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### Case Study

## Atropine-Induced Psychosis in The Treatment of Cypermethrin Poisoning: A Case Study

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### ABSTRACT

This case study presents a 23-year-old female who ingested an unknown quantity of cypermethrin-containing ant killer chalk in a suicide attempt. She exhibited typical poisoning symptoms such as vomiting, altered mental status, salivation, and abdominal pain. Treatment included gastric lavage and administration of intravenous atropine, which led to atropine-induced psychosis with symptoms like agitation, hallucinations, and anxiety. The adverse reaction was managed by tapering atropine and administering psychiatric support with haloperidol, clonazepam, and escitalopram. The patient recovered and was discharged in stable condition. This case highlights the critical need for careful monitoring of atropine in poisoning cases to prevent serious neuropsychiatric complications.

### INTRODUCTION

Atropine is an anticholinergic agent that blocks the muscarinic effects of acetylcholine at postganglionic parasympathetic neuroeffector sites, which include smooth muscles, secretory glands, and the central nervous system (CNS). It can be given via intravenous (IV), intramuscular (IM), eye drops, or oral administration. The FDA has approved it for several uses, including treating amblyopia, cardiac arrest, cycloplegic refraction,

inducing pupil dilation (mydriasis), organophosphate poisoning, as pre-anesthetic medication, and for addressing toxic reactions from mushroom consumption. Most side effects are related to its anti-muscarinic properties, with common issues like dry mouth, blurred vision, sensitivity to light, and rapid heartbeat occurring with long-term use. Reduced sweating (anhidrosis), which may result in heat intolerance or trouble with body temperature regulation, can also occur, especially in hot environments. Elderly

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patients may experience constipation and trouble urinating. Rarely, hypersensitivity reactions, such as skin rashes that can lead to peeling, have been observed. In some cases, atropine may also cause psychological symptoms like agitation, restlessness, hallucinations, or delirium [1]. Its antispasmodic properties make it useful in treating conditions like pylorospasm and other spasms. In cases of poisoning by organophosphate cholinesterase inhibitors, such as those found in certain insecticides and nerve gases used in chemical warfare, large doses of atropine help alleviate muscarinic symptoms and some CNS effects. The CNS side effects of atropine include headaches, flushing, nervousness, drowsiness, weakness, dizziness, and insomnia [2]. Delirium is a disorder characterized by disruptions in cognitive functions, leading to a decreased awareness of one's surroundings. It typically has a sudden onset and can last for a few hours to several days[3].

### CASE REPORT:

A 23 years old female patient weighing 50kg admitted to the emergency department on alleged consumption of ant killer chalk which is a cypermethrin compound. Quantity of the compound ingested was unknown. Past medical and medication history along with the known allergies was nil. The medical record shows that the patient is a homemaker, having two children made a deliberate attempt of suicide after dispute with her mother – in – law.

On admission, the patient had a complaints of vomiting two episodes, altered sensorium, excessive salivation, mild abdominal pain, burning sensation, loose stools one episode. On examination CVS (Cardiovascular system) noted with S1S2 +, RS with NVBS + however with B/L Crepts still being noted positive. Per abdomen was noted soft while the pupils were noted constricted? Patient was conscious, irritable, not oriented with

Blood Pressure was noted at 110/90mmHg, Bilateral pupils noted at 4mm, Temperature at 98.4°F, Pulse rate at 90/min, Respiratory rate at 22/min and partial oxygen saturation at 99% in room air.

