

Tips on Electrolyte Replacement in the Hospital Setting

Definition and Overview

Electrolyte replacement corrects imbalances in sodium (Na⁺), potassium (K⁺), calcium (Ca²⁺), magnesium (Mg²⁺), and phosphate (PO₄⁻) in hospitalized patients to restore homeostasis. This document focuses on replacement protocols, dosing, and monitoring for common inpatient scenarios, complementing existing knowledge on electrolyte disturbances.

Electrolyte Replacement Guidelines

Electrolyte	Indication	Replacement Protocol	Monitoring	Notes
Sodium (Na ⁺)	Na ⁺ <135 mEq/L (severe <120)	3% NaCl 100-150 mL IV over 1-2h (severe, symptomatic); 0.9% NS 1-2 L/day (mild). Correct ≤8 mEq/L/day	CMP q6-12h, serum osm, daily weights	Avoid >10 mEq/L/day correction (ODS risk); use D5W + NaHCO ₃ for acidosis
Potassium (K ⁺)	K ⁺ <3.5 mEq/L (severe <2.5)	IV KCl 10-20 mEq/h (central, max 40 mEq/h); PO KCl 20-40 mEq q4-6h. Replace Mg ²⁺ first	ECG q4h, CMP q6h	No IV push (cardiac arrest); oral if stable; max 10 mEq/h peripheral
Calcium (Ca ²⁺)	Ionized Ca ²⁺ <4.5 mg/dL	IV Ca gluconate 1-2 g over 10-20 min (symptomatic); PO Ca carbonate 500-1000 mg q6h	CMP q12h, ECG (QT)	Check Mg ²⁺ , PO ₄ ⁻ ; avoid in hyperphosphatemia; vitamin D if needed
Magnesium (Mg ²⁺)	Mg ²⁺ <1.8 mg/dL (severe <1.0)	IV MgSO ₄ 1-2 g over 1h (severe); PO Mg oxide 400-800 mg/day. Max 4 g/h IV	CMP q12h, vitals (hypotension)	Renal dosing if GFR <30; monitor bradycardia
Phosphate (PO ₄ ⁻)	PO ₄ ⁻ <2.5 mg/dL (severe <1.0)	IV NaPO ₄ 15-30 mmol over 4-6h (severe); PO KPO ₄ 500-1000 mg q6h	CMP q12h, Ca ²⁺ (hypocalcemia risk)	Slow infusion prevents precipitation; avoid in hypercalcemia

Clinical Scenarios

Case 1 Hyponatremia

Presentation 60 y/o F with confusion post-diuretic. Na⁺ 118 mEq/L, serum osm 260 mOsm/kg.

Management 3% NaCl 100 mL IV over 1h, fluid restriction 1 L/day. CMP q6h. Na⁺ 124 mEq/L by 24h.

Case 2 Hypokalemia

Presentation 45 y/o M with weakness post-vomiting. K⁺ 2.4 mEq/L, Mg²⁺ 1.5 mg/dL, U waves ECG.

Management MgSO₄ 2 g IV over 1h, KCl 20 mEq IV over 2h, PO KCl 40 mEq q6h. ECG q4h. K⁺ 3.6 mEq/L by 12h.

Case 3 Hypophosphatemia

Presentation 30 y/o F with anorexia nervosa, muscle pain post-refeeding. PO₄⁻ 1.2 mg/dL.

Management NaPO₄ 20 mmol IV over 6h, PO KPO₄ 500 mg q6h. CMP q12h. PO₄⁻ 2.8 mg/dL by day 2.

Expert Tips

- Replace Mg²⁺ before K⁺ to ensure K⁺ uptake
- Correct Na⁺ ≤8 mEq/L/day; check urine Na⁺ for SIADH
- Use Ca gluconate in alkalosis; avoid Ca chloride
- Monitor IV K⁺ via central line for >10 mEq/h; max peripheral 10 mEq/h
- Start PO₄⁻ early in refeeding; check Ca²⁺ to avoid hypocalcemia
- Pitfall
 - Overcorrecting Na⁺ risks ODS; aim 4-6 mEq/L rise in 24h
- Advanced
 - Tolvaptan for SIADH; calcitriol for hypocalcemia in RTA

Key Pearls

- Na⁺ <120, K⁺ <2.5 need urgent IV; monitor CMP, ECG q6h
- Mg²⁺ <1.8 often coexists with K⁺; correct Mg²⁺ first
- Ca²⁺ IV for tetany; PO for chronic; check Mg²⁺, PO₄⁻
- PO₄⁻ <1.0 risks respiratory failure; slow IV infusion
- ECG, vitals critical; adjust rates to avoid overcorrection

References

UpToDate “Electrolyte Disorders: Management” (2025)

NEJM "Electrolyte Replacement in Critical Care" (2024)

Crit Care Med "Refeeding Syndrome: Electrolytes" (2023)

Lancet "Hyponatremia: Treatment Strategies" (2024)

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