

Neuropsychological profile following suicide Attempt by hanging in Botswana: Three case reports

James Ayug^{*1} Kigosi Bojosi², Philip Opondo³ Keneilwe Molebatsi⁴ Anthony Olashore⁵

1. Lecturer School of Medicine, Department of Psychiatry, University of Botswana, Private Bag 30 Lobatse Botswana

2. Medical Officer, Sbrana Psychiatric Hospital, Private Bat 30 Lobatse

3. Lecturer School of Medicine, Department of Psychiatry, University of Botswana, Private 00712 Gaborone Botswana

4. Lecturer School of Medicine, Department of Psychiatry, University of Botswana, Private Bag 00712 Gaborone, Botswana

5. Lecturer School of Medicine, Department of Psychiatry, University of Botswana, Botswana, Private Bag 00712 Gaborone, Botswana

Email: ayugijo@yahoo.com

Abstract

Botswana police suicide statistics reported a total of 783 cases of both attempted and completed suicide in one year. Attempted hanging usually results in severe memory disturbances but that these amnesic states usually are only temporary. While there is a considerable amount of early German-language literature on the neurological and neuropsychological consequences of unsuccessful attempts by hanging, by the early 1990's, only two cases of attempted hanging had been reported in the English language as the cause of a persistent anterograde amnesic syndrome resembling that seen in Korsakoff's syndrome. We present three cases we believe to be the first reported cases of amnesic syndromes in Botswana following unsuccessful attempts by hanging in three male adults.

Key words: Attempted suicide, Amnesic states, Botswana, Korsakoff's syndrome

1.Introduction

While no precise figures are available for unsuccessful suicide attempts by hanging in Botswana, it is safe to assume that hundreds if not thousands unsuccessfully attempt suicide by this method yearly. Over a period of four years from 1995 to 1998, for example; the Botswana police suicide statistics reported a total of 783 cases of both attempted and completed suicide (Alao et al. 2005) International surveillance records suggest that the male rate of suicide attempts by hanging increased dramatically during the 1980's and stabilized in the 1990's (Langley, Nada-Raja, & Alsop 2000).

Lethal suspension (hanging) is one of the most common methods of attempting suicide. Spinal fractures, cognitive and motor deficits as well as epileptic seizures can be detected after unsuccessful hanging attempts (Cinar et al. 2012.) By early 1990's, only two cases of attempted hanging had been reported in the English language as the cause of a persistent anterograde amnesic syndrome resembling that seen in Korsakoff's syndrome. However, there is a considerable amount of early German-language literature on the neurological and neuropsychological consequences of unsuccessful attempts (Salinger 1927). By 1896, Boediker (1891) had described attempted hanging as usually resulting in retrograde amnesia. Two of the first detailed reports of such cases were also given by Wagner in Southeastern Austria (Wagner 1891). Wagner noted that attempted hanging usually resulted in severe memory disturbances which he characterized as "dementia acuta", but that these amnesic states were usually only temporary; in a few cases he noted that the reverse pattern might even follow namely an improvement of amnesic functions or the cure of a psychosis (Wagner 1891).

There are several studies of the neuropsychological sequelae of nonlethal hanging in adults, including isolated case studies (Berlyne & Strachen, 1968; Medalia, Merriam, & Ehrenreich, 1991) in which memory deficits are the primary finding. For instance, Medalia and colleagues (1991) reported on two adults who presented with retrograde/anterograde amnesia and otherwise intact cognitive functioning 2 to 3 years after hanging attempt. Caine and Watson (2000) found that memory disturbance rarely occurred without other accompanying cognitive dysfunction. Compared with incidence of isolated amnesia, they found a much higher rate of memory disturbance combined with other cognitive deficits, including changes in behavior, personality, visuospatial functioning, and expressive language skills. Caine and Watson (2000) review suggests that multiple brain structures and cognitive functions may be disrupted following periods of hypoxia/anoxia, and argues against the commonly held belief that amnesia typically exists in isolation following such injuries.

Hanging differs from many other causes of hypoxic-ischemic injury in that the ligature used in hanging can partially or completely occlude both air flow and arterial flow simultaneously (Zabel et al. 2005) This is quite different from other forms of injury (e.g., asphyxia), in which decreased tissue oxygenation (i.e., hypoxia) can

occur without immediate disruption of blood flow to brain tissue (i.e., ischemia). The link between hanging and the potential for immediate disruption of arterial blood flow is significant, as short periods of hypoxia alone have not been associated with cerebral necrosis in animal studies when minimal blood pressure has been preserved (Zabel et al.2005).We present three cases, we believe to be the first reported cases of varying levels of cognitive dysfunction following unsuccessful attempts by hanging in three male adults admitted at Sbrana Psychiatric Hospital in Botswana.

