Perioperative Nutrition for Better Outcomes in Surgery

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Adverse Effects of “MALNUTRITION” in Surgical Patients

Malnutrition can affect outcomes in surgical patients was first reported in 1936 in a study showing that;

- Malnourished patients undergoing ulcer surgery had a 33 percent mortality rate compared with 3.5 percent in well-nourished individuals
- A prospective study of 500 patients, including 200 surgical patients, admitted to a teaching hospital in England found that 40 percent of patients were undernourished on presentation
- And patients lost an average of 5.4 percent of their body weight during their hospital stay

Remains a “common” problem

Incidence of about 50% exacerbated by hospital stay

Consequences of Malnutrition

- Increased susceptibility to infection
- Poor wound healing
- Increased frequency of decubitus ulcers
- Overgrowth of bacteria in the gastrointestinal tract
- Abnormal nutrient losses through the stool

Development of Postoperative Malnutrition

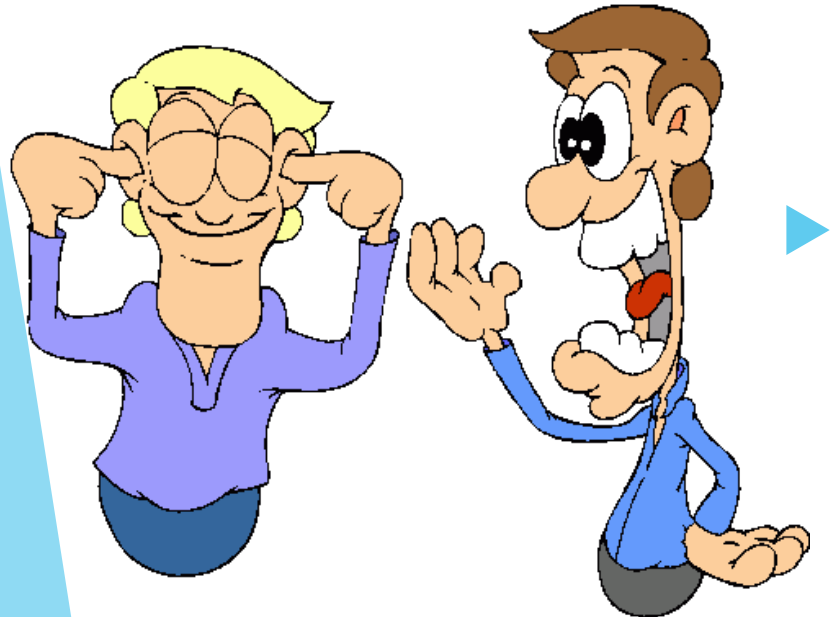
- Pre-existing nutritional status
- Nature and complexity of the surgical procedure
- Degree of hypermetabolism

Risk factors for 30-day hospital "**Readmission**" among general surgery patients

- Gastrointestinal complications
- Surgical infections
- Malnutrition

Preoperative Nutrition in Surgical Outcome

- There is an overwhelming amount of data supporting the importance of preoperative nutrition in surgical outcome....



- But Little attention is paid to Nutrition and Metabolic preparation

CLINICAL NUTRITION

< Previous Article | August 2015 Volume 34, Issue 4, Pages 679–684 | Next Article >

Malnutrition risk predicts surgical outcomes in patients undergoing gastrointestinal operations: Results of a prospective study☆

Conclusions

Preoperative malnutrition was an important predictor of poor clinical outcomes in patients undergoing gastrointestinal operations in Hong Kong.

Diagnosis of Malnutrition

- **Two or more of the following :**
  - Insufficient energy intake
  - Weight loss
  - Loss of muscle mass
  - Loss of subcutaneous fat
  - Localized or generalized fluid accumulation that may mask weight loss
  - Diminished functional status as measured by handgrip strength

Preoperative Nutritional Assessment

- **All elective surgery patients**
  - Weight
  - BMI
  - Percentage weight loss
  - Identification of any factors which may affect nutritional intake prior to surgery

High Morbidity and Mortality Rates Suboptimal Dietary Intake > 14 days

- So, before we go further ,we must accept the fact that Malnutrition has a great impact on outcome of surgery
- Requires that we must do “ nutritional assessment
- To ensure the patient is in an optimal nutritional state, all elective surgery patients should have a nutritional assessment performed at the pre-assessment clinic

Preoperative Nutritional Assessment

- Identifies “high-risk” patients that benefit dramatically from nutritional supplementation

- Referral to a dietitian
  - for more in-depth assessment
  - provision of nutrition support as indicated.

European Society of Parenteral and Enteral Nutrition (ESPEN) Guidelines

- Severely malnourished surgical population:
  - weight loss of >10%-15% over the last 6 months
  - those with a BMI <18.5
  - those with a serum albumin level of <3 g/ dL without renal or hepatic dysfunction

High-risk patients

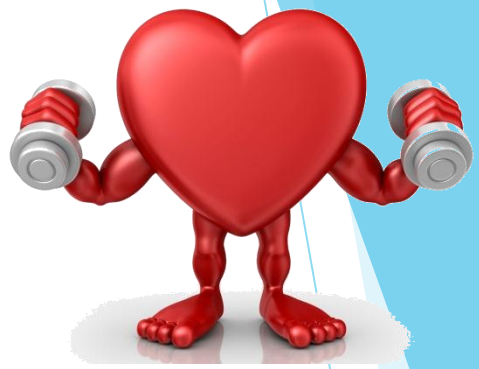
- Surgery should be postponed when possible to allow for the pre-op metabolic and nutrition preparation for surgery
- Surgery should be delayed to initiate PN for 7 days preoperatively, and then continued in the postoperative period for a minimum of 7 days
  - (grade “B” evidentiary support)
- PN should only be used when EN is not possible or has failed

Society of Critical Care Medicine & American Society for Parenteral and Enteral Nutrition guidelines -2009

