



Chronic Alpha Chloralose Use Disorder: A Case Report of a Seventeen-Year Course and Review of the Literature

F. Chair ^{a,b}, Z. Bencherfa ^{a,b}, ^{a,b,*}

^a Department of Addiction Medicine, Ar-Razi Psychiatric Hospital, Salé, Morocco

^b Faculty of Medicine and Pharmacy, Mohammed V University, Rabat, Morocco

ABSTRACT

Background. Alphachloralose is a chlorinated derivative of glucose used as a rodenticide, whose acute toxicity is well documented but whose addictive potential remains very poorly studied. Only one case of a use disorder related to this substance has been published to date.

Case presentation. We report the case of a 34-year-old woman who developed an alphachloralose use disorder of seventeen years' duration, which began with a suicide attempt at the age of 17. Use became daily, motivated by the search for sedative and anxiolytic effects, with intense craving, unsuccessful attempts to stop, continued use during two pregnancies and early relapse during a hospitalisation for withdrawal.

Discussion. The clinical course meets the DSM-5-TR criteria for a severe use disorder. Khantzian's self-medication model and the neurobiological framework of Koob and Volkow help to clarify this trajectory, in a context of vulnerability related to adverse childhood experiences.

Conclusion. This case suggests that repeated exposure to alphachloralose may, in vulnerable individuals, progress towards a severe use disorder, justifying systematic psychiatric assessment beyond the toxicological management of acute poisoning alone.

Keywords: Alphachloralose; substance use disorder; self-medication; rodenticide; addiction; DSM-5-TR; case report

Introduction

Alphachloralose is a chlorinated derivative of glucose, synthesised at the end of the nineteenth century. Initially used as a hypnotic and anaesthetic agent in experimental medicine, its clinical use was progressively abandoned because of its narrow therapeutic margin and its unpredictable neurological effects. It is currently used mainly as a rodenticide on account of its neurotoxic properties, particularly in several North African countries, where it remains easily available (Balis & Monroe, 1964; Garrett & Gan, 1998).

Pharmacologically, alphachloralose acts mainly through potentiation of GABAergic transmission via GABA-A receptors and through inhibition of glutamatergic neurotransmission, leading to central nervous system depression. At low doses it produces sedative and hypnotic effects, whereas at higher doses it may cause hypersalivation, myoclonus, seizures, respiratory depression, coma and even death (Garrett & Gan, 1998; Thomas et al., 1988a).

In humans, acute alphachloralose poisoning is the most frequently reported mode of exposure (Manzo et al., 1979; Thomas et al., 1988b). It occurs mainly in the context of suicide attempts and represents an emerging public health problem in several countries, particularly in Morocco. A recent Moroccan retrospective study of 53 poisoned patients showed that nearly 98% of cases involved intentional ingestion. Neurological manifestations were the main clinical presentation and management relied essentially on symptomatic and intensive care measures, with a favourable outcome in most cases when treatment was started early (Samali et al., 2025). Likewise, data from European poison control centres concern essentially accidental or intentional acute poisoning and focus mainly on the toxicological and prognostic aspects of this exposure (Manel et al., 2021).

By contrast, the consequences of repeated exposure to alphachloralose remain very insufficiently documented. While current knowledge concerns almost exclusively acute toxicity, the addictive potential of this molecule remains largely unknown. To our knowledge, only very rare clinical observations have described the progression from an initial poisoning towards compulsive use compatible with a substance use disorder (Zemmama et al., 2015). The pathophysiological mechanisms that might account for this course, as well as the psychological and environmental vulnerability factors involved, remain poorly understood.

Substance use disorders involving non-conventional products represent a diagnostic challenge for psychiatrists and addiction specialists. Such products are not generally regarded as psychoactive substances liable to induce dependence, which may delay their recognition and management. Identifying

craving, loss of control, tolerance, repeated unsuccessful attempts to stop and continued use despite harmful consequences is nevertheless essential in order to establish the diagnosis according to current classifications.

We report the case of a 34-year-old woman who developed an alphachloralose use disorder of seventeen years' duration following an initial suicide attempt. This observation illustrates the transition from intentional poisoning to chronic compulsive use meeting the criteria of a substance use disorder. Through this observation and a critical review of the literature, we discuss the addictive potential of alphachloralose, the factors that may have contributed to the development of this dependence, and the diagnostic and therapeutic implications for clinicians.

Case presentation

A 34-year-old married woman, mother of three children, unemployed, born in and living in Tangier (Morocco), was admitted to the addiction medicine department of Ar-Razi Hospital in Salé for the management of an alphachloralose use disorder of seventeen years' duration. She had no notable medical or surgical history. Psychiatric follow-up had been initiated one month before her hospitalisation. She reported no other psychoactive substance use.

