GUIDELINES ON ARTIFICIAL NUTRITION SUPPORT

SUMMARY

• Malnutrition is common in patients who are admitted to hospital, and many patients lose weight during hospital admission. Malnutrition is associated with increased morbidity and mortality. Artificial nutrition support benefits nutritional status in malnourished patients, it can lead to reduced morbidity and hospital stay, and more rapid recovery from illness.

• Nutritional screening of hospital admissions is recommended; patients who are malnourished, or at nutritional risk through impaired appetite or prolonged starvation, should be referred for nutritional assessment and support. Starvation for more than one week is detrimental. Nutritional support may be required within one week in patients who are unable to take adequate oral diet and who are moderately or severely malnourished, or stressed through infection surgery or disease.

• Whenever possible nutritional support should be introduced before malnutrition has developed. The goals of nutritional support, prevention or management of nutritional depletion, should be clearly defined.

• Nutritional support should be given by the enteral route when the intestine is accessible. Enteral feeding may be provided by nutritional supplements, tube feeding is required in patients with profound anorexia or mechanical disorders of swallowing. Patients in whom the need for tube feeding is likely to exceed 2-4 weeks should be considered for the insertion of a percutaneous endoscopic gastrostomy (PEG) tube.

• Parenteral nutrition is required when the intestine is inaccessible or its function is inadequate. Where possible parenteral nutrition should be administered by the peripheral route; central parenteral nutrition is required for patients who need prolonged periods of intravenous feeding and should be undertaken in wards where the staff are familiar with this form of nutritional support.

• Safe and effective nutritional support is most readily achieved by a multidisciplinary nutrition support team (NST). NSTs include a nurse, dietician, pharmacist, biochemist and clinician. The NST within each hospital develops guidelines for nutritional management and monitoring.

• Most hospitals will be expected to supervise the treatment of patients who need home enteral feeding; patients receiving home parenteral nutrition are best managed in regional or supra-regional centres.

INTRODUCTION

One third of hospital patients are affected by moderate or severe malnutrition. Malnutrition impairs immunity, organ and muscle function; it results in weak muscles that fatigue more readily, including muscles of respiration and locomotion. Malnourished patients are withdrawn and apathetic and are less able to co-operate in their management. The restoration of body tissues occurs much more slowly than weight loss, especially in ill or septic patients. Studies have demonstrated increased morbidity and mortality in malnourished patients, and malnutrition is associated with prolonged hospital stay. Conversely nutritional support under these circumstances has resulted in reduced morbidity, mortality and hospital stay.
Gastroenterologists (physicians and surgeons) are responsible for the management of patients with intestinal failure, the placement of percutaneous enteral feeding devices, and they are increasingly involved in the organisation of nutrition support services within the hospital. Consequently gastroenterologists must be able to identify malnourished patients and those at nutritional risk, arrange appropriate nutritional intervention, supervise and monitor treatment in the hospital, and when indicated in the home.

Examples of patients who need nutritional assessment include: those with gastrointestinal disease (inflammatory bowel disease, chronic liver disease, cystic fibrosis, and some gastrointestinal malignancies), patients with swallowing disorders (chronic neurological disease and oropharyngeal disorders), and patients with severe anorexia.

DEFINITIONS

1. Artificial nutrition support: refers to the administration of nutrient solutions by the enteral or intravenous (parenteral) routes. Enteral feeding includes the use of oral supplements and tube feeding. The method of tube feeding may be by nasogastric, nasojejunal, percutaneous endoscopic gastrostomy (PEG), percutaneous endoscopic jejunostomy (PEJ), or fine needle jejunostomy. Parenteral nutrition may be administered by peripheral or central veins.

Both types of feeding may supply all or part of the patient’s nutritional needs, depending upon oral intake. The terms total and supplemental parenteral nutrition may refer to the spectrum of nutrients or the amount of nutrients supplied, and to avoid confusion they should not be used.

2. Malnutrition. Patients with an unintentional weight loss of more than 10% of their body weight are at risk of the effects of malnutrition. Malnutrition may be classified as mild, moderate, or severe on the basis of anthropometric measurements; body mass index, arm muscle circumference, and skin fold thickness. Thus patients with a history of unintentional weight loss, and Body Mass Index (BMI: is derived from the weight(Kg)/(height(m))^2 ) below 18 and 16 with corresponding reduction of mid-arm circumference may be regarded as moderately and severely malnourished respectively.