“Pre-habilitation” Program

Glycemic control

Nutrition

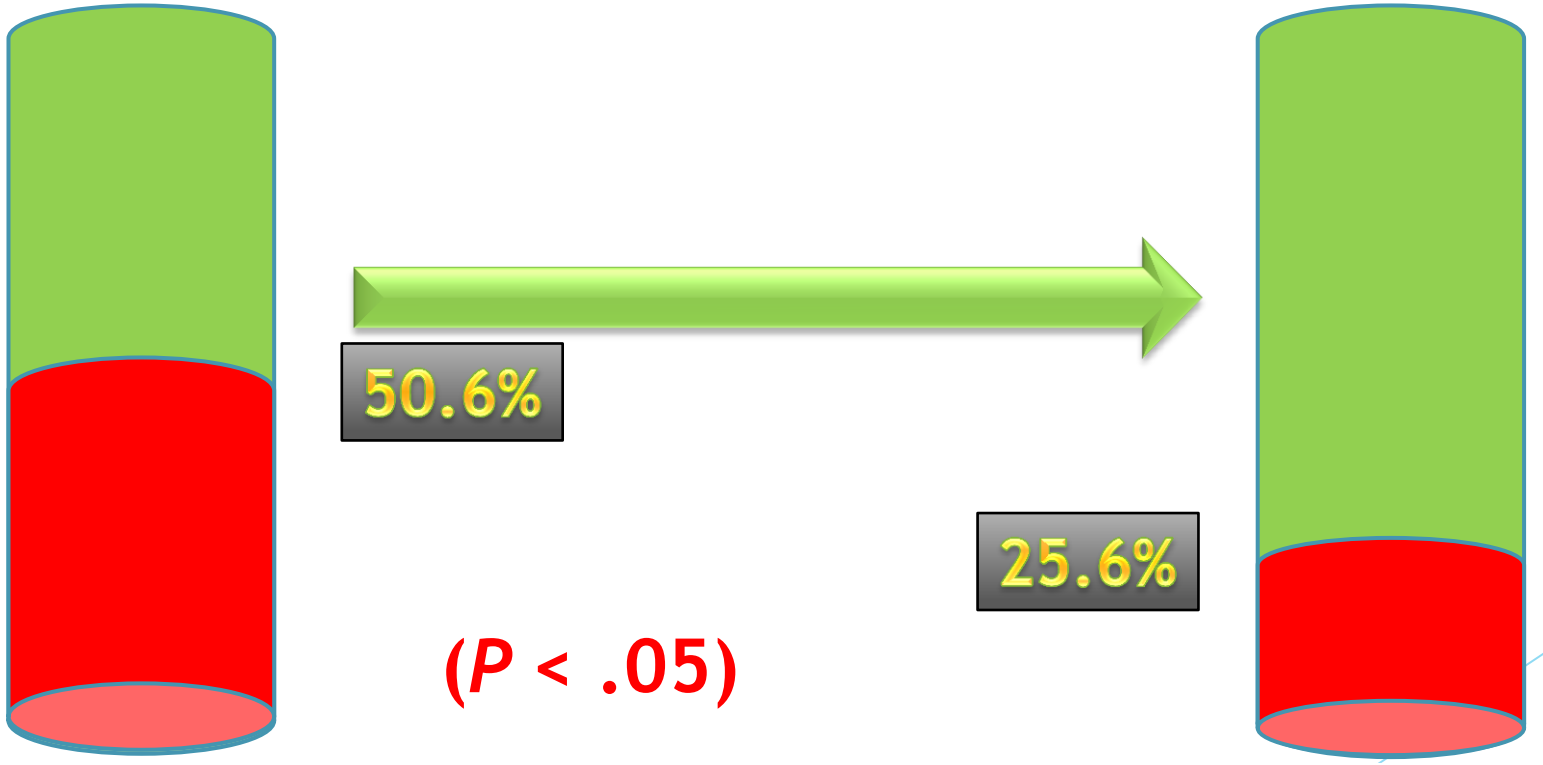


Exercise

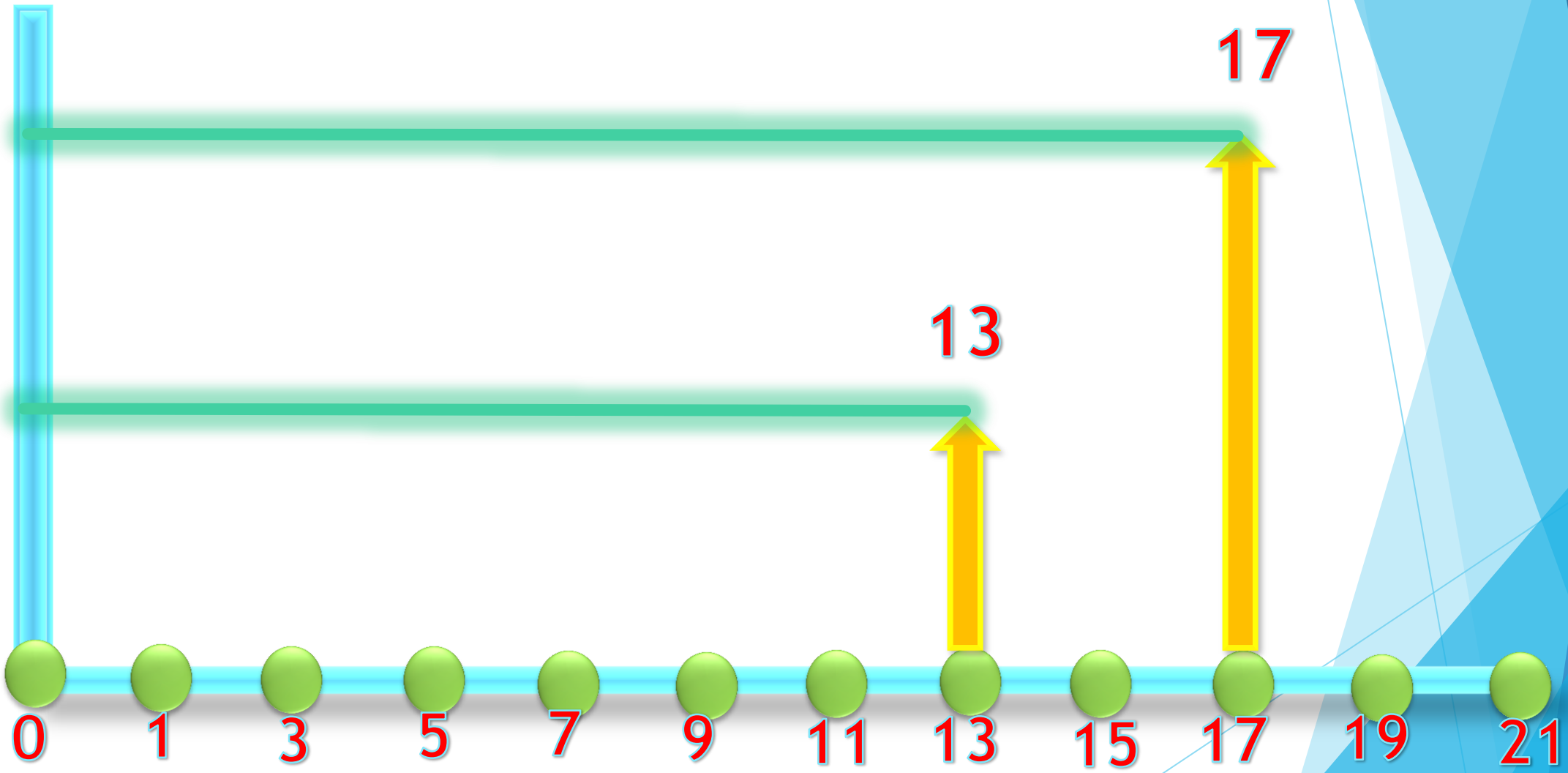
Smoking cessation

Benefits of “Pre-habilitation”

Decrease in the incidence of major complications from 50.6% to 25.6%



Length of hospital stay reduced from 17 days to 13 days



Length of hospital stay in days (*P* < .05)

Indications for Nutritional Support

- Pre-existing nutritional deprivation
- Anticipated or actual inadequate energy intake by mouth
- Significant multi-organ system disease

Established malnutrition
Patient cannot maintain adequate nutrition

Nutritional Interventions

Oral supplementation
Enteral (tube) feeding
Parenteral (intravenous) feeding

Preoperative Carbohydrate Loading

- An important component of the (ERAS) protocols
- It involves the use of specially formulated carbohydrate drinks which leave the stomach rapidly as they have a low osmolality

Preoperative Carbohydrate Loading

→

Liver and Muscle Glycogen Stores are replete

Optimizing the metabolic response to surgery;

