Renal Function

Renal function refers to the ability of the kidneys to **filter blood**, **eliminate waste products**, and **maintain fluid, electrolyte, and acid-base balance**. It also plays a key role in the **clearance of many drugs**, including anticoagulants and contrast agents.

Key Measurements

- **Serum Creatinine (sCr)**: primary marker; influenced by age, muscle mass
- **Estimated Glomerular Filtration Rate (eGFR)**:
  - Calculated via CKD-EPI or MDRD formulas
  - Normal >90 mL/min/1.73 m²
- **Creatinine Clearance (CrCl)**:
  - Useful for drug dosing (e.g., dabigatran)
  - Calculated via Cockcroft-Gault formula

Clinical Relevance

Drug Clearance

- Renal function determines elimination of:
  - **Dabigatran**, **enoxaparin**, **vancomycin**, **contrast media**
- Impaired renal function increases **risk of toxicity** or **delayed drug clearance**
- Always assess before:
  - **Contrast-enhanced imaging**
  - **Anticoagulant dosing**
  - **Nephrotoxic antibiotics**

Neurosurgery Context

- **Dabigatran**: requires renal dose adjustment; reversal urgency ↑ in renal impairment
- **Contrast-induced nephropathy**: risk with repeated CT/MRI contrast in elderly or ICU patients
- **Surgery planning**: electrolyte control, fluid balance, uremia-related bleeding risk

⚠ Red Flags

- Rapid rise in serum creatinine
- Oliguria (<0.5 mL/kg/h)
- Elevated BUN/creatinine ratio
- Acid-base or electrolyte disturbances (↑K^+, ↓HCO_3^-)

Best Practice

- Always document **baseline renal function** pre-intervention
- Use **eGFR/CrCl** to adjust drug doses
- In patients >70 years or on nephrotoxic agents, monitor **daily renal profile**
- Avoid contrast or nephrotoxins when possible in acute impairment

Related Entries

- dabigatran_reversal_in_mild_traumatic_brain_injury
- anticoagulation_reversal_protocol
- postoperative_complications
- delayed_bleeding