2. METHOD

2.1 Participants

Selected background and demographic data for Patients A and B are presented in Table 1. The purpose of this case study report was explained to the patients in person during a routine visit to the Psychiatric Outpatient Department at Sbrana Psychiatric Hospital. Consent for inclusion in this case study publication was obtained from both patients.

2.2 Materials and Methods

The current study describes the neuropsychological profiles of three adult males who survived suicide attempt by hanging. Both men were referred to Sbrana psychiatric Hospital by close relatives. Informal measures were administered and behavioral observations were made during their initial recovery, and comprehensive neuropsychological evaluation was conducted several weeks post injury shortly, before discharge from the Hospital. Patient A was 23 years, old at time of hanging, and Patient B was 42years old at the time of hanging while patient C was 39 years old.

Table 1 Comparison of Demographic and Injury-Related Variables.

| Demographic Injury related Variables | PATIENT A | PATIENT B | PATIENT C |
|---|--------------------------------|-------------------------------|--------------------------------|
| Age at time of Injury | 23 | 42 | 39 |
| Weight | 64kg | 71kg | 68kg |
| Pre –Injury IQ Estimate(below average/average/ High) | Average | High | Average |
| Drugs/Alcohol Use | Reported | NIL | NIL |
| Psychiatric History | | | |
| Precipitants to Hanging | Confrontation with Girl friend | Family psychosocial Stressors | Confrontation with girl friend |
| Hanging Ligature | Dog Leash | Dog Leash | Dog Leash |
| Estimated duration of Hanging | 5-10mins | 5-10mins | 10-15 mins |
| Initial Respiratory Status | Shallow | Shallow | Very Shallow |
| Initial GCS Score | | | |
| Estimated Duration of Coma | Nil | Nil | 2-5 mins |
| Initial EEG | NORMAL | NORMAL | NORMAL |
| Follow up MRI | NORMAL | NORMAL | NORMAL |

3. RESULTS

Patient A—Background History of Injury and Recovery

Patient A was 23 years old at the time of his suicide attempt by hanging. There was no reported family history of mental illness. In 2014 he had also attempted to kill himself by ingesting paraffin after a quarrel with a previous girlfriend. There were no significant behavioral or emotional problems reported prior to quarrelling with his girlfriend and beating her after suspected her of cheating on him. He was reprimanded by his Uncle for this behavior. Suicide attempt involved self-induced ligature injury using a pet leash anchored to a tree in the bushes where he had ran to after the confrontation with the girl friend and reprimand from his Uncle. He was found by his brother shortly afterwards hanging by a rope tied to a tree branch and was cut loose. He was rated of average intelligence as he had attended school and performed averagely up to secondary school. Patient A

weighed approximately 64 kilograms at the time of injury. Parents' estimate of duration of hanging was approximately 5-10 minutes. When found, Patient A's lips were not cyanotic, and nor was he unconscious. His brother reported a positive carotid pulse at the scene and shallow respirations, and the attempted some rudimentary first Aid before referral to the Hospital.

In terms of motor functioning, Patient A displayed no deficits in motor functioning and needed no assistance in walking. Cognitively, Patient A was conscious at the time of admission, and was orientated in all spheres, followed commands, and communicated well. A period of retrograde amnesia was reported that included loss of memory for the suicide attempt and other precipitating events. Patient interview did not reveal evidence of suicidal ideation or intent during the acute period of rehabilitation, but even so he was put on a 24 hour suicidal watch as part of his risk management. During this time, Patient A presented with flat affect and restricted facial expression. Patient A reported that he did not remember his suicide attempt nor taking a rope and going to the bush. Patient A was discharged from the Hospital six days after admission.

Patient B—Background History of Injury and Recovery

Patient B was 42 years old at the time of his suicide attempt by hanging and weighed 71.4kg. There was no reported family history of mental illness. The patient had attempted suicide in 2017 for unclear reasons. There were no significant behavioral or emotional problems reported prior to attempted suicide by hanging. Before the attempt the patient had closed all the windows in the bedroom where the attempt took place despite the very hot weather prevailing at the time of the attempt. The patient then proceeded and fetched a rope went to the bed room and closed the door. After getting suspicious, the patient's wife who was present in the house peeped through the bed room key hole and saw the patient putting the rope around his neck. The wife then alerted the others who were in the house and a spare bed room key was frantically looked for, found and the bedroom door immediately opened. The patient was found hanging by the neck, rescued and rushed to our Hospital.

