



ESPEN Congress Glasgow 2002

Pharmacists' Educational Session: Debate

Con

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Can Multi-Chamber Bags (MCB's) Optimise Parenteral Nutrition?

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Multi-chambers bag -3-compartment bag - parenteral nutrition

Administered Parenteral Nutrition should be:

- **Clinically appropriate with respect to**
 - Patient, and existing disease state - NST
 - Current and changing clinical condition – monitoring by NST
- **Safe**
 - Sterile and minimise infection risk – e.g. 'A-I-O'
 - Stable and avoid incompatibilities – pharmacy preparation with pharmaceutical research support
 - Minimise medication errors – one infusion
 - Promote nutrient tolerance and avoid metabolic complications – co-infusion of all nutrients

And should also be:

- **Nutritionally complete for the patient**
 - All 7 groups of nutrients included
 - Maintain or correct fluid and acid / base balances
 - Address provision of all major electrolytes and maintain them in normal ranges
 - Include specific nutrients when indicated
 - e.g Glutamine; newer lipid emulsions

But patients are not standard!!

- hyperglycaemia
- oedema
- hypokalaemia
- hypernatraemia
- chronic renal failure
- high gi aspirates
- hypophosphataemia
- liver failure / cholestasis
- high fistula losses
- assessed need for glutamine
- acute renal failure
- hyperphosphataemia
- dehydration
- hypomagnesaemia
- low zinc or other t.e.'s
- hyperkalaemia
- hyponatraemia
- hyperlipidaemia
- hypocalcaemia
- re-feeding syndrome
- some enteral intake

Wrexham Study (J D'Enrico)

- What percentage of TPN bags compounded in-house could be substituted by one of the MCB's from one supplier (9 bags in the range)
- How many could be used 'as supplied' with only vitamin and t.e additions?
- How many could be used with further supplementation of other nutrients within suppliers stability ranges?
- Retrospective study – all inpatients on TPN in Sept – Oct 2001 – 214 bags

Results

- 214 bags compared, used in a 2 month period
- 85 (40%) could not have been substituted by any of the 9 bags in the supplier's range.
- Principal reasons
 - Too much of one or more electrolytes for corresponding amount of either nitrogen, energy or volume
 - Too great a volume for corresponding other nutrients

Conclusions

- Currently, MCB's alone do not enable the supply of fully assessed nutritional needs for most patients on TPN
- All need supplementation, some by significant amounts
- Up to 40% of patients cannot be correctly supplied even by supplemented versions
- Thus, to abandon in-house compounding in favour of MCB's is **CLINICALLY INAPPROPRIATE.**

Conclusions (2)

- There is no evidence to indicate superiority of MCB's over customised formulae
- Good evidence exists of the complications from inappropriate or poorly administered TPN- electrolyte or water imbalances; vitamin or trace element deficiencies; over- or under-feeding; line infections + sepsis; particulate or fat emboli
- Cost comparisons are not relevant if they do not compare methods which all provide full nutritional need and enable best clinical practice.

Conclusions (3)

- **There is no such thing as a standard patient**
- **No two patients have identical needs across the whole range of nutrients**

Thus, TPN formulae must be formulated and customised for each individual patient.

What may happen when MCB's are used

1. We may use the bags as supplied –
 - this is clinically inappropriate, and would fuel arguments that PN involves unacceptably high complication rates
2. We may use the bags as supplied and rely on the infusion of other solutions, with added t.e.'s and vitamins, to supplement volume and electrolytes
 - This would be a reversion to out-dated and unsafe techniques of multi-bottle infusions and ward additives, both replaced over 20yrs ago due to high risks of contamination, incompatibility and medication error.

continued

3. There may be a tendency to supply patients with the available bags, not to match the bags to the patients' fully assessed needs (Kyle study)
4. We may use the bags as supplied and make them complete via additives made in a Pharmacy Aseptic Unit
 - This is the only safe way to use MCB's
 - Our study showed this was not feasible for many patients
 - If the facility exists for this, then it also exists for full, customised TPN compounding.

DEBATE

Can multi-chamber bags **OPTIMISE**
parenteral nutrition?

NO!

No references provided by the author(s)