Amanita phalloides poisoning; new trends

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Core tip: Amanita phalloides is one of the most poisonous mushrooms that contains three groups of toxins: amatoxins, virotoxins and phallotoxins. Gastrointestinal symptoms are the first clinical manifestations. The toxin can cause liver necrosis. This poisoning management includes supportive care, gastric decontamination, chemotherapy and liver transplantation.

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The clinical figure caused by poisonous compounds in mushrooms is named mushroom poisoning or mycetismus. Toxic mushrooms are spread across the world with more than 10000 species, that almost 100 species are involved for furthermost of mushroom poisoning. The most of clinical manifestations following ingestion of toxic mushrooms are gastrointestinal at first, but sometimes, the patients lead to organ damage and even death (1,2). Mushrooms are known as the multicellular organisms which are divided in many specialized types. They have different examples of toxins and chemically specialized cell types (3,4).

Amanita phalloides is one of the most poisonous mushrooms that is responsible for the majority of human fatal cases of mushroom poisoning global (1). It contains three groups of toxins; amatoxins, virotoxins and phallotoxins, which amatoxins are the main responsible in the poisoned patients (3). Alpha-amanitin is an amatoxin that inhibits RNA polymerase (especially polymerase II). Hence it causes protein deficit and ultimately cell death (3). Its lethal dose is reported around 0.1 mg/kg (4). The toxin concentration in certain species is variable. The younger fruit body of mushrooms are containing lower toxin. Conversely, the well-developed fungus have higher toxin concentrations (5). Phallotoxins are not absorbed by the digestive tract in mammals, but can cause toxicity by injection (3,4). A survey showed that both the amatoxins and phallotoxins were biosynthesized on ribosomes, unlike other fungal cyclic peptides, by nonribosomal peptide synthetases (5).

The first clinical manifestation of amatoxins are often gastrointestinal symptoms (1). The main target organ of toxicity is liver, but other organs may also involve, especially the kidneys (4). The toxin causes liver necrosis, the cellular changes leading to the fragmentation and segregation of the whole nuclear components.

Intoxication symptoms ordinarily appear after a latent period. This latency period is evaluated as an independent prognostic factor (3). They may include gastrointestinal disorders afterward jaundice, seizures and coma, ending in death (4). Thus, Amanita should be considered as a medical emergency for a primary diagnosis also immediate treatment to require for a successful outcome (3). Treatments for this hepatotoxic mushroom consist of supportive care such as correction of hypoglycemia and electrolytes, gastric decontamination, chemotherapy with different compounds such as penicillin G and silymarin, and finally, liver transplantation. Liver transplant is mostly the lone treatment option in patients that have elapsed more than 48 hours since their ingestion. Unfortunately, an effective antidote has not been still discovered for it (2,3). An animal study reported that polymyxin B in the kidneys could revert the inhibition of the mRNA transcripts elicited by α-amanitin, and protect ribonucleic acid polymerase II from inactivation leading to a helpful prevention (6). Polymyxin B could also decrease the hepatic and renal α-amanitin-induced injury as observed by hepatic aminotransferases plasma data and histology and increasing survival (6). Amifostine is a radio protective and chemoprotective agent which protects against lipoperoxidation and interferes with the cross-linking of deoxyribonucleic acid. It might be decreased by attenuating ongoing hepatic necrosis associated by this poisoning (7).

Some exposures to these toxic mushrooms lead to acute hepatic necrosis then fulminant hepatic failure supervene
requiring liver transplantation. Mortality from Amanita poisoning was around 20%-40% within 3–7 days with many live patients through liver transplantation (1,2,7). According a recent study, higher values of coagulation profile especially international normalized ratio were correlated with poor outcome (2). Clinicians should consider and check alpha amanitin levels whereas amanita poisoning is suspected when a history of mushroom ingestion existed.

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