

DISCLAIMER: These guidelines were prepared by the Department of Surgical Education, Orlando Regional Medical Center in conjunction with the Pharmacy Department. They are intended to serve as a general statement regarding appropriate patient care practices based upon the available medical literature at the time of development. They should not be considered to be accepted protocol or policy, nor are intended to replace clinical judgment or dictate care of individual patients.

ADULT ELECTROLYTE REPLACEMENT PROTOCOLS

SUMMARY

Standing electrolyte replacement protocols are available for use in adult patients admitted to Orlando Regional Healthcare hospitals. These are instituted upon direct physician order entry into Sunrise XA. The protocols are listed below.

SPECIFIC REQUIREMENTS:

- Intravenous piggyback infusions of electrolytes must be administered with free-flow protected infusion devices (i.e. infusion pump).
- Patients must meet the following criteria prior to initiation of the Potassium, Magnesium, or Phosphorus protocols:
 - SCr < 2 mg/dL
 - Weight > 40 kg
- The electrolyte replacement protocols, Calcium chloride (Level I areas only) or Calcium gluconate (all levels of care), Magnesium sulfate, Potassium chloride, or Potassium Phosphate, may be ordered individually or in combination.

POTASSIUM REPLACEMENT PROTOCOL – INTRAVENOUS

- Recommended rate of infusion is 10 mEq/h
- Maximum rate of intravenous replacement is 20 mEq/h with *continuous ECG monitoring* (the maximum rate may be increased to 40 mEq/h in emergency situations – see Policy #5080)
- Standard Concentrations: 10 mEq/50 mL, 10 mEq/100mL, 20 mEq/50 mL and 20 mEq/100 mL
 - Maximum Concentration for Central IV administration = 20 mEq/50 mL
 - Maximum Concentration for Peripheral IV administration = 10 mEq/50 mL

Current Serum Potassium Level	<u>Central</u> IV Administration	<u>Peripheral</u> IV Administration	Monitoring
3.6 – 3.9 mEq/L	20 mEq IV over 2 HR x 1	10 mEq IV over 1 HR x 2	No additional action
3.4 – 3.5 mEq/L	20 mEq IV over 2 HR x 1 AND 10 mEq IV over 1 HR x 1	10 mEq IV over 1 HR x 3	No additional action
3.1 – 3.3 mEq/L	20 mEq IV over 2 HR x 2	10 mEq IV over 1 HR x 4	Recheck serum potassium level 2 hours after infusion complete
2.6 – 3 mEq/L	20 mEq IV over 2 HR x 2 AND 10 mEq IV over 1 HR x 1	10 mEq IV over 1 HR x 5	Recheck serum potassium level 2 hours after infusion complete
2.3 – 2.5 mEq/L	20 mEq IV over 2 HR x 3	10 mEq IV over 1 HR x 6	Recheck serum potassium level 2 hours after infusion complete
< 2.3 mEq/L	Call Physician AND 20 mEq IV over 2 HR x 3	Call Physician AND 10 mEq IV over 1 HR x 6	Recheck serum potassium level 2 hours after infusion complete
- If both potassium and phosphorus replacement required, subtract the mEq of potassium given as potassium phosphate from total amount of potassium required. (Conversion: 3 mmols KPO₄ = 4.4 mEq K⁺) - Call pharmacy for assistance if needed.			

POTASSIUM REPLACEMENT PROTOCOL – ORAL or ENTERAL (PT)

- Standard dosage forms: KCl 20mEq tablet or KCl 10% solution (20 mEq/15 mL)

Current Serum Potassium Level	Total Potassium Replacement	Monitoring
3.7 – 3.9 mEq/L	20 mEq KCl PO/Per feeding tube x 1 dose	No additional action
3.5 – 3.6 mEq/L	20 mEq KCl PO/Per feeding tube Q2H x 2 doses	No additional action
3.3 – 3.4 mEq/L	20 mEq KCl PO/Per feeding tube Q2H x 3 doses	Recheck serum potassium level 4 hours after last oral dose
3.1 – 3.2 mEq/L	20 mEq KCl PO/Per feeding tube Q2H x 4 doses	Recheck serum potassium level 4 hours after last oral dose
< 3.1 mEq/L	Call Physician AND 20 mEq KCl PO/Per feeding tube Q2H x 4 doses	Recheck serum potassium level 4 hours after last oral dose