Sr. NO	LABORATORY TEST	RESULT
1.	Hb	12.5 g/dl
2.	PCV	38.3%
3.	TLC	6,900cells/mm
4.	RBC	4.47m/cumm
5.	S.CHOLINESTERASE	8.5U/ml
6.	CREATININE	0.7mg/dl

After admission, the patient was kept on Nil Per Oral (NPO) and gastric lavage was performed for the decontamination. Intravenous fluids were administered such as RL (Ringer Lactate), DNS (Dextrose normal saline) 1 pint each. Followed by the administration of Inj. Atropine 20 ampoules (0.6mg/ampoule) IV STAT and Inj. Atropine 1mg/hr with normal saline IV infusion. Additionally, Injection Ranitidine 50mg IV BD, Injection Emeset 4mg IV BD

As such after the administration of atropine, patient started agitation, visual & auditory hallucinations, anxiety and dry mouth. All these symptoms were observed after the administration of atropine and hence a diagnosis of atropine induced psychosis was made. To manage the adverse drug reaction, the dose of atropine was progressively tapered and finally stopped after the appearance of signs of complete atropinisation. Supportive care was given with IV fluids and blood glucose levels were monitored regularly. Intravenous haloperidol 5mg was given whenever required to manage psychiatric effects. To manage anxiety and to calm the patient, a combination tablet comprising of clonazepam 0.25mg and escitalopram 10mg. Finally patient was discharged in a much-improved condition. Casualty assessment of atropine induced delirium was done



using Naranjo Casualty assessment scale and WHO-UMC scale.

ATROPINE	NARANJO	WHO - UMC
Delirium	Probable ADR (6)	Probable ADR

## DISCUSSION:

This case describes a 23-year-old female admitted to the emergency department following the ingestion of an unknown quantity of ant killer chalk containing cypermethrin, a synthetic pyrethroid. The patient's suicide attempt, precipitated by familial conflict, underscores the importance of recognizing the psychosocial factors underlying such incidents. Cypermethrin, while toxic to insects, is typically of low toxicity in humans, although ingestion can result in various symptoms due to its neurotoxic effects.

Upon presentation, the patient exhibited typical symptoms associated with pesticide ingestion, including vomiting, altered sensorium, salivation, mild abdominal pain, and loose stools. Her physical examination revealed signs of respiratory distress with bilateral crepitations, altered mental status, and constricted pupils. However, laboratory tests, including serum cholinesterase levels, were normal, indicating the absence of cholinesterase inhibition, a hallmark of more dangerous insecticides like organophosphates.

Initial treatment involved gastric decontamination through gastric lavage, a standard intervention in acute poisoning cases to prevent further absorption of the toxin. Supportive care was provided with intravenous fluids, and atropine was administered as part of the treatment protocol. Atropine, a well-known anticholinergic agent, is often used to counteract the muscarinic effects of poisoning by cholinesterase inhibitors, although it is not the primary treatment for pyrethroid poisoning.

Following the administration of atropine, the patient developed symptoms consistent with atropine-induced psychosis, including agitation,

hallucinations, anxiety, and dry mouth. Atropine-induced psychosis is a rare but recognized complication, especially when large doses are administered. Atropine crosses the blood-brain barrier and, in high concentrations, can cause central anticholinergic syndrome, leading to delirium, hallucinations, and other neuropsychiatric symptoms.

In this case, the adverse effects of atropine were managed by tapering the dose and providing supportive care. The patient's psychiatric symptoms were addressed with haloperidol and a combination of clonazepam and escitalopram to manage anxiety and psychosis. These interventions were effective, and the patient's condition improved significantly. The causality of the adverse reaction was assessed using the Naranjo scale and the WHO-UMC criteria, both of which classified the reaction as a "probable" adverse drug reaction.

This case emphasizes the importance of recognizing and managing adverse drug reactions, particularly when administering high doses of drugs like atropine. While atropine is crucial in treating poisoning from cholinesterase inhibitors, its use in other forms of poisoning, such as cypermethrin ingestion, should be carefully monitored due to the risk of central nervous system effects. Supportive care, decontamination, and careful management of psychiatric symptoms played a key role in this patient's recovery.

## CONCLUSION:

The case illustrates the complexities involved in managing pesticide poisoning, particularly when associated with an adverse drug reaction. While atropine can be life-saving in certain poisonings, this case highlights the need for cautious use and close monitoring for potential neuropsychiatric side effects. The patient's successful recovery underscores the importance of prompt



decontamination, supportive care, and the appropriate management of drug-induced complications.

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