Lupin poisoning in a geriatric patient: a case report

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Abstract

Lupin seeds can contain toxicologically significant bitter quinolizidine alkaloids, which may induce symptoms of poisoning in humans by affecting the nervous, circulatory, and digestive systems. Typical manifestations of lupin alkaloid poisoning include dizziness, confusion, tachycardia, nausea, dry mouth, loss of motor coordination, and, in severe cases, cardiac arrest and respiratory paralysis. This case report describes accidental poisoning following the ingestion of food contaminated by water previously used to boil dry lupin seeds. An 85-year-old woman consumed meals prepared with this water and subsequently exhibited classic symptoms of gastrointestinal poisoning, requiring urgent admission to the emergency department.

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Introduction

Lupin (genus *Lupinus*), a leguminous plant of Mediterranean origin, has been cultivated since ancient times due to its nutritional properties.[1] Its seeds are rich in proteins, dietary fiber, and essential fatty acids.[2,3] However, lupin seeds also contain bitter quinolizidine alkaloids—such as lupanine, sparteine, and lupinine—that can be toxic to humans and animals when consumed in large quantities or improperly prepared.

The alkaloid content varies depending on the species, environmental conditions, and method of processing. Traditionally, the seeds are subjected to soaking and boiling processes to remove these bitter compounds before consumption.[3] If not adequately treated, lupin seeds can cause symptoms of poisoning, including nausea, vomiting, dizziness, visual disturbances, and, in severe cases, respiratory depression and cardiac arrhythmias.[4]

While cases of lupin poisoning are relatively rare and often underdiagnosed, they can be particularly dangerous in vulnerable populations, such as the elderly, due to reduced physiological reserves and potential interactions with existing comorbidities or medications.

This case report highlights the clinical features and management of accidental lupin alkaloid poisoning in an elderly patient, emphasizing the importance of food safety and awareness of traditional food preparation practices.

Case Report

An 85-year-old female, previously independent in both basic and instrumental activities of daily living [respectively, activities of daily living (ADL) 5/6, instrumental ADL (IADL) 6/8], presented to our emergency department accompanied by her daughter. She reported nausea and vomiting that began approximately 24 hours after ingesting lupins and chickpeas cooked in the same washing water.

Her medical history included arterial hypertension treated with olmesartan and amlodipine, polyarticular arthritis, osteopenia managed with cholecalciferol, dyslipidemia, and prior right knee arthroplasty. Upon admission, she was diagnosed with food poisoning and treated with intravenous hydration, antiemetics, and paracetamol for abdominal pain, leading to symptomatic improvement.

Abdominal ultrasonography showed no evidence of acute intra-abdominal pathology, ruling out intestinal obstruction, cholecystitis, acute pancreatitis, abdominal aortic aneurysm rupture, and renal lithiasis. After 24 hours of observation and hemodynamic stability, she was discharged home with improved symptoms. Hematochemical analysis revealed chronic renal insufficiency (creatinine 1.08 mg/dL). Arterial blood gas analysis was unremarkable.

Due to persistent and worsening symptoms, the patient returned to the emergency department 24 hours later. On arrival, she presented with anuria. Blood tests revealed severe acute-on-chronic renal failure (creatinine 6 mg/dL). In conjunction with anuria and ongoing bowel symptoms, a hyperdynamic ileus was suspected, prompting the placement of a nasogastric tube and rectal probe.

An abdominal computed tomography (CT) scan revealed multiple air-fluid levels in the small intestine, especially in the duodenum, along with mild gaseous distension of the ileum and colon, without identifiable transition points—findings consistent with ileus. Additionally, diverticular changes with wall thickening and perivisceral fluid stranding were seen in the sigmoid colon, suggestive of localized inflammation. Following surgical evaluation, evacuative enteroclysis *via* rectal tube was initiated, along with intravenous hydration and levosulpiride, resulting in significant clinical improvement. A follow-up CT scan showed a reduction in air-fluid levels. After 2 days of persistent anuria, dialysis was initiated *via* femoral central venous catheter placement.

The patient was subsequently admitted to the geriatric ward for further management. Upon admission, a comprehensive geriatric assessment revealed mild-to-moderate neurocognitive disorder (Mini-Mental State Examination score of 21.4, corrected for age and education) and a normal Geriatric Depression Scale score (=3). Functional status had declined compared to baseline, with worsened ADL (1/6) and IADL (1/8) scores.

During hospitalization, treatment included intravenous hydration and diuretic therapy with furosemide 40 mg three times daily, alongside dialysis sessions. After four dialysis treatments, spontaneous diuresis resumed. The regional poison control center was consulted and recommended supportive care with intravenous fluids. With the return of diuresis, furosemide was discontinued, and creatinine levels gradually decreased to pre-hospitalization values (2 mg/dL).

Approximately 10 days post-admission, peristalsis and bowel function progressively improved, allowing for the removal of the nasogastric tube and the reintroduction of oral feeding. Due to mild dysphagia to liquids, a dense creamy diet was prescribed. Oral furosemide 25 mg once daily therapy was continued. Owing to her overall condition, the patient developed immobility syndrome and a stage II sacral pressure ulcer. Motor rehabilitation was initiated approximately 15 days into hospitalization, resulting in the gradual restoration of ADL and IADL functions.

The patient was discharged 25 days after her initial emergency department visit. At the 1-month follow-up, she demonstrated a favorable response to medical therapy and home-based rehabilitation, with near-complete recovery of functional independence.

Discussion

Lupin seeds are increasingly used in vegetarian and gluten-free diets due to their high nutritional value. However, their consumption carries a risk of toxicity when bitter varieties, which contain higher concentrations of quinolizidine alkaloids, are improperly processed. These alkaloids have anticholinergic properties and can affect the central and peripheral nervous systems,[5] cardiovascular function, and the gastrointestinal tract.

The most commonly reported symptoms include nausea, vomiting, dizziness, confusion, and tachycardia. In severe cases, respiratory depression and cardiac arrhythmias may occur.[6] Symptoms typically begin within a few hours of ingestion and can persist for 24 to 48 hours, depending on the amount of alkaloid ingested and the patient's metabolism and comorbidities.

Older people are particularly susceptible to the effects of these toxins due to age-related physiological changes, polypharmacy, and potential cognitive impairment that may delay the recognition of early symptoms or appropriate responses.[7]

In this case, the patient's symptoms were consistent with mild-to-moderate acute alkaloid poisoning. The reuse of cooking water,[2] which had retained a significant amount of alkaloids after boiling the lupin seeds, was the source of exposure. The absence of other affected individuals in the household further supports this route of poisoning.

Diagnosis is largely clinical, based on a detailed dietary history and the exclusion of other causes.[6] There are no widely available toxicological assays for alkaloid levels in routine clinical practice. Management is supportive, as there is no specific antidote. Intravenous fluids, electrolyte correction, and monitoring of vital signs are the mainstays of treatment. Activated charcoal may be useful if administered shortly after ingestion.

Public awareness and education about the proper preparation of lupin seeds are crucial to preventing accidental poisoning.[8] Food safety practices, particularly in households where traditional or alternative food processing methods are used, should be emphasized.

Conclusions

This case underscores the importance of recognizing lupin seed poisoning as a potential cause of acute gastrointestinal and neurological symptoms, especially in elderly patients. Detailed dietary history and awareness of traditional food preparation methods are essential for timely diagnosis. Supportive treatment is usually sufficient, and the prognosis is favorable with prompt care. Public education on safe lupin seed preparation can significantly reduce the risk of similar cases.

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