TOTAL PARENTERAL NUTRITION

Lecture by

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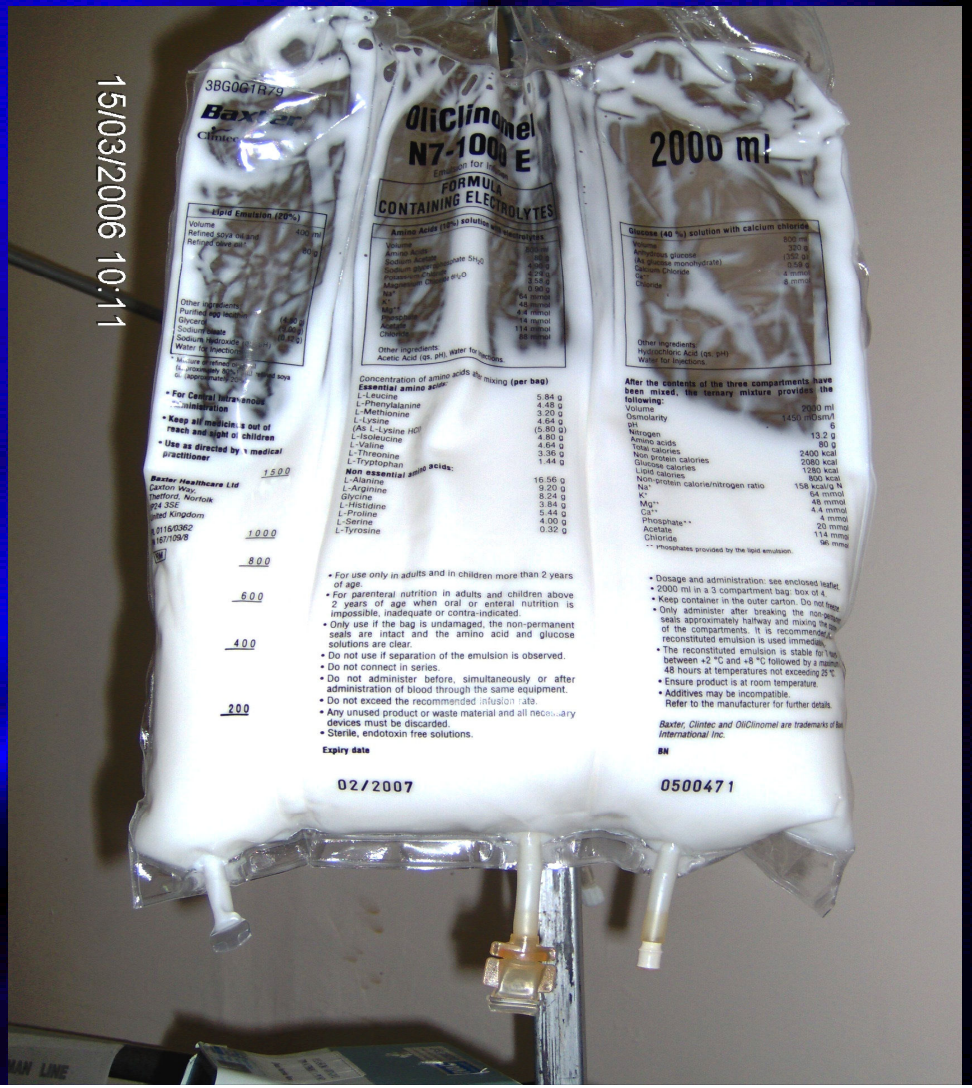
What is Total Parenteral Nutrition (TPN)?

- Artificial feeding that is administered via a route other than the gastrointestinal tract.
- It is administered via a central line (jugular or subclavian).
- It is a complete feed made up of the constituents (building blocks) of a healthy diet, i.e. fats, amino acids and carbohydrates.

What Total Parenteral Nutrition looks like today…



What Total Parenteral Nutrition looked like in the past…

Indications for Total Parenteral Nutrition

1. When the gastrointestinal tract is not functioning properly:
   a) Inadequate absorption resulting from short bowel syndrome.
   b) Gastrointestinal fistula.
   c) Bowel obstruction.
   d) Prolonged bowel rest needed for pancreatitis, ileus, etc.

Indications for Total Parenteral Nutrition

e) Severe malnutrition, significant weight loss and/or hypoproteinemia when enteral therapy is not possible.

f) Other disease states or conditions in which oral or enteral feedings are not an option.

Doubtful Indications for Total Parenteral Nutrition

Benefit is uncertain or questionable in certain situations:

a) Terminal cancer patients

b) AIDS patients (Al-Jurf & Dillon, 1996).