The effects of malnutrition and nutritional repletion can be demonstrated by changes in muscle function before there is any change in muscle size; (satisfactory clinical methods for demonstrating change in function do not exist, although some authorities recommend dynamometry and respiratory function tests). Thus it is important to consider the patient’s diet before and during hospitalisation.

EPIDEMIOLOGY

Nine large studies over the last 20 years have demonstrated that between 30-40% of hospital patients are malnourished. The most recent study indicated that 30% of patients suffered from moderate or severe malnutrition, malnutrition was not recognised in the majority of affected patients, most patients lost weight during their hospital stay, and proportionately the greatest weight loss was experienced by malnourished patients. The minority who were referred for nutritional support gained weight.

Malnutrition is found in all hospital departments. Gastroenterologists will most commonly encounter malnutrition in patients with gastrointestinal disease, and patients with swallowing disorders who are referred for PEG tubes. The latter include patients with cerebrovascular accidents. However more gastroenterologists are being required to participate in NSTs, or formulate nutritional policy for affected
patients in other departments. Under these circumstances gastroenterologists may be increasingly involved with the management of the significant numbers of malnourished patients that exist in departments such as care of the elderly, respiratory medicine and general surgery.

There is little information about the numbers of patients who are receiving nutritional support in hospital at present. Enteral nutrition in the community is growing at a rate of about 20% per year, the most recent figures suggest a prevalence of 80 patients per million. In contrast the prevalence of home parenteral nutrition is only 4 per million, and this figure remains static.

PRESENTATION
Significant malnutrition is accompanied by fatigue and inertia, with reduced muscle strength, impaired cardiac and respiratory function, and impaired immunity.

Medical patients mainly lose fat stores whereas patients who are septic, burned, or traumatised waste muscle tissues rapidly. The effect of malnutrition on mental function is notable, and frequently it is mistaken for depression or unco-operative behaviour.

Unless specifically sought the condition will continue to escape recognition in many affected patients.

RECOGNITION OF MALNUTRITION
All hospital patients, in the clinic or the ward, should have their height and weight recorded and where appropriate a brief dietary history. A nutrition scoring chart for use by nursing staff has proved a valuable method of detecting patients who are at risk of malnutrition or who are in need of formal nutritional assessment. This includes information about change in diet and weight.

Patients thus identified are referred to the dietetic department for further evaluation and advice. Some of these patients may require management by the NST.

TREATMENT OPTIONS
Patients may require oral dietary supplements, enteral tube feeding, or parenteral nutrition. Wherever possible the oral or enteral route should be used for reasons of cost and safety.

Oral supplements
Oral supplements increase nutrient intake without significantly reducing the con-

INDICATIONS FOR ARTIFICIAL NUTRITIONAL SUPPORT
Include:
• The patient with severe anorexia
• The patient with moderate or severe malnutrition who is unable to eat sufficient oral diet.
• The pre-operative patient who has lost 10% or more of body weight.
• The patient who is unable to eat or swallow because of neurological, oropharyngeal, or oesophageal disease.
• The patient in whom oral diet is not anticipated for more than 7 days.
• The patient with intestinal failure

In all of these patients the aim of treatment is to prevent malnutrition, or to correct nutritional depletion where it already exists. Significant nutritional repletion is not possible in the stressed patient.
sumption of conventional food. In compliant patients supplements can be as effective as supplemental nasogastric feeding.

**Tube feeding**

Tube feeding is required in patients with profound anorexia, swallowing disorders, and occasionally to fully utilise available intestinal function by overnight infusion. In addition some intensive care and postoperative patients with gastric stasis can be fed through naso-jejunal tubes often with simultaneous gastric aspiration via a second nasogastric tube. Where prolonged tube feeding is anticipated, for example 2-4 weeks, PEG tubes should be placed. Percutaneous gastrostomy tubes may also be inserted by the radiologist, this is of particular value in patients in whom endoscopy is not possible or advisable.

The surgical placement of a percutaneous jejunostomy tube will provide a suitable route for nutrient administration in some patients who are undergoing upper alimentary surgery, in whom oral nutrition is not anticipated soon after the operation.

**Parenteral nutrition**

Parenteral nutrition will be needed when intestinal function is inadequate or the intestine is not available. Patients should not be allowed to starve for more than 7 days, and treatment may be started earlier in the malnourished or stressed patient.

When peripheral veins are adequate and the need for treatment is unlikely to exceed two weeks most nutritional needs can be met using lipid-containing nutrient mixes infused into peripheral veins through small venflons or ultra-fine bore catheters. The addition of heparin and hydrocortisone to the feed, and the use of GTN patches, may delay or prevent thrombophlebitis. Prolonged parenteral nutrition will need to be given by a central venous catheter. A catheter with a detachable hub such as the Nutricath is convenient when treatment is considered for up to 2 months, a cuffed catheter may be preferred for longer periods of treatment in the mobile patient and when home treatment is envisaged. For HPN the possible use of a subcutaneous port should be discussed with the patient. All parenteral nutrition solutions must be administered through volumetric pumps. Central parenteral nutrition is not commenced until the satisfactory position of the catheter tip has been confirmed radiologically.

**MANAGEMENT OF NUTRITIONAL SUPPORT**

Each hospital should have guidelines for artificial nutritional support, for enteral and parenteral feeding in hospital and at home. These protocols should address patient selection, management of treatment, type and amount of nutrients to be infused, and the monitoring of treatment. Care of infusion catheters is particularly important, to minimise the risk of serious complications such as catheter sepsis and venous thrombosis. Protocols should also exist for the management of these complications.

Enteral feeding with oral supplements can be commenced in the primary care setting. Although most patients who need tube feeding are admitted to hospital, usually for the management of the underlying disease, when their clinical condition permits there is evidence that nasogastric feeding can be commenced in the outpatient setting. All patients who need parenteral nutrition will have treatment commenced in hospital. Patients who need home parenteral nutrition should be referred to tertiary centres.

The management of patients who need home artificial nutritional support requires adequate facilities for supervision, training and monitoring; in addition to co-ordination between the hospital and primary care team. These facilities have been defined. The provision of nutrient solutions is facilitated through pharmaceutical companies with home care services.
MONITORING
Patients should be monitored by clinical, nutritional and laboratory indices according to protocols developed in each hospital. Patients who are receiving parenteral feeding need the most intensive monitoring. This will include measurement of weight, temperature and fluid balance, and biochemical monitoring of glucose, electrolytes and liver function tests. Venous catheters must be inspected daily with reference to the exit site and veins. In the longer term nutritional monitoring by anthropometric measurements is traditionally performed, but this is not likely to provide information of short term value. Very malnourished patients require intensive monitoring for features of the re-feeding syndrome; the rapid cellular uptake of phosphate, magnesium, potassium, and other elements, which may accompany a switch of energy source from endogenous lipid to exogenous carbohydrate, can lead to a rapid decline in serum concentrations with important metabolic consequences. Trace element and vitamin status should be measured both in these patients as well as in patients who require prolonged period of nutritional support. Patients who need prolonged nutritional support must also be assessed for the development of psychological disorders.

RESOURCES
The literature clearly demonstrates that artificial nutritional support is most effective, cost effective and safer, when it is supervised by multidisciplinary nutrition support teams with appropriate management protocols. In the absence of such an approach parenteral nutrition in particular is accompanied by an unacceptable incidence of dangerous and expensive complications. The function and composition of such teams may differ according to local needs. The group usually includes a nurse, dietitian, pharmacist, biochemist, and clinician.

Central parenteral nutrition should be restricted to units in which the staff have experience of this type of treatment. Artificial nutrition support at home should be supervised by a hospital with a major interest and this would usually include a NST. Patients who need home parenteral nutrition should be referred to tertiary centres.

All hospitals undertaking artificial nutrition support require adequate laboratory facilities and access to supraregional centres for micronutrient assays.

COSTS
The provision of nutritional support to prevent or correct malnutrition will improve the quality of care and reduce morbidity. These benefits will, in part, offset the cost of treatment. The introduction of NST with management protocols will further reduce treatment costs by avoiding the inappropriate use of expensive parenteral nutrition and minimising the incidence of costly complications. Costs of treatment vary according to patient requirement and local circumstances. However, the costs of parenteral nutrition are upto ten times the cost of enteral nutrition. This subject has been addressed in a recent publication.
REFERENCES


