NCLEX-RN PHARMACOLOGY · 2026 TEST PLAN · NGN/NCJMM ALIGNED

Aldosterone *Antagonists*

Potassium-Sparing Diuretics · Mineralocorticoid Receptor Blockers · Cardiovascular / Renal

CLASS: ALDOSTERONE ANTAGONIST

SYSTEM: CARDIAC · RENAL · ENDOCRINE

⚠ HIGH-ALERT — HYPERKALEMIA

HF MORTALITY BENEFIT (RALES TRIAL)

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DRUG OVERVIEW

WHY WE GIVE IT · HIGH-YIELD CLINICAL USE

- **Heart Failure with Reduced EF (HFrEF)** — Class I recommendation; **proven mortality benefit** (NYHA Class II–IV)
- **Post-MI heart failure** with LV dysfunction (especially eplerenone)
- **Resistant Hypertension** — when 3+ antihypertensives aren't enough; spironolactone is first-line add-on
- **Primary Aldosteronism (Conn's syndrome)** — definitive medical therapy
- **Cirrhosis with Ascites** — **spironolactone is FIRST-LINE diuretic** (often paired 100:40 with furosemide)
- **Hypokalemia** due to other diuretics (loop, thiazide) — adds K^+-sparing effect
- **Off-label:** hirsutism, PCOS, acne (spironolactone has antiandrogen effect)
- KEY Spironolactone & eplerenone are diuretics that **SAVE potassium** instead of wasting it

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MECHANISM OF ACTION

BLOCK ALDOSTERONE AT THE RECEPTOR — DISTAL/COLLECTING TUBULE

`RAAS pathway` Renin → Ang I → Ang II → adrenal cortex releases **ALDOSTERONE**

→ Aldosterone normally binds **mineralocorticoid receptors** in the **distal tubule & collecting duct**

→ Normal effect: **Na^+ & H_2O retention, K^+ & H^+ excretion**

Aldosterone antagonists BLOCK the receptor:

→ `↑ Na⁺ & H₂O excretion` = mild diuresis = ↓ preload & BP

→ `↑ K⁺ retention` = **potassium-sparing** = HYPERKALEMIA risk

→ `↓ Cardiac remodeling` & ↓ myocardial fibrosis = HF mortality benefit

Spironolactone vs Eplerenone: Spironolactone also blocks *androgen & progesterone receptors* → gynecomastia, menstrual changes. Eplerenone is **selective** for the mineralocorticoid receptor → fewer endocrine side effects.

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THERAPEUTIC EFFECTS

WHAT TELLS YOU IT'S WORKING

- **↓ Symptoms of HF** — less dyspnea, less edema, ↑ exercise tolerance
- **↓ Weight** from fluid loss (HF, ascites) — daily weights are key
- **↓ Ascites & abdominal girth** in cirrhosis
- **BP at goal** in resistant HTN (often 130/80)
- **Normalized K^+** when used to offset loop/thiazide-induced hypokalemia
- **↓ Hospitalization & ↓ mortality** in HFrEF (the major outcome)
- **Onset:** Diuresis begins in ~48 hrs; full effect **2–3 weeks** (especially spironolactone — long onset, long half-life)

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SIDE EFFECTS & ADVERSE REACTIONS

COMMON VS. SERIOUS 🚨

COMMON (MILD)

- **Gynecomastia** in men (spironolactone — up to 10%)
- **Menstrual irregularities** & breast tenderness in women (spironolactone)
- Decreased libido / impotence (spironolactone)
- Mild GI upset, nausea
- Headache, drowsiness, dizziness
- Mild dehydration / orthostatic hypotension
- Eplerenone = **fewer** endocrine effects ✅

🚨 SERIOUS / LIFE-THREATENING

- **HYPERKALEMIA** (K^+ >5.0) — **#1 deadly risk** → arrhythmia, cardiac arrest
- **Lethal arrhythmias** — peaked T-waves, widened QRS, V-fib, asystole
- **Acute kidney injury** — esp. with ACE-I/ARB or NSAIDs
- **Severe hyponatremia** & dehydration
- **Metabolic acidosis** (H^+ retention)
- **Stevens-Johnson syndrome** (rare, spironolactone)
- **Agranulocytosis / hepatotoxicity** (rare)