- reducing insulin resistance
- protein balance
- preservation of lean body mass and muscle strength

↓

Improves the postoperative recovery period and reducing length of hospital stay

Feeding the patient:
Post-operative Nutrient Provision?

Enhanced Recovery After Surgery (ERAS)

- Oral intake should be resumed early as tolerated on the day of the surgery and
- built up to oral diet over next 24 hours
- No reason to await the return of bowel function
- Goal to meet nutritional needs within 72 hours
- Avoid excessive IV Fluid

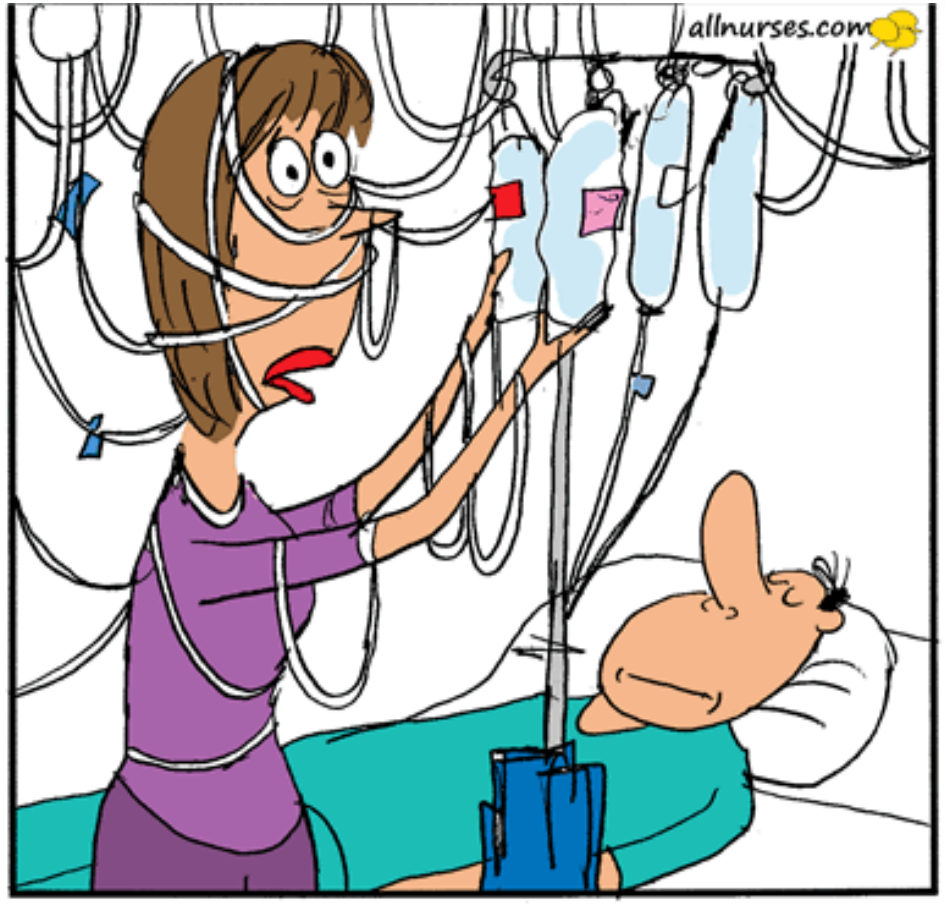
Early enteral feeding

- Early enteral nutrition (EN) delivery can
  - ✓ decrease infectious complications
  - ✓ maintain the integrity of the gut mucosal border
  - ✓ attenuate the metabolic response to surgical stress
  - ✓ decrease mortality
- If artificial nutrition support is indicated, this can be administered via a nasogastric or nasojejunal feeding tube
- Before feeding commences, the patient's risk of refeeding syndrome should be determined

