisted for as long as nine months. [17] Various studies report prevalence of prolonged delirium in the range of 20-51%. [15, 16, 18] In the same study, in elderly patients who underwent hip fracture surgery, presence of pre-injury dementia was found to be a risk factor for prolonged delirium; this in turn was associated with poor functional outcome and increased mortality. [19] Another study by Kiely et al.[18] replicated this finding. A review studied the factors associated with the persistence of delirium; the risk factors identified were, ‘the presence of dementia, increasing number of medical condition, increasing severity of delirium, hypoaffective symptoms and hypoxic illnesses’. [19] Other risk factors include prehospital cognitive impairment, old age, and severe delirium at admission (among newly admitted post ICU patients). [16] In their study, patients who were delirious at the time of admission were followed up for one year; persistent delirium was a significant predictor of one year mortality. According to Kayrak et al.[20] delirium in elderly is associated with poor prognosis; however, Schmidt et al., [21] argue that age at the time of injury is less consistently implicated with poor prognosis in patients of delirium following acute myocardial infarction. In fact, our patient was a 27 year-old man, who presented with prolonged delirium following a medical condition, i.e. HIE.

**CONCLUSIONS:**
Most of the case reports of HIE and prolonged delirium have been reported following cardiac arrest and hip fracture surgery. There are hardly any reports of HIE and prolonged delirium following hanging. Our case highlights the importance of early detection and management of prolonged delirium in view of complications like poor functional outcome and mortality associated with it.

**Clarifications**
The images of CT and MRI brain are not published in this case report, as these films were retained by the previous hospital where he was treated for HIE.

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**References:**
et al.

**Conflict of Interest :** None declared **Source of Support :** Nil