

CASE REPORT

DELAYED NEUROPSYCHIATRY SEQUELAE (DNS) OF CARBON MONOXIDE (CO) POISONING – A CASE REPORT

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Abstract

Objective: Several cases of suicide attempt by charcoal burning producing CO have been reported in Malaysia. This case report highlights a case of delayed delayed neuropsychiatry sequelae (DNS) in CO poisoning. **Method:** We report a young Chinese homemaker who presented with DNS who was detained in a Malaysian forensic psychiatric ward. **Results:** After approximately two weeks of admission, in a familicide attempt, she had started to exhibit subtle changes in her behaviour, including social withdrawal, impaired memory, and there was lack of emotional distress. **Conclusion:** We report an interesting DNS as one of the two forms of chronic sequelae of CO poisoning, whereas the other type of neuropsychiatric sequelae is the persistently progressive type. *ASEAN Journal of Psychiatry, Vol. 16 (1): January – June 2015: XX XX.*

Keywords: Delayed Carbon Monoxide Poisoning, Neuropsychiatric Sequelae

Introduction

Suicide attempt by charcoal burning has been a familiar method in Asian countries [1], not precluding Malaysia, despite a lack of data of such a suicide method [2]. The diagnosis of delayed neuropsychiatry sequelae (DNS) of carbon monoxide (CO) poisoning due to charcoal burning is not a familiar term among psychiatrists, especially junior ones. The occurrence of such a disorder is hardly commonplace in the local psychiatry setting, as most cases would either be treated during the acute event in emergency department or would have not survived from the cerebral insult. The aim of this case report is to discuss presentations of DNS in relevance to psychiatry, and its remarkable recovery, without any specific treatment for CO poisoning.

Case Report

A 37 year old Malaysian Chinese homemaker

was detained in our forensic psychiatry ward under court order for investigation into the murder of her five-year-old daughter. This murder charge was in the context of an attempted familicide, perpetrated by both the patient and her husband, by inhalation of burnt charcoal in an enclosed room for two consecutive nights, where their two children were also sleeping, after ingestion of over the counter hypnotic medications. The youngest of the children had succumbed to death on the second attempted familicide night, while the seven-year-old son and his parents survived and remained in their apartment for four days before being discovered by an acquaintance who notified the police. The parents were apprehended and later detained in the forensic psychiatry ward. This act of deliberate self-harm is criminalized under the Malaysian Penal Code, and requires a psychiatric assessment of the perpetrator, by a court order.

The main stressor was that the patient's husband, was no longer able to provide

financially for his family in the preceding six months of the incident. This was coupled with pressure of having borrowed money from loan sharks and being unable to repay their mounting debt, which included credit card debts. This account of the history was reported by the patient upon her admission into our ward. Mental state examination at the time was reported as unremarkable. Subsequent mental state assessments revealed that she was grieving the loss of her child and this was assessed to be a normal bereavement process.

After approximately two weeks of admission, which was approximately 40 days after the familicide attempt, patient had started to exhibit subtle changes in her behaviour. She initially appeared not forthcoming during the interview, by not talking as much as she did before, and had been keeping to herself in the ward. Later, there were signs of impaired memory; not being able to recall the details of the incident, and there was lack of emotional distress associated with this. Her affect was described as blunted due to lack of emotional tone, and appearing dulled throughout serial interviews. There was also a gradual change in her gait over a period of two weeks, best described as mild shuffling, but was not unsteady. There were no falls and Romberg's sign was negative. Physical examination revealed mild rigidity over her proximal upper limbs and pupils were dilated at 4mm bilaterally. Nursing staff also started to report patient appearing dazed and did not know how to carry out complex activities, such as washing her dishes, bathing, and toileting. Subsequently, she developed double incontinence (day 44), and had required the use of pampers. By this time, she required close supervision and assistance in her basic activities of daily living. Interestingly, her clinical deterioration had paralleled her husband's, albeit behind in presentation by a week's duration, who was also detained in the male ward, under a different treating forensic psychiatrist.