Suggested Daily Electrolyte Intake

1. Potassium - 50-80 mEq/day
2. Sodium - 50-120 mEq/day
3. Calcium - 8-20 mEq/day (160-400 mg)
4. Magnesium - 10-30 mEq/day (120-360 mg)
5. Chloride - 100-120 mEq/day
6. Phosphate - 12-30 mmol/day (463-927 mg)
7. Acetate - no defined daily need

Calculating Basal Energy Expenditure (BEE)/Basal Metabolic Rate (BMR)

The Harris-Benedict equations:

- Women:
  BEE = 655 + (9.6 x W) + (1.8 x H) - (4.7 x A)
- Men:
  BEE = 66 + (13.7 x W) + (5 x H) - (6.8 x A)

W = weight in kilograms

H = height in centimeters

A = age in years

Laboratory Monitoring of Patient on TPN

1. Baseline laboratory studies:
   a) CBC/ differential, PLT, RBC indices, iron status, ALB
   b) Lymphocyte count, delayed hypersensitvity skin tests

Laboratory Monitoring of Patient on TPN

2. Acute condition, unstable patient, early nutrition support:
   a) Electrolytes, BUN, Se. Cr.: 3-7 times per week
   b) Calcium, magnesium, phosphate: 1-3 times per week
   c) LFT's, TP, ALB: once weekly or every other week
   d) Triglycerides: weekly or as appropriate for IV fat emulsion use.

Laboratory Monitoring of Patient on TPN

3. Stable hospitalized patient, prolonged parenteral nutrition support:
   a) Electrolytes, BUN, Se. Cr.: 1-3 times per week
   b) Calcium, magnesium, phosphate: once weekly or every other week
   c) LFT's, TP, ALB: every 2-4 weeks
   d) CBC/ differential, PLC RBC indices: every 2-4 weeks

Nutritional Assessment of Patient

1. Diet history includes information about weight change, food intake (if applicable), and nutritional support history.
2. Calculation of calories, protein, fat, and carbohydrate from all sources of nutrition support are made.

Nutritional Assessment of Patient

3. Nutritional needs:
   a) Basal energy needs are calculated from patient's weight, height, and age. Additional energy needs are based on an assessment of activity and metabolic needs.
   b) Protein needs are determined by the patient weight and metabolic state (e.g., burn, sepsis, renal disease).
   c) Fluid requirements are 30 — 35 cc/kg (average sized adults), or 25 cc/kg (65 years of age or older).

Nursing Parameters for Patient on TPN

1. Vital signs every eight hours:
   a) Temperature
   b) Pulse
   c) Respiration
2. Intake and output charting:
   a) Including TPN fluid
3. Daily weights
4. Blood sugars every four to six hours until the patient's glucose is stable and then at least twice a day.

Nursing Care of Patient on TPN

1. Central line care:
   a) Aseptic technique during TPN and line changes
   b) Do not disturb dressing on central line insertion site unless soiled
   c) Ensure patency of central line
   d) Ensure central line is sutured well onto patient's skin
   e) Always flush line with Heparinised Saline when leaving idle
2. Mouth care
3. Psychological care:
   a) Altered body image
   b) Social aspect associated with eating
   c) Information giving

The Importance of Aseptic Technique

This is crucial because:

- The central line is connected directly to the heart via a principal artery
- The T.P.N. fluid is full of ideal nutrients and so offers an ideal medium for bacteria to grow and flourish.

Therefore…

1. The central line should ideally be used solely for T.P.N. purposes and no I.V.I. or I.V. treatment given or blood taken from the line
2. Keep the central line insertion site clean at all times. Apply a transparent dressing, e.g. Opsite®, which will leave the insertion point visible for redness or infection
3. Unless soiled do not uncover the insertion site, i.e. change the dressing. Always apply Betadine® before applying a new dressing.

To safeguard the patient's safety…

1. Do not connect a T.P.N. bag that is discoloured (yellowish) or the contents mixed
2. Change the T.P.N. bag – its maximum hanging time is 48 hours (in U.K.)
3. Change the line (volumetric pump giving set) also every 24 hours
4. Give T.P.N. always by pump – to control fluid intake and avoid complications.

Stopping of Feeding by TPN

- When G.I. function is restored
- When an intestinal fistula closes completely
- When oral feeding or enteral nutrition can be resumed
- In cases of fever - ? due to infection of the central line
- Patient regaining consciousness or leaving Intensive Therapy Unit or sedation being stopped
- Patient dies