ROUTE OF NUTRITION

Nutritional Support Can Be Given Through One Of The Three Routes:-

1) Oral **2)** Enteral **3)** Parenteral

ORAL

If Patient Can Eat Then They Should Be Encouraged To Do So. It's Important To Know That Patient Receiving Adequate Nutrition Or Not.

ENTERAL

INDICATION:

When oral intake has been inadequate for **1-3 days.** Patients who are at risk of bacterial translocation across the bowel (burn victim).

CONTRA INDICATIONS:

- **Circulatory Shock.**
- **Intestinal Ischemia.**
- **Complete Mechanical Bowel Obstruction Or Ileus.**
- **Severe Diarrhea.**
- **Pancreatitis.**

METHODS OF ENTERAL FEEDING:

- NASOGASTRIC TUBE
- NASO DUODENOSTOMY TUBE
- NASOJEJUNAL TUBE
- PERCUTANEOUS FEEDING GASTROSTOMY.
- JEJUNOSTOMY TUBE.

MODES OF FEEDING:

1) BOLUS FEEDING:

Administration of **200-400 ml** of feed over **20 -30 mts** several times a day.

2) INTERMITTENT FEEDING:

Administration of **200-400ml** of feed over **30-60 mts** several times a day.

3) CONTINUOUS FEEDING:

Feed given at continuous rate over **16-24hrs /day.**It is preferred for small intestine feeding.

TIME TO START NUTRITION

The Timing Of Initiating Nutritional Support Is A Complex Issue Involving Various Factors Which Includes:

- Pre Illness Nutritional Status.
- Type, Severity And Stage Of Critical Illness And Organ Failure.
- Route Of Feeding And Use Of Special Diets.

IN GENERAL

EARLY FEEDING:

- Beginning Of Nutrition Within 24-48hrs After An Acute Onset.

CONVENTIONAL FEEDING:

- Initiating Nutrition Within 3-10 Days.

LATE FEEDING:

- Refers To The Nutrition After 10 Days.

EARLY ENTERAL NUTRITION

INDICATIONS:

- Severe Trauma (Abdominal, Major Burns).
- Ards.
- Major Abdominal Cancer Surgery.
- Acute Malnutrition.

CONTRA INDICATIONS:

- Loss Of Bowel Anatomical Integrity.
- Severe Splanchnic Ischemia Shock.
- Generalized Peritonitis.

EARLY PARENTERAL NUTRITION HAS NO PLACE IN ICU IN PATIENTS WITHOUT PRE-EXISTING MALNUTRITION.

INTRODUCTION

- Nutritional Support Has Become A Routine Part Of Critically Ill Patients.
- Nutritional Support Refers To Enteral, Parenteral, Provision Of Calories, Proteins, Electrolytes, Vitamins, Minerals, Trace Elements And Fluids.
- These Patients Are Hypermetabolic And Have Increased Nutritional Requirements.
- In Critically Ill Patients Malnutrion Develop Rapidly Due To Presence Of Acute Phase Responses, Which Not Only Promote Catabolism But Also Alter The Response To Nutritional Support.
- Malnutrition Once Established Exerts Well-known Deleterious Effects By Altering Immunity, Increasing Susceptibility To Nosocomial Infections, Decreasing Wound Healing And Promoting Organ Failure.

TOTAL ENERGY AND FLUID REQUIREMENTS

Energy Requirements Can Be Calculated In Various Ways But For All Practical Purposes -calorie Intake Is:-

- **25kcal/kg/24hr** Post Elective Surgery.
- **35kcal/kg/24hr** Polytrauma Sepsis And Burns.
- Additional Must **10% Calories** Added For Each One Degree Centigrade Rise In Temperature.
- Baseline Water Requirements For Adults = **30-35 Ml/kg/hr.**

DAILY REQUIREMENTS FOR ELECTROLYTES

NUTRIENT	ENTERAL ROUTE	PARENTERAL ROUTE
SODIUM	500MG(22MEQ/KG)	1-2 MEQ/KG
POTASSIUM	2G (5MEQ/KG)	1-2MEQ/KG
CHLORIDE	750MG(21MEQ/KG)	AS NEEDED TO MAINTAIN ACID BASE BALANCE
CALCIUM	1200MEQ/KG)	5-7 MEQ /KG
MAGNESIUM	420MG(17MEQ/KG)	4-10MEQ/KG
PHOSPHORUS	700MG(23 MEQ/KG)	20-40MEQ/KG

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ICU NUTRITIONAL DIET

DISEASE SPECIFIC FORMULAE

These are usually polymeric and feed designed for:

- **LIVER DISEASE:**
  - Low sodium and altered amino acid contents (to reduce encephalopathy).
- **RENAL DISEASE:**
  - Low phosphate and potassium 2kcal/ml (to reduce fluid intake).
- **RESPIRATORY DISEASE:**
  - High fat content reduce co2 production.

