Adult Nutrition

Background knowledge

Normal requirements for hospital patient
Depend on patient’s weight...
(e.g. for an average 70kg patient over 24 hours):

**Energy:** 30 kcal/kg/day (≈ 2100 kcal)
**Protein:** 0.8-1 g/kg/day (≈ 56-70 g)
**Fluid:** 30-35 ml/kg/day (≈ 2.1-2.45 L)

Assessing nutritional status

- Malnutrition Universal Screening Tool (MUST) score: 0 = low risk; 1 = medium risk (observe); 2 or more = high risk (treat)

<table>
<thead>
<tr>
<th>MUST screening score</th>
<th>0 points</th>
<th>1 point</th>
<th>2 points</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMI</td>
<td>&gt;20 kg/m²</td>
<td>18.5-20 kg/m²</td>
<td>&lt;18.5 kg/m²</td>
</tr>
<tr>
<td>Unplanned weight loss</td>
<td>&lt;5%</td>
<td>5-10%</td>
<td>&gt;10%</td>
</tr>
<tr>
<td>Acutely ill and has been/will be no intake for &gt;5 days</td>
<td>No</td>
<td>Yes</td>
<td></td>
</tr>
</tbody>
</table>

- BMI
- History
- Nutritional status exam
- Bloods: haemoglobin, electrolytes (including Mg, PO, Ca), LFTs (including albumin), haematinics (B12, folate, ferritin)

Foods

- Meals should ideally contain 650-850 kcal
- A food guide should be used to calculate energy and protein intake

Oral supplements

Nutritional drinks
Prescribed by calculating patient’s daily calorie requirement against their food intake, then top up with the nutritional drinks; examples:

- Nutricia Fortisips (200ml bottles) – most commonly used
  - 300 kcal/bottle
  - Nutritional complete (50% reference nutrient intake in 1 bottle) so can be sole source of nutrition
  - Cost 2p in hospital but £2 in community
  - Can be written up in mls
- Nestle resource energy
- Nutricia PreOp
- Nestle build up soup

<table>
<thead>
<tr>
<th>Nutritional drinks contents (reference table)</th>
<th>Energy (kcal)</th>
<th>Carbohydrate (g)</th>
<th>Protein (g)</th>
<th>Fat (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fortisip Extra (200ml milkshake)</td>
<td>320</td>
<td>36</td>
<td>20</td>
<td>11</td>
</tr>
<tr>
<td>Fortisip Compact (125ml milkshake) – similar contents in smaller volume</td>
<td>300</td>
<td>37</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>Fortisip Multi Fibre (200ml milkshake) - with 5g fibre to help maintain bowel function</td>
<td>300</td>
<td>37</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>Fortijuice (200ml juice)</td>
<td>300</td>
<td>67</td>
<td>8</td>
<td>0</td>
</tr>
<tr>
<td>Nestle resource energy (200ml milkshake)</td>
<td>300</td>
<td>42</td>
<td>11</td>
<td>10</td>
</tr>
<tr>
<td>Nestle build up soup (49g sachet)</td>
<td>200</td>
<td>27</td>
<td>7</td>
<td>6.9</td>
</tr>
<tr>
<td>Nutricia PreOp (200ml clear drink) – 2 taken 2 hours pre-op for major elective operations</td>
<td>100</td>
<td>25</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Additional micronutrients to consider

- Vitamins
  - Sanatogen multivitamin tablets
  - Oral vitamin B co-strong + thiamine
  - Pabrinex (IV equivalent of oral vitamin B co-strong + thiamine) – use for first 3 days before changing to oral if patient has anorexia nervosa or chronic alcoholism

- Electrolytes (if low) – see U&Es interpretation
  - Potassium
  - Phosphate
  - Magnesium
  - Calcium

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**Enteric feeds**

Required when oral intake is likely to be absent for >5-7 days and gut is functioning

**Administration methods**

- Fine bore-nasogastric (NG) tube
- Nasojejunal (NJ) tube – if problems with gastric reflux or delayed gastric emptying
- Percutaneous gastrostomy/jejunostomy tube – for longer term feeding i.e. >4-6 weeks or if mechanical swallowing obstruction.

May be inserted:
- Endoscopically (PEG/J) – most
- Fluoroscopically (PFG/J)
- Radiologically (RIG) – if patient cannot swallow
- Surgically – if having other surgery, tube may be placed at the same time

**Matching requirements**

- Most feeds contain 1 kcal/ml and are nutritionally complete (hence, 30 ml/kg/day will give requirements above, but start at <10 ml/kg/day in patients at risk of re-feeding syndrome)
- Exact feed choice is influenced by nutritional requirements, absorption/motility abnormalities, diarrheal loss and liver/renal failure

**Types of feed**

- Polymeric feeds (polypeptides) – most commonly used
- Pre-digested feeds (small peptides) – better absorbed, for mal-digestive patients, patients with short gut or pancreatic insufficiency
- Disease specific and pharmaco nutrient feeds – for liver/renal failure patients

**Administration**

- Boluses (e.g. 200-400ml over 15-60 mins at regular intervals) – more physiological but can cause ‘dumping syndrome’
- Intermittent infusion (breaks of 6 or more hours depending on requirements) – most commonly used
- Continuous infusion – used for very ill patients

**Drugs down enteric tubes**

- Use solutions where possible
- Some tablets can be crushed and some capsules may be opened (check with pharmacist)
- Tablets which cannot be crushed: modified release tablets; enteric coated tablets

**Parenteral nutrition**

Parenteral nutrition may be required in intestinal failure (acute or chronic) and is given via central venous access

- ‘Parenteric nutrition’ (PN) – if also feeding patient by other methods
- ‘Total parenteric nutrition’ (TPN) – only IV feeding

**Re-feeding syndrome**

- Insulin surge and re-switching on of cellular membrane pumps in response to feeding causes electrolyte abnormalities (especially K⁺, PO₄³⁻, Mg²⁺) which can lead to arrhythmias and death
- Check K⁺, PO₄³⁻, Mg²⁺
- Management
  - Continue low level of feed
  - Daily bloods minimum initially
  - Replace all electrolytes – see U&Es interpretation
- Anyone who is at risk:
  - Start feeding at ~ 10 kcal/kg/day (5 kcal/kg/day if very malnourished)
  - Give supplements
    - Pabrinex (convert to oral vitamin B co-strong and thiamine after 3 days)
    - Electrolyte replacement – see U&Es interpretation
      - Potassium
      - Magnesium
      - Phosphate
Infection in malnourished patients

- Malnourished patients have a high risk of infection and don’t mount a proper immune response
- Deadly triad
  - Low BMI
  - Hypoglycaemia
  - Hypothermia
- Have low threshold for septic screen and antibiotics

Requirements in special cases

Exocrine pancreatic insufficiency
- Require Creon (enzyme) supplementation

Liver patients
- Low protein diet in encephalopathy
- Low sodium (to reduce risk of ascites)

Respiratory failure
- Low carbohydrate to fat ratio (to minimise CO$_2$ production)

Renal failure
- Low protein
- Low sodium
- Low potassium
- Reduced fluid quantity