Nutrition — its role in disease management

By Pamela Mason, PhD, MPharmS

Nutrition is an important consideration when treating certain diseases. This article describes some of these conditions and details the adjustments to foods, feeds and fluids that might need to be made.

The potential consequences of dysphagia include choking, aspiration, dehydration, malnutrition and death. Feeding can be slow, difficult and tiring, which can lead to a patient’s food intake being inadequate.

Nutritional management involves assessing the nature of the swallowing problem and deciding whether feeding by the oral route is safe. If it is not, enteral or parenteral feeding should be considered.

Modifying food texture: If a patient can safely manage an oral intake, the texture and consistency should be such that he or she has optimal control of the rate at which foods and fluids pass through his or her pharynx. Nutritional and fluid requirements should be met while minimising the risk of aspiration and choking. An appropriate diet may vary from one consisting of normal foods to a liquid or pureed diet, and will generally be determined by a speech and language therapist or dietitian.

National guidelines on texture modification in dysphagia have been produced. In general, single-texture foods (eg, mashed potato, semolina, yogurt) are more appropriate than combination meals, such as casseroles or risotto. Commercial thickening agents derived from food starch are available for dysphagia and can be added to foods or liquids to provide the desired consistency.

Inflammatory bowel disease

The two major forms of inflammatory bowel disease are Crohn’s disease and ulcerative colitis. Both conditions cause similar symptoms (ie, abdominal pain, diarrhoea, weight loss and anaemia), but Crohn’s disease can affect any part of the GI tract, while ulcerative colitis occurs mainly in the large intestine. Periods of relapse and remission are experienced by patients with these conditions and malnutrition commonly occurs.

Dietary management depends on restoring and maintaining fluid and electrolyte balance and maintaining optimal nutrition by providing food or artificial feeds. During and after periods of acute relapse, additional nutritional support will be valuable, particularly if weight has been lost and oral intake is poor.

Food withdrawal: In acute phases of Crohn’s disease (but not ulcerative colitis), replacement of normal food with a liquid formula diet or parenteral nutrition for two to four weeks is sometimes used to induce remission, rather than using drug treatment (eg, corticosteroids). Cochrane meta-analyses suggest that supplementary enteral nutrition may be effective for maintaining remission in Crohn’s disease, but is less effective than corticosteroid therapy for inducing remission.

In children, the limited available data suggest that enteral nutrition has a similar efficacy to corticosteroids for inducing remission.

Enteral nutrition may be most worthwhile in specific patient groups, such as patients aged under 40 years (for whom there is potential for long-term use of corticosteroids), pregnant women and patients who are at high risk of suffering side effects of the drugs used to treat the condition.
Following the period of food withdrawal, transition to normal foods needs to be made with care. Some centres devise individual food reintroduction plans for each patient, while others use existing plans such as the “LOFLEX diet” or the “Holt protocol”, both of which are low in fat and fibre. Diet sheets for these plans are available from SHS International, a company that manufactures medical nutrition products.

Cystic fibrosis

Cystic fibrosis is an inherited disorder in which the exocrine glands produce abnormally viscous secretions. Most of the clinical problems associated with the condition involve the pancreas and the lungs. In particular, pancreatic exocrine insufficiency is present in 90 per cent of patients. Malabsorption of fat occurs and treatment with pancreatic enzymes is required.

High fat diet

Agressive nutritional intervention is necessary to ensure growth and development of cystic fibrosis patients. A high intake of energy and nutrients is usually achieved by eating foods with a high fat and sugar content as regular meals and as snacks. The appropriateness of this diet can be difficult for others to accept, because it contradicts the principles of healthy eating.

Periods of enteral feeding will also be required, particularly during episodes of infection, since it may otherwise be impossible to ensure that patients have sufficient energy intake to prevent weight loss. Sip feeds may be given and glucose polymer energy supplements can be added to drinks. Supplements of fat-soluble vitamins A, D, E and K should also be given, but there is no need for the routine supplementation of water-soluble vitamins.

Liver disease

Nutritional support plays a major role in the management of liver disease, and is based on the underlying cause. Malnutrition is a common characteristic of liver disease, so the aim of treatment is to maintain or improve a patient’s nutritional status.

