CKD Staging and Drug Dosing Implications

When to Adjust, When to Stop, When to Worry

CKD is staged on two axes: **GFR category (G1–G5)** and **albuminuria category (A1–A3)**. Both axes matter. A patient with G3a CKD and A3 albuminuria carries far higher risk than G3a/A1 — and may need the same drug precautions as someone at G4. Check both before prescribing.

Part 1 — CKD Staging: GFR and Albuminuria

Stage	eGFR (mL/min/1.73 m²)	Clinical Meaning
G1	≥90	Normal or high. CKD only if structural or albuminuria marker present.
G2	60–89	Mildly decreased. Often asymptomatic. Begin medication awareness.
G3a	45–59	Mild-to-moderate decrease. Most drug adjustments begin here.
G3b	30–44	Moderate-to-severe decrease. High-risk medications need reconsideration.
G4	15–29	Severely decreased. Prepare for renal replacement therapy (RRT) planning.
G5	<15 (or dialysis)	Kidney failure. Renally-cleared drugs behave completely differently.

ACR	Range (mg/g)	Clinical Meaning
A1	<30	Normal.
A2	30–300	Moderately increased. Independent cardiovascular risk factor.
A3	>300	Severely increased. Strongly associated with CKD progression and CVD.

> **Key point:** A single abnormal eGFR or ACR is not enough for a CKD diagnosis. Abnormality must persist for **at least 3 months**. One bad value may reflect AKI or transient illness, not CKD.

Part 2 — Drug Adjustments by GFR Threshold

Drug / Class	Threshold	Action Required
Metformin	eGFR <45: caution eGFR <30: stop	Reduce dose at G3a/G3b. Discontinue at G4. Lactic acidosis risk accumulates with declining clearance.
NSAIDs	eGFR <60: avoid eGFR <30: absolutely contraindicated	NSAIDs cause renal vasoconstriction and can precipitate acute-on-chronic AKI. No safe threshold in advanced CKD.
ACEi / ARB	Continue through G4. Hold if acute spike.	Do not reflexively stop for a mild creatinine rise. Stop only if creatinine rises >30% within 4 weeks, or hyperkalemia develops. Proven renal benefit outweighs risk in most patients.
Rivaroxaban	eGFR <50: dose-adjust eGFR <15: avoid	Dose-reduce for AF anticoagulation at eGFR <50. Renally cleared — accumulates with declining GFR.
Apixaban	2-of-3 criteria: SCr ≥1.5, age ≥80, weight ≤60 kg	Dose-reduce (5 mg → 2.5 mg BID) when patient meets 2 of 3 criteria. Not strictly GFR-based.
Dabigatran	eGFR <30: avoid	Highly renally cleared. Avoid entirely at G4–G5.
Iodinated contrast	eGFR <30: high risk	Use alternatives for elective studies. Pre-hydrate with IV isotonic saline when contrast is unavoidable.
Gadolinium (MRI)	eGFR <30: high risk	Use only ACR Group II/III agents. Nephrogenic systemic fibrosis risk at low GFR.
Digoxin	eGFR <60: use with extreme caution	Narrow therapeutic index. Accumulates in renal impairment. Monitor levels and electrolytes closely. Toxicity risk is high.
Potassium-sparing agents (spironolactone, triamterene, amiloride)	eGFR <30: avoid or extreme caution	Hyperkalemia risk is substantial at G4–G5. Non-steroidal MRA (finerenone) requires K^+ monitoring at any CKD stage.
SGLT2 inhibitors	Continue even if eGFR falls <20	Do not stop prematurely. Renal protection continues at low GFR. Hold during surgery, prolonged fasting, or critical illness.

> **ACEi/ARB caution:** A creatinine rise of up to 30% after starting or increasing a RASi is expected and acceptable. It reflects reduced intraglomerular pressure — the mechanism of renal protection. Stopping for this reason forfeits the benefit. Stop only for a rise >30% within 4 weeks, or for hyperkalemia that cannot be managed.

Part 3 — ESRD and Dialysis: What Changes Completely

Once a patient reaches G5 or starts dialysis, the pharmacokinetics of most renally-cleared drugs are reset. The dialysis circuit itself clears some drugs and not others.

Category	What Happens at Dialysis
Renally-cleared drugs	Stop relying on eGFR-based dose adjustments. GFR is near zero. Clearance now depends on dialysis frequency, membrane characteristics, and drug protein binding.
DOACs	Most are contraindicated or require specialist guidance. Warfarin is often used for AF in dialysis patients despite its own risks.
Metformin	Contraindicated. Lactic acidosis risk is prohibitive.
Potassium	Hyperkalemia is a primary threat between dialysis sessions. Dietary restriction and potassium binders (patiromer, sodium zirconium cyclosilicate) are essential.
Volume	No urinary compensation for volume overload. Fluid balance depends entirely on dialysis schedule and ultrafiltration.
Dialyzable drugs	Aminoglycosides, lithium, certain antibiotics are removed by dialysis — post-dialysis redosing is required. Check a dialysis drug compatibility reference for every new agent.

CLINICAL RULE

Check the GFR before prescribing. Drugs that are safe at eGFR >60 can accumulate, fail to work, or cause acute injury below 30. **NSAIDs are the most dangerous offender in CKD** — they cause acute-on-chronic worsening and are almost never appropriate.