

Initiating Enteral and Parenteral Nutrition and the Refeeding Syndrome

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The following guideline is for use by medical staff caring for the patient, members of the Nutrition Support Team and registered dietitians. It applies to adult hospital based patients receiving enteral or parenteral nutrition (TPN).

Refeeding Syndrome

In starvation fat and protein stores are catabolised to produce energy. This results in an intracellular loss of phosphate. Malnourished patients' intracellular phosphate stores can be depleted despite normal serum phosphate concentrations. When they start to feed a sudden shift from fat to carbohydrate metabolism occurs and secretion of insulin increases. This stimulates cellular uptake of phosphate, which can lead to profound hypophosphataemia, together with cellular uptake of potassium and magnesium. This phenomenon usually occurs within 4 days of starting to feed again.

Major effects of a low phosphate tend to occur when the serum concentration is less than 0.32 mmol/l resulting in -

Muscle - myopathy, rhabdomyolysis
 Haematology - haemolysis, tissue hypoxia, reduced white cell and platelet function
 Neurology - malaise, confusion, coma
 Skeleton - rickets, osteomalacia

Certain patients are at particular risk of developing the refeeding syndrome -

Chronic alcoholics
 Patients unfed for 7-10 days with evidence of stress/depletion
 Patients suffering from chronic malnutrition
 Anorexia Nervosa
 Oncology patients on chemotherapy
 Chronic antacid users
 Chronic diuretic users
 Classic Marasmus
 Hyperglycaemia eg DM

Avoiding the refeeding syndrome

1. Check UE, glucose, LFT, calcium, magnesium, phosphate in all patients at risk of refeeding syndrome prior to commencing nutrition support.
2. Introduce feed slowly – 20 kcal/kg and max 50% BMR in the first 24hrs (for TPN this may mean the use of a proportion of a bag rather than a whole bag).
3. Increase the Kcal content gradually within the first week to full feeding.
4. Monitor the biochemistry at least 2 times each week - and more frequently if clinical condition indicates.

Treating the refeeding syndrome

Serum phosphate concentrations of less than 0.50 mmol/l can produce the clinical features of the refeeding syndrome. Hence in refeeding syndrome a level of phosphate of less than 0.50 mmol/l is the threshold for treatment.

Oral/ng phosphate

If the patient is able to take oral/enteral phosphate and the serum phosphate is greater than 0.32 mmol/l without clinical evidence of hypophosphataemia then the use of oral phosphate (phosphate-sandoz 4-6 tablets/day) with monitoring of serum phosphate should be considered. No additional electrolytes/mineral can be added to enteral nutrition and must be given separately if needed.

Intravenous phosphate

The amount of phosphate that can be incorporated in TPN is limited by the combination with calcium and precipitation. Additional phosphate is thus given as a separate iv infusion.

For peripheral iv infusion use 500 ml 'Phosphates Polyfusor' = 50 mmol phosphate infused over 24 hours via a dedicated peripheral iv cannula (also contains 81 mmol sodium and 9.5 mmol potassium). *Amount of phosphate given needs to be reduced in renal failure.*

Patients may develop hyperphosphataemia and asymptomatic hypocalcaemia on this treatment. *Serum calcium and phosphate should be measured on a daily basis.*

For central iv infusion in critical care areas phosphate may be given more rapidly. Give 20 mmol of phosphate centrally iv in 100ml over 3 hrs and repeat as needed.

Other electrolytes may need replacement-

Potassium

Potassium may be given orally eg up to qds Sando-K = 12 mmol = 470 mg potassium.

For intravenous use give 40 mmol of potassium / 1 litre bag of sodium or dextrose.

NB depends on renal function.

Daily check of serum potassium required.

Magnesium

Magnesium can be given orally, 24 mmol / day in divided doses (order magnesium glycerophosphate from pharmacy) but can give diarrhoea - used as a laxative! For intravenous therapy 40 mmol (= 10g) of Magnesium Sulphate in 250 ml of 5% dextrose or normal saline given iv over 12 hours and recheck serum Mg.

NB Depends on renal function so check U+E before starting iv - magnesium is retained in renal failure.

MAY CAUSE HYPOTENSION IF GIVEN TOO RAPIDLY.