Nutrition Management in GI Diseases

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Patient’s Care

1. Drugs
2. Nutrition
3. Nursing
Pediatric Nutrition Care

1. Nutritional Status Assessment
2. Nutritional requirement
   - Calory
   - Carbohydrate, protein, fat
   - Vitamin, mineral
3. Determine:
   - Formula
   - Route of Delivery
4. Monitoring
Infant Feeding Practice

<table>
<thead>
<tr>
<th>Age (months)</th>
<th>Feeding</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 6</td>
<td>Breast feeding/ formula milk</td>
</tr>
<tr>
<td>6 - 12</td>
<td>BF/Formula milk</td>
</tr>
<tr>
<td></td>
<td>semisolid &amp; solid foods</td>
</tr>
<tr>
<td>&gt; 12</td>
<td>BF/Formula milk</td>
</tr>
<tr>
<td></td>
<td>solid foods /family food</td>
</tr>
</tbody>
</table>
Common GI Disorders

1. Vomiting
2. Diarrhea
3. Constipation
4. Abdominal pain
5. GI Bleeding
6. Short Bowel Syndrome
Vomiting

1. Small frequent feeding
2. Food choice according to child’s age
   - BF
   - Formula milk
   - Semi solid/ solid food
3. Nasogastric tube sometime is needed
   - Formula milk
   - Liquid food
Acute GE

- Dietary management depend on the age & diet history of the patient
- Infant feeding practice
  - 0 – 6 month: Breast feeding/ formula milk
  - 6 – 12 months: BF/FM, semisolid & solid foods
  - > 12 months: solid foods /family food
Child’s food

- Brest Milk
- Starting formula
- Follow on formula
- Growing up formula
- Special formula
  - Low lactose/Free lactose
  - Soy formula
  - Hypo-osmoler/hypoallergenic formula
- Liquid food
- Semi solid/solid food
Infant 0 – 6 month of age

Non dehydration, mild-moderate dehydration

- Continue breast feeding
- ORS
Infant 0-6 months on Formula Milk

Non dehydration, mild-moderate dehydration

- Continue Formula Milk
- ORS
- Diluted formula milk has no benefit
Infant 0-6 months on Formula Milk

Severe dehydration

- IVFD
- Continue Formula Milk
- ORS
- Diluted formula milk has no benefit
- Free lactose formula
Infant 6-12 months of age

- Continue breast feeding/formula milk
- ORS
- Semi solid/solid food
Infant 6-12 months

Non dehydration, mild-moderate dehydration

- Continue breast milk/Formula Milk
- ORS
- Semi solid/solid food should be continued
- Food high in simple sugar should be avoided
- Highly specific diet such as BRAT (bananas, rice, apple sauce & toast) commonly recommended
Infant 6-12 months

Severe dehydration

- IVFD
- Continue breast milk/Formula Milk (Free lactose)
- ORS
- Semi solid/solid food should be continued
- Food high in simple sugar should be avoided
- Highly specific diet such as BRAT (bananas, rice, apple sauce & toast) commonly recommended
Children above 1 year

- Continue breast milk/Formula Milk
- ORS
- solid food should be continued
- Food high in simple sugar should be avoided
- Highly specific diet such as BRAT (bananas, rice, apple sauce & toast) commonly recommended
Pathogenesis Chronic Diarrhea

Predisposition

Small Intestinal Dysfunction

Chronic Diarrhea

Malnutrition

Pancreatic & Gastric Dysfunction

Immune Deficiency

Infection

Specific Deficiencies e.g. Zn
Chronic diarrhea (1)

- Infant with intractable diarrhea are at nutrition risk & should undergo nutrition screening to identify those who require formal nutrition assessment with development of a nutrition care plan.
Chronic diarrhea (2)

- Continues Enteral nutrition should be given to children with intractable diarrhea unable to maintain normal nutrition status with normal intake
Chronic diarrhea (3)

- Parenteral Nutrition should be given to children with intractable diarrhea unable to maintain normal nutrition status with oral intake & EN

- High fat, high MCT containing EN formulation should be given to children with intractable diarrhea who are carbohydrate intolerant
Diarrhea in severe malnutrition child

- Persistent diarrhea that occurs everyday for at least 14 days
- Feeding guidelines are the same as for severe malnutrition
- BF should be continued as often and for long as the child wants
- Milk intolerance is rare when the recommended feeding guidelines for malnutrition are followed.
- If it occurs replace the animal milk with commercial lactose free formula
## Formula diet for severe malnutrition

