Case Report

DESPERATE MEASURES OF INVOLUNTARY DEADDICTION: A CASE REPORT OF ACUTE DISULFIRAM POISONING

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Abstract

Disulfiram is an effective deterrent drug for alcohol use in patients who have undergone detoxification and who are motivated to remain abstinent. Disulfiram poisoning is not common; only a few cases have been reported in the literature. Although most patients tolerate disulfiram well, severe toxic side effects have also been reported, including hepatitis, encephalopathy, psychosis, optic neuropathy, and peripheral neuropathy. This is a case report of disulfiram toxicity in a 30-year-old man who developed mental status changes, pruritic rashes, and blurred vision after being given one gram of disulfiram per day covertly. He was managed conservatively, and the symptoms subsided gradually. This case report highlights the importance of creating awareness about the dangers of covert administration of medications for alcohol use.

Keywords: Disulfiram, direct toxic effects, adult, covert use

Introduction

Disulfiram is an irreversible inhibitor of the enzyme aldehyde dehydrogenase and has been used as an aversion therapy to treat alcohol dependence. Drinking alcohol while taking disulfiram leads to elevated levels of acetaldehyde and precipitation of unpleasant disulfiram–alcohol reaction. Symptoms of this reaction include diaphoresis, flushing, tachycardia, nausea, vomiting, palpitations, hypotension, etc.[1] Disulfiram is commonly used in dosages of 250–500 mg/day.[1] Acute disulfiram overdose without ethanol is uncommon and exhibits primarily neurologic symptoms, with headache, ataxia, confusion, lethargy, seizures, and prolonged coma. Though some cases of disulfiram poisoning in children due to accidental ingestion have been reported, cases of adults presenting with acute disulfiram poisoning have been rare.[2] In this report, we present a case of acute toxicity in a 30-year-old man who was given Disulfiram 1 g daily for five days by his family members without his knowledge. This case report is unique in several aspects as it highlights the potential for disulfiram to be used contrary to its intended therapeutic use and raises important considerations for medical and legal communities regarding consent and autonomy in treatment. The report makes a significant contribution to the medical literature as it underscores the need for vigilance in monitoring for signs of poisoning, especially in settings where disulfiram is available and could

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be misused. However, its limitations include a lack of comparative data and generalizability.

Case Description

A 30-year-old man was brought to the psychiatry outpatient department with complaints of excessive sleepiness, dizziness, confused behavior, and blurring of vision for three days. History taken from the patient's wife revealed that he had been using alcohol for ten years, which gradually developed into a dependence pattern. Six months back, his family members started giving him Tab. Disulfiram 250 mg covertly to prevent him from drinking. The medicine was obtained from a medical shop using another person's prescription. It was administered mixed with food without his knowledge. The patient stopped drinking alcohol within one week after developing an adverse reaction to alcohol. He remained abstinent after that, but three months back, he resumed drinking alcohol. Around three weeks back, his wife started giving him disulfiram 250 mg daily, mixed with his food, since he was not getting any adverse effects. As he continued to use alcohol in larger amounts, she gradually increased the dosage to 1 gram per day (4 tablets daily) for one week. Following this, he developed excessive sleep, headache, confusion, dizziness, and blurred vision, and he stopped using alcohol. His wife continued to give the medicines at the same dosage covertly for the next three days, even while he remained abstinent. Since these symptoms worsened even without the usage of alcohol, the patient was brought to the Medicine outpatient department, from where he was referred to Psychiatry. There was no past history or family history of neurological or psychiatric illnesses. On examination, the patient was drowsy and was confused regarding time and place. Attention, concentration, and recent memory were impaired, and reaction time was prolonged. MMSE was 18/30 at the time of admission. His vitals were stable: pulse rate – 88 bpm, BP – 120/80 mmHg, temperature was normal, respiratory rate – 17/min, SpO_2 – 99 % on room air. Pupil size was normal, and pupillary and corneal reflexes were preserved. There were no focal neurologic deficits or signs of peripheral neuropathy. Routine investigations, including complete blood count, electrolytes, liver function tests, renal function tests, thyroid function tests, urine routine, and electrocardiogram were normal. The electroencephalogram showed that theta waves were predominant. The MRI of the brain indicated normal brain parenchyma. The ultrasound of the abdomen showed mild coarse echotexture of the liver. Ophthalmology evaluation revealed normal fundus but reduced visual acuity, with 6/36 in the right eye and 6/24 in the left eye. The patient was admitted for one week and treated conservatively with daily injections of Thiamine 1500mg. His cognitive function was monitored daily using the MMSE test and the scores varied between 18/30 and 25/30 during the initial few days. On the third day, he developed a low-grade fever, pruritus, and a generalized erythematous papular rash. However, the rash subsided after two days when treated with antihistamines. His cognitive functions gradually improved, which was reflected in an improvement in his MMSE score. At the time of discharge, he was asymptomatic with an MMSE score of 29/30. Ophthalmology review at discharge revealed normal visual acuity of 6/6 in both eyes. The patient's wife was psycho-educated regarding disulfiram use, the risk of disulfiram-ethanol reaction, and the direct effects of drug overdose.

