ICR-HYK-038

Critical care · electrolytes

Updated 21 Jun 2026

CRITICAL CARE ORDER SET

Hyperkalemia

Emergency management of hyperkalemia in the ICU. Work the five steps in order — protect the heart, shift potassium into cells, remove it from the body, stop what's adding to it, and monitor relentlessly. Calcium buys minutes; insulin buys an hour; only elimination and dialysis are definitive. Adapt every threshold to your protocol.

MILD	MODERATE	SEVERE
5.5–5.9	6.0–6.4	≥ 6.5 or ECG Δ

5 STEPS ① Stabilize the myocardium · ② Shift K intracellularly · ③ Remove K from the body · ④ Stop exogenous K & precipitants · ⑤ Monitor. Rule out **pseudohyperkalemia** (hemolysis, ↑WBC/platelets) only if clinically inconsistent — never delay treatment for ECG changes.

01 General & monitoring orders

ADMISSION / MONITORING

- [ ] ICU, continuous cardiac monitoring; place on **telemetry**
- [ ] Vitals — **q15 min × 1h → q1h × 4h → q4h** or per status
- [ ] **12-lead ECG** on arrival; repeat PRN for **K ≥ 6.0**, status change, or after each major intervention (e.g., calcium, insulin)

LABS

- [ ] STAT **BMP**, Mg, phosphate, VBG/ABG (pH), creatinine, BUN
- [ ] Repeat BMP **1h after insulin/dextrose**, then **q2–4h** until K < 5.5 and stable

- [ ] **POC glucose** — baseline, then **`q30 min × 2h`** after insulin, then q1–2h × 4–6h (longer with renal / hepatic dysfunction)

NOTIFY MD New / worsening ECG changes (peaked T, QRS widening, sine-wave, heart block, ventricular arrhythmia) · **K ≥ 6.0** on repeat despite therapy · **glucose < 70 mg/dL**.

① Stabilize the myocardium — calcium

INDICATION ECG changes attributable to hyperkalemia, or **K ≥ 6.5** with concern for rapid rise / instability. **Calcium does not lower K** — give shifting / elimination therapy alongside.

Calcium gluconate · preferred (peripheral OK)

- [ ] **1 g IV (10 mL of 10%)** over 5–10 min, peripheral or central
- [ ] May repeat **`1 g q5–10 min × up to 3`** for persistent / worsening ECG changes

Calcium chloride · central line only

- [ ] **500–1000 mg IV (5–10 mL of 10%)** over 5–10 min — more elemental Ca
- [ ] **Avoid peripheral** — tissue necrosis risk

NOTES Onset **1–3 min**, duration ~30–60 min. In digoxin toxicity, still given for life-threatening hyperkalemia but consider a lower, slower dose with cardiology input.

② Shift potassium intracellularly

A · Regular insulin + dextrose · first-line shift

WHEN K ≥ 6.0, rapidly rising K, or any ECG changes — virtually always unless imminent dialysis.

- [ ] **Regular insulin 10 units IV bolus** over 5 min
- [ ] Glucose **70–250** → **`25 g dextrose (50 mL D50W)`** IV push with / just before insulin · Glucose **≥ 250** → may omit initial dextrose, monitor closely
- [ ] Glucose **< 70** → 25 g dextrose, recheck in 15 min; consider **`D10W 50–75 mL/h × 2–4h`**

- [ ] **Hypoglycemia-prophylaxis** (renal failure, liver disease, frail, low weight) — consider `insulin 5 units` with same / increased dextrose

B · Beta-2 agonist · adjunct

- [ ] **Albuterol 10–20 mg nebulized** over 10 min (4–8 × 2.5 mg nebs / continuous)
- [ ] Less effective on nonselective beta-blockers; may cause tachycardia / ischemia in CAD / arrhythmia

C · Sodium bicarbonate · select

- [ ] Acidosis (pH ≤ 7.1–7.2), esp. CKD/ESRD — **50–100 mEq IV** over 5–10 min
- [ ] Severe — infusion `150 mEq in 1 L D5W at 100–150 mL/h`. Limited effect if pH near normal

③ Remove potassium from the body

A · Loop diuretics · if volume-overloaded & kidneys working

- [ ] Diuretic-naïve / normal renal function — **furosemide 20–40 mg IV** once, repeat / double q2–4h by UOP
- [ ] CKD / prior loop — IV dose ≥ home daily oral dose (≈ `1–2× total daily oral` as bolus); strict I/O & daily weights

B · Potassium binders · adjunct, not stand-alone for life-threatening K

- [ ] **Sodium zirconium cyclosilicate (Lokelma)** — `10 g PO TID × up to 48h`; faster onset, still not a sole acute therapy
- [ ] **Patiromer (Veltassa)** — `8.4–25.2 g PO` once (start 8.4–16.8 g); onset several hours, not for emergency monotherapy
- [ ] **Sodium polystyrene sulfonate (Kayexalate)** — **caution: intestinal necrosis risk** (esp. with sorbitol, post-op, ileus); many ICUs avoid for acute severe hyperkalemia

C · Renal replacement therapy · definitive

- [ ] **Indications** — K ≥ 6.0–6.5 with anuria/oliguria or advanced CKD/ESRD · refractory K despite temporizing · life-threatening ECG / arrhythmia · with severe acidosis, refractory volume overload, or uremia
- [ ] **Nephrology STAT** for emergent dialysis. IHD — specify `low-K bath (1–2 mEq/L)` per nephrology. Unstable → CRRT per ICU–nephrology protocol

④ Stop exogenous K & precipitants

MEDICATION HOLDS

- [ ] **Hold all potassium supplements** (oral & IV)
- [ ] Hold / reconsider — **ACEi/ARB/ARNI**, direct renin inhibitors, **MRAs** (spironolactone, eplerenone, finerenone), K-sparing diuretics (amiloride, triamterene)
- [ ] **NSAIDs, trimethoprim-sulfamethoxazole, heparin / LMWH** if contributing
- [ ] Consider holding beta-blockers acutely if markedly limiting beta-agonist response and hyperkalemia is severe

IV FLUIDS & NUTRITION

- [ ] Switch maintenance fluids to **potassium-free solution** (NS or ½NS as appropriate)
- [ ] Review TPN, tube feeds, oral diet for K content; switch to low-potassium formulation if feasible

ADAPT LOCALLY

Acute severe hyperkalemia bundle

For **K ≥ 6.5 or ECG changes** — fire all five steps together.

① Cardiac protection

- [ ] Calcium gluconate 1 g IV over 10 min now; repeat 1 g q10 min × 2 PRN ECG changes

② K shift

- [ ] Regular insulin 10 U IV + D50W 50 mL (hold dextrose if glucose ≥ 250); albuterol 20 mg neb over 10 min

② If pH ≤ 7.1–7.2

- [ ] Sodium bicarbonate 50–100 mEq IV over 10 min now

③ Elimination

- [ ] Furosemide 40 mg IV (dose-adjust per renal) if not volume-deplete; SZC 10 g PO if enteral; Nephrology STAT for dialysis if K ≥ 6.0 + anuria, persistent K, or arrhythmias

④ Stop contributors

- [ ] Hold ACEi/ARB/ARNI, MRAs, K supplements & other listed drugs; change IV fluids to K-free

⑤ Monitoring

- [ ] Continuous telemetry; BMP & glucose in 1h then q2–4h; ECG now & PRN with any status change