Artificial nutrition and nutritional support and refeeding syndrome

Ruth F McKee

Abstract

Artificial nutritional support is needed when a patient is unable to absorb sufficient nutrition from normal diet. NICE guidance recommends that enteral and parenteral nutrition is supervised by a multidisciplinary nutrition team and that clear goals of nutritional support are defined and reviewed regularly. The combination of nutrition and control of the systemic inflammatory response enables the patient to become anabolic. If possible the enteral route should be used, most commonly nasogastric feeding. Recent NPSA alerts have highlighted the risks of nasogastric tube misplacement and hospitals should have clear policies about checking tube position. Percutaneous gastrostomy feeding is useful for longer term enteral feeding. In the past decade jejunal feeding has reduced the use of parenteral feeding in critical care and upper gastrointestinal disease. Feeding into the distal small bowel beyond a fistula or a proximal stoma can also avoid parenteral nutrition. Parenteral nutrition may be life saving, but may also result in serious complications such as septicaemia due to line infection. Metabolic complications have been less common since 'standard' PN bags became widely available. Refeeding syndrome may occur in severely malnourished patients who recommence feeding. Complex electrolyte disorders, such as hypophosphataemia, hypomagnesaemia and hypokalaemia may result, owing to cellular utilization of phosphate. Feeding should be recommenced slowly with careful electrolyte monitoring.

Keywords Enteral nutrition; macronutrient requirements; nutritional screening; parenteral nutrition

Many patients in hospital are undernourished or at risk of becoming so because of inadequate intake. This increases the risk of complications and well-managed nutritional support is beneficial. This article deals with feeding using tubes and artificial nutrition, including both enteral and parenteral routes. It assumes that nutritional screening has already occurred, that dietetic assessment has concluded that dietary adjustments and oral supplements are insufficient, and that artificial nutritional support is considered necessary.

Nutritional support teams

In order to achieve adequate nutritional support without complication, a multiprofessional team is recommended.[1] The number of staff involved will vary depending on the numbers of patients and complexity of nutritional support provided, but doctor, dietitian, nutrition nurse and pharmacist are essential. Percutaneous enteral access requires regular gastroenterology or GI surgical commitment to providing this. Managing unstable intestinal failure patients with longer term parenteral nutrition requires a wide portfolio of skills including gastroenterology, biochemistry, surgery and interventional radiology, in addition to a larger number of dietitians, nutrition nurses and dedicated pharmacy time. A key aspect of team function is the decision about the route of feeding and the input of a senior gastrointestinal physician or surgeon is invaluable in discussion with the ward team. The team should undertake regular patient review rather than simply providing guidelines for management.

Aims of nutritional support

As part of the decision to institute artificial nutritional support, an expert dietitian should calculate the patient's nutritional requirements and advise on the route of feeding. The nutritional goal depends upon the patient's condition. While the patient is catabolic due to sepsis or injury, it is not possible to achieve positive nitrogen and energy balance, and the aim is to replace deficiencies and achieve 'damage limitation'. Once the acute phase response is controlled by treatment of the underlying disease, the aim changes to maintenance and repletion of lost tissue.

Choice of route for nutritional support

The gut should be used for feeding if at all possible — it is more physiological, simpler, and results in fewer complications. Figure 1 shows the thinking behind the choice of route, although it may be necessary to use more than one method either concurrently or consecutively to achieve sufficient absorption of nutrients.

Short-term enteral nutrition

A fine-bore nasogastric tube is the most common means of artificial nutrition, but has its own hazards. The National Patient Safety Agency has issued several alerts about the need to ensure that the tip lies within the stomach and remains there. Figure 2 shows a poster used to remind staff to check and document the pH of aspirate for this reason.

Although nasogastric feeding is widespread, it can be difficult to achieve adequate intake and absorption of the prescribed feed because of feed interruptions and tolerance. The majority of patients are fed with standard complete formula feeds with an energy content of 1 kcal/mL, providing balanced nutrition including protein, energy, fluid, electrolytes and micronutrients in a volume of 25–30 mL/kg. Partially digested peptide feeds may be used if absorption is impaired, as in pancreatic disease. For particular circumstances, special feed formulas with, for example, a low potassium content (renal impairment) or a higher fat:carbohydrate ratio (pulmonary disease) are available.

Nasojejunal feeding is most often used in patients who have gastric emptying problems, common in patients who are critically ill or have undergone upper gastrointestinal surgery. There may also be some benefit in patients with recurrent aspiration