HOW TO GIVE ENTERAL NUTRITION?

- Confirm tube position -x ray and auscultation.
- Secure the tube well.
- Sit up position -at least 30 degree to prevent aspiration of gastric contents.
- Aspirate regularly -q4hrly to ensure gastric residual volume is less than 200ml.
- Avoid bolus feeding -it may increase the risk of aspiration of gastric contents.
- Use of prokinetics, eg: metoclopramide 10 mg tds.

COMPLICATIONS OF ENTERAL FEEDING

- Occlusion Of Feeding Tube.
- Reflux Of Gastric Contents Into The Airway.
- Diarrhea.
- Bloating And Abdominal Discomfort.

PARENTERAL NUTRITION

- The only absolute indication of parenteral nutrition is gastro intestinal failure.
- Parenteral nutrition can be given as separate components but is more commonly given as sterile emulsion of water, protein, lipids, carbohydrates, electrolytes, vitamins and trace elements.

ROUTES OF INFUSION

- PERIPHERAL
- CENTRAL

PERIPHERAL PARENTERAL NUTRITION (PPN)

THE MAXIMUM OSMOLARITY THAT CAN BE TOLERATED BY PERIPHERAL VEIN IS 900 mosm/L.

The concentration of various solution that can be given safely through peripheral veins are:

- **GLUCOSE 5-10%**
- **AMINOACIDS 2-4%**
- **LIPIDS10-20% BOTH CONCENTRATION ARE ISO-OSMOLAR**

PPN IS UNSUITABLE FOR PATIENTS -

- **Poor peripheral venous access.**
- **High energy and nitrogen requirement.**
- **High fluid requirements.**
- **Requiring nutrition for longer time.**

CENTRAL PARENTERAL NUTRITION: CPN

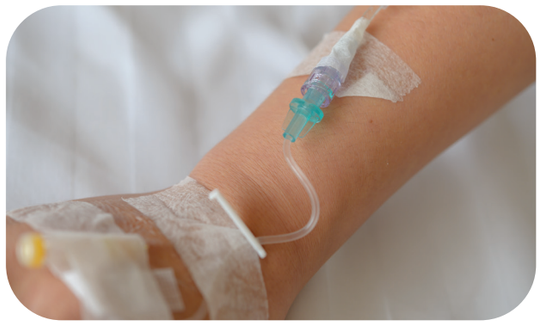
- IV catheter should be inserted under all aseptic condition.
- It should be used only for purpose of parenteral nutrition.
- Confirm the position of catheter by x-ray chest.

INTRAVENOUS NUTRIENT SOLUTIONS

- CARBOHYDRATES.
- PROTEINS.
- LIPIDS.
- ELECTROLYTES AND MICRONUTRIENTS.

COMPLICATIONS OF TPN

- **Catheter related:** pneumothorax, hemothorax, air embolism, cardiac tamponade, catheter sepsis.
- **Metabolic:** hepatic dysfunction, cholestasis, hyperglycemia, hypoglycemia, excessive co2 production, metabolic acidosis and alkalosis.
- **Refeeding syndrome.**
- **Overfeeding.**



MONITORING OF PATIENTS

- **Vital signs:** temperature, blood pressure, pulse, respiratory rate.
- **Fluid balance:** weight, edema, input-output.
- Delivery equipment.
- On first day measure blood sugar level every Q6TH fly for 24 hrs.
- During first week measure serum electrolytes, blood urea, sugar and serum triglycerides daily.
- Serum calcium, ast, bilirubin, alkaline, phosphate, phosphorus magnesium and blood counts at least twice a week.
- Prothrombin time and albumin once a week.

CONCLUSION

- Malnutrition is associated with a poor outcome in critical illness.
- Enteral nutrition is mainstay of nutritional support and should be started early in all patients in whom it is safe to do so.
- Parenteral nutrition has definite role but only in selected patients.
- In all patients receiving nutritional support it is vital to achieve glucose control with insulin therapy and important not to over feed .

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