

End Stage Renal Disease

Anesthetic Pearls: Pre-Operative Testing & Intra-Operative Management of ESRD

End Stage Renal Disease (ESRD) is defined as a clinical syndrome of renal failure characterized by multiple organ dysfunction that would prove fatal without dialysis.

ESRD is associated with GFR < 25% of normal (may result in uremic syndrome when GFR decreases below 10% of normal).

Complications of renal failure: fluid overload, hyperkalemia, metabolic acidosis, platelet dysfunction, encephalopathy, anemia, nausea / vomiting, GI dysmotility, sepsis, hepatitis, and electrolyte imbalances

Pre-Operative Evaluation:

1. Renal function tests: may indicate degree of renal insufficiency or failure.
2. Coagulation studies: especially if regional technique employed.
3. Electrolytes: focus on common Na^+ and K^+ disturbances.
4. ECG: may demonstrate signs of hyper- K^+ , hypo- Ca^{2+} (may reveal ischemia, conduction blocks, and hypertrophy).
5. Echo: if undergoing major surgery and evaluates for possible wall motion abnormalities, pericardial fluid, quantification of hypertrophy, and provides an approximate ejection fraction.
6. ABG: evaluates acid / base status (may reveal hypoxemia).
7. Evaluate need for dialysis as indicated by: fluid overload, hyperkalemia, severe acidosis, coagulopathy, drug toxicity, and azotemia.

Anesthetic Management

- A. Premedication: Reduced dose opioid or benzodiazepine, aspiration prophylaxis with H2 blocker and/or Reglan to speed gastric emptying, continue cardiac medications.
- B. Intra-operative Monitoring: No monitors on extremity with A-V fistula, A-line and CVP for intermediate or major surgery indicated because of potential for fluid shifts and volume status changes.
- C. Induction: Consider rapid sequence due to increased aspiration risk, reduced dosages of Thiopental / Propofol can be used, but may consider Etomidate if CV status or fluid volume status questionable; Succinylcholine may be used if $\text{K}^+ < 5$, if hyper- K^+ safe to use Rocuronium / Cis-Atracurium for muscle relaxation.
- D. Maintenance: Best to use agents with minimal effect on cardiac output because decreased cardiac output is the principle response to anemia, narcotics, and volatile agents. Avoidance of meperidine due to the accumulation of the toxic metabolite nor-meperidine. Controlled mechanical ventilation is best secondary to respiratory acidosis can lead to worsening metabolic acidosis, cardiovascular depression, and hyperkalemia.
- E. Fluid Therapy: Minor surgery calls for replacement of insensible losses only; Major surgery requires isotonic fluids and colloid but avoidance of K^+ containing solutions (Isolyte & LR), blood transfusions may also be given.

