

Calcium, Phosphate and Magnesium Replacement

I. Calcium (25 mEq = 500 mg elemental calcium).

A. Parenteral Calcium Salts

Calcium chloride	1 gram	13.6mEq (272mg) of elemental Calcium
Calcium gluconate	1 gram	4.65mEq (90mg) of elemental Calcium

B. Parenteral Calcium Therapy

Indication	Dose	Rate of Infusion
Symptomatic Hypocalcemia (tetany)	4.65 to 18.6 mEq of elemental Calcium (1-4 grams of Calcium gluconate)	1 gram (Calcium gluconate or chloride) over 10 minutes, then 1-2 gram(s)/hour. Calcium infusion should be continued until Calcium level reaches 8-9 mg/dl.

For calcium replacement, the rate of infusion should be about 1-2 gram(s)/hour. Calcium chloride should be given via a central line due to a higher incidence of thrombophlebitis.

Calcium chloride is compatible in most common IV infusion solutions, i.e. 0.9% NaCl, 5% dextrose.

II. Phosphorus

A. Parenteral Phosphate Salts

Potassium Phosphate:	4.4 mEq of K ⁺ /ml and 3 mM of phosphate/ml
Sodium Phosphate:	4 mEq of Na ⁺ /ml and 3 mM of phosphate/ml

B. Parenteral Phosphate Therapy

Serum PO	Action
Serum phosphorus 1-2 mg/dl	Give 0.2 mmol/kg over 4-6 hours
Serum phosphorus < 1 mg/dl	Give 0.3 mmol/kg over 4-6 hours

Parenteral phosphate should be diluted and mixed in as large a volume of fluid (i.e. 250 ml) as possible. When ordering parenteral phosphate, always order the amount of phosphate in mmol units.

C. Oral: Neutra-Phos Powder (1 packet) 250 mg (8 mmol)/packet

III. Magnesium

- A. Magnesium Salts: Magnesium (elemental) 1 gram = 83.3 mEq
 Magnesium sulfate 1 gram = 8.1 mEq
- B. Oral Preparation: Mg Chloride 535 mg = 64 mg (5.33mEq) Mg/tablet
 Mg gluconate 500 mg = 27 mg (2.25 mEq) Mg/tablet
 Mg oxide 400 mg = 241.3 mg (20.1 mEq) Mg/tablet
 Magnesium Citrate 1.745 gram/30 ml

C. Parenteral Magnesium Therapy

In patients with normal renal function, up to 50 mEq (6 grams) of magnesium may be given IV over 4 to 6 hours (usually infuse 1 gram/hour), mixed in 50 to 100 ml of 0.9% NaCl or 5% dextrose.

Magnesium sulfate is incompatible with soluble phosphates and with alkali carbonates and bicarbonates (except in dilute solutions).