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CASE REPORT

A case report on mushroom poisoning: modern insights into an age-old problem

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Abstract

Mushroom poisoning is a common toxicological emergency in Nepal during the monsoon season, often due to the misidentification of wild mushrooms. This report presents a case of accidental poisoning in a family of three who developed gastrointestinal and neurological symptoms after consuming foraged mushrooms. Clinical findings suggested hallucinogenic Psilocybin species as the likely cause. With supportive care—including IV fluids, anti-emetics, and sedatives—all three recovered fully within 24 hours. The case highlights the diagnostic challenges posed by hallucinogenic mushrooms and identifies the potential role of Artificial intelligence (AI) based tools in aiding mushroom identification, particularly in resource-limited settings. The integration of such technologies, along with standardized guidelines, could enhance early recognition and improve outcomes in mushroom poisoning cases.

Keywords: Mushroom, Magic Mushroom, Poisoning, Psilocybin

INTRODUCTION

Mushroom poisoning is a major health concern in Nepal, where foraging for wild mushrooms is a common practice in rural and hilly regions. Peaks in poisoning cases are observed during the monsoon and post-monsoon periods, which are the mushroom-growing seasons. Few studies from Nepal have highlighted *Amanita phalloides* (Death Cap) poisoning as one of the major causes of toxicological emergencies.[1] There are even fewer reports of hallucinogenic mushrooms.

The clinical manifestations of mushroom poisoning vary with early symptoms, including nausea, vomiting, and diarrhea, occurring within six hours of ingestion to organ failure in later stages. *Amatoxin* poisoning is characterized by an initial latent phase often asymptomatic or with the least symptoms leading to misjudgment of case severity followed by severe toxicity, including progressive hepatic and renal failure. Symptoms of mushroom poisoning in our context can be grossly divided into two spectrums. At one end of the spectrum are Amanita-related poisoning, which is initially asymptomatic but can be fatal later, at the other end are hallucinogenic mushrooms which cause early symptoms but are rarely fatal.[2]

In Nepal, the diagnosis and management of mushroom poisoning remain difficult due to limited resources for species identification and a lack of toxin-specific treatment without proper management guidelines in Primary care centers and district hospitals where a lot of patients usually end up.

This case report aims to highlight the clinical approach, challenges, and management strategies encountered in a resource-constrained setting. It emphasizes the critical role of general practitioners who are often the first to encounter them in these settings, in improving outcomes for such cases.

CASE REPORT

A family consisting of three members, including the father (54 years old), mother (44 years old), and daughter (23 years old) came to the emergency department of Pashupati Chaulagain Memorial Hospital from Bhimeswor-7, Dolakha, Nepal. They complained of dizziness, abdominal pain, nausea, multiple episodes of vomiting, and tingling sensations in the hands, feet, and perioral area. The dizziness was associated with headache. It was persistent, and not associated with change in head motion, no ear ringing or decreased hearing was present. Abdominal pain was primarily periumbilical, contracting type, and associated with nausea and vomiting. Vomitus was non-projectile, containing food particles that they had taken previously.

They also complained a sensation of floating, even when remaining still, along with tingling sensations. Also, during examination, all of the members were noted to have temperatures slightly above the 37^{o}C. The complaints were similar among all three individuals. With the father experiencing more severe neurologic symptoms. They admitted to eating mushroom curry for lunch, which the father had picked from his field. Among the three, the daughter initially felt nauseous after about 20 minutes from the time of ingestion followed by her father, and the mother who had consumed it last. By the time they presented to the emergency department of our hospital, around 3 hours had passed. When inquired about the amount they had consumed, they recalled it to be around 200 grams that was cooked. Similarly, when inquired about past co-morbidities among the patients, there were no significant medical, drug or allergy history.

The vital signs recorded at the time of presentation are shown in Table 1 and the laboratory reports of the patients in Table 2. The mushroom they had consumed for lunch is shown in Figure 1. The mushroom in Figure 1 was promptly identified by the physician to be a “magic mushroom” from prior familiarity.

The patients were treated with IV normal saline 0.9 % to maintain an output of 0.5ml/kg/hr and admitted

Table 1. Vital signs (pulse, blood pressure, SpO_2, respiratory rate and temperature) of the family members

Vitals	Father	Mother	Daughter
Pulse	94 bpm	88 bpm	80 bpm
Blood Pressure	180/100 mm Hg (Rt arm)	140/90 mm Hg (Rt arm)	130/60 mm Hg (Rt arm)
SpO_2	98% at room air	99% at room air	100% at room air
Temperature	37.8^{o}C	37.5^{o}C	37.7^{o}C
Respiratory rate	16 / min	15 / min	14 / min

Table 2. Patient demographics and laboratory parameters during presentation to emergency room

SN	AgeSex	Ur/Cr	RBS	Na/K	TB/ DB	AST/ ALT	PT/INR	Hb
1	54Male	35 / 1.0	95	140/4.2	1.8/0.5	52/68	11/0.96	14.2
2	44Female	28/0.9	105	138/3.8	2.1/0.6	48/72	12/1.04	13.8
3	23Female	40/1.1	90	141/4.5	1.6/0.4	60/80	10/0.87	12.5