Discussion

Acute disulfiram poisoning is uncommon but can occur due to ignorant practices of covert administration. It is common in Indian settings to see family members giving medications, including disulfiram, to alcohol dependent persons without their knowledge to prevent them from drinking. Disulfiram is also offered to patients surreptitiously by traditional healers in other forms (e.g., powder, liquid, and herbal mix), which may contain very high doses of disulfiram (up to 2500 mg/dose).[3]

In considering disulfiram toxicity, a distinction must be made between the clinical manifestation of the disulfiram-ethanol reaction and the toxic effects of disulfiram itself. Clinical features of a disulfiram-ethanol reaction include diaphoresis, flushing, tachycardia, nausea, vomiting, palpitations, hypotension, and rarely cardiac arrhythmias and seizures.[4] It usually develops within 10-30 minutes after alcohol use.[4]

In this particular case, the patient experienced symptoms gradually while taking disulfiram and after ceasing alcohol use. The clinical presentation suggested direct toxic effects of disulfiram rather than a disulfiram-ethanol reaction.

Acute toxicity can occur with a dose higher than 500 mg, and death is possible at a dose of 10–30 g/day.[1] Plasma concentration of disulfiram may vary between individuals due to several factors, most notably age and hepatic function. Disulfiram plasma levels are rarely utilized in clinical practice. Overdose can result in hepatotoxicity, psychosis, peripheral neuropathy, optic neuritis, exfoliative dermatitis, anti-thyroid effects, and seizures. Parkinsonism, choreoathetosis, and thalamic syndrome may follow the ingestion of more than 5 g of disulfiram by adults.[5] Symptoms of overdose include nausea, vomiting, pruritus, skin rash, headache, aggressive or psychotic behavior, drowsiness, coma, and ascending flaccid paralysis that can also involve cranial nerves.[1] The exact mechanism of disulfiram-mediated encephalopathy is not known. Disulfiram is metabolized via cytochrome P450-mediated phase I oxidation and phase II methylation and glucuronidation. A metabolite is carbon disulfide, which may play a role in toxicity in the central and peripheral nervous system. Disulfiram causes oxidative stress and inhibits dopamine β-hydroxylase in the brain, thereby augmenting dopamine and depleting norepinephrine concentrations.[1,6] With the usual therapeutic doses, side effects such as tiredness, sleepiness, headaches, reduced vigilance, or psychiatric complications can occur. Cases of psychoses have been reported after several weeks of disulfiram treatment and from overdose. The psychoses are characterized by confusion, disorientation, disinterestedness, forgetfulness, anxiety, delusions, depressive moods, aggression, restlessness, and uninhibitedness.[5] These effects are dose-dependent[7] and are frequently associated with neurological symptoms such as dizziness, ataxia, nystagmus, and indistinct speech.[5] Even therapeutic doses can induce slowing of the basic EEG rhythm.[5] The variability and delayed onset of symptoms can complicate diagnosis of disulfiram toxicity.

All symptoms are said to be largely reversible when the treatment is discontinued. No specific antidote is available for disulfiram toxicity. The mainstay of treatment is supportive care via supplemental oxygen, cardiac monitoring, and intravenous fluids as needed.[8] Since oxidative stress is a major cause of neurotoxicity with disulfiram, administering antioxidants like glutathione and sodium ascorbate has been suggested as a treatment.[9,10] In this case, the patient's vitals were stable, and his symptoms were resolved by discontinuing disulfiram and providing supportive measures.

Administering disulfiram without the patient’s knowledge infringes on their autonomy as they are denied the right to make informed decisions about their health, and it violates the principles of beneficence and non-maleficence as it carries significant and life-threatening consequences. Covert administration can damage the trust relationship between healthcare providers or family members if discovered, making patients less likely to seek help or adhere to future treatments. Administering medication without consent can lead to legal actions against the provider or caregiver. By promoting transparent communication, involving patients in decision-making, and providing comprehensive support, effective and ethical care for individuals struggling with substance use can be ensured. Mandatory informed

consent with standardized forms, strict monitoring of prescription, and guidelines for dispensing disulfiram (e.g., dispensing the medication from the pharmacy only to the patient) can help prevent its covert use.

Conclusion

The covert administration of disulfiram, while possibly well-intentioned, is fraught with ethical concerns that largely outweigh its potential benefits. Inadvertently using disulfiram can lead to toxicity or disulfiram-ethanol reactions that could be fatal. It is crucial to educate people about the risks of secretly administering medication to alcoholic patients and discourage such behavior. Healthcare providers must prioritize patient autonomy, informed consent, and the therapeutic relationship, ensuring that all interventions are conducted transparently and with respect for the patient's rights and dignity. Disulfiram should only be offered to those who are ready to abstain after proper education and with proper supervision.

Note on patient consent

Informed written consent was taken from the patient.

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