

TPN/ Enteral nutrition

Salsabil HADIRE

Dietitian in Oncology Hematology Center of
University Hospital Mohammed VI

–Marrakech–

Work plan

**Part 1: Total Parenteral
Nutrition (TPN)**

Part 2: Enteral Nutrition

Part 3: !!!!!

Work plan

Part 1: Total Parenteral Nutrition (TPN)

1. Definition
2. Indications for use
3. When it can't be used?
4. Sites of delivery
5. Regimens
6. PN Solutions
7. Complications
8. Advantages/ Disadvantages

Work Plan

Part 2: Enteral Nutrition

1. Definition
2. Indications for use
3. Contraindication for use
4. Route
5. Feeding selection
6. Complications
7. Advantages/ Disadvantages

Work Plan

Part 3:!!!

Part 1: Total
Parenteral
Nutrition (TPN)

Total Parenteral Nutrition (TPN)

1. Definition: TPN

T: Total means that all the daily nutritional needs for a child or adolescent are in the TPN bag.

P: Parenteral means that the daily feedings are given to the child or adolescent through a vein.

N: Nutrition means all the proteins, fats, carbohydrates, vit and minerals that are needed for growth and activity. (1)

Total Parenteral Nutrition (TPN)

2. Indications for use:

- Infant is unable to or should not receive food or liquids by mouth
- Enteral nutrition is impossible
- Poorly tolerated oral or enteral feeding

TPN

2. Indications for use:

Inflammatory bowel diseases such as:

- Severe diarrhea
- Crohn's disease
- Ulcerative colitis
- Surgery-related short bowel syndrome
(2)

TPN

2. Indications for use:

- Burns
- Malnourished oncology patients
- Renal or hepatic failure
- Malnourished patient before major surgery
- Require prolonged respiratory support
(4)

TPN

2. Indications for use:

Patient who is not expected to eat sufficiently for:

- 3-5 days in severe malnutrition,
- 5-7 days in mild or moderate malnutrition,
- 7-10 days in well-nourished patients. (3)

TPN

2. Indications for use:

In case of BMT:

- Nausea, vomiting, and diarrhea, catabolism and malabsorption associated with cytoreduction.
- Taste alterations, electrolyte derangements, protein loosing associated with the course of GVHD.

TPN

2. Indications for use:

In case of BMT:

- Cachexia due to the primary disease (recent weight loss & poor oral intake).
- Poor nutritional intake due to mucositis associated with cytoreduction. (3)

TPN

2. Indications for use:

Short-term use

- Bowel injury, surgery, major trauma or burns
- Bowel disease
- Severe malnutrition

TPN

2. Indications for use:

Short-term use

- Nutritional preparation prior to surgery.
- Malabsorption - bowel cancer
- Severe pancreatitis
- Malnourished patients who have high risk of aspiration

TPN

2. Indications for use:

Long-term use

- Prolonged Intestinal Failure
- Crohn's Disease
- Bowel resection (6)

TPN

3. When it can't be used?

- If the patient's nutritional needs could be met via enteral or oral nutrition.
- Enteral and oral nutrition are more compatible with the body's normal processes.

TPN

3. When it can't be used?

- Early enteral or oral nutrition is associated with better outcomes after surgery.
- Increased infectious complications are associated with the use of parenteral nutrition.

TPN

3. When it can't be used?

- If it will be used for only a short period (such as less than five days).
- In malnourished critically ill patients. (5)

TPN

4. Sites of delivery (5)

| Site | Indication |
|---|---|
| Central (superior vena cava, right atrium, or inferior vena cava) | <ul style="list-style-type: none">• Longer-term use• Short-term use when peripheral solution cannot meet full nutritional needs or if peripheral route not available |

TPN

4. Sites of delivery (5)

| Site | Indication |
|-----------------------------------|---|
| Peripheral (any other vein) | <ul style="list-style-type: none"><li data-bbox="774 733 1566 976">• short-term use (<10-14 days)<li data-bbox="774 1011 1804 1253">• Every 48 h, change the site of delivery |