Early enteral feeding

- 4 metaanalysis and >21 individual studies evaluating early postoperative enteral feeding started within 24-48 hours of the time of surgery
- decreased morbidity and a mortality benefit
- This benefit is seen most clearly when enteral delivery is started within 24 hours of completion of the surgery

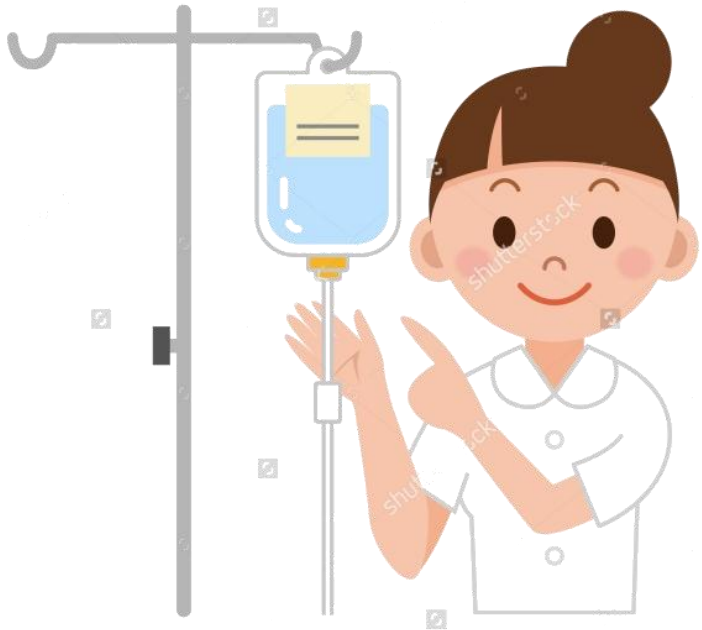
Nutritional Management of Postoperative Complications



"Help."

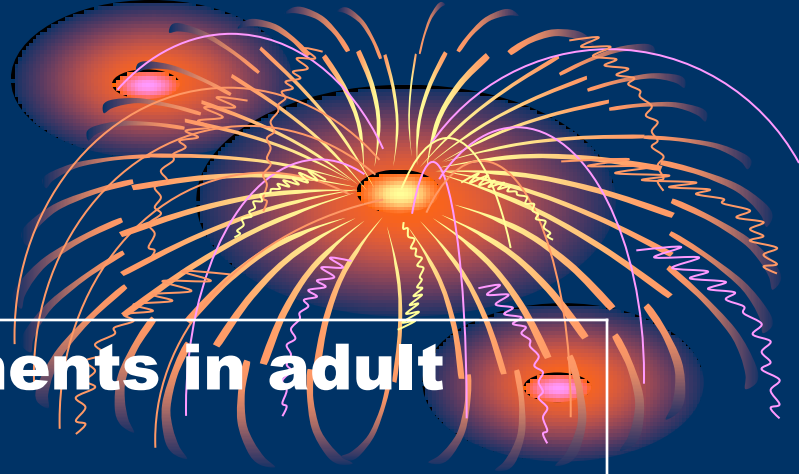
Postoperative Ileus

- The patient with a postoperative ileus for more than 7 days should be treated with PN until the ileus has resolved



Surgical wounds

- Protein intake should be optimized as losses from larger open abdominal wounds are often underestimated
- Electrolyte, Vitamin and Mineral losses
- Vitamin and mineral levels should be checked especially zinc and vitamin C
- If calorie and protein requirements cannot be met via diet and sip feeds, a high-protein feed should be administered via a nasogastric feeding tube

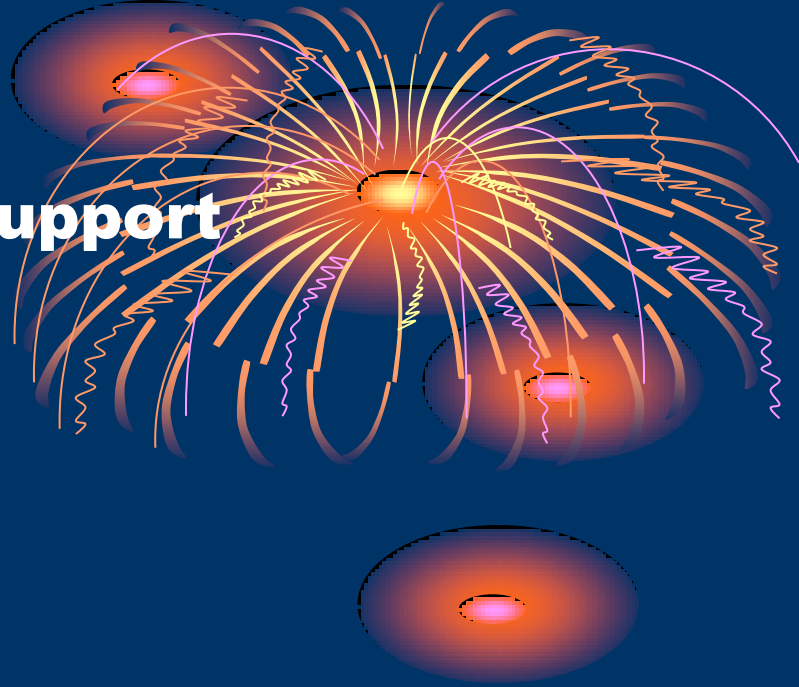


Estimation of energy & protein requirements in adult surgical pts		
	uncomplicated	Complicated/ stress
Energy (kcal/kg/day)	25	30-35
Protein (g/kg/day)	1.0	1.3-1.5

