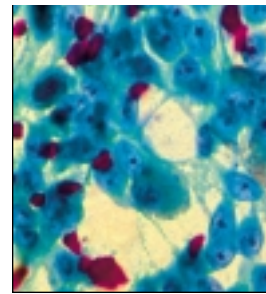


NUTRITIONAL SUPPORT FOR THE SURGICAL ONCOLOGY PATIENT

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Introduction

It is well established that malnourished cancer patients harbor increased risks of morbidity and mortality when undergoing major surgical procedures.¹ It is also established that by increasing the lean body mass, these complications can be reduced. The role of nutrition in mitigating the surgical complications linked to the preoperative state of malnutrition, however, has not been well defined. Thus, the indications for using parenteral or enteral nutrition in the management of the cancer patient are not clearly established.²

The judicious use of nutritional supplementation principally requires the correct identification of the severely malnourished patient who may benefit from added caloric intake.³ When this identification is made preoperatively and the patient is scheduled for a major surgical procedure, it is likely that the patient will benefit from preoperative nutrition. If the patient is only modestly malnourished, nutritional supplementation can be delivered postoperatively for an appropriate length of time with defined endpoints.

Identifying the Malnourished Cancer Patient

While signs of cancer cachexia, such as weight loss, are generally easy to assess, it is difficult to determine precisely which patients will truly benefit from a preoperative course of enteral or

parenteral nutrition prior to surgical resection of their tumor. Weight loss is defined by the American Society for Parenteral and Enteral Nutrition (ASPEN) guidelines as loss of >10% of pre-illness weight.⁴ Protein calorie malnutrition has been assessed through the use of objective measurements, which include serum albumin levels, weight, anthropomorphic measurements, grip strength, and indices such as the body mass index in nutritional risk index. Unfortunately, no single measurement is sensitive and specific for the identification of malnutrition.

Because our decisions are now largely based on clinical trials that have been performed and published, it is reasonable to attempt to use the same criteria promulgated in these trials to assess the cancer patient. Whereas the simplest way to screen patients for malnutrition may be to determine the occurrence and degree of unintentional weight loss, more objective means are now available. Generally, most hospitals now have nutritional assessment teams that are highly capable of assessing the nutritional risk of the cancer patient requiring surgical intervention. The nutritional risk index is an example of one published method for determining the degree of malnutrition present in the preoperative patient. The risk index is calculated according to the following formula:

$$\text{Risk} = 1.59 \times \text{serum albumin level (g/L)} + 0.417 \times (\text{current weight/usual weight}) \times 100$$

As can be seen with this formula, nutritional risk can be

assessed by monitoring the albumin level and degree of preoperative unintended weight loss. Malnutrition is generally defined by a score of 100 or less with this semi-objective index. Malnutrition can be further stratified as borderline (score >97.5), mild (score 83.5 to 97.5), or severe (score <83.5).

Determining Who Will Benefit From Supplemental Nutrition

Once it was clear that virtually all patients could be fed intravenously or enterally, the question was raised as to which patients will truly benefit from supplemental nutrition.^{3,5,6} The completion of several randomized clinical trials led to the conclusion that there are several specific established indications for the use of nutritional support.⁷ For example, it is now accepted that patients who are unable to eat for an indefinite period of time (generally 7 to 10 days) require nutritional support. These patients may have conditions such as neurologic impairment, short-gut syndrome, and oropharyngeal dysfunction. In addition, patients suffering major trauma or undergoing bone marrow transplantation are now known to benefit from supplemental nutrition.

Other cancer patients who will likely benefit from nutritional support include the severely malnourished cancer patient undergoing a major extirpative procedure such as an esophageal resection, the moderately malnourished cancer patient who will be unable to eat

for more than 7 to 10 days following their surgical procedure, and the patient undergoing chemotherapy with complications precluding oral intake. Newer research has also suggested that patients with immunosuppression may benefit from nutritional manipulation.⁸

The Veterans Affairs Total Parenteral Nutrition Cooperative Study Group⁹ demonstrated that the use of preoperative total parenteral nutrition should be limited to patients who are severely malnourished. In patients with documented severe malnutrition, intravenous nutrition delivered 7 to 15 days before surgery resulted in fewer noninfectious complications than control populations not receiving nutrition (5% vs 43%, $P=.03$). Patients with mild or moderate degrees of malnutrition showed no benefit to preoperative nutritional supplementation. Two additional randomized trials^{7,10} and one meta-analysis¹¹ confirmed that only patients with severe malnutrition, generally defined as having weight losses greater than 10% to 15% or albumin levels <2.8 g/dL, will benefit from preoperative nutrition.

The decision to institute postoperative nutrition is generally more empirical and is based on clinical judgment of the surgeon. It is common practice to plan for postoperative enteral or parenteral nