Poisoning

Haemodialysis is effective at removing a number of low molecular weight, water-soluble poisons with a low degree of protein binding. It is indicated when elimination by other routes is unacceptably slow, especially if renal failure is contributing to this. The following agents are usefully removed:

Inorganic acids (Acetic, Phosphoric, Formic)
Alcohols (ethanol, methanol*)
Barbiturates
Chloral Hydrate
Ethylene glycol*
Thallium

Lithium : is the ideal poison for removal by dialysis. Renal tubular reabsorption leads to a renal clearance of 10-40ml/min when hydration is adequate, whereas haemodialysis can achieve clearances of up to 150ml/min. Some suggested indications for dialysis are:

• Lithium level of Â³ 4mM
• Lithium level of Â³ 2.5 with severe symptoms or in the presence of significant renal impairment or sodium retention (eg heart failure, liver disease)
• if the level is falling slowly

Rebound is normal, because of intracellular stores and the fact that slow-release preparations are commonly responsible for poisoning. Try 6 hours of HD on a large kidney with maximal flow rates. Check levels 1-2h later.

Salicylates Although there is a high degree of protein binding at therapeutic levels, this is saturated at toxic doses, and salicylates become more widely tissue distributed, extending half life 3 to 4-fold to 15-30h. Alkalinization of plasma and urine are beneficial.

Dialysis should be considered when

• salicylate levels are >800mg/l
• impaired renal function or fluid overload
• serious toxicity (eg coma, or deterioration despite treatment)

* **Fomepizole** is now first line therapy for methanol and ethylene glycol

poisoning, but will often need to be used together with haemodialysis in severe poisoining. Ethanol can be used to inhibit metabolism of these compounds to toxic intermediates. It is less expensive, but harder to use effectively.

Further information

- **Extrip** provides very useful information at expert level for management of drug toxicity where dialysis or other extracorporeal treatments are recommended. See the list of Extrip recommendations.
- **Poisons Units** will give detailed advice for specific drugs. TOXBASE is invaluable for all types of poisoning. Using it requires registration. Contact A&E departments or local poisons unit for help with access. Edinburgh Renal Unit users – look on your noticeboard or in your email.
- **Haemoperfusion** over activated charcoal is more effective if poisons that are protein-bound in the circulation bind to it well. This applies to (for instance), theophylline, some anticonvulsants, procainamide. Practically this is now so rarely undertaken that obtaining the charcoal cartridge may be difficult.

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