

Nutritional intervention in hospitalised paediatric patients

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Back to basics

- Suboptimal nutrient intake is always dangerous in health and more so in disease
- “to feed or not to feed” – is it a question?
- Hospitalised children have serious illness that leads to poor intake, synthesis and utilisation while nutritional needs are increased
- Autocannibalism results leading to increased morbidity and mortality, immune suppression with risk of infection, muscle weakness, delayed healing and prolonged hospital stay

Demography of hospitalised children

- Critically ill children in ICU (shock, coma, organ failure, mechanically ventilated)
- Children in ICU during immediate post-operative period after major surgery
- Children in level 2 care facility with respiratory distress (pneumonia), impaired sensorium (TBM), chronic GI diseases (diarrhoea, IBD), worsening chronic illness (hepatic, renal, cardiomyopathy, diabetes)
- Many are malnourished – few SAM
- Most of them need nutritional intervention

When to start nutritional intervention?

- As early as possible
- If stable (perfusion and oxygenation), on day 1 in malnourished, day 3-4 in healthy child
- If not stable (as in shock or acute respiratory failure, SAM), resuscitate first and once stable, start nutritional support
- In immediate post-surgical period, as soon as child is stable

Route of intervention

- Enteral route always preferred
it is physiological, safe, effective and cheap
- Nasogastric tube feeding – head high at 30 degree, bolus or continuous / risk of microaspiration, blockage or displacement / needs frequent change and not > 6-8 weeks
- Nasojejunal, gastrostomy, PEG
- Contraindication for enteral feeding
intestinal obstruction, paralytic ileus, sepsis

Planning enteral nutrition

- Assess premorbid nutritional status
- Evaluate stress-related changes in nutritional need and volume status
- Note intestinal, hepatic and renal functional integrity
- Define ideal calorie requirements and energy sources along with vitamins and minerals
- Too little and too much are both harmful
- Avoid hyperosmolar solutions
- Define quantity per feed and frequency of feeds

Choice of formula

- Depends mainly on GI function
normal composition including whole protein
nitrogen source in normal state
in severe impairment, complex carbohydrate,
vegetable source of protein and low fat with high
MCT or elemental predigested formula
- Add vitamins and minerals – many have dose-
response curve leading to toxicity
- Start midway and make changes as per tolerance

Do we need special diet?

- Immuno-nutrition
immunomodulation through specific nutrients
such as glutamine, arginine, fish oil
role of vitamin D
is it fact, fancy or folly?
limited role?
- Elemental formula for impaired GI function –
need for low cost alternative
- Special diet for hepatic or renal diseases, diabetes

Nutritional intervention for SAM

- Resuscitation, restoration, rehabilitation and prevention
- Resuscitation for presence of sepsis, hypoglycemia, electrolyte disturbances (Na, K, Mg, phosphates, Ca), hypothermia
- Restoration once stabilised
F75 (75 calories / 100 ml, low sugar and protein) – gradually increase to F100 (100 calories / 100 ml with higher sugar and protein), further advance to ideal nutritional intake
- Rehabilitation–sustain ideal nutrition with “family pot”
- Prevention – counselling and communication

Refeeding syndrome

- During poor feeding or starvation, energy is derived from ketone bodies derived from breakdown of fatty acids to avoid breakdown of muscles and proteins
- Intracellular minerals are also depleted
- With refeeding, there is an increase in blood sugar and synthesis of glycogen, proteins and fat, which requires K, Mg, phos
- This results in further severe depletion of all intracellular minerals that endangers cell function
- It happens after 4-5 days of refeeding and a child who has lost weight rapidly is at high risk

Parenteral nutrition

- Total (TPN) through central catheter or port with high glucose / partial (PPN) through peripheral vein with 5-10% glucose
- Standard solution with aminoacids, lipids, vitamins and minerals besides glucose
- Indications – when GI tract is unavailable (TPN) or when oral intake cannot meet the demands (PPN)
- Complications of TPN – hepatic steatosis, cholestasis, infection, GI mucosal atrophy, metabolic disturbances, catheter-related blood stream infection, pneumothorax, vessel puncture

Summary

- Nutritional deficiency is in the background of most hospitalised children
- Disease further worsens nutritional status
- If not identified and not intervened appropriately, recovery from disease is delayed with a risk of complications
- Unfortunately nutrition is often ignored with sole attention on disease process and attempt to cure the same with modern technology
- Modern technology cannot replace traditional wisdom and basic facts