General conditions suggestion initiation of nutritional support

- Poor nutritional status (oral intake <50% 0f energy needs)
- Catabolic state (burn, sepsis, pancreatitis)
- Significant wt loss (>10%)
- Anticipated duration of artificial nutrition longer than 7 days
- Nonfunctional GIT
- Serum albumin <30g/dl in the absence of an inflammatory state

Methods of providing nutritional support



- Enteral nutrition
- Parenteral nutrition

Enteral nutrition

- Is used for pts with a functioning small bowel unable to take nutrients by mouth.

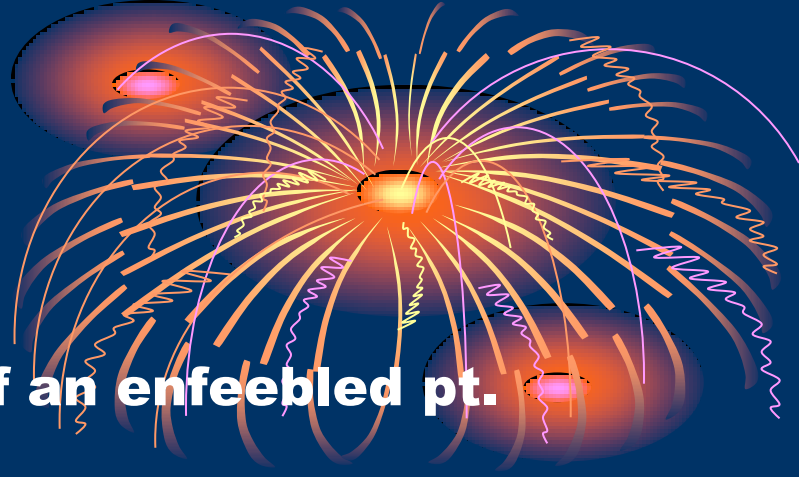
Oral route

-is efficient , less expensive, most pleasant & safest route for pts.

- common sense –adequate, palatable, varied diet including all the nutritional required.

- **Cleanliness – for the preparation & serving of food &utensils.**
- **Compassion – is needed to ensure that the pt actually receives & ingests proffered food .**

Food must be placed within reach of an enfeebled pt.



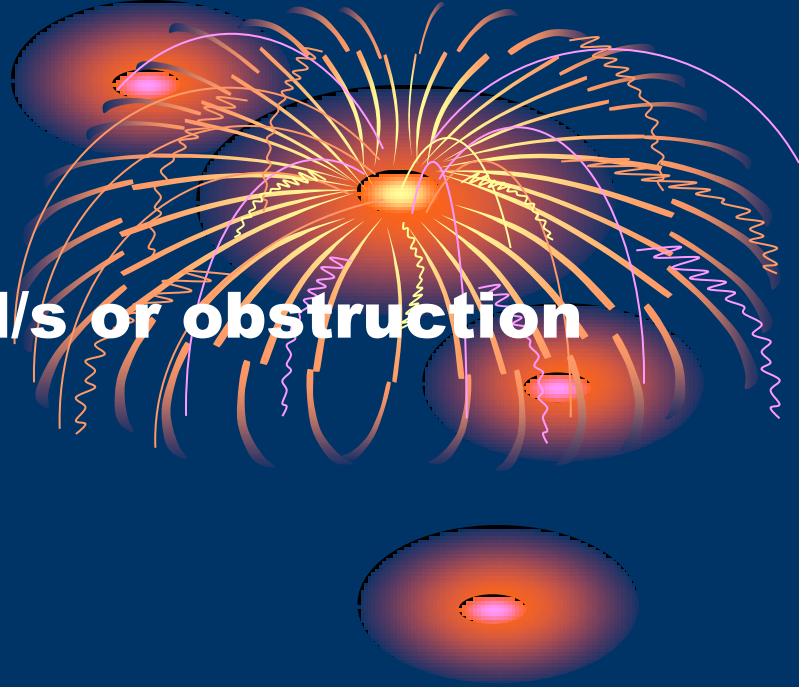
Nasogastric or nasojejunal route

-Pt's with a functional GIT who can't achieve adequate nutritional intake orally.

-can be given by a fine bore nasogastric or nasoenteric tube.

-The position of the tube tip s/b checked radiologically or aspirating gastric content & confirming presence of acid by litmus paper before nutrients are infused.

Gastrostomy & jejunostomy



- Nasogastric feeding is impossible due to d/s or obstruction of the upper alimentary tract.
- Appropriate for long term enteric feeding.

Gastrostomy

- Opened approach (Stamm gastrostomy)
- Percutaneous technique using endoscopic, radiologic, laparoscopic methods.
- Is useful for prolong feeding without impairment of gastric emptying.