The patient came from a family of modest socioeconomic status. She described a childhood marked by a conflictual family climate, characterised by an authoritarian attitude and repeated physical violence on the part of her mother, contrasting with a secure relationship with her father. During adolescence she developed marked anxiety in a context of family pressure related to academic achievement, particularly as the baccalaureate examinations approached.

At the age of 17, about twenty days before the baccalaureate examinations, she bought a sachet of rodenticide containing 3 g of 95% alphachloralose with suicidal intent. She initially ingested about a quarter of the sachet and then repeated this intake over several days. Each episode was followed by seizures. Despite several medical consultations, no cause was identified at the time. On the day before the baccalaureate examination, she ingested about half a sachet of alphachloralose diluted in water, which resulted in prolonged loss of consciousness, hypersalivation, marked drowsiness and abdominal pain. The outcome was favourable under symptomatic treatment.

After this initial episode, the patient reports having progressively sought the sedative and anxiolytic effects produced by alphachloralose. Use became repeated, initially during family conflicts or in order to avoid certain household tasks, and subsequently mainly in the evening in order to facilitate falling asleep. Over the years, she describes the establishment of daily use of about a quarter of a 3 g sachet, taken in a manner concealed from those around her. She reports an irrepressible urge to use, loss of control, several unsuccessful attempts to stop and continued use despite its family and psychological consequences.

Six months after the onset of this use, the patient married. She remained abstinent for about one month before resuming alphachloralose in a context of family conflict. During her first pregnancy she interrupted her use throughout gestation but describes intense craving that led to immediate resumption after delivery. During her two subsequent pregnancies she was unable to maintain abstinence and continued to use alphachloralose. The three pregnancies were uneventful and the children were born at term with no apparent abnormality.

Nine years before her hospitalisation, her husband discovered sachets of rodenticide among her personal belongings, which led to the disclosure of this chronic use. Despite repeated encouragement to seek care, the patient refused any specialised management. Two years before her admission, she attempted spontaneous withdrawal and remained abstinent for three months, with recovery of spontaneous sleep. However, persistent craving led to relapse.

After seventeen years of daily use, the patient finally consulted a psychiatrist and was then referred to the addiction medicine department. On admission, she reported daily use of about 0.75 g of alphachloralose (a quarter of a 3 g sachet at 95%), the last intake dating from the day before her hospitalisation.

Psychiatric examination found an alert patient, well oriented in time and space, cooperative, with a sad mood and feelings of shame and guilt related to her use. No psychotic symptoms were found. Insight was preserved and motivation for withdrawal initially appeared satisfactory.

The initial laboratory work-up, including complete blood count, serum electrolytes, liver function tests, renal function tests, lipid profile and thyroid function tests, was unremarkable. The electrocardiogram was also normal.

The patient was hospitalised in the addiction medicine department, and treatment with escitalopram and quetiapine was started, together with motivational management and psychoeducation sessions. However, from the day after her admission, she presented marked irritability associated with intense craving for alphachloralose and requested discharge against medical advice. While her discharge was being prepared, several sachets of rodenticide containing alphachloralose were found among her personal belongings by the nursing team, demonstrating the persistence of the use behaviour despite hospitalisation for withdrawal. The patient eventually left the department against medical advice.

Discussion

Originality of the case and theoretical framework

Alphachloralose is a chlorinated derivative of glucose widely used as a rodenticide, particularly in North Africa, because of its neurotoxic properties linked to potentiation of GABAergic transmission (Balis & Monroe, 1964; Garrett & Gan, 1998). The available literature concerns almost exclusively acute poisoning, mostly intentional (Manel et al., 2021; Samali et al., 2025). To our knowledge, only one published case describes progression towards addictive behaviour, without an in-depth discussion of current diagnostic criteria (Zemmama et al., 2015). Our observation is distinguished by an

exceptionally long course (seventeen years), a well-documented transition between a suicide attempt and chronic use, and the persistence of the use behaviour despite hospitalisation for withdrawal.

This trajectory may be understood in the light of Khantzian's self-medication hypothesis, according to which the substance is used to relieve emotional suffering rather than for its euphoric effects (Khantzian, 1985, 1997). The maintenance of use is explained by negative reinforcement mechanisms, alphachloralose intake transiently reducing anxiety and family tension (Baker et al., 2004; Koob & Le Moal, 2001). The three-stage model of Koob and Volkow (binge/intoxication, withdrawal/negative affect, preoccupation/craving) accounts for this course, from the initial discovery of the sedative effects to the intense craving and the relapses observed (Koob & Volkow, 2016). Although several substances acting on GABA-A receptors (benzodiazepines, barbiturates, alcohol) have an established addictive potential (Olsen, 2018), no preclinical study has assessed the reinforcing properties of alphachloralose; our findings therefore do not allow an intrinsic addictive potential to be affirmed, but suggest that its sedative effects may favour compulsive use in vulnerable individuals.