TPN

5. Regimens

PN infusions can be:

- Continuous (running 24 hours a day),
- Cyclic (running for a period of between 8 and 18-20 hours each day) or intermittent (on some days only). (5)

TPN

6. PN Solutions:

- ✓ Carbohydrates (dextrose), 50% or less
(500 ml = 1 unit)
- ✓ Amino acid 3.5%, (500 ml = 1 unit)
- ✓ Lipids 10% with administration set
(500 ml = 1 unit)

TPN

6. PN Solutions:

- ✓ Compounded amino acid and carbohydrates with electrolytes, trace elements, and vitamins, including preparation, any strength, 10 to 51 grams of protein → over 100 grams of protein (8)

TPN

7. Complications:

- Mechanical pneumothorax, malposition, embolism
- Infectious sepsis, thrombophlebitis
- Nutritional complications including:
 - Fluid overload

TPN

7. Complications:

- ✓ Electrolyte imbalance/ Mineral imbalance,
- ✓ Hyperglycemia / hypoglycemia
- ✓ Over feeding
- ✓ Re-feeding syndrome
- ✓ Nutrient deficiency
- ✓ Hepatobiliary dysfunction/ liver toxicity

TPN

- Other metabolic complications:
 - ✓ Air embolism
 - ✓ Clotted catheter line
 - ✓ Catheter displacement
 - ✓ Acid-base imbalance,
 - ✓ Toxicity of contaminants of the parenteral solution. (4;6;7)

TPN

8. Advantages/ Disadvantages

a) Advantages:

- Ease of administration
- Easier correction of fluid and electrolyte disturbances
- Nutrition in setting of mucositis
- Allows nutrition support when GI intolerance prevents oral or enteral support (9,10)

TPN

b) Disadvantages:

- High financial cost
- Catheter-associated infections
- Fluid overload
- Hyperglycemia
- Catheter-associated thrombosis

TPN

b) Disadvantages:

- Hepatic dysfunction
- Promotes enterocyte atrophy leading to loss of gut barrier function
- Blood electrolyte abnormalities (9)

Part 2:
Enteral
Nutrition

Work plan

1. Definition
2. Indications for use
3. Contraindication for use
4. Sites of delivery
5. Feeding selection and enteral solution
6. Complications
7. Advantages/ Disadvantages

Enteral Nutrition (EN)

1. Definition: EN

Enteral tube feeding is a medical treatment of giving nutrition by passing a liquid diet through a tube unto the stomach or intestines.

Enteral Nutrition (EN)

2. Indications for use

- Anorexia associated with chronic illness
- Cancer
- Severe pancreatitis, without pseudocyst or fistula complication.
- Neurological impairment e.g. unconsciousness, coma, head injury Coma
- Acute metabolic stress (e.g., trauma, burns)

EN

2. Indications for use

- Inflammatory bowel disease (e.g., Crohn's disease)
- Prematurity
- Short gut.
- Oral surgery

EN

2. Indications for use

- Gastrointestinal tract surgery
- Dysphagia e.g. after a stroke
- Mouth or oesophageal disorder or obstruction e.g. cancer
- Enteral nutrition is preferable to parenteral nutrition (11;12;13;14)

EN

3. Contraindications for use

- Obstruction of the intestines
- Paralytic ileus
- Protracted vomiting or diarrhea
- Acute bowel ischemia with peritonitis

EN

3. Contraindications for use

- High-output fistulas
- Acute severe pancreatitis
- If patient can meet nutritional requirements orally
- Early stages of Short bowel syndrome
- Severe malabsorption (12;13;14)

EN

4. Sites of delivery

Nasogastric (NG) tubes:

- These are the most commonly used delivery routes, but depend on adequate gastric emptying.
- They allow the use of hypertonic feeds, high feeding rates and bolus feeding into the stomach reservoir.
- Tubes are simple to insert, but are easily displaced.

