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CASE REPORT

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Lindane and Cetrimide lotion poisoning in an adult patient: A case report on an uncommon ingestion

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Key Clinical Message

Lindane induces severe side effects, including fatality, while Cetrimide causes esophageal damage. With no antidotes available, our patient ingested both, requiring prompt gastric lavage and comprehensive treatment.

KEYWORDS

Cetrimide, gastric lavage, Lindane, poisoning, psychiatry

1 | INTRODUCTION

Gamma benzene hexachloride, commonly referred to as Lindane emerged in the 1950s as an organochloride pesticide initially intended for topical use as a scabicide among humans.[1] Its affordability and effectiveness led to its rapid adoption as a primary treatment for scabies and head lice.[1] However, concerns about its neurotoxic effects arose after prolonged and widespread usage.[1,2] The lethal dosage seems to fluctuate significantly depending on the carrier substance or the level of product homogenization. In specific circumstances, a dosage range of 10–20 mg/kg body weight can pose a lethal risk to humans.[3]

Acute oral poisoning may lead to developing primary signs including vomiting and manifestations of central nervous system stimulation, such as convulsions and hyperexcitability.[4] Seizures typically commence within 1–2 h and may persist for several days, accompanied by side effects such as skin irritation, dizziness, muscular cramps, and rarely, aplastic anemia and megaloblastic anemia.[4,5] Lindane, despite its potential life-threatening side effects, exhibited the slowest pediculicidal and least effective ovoidal activity among Food and Drug Administration (FDA)-approved pediculicides, prompting its reclassification to second-line therapy for pediculosis in 1995 in favor of safer alternatives.[6]

Similarly, Cetrimide, a quaternary ammonium compound, commonly found in sterilizing and detergent fluids for skin antisepsis, hair shampooing, and instrument cleaning in hospitals and communities, poses risks when ingested, causing nausea, vomiting, and potential esophageal damage and necrosis with strong solutions.[7] Cetrimide poisoning typically manifests with mild symptoms, including nausea, vomiting, sore throat, and abdominal pain, while aspiration of Cetrimide mixed with 'Dettol' liquid can lead to acute respiratory distress

syndrome (ARDS).[8] With no specific antidote identified,[9] the treatment for both Lindane and Cetrimide poisoning primarily involves symptomatic and supportive management in the Intensive Care Unit (ICU).

2 | CASE HISTORY AND EXAMINATION

An 18-year-old female arrived at the Emergency Department (ED) of a local hospital shivering and with decreased level of consciousness, approximately 10 min after reportedly ingesting Lindane and Cetrimide lotion at home. The lotion was obtained from a nearby pharmacy for lice treatment.

On presentation, she had a Glasgow Coma Scale (GCS) of 9/15 (E2M4V3), a pulse rate of 110/min, blood pressure of 100/60 mmHg, respiratory rate of 24/min, temperature of 98°F, and oxygen saturation (spO_2) of 94% in room air (Table 1).

Physical exams along with respiratory, cardiovascular, abdominal, musculoskeletal, skin, and oral examinations showed no abnormalities. The Central Nervous System examination showed no focal neurological deficits or signs of meningeal irritation and had intact sensory and motor functions and reflexes.

Upon arrival at a new hospital with ICU services, the patient disclosed a history of ingesting 70–100 mL of poison with suicidal intent following a dispute with her boyfriend. She reported mild epigastric pain but no headache, fever, blurred vision, loss of consciousness, abnormal body movements, bleeding, or dizziness. She also had experienced one episode of vomiting at the ED. The patient had no significant past medical, surgical, menstrual, or family history and was a non-alcoholic and non-smoker. Vitals and examination findings were normal, leading to the patient's admission to the ICU for observation.

3 | METHODS

In the local hospital, a nasogastric (NG) tube was inserted, and gastric lavage was performed with 1.5 L of 0.9% Normal Saline. After the treatment, patient had normal assessment of sensorium, cognition, cranial nerves, motor, sensory and cerebellar signs and without any signs of meningeal irritation. The patient was subsequently referred to a higher center for Intensive Care services.

Laboratory investigations done at the hospital with ICU services, consisting of Complete Blood Count, Renal Function Test, Liver Function Test, Chest x-ray, PT/INR, ECG, and serology, returned normal results. The patient was kept NPO for 24 h and received symptomatic treatment, including Injection Pantoprazole and Ondansetron. Additionally, she was administered Syrup Sucralfate 15 mL every 6 h via Nasogastric tube.

The psychiatric evaluation uncovered a history of multiple self-harm and suicide attempts, increased emotional instability, crying spells, anxious overthinking, and irritability. The patient received a prescription for Tablet Fluoxetine 10 mg to be taken once daily, alongside Tablet Clonazepam 0.25 mg to be taken every 12 h for 3 days, and then once nightly for the subsequent 5 days. This regimen suggests a potential diagnosis of mixed anxiety and depressive disorder. The prescription for Tablet Clonazepam was limited to 5 days due to its potential for abuse, and it was recommended that the medication be taken in the presence of the patient's father for close monitoring.

4 | CONCLUSION AND RESULTS

After 72 hours of normal examinations and laboratory findings, patient was discharged with medications (tablets Cefixime 200 mg for 4 more days, Pantoprazole 40 mg, Fluoxetine 10 mg and Clonazepam 0.25 mg) and advised to follow up with her treating physician and psychiatrist after a week.