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PRIORITY NURSING CONSIDERATIONS

ASSESS · MONITOR · HOLD · NOTIFY

✅ MONITOR

- **POTASSIUM** — baseline, day 3, 1 week, 1 month, then every 3 months
- **BUN, creatinine, GFR** — same schedule as K^+
- **Daily weights** (same time, same scale, same clothing)
- **I&O, BP, HR** & orthostatics
- **ECG** if K^+ elevated — peaked T-waves are early sign
- Edema reduction · ascites/abdominal girth
- Signs of hyperK: muscle weakness, cramps, paresthesias, bradycardia

🛑 HOLD & NOTIFY HCP

- **K^+ > 5.0 mEq/L** — HOLD; >5.5 = STAT notify
- **Creatinine > 2.5 (men) or > 2.0 (women)**, or >30% rise
- **GFR < 30 mL/min** — relative contraindication
- **SBP < 90** or symptomatic hypotension
- **ECG changes** — peaked T-waves, wide QRS
- Signs of hepatic/SJS reaction — rash, jaundice, mucosal lesions

⛔ CONTRAINDICATIONS & MAJOR INTERACTIONS

- **Hyperkalemia** (K^+ >5.0) — absolute contraindication
- **Severe renal impairment** (GFR <30; anuria; acute renal failure)
- **Addison's disease** — already low aldosterone
- **Pregnancy Category C** (spironolactone — antiandrogen risk to male fetus); eplerenone Category B
- **NEVER combine with:** K^+ supplements · K-containing salt substitutes · other K-sparing diuretics (amiloride, triamterene)
- **Caution + monitor:** ACE-I, ARBs, direct renin inhibitors, NSAIDs (↓ effect, ↑ AKI), trimethoprim (TMP-SMX) — all ↑ hyperK risk
- **Drug interactions:** ↑ **digoxin** levels (toxicity risk) · ↑ **lithium** levels (toxicity) · eplerenone + strong CYP3A4 inhibitors (ketoconazole, clarithromycin) = avoid

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LABS & DIAGNOSTICS

CRITICAL VALUES · WHAT ABNORMAL MEANS

LAB	NORMAL RANGE	WHAT ABNORMAL MEANS
Potassium (K^+)	3.5 – 5.0 mEq/L	**K^+ >5.0 = HOLD.** >5.5 critical → ECG, calcium gluconate, insulin/D50, kayexalate/Lokelma. **Peaked T-waves** = earliest ECG sign.
Creatinine	0.6 – 1.2 mg/dL	↑ >30% from baseline = AKI; hold drug.
BUN	7 – 20 mg/dL	↑ = dehydration or worsening renal function.
eGFR	>90 mL/min	<30 = avoid; <45 = use with extreme caution & ↑ K^+ monitoring.
Sodium (Na^+)	135 – 145 mEq/L	Hyponatremia from diuresis — watch for confusion, seizures.
Magnesium	1.5 – 2.5 mg/dL	Spared along with K^+ (can rise); important in HF/arrhythmia.
Digoxin level	0.5 – 2.0 ng/mL	Spironolactone ↑ digoxin — watch for toxicity (N/V, vision changes, bradycardia).
Daily weight	±2 lb baseline	Gain >2 lb/day or >5 lb/week = fluid overload; loss too fast = dehydration.

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ADMINISTRATION & SAFETY

ROUTE · TIMING · HIGH-ALERT PRECAUTIONS

- **Route:** Oral only (PO) — no IV form
- **Timing:** Once daily, **preferably in the morning** to avoid nocturia (it IS a diuretic, just a mild one)
- **Spironolactone:** take with food (improves absorption, ↓ GI upset)
- **Eplerenone:** with or without food
- **Start LOW, go SLOW** — typical spironolactone HF dose 12.5–25 mg/day; never aggressive
- **Recheck K^+ within 3 days** of starting or dose increase
- Avoid **salt substitutes** (KCl) and **NSAIDs**
- Use cautiously in **elderly** — declining renal function ↑ hyperK risk
- Do NOT abruptly stop in HF — taper
- Counsel patients to maintain consistent dietary K^+ intake — avoid loading with bananas, oranges, tomatoes, potatoes