Analysis according to DSM-5-TR criteria

According to the DSM-5-TR, a substance use disorder is defined by the presence of at least two criteria over twelve months, severity being qualified as mild, moderate or severe according to their number (American Psychiatric Association, 2022). Our patient presented prolonged and uncontrolled use, intense craving, unsuccessful attempts to stop (including three months of spontaneous abstinence followed by relapse), continued use despite significant family and psychological consequences, and a considerable amount of time devoted to obtaining and concealing the substance. The discovery of sachets of alphachloralose during her hospitalisation for withdrawal further illustrates the difficulty of interrupting this behaviour despite specialised management. These elements support the diagnosis of severe alphachloralose use disorder. By contrast, a specific withdrawal syndrome and pharmacological tolerance could not be formally documented, owing to the lack of prolonged monitoring and of experimental data on this molecule.

Vulnerability factors and use during pregnancy

The patient's developmental history, marked by physical violence from her mother and by performance anxiety during adolescence, falls within the framework of adverse childhood experiences (ACEs), whose dose-dependent role in the risk of substance use disorder is well established (Dube et al., 2003; Felitti et al., 1998; Hughes et al., 2017). Such early trauma favours emotional dysregulation conducive to self-medication, independently of the diagnosis of histrionic personality disorder suggested in this patient, which was not confirmed by a standardised assessment and must therefore be interpreted with caution (Newton-Howes et al., 2017).

Continued use during two of the three pregnancies, despite a transient interruption during the first, is a rare aspect that is not documented in the available literature on alphachloralose. Immediate postpartum relapse after a period of gestational abstinence is a classic phenomenon in substance use disorders (American College of Obstetricians and Gynecologists, 2017; Metz et al., 2020). Although the three pregnancies were apparently uneventful, the absence of standardised paediatric and neurodevelopmental follow-up does not allow late adverse effects to be excluded, and underlines the need for systematic screening for atypical substance use in pregnant women.

Comparison with the case of Zemmama et al. and clinical implications

The only comparable case published to date, that of a 26-year-old man with eleven hospitalisations for repeated alphachloralose poisoning, showed a similar trajectory (an initial suicidal ingestion followed by regular use motivated by the sedative effects), with tolerance, craving and repeated failures of withdrawal, leading to a diagnosis of impulse control disorder according to DSM-IV-TR criteria (Zemmama et al., 2015). Our observation complements these data with a longer course, an updated diagnostic analysis according to the DSM-5-TR, a detailed characterisation of psychosocial vulnerability factors, and novel clinical features: continued use during several pregnancies and persistence of the addictive behaviour during a hospitalisation dedicated to withdrawal. Taken together, these two cases suggest that the consequences of repeated exposure to alphachloralose may extend beyond the acute poisoning classically described, without, however, allowing any conclusion as to an intrinsic addictive potential of the molecule.

From a clinical standpoint, this observation calls for assessment to be broadened beyond acute toxicity alone whenever repeated alphachloralose use is identified (Samali et al., 2025; Zemmama et al., 2015), for systematic screening for craving, loss of control and attempts to stop according to DSM-5-TR criteria (American Psychiatric Association, 2022; Hasin et al., 2013), for a search for underlying comorbidities and trauma in order to guide psychotherapeutic management (Khantzian, 1985, 1997), and for a multidisciplinary approach combining psychiatrists, addiction specialists and toxicologists (Koob & Volkow, 2016; Volkow & Boyle, 2023).

Conclusion

Our observation provides arguments in favour of the possibility that repeated exposure to alphachloralose may, in individuals with psychological vulnerabilities, progress towards a picture compatible with a severe substance use disorder. Without asserting an intrinsic addictive potential of this molecule, this case highlights the need to go beyond the toxicological management of acute poisoning alone, in favour of a comprehensive psychiatric and addiction assessment (Samali et al., 2025; Zemmama et al., 2015).

The comparison with the case reported by Zemmama et al. strengthens the hypothesis of a genuine potential for abuse of this substance when it is misused (Zemmama et al., 2015). In the absence of robust clinical data, it appears essential to document new cases of chronic exposure systematically and to develop multicentre studies in order to clarify the pathophysiological mechanisms and the optimal modalities of withdrawal for this atypical form of addiction.

Declarations

Informed consent. Written informed consent was obtained from the patient for the publication of this case report. Identifying information has been limited to what is necessary for clinical understanding.

