Amanita phalloides: The Death Cap

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About 5% of all known mushroom species are poisonous. Most fatal ingestions are due to the consumption of Amanita phalloides (A. phalloides), commonly known as “death cap.” It is widely distributed across Europe and other parts of the world. These toxic mushrooms resemble several edible mushrooms, most notably Caesar’s mushroom and paddy straw mushroom. As little as half a mushroom contains enough toxin to kill an adult human. In general, poisoning incidents are unintentional and result from errors in identification. Roman Emperor Claudius in AD 54, Holy Roman Emperor Charles VI, and some other historical figures are alleged to have died from A. phalloides poisoning as assassination plots.

Its heat-stable amatoxins withstand cooking temperatures and inhibit ribonucleic acid (RNA) polymerase II and, subsequently, protein synthesis. Death caps have been reported to taste pleasant. This, coupled with delay in the appearance of symptoms (>6 hours)—during which time internal organs are being severely, sometimes irreparably damaged, makes it particularly dangerous. Initial symptoms include colicky abdominal pain, diarrhea, nausea, vomiting, and dehydration, followed by jaundice and hypoglycemia. The liver is principally affected, as it is the organ first encountered after absorption in the gastrointestinal tract. Later kidney failure also ensues. Amatoxins can be measured directly in the serum, urine, and gastric aspirate of a poisoned patient.

Treatment is mainly supportive. High-dose intravenous penicillin G may displace amanitin from plasma binding sites. Intravenous silibinin, an extract from the herb, blessed milk thistle, prevents the uptake of amatoxin by liver cells, thereby protecting undamaged liver tissue. It also stimulates deoxyribonucleic acid-dependent RNA polymerase, and RNA synthesis, thus may prove useful when started within 96 hours of ingesting this poisonous mushroom. Thiocytic acid may also have some antidotal effects. A liver transplant may prove lifesaving in some cases.

Commonly consumed mushrooms on a day-to-day basis in India are white button mushrooms—Agaricus bisporus. There are certain characteristics of the death cap that help in its identification. It has white gills that don’t turn brown as the mushroom matures. It has a white cap with a greenish or yellowish tint. It has a cup-like volva at the base. There may be a large loose skirt-like membrane on the top of the stalk. Its immature forms are egg-like. Its spore print is white and may have an ammonia-like odor. But most important of all, if one suspects that a mushroom may be a death cap, do not eat it. It may very well turn out to be one’s last meal.

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