MAGNESIUM REPLACEMENT PROTOCOL

- Infusions should be no faster than 1gm of magnesium sulfate every 30 minutes.
- Standard Concentrations: 1 gm/100 mL and 2 gm/50 mL

Current Serum Magnesium Level	Total Magnesium Replacement	Monitoring
1.5 – 2 mEq/L	2 grams Magnesium Sulfate IV over 1 HR	No additional action
0.9 – 1.4 mEq/L	2 grams Magnesium Sulfate IV over 1 HR x 2 doses	Recheck serum magnesium level 2 hours after infusion complete
< 0.9 mEq/L	Call Physician AND 2 grams Magnesium Sulfate IV over 1 HR x 2 doses	Recheck serum magnesium level 2 hours after infusion complete

PHOSPHORUS REPLACEMENT PROTOCOL

- Replacement must be ordered in mmol of phosphorus.
- Recommended rate = 3mmol/hr (= 4.4 mEq/h of K)
- Maximum rate = 10 mmol/hr (= 15 mEq/h of K)
- Use **SODIUM** phosphate for patients with serum potassium > 4.5 mEq/L and serum sodium < 145 mEq/L
- Standard Concentrations:
 - Potassium Phosphate: 15 mmol/250 mL and 21 mmol/250 mL
 - Sodium Phosphate: 15 mmol/250 mL, 21 mmol/250 mL, and 30 mmol/250 mL

Current Serum Phosphorus Level	Total Phosphorus Replacement	Monitoring
2 – 2.5 mg/dL	15 mmol Potassium Phosphate IV over 4 HR	No additional action
1 – 1.9 mg/dL	21 mmol Potassium Phosphate IV over 4 HR	Recheck serum phosphorus level 2 hours after infusion complete
< 1 mg/dL	Call Physician AND 30 mmol Potassium Phosphate IV over 4 HR (<i>Administered as: 15 mmol Potassium Phosphate IV Q2H x 2 doses</i>)	Recheck serum phosphorus level 2 hours after infusion complete
• If both potassium and phosphorus replacement required, subtract the mEq of potassium given as potassium phosphate from total amount of potassium required. (Conversion: 3 mmols KPO₄ = 4.4 mEq K⁺) • Call pharmacy for assistance if needed.		

CALCIUM REPLACEMENT PROTOCOL

- You must specify the salt form (gluconate or chloride)
- Calcium chloride:
 - Reserved for Level I areas only
 - Must be administered via a central line
 - Maximum rate = 1 gm IV over 10 minutes
- Calcium gluconate:
 - May be used in all levels of care
 - Administration via a central line is *preferred*; however, it may be given peripherally with adequate IV access.
 - Maximum rate = 3 gm IV over 10 minutes
- Standard concentrations:
 - Calcium chloride: 1 gm/50 mL, 2 gm/100 mL, 3 gm/150 mL
 - Calcium gluconate: 1 gm/50 mL, 2 gm/100 mL

Current Ionized Calcium Level	Total Calcium <u>GLUCONATE</u> Replacement	Total Calcium <u>CHLORIDE</u> Replacement (Level I areas only)	Monitoring
1 – 1.1 mmol/L	1 gram IV over 1 HR	1 gram IV over 1 HR	No additional action
0.85 – 0.99 mmol/L	2 grams IV over 1 HR	2 grams IV over 1 HR	Recheck serum ionized calcium 2 hours after infusion complete
< 0.85 mmol/L	Call Physician AND 2 grams IV over 1 HR	Call Physician AND 3 grams IV over 1 HR	Recheck serum ionized calcium 2 hours after infusion complete