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PATIENT EDUCATION

WHAT PATIENTS MUST KNOW

- **Take exactly as prescribed** — even when feeling well
- **Take in the morning** — to avoid waking up at night to urinate
- **AVOID salt substitutes** — they contain potassium chloride
- **AVOID K^+-rich food binges** — bananas, oranges, tomatoes, potatoes, spinach, avocado, dried fruit (consistent intake is OK; loading is not)
- **AVOID NSAIDs** (ibuprofen, naproxen) — reduce drug effect & ↑ kidney risk
- **Daily weights:** same time, same scale; report gain >2 lb in a day or >5 lb in a week
- **Rise slowly** from sitting/lying — orthostatic hypotension
- **Report:** muscle weakness/cramps, palpitations, very slow heart rate, confusion, decreased urine output, breast tenderness/enlargement
- **Men:** breast enlargement & tenderness can occur with spironolactone — usually reversible; discuss switching to eplerenone
- **Women:** menstrual irregularities possible; report missed periods or pregnancy plans
- **Don't stop suddenly** in heart failure — rebound fluid overload

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NCLEX TEST TRAPS ⚠

WHERE STUDENTS LOSE POINTS

- **TRAP:** "Encourage potassium-rich foods like bananas" — ❌ This is correct for LOOP/THIAZIDE diuretics, NOT for K-sparing. Always identify the diuretic class first!
- **TRAP:** Recommending salt substitute as "heart healthy" — ❌ contains KCl → hyperkalemia → arrhythmia
- **TRAP:** Combining spironolactone + ACE-I + ARB "for triple RAAS blockade" — ❌ NEVER triple-block; severe hyperK
- **TRAP:** Using spironolactone in a young male athlete — ⚠ gynecomastia & impotence; consider eplerenone instead
- **TRAP:** "PRN for high BP" — ❌ Aldosterone antagonists are scheduled, NOT PRN
- **TRAP:** Confusing K^+-sparing (spironolactone, eplerenone, amiloride, triamterene) with K^+-wasting (loops, thiazides)
- **TRAP:** Holding for K^+ of 4.0 — ❌ that's normal! Hold for K^+ >5.0.
- **TRAP:** "Aldosterone antagonist + digoxin is fine" — ⚠ spironolactone ↑ digoxin levels; watch for tox
- **TRAP:** Expecting rapid diuresis like furosemide — ❌ onset is slow (2–3 weeks for full effect)
- **PRIORITY question:** Patient on spironolactone + ACE-I has K^+ 6.2, peaked T-waves, muscle weakness → **HOLD drug, notify HCP, prepare for emergency hyperK treatment** (calcium gluconate first to stabilize the heart, then insulin/D50 to shift K^+ in, then kayexalate/Lokelma to remove)

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MEMORY BOOSTERS

MNEMONICS · PATTERNS · QUICK RECALL

🧠 "SPIRO"

- **S** — Saves potassium (K-sparing)
- **P** — Pee a little (mild diuresis)
- **I** — Increases breast tissue (gynecomastia)
- **R** — RAAS blocker (aldosterone antagonist)
- **O** — Output: monitor I&O, weight, K^+

"-ONE" SUFFIX

- Spironolact**ONE** · Epleren**ONE** · Canren**ONE** · Finerenone (newer; "-renone")
- If it ends in **-ONE** = aldosterone antagonist
- **ONE** word: **POTASSIUM** (always think K^+ first)

THE "3 K'S TO AVOID"

- **K**$^+$ supplements
- **K**-rich salt substitutes
- Other **K**-sparing meds (amiloride, triamterene, ACE-I, ARB)
- → Same rule as ARBs/ACE-I — these classes stack hyperK

"MR. GBH" FOR SPIRONOLACTONE S/E

- **M** — Menstrual irregularity
- **R** — Renal impairment
- **G** — Gynecomastia
- **B** — Breast tenderness
- **H** — Hyperkalemia (the deadly one)