*Normal range of values: Ur- Urea (10-20)mg/dl; Cr-Creatinine(0.6-1.2)mg/dl; RBS- Random Blood Sugar (70-110) mg/dl; Na- Sodium(132-145)mmol/L; K- Potassium (3.5-4) mmol/L; TB-Total bilirubin (0.1-1.2) mg/dl; DB-Direct Biliruibin (0.0-0.3) mg/dl; AST- Aspartate aminotransaminase (10-40)U/L; ALT-Alanine transaminase (7-56)U/L; Pt-Prothombin time (10-13) seconds; INR-International Normalized Ratio (0.9-1.1) seconds; Hb-Haemoglobin (13-17.5)g/dl for male and (12-15.5)g/dl for female

later with the following medications; (1) Intravenous Pantoprazole 40mg x once a day, (2) Intravenous Ondansetron 8mg x thrice a day, (3) IV paracetamol 1g x thrice a day, (4) IV diazepam 5mg as need basis. Hypertension was observed in the father and treated with an Injection of Labetolol 5 mg iv x stat, which brought the blood pressure to 150/100 mm Hg in 30 minutes. They were admitted with the diagnosis of Accidental Mushroom Poisoning. A total of four pints of normal saline was given in 24 hours.

Figure 1. The mushrooms are small, in size, brownish with a conical top, and nipple-like with a short and slender base(right), also there is a bluish-green tint at the margins of the cap, gills are brownish (left)

The patient's symptoms gradually improved within 8 hrs of admission. The father's blood pressure had decreased to 140/90 mm Hg within 3 hours and no one had to be given additional antihypertensives. By the following day, the symptoms had completely subsided, except for the father who was still complaining of mild headaches with a Visual Analogue Scale(VAS) to be around 3. Diazepam was not needed to be given. All of the family members were discharged after 24 hours of admission with a follow-up arranged in one week time with advice given to each member to look for danger signs like persistent nausea, vomiting, diarrhea, rash, bleeding manifestation, urinary changes or persistent headache and abdominal pain and to visit hospital immediately if these symptoms occurred, otherwise to follow up in outpatient department after one week. After one week normal blood parameters including complete blood count, liver profile, renal profile and coagulation profile was observed.

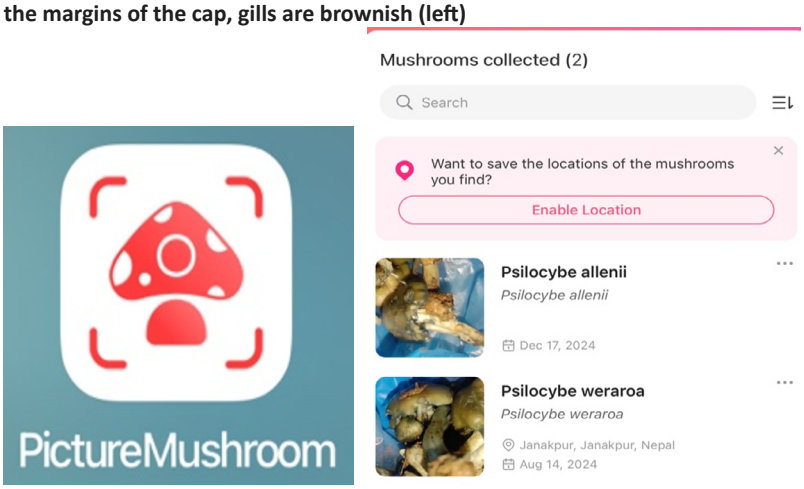

Figure 2. Logo of the App (left) in the app store, with identification of the correct genus of the mushroom by the use of the same app (Right) at two different times

Since identification of mushroom species is paramount to decisive clinical decisions, we wanted to see if Artificial Intelligence (AI) could be of help in the identification of mushrooms and tested two AI tools. A free app called Picture Mushroom by next vision limited(ios/android), version 1.12.14 as shown in Fig 2 and ChatGpt 3 by open AI from chatgpt.com was used to scan pictures of the mushroom that was available. Both tools correctly identified the genus.

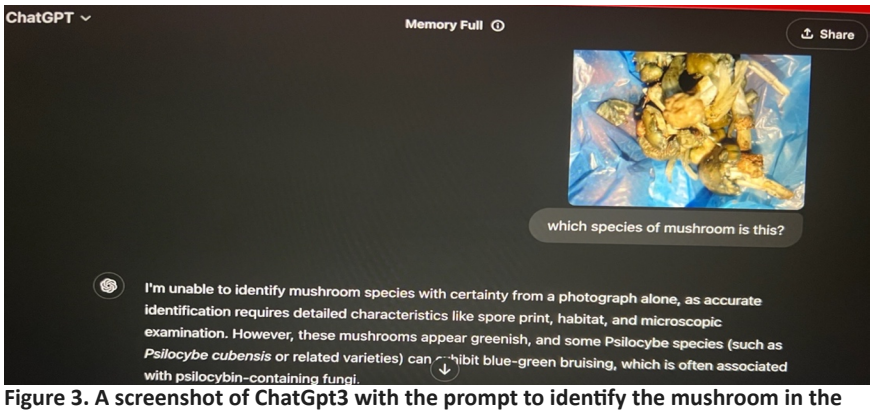

Figure 3. A screenshot of ChatGpt3 with the prompt to identify the mushroom in the picture returned the mushroom to be of Psilocybe genus

DISCUSSION

A study by Devkota (2008) documented the presence of *Psilocybe montana* and *Psilocybe coprophila* in the highland regions of Nepal, localizing them in the Dolpa region.[3] Another study by Gaston Guzman et al reported three species of Psilocybin in Nepal viz. *Psilocybe percevalii*, *P. pseudobullacea*, and *P. subcubensis* with the latter as the only species with neurotropic properties. They localized species to subtropical and tropical areas (2000-3000 m) of Nepal and collected samples from Dhulikhel and Chitwan.[4]

The mushrooms of this class are small golden or brownish and characteristically turn greenish-blue when cut.[5] On the contrary among the highly toxic *Amanita* species, *Amanita phalloides* has distinct morphological characteristics, including a greenish-yellow to olive cap, a prominent bulbous base, and white gills.[6]

Symptoms associated with hallucinogenic mushrooms are feelings of euphoria, heightened imagination, a loss of sense of time, and visual distortions or hallucinations with developing fever and seizures.[7]

The treatment of hallucinogenic mushrooms is primarily supportive. Keeping patients in a quiet, dark room devoid of visual stimulus with the use of sedatives like benzodiazepines in cases of severe agitation is advised. Activated charcoal can be used for those who present within one hour of ingestion, however, the use of anticholinergics should only be reserved for severe anticholinergic side effects.[8]

Considering the presence of hallucinogenic effects, increased temperature, increased blood pressure, tachycardia, and typical appearance of the mushroom identified, it can be correctly said that we identified it to be a species of Psilocybin, most probably *P. Subcubensis*. However, in other cases where clinicians are not familiar with the condition, unnecessary investigations and referrals might take place. The Standard Treatment Protocol of Emergency Health Package 2078 B.S (2021 AD) which is the emergency reference manual found in most Primary Health Care centres and District hospitals in Nepal. It mentions gastric lavage with charcoal and treatment with Inj. Penicillin 1 million unit/kg/day as continuous infusion and Inj.Vitamin K 10mg iv x od for 3 days in the presence of coagulation abnormalities for mushroom poisoning. This has been solely introduced to cover for the more fatal amanita species and does not address the management of hallucinogenic mushrooms. Guidelines in management of mushroom poisoning is varied and region specific.[9] A study by Rita Mrvos et al found and suggested no role of gastric lavage therapy in asymptomatic patients.[10] Another study by CN Broussard et al favors the usage of Silibinin at 5m/kg stat dosage followed by 20mg/kg/dy as continuous infusion in Amanita poisoning.[11] A study by Qunmei Yao et al concluded that there should be development of poisonous mushroom identification, public and professional training and also hierarchical treatment systems in hospitals in order to manage mushroom poisoning effectively.[12]

In our case physician's prior familiarity with the case and prompt initiation of supportive measures made management easier. Case fatality rate with poisoning with Psilocybin is very rare and studies conducted across England, Wales, and Northern Ireland have found the deaths associated with Psilocybin to be due to erratic behavior under the influence.[13] However, as the studies on fatalities were done in European population, without the availability of adequate data on our population we can only assume that same is replicable.

Management in our case was largely symptomatic without prolonged hospital stay. We did not opt for gastric decontamination due to longer time frame till arrival at the hospital. Similar to our case, a study by Justin P. Reinert et al suggests that management in Psilocybin poisoning is largely symptomatic with role of activated charcoal to reduce absorption if given early, it also mentions that symptoms do not persist beyond 24 hours because it is usually completely metabolized by that time.[14]

CONCLUSION

This case report highlights the importance of early identification especially in the case of mushroom poisoning to be paramount for prompt and proper management of the patient.

With proper training and exposure, clinicians and health service providers can avoid uncertainties and manage mushroom poisoning in their respective health settings.

The use of AI to identify the genus of mushrooms showed promise in our case, however, the prospect needs to be further explored in other setups. Whether it can identify species of Amanita which is more toxic and fatal is a frontier that needs to be tested and might be practice changing in the future. However, as this is a single case report on usage of AI-based tool for identifying mushroom species, repeated trials are needed before sufficient confidence can be given to these tools.

DECLARATIONS

Conflict of Interest

None

Funding Source

None

Ethical Clearance

Ethical clearance was not required for this case

Consent for Study

Informed consent was given by the patient for publication of this case report.

Two AI software has been used

ChatGpt3 from Open AI available from chatgpt.com and Picture Mushroom app ios/android by Next Vision Limited©, version 2.12.14 available from Appstore/Google apps. These AI tools were used for identification of mushrooms consumed by patients.

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