

Severe Amnesia and Neuropsychiatric Symptoms After a Suicide Attempt by Charcoal Burning

Edouard Godier, MD^{a,*}; Guillaume Ifrah, MD, PharmD, MSc^a; Dewi Le Gal, MD^a; and Bénédicte Gohier, MD, PhD^a

Carbon monoxide (CO) self-poisoning by charcoal burning is a common method of attempted suicide in Asia¹ but has rarely been described in Western countries. It can lead to chronic and severe disability due to brain damage² and should therefore be known by clinicians. We present a case of severe amnesia and neuropsychiatric symptoms after a suicide attempt by charcoal burning in France.

Case Report

A 44-year-old woman with a history of breast cancer was found unconscious in her kitchen. An empty package of tamoxifen and a suicide note were found next to her. Surprisingly, the vents in the room had been blocked, and charcoal was burning in a frying pan. The room monoxide rate was measured at 45 ppm by first responders, but the duration of CO exposition was unknown.

In the intensive care unit, the initial evaluation revealed no focal neurologic sign, and her carboxyhemoglobin (COHb) level was measured at 8.1%. Hyperbaric oxygen therapy was not used. Sedation was discontinued on day 2, but the patient remained comatose with a Glasgow Coma Scale³ score of 8. The electroencephalogram (EEG) showed no sign of encephalopathy, but magnetic resonance imaging (MRI) revealed bilateral ischemic lesions of globus pallidus (Figure 1A) and hippocampus (Figure 1B). On day 6, the patient showed awakening signs and quickly regained normal alertness. Evaluation revealed psychomotor slowing and apathy and, most evidently, severe anterograde amnesia associated with retrograde amnesia that extended over 2 years. Therefore, no further information was obtained about her suicide attempt.

The patient was later admitted to a neurologic rehabilitation facility. Neuropsychological evaluation completed 1 month after the attempt confirmed that immediate and delayed free recall were severely impaired. Planning, inhibition, and attentional deficits were also

noted. In the same period, obsessive thoughts about her children and compulsive walks appeared. The presentation remained unchanged during the 6-month follow-up period.

Discussion

The lethal rate of CO self-poisoning by charcoal burning is considered moderate,⁴ but CO has the property to bind to hemoglobin with high affinity and induce hypoxia and oxidative stress reactions. These effects can lead to neuronal necrosis in areas such as the striatum, globus pallidus, hippocampus, and frontal cortex.² In this case, necrosis of the globus pallidus and hippocampus was visible on the MRI scan. The patient's severe amnesia was related to the hippocampal damage.

Early symptoms were initially interpreted as tamoxifen self-poisoning, rather than CO self-poisoning, possibly due to moderate CO rates in the room and COHb in the patient's blood. The lack of awareness regarding charcoal burning as a suicide method in Western countries may also have played a role.⁵ The diagnosis of CO intoxication requires careful history taking, and CO rates should not play out in clinical decisions, since they can drop rapidly once the room is ventilated and do not correlate well with symptoms.⁶

If the characteristic setup of charcoal burning in a closed space is found, vigilance should be required during the follow-up of the suicide attempter. Indeed, CO poisoning encephalopathy with neuropsychiatric symptoms including depression, mania, or psychosis may appear after a lucid interval of 2 to 40 days.⁷ Those delayed neuropsychiatric impairments may occur in up to 30% of survivors.⁸ In this specific case, in addition to amnesia, obsessions and compulsions appeared 1 month after the suicide attempt.

Suicide by charcoal burning also seems to present a risk of contagiousness in connection with the media,⁹ known as the Werther effect. Strategies to prevent further use of this method should include media guidelines for reporting on suicide.¹⁰

^aAdult Psychiatry and Addictology Unit, Angers University Hospital (CHU Angers), France

*Corresponding author: Edouard Godier, MD, CHU Angers - 4 rue Larrey 49100 Angers, FRANCE (edouard.godier@chu-angers.fr).

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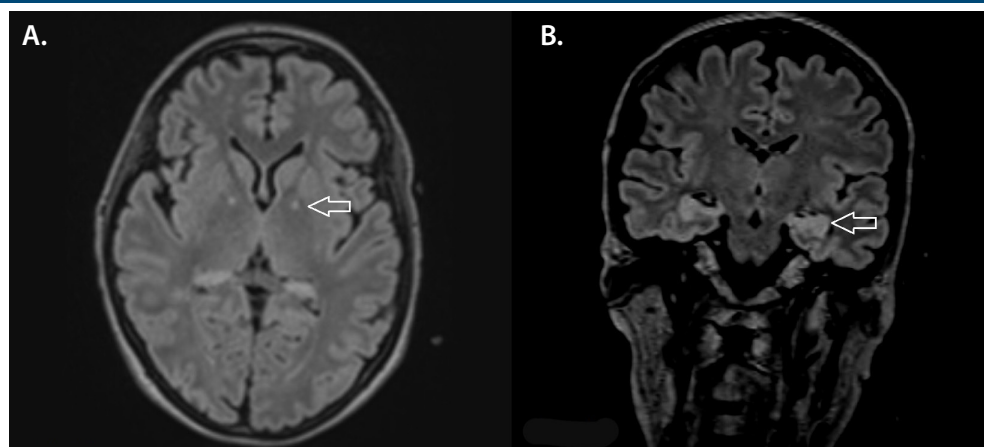
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Figure 1. Magnetic Resonance Imaging Revealed Bilateral Ischemic Lesions of (A) Globus Pallidus and (B) Hippocampus



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