Cyclopeptide Poisoning: Extracorporeal Therapies - Toxin Removal vs Bridging to Recovery

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Amanitins have molecular weights on the order of 500 daltons, are not highly protein bound in animals, and distribute into a volume that is equivalent to the extracellular space (0.15-0.3L/kg). Urinary elimination accounts for more than 80% of radiolabeled drug with less than 10% found in the bile. Alpha- and beta-amanitin are adsorbed to activated charcoal and partially removed in experimental models of hemoperfusion. Experiments with albumin dialysis with or without artificial liver cells reduce toxicity and prolong survival in animals. This information reinforces the belief that some form of extracorporeal treatment (ECTR) might be useful in human cases of poisoning from amatoxin containing mushrooms.

Unfortunately, neither toxin concentrations nor even qualitative proof of circulating toxin are routinely available to assist with real-time decisions to perform extracorporeal therapy. Amatoxins can be detected in serum as late 9 days in some patients with toxicity, but in others who appear poisoned, analysis is negative as early as 9-18 hours post ingestion. Only a single study that the author is aware of measured amatoxin concentrations before and after extracorporeal treatment. Bergis and colleagues reported urinary amanitin concentrations in nine patients with amanita ingestions who underwent fractionated plasma separation and adsorption (Prometheus). Although concentrations fell dramatically after a 6 hour procedure, no concentrations were measured in the control group so it is unclear what the natural rate of fall would be. In contrast, forced diuresis eliminated far more amatoxin in 24 hours than therapeutic apheresis. Quantitative data for intermittent hemodialysis or charcoal hemoperfusion are lacking. Many authors report improved laboratory parameters or clinical improvement, and suggest enhanced survival in patients undergoing some extracorporeal therapy. These are all uncontrolled investigations that suffer largely from lack of proof of toxin present at the time of extracorporeal therapy, varied other therapies, and a historical mortality rate that is in fact quite low with good medical care. As such, it is unclear when and if extracorporeal therapy is indicated following amatoxin ingestion. That being said, if used, it makes sense to perform these techniques as early as possible to assure toxin is present, or to reserve more advanced techniques for bridging therapy in patients with severe liver injury.