MOST TESTED ALDOSTERONE ANTAGONISTS · KEY DIFFERENCES

HIGH-YIELD DRUG COMPARISON FOR NCLEX

DRUG	TOP INDICATION	SELECTIVITY	DISTINGUISHING FEATURE / NCLEX PEARL
Spironolactone Aldactone · CaroSpir	HFrEF, ascites, resistant HTN, primary aldosteronism, PCOS/acne	Non-selective (also blocks androgen & progesterone)	**The "OG" — most tested aldosterone antagonist.** Causes **gynecomastia, impotence, menstrual changes**. First-line for cirrhosis ascites. ↑ digoxin levels.
Eplerenone Inspra	Post-MI HF, HFrEF, HTN	**Selective** (mineralocorticoid only)	**Use when patient gets gynecomastia from spironolactone.** Avoid with strong CYP3A4 inhibitors (ketoconazole, clarithromycin, ritonavir).
Finerenone Kerendia	CKD with Type 2 diabetes (slows progression)	Selective, non-steroidal (newer)	Renal & CV outcomes in T2DM + CKD; non-steroidal = fewer endocrine side effects than spironolactone.

K^+-SPARING DIURETIC FAMILY — NCLEX DISTINCTION

ALDOSTERONE ANTAGONISTS VS ENAC BLOCKERS — BOTH SPARE K^+

FEATURE	ALDOSTERONE ANTAGONISTS (spironolactone, eplerenone)	ENAC BLOCKERS (amiloride, triamterene)
Mechanism	Block aldosterone at the mineralocorticoid receptor	Block epithelial Na^+ channel directly (no aldosterone needed)
Site	Distal tubule & collecting duct	Distal tubule & collecting duct
HF mortality benefit	✅ Yes (RALES, EMPHASIS-HF)	❌ No
Endocrine side effects	Spironolactone: gynecomastia, menstrual changes	None
Triamterene unique risk	—	Kidney stones; can turn urine blue
Hyperkalemia risk	High	High

❌ **NEVER combine two K-sparing diuretics — additive hyperkalemia**

NCJMM

Clinical Judgment *Snapshot*

NGN · NCJMM · RECOGNIZE → ANALYZE → PRIORITIZE → ACT → EVALUATE

#1 PRIORITY RISK

HYPERKALEMIA → lethal arrhythmia. K^+ >5.5 with peaked T-waves can progress to V-fib/asystole within hours. This is the deadliest risk of the entire RAAS family.

WHAT HARMS FIRST?

Cardiac conduction — K^+ disrupts the resting membrane potential. **Peaked T-waves** appear first, then PR widening, QRS widening, sine wave, then arrest.

FIRST NURSING ACTION

Patient on spironolactone with K^+ 6.4, peaked T-waves: **1) Place on cardiac monitor · 2) HOLD the drug · 3) IV calcium gluconate FIRST** (stabilizes myocardium) **· 4) Insulin + D50 to shift K^+ intracellularly · 5) Kayexalate or Lokelma to eliminate K^+**. Calcium first — protect the heart.

RECOGNIZE CUES

Muscle weakness · cramping · paresthesias · bradycardia · palpitations · K^+ >5.0 · creatinine ↑ >30% · peaked T-waves · widened QRS · gynecomastia (men) · menstrual changes (women).

ANALYZE & PRIORITIZE

Cardiac stability > renal function > fluid status > teaching. **Question the order** if: spironolactone + ACE-I + K supplement + salt substitute = stacked hyperK risk. **STOP** if K^+ >5.5 or creatinine sharply rising.

EVALUATE OUTCOMES

K^+ 3.5–5.0 · stable creatinine & GFR · ↓ edema, ↓ ascites · daily weight stable · BP at goal · patient verbalizes "no salt substitutes, no NSAIDs, no K^+ loading, daily weights, take in AM."

NCLEX-RN 2026 · ALDOSTERONE ANTAGONISTS · SAVE THE K, SAVE THE HEART · MADE FOR STUDENT ♥