Jejunostomy

- **Feeding jejunostomy tube can be inserted at the time of laparotomy when the surgeon anticipates that the prolong nutritional support will be needed post operatively.**

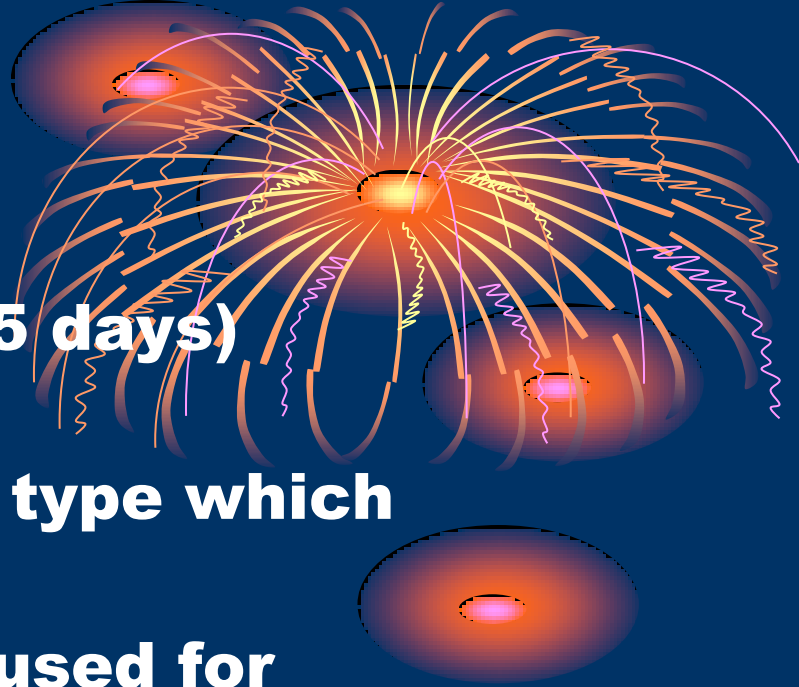
Parenteral nutrition

- Is indicated when pts can't be fed adequately by mouth, by nasogastric tube, gastrostomy /jejunostomy or when they have complete or partial intestinal failure.

- May be permanent (short bowel syndrome)
  -reversible (paralytic ileus or fistula)
- Chief indication- failure of GIT.

- It can be both effective & life saving when post-op complication develop.

Administration of TPN



- Peripheral line- short term feeding (up to 5 days) may be given via drip in a peripheral vein.

  -solution must be a special type which causes little thrombophlebitis.
- Central line – most appropriate route & is used for total parenteral nutrition.

  -short term used –percutaneous internal jugular line

  -long term used & permanent nutrition-a tunneled subcutaneous line .
- Hypertonic solutions are infused via a catheter into a large bore vein with good flow to prevent thrombophlebitis.

