Mushroom Poisoning

The Symptoms:

1. **Amatoxins** - The symptoms of amatoxin poisoning in humans are a ghoulish series of four phases, beginning with the not-too-alarming latency phase of 6-12 hours. This is followed by the gastrointestinal phase, where the human gets its first inkling that something is not quite right. The gastrointestinal phase consists of diarrhea, dehydration, vomiting and, not surprisingly, abdominal pains. The third phase begins with the patient feeling deceptively better off (another latency period) until the fourth and final phase hits. The final phase consists of the final degradation of the liver and kidney until, between the fourth and eighth day after ingestion, the patient lapses into hepatic coma combined with renal failure, ending in death. All this from a dose of 0.1 mg/kg body weight or even lower. That's not much mushroom to kill a person!
   - cholera-like diarrhea
   - dehydration
   - vomiting
   - abdominal pains
   - drop in coagulation factors
   - increase in liver enzymes (SGOT,SGPT,LDH)
   - hepatic failure
   - encephalopathy
   - kidney damage
   - DEATH due to combined liver and renal failure

2. **Phallotoxins & Virotoxins**
   - severe swelling of the liver
   - cessation of bile flow

3. **Phallolysins**
   - The phallolysins are labile against acids and heat, and do not contribute to human Amanita poisoning.

4. **Ibotenic acid (and possibly its derivative, muscimol)**
   - central nervous system depression
   - ataxia
   - hysteria
   - hallucinations - even worse this amino acid may drive you to drink urine.

The Cures:

1. The first step in detoxifying amatoxins from the system involves mechanical purification of the blood (hemodialysis, hemoperfusion, or forced diuresis), then interruption of the enterohepatic circulation by insertion of a duodenal tube, silymarin or penicillin.
2. If the above treatments were not enough, the victim may still have to endure a liver transplant. As this is expensive, painful and not without complications itself, prevention must be emphasized as the best solution to Amanita poisoning.

3. Antamanide is a nontoxic monocyclopeptide found in *A. phalloides* that competes with the phallotxins for the membrane proteins involved in the uptake of the phallotoxins. Unfortunately, antamanide only is effective when ingested 1 to 2 hours prior to or within 20 minutes of ingestion of the phallotoxins (at least in mice). So it's a rather ineffective cure at best.

4. Silymarin, a mixture of components in the milk thistle, also alleviates the toxicity of phallotoxins, but again is hampered by time constraints.

5. Rifampicin reduces the rate of phallotoxin uptake in the liver, but with the same problems found with silymarin and antamanide.

6. Bile salts have a great effect in reducing phalloidin uptake in vitro, but, as the phallotoxins cause the cessation of bile flow, this is a really ineffective cure.

7. Liver-damaging substances, such as carbon tetrachloride, can be used to stop uptake of phallotoxins, but this "cure" is not much better than the affliction.