EN

4. Sites of delivery

Nasojejunal (NJ) tubes:

- These reduce the incidence of gastro-oesophageal reflux and are useful in the presence of delayed gastric emptying.
- Post-pyloric placement can be difficult but may be aided by intravenous prokinetics or fibre-optic observation.

EN

4. Sites of delivery

Percutaneous endoscopic gastrostomy (PEG) tubes:

Indications for gastrostomy include stroke, motor neuron disease, Parkinson's disease and esophageal cancer.

EN

4. Sites of delivery

Percutaneous endoscopic gastrostomy (PEG) tubes:

- Relative contra-indications include reflux, previous gastric surgery, gastric ulceration or malignancy and gastric outlet obstruction.
- They are inserted directly through the stomach wall endoscopically or surgically, under antibiotic cover.

EN

4. Sites of delivery

Percutaneous jejunostomy tubes:

- They permit early postoperative feeding and are useful in patients at risk of reflux.
- They are inserted through the stomach into the jejunum, using a surgical or endoscopic technique.
- This can be difficult and has more complications. (11)

EN

5. Feeding selection and enteral solution

In choosing a feeding, consider:

- Age
- Nutritional requirements (energy, protein, fat, fluid, vitamins, minerals)
- GI function
- clinical status
- disease entity
- cost.

5. Feeding selection and enteral solution

The enteral solution:

| Food | Quantity |
|-----------------|-------------------------------------|
| Powdered Milk | 50g |
| Chicken | 80g |
| Carrot | 60g |
| Potato | 100g |
| Appel or banana | 100g |
| Vegetable oil | 30 cc (ml) |
| salt | a pinch |
| Water | sufficient amount to 1 liter volume |

EN

6. Complications

- Mechanic
- Metabolic
- Infectious
- Gastrointestinal

EN

6. Complications

Mechanic

1. Erosion and/or necrosis and/or infection at the contact zones
2. Pharyngeal, and esophageal perforation and stenosis
3. Tracheoesophageal fistula
4. Malpositioning and removal of the probe

EN

6. Complications Mechanic

5. Intraperitoneal leakage through osteotomy site
6. Leakage of the formulation
7. Pulmonary aspiration
8. Hemorrhage

EN

6. Complications

Metabolic

1. Hypertonic dehydration
2. Hyperosmolarity
3. Hyperosmolar coma
4. Hyper/hypoglycemia

EN

6. Complications

Metabolic

5. Hyperhydration
6. Dumping syndrome
7. Refeeding syndrome

EN

6. Complications

Infectious

1. Sinusitis and otitis
2. Aspiration pneumonia
3. Necrotizing peritonitis and enteritis
4. Dietary contamination

EN

6. Complications

Gastrointestinal

1. Increased gastric residual volume
2. Constipation
3. Abdominal fullness and distention
4. Vomiting and regurgitation
5. Diarrhea
6. Hypertransaminasemia,
hepatomegaly (14)

EN

7. Advantages/ Disadvantages

Advantages

- Provides good nutritional care plan
- Nourishing child who can not take adequate nutrients orally
- Cheaper
- Simple

EN

7. Advantages/ Disadvantages

Advantages

- Stimulates intestinal blood flow
- Maintain GI mucosal barrier (prevents bacterial translocation and portal endotoxaemia)
- Reduced gut associated lymphatoid system (GALT) -> becomes a source of activated cells and proinflammatory stimulants

EN

7. Advantages/ Disadvantages

Advantages

- prevents muscle atrophy
- reduces septic complications compared with TPN
- avoids CVL complications
- avoids TPN induced immunosuppression (lipid load) (16,17)

EN

7. Advantages/ Disadvantages

Disadvantages

- GI, metabolic, and mechanical complications—tube migration; increased risk of bacterial contamination; tube obstruction; pneumothorax
- Costs more than oral diets
- Labor-intensive assessment, administration, tube patency and site care, monitoring (15)

Part 3:
Debate

TPN Vs EN

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Thank

you