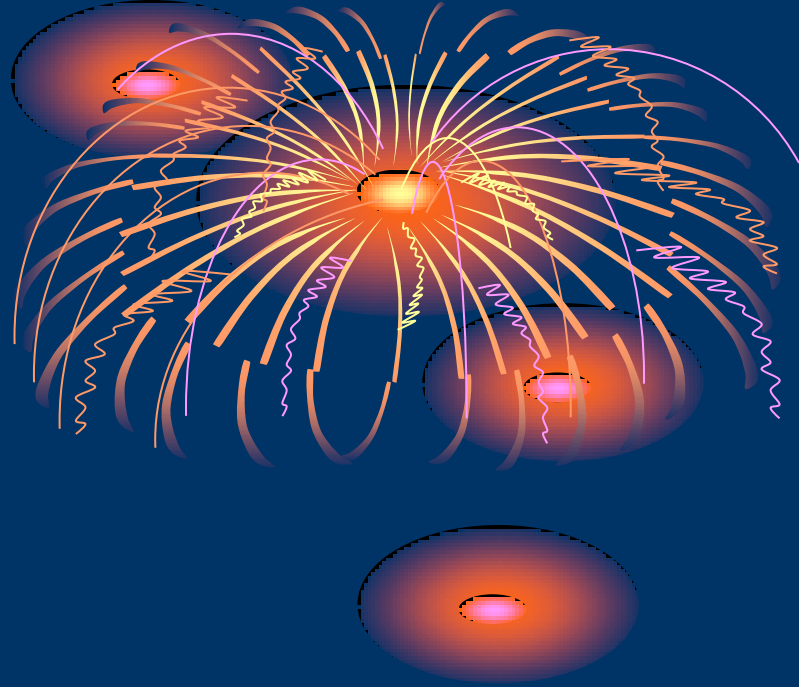
Monitoring

Daily

- Body wt
- Fluid balance
- Blood glucose
- U & E

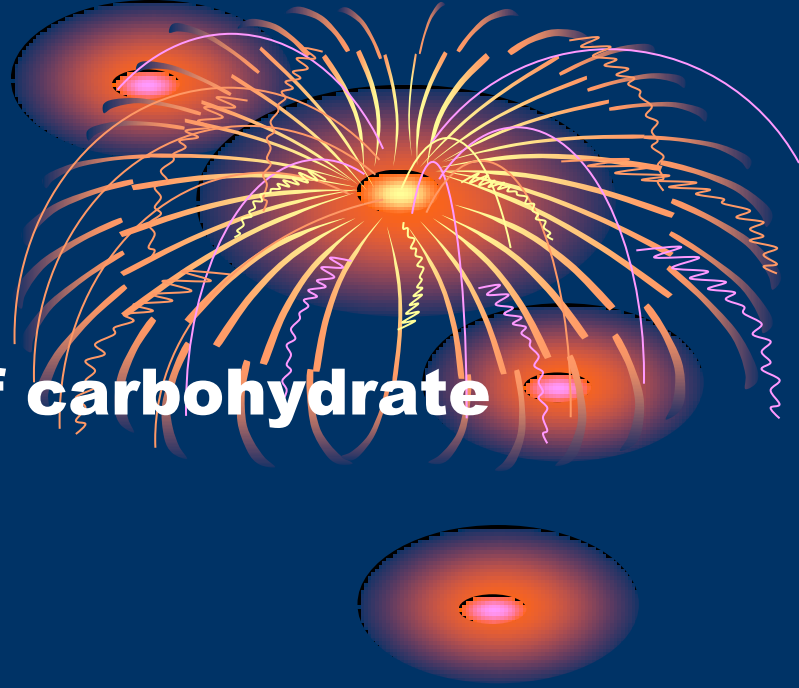
Twice weekly

- LFT
- Ca
- Mg
- Phosphate
- FBC

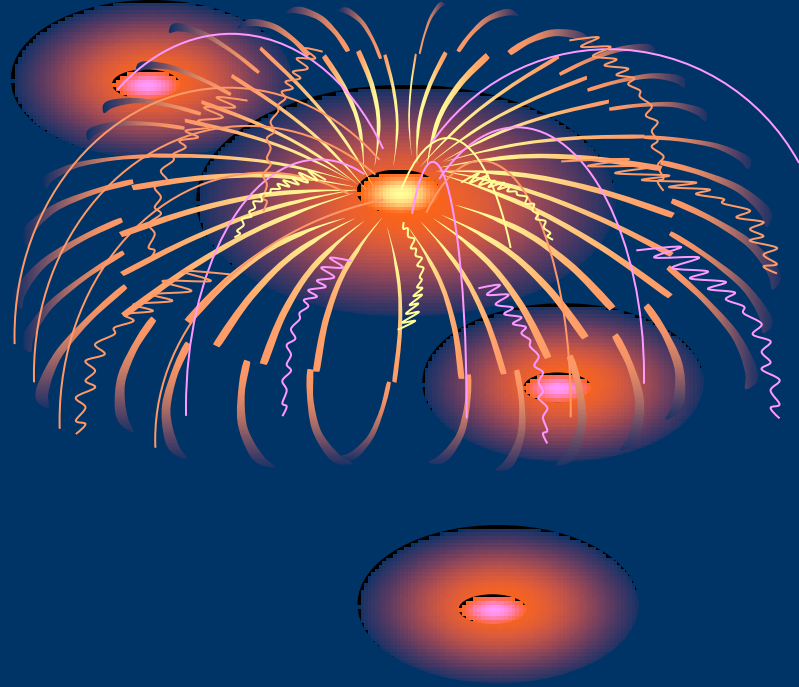


Components of TPN

- Calories –are supplied as a combination of carbohydrate and fat.
- Protein – is supplied as a amino acid.
- Water
- Vitamins
- Electrolytes & trace elements



Complications of TPN

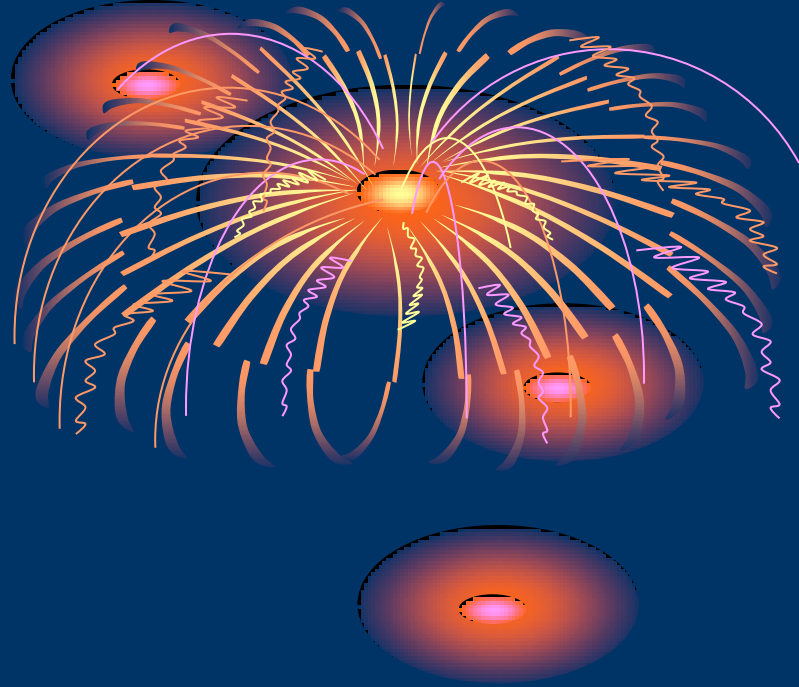


Catheter related

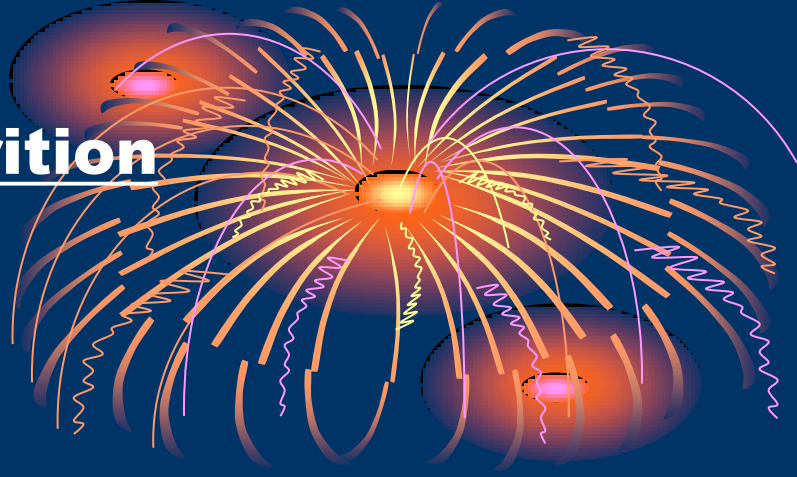
- Pneumothorax
- Air embolus
- Migration of the catheter
  - in the chamber of the heart –arrythmia
  - erode through the vessel wall – haemopericardium
- Catheter blockage
- Infection
- Thrombosis

Metabolic

- Fluid over load
- Hyperglycaemia
- Hypoglycaemia
- Electrolytes abnormalities
- Hypertriglyceridemia
- Hyperchloraemic acidosis
- Trace elements & vitamin deficiency
- Hepatic cholestasis



Novel substrates or immunonutrition



- **Has two supplementations.**
  -glutamine supplemented feeds
  -arginine based cocktail

- **Glutamine is required by many biochemical processes & is in high demend during inflammation & repair.**

  - A shortage may limit immune activity, enterocyte replication, & maintenance of glutathione antioxidant defences in ill or injured pt.