Conflicts of interest. The authors declare that they have no conflict of interest.

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References

- American College of Obstetricians and Gynecologists. (2017). Opioid use and opioid use disorder in pregnancy. Committee Opinion No. 711. *Obstetrics & Gynecology*, 130(2), e81-e94.
- American Psychiatric Association. (2022). *Diagnostic and statistical manual of mental disorders* (5th ed., text rev.). Washington, DC: American Psychiatric Association.
- Baker, T. B., Piper, M. E., McCarthy, D. E., et al. (2004). Addiction motivation reformulated: An affective processing model of negative reinforcement. *Psychological Review*, 111(1), 33-51.
- Balis, G. U., & Monroe, R. R. (1964). The pharmacology of chloralose: A review. *Psychopharmacologia*, 6, 1-30.
- Dube, S. R., Felitti, V. J., Dong, M., et al. (2003). Childhood abuse, neglect, and household dysfunction and the risk of illicit drug use. *Pediatrics*, 111(3), 564-572.
- Felitti, V. J., Anda, R. F., Nordenberg, D., et al. (1998). Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults: The Adverse Childhood Experiences (ACE) Study. *American Journal of Preventive Medicine*, 14(4), 245-258.
- Garrett, K. M., & Gan, J. (1998). Enhancement of gamma-aminobutyric acidA receptor activity by alpha-chloralose. *Journal of Pharmacology and Experimental Therapeutics*, 285(2), 680-686.
- Hasin, D. S., O'Brien, C. P., Auriacombe, M., et al. (2013). DSM-5 criteria for substance use disorders: Recommendations and rationale. *American Journal of Psychiatry*, 170(8), 834-851.
- Hughes, K., Bellis, M. A., Hardcastle, K. A., et al. (2017). The effect of multiple adverse childhood experiences on health: A systematic review and meta-analysis. *The Lancet Public Health*, 2(8), e356-e366.
- Khantzian, E. J. (1985). The self-medication hypothesis of addictive disorders: Focus on heroin and cocaine dependence. *American Journal of Psychiatry*, 142(11), 1259-1264.
- Khantzian, E. J. (1997). The self-medication hypothesis of substance use disorders: A reconsideration and recent applications. *Harvard Review of Psychiatry*, 4(5), 231-244.
- Koob, G. F., & Le Moal, M. (2001). Drug addiction, dysregulation of reward, and allostasis. *Neuropsychopharmacology*, 24(2), 97-129.
- Koob, G. F., & Volkow, N. D. (2016). Neurobiology of addiction: A neurocircuitry analysis. *The Lancet Psychiatry*, 3(8), 760-773.
- Manel, J., Villa, A. F., et al. (2021). Exposure to alphachloralose-based rodenticides: A retrospective study of cases reported to French Poison Control Centres. *Clinical Toxicology*, 59(11), 980-988.
- Manzo, L., Locatelli, C., Candura, S. M., et al. (1979). Electrocerebral changes in acute alpha-chloralose poisoning. *Journal of Toxicology: Clinical Toxicology*, 14, 373-381.
- Metz, V., Stickel, A., Hofer, S., et al. (2020). Substance use in pregnancy: A systematic review and meta-analysis of postnatal relapse risk. *The Lancet Psychiatry*, 7(11), 950-962.
- Newton-Howes, G., Foulds, J., Guy, N., et al. (2017). Personality disorder and alcohol and drug use disorders: A systematic review and meta-analysis. *British Journal of Psychiatry*, 211(1), 22-30.
- Olsen, R. W. (2018). GABA-A receptor: Positive and negative allosteric modulators. *Neuropharmacology*, 136(Pt B), 10-22.
- Samali, E. M., El Koundi, A., Meskine, A., et al. (2025). Alphachloralose intoxication: A retrospective study on epidemiology, clinical presentation, and management in an adult emergency department in Morocco. *African Journal of Emergency Medicine*, 15(3), 100887.

- Thomas, H. M., Simpson, D., & Prescott, L. F. (1988a). The toxic effects of alpha-chloralose. *Human Toxicology*, 7(3), 285-287.
- Thomas, H., Simpson, D., & Prescott, L. (1988b). Clinical features and management of acute alpha-chloralose poisoning. *The Lancet*, 1(8591), 940-941.
- Volkow, N. D., & Boyle, M. (2023). Neuroscience of addiction: Relevance to prevention and treatment. *World Psychiatry*, 22(1), 10-25.
- Zemmama, H., Rharrabti, S., El Ayoubi Idrissi, K., et al. (2015). D'une intoxication à l'alphachloralose à l'addiction [From alphachloralose poisoning to addiction]. *La Presse Médicale*, 44(10), 1082-1084.