The wife estimated the duration of hanging as approximately 5-10 minutes. When found, Patient B was confused but conscious. There was a positive carotid pulse and shallow respirations when first seen at the Hospital. He was orientated in all spheres, followed commands, and tried to communicate with staff though mumbling initially. The patient had a scar across the anterior aspect of his neck. He was anxious but denied any suicidal /homicidal ideations. A period of retrograde amnesia was reported that included loss of memory for the suicide attempt and other precipitating events. He could not recollect fetching the rope, closing the bedroom windows and doors or the act of hanging himself. Though the patient interview did not reveal evidence of suicidal ideation or intent during the acute period of rehabilitation, he was put on a 24 hour suicidal watch as part of his risk management. Review by psychologist revealed that though the patient denied any significant psychosocial stressors prior to the suicide attempt, the patient deeply resented his wife's life style of drinking a lot and partying every week end and coming home late often; while he was a lay preacher and community elder. A few days prior to the suicide attempt the patient had confronted his wife over some body the wife had been chatting with in "Wassup". The wife had refused to give the patient her phone as the patient had demanded. The patient was subsequently discharged from the Hospital one week after admission

Patient C—Background History of Injury and Recovery

Patient C was a 39 year old male who weighed 68kg. There was no previous history of mental illness or attempted suicide or suicidal thoughts. There is also no family history of mental illness or suicidal attempts. The patient was of sober habits. Prior to the attempted suicide, the patient had locked himself and his partner in their bed room where they had a confrontation over some relationship issues. During the confrontation process, the patient had choked the girl friend until she had briefly lost consciousness. Apparently when the girl friend passed out, the patient thought that he had indeed killed her. He then proceeded to fetch a rope and used it to hang himself by the neck. When the girl friend regained consciousness a few minutes later she saw her partner hanging by the neck and raised an alarm. The patient was consequently rescued and rushed to a general Hospital from where he was referred to our Hospital a day later. It was later estimated by relatives nearby, that the of duration of hanging was approximately 10-15 minutes. When found, Patient B was semi-conscious. There was a weak carotid pulse with shallow respirations when first seen at the General Hospital. He was dis orientated in all spheres could not follow commands, and communication with staff proved initially difficult. The patient had a ligature mark around his neck which was tender with some mild swelling.

Two days later when interviewed, the patient could not remember the events preceding the confrontation with his girlfriend or the act of trying to kill himself by hanging. He was able to remember only events from the time he became orientated at the General Hospital. He was put on a 24 hour suicidal watch and was subsequently reviewed by both the psychologist and the social worker individually and together with his girlfriend. He was discharged after ten days of admission.

4. DISCUSSION

Hanging is one of the most commonly used methods of suicide among both men and women (Cinar 2012). The impact of lethal suspension on cognitive functioning is dependent on many factors including the length of asphyxiation time (Zabel et al. 2005). The cases presented above are important for examining the impact of attempted suicide by hanging on cognitive functioning in adult males in Botswana.

In the three cases, the reported duration of hanging was approximately the same (5-10) minutes, but the cognitive functioning was not uniform. In patient A and B, the main cognitive dysfunction was principally retrograde amnesia while in patient C apart from the retrograde amnesia the patient also showed disorientation, inability to follow simple commands and difficulties in communication with the staff. Similar to our first two cases Wagner also noted that attempted hanging usually resulted in severe memory disturbances which he characterized as "dementia acuta", but that these amnesic states were usually only temporary (Wagner 1891). In relation to patient C, Caine and Watson (2000) also similarly found a much higher rate of memory disturbance combined with other cognitive deficits, including changes in behavior, personality, visuospatial functioning, and expressive language skills (Caine & Watson 2000). In addition to memory problems, deficits were identified in the areas of attention and language in patient C. This observation shows the importance of multidisciplinary or comprehensive assessment following attempted suicide by hanging as there may be impairments in other cognitive domains other than, or in addition to, memory.

The three cases presented here share several some common characteristics, but they also differ in some key areas. Patient A who was the youngest and weighed less than the other patients at the time of attempted hanging appears to have had the least cognitive dysfunctioning as he was conscious when found, could obey verbal commands and was well orientated in all spheres. Patients B and C however were older and heavier than patient A at the time of attempted suicide. When found, they were disorientated, confused, could not follow commands, and had difficulties in communicating with staff. We also observed that Patient D who was in a semi coma when found appeared to have more cognitive dysfunction than the other two patients.

Our findings are consistent with that of Zabel et al. (2005) who also noted that some individual variables may be more predictive of cognitive functioning following hanging injury than others. On patients' weight at the time of hanging, Zabel et al. (2005) postulated that the weight variable may contribute to increased occlusion of arterial blood flow in the neck during hanging and thus a greater risk for ischemia. On age differences, Zabel et al. (2005) postulated that the younger patients who survive the attempted suicide by hanging tend to suffer less cognitively possibly due to neural plasticity.

In all our cases, post-acute cognitive functioning was characterized by a disruption of multiple cognitive systems, ranging from; confusion, disorientation, mumbling, inability to obey command, retrograde amnesia, and difficulty in communication with the staff.

5. CONCLUSION

These case studies provide an important contribution to the emerging literature that there should be comprehensive neuropsychological evaluation of patients following suicide attempt by hanging and that the degree of cognitive dysfunction may well vary according to several individual variables.

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