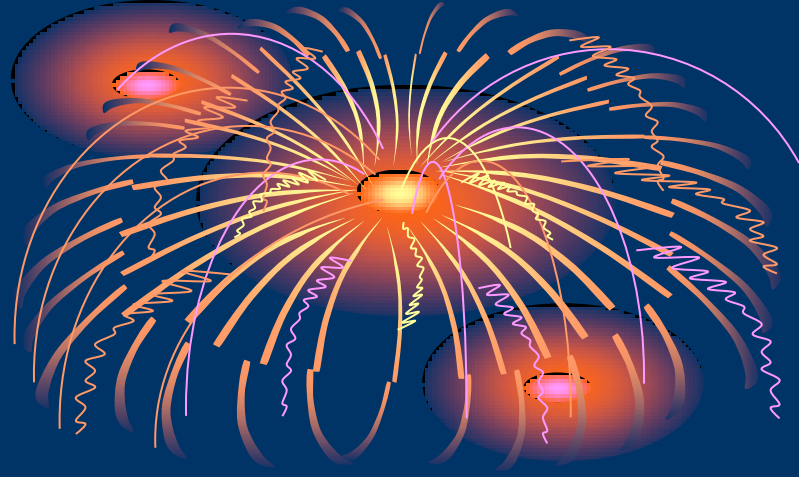
  - It can be given enterally & more benefit in pts with intestinal disease.

- **Arginine based cocktail contains arginine, RNA, and omega 3 fatty acid.**

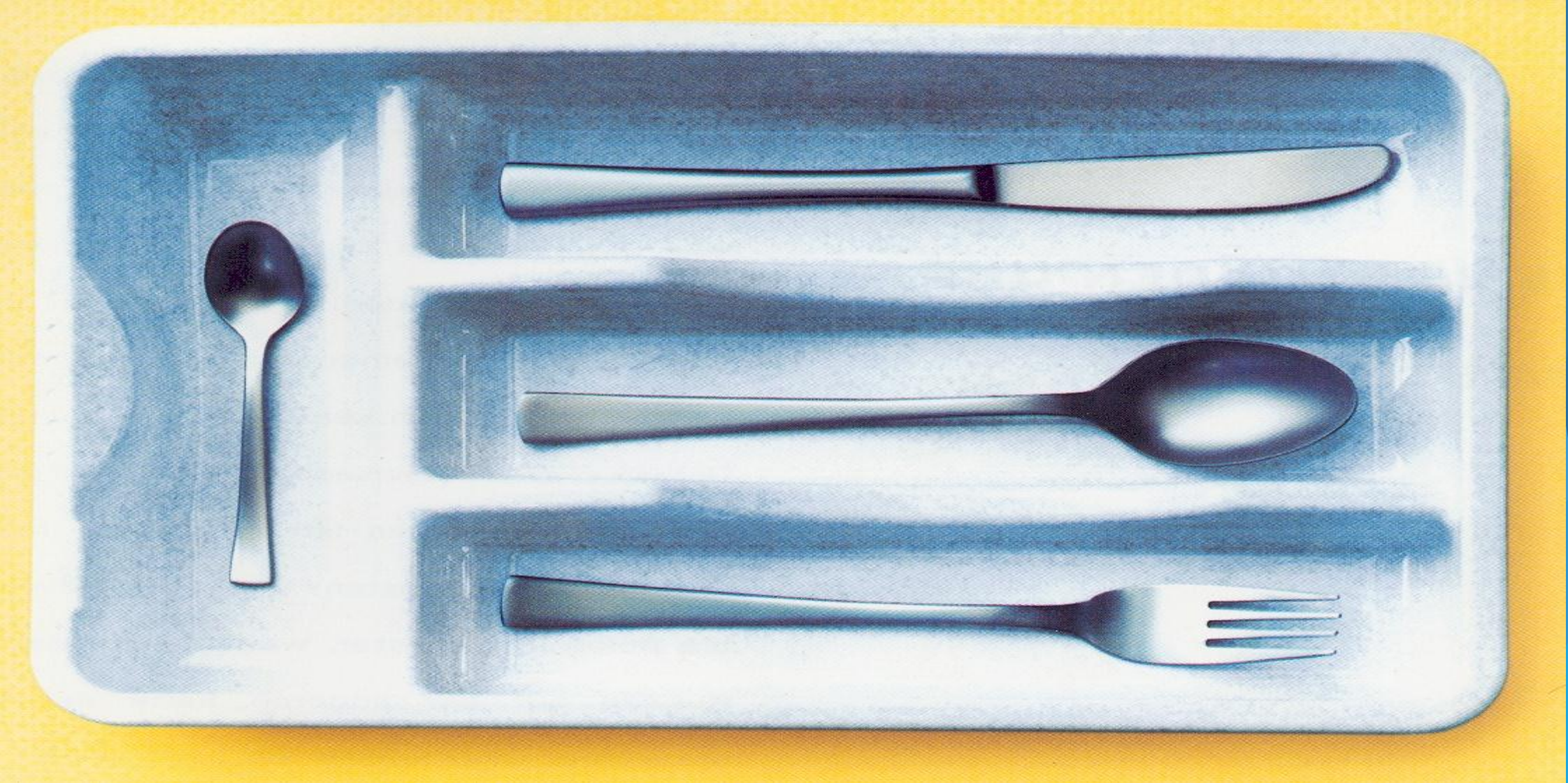
-used as EN feeding usually given pre-op oral supplementation followed by post-op jejunostomy feed.

- it stimulates T lymphocytes, promotes the synthesis of PGs and enhances immune competence.

- reduces infectious complications by about 50% in pts with GI malignancy & also reduce mortality rate in ICU pts.



- It goes without saying that without food there can be no life , that food is a basic human right, and that is behaves every doctor to pay attention to the nutritional needs of his or her pts.



Eating is more than caloric intake

Thank you