Avoid dietary restrictions

Although sometimes appropriate, dietary restriction (eg, a reduced intake of sodium in patients with ascites) should not be used at the expense of providing adequate nutrition. The evidence of benefit from such traditional approaches is not clear. The risks of malnutrition high, so dietary restrictions should be minimised while optimising drug treatment (eg, with diuretics, oral hypoglycaemics, insulin). For patients with ascites, current practice at specialist centres in the UK uses a “salt to tolerance” approach, during which the patient's level of co-operation for reducing his or her salt intake is assessed.

Renal disease

Nutritional therapy is important in the management of patients with all types of renal disease, such as:

- A cute renal failure (ARF)
- Chronic renal failure (CRF)
- End-stage renal failure (ESRF)
- Nephrotic syndrome

Foods with high fat and sugar content help to prevent weight loss in cystic fibrosis patients.

Meeting energy and protein requirements is the primary aim of nutritional therapy and can assist recovery from disease. In many patients, this goal can be achieved by consuming a normal diet. However, six to seven small meals or snacks a day may be better tolerated than larger, less frequent meals. This approach also avoids long periods of fasting, which helps to minimise gluconeogenesis and muscle catabolism (which are often a problem in patients with severe liver disease).

Further management

Patients who are unable to meet their nutritional requirements from a normal diet will need sip feeds. If nutritional requirements are still not met, enteral feeding should be started without delay. Nasogastric or nasojejunal feeding can be used. Specialist liver centres often use nasojejunal feeding for patients with ascites, encephalopathy, nausea, vomiting and early satiety because this method delivers feed directly into the small bowel and does not exacerbate these conditions.

Percutaneous feeding (eg, via a percutaneous endoscopic gastrostomy tube) is contraindicated in patients with liver cirrhosis. There is a high risk of bleeding when the tube is inserted because the patient will have impaired blood coagulation and, if varices are present, a fatal variceal bleed is possible. In addition, the presence of ascites predisposes patients to infection and potential leakage of ascites fluid from the insertion site.

Acute renal failure

In A RF, treatment depends on whether a patient is catabolic or non-catabolic. Catabolic causes of A RF include trauma and sepsis and many catabolic patients are postoperative and have multiple organ failure. A RF requires intensive support and patients are likely to require enteral feeding. Protein intake should not be restricted, since protein turnover is increased in these patients. Fluid and electrolyte requirements are variable and frequent monitoring is essential to guide provision.

N on-catabolic A RF is managed in a similar way to C RF (see below). Protein and energy requirements are not increased, but anorexia and nausea may be present. In such cases, energy dense supplements may be needed, in addition to normal food, to optimise nutritional status. Fluid and electrolyte intake should be modified according to a patient's blood biochemistry, and his or her level of fluid overload.

Chronic renal failure

C RF is an irreversible and usually progressive form of renal impairment. What constitutes an appropriate protein intake in C RF is controversial. Traditionally, “low protein” diets were prescribed as a means of slowing disease progression and, before dialysis was widely available, as a means of alleviating uraemia. However, such diets are associated with a reduced nutritional status and difficulties with compliance are common. Their use remains contentious and guidelines differ.
In practice, the amount of protein given to a patient with CRF is decided on locally. If a low-protein diet is prescribed, careful supervision by a renal dietitian is essential.

**Fluids** Fluid intake should be restricted (usually to 500ml plus the previous day’s urine output) if there is fluid overload. If fluid is restricted, the amount of sodium consumed should also be restricted to alleviate thirst. This can be achieved by not adding salt to food during or after cooking and reducing consumption of salty, processed foods. A few patients with advanced CRF lose salt. These patients should not have their sodium intake restricted (unlike most CRF patients) and may require salt supplementation.

**Potassium** Hyperkalaemia is a concern because of its potentially adverse cardiac effects. If hyperkalaemia is present and cannot be corrected by standard treatment (eg, with ion exchange resins or calcium gluconate), potassium intake should be restricted to approximately 1mmol/kg of body weight per day.