She was then referred to the visiting neurologist of the nearby general hospital and underwent brain Magnetic Resonance Imaging (MRI) (day 54) which revealed T1WI hypointensities and T2WI hyperintensities in both globus pallidus and periventricular white matter with some extension to subcortical

white matter at the frontal region. There were no cortical, cerebrum or brainstem abnormalities. MMSE revealed cognitive impairment with a score of 11/30; with impairments in the domains of orientation, memory, concentration and visuospatial abilities. A diagnosis of delayed neuropsychiatry sequel (DNS) of carbon monoxide (CO) poisoning was made based on clinical and radiological findings. Management involved supportive treatment, mainly with assistance with basic daily living. Neurobion, which is a combination of vitamin B1/B6 and B12, was started as a supplement. There were no behavioural disturbances and no psychotic symptoms.

In the following one month of hospitalization, which was approximately 70 days after the familicide attempt, the status of her condition, was at best described as no further deterioration, as demonstrated by (a) serial MMSE; score range between 13/30 to 15/30, with impairment noted on orientation, attention, registration, recall and visuospatial skills; (b) no worsening of her activities of daily living (lesser degree of assistance needed); (c) lesser extrapyramidal rigidity in muscle tone over upper arms; and (d) lesser frequency of incontinence. She was not fit to stand trial in court to face her charge of criminal offence and hence an extension into her forensic assessment was obtained. Astonishingly, her condition took a turn for the better, gradually, over the following month (approximately 85 days after the suicide attempt). Her motor and cognitive deficits had started to improve after the above clinical dip, in two weeks. She recorded MMSE score of 22/30 (day 99) on the last assessment, with full score on recall memory. Nursing observation reported she was fully independent in activity of daily living (ADL) by then and was no longer incontinent.

She was finally deemed fit to stand trial for the charge brought against her and was discharged from the forensic ward. Her husband also, remarkably, had similar clinical improvement that he was mentally fit to stand trial for the same criminal charge.

Discussion

This case demonstrates an attempted

familicide that turned into a homicide investigation. While the acute presentation of CO poisoning is recognisable, the delayed effects of this toxic exposure is less easy to be identified; in part due to its non-specific cluster of neuropsychiatry changes, and also due to a latency onset that ranges between 3-240 days [3]. The survivors, including the patient, of this botched suicide attempt were discovered after four days, and during this period, could have recovered from the acute intoxication effects of CO without any overt residual signs. It was assumed that the patient had substantial exposure to CO, based on the history of having attempted charcoal burning suicide twice in a row over two days, and remained in their apartment in the following four days, and that the youngest child had succumbed to death from the exposure. However, during discovery (day 4), she was apparently not ill enough to require medical attention and this was regarded as the latency period before the onset of DNS. It took approximately 40 days for the signs of DNS of CO poisoning to appear in this patient, and a further 30 days before she showed signs of recovery from DNS; well enough to have the mental capacity to stand for court trial.

The onset of this patient's DNS was heralded by the gradual blunting of her affect or apathy, followed by an abrupt decline in gross intellectual function and subsequently motor and neurological deficits. The apathy was associated with psychomotor retardation, and was initially thought to be part of her grieving process. However, when this quickly took a turn for the worst, with the development of disorientation, executive dysfunction such as inability to carry out basic ADLs, and later double incontinence with gait abnormality, the possibility of a delayed onset effect of CO poisoning was suspected. Her clinical picture had also coincided with that of her husband's, who was an inpatient in another ward in the same psychiatric facility. The diagnosis of DNS was corroborated with MRI imaging which revealed characteristic changes, and neurologist's confirmation of the diagnosis.

This patient had manifested several of the most commonly reported clinical manifestations of DNS in literature: apathy, double incontinence, and gait disturbance [4]. Neuroimaging study on this patient also

correlated with the most common conventional MRI brain findings in the chronic phase (22 days and beyond) of CO exposure: T2 weighted hyperintensities in bilateral globus pallidus and cerebral white matter [5]. The reason for the lucid interval; the apparent asymptomatic interval after recovery from acute CO intoxication; and the occurrence of neuropsychiatry sequelae has not been determined thus far. However, risk factors for developing DNS has been suggested [6]. DNS is one of the two forms of chronic sequelae of CO poisoning, the other type being the persistently progressive type. The reported incidence is variable and recovery from this has been documented as almost 70% of cases within a year [7]. In conclusion, a presentation of a delayed onset of brain syndrome as a result of CO poisoning can be an interesting case report.

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