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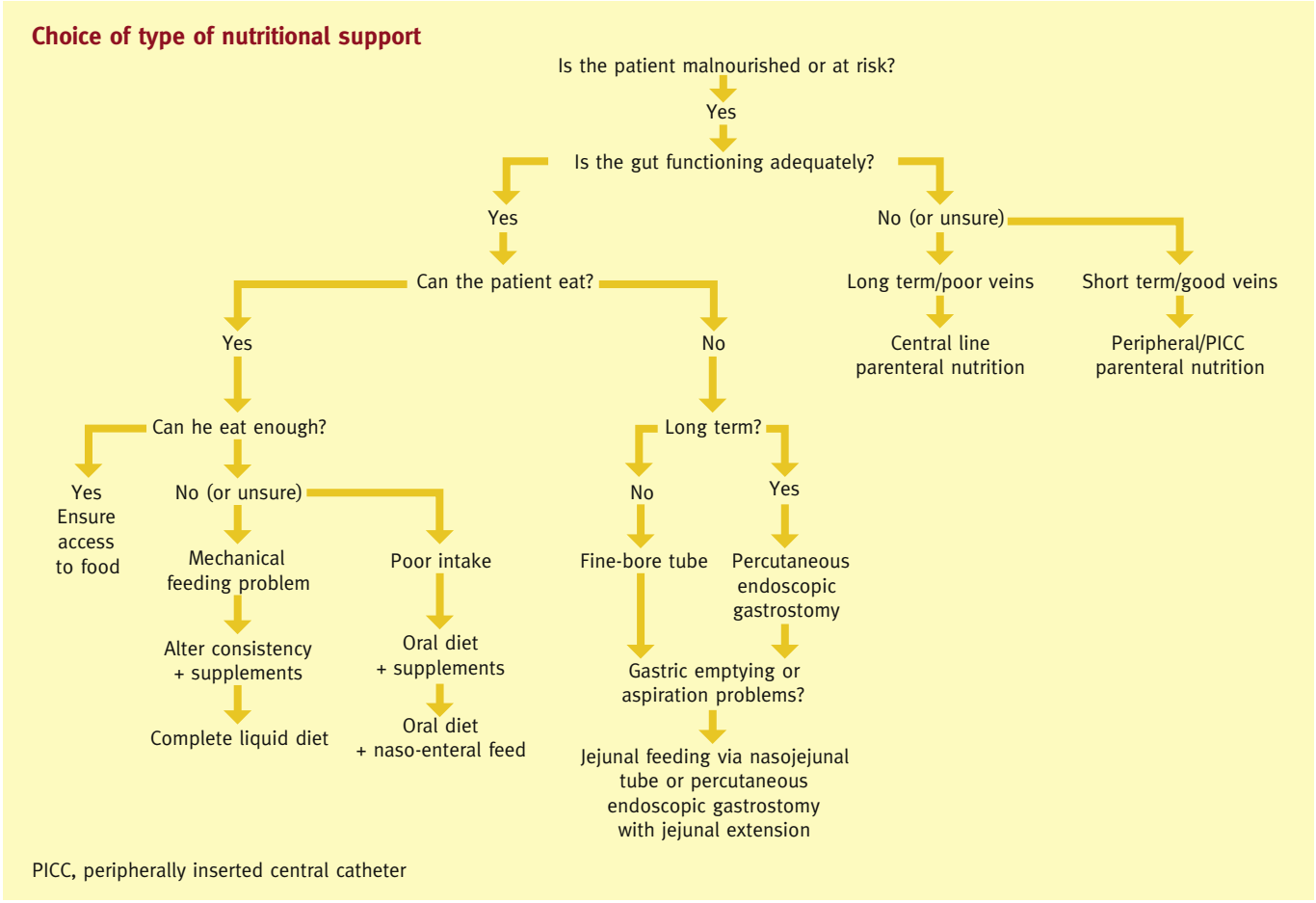

Figure 1

problems. A variety of tubes is available; these may have one, two or three lumens, and can be inserted endoscopically, using radiological screening or guided by a magnetic imaging system. Although the availability of nasojejunal feeding has significantly reduced the use of parenteral nutrition in critical care, it should be used only after careful consideration if there is any suggestion of small bowel ischaemia or ileus, as it may predispose to small bowel necrosis.

Longer term enteral tube feeding

Longer term enteral tube feeding is most often needed in patients with neurological disease or cancer of the head and neck or oesophagus. A feeding tube is inserted through the abdominal wall with the tip in the stomach. The most common tube is a percutaneous endoscopic gastrostomy (PEG) tube, which is inserted under sedation by an endoscopic operator and an assistant, who places a cannula and guidewire through the abdominal wall into the stomach. The endoscopist catches the guidewire and pulls this back up through the oesophagus and mouth, allowing the PEG tube to be attached and 'pulled through' the upper GI tract and out of the abdominal wall. If there is a possibility that head and neck tumours may be seeded to the abdominal wall using the PEG method, percutaneous insertion of gastrostomy (PIG) by a 'push' method can be performed but this carries a higher risk of complications. Radiologically inserted gastrostomy (RIG) is more widely performed than PIG, but in practice the method used often depends on the local expertise available. There is evidence that in stroke patients PEG insertion should be avoided for at least the first 2 weeks, as mortality is high at this stage and many patients will improve their swallowing with time.

If jejunal feeding is necessary for longer than a few weeks, this can be achieved in several ways: a jejunal extension can be placed endoscopically through a previous gastrostomy; a new transgastric gastrojejunal tube can be inserted by radiology; or a direct percutaneous endoscopic jejunostomy can be inserted. The choice of method generally depends on the local expertise.

Surgical jejunostomy is performed as part of major upper GI resections to provide a reliable route for postoperative enteral feeding until adequate oral intake is achieved. It is relatively rare for surgical jejunostomy to be performed in isolation because the methods above have failed.

In recent years a number of intestinal failure centres have promoted the use of enteroclysis — enteral tube feeding distal to a small bowel fistula or into a mucous fistula, which may enable enteral rather than parenteral nutrition if sufficient distal bowel is available for absorption. Radiological screening is often