Though poisoning from Lindane and Cetrimide is an infrequently reported occurrence, proactive preparedness of the case management is required from a life-saving perspective. Lindane, on its own, is associated with intentional side effects such as nausea, vomiting, dizziness, muscle cramps, anemia, hyperglycemia, pulmonary edema, seizures, and even fatality. Additionally,

TABLE 1 Vitals of the patient in different settings.

Vitals	In the ER	In the ICU	On discharge
Temperature	97.5	98	98
Blood pressure	100/60 mmHg	100/80 mmHg	110/70 mmHg
Respiratory rate	24/min	24/min	18/min
Pulse rate	110 beats/min	86 beats/min	74 beats/min
Saturation of oxygen	94% in RA	98% in RA	98% in RA

Cetrimide exhibits side effects like nausea, vomiting, esophageal damage, necrosis, and abdominal pain. Notably, there exists no antidote for either of these toxins.

Our patient ingested approximately 70–100 mL of Lindane and Cetrimide (1% w/v of Lindane and 0.1% w/v of Cetrimide in 100 mL approximating 22.2 mg/kg for lindane), experiencing shivering and a decreased level of consciousness within minutes, followed by vomiting and abdominal pain within an hour. Through prompt gastric lavage and comprehensive supportive and symptomatic treatment, the patient remained free of physical symptoms for 72 h, leading to her eventual discharge. No deviations were observed in examination and laboratory findings.

Given the absence of specific antidotes for these substances, supportive and symptomatic management with lindane and cetrimide poisoning would be beneficial. Observing the patient aims to mitigate the potential deliberate side effects that may manifest in the future.

5 | DISCUSSION

Lindane, identified as the γ isomer of benzene hexachloride, is recognized for its insecticidal attributes. While banned in agricultural applications, it persists for therapeutic use in scabicidal lotions and shampoos. Lindane is employed as a secondary measure, subject to restrictions in certain regions such as California,[10] and was banned for formulation and use in 2022 in Nepal.[11] Although prohibited, our patient managed to obtain it from a nearby pharmacy in her village, indicating that these lotions are still available over the counter in such areas which is a matter of concern. It, along with cyclodienes, operates by binding to the picrotoxin site on the chloride channel, impeding its opening and antagonizing the inhibitory effects of gamma-aminobutyric acid (GABA).[12] Lindane ingestion typically leads to vomiting, central nervous system stimulation, and seizures within 1–2 h,[4] but these symptoms were not evident in our case.

The promptness of gastric lavage conducted within 10 min in this instance was evidenced by the patient's neurological status improvement. Lindane absorption occurred swiftly, with 29%–53% of the administered substance absorbed from the intestinal loops within the initial 30 min in rats. Nonetheless, the necessity for a 72-h observation period for our patient was supported by a comparable case report published by Graeve & Herrnring, which provided evidence that symptoms may persist for up to 3 days.[3]

In most instances, ingestion of Cetrimide, an antiseptic liquid, results in relatively mild symptoms like nausea and vomiting.[7] E.S. Mucklow documented cases of accidental ingestion of a dilute antiseptic solution by infants, causing caustic burns.[13] Symptoms included throat pain, minor hematemesis, and abdominal pain, with one severe case marked by acute pulmonary edema. However, in our case, despite ingesting cetrimide, the case experienced only vomiting and loss of consciousness, possibly due to prompt nasogastric lavage within an hour of ingestion.

Nordt and Chew's study reported three toddlers orally ingesting lindane, resulting in nausea and central nervous system toxicity. Fortunately, all children fully recovered without complications.[14] The rapid CNS recovery, despite a substantial total body burden, was attributed to lindane redistribution to the bloodstream and adipose tissue. Prompt vomiting and nasogastric lavage likely prevented convulsive episodes, presenting a contrast to the findings in a different study. In our case, immediate lavage after loss of consciousness averted further CNS complications.

Similar to Thomas Y.K. Chan's study on cetrimide poisoning, our patient experienced self-limiting nausea and vomiting within 24 h.[8] However, the absence of hematemesis and pulmonary symptoms distinguishes our case from some in Chan's study.[8]

In managing lindane toxicity, seizure control takes precedence due to its impact on GABA. Benzodiazepines like diazepam or lorazepam, acting as GABA agonists, are effective in promptly managing seizures. The lack of additional complications aligns with existing studies,[15] highlighting supportive treatment and vigilant monitoring for convulsive episodes and respiratory distress associated with Lindane and Cetrimide exposure.

AUTHOR CONTRIBUTIONS

Pragya Rai: Conceptualization; formal analysis; investigation; methodology; project administration; visualization; writing – original draft; writing – review and editing. **Shrijan Shrestha:** Conceptualization; data curation; methodology; project administration; resources; visualization; writing – original draft; writing – review and editing. **Suman Rijal:** Project administration; resources; writing – original draft. **Rakesh Singh:** Supervision; validation; writing – review and editing.

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None.

CONFLICT OF INTEREST STATEMENT

The authors declare that they have no conflicts of interest.

DATA AVAILABILITY STATEMENT

The data underlying this case report are available from the corresponding author upon reasonable request.

CONSENT

Written informed consent was obtained from the patient to publish this report in accordance with the journal's patient consent policy.

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