ACUTE KIDNEY INJURY (AKI)

Acute kidney injury is a sudden reduction in renal function, resulting in failure to maintain fluid, electrolyte, and acid–base homeostasis. In the ED, AKI is almost always secondary.

ED priorities:

- Identify AKI early
- Determine functional category (pre renal / intrinsic / post renal)
- Prevent progression
- Treat life threatening complications
- Avoid iatrogenic worsening

AKI is often a marker of severity, not just an isolated diagnosis.

RECOGNITION

CLINICAL

- Reduced urine output
  - Oliguria: <0.5 mL/kg/hr
  - Anuria is late and ominous
- Fluid overload
- Confusion (uraemia)

BIOCHEMICAL (IF AVAILABLE)

- Rising creatinine
- Rising urea
- Electrolyte derangement

Creatinine may be **normal early,** urine output and trajectory matter more.

CLASSIFICATION

A PRE RENAL (MOST COMMON)

Failure of renal perfusion:

- Hypovolaemia (bleeding, dehydration)
- Sepsis
- Cardiogenic shock
- Over diuresis

Potentially reversible early

B INTRINSIC

Direct renal injury:

- Sepsis associated AKI
- Toxins / drugs
- Rhabdomyolysis
- Acute interstitial nephritis

Often evolves from untreated pre renal AKI.

C POST RENAL

Outflow obstruction:

- Prostatic obstruction
- Catheter blockage
- Stones
- Pelvic malignancy

Frequently missed, **always consider and exclude.**

PATHOPHYSIOLOGY

- Kidneys autoregulate poorly in shock
- Prolonged hypoperfusion → tubular necrosis
- Once ATN established, fluids no longer help and may harm

Early volume correction saves kidneys; late fluids cause overload.

INITIAL MANAGEMENT (CAUSE DRIVEN)

A ASSESS VOLUME STATUS

- Clinical exam
- BP trends
- Lactate (if available)
- Urine output response

Uncertainty favours small fluid challenges with close reassessment.

B FLUID MANAGEMENT

- If hypovolaemic:
  - Careful crystalloid boluses
- If euvolaemic or overloaded:
  - Avoid fluids
  - Consider diuresis ONLY specialist guided

Fluid overload worsens mortality in AKI.

MONITORING

- **Urinary catheter** for accurate output
- Strict input/output chart
- Serial electrolytes if available
- Daily (or more frequent) creatinine trends

Urine output is the earliest and most actionable marker.

TREAT THE CAUSE

- **Sepsis** → early antibiotics + source control
- **Shock** → restore perfusion (fluids ± vasopressors)
- **Obstruction** → catheterise / relieve
- **Toxins** → stop exposure
- **Rhabdomyolysis** → fluids early (before AKI established)

COMPLICATIONS

ELECTROLYTES

- Hyperkalaemia → arrhythmia risk
- Hyponatraemia
- Hyperphosphataemia

ACID–BASE

- Metabolic acidosis

FLUID

- Pulmonary oedema
- Hypertension

INDICATIONS FOR RENAL REPLACEMENT THERAPY

Refractory:

- Hyperkalaemia
- Severe metabolic acidosis
- Fluid overload with respiratory compromise
- Uraemic complications (encephalopathy, pericarditis)

Do not wait for creatinine numbers alone.

WHAT TO AVOID (COMMON FAILURES)

- Blind fluid loading
- Nephrotoxic drugs (NSAIDs, contrast if avoidable)
- Ignoring urine output
- Delayed obstruction relief
- Delaying escalation for complications

DISPOSITION

- AKI almost always requires admission
- ICU if:
  - Severe electrolyte derangement
  - Oliguria/anuria
  - Multiorgan failure
  - Dialysis likely

CHECKLIST
ACUTE KIDNEY INJURY

INITIAL ASSESSMENT

- [ ] Measure urine output
- [ ] Review vitals and perfusion
- [ ] Check creatinine (if available)
- [ ] Identify baseline renal function if possible

CLASSIFY AKI

- [ ] Pre renal suspected
- [ ] Intrinsic suspected
- [ ] Post renal excluded or identified

URINE OUTPUT MONITORING

- [ ] Urinary catheter inserted
- [ ] Strict I/O chart commenced
- [ ] Monitor trend, not single value

FLUID STRATEGY

- [ ] Hypovolaemic → cautious crystalloid bolus
- [ ] Reassess after each bolus
- [ ] Avoid fluids if euvolaemic/overloaded

URINE OUTPUT MONITORING

- [ ] Urinary catheter inserted
- [ ] Strict I/O chart commenced
- [ ] Monitor trend, not single value

TREAT UNDERLYING CAUSE

- [ ] Sepsis → antibiotics
- [ ] Shock → restore perfusion
- [ ] Obstruction → relieve
- [ ] Stop nephrotoxins

MONITOR FOR COMPLICATIONS

- [ ] Hyperkalaemia
- [ ] Metabolic acidosis
- [ ] Fluid overload
- [ ] Uraemic symptoms

DIALYSIS TRIGGERS

- [ ] Refractory hyperkalaemia
- [ ] Severe acidosis
- [ ] Pulmonary oedema
- [ ] Uraemic complications

WHAT TO AVOID

- [ ] Excess fluids
- [ ] NSAIDs / nephrotoxins
- [ ] Delayed escalation
- [ ] Ignoring oliguria

DISPOSITION

- [ ] Admit all AKI
- [ ] ICU if unstable or complications
- [ ] Early renal / ICU consultation
- [ ] Clear handover:
  - Urine output
  - Creatinine trend
  - Fluid balance
  - Electrolytes
  - Suspected cause