**Phosphate** Hyperphosphataemia is common in patients with CRF. Blood phosphate concentrations can be reduced if necessary, by restricting dietary phosphate (to 30mmol per day) or using phosphate binders. Hyperphosphataemia is commonly accompanied by hypocalcaemia, due to the kidneys’ failure to activate vitamin D as CRF advances, hence reduced calcium absorption. Supplementation with active vitamin D may be required. Achieving a patient’s optimal blood biochemistry can be difficult and frequent monitoring, with appropriate adjustments in the intake of nutritional components, may be required.

**Other requirements** The metabolism of vitamins and minerals is altered in renal failure, although there is no requirement for routine supplementation. Plasma vitamin A concentrations tend to be raised in patients with CRF because of high levels of retinol binding protein in the blood. However, toxicity is rare because the vitamin is bound to the protein and is therefore inactive.

Anemia commonly occurs in renal disease. Parenteral iron is often required, especially when erythropoietin is used. Deficiencies of vitamin B₁₂, B₆, and C may occur in patients with CRF who are consuming only small amounts of protein and supplementation may be required.

**End-stage renal failure** ESRF occurs when renal function has deteriorated to the point that dialysis or transplantation is required. Malnutrition is present in 40–50 per cent of patients receiving haemodialysis.

Peritoneal dialysis results in the loss of amino acids and it is important that protein depletion is prevented. Dialysate fluid is a source of glucose and energy, which has implications for patients with diabetes and for those who are overweight.

Following transplantation, a patient’s diet can be less strictly controlled and, in the long term, a low-fat, healthy diet should be encouraged. However, intake of large amounts of protein (>1g/kg of ideal body weight) should be discouraged because of the danger of protein-induced hyperfiltration.

**Nephrotic syndrome** Nephrotic syndrome describes the clinical consequences of excessive urinary loss of protein. It can occur as a result of many diseases that affect the kidney. Its clinical features are proteinuria, peripheral oedema, hypoalbuminaemia and hyperlipidaemia. Drug treatment may involve corticosteroids and other immunosuppressives to manage the underlying renal disease. Diuretics, albumin and lipid lowering therapy may also be used.

For patients who do not respond to drug treatment, nutritional management may involve adjustment of protein, fat and salt intake.

**Burns** Extensive burns result in a huge stress response, which involves an increase in resting energy expenditure and associated weight loss. Nutritional therapy must provide sufficient nutrients to prevent weight loss or to minimise it to less than 10 per cent of the patient’s hospital admission weight. The aims are to:

- Preserve lean body mass
- Promote maximum wound healing and skin graft “take”
- Maintain immunocompetence

Monitoring is crucial to ensure that appropriate nutritional support is being provided. This should include regular weighing (preferably once or twice a week with dressings removed), electrolyte monitoring and the keeping of accurate food and fluid charts. Patients who suffer major burns are at greatest risk of malnutrition.

**Major burns** For major burns, enteral feeding is required, with parenteral feeding reserved for cases where the GI route is not available. Acute reductions in blood levels of zinc, selenium and copper can occur following major burns. An improvement in skin graft take and a reduction in the frequency of septic episodes have been shown in patients who receive high-dose intravenous supplementation of these trace minerals. The British Dietetic Association’s burns interest group has recommended that such supplementation should be given daily to adults with burns greater than 30 per cent of their body surface area for eight days following a burn injury.

**Minor burns** For minor burns, a diet high in protein and energy is recommended and patients should be encouraged to eat and drink appropriately from admission. Oral supplementation should be considered.

**Patients in intensive care**

Patients in intensive care can be classified into three groups:

- Those recovering from major elective surgery
- Those who have suffered major trauma
- Those with severe sepsis

All of these patients are difficult to feed, partly because the nutritional requirements associated with improved clinical outcomes have not been fully established.

**Management**

Sufficient protein, probably in the region of 1.2g/kg of body weight per day, is required to minimise muscle wasting. An appropriate energy intake is approximately 25kcal/kg of body weight per day. O verfeeding should be avoided as it can negatively affect organ function. The use of immune modulating nutrients (eg, glutamine, arginine, omega-3 fatty acids) may benefit certain critically ill patients (EDIT OR — see Hospital Pharmacist 2005;12:14-16), but it is controversial.

**References**


