My Patient’s Creatinine Rising or Urine Output is Decreasing… Now What Do I Do?

1) Gather more information about the issue by asking three questions:
   • In the last 24 hours: has the creatinine risen to 1.5 times the baseline?
   • In the last 24 hours: has the creatinine risen by >0.3 mg/dL?
   • In the last 12 hours: has the average urine output been lower than 0.5 ml/kg/hr?

   If “Yes” to any of the above, the patient has acute kidney injury; Go to Step 2 below
   If “No” to all of the above, monitor serum creatinine, potassium, and magnesium daily.

2) Rule out post-obstructive nephropathy:
   • Flush foley catheter and inspect for obstruction.
   • Obtain bladder scan: If bladder is decompressed, post-obstructive nephropathy unlikely.
   • If concern remains, obtain renal ultrasound to evaluate for hydronephrosis

3) If no evidence of post-obstructive nephropathy, pursue further evaluation
   • Measure urine sodium and creatinine
   • Obtain urinalysis with microscopy
   • Calculate fractional excretion of sodium \[\text{FE}_{\text{Na}} = \frac{(\text{Urine Na/Serum Na})}{(\text{Urine Cr/Serum Cr})}\]

4) Evaluate and treat for pre-renal nephropathy:
   Pre-renal etiology is likely with urine sodium < 10 and/or fractional excretion of sodium < 1%
   If present:
   • Assess for hypovolemia and cardiac dysfunction
   • Treat hypovolemia with fluid boluses; start with 1 liter lactated ringers in most patients
   • Treat hypotension using the approach laid out in “My patient is hypotensive…”

5) Evaluate and treat for intrinsic nephropathy:
   An intrinsic renal process is likely if urine sodium > 20 or fractional excretion of sodium > 1%
   or urine microscopy reveals muddy brown casts, granular casts, red or white cell casts
   • Avoid repeated fluid boluses
   • Review medication list for nephrotoxic medications
   • Monitor potassium, magnesium, calcium, phosphate

   Consult nephrology if:
   • Severe or worsening metabolic acidosis (bicarbonate < 15 mEq/l)
   • Hyperkalemia unresponsive to medical interventions (> 5.5 mEq/l)
   • The patient is anuric
   • Ongoing increases in creatinine and/or BUN

6) Work with the pharmacist to adjust the dose of medications based on the estimated glomerular filtration rate.

Critical Care Skills for Non-Critical Care Providers
My Patient’s Renal Function is Getting Worse