

Nutritional management of gastrointestinal malignancies

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Abstract

The evidence connecting food and gastrointestinal cancers from epidemiological studies, case-control studies, and prospective observational studies, indicates that determining the independent effects of specific nutrients is extremely difficult, given the many potential environmental factors to consider. The nutritional management of a patient with gastrointestinal cancer first begins with an appropriate nutritional assessment, seeing that several factors could affect the patient's nutritional status. The most significant dietary advice for cancer patients in general, is to consume a significant amount of energy daily to maintain current body weight, as well as a liberal amount of protein. In cancer patients requiring gastrointestinal surgery, the benefit of delaying surgery to attain improved nutritional status needs to be determined for improved outcomes. Postoperatively, severely malnourished cancer patients, and patients with an anticipated inadequate nutritional intake for seven days or longer, will benefit from postoperative TEN, given within 48 hours after surgery. Regular monitoring and adjustments to nutritional prescriptions is imperative in order to improve the cancer patient's nutritional status within the context of the prognosis.

S Afr J Clin Nutr 2010;23(1) Supplement:S62-S64

The evidence connecting food and gastrointestinal malignancies from epidemiological, case-control, and prospective observational studies, indicate that determining the independent effects of specific nutrients is extremely difficult, given the many potential environmental factors to that need to be considered.¹⁻³

Nevertheless some associations have been documented. For instance, oesophageal cancer has been linked to low intakes of vitamin C, selenium and zinc, with a protective effect been afforded by an increased fruit and vegetable intake. Meat and fish consumption has shown inconsistent associations with oesophageal cancer studies.¹

Gastric cancer has been linked to foods preserved with salt or foods with a high salt content, while fruit and vegetable intake has been shown to have a protective effect against gastric cancer. Green tea has shown a protective effect against gastric cancer in several studies.⁴ Japanese studies have shown a strong environmental factor in the development of gastric cancer.⁵ Pancreatic cancer has been linked to increased energy intake and obesity.¹ Dietary fat,^{6,7,8} increased energy intake,^{9,10,11} processed meats,¹² and central obesity appear to increase the risk of colon cancer in some studies.

Nutritional assessment

Nutritional management of a patient with gastrointestinal malignancy first begins with an appropriate nutritional assessment, since several factors could affect the patient's nutritional status. Long standing nutritional deficiencies could result in compromised cellular

immunity which causes an increased risk for infection and delayed wound healing after surgery. Patients with the potential to become malnourished should be identified as early as possible during the treatment process. Nutritional management of these frail patients should be goal orientated, trying to correct nutritional deficiencies. It is important to realise that nutritional status will also be affected by underlying comorbidities that may increase the patient's risk for nutritional deficits.¹

Assessing the patient's general nutritional status at the start of treatment is imperative.^{13,14} A complete medical and dietary history is probably the best tool to achieve this goal. The important factors to assess include dietary and physical examination, anthropometrics and laboratory parameters which may reflect nutrient deficits. Patients that have lost a significant amount of weight, greater than 10% of initial body weight, and have shown a reduced oral energy intake for a period of between two and 24 weeks are at greater risk of developing both macronutrient and micronutrient deficiencies. Available evidence indicates that cancer patients with a weight loss greater than 10% of their initial body weight have a reduced appetite, lower chemotherapy response as well as shorter medial survival time.¹⁵ The Subjective Global Assessment (SGA) is a clinical method that can be used for the evaluation of a patient's nutritional status. The SGA is a reliable tool to use in clinical settings, with an 80% accuracy.¹⁶

The most significant dietary advice for cancer patients in general, is to consume an adequate amount of energy daily in order to maintain current body weight, as well as a liberal amount of protein. Oral energy intake should be approximately 105–150 kJ/kg/day. A protein intake of approximately 1,0–1,5 g/kg/day will be adequate to meet the requirements of most non-wasted cancer patients. Cancer patients with a weight loss greater than five percent of their initial body weight should be advised to increase their daily energy intake by an additional 2100 KJ over and above the recommended intake of 105–150 kJ/kg/day. In such patients, protein intake should be maximised at 1,5 g/kg/day. It is also important to keep in mind that due to the malignancy induced inflammatory response in advanced cancer, additional energy and protein intake may not improve lean muscle mass.¹

Gastrointestinal surgery

Surgery is the treatment of choice in patients with cancer of the oesophagus, with radiation and chemotherapy often given pre-operatively. Side effects of radiation and chemotherapy often result in further weight loss. Surgical treatment usually involves a total or distal oesophagectomy requiring bilateral vagotomy, proximal gastrectomy, and anastomosis of the retained portion of the oesophagus to the remaining stomach. Post-operative regurgitation of food and bloating are common complications following surgery that can result in further weight loss and debilitation. Oesophageal strictures can appear post-operatively that often require repeated dilatation to ensure adequate food passage. Placing an oesophageal stent to improve food and fluid passage may be a palliative measure for non-surgical patients who experience severe dysphasia due to oesophageal luminal cancer growth.^{1,17}

