



# ACUTE KIDNEY INJURY (AKI)



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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