general: techniques of RRT may be judged on the basis of:
(i) haemodynamic side effects
(ii) ability to control fluid status
(iii) biocompatibility
(iv) risk of infection
(v) uraemic control
(vi) avoidance of cerebral oedema
(vii) ability to allow full nutritional support
(viii) ability to control acidosis
(ix) absence of specific side effects
(x) cost
haemodialysis or CRRT techniques should be considered for serious toxic ingestions of:
(i) alcohol
(ii) chloral hydrate
(iii) barbiturates
(iv) ethylene glycol (significant ingestion, >2.5 mg/dL, ARF, CRF)
(v) methanol
(vi) lithium (>4.0 mmol/L, ARF, CRF, failure to decrease 20% at 6 hours)
(vii) salicylates (>120 mg%, initially, >100 mg% at 6 hours)

- trials: a 2006 RCT published by a French group in Lancet compared intermittent HD with CVVH in patients with MOD. This study showed no significant difference between these modalities in terms of mortality or complications including hypotension; hypothermia was more common in the CVVH group

continuous renal replacement therapy: no matter what technique is used, the following outcomes are predictable:
(i) continuous control of fluid status
(ii) haemodynamic stability
(iii) control of acid base status
(iv) ability to provide protein rich nutrition which achieving uraemic control
(v) control of electrolyte balance including phosphate and calcium balance
(vi) prevention of swings in intracerebral water
(vii) minimal risk of infection
(viii) high level of biocompatibility

- some biosynthetic membranes on the market have excellent biocompatibility (AN69, polyamide, polysulfone, cellulose triacetate) but no controlled studies have been undertaken to show that one of them confers any benefit over the others - AN69 is the most commonly used CRRT membrane in Australia
- the issue of membrane size is controversial as no studies have compared different membrane surface sizes. For AN69 membrane there is no increase in price up to an area of 1.2 m² thus there is no reason to use a smaller membrane in adults; high volume haemofiltration requires a membrane surface of 1.8-2.0 m²

intermittent haemodialysis: the major differences are that standard HD uses high dialysate flows (300-400 ml/min), generates dialysate by using purified water and concentrate and is applied for short periods of time (3-4 hours) usually every 2nd day. Important considerations in the critically ill include:
(i) hypotension due to poor tolerance of removal of volume in a short period of time
(ii) repeated hypotensive episodes may delay renal recovery
(iii) episodic solute removal translates into inferior uraemic control and acid-base control which may impose limitations on nutritional support
(iv) rapid solute shifts increase brain water content and raise ICP
(v) bioincompatible membranes may be proinflammatory

peritoneal dialysis: used uncommonly in adults with ARF but may be an adequate technique in developing countries or in children when alternatives are too expensive, too invasive or not available

- several major shortcomings make PD relatively unsuited to the treatment of ARF:
  (i) limited and sometimes inadequate solute clearance
  (ii) high risk of peritonitis
  (iii) unpredictable hyperglycaemia
  (iv) fluid leaks
  (v) protein loss
  (vi) interference with diaphram function

haemoperfusion: during haemoperfusion, blood is circulated through a circuit similar to the one used for CVVH; however, a charcoal cartridge is perfused with blood instead of a dialysis membrane
- charcoal microspheres effectively remove molecules of 300-500 daltons in size including some lipid soluble and protein bound substances
- problems include:
  (i) the large priming volume of the cartridge (280 ml) can cause hypotension of the patient is hypovolaemic
  (ii) glucose absorption is significant and hyperglycaemia can be common
  (iii) thromboplasty can be common
  (iv) the need for heparinisation to prevent filter clotting
- no trials demonstrate a benefit for haemoperfusion; however it is useful in serious overdoses of:
  (i) theophylline (acute >440 mcg/mL, chronic >330 mcg/mL, lower threshold if age >60, IHD, seizure)
  (ii) barbiturates
  (iii) phenytoin
  (iv) carbamazepine

plasmapheresis or plasma exchange:
- plasma is removed and exchanged with FFP and mixture of colloid and crystalloid solutions - a plasmapherter (a filter that allows passage of molecules up to 500 kDa is used instead of a haemofilter in the CVVH circuit & the plasma is discarded