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Amount</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>F-75</td>
<td>F-100</td>
</tr>
<tr>
<td>Dried skim milk</td>
<td>25 g</td>
<td>80 g</td>
</tr>
<tr>
<td>Sugar</td>
<td>70 g</td>
<td>50 g</td>
</tr>
<tr>
<td>Cereal flour</td>
<td>35 g</td>
<td>-</td>
</tr>
<tr>
<td>Vegetable oil</td>
<td>27 g</td>
<td>60 g</td>
</tr>
<tr>
<td>Mineral mix</td>
<td>20 ml</td>
<td>20 ml</td>
</tr>
<tr>
<td>Vitamin mix</td>
<td>140 mg</td>
<td>140 mg</td>
</tr>
<tr>
<td>Water to make</td>
<td>1000 ml</td>
<td>1000 ml</td>
</tr>
</tbody>
</table>
Constipation

- Encouraging fluids & dietary intervention are the first line of therapy
- High fiber diets are recommended
- AAP : 0.5 g/kgBW
- Toilet training
## Dietary fibers guidelines

<table>
<thead>
<tr>
<th>Age groups (years)</th>
<th>Adequate intake (Total fiber)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - 3</td>
<td>19 g/day</td>
</tr>
<tr>
<td>4 - 8</td>
<td>25 g/day</td>
</tr>
<tr>
<td>Boys</td>
<td></td>
</tr>
<tr>
<td>9 – 13</td>
<td>31 g/day</td>
</tr>
<tr>
<td>14 - 18</td>
<td>38 g/day</td>
</tr>
<tr>
<td>Girls</td>
<td></td>
</tr>
<tr>
<td>9 – 13</td>
<td>26 g/day</td>
</tr>
<tr>
<td>14 - 18</td>
<td>26 g/day</td>
</tr>
</tbody>
</table>
RDA fiber intake ( > 2 years)

5 + age (in years), max 35 g/day

Eg. 7 years old receive:
5 + 7 = 12 g per day
Most effective fibers

- Wheat bran
- Fruits
- Vegetables
- Oats
- Corn
- Soya
Good source of dietary fibers

- Fruits: apple, apricot, blueberries, dates, pear, raisin, strawberry, avocado.
- Vegetables: beans, broccoli, etc
- Cereals, jelly, pudding
Abdominal pain

- Lactose intolerance: Lactose free diet
- Constipation: High fibers diet
GI Bleeding

- Nothing per oral
- Start with formula milk/liquid food
- Increase volume gradually
Short Bowel Syndrome

- Disorder characterized by decreased GI mucosal surface area & increased transit time

- Can lead to:
  - macro & micronutrients malabsorption
  - electrolyte abnormalities
  - dehydration
  - malnutrition
Common Cause

- Necrotizing enterocolitis (NEC)
- Intestinal atresia
- Gastrochisis
- Midgut volvulus
- Inflammatory bowel disease
- Tumors
- Radiation enteritis
- Ischemic injury
- Others
Length of small bowel resected

- Normal small intestine length
  - 217 ± 24 cm (infants 27-35 weeks GA)
  - 304± 44 cm (infants ≥ 35 weeks GA)
  - 250 – 300 cm (terms)
  - Added 2-3 m from term (growth-adulthood)

- Large intestine
  - 30-40 cm (at birth)
  - 1.5-2 m (adulthood)
Lost of intestinal length

- Limit digestion by reducing exposure of nutrients:
  - to brush border hydrolytic enzyme
  - pancreatic & biliary secretion
- Infants required approximately 10-30 cm of small intestine + intact ileocecal valve
Portion of small bowel resected

- The location of resected bowel has an impact on nutrient loss in SBS
<table>
<thead>
<tr>
<th>Location</th>
<th>Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duodenal</td>
<td>Iron &amp; folate malabsorption</td>
</tr>
<tr>
<td>Proximal small bowel resection</td>
<td>Ca malabsorption</td>
</tr>
<tr>
<td>Jejunum</td>
<td>Digestive enzyme, transport carrier protein, most nutrient, pancreatic &amp; biliary secretion</td>
</tr>
<tr>
<td>Ileum terminal</td>
<td>Bile acids malabsorption</td>
</tr>
<tr>
<td></td>
<td>B12, hormonal substance that slow GI motility in response to fat malabsorption</td>
</tr>
<tr>
<td></td>
<td>Reduce transit time</td>
</tr>
<tr>
<td>Small bowel resection</td>
<td>Reduce transit time</td>
</tr>
</tbody>
</table>
Presence or absence of the ileocecal valve

- ICV: serve to regulate the flow of enteric contents from the small bowel into the colons

- The absence of an ICV:
  - shorten GI transit
  - increases fluid losses
  - increase nutrient losses
Adaptive changes in the small bowel following extensive resection

- Increased bowel circumference
- Increased bowel wall thickness
- Increased bowel length
- Increased villus height
- Increased crypt depth
- Increased cell proliferation & migration to villus tip
Nutritional management

- Enteral feeding
- Parenteral feeding
“Always feeding the Guts”

Prolong fasting
- difficulty when starting oral/enteral feeding