Nutrition support of gastrointestinal cancers

In cancer patients requiring gastrointestinal surgery, the benefit of delaying surgery to attain improved nutritional status needs to be carefully considered. Nutritional support can be given by either intravenous [parenteral nutrition (PN)] or total enteral nutrition (TEN). Available literature suggests that severely malnourished cancer patients, with a weight loss greater than 10% of their initial body weight, will benefit from preoperative TPN for a duration of seven to ten days.¹⁸ Although improved mortality has not been reported with improved nutritional status, a 10% improvement in postoperative complications has been reported in nutritionally supported patients when compared to patients who had nutrition support. Administration of PN pre-operatively to non-malnourished patients is not recommended, as it results in increased PN associated complications.¹⁹ Nutritional support of the hospitalised cancer patient should be commenced as soon as nutritional intake does not match daily increased requirements for a period longer than seven days. After a fasting period of seven to ten days, a negative nitrogen balance is known to occur, which increases the patient's risk for infections and interferes with wound healing. The practicality of giving PN for seven to ten days prior to surgery is however often a problem.¹

Postoperatively, severely malnourished cancer patients, and patients with an anticipated inadequate nutritional intake for seven days or longer, will benefit from postoperative TEN, given within 48 hours after surgery.¹⁸ Nutritional improvement appear to be more significant with TEN compared to TPN post surgery.²⁰ Patients with a pre-operative weight loss greater than 10% of initial body weight should ideally have a jejunal feeding tube placed at the time of surgery. The feeding tube can later be removed as an outpatient, once normal oral intake has resumed.

Early satiety, postprandial abdominal pain and weight loss are frequently experienced by patients with gastric cancer. Surgical resection usually requires a total gastrectomy with an oesophageal anastomosis. Significant weight loss; dumping syndrome; fat malabsorption; and iron, calcium and vitamin B12 deficiency commonly occur postoperatively. Fluid nutritional supplements and small frequent meals may be beneficial to post-surgical patients with dumping and bloating. Increasing the pectin content in the diet to slow down gastric emptying and minimise fall in postprandial blood glucose levels is helpful and improves the nutritional management of such patients.²¹ Steatorrhea may occur due to secondary pancreatic insufficiency, and could be treated with pancreatic enzyme supplementation.²² Vitamin and mineral deficiencies should be prevented and treated with adequate oral supplementation of iron, vitamin C and B12. Nocturnal jejunal feeding should be considered in patients who continue to lose weight despite dietary adjustments/supplements.¹

Treatment of colorectal cancer involves resection of the affected segment of the bowel. Postoperative chemotherapy is usually tolerated well, with few nutrition-related side effects. If large sections of the right colon are resected, and the ileocaecal valve is compromised, postprandial diarrhoea may result. If more than 60 cm of the terminal ileum is resected, vitamin B12 supplementation will be necessary.¹

Parenteral nutrition

Indications for parenteral nutrition include small bowel obstruction, which may develop due to tumour growth; severe diarrhoea and malabsorption during the active treatment of the disease; gastrointestinal haemorrhage; treatment of fistulae; and as a supportive care for severely malnourished patients. PN is not generally indicated for patients with non-obstructive disease or if the duration for nutritional support is suspected to be shorter than seven days. There is no evidence to support that PN improves the outcome of chemotherapy or radiation-related treatment or the survival of patients with cancer.²³ Optimal nutrition does however affect the patient's quality of life.

Peripheral parenteral nutrition can be used when short-term nutritional support is needed for a period of less than seven to ten days.¹

How much?

Several studies have investigated energy expenditure and protein needs of cancer patients. Cancer patients with active disease may require as much as 1.2–1.5 times increased energy intake compared to normal resting energy expenditure. Energy needs can be calculated up to 168 kJ/kg/day of ideal body weight, and 1–1.5 g/kg of ideal body weight for protein are usually sufficient for most adult cancer patients. Most hospitalised cancer patients only require nutritional support for up to two weeks.¹

Monitoring safety

PN will not have any significant value to the patient if not used and monitored appropriately. Monitoring the therapy and making regular adjustments as required is imperative to achieve the desired goal/benefit. Patients should be weighed daily, and accurate fluid intake and output should be recorded. Urine output should be more than 1000 ml per 24 hours in order to ensure adequate hydration of the patient. A weight gain of more than one to two kilograms per week usually indicates fluid retention. This may occur in the first two weeks after PN is initiated. Diuretic therapy is occasionally required. Electrolytes and triglyceride levels should be monitored twice weekly.²⁴

The human body adapts to weight loss and starvation by reducing resting energy expenditure. When large amounts of energy and carbohydrates are supplied to a malnourished cancer patient at too rapid a pace, refeeding syndrome may result.²⁵ Refeeding is a potentially life-threatening complication of both PN and TEN when carbohydrate intake stimulates pancreatic insulin release, which results in the flow of potassium and magnesium to the intercellular space, with the possibility of cardiac arrhythmias as an adverse outcome. Prevention of refeeding syndrome is possible by using a mixed carbohydrate, protein and lipid formula, and gradually increasing the rate of administration.

Enteral nutrition

Enteral nutrition is recommended in the absence of bowel obstruction, high output fistula, or toxic megacolon. Because of postoperative gastroparesis, jejunal feeding may be preferred for specific cancer patients. TEN is generally started at a relatively slow rate (40 ml/h) and gradually increased eight hourly until the nutritional goal is reached. In severely malnourished patients, the infusion rate may have to be started at an even slower rate so as to avoid the refeeding syndrome. No standard commercial formula provides sufficient free water to meet the patient's daily fluid requirements. Small frequent bolus amount of free water is required to meet patient needs.¹ Percutaneous endoscopic gastroscopy (PEG) feeding is often an effective and emotionally acceptable means of long term TEN.

Regular monitoring and adjustments to nutritional prescriptions is imperative in order to achieve nutritional goals which will improve the patient's nutritional status.

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