

Interpretation of Biochemistry for the prescribing of TPN

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The following is meant for use by the Senior Dietitian and Pharmacist on the Nutrition Support Team. This guideline cannot cover every eventuality and if in doubt the dietitian and pharmacist should seek advice of a senior medical member of staff or not prescribe parenteral nutrition.

The following should be noted

1. Biochemistry results should always be interpreted in the light of the full clinical scenario (which includes medication, intravenous fluids and patient's charts and should include discussion with medical and nursing staff responsible for the patient).
2. Biochemistry results should be interpreted in the light of previous investigations - the trend in a biochemistry result may be more important than the actual value.
3. Parenteral nutrition is a potentially dangerous form of intravenous treatment and it may be better not to prescribe if unsure - and use iv fluids as a temporary measure.
4. It is probably safer to prescribe a bag with low amounts of 'electrolytes' eg potassium as these can always be given separately if needed. This is especially true if the prescription is to be used over a number of days eg bank holiday weekend
5. It is best to avoid making major changes to a parenteral nutrition regime just prior to a weekend/holiday period.
6. Patients with deranged biochemistry on TPN will probably require more frequent monitoring than the minimum twice a week U+E, glucose, LFT, Ca, Mg, PO₄.

Sodium

Very rarely is sodium an issue in TPN.

If the patient is becoming hypernatraemic then electrolyte free TPN may be required. As a guide if the sodium is > 155 mmol/L then consider this.

Hyponatraemia is usually due to water excess rather than lack of sodium. Review other iv fluids. If these are ok then consider adding an extra 50 mmol of sodium to the TPN (above the usual ~ 114 mmol in Kabi 11) if the sodium is < 130 mmol/L.

Potassium

Very dependent on clinical picture. May be considerable GI losses in some patients requiring replacement. Retention of potassium will occur in renal failure (elevated urea and creatinine). Many drugs will affect potassium concentrations. Reference range = 3.5 - 5.3 mmol/L. Consider additional potassium above that already in the bag (initially 20 mmol/day) in TPN if potassium < 3.0 mmol/L and reducing potassium / changing to electrolyte free TPN if potassium > 5.5 mmol/L. Check U+E on a daily basis. The average amount required is 40 - 80 mmol / day.

Glucose

Glucose should be checked on a plasma sample by the lab at least 2 times each week. BMs usually only necessary if patient is a known diabetic - whether on treatment or not.

If the glucose is consistently above 11 mmol/L (above this glucose is likely to appear in the urine and cause an osmotic diuresis) then the surgical/medical team need to consider the use of sliding scale insulin. The TPN prescription should also be reviewed to ensure that the patient is not being overfed.

It is always advisable to start with a lower glucose load to begin with (eg use a peripheral type feed such as Kabiven 5 peripheral) and then increase (eg Kabiven 8, 11 or 14) if required. This is particularly true if the patient is likely to be glucose intolerant - critically ill, on steroids.

Calcium

Usually standard amounts required.

If hypercalcaemic (persistent adjusted calcium > 2.6 mmol/L) then consider electrolyte free TPN.

If hypocalcaemic on TPN (persistent adjusted calcium < 2.1 mmol/L) then consider additional calcium in TPN (initially an extra 2 mmol/day). May require use of a separate calcium gluconate bolus / infusion by medical staff if the calcium is particularly low / patient symptomatic.

Will require more frequent monitoring of calcium.

Magnesium

Often mirrors potassium ie GI losses may require replacement and retention occurs in renal failure. Persistently elevated magnesium (not on magnesium therapy eg ITU) > 1.2 mmol/L may require the use of electrolyte free TPN. Persistently low magnesium < 0.6 mmol/L may require additional magnesium in TPN (up to a total of 10 mmol/bag).

Phosphate

May drop with re-feeding syndrome / use of insulin. Retention occurs in renal failure. If phosphate persistently above 2.0 mmol/L then consider use of electrolyte free TPN. If phosphate persistently below 0.4 mmol/L then medical staff need to consider the use of a polyfusor of phosphate in addition to the phosphate contained within the TPN.