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Lethal ingestion of stored *Amanita phalloides* mushrooms

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Summary

We report the first case of a lethal *Amanita phalloides* intoxication from stored mushrooms. After picking the mushrooms were kept in a freezer for 7–8 months. This case is in accordance with the well-known stability of the amatoxins and demonstrates the possibility of *A. phalloides* poisoning at any time of year.

Key words: Amanita phalloides; poisoning; toxins; toxicology

Case report

A 61-year-old female patient presented at the emergency room with severe dehydration due to vomiting and diarrhoea. After specific questioning she reported ingesting several mushrooms about 36 hours earlier. She had picked the mushrooms the previous autumn (about 7–8 months earlier), dried them and kept them in the freezer. She had cooked the mushrooms before eating the entire batch. The mushrooms had not been checked by an expert. Severe nausea, vomiting and diarrhoea had set in some 12–16 hours after ingestion. On admission she was awake and fully oriented, blood pressure 130/45, pulse 116/min, regular, respiratory frequency 20/min. Hepatomegaly was not found. Laboratory findings were severe metabolic acidosis (pH 7.05), base excess –24.1, with respiratory compensation. Serum creatinine was 248 µmol/, AST 772 U/l, ALT 963 U/l, bilirubin 7 µmol/l, LDH 1150 U/l, prothrombin time 47%. During the next 12 hours the patient was rehydrated but became more obtunded and developed hypoglycaemia. Prothrombin time fell to 32% despite administration of vitamin K and the patient was referred to our intensive care unit with the suspected diagnosis of *Amanita phalloides* poisoning. Repeat blood chemistry showed serum lactate of 11 mmol/l, serum creatinine 270 µmol/l, AST 1424 U/l, ALT 2326 U/l, bilirubin 18 µmol/l, prothrombin time 27%, factor V 8%. The diagnosis of *Amanita phalloides* poisoning was confirmed by detection of amatoxin in the urine at a level of 37.3 µg/l (measured approximately 4 days after ingestion). Therapy with penicillin G, silibinin and N-acetylcysteine was initiated immediately. Despite these supportive measures the patient's condition deteriorated, and on day 3 the prothrombin time was <10%. The patient declined evaluation for a liver transplant and died on day 4 from progressive liver and renal failure.

Discussion

Amanita phalloides poisoning is mediated by a number of toxins, the most important of which are the amatoxins [1]. These toxins interfere with DNA transcription by inhibiting RNA polymerase B. Synthesis of messenger RNA and subsequent protein synthesis is interrupted. Cells with high rates of protein synthesis (e.g. those of the gastrointestinal tract, the liver and the kidneys) are particularly sensitive to injury [2]. Depending on the development stage of the fruiting bodies, the concentration of amatoxin is higher in old than in young mushrooms. Severe poisoning can occur with 5–7 mg amatoxin, an amount that can be present in a single mushroom weighing about 50 g.

Amatoxins are heat stable (cooking, drying at 250–280 °C) and resist freezing temperatures down to –25 °C [3]. The lethal dose of amatoxins is approximately 0.1 mg/kg body weight [4]. There is very little in the literature concerning the stability of *Amanita* toxin in stored mushrooms. One report has compared the toxin content in fresh *A. phalloides* and in dried mushrooms stored for 1 and 5 years. While there was gradual loss of phalloidin content, amatoxins could still be detected in dried mushrooms [5]. In animal studies lethal intoxications have been induced in mice using toxins extracted from mushrooms and subsequently stored after freezing [6]. In the light of these data demonstrating the extraordinary stability of amatoxins, lethal intoxication by ingestion of stored *A. phalloides* mushrooms can occur at any time of year. However, no such cases have so far been reported in the literature. In one case involving dried mushrooms, the time lapse between picking and ingestion was not specified [7]. Nor are similar cases on file at the Swiss Toxicological Information Centre. In the period 1966–2000 23 cases of lethal *Amanita phalloides* intoxication were documented. All occurred in autumn and involved ingestion of freshly picked mushrooms. Expert mycologists were not consulted in any of these cases. Our case demonstrates for the first time that lethal *A. phalloides* poisoning can result from ingestion of stored *A. phalloides* mushrooms. The possibility of *A. phalloides* intoxication must therefore be considered at any time of year if the clinical setting is suggestive.

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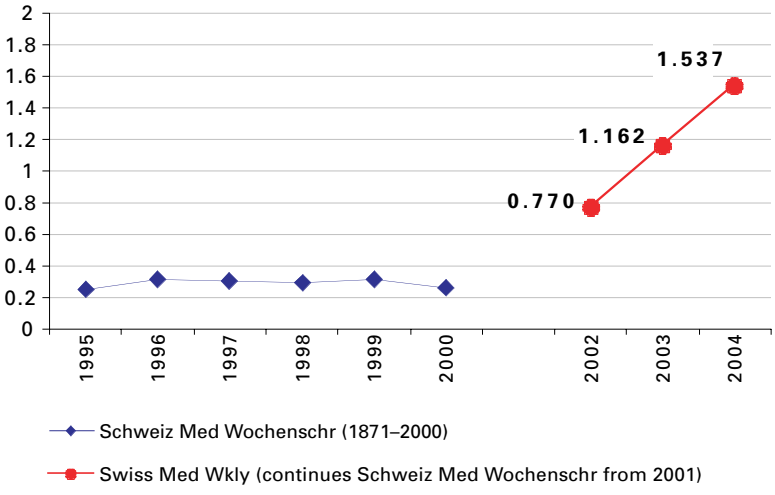

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