

ACUTE MUSHROOM POISONING : A REPORT OF 41 CASES

Joshi A*, Awale P*, Shrestha A*, Lee M*

* Tansen Mission Hospital, Palpa, Nepal.

ABSTRACT

A retrospective analysis of all mushroom poisoning cases admitted in Tansen Mission Hospital in the period of two months of the year 2005 was done. Forty-one cases were admitted during that period, among which only 34 case records could be found for analysis. Female (58.82%) outnumbered the male and 15 (44.11%) of the cases were from pediatric age group. The poisoning was secondary to consumption of different species of *Amanita* variety including the most poisonous *Amanita phalloides*. The commonest symptoms at the time of presentation in both adults and children was gastrointestinal (diarrhea, vomiting and abdominal pain). There were 12 mortalities and they died at the median interval of 3.5 days after admission. The main cause of death was acute liver failure and acute renal failure. Relative risk of having a bad outcome was found to be higher when the mushroom was consumed with alcohol when compared with non-alcoholics. High mortality was probably due to late presentation and only the conservative management in all the cases. Increased community and medical awareness is needed to reduce the frequency, morbidity and mortality of mushroom poisoning.

Key Words: *Mushroom Poisoning, Amanita Phalloides.*

INTRODUCTION

Mushroom poisoning is a medical emergency. It is prevalent in many part of the world. In Nepal, picking and eating wild, uncultivated mushrooms, especially in the rainy season is very popular and contributes to both local food and income through selling in local markets. In the

Tansen Municipality of the Palpa district, the collection of mushrooms this year turned into tragedy with 41 people admitted to Tansen Mission Hospital (TMH) and 12 patients died. A retrospective analysis of all mushroom-poisoning cases admitted to Tansen Mission Hospital in a 2-month period was done to look at the patterns of presentations of mushroom poisoning.

Address for correspondence :

Dr. Arbin Joshi
Tansen Mission Hospital, Palpa, Nepal.
Email: joshiarbin@wlink.com.np

Received Date : 17th Jul, 2006

Accepted Date : 12th Feb, 2007

A group of mycologists from Pokhara¹ confirmed that the local forest in Shreenagar in Tansen had a large diversity of mushrooms including some very poisonous species of Amanita Mushrooms. Discussions with the victims and the relatives of the dead persons confirmed that poisoning happened after consumption of a mixture of mushrooms collected in the local Katus-Chilaune (*Castanopsis indica* and *Schima wallichii*) forest.

MATERIALS AND METHODS

All case records of patients with clinical diagnosis of Mushroom Poisoning admitted to Tansen Mission Hospital in June/July 2005 (2 months) were analyzed. A specially designed proforma was used to collect data (age, sex, duration taken for symptom appearance, duration of hospital stay, investigations done, regimen of treatment and mortality) on all the patients. The analyses of relevant laboratory tests done were carried with special consideration to liver function test and renal function tests. The outcome was compared in patients who consumed mushroom with or without alcohol. Other relevant data was also tabulated and analyzed.

RESULTS

A total of 41 cases of mushroom poisoning were admitted in TMH during months of June/July 2005, but only 34 case records were located from the hospital's records section (Fig 1). In this hospital it is the norm for patients to take their case notes away with them, and this would account for the absence of the remaining 7 case records. Demographic profile of the patients is given in tale 1. Vomiting was the main presenting symptom followed by loose motion and cramping abdominal pain. Other presenting complaints are tabulated in table 2. There was some difference in presenting symptoms between pediatric and adult patients.

Majority of the patients died due to acute liver failure. Prothrombin time (PT) was done in only 19 patients, of which only 3 showed markedly elevated levels of more than two times of control. One of them had PT of >1 hour, who eventually expired but two other cases who survived showed gradual decrease in serial PT levels. Out of other 16 patients who had normal or < 2 times elevated PT, 7 expired. Alanine transaminase was sent

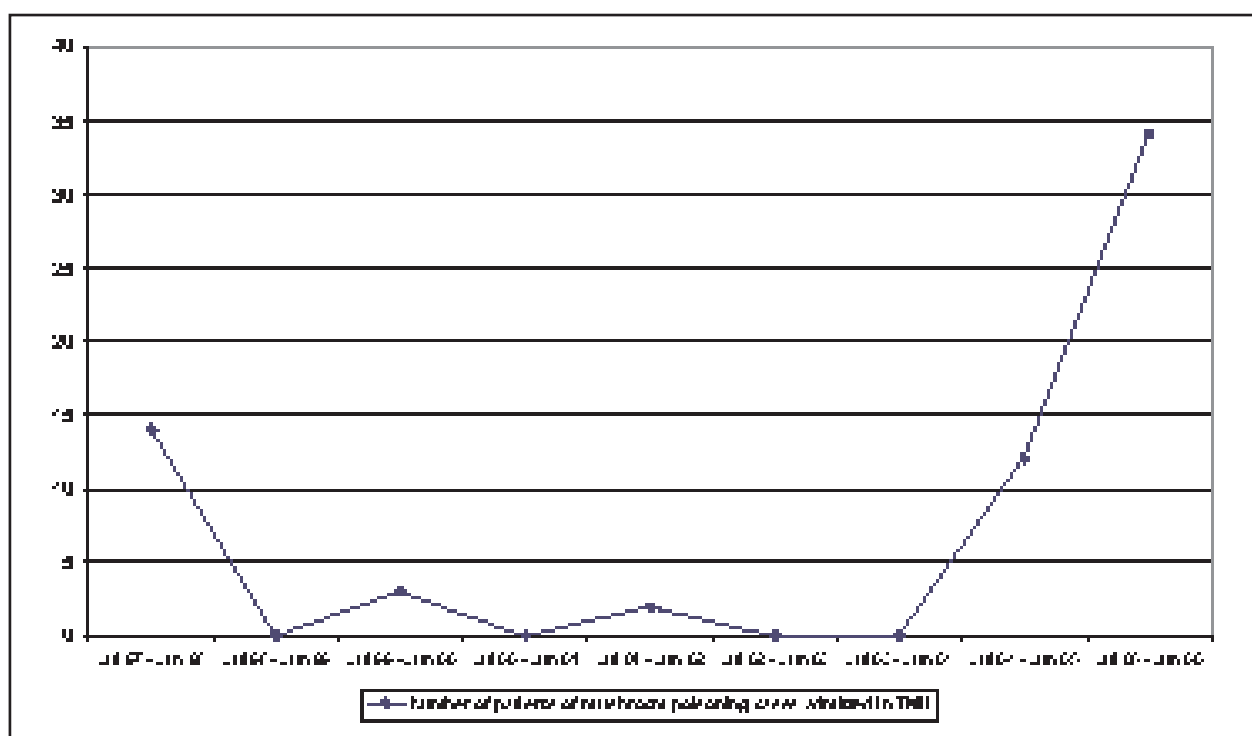


Fig.1: Number of Mushroom poisoning cases admitted in TMH in last 10 years

(Source: Hospital Database)

Table I: Demographic profile of the cases admitted with the diagnosis of mushroom poisoning in TMH in June/July 2005

Age(n years)	No. of Patients		
	Males(%)	Females(%)	Total(%)
1-13	4 (11.74%)	11 (32.33%)	15 (44.11%)
14-75	10 (29.4%)	9 (26.4%)	19 (55.88%)
Total	14 (41.17%)	20 (58.82%)	34

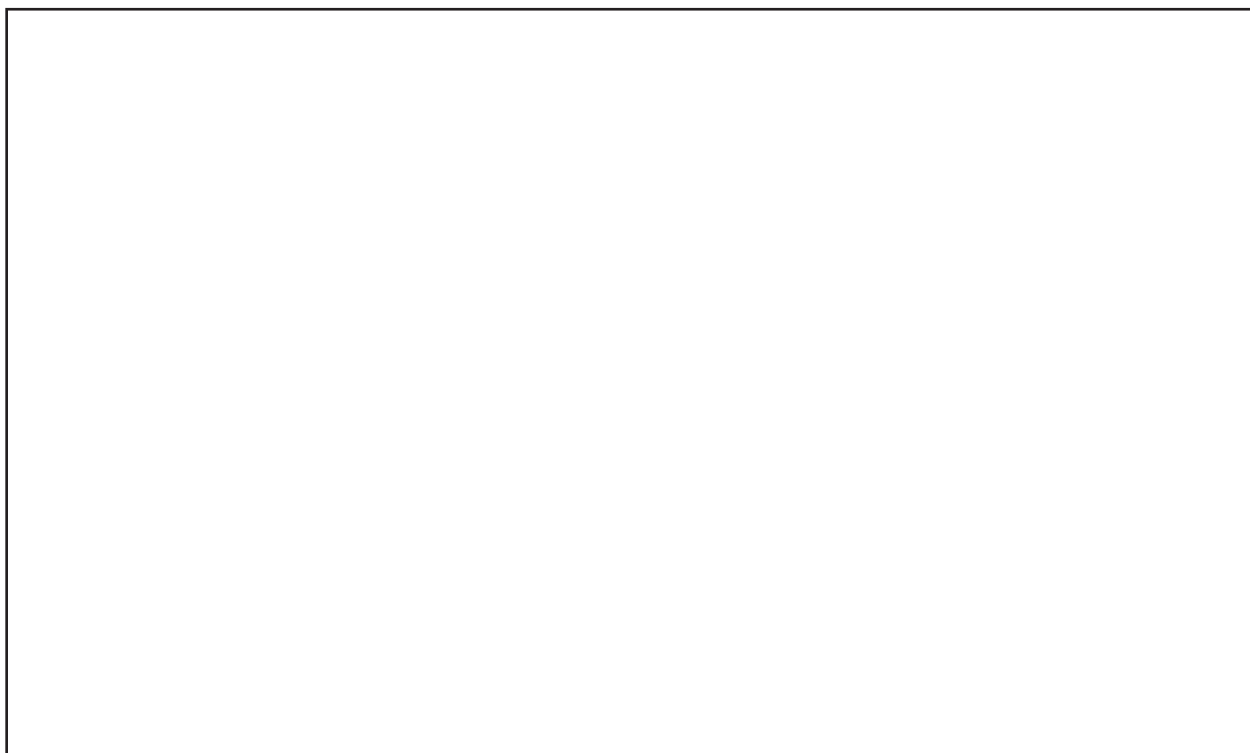
Table II: Clinical features of the cases admitted with the diagnosis of mushroom poisoning in TMH in June/July 2005

Clinical Features	No. of Patients (%)	
	1-13 years (n=15)	14-75 years (n=19)
Diarrhoea	9	17
Vomiting	14	18
Abdominal Pain	8	13
Abdominal Distention	1	3
Jaundice	1	7
Gastrointestinal Bleed	3	3
Hepatic Encephalopathy	5	5
Dehydration	3	7
Hepatomegaly	3	2
Unstable vitals	3	4



Fig.2: Amanita Mushrooms are large mushrooms with slender stipe and a cap with brown, green or reddish colours. The under surface of the cap is covered by white lamella (like pages in a book) and the whole mushroom is in the young stage covered by a skin-like veil which remains as a volva near the base of the mushroom when it matures. Most species are also characterised by a ring on the stipe.

(Photo Courtesy Christensen, Sharma, Bhattarai¹)



**Fig.3: Amanita virosa another very poisonous mushroom
which are commonly found in Katus-Chilaune forest in Nepal**

(Photo Courtesy Christensen, Sharma, Bhattarai)

in 27 patients only, of which only 8 (29.62%) had elevated enzyme. In all the patients, only the conservative management with IV fluid and lavage was carried out. Active management with high dose penicillin or antidote like N-acetylcysteine was not given in any of the cases. Renal failure was the next common cause of fatality. It was observed that relative risk of having a bad outcome with mushroom poisoning in alcoholic adults was 45% higher as compared with non-alcoholic patients with mushroom poisoning. Those patients, who expired, died after the median interval of 3.5 days after admission (NB: majority of them (83%) presented within 24-48 hours of ingestion).

DISCUSSION

Due to poor socio-economic condition and ignorance, consumption of wild mushroom is still common in Nepal. In some areas it is still usual social practice, especially during rainy season. A tribal group from terai regions of Nepal, known as 'Chepang', was having a certain type of

wild mushrooms grown in their area for years and years. In recent times, mycologists recognized that variety to be a new species and termed it as 'Chepangiensis' - a white mushroom looking similar to *A. virosa*. These facts indicate mushroom (esp. uncultivated) to be a popular food among consumers from the poor, low-class people of Nepal.

Just after the monsoon rains of 2005, TMH in the remote hills of Nepal had a sudden influx of patients in a 2-week period. The incident was confirmed to have occurred due to ingestion of a mixture of poisonous *Amanita* species - *A. virosa*, *A. longistriatum* and *A. phalloides*. This was confirmed by the mycologists¹ after visiting the local jungle along with the local people and few of the victims. *Amanita phalloides*, the most poisonous among the three, is a mycorrhizal fungus and produces a range of toxins (amatoxins and pralitoxins) that is not inactivated by cooking, freezing or drying. The lethal dose is said to be 0.1 mg/kg, which may be contained in as little as one mushroom.⁸ They found few other non-poisonous variety

of the Amanita mushrooms too in the same jungle, like *A. caesarea* and *A. hemibapha* (locally known as Dhar Shyamo, Phul Chyau and Suntale chyau), which are highly appreciated as an edible mushrooms.

Literature on toxicology in Nepal is limited. To our knowledge, there have been no studies in Nepal regarding accidental mushroom poisonings so far, though there are many series reported from different parts of the world.² According to other few general poisoning case series reported from Nepal, the rate of mushroom poisoning cases admitted to the hospital had a great geographical variation. In the major leading tertiary hospital of Kathmandu, the rate of mushroom poisoning cases ranged from 1 to 4%^{3,4,5} of the total poisoning cases. American Association of Poison Control Center (AAPCC) reported that mushroom poisoning represented <0.5% of all reported toxic exposures in US from 1979 to 1995, indicating even lower incidence in western countries. Outside Kathmandu, Mushroom poisoning rate was found to be 4.89 % in a tertiary care center in eastern Nepal⁶ and 1% in another urban district level hospital of Chitwan.⁴ This appears to show low incidence of mushroom poisoning in hospitals of urban Nepal but there is a paucity of data regarding the incidence from rural hospitals. However, unpublished data collected by mycologists Christensen and Devkota, showed 23 total incident of mass accidental mushroom poisoning in last 6 years, including 5 incidents in 2005 in different regions of Nepal affecting more than 77 people. We assume that the actual incidence is much higher than shown because there is no formal national registration for poisoning cases, and that many poisoning victims never come in contact with the health care providers.

Mushroom poisoning is a rare but potentially fatal condition. Different literatures shows varied case fatality rate. Failure to identify exact species (which happens in >95% of the cases) could be the reason. A case series of 9 *Amanita phalloides* poisoning in California in 1996-1997 showed Case fatality rate (CFR) to be 22.2%, whereas another huge series of 10,924 all-species poisoning from Japan showed CFR to be only 0.007%². Another case report in which species were expertly identified in only 3.4% of 9208 cases, all the mortality (0.03% case fatality

rate) occurred following ingestion of amatoxic species.² A 33% of CFR in this series seems quite high compared with others. Late arrival to hospital, association with alcohol and less treatment options in our setup could be the reasons. Failure to include the patients who had mild symptoms and were not admitted to the hospital must have reduced the total number of affected people. Hepatic Failure as the cause of death in this series is consistent with other literatures.³

A consistent treatment protocol was not followed in this series; hence it is out of the scope of this report to analyze the efficiency of different treatment options available in the hospital. Apart from gastric lavage and aggressive fluid and electrolyte correction, drugs like Silymarine, high dose penicillin G (500,000 to 1,000,000 units/kg/day) and N-acetylcysteine has been recommended as a conservative management.⁸ More aggressive treatment in the earlier phase was recommended⁹ with repeated doses of activated charcoal, 1 gm/kg initially followed by 0.5 gm/kg for several doses. A complete bowel prep wash out with PEG-LEC is also recommended after multi dose activated charcoal treatment. Animal studies have supported the use of high Dose Penicillins. Penicillins were claimed to displace Amanitin from protein and block its uptake by hepatocytes. But no prospective clinical trial evidence seems to be available till date regarding the management of mushroom poisoning. A case report from Turkey showed beneficial effect of plasma exchange in the case of *Amanita* toxin poisoning with hepatic encephalopathy.¹⁰ However, a prospective evaluation of gastric emptying and activated charcoal revealed both procedures did not alter outcome measures in the 357 symptomatic and asymptomatic self-poisoned patients.¹¹

In the context of developing countries like Nepal, where advanced technologies and lack of skills make procedures like liver transplantations or plasma exchange impossible, preventive methods like community awareness about the mushroom poisoning seems to be the most effective way to tackle this preventable problem. After the unfortunate

incident in Palpa, public health department of the hospital along with the District Health office conducted programs like displaying the poisonous mushrooms, teaching the hospital visitors and their relatives, making programs telling people to avoid mushroom and posting around the bazaar area warning people of the problem. The local radio stations did have radio messages to warn people of the risk. In follow up, it is planned to organize such programs every year at the beginning of the rainy season, which is the prime time for mushrooms to grow. An effective nationwide awareness program is needed to prevent such incidents and a definite protocol should be launched to the hospitals to manage such cases, which is lacking at the moment.

ACKNOWLEDGEMENTS

Dr. Niranjana Sharma, HOD Medicine Department, Dr. Rachel Karrach, Director TMH, Dr. Amit Lamgade, Dr. Sangita Kharel and Dr. Lawrie McArthur for the initial management of the patients. We would like to express our sincere gratitude to Dr. Maurice Lee, Consultant Anaesthetist for his generous help in literature search, commenting the manuscript and preparing this study.

REFERENCES

1. Christensen M¹, Devkota S², Bhattarai S³. ¹The Royal Veterinary and Agricultural University, Copenhagen, Denmark., ²Central Dept of Botany, TU, ³Institute of Forestry Pokhara, Nepal. Press Release issued on 2nd August 2005.
2. Diaz JH. Evolving global epidemiology, syndromic classification, general management, and prevention of unknown mushroom poisonings. *Critical care med* 2005 Vol 33, No 2.
3. Paudyal BP, Poisoning: Pattern and profile of admitted cases in a hospital in central Nepal, *J Nep Med Assoc* 2005; 44: 92-96
4. Ghimire RH, Sharma SP, Pandey KR A comparative study of acute poisoning in Nepal at tertiary and secondary level hospitals, *J Nep Med Assoc* 2004; 43: 130-133
5. Prasad PN, Karki P, Poisoning cases at TUTH emergency: a one year review. *J Inst Med* 1997; 19: 18-24
6. Rauniyar GP, Das BP, Naga Rani MA, et al Retrospective analysis of profile of acute poisoning cases in a tertiary care hospital in eastern Nepal: A four year database from 1994 to 1997. *J Nep Med Assoc* 1999; 38: 23-28.
7. Christensen M. (Personal communication) The Royal Veterinary and Agricultural University, Copenhagen, Denmark.
8. Trim GM, Lepp H, Hall MJ, et al. Poisoning by *Amanita phalloides* (death cap) mushrooms in Australian Capital Territory, *MJA* 1999; 171: 247-249.
9. Diaz JH. (Personal communication) Professor and Head, Environmental and Occupational Health Sciences Louisiana State University Health Sciences Center-New Orleans, LA, USA.
10. Saltik IN, Soysal A, Sarikayalar F, et al *Amanita* Poisoning in a Child, Treated with Plasma Exchange. *Indian Pediatrics* 2000; 37: 1028-1029.
11. Merigian KS, Woodard M, Hedges JR, et al. Prospective evaluation of gastric emptying in the self-poisoned patient. *Am J Emerg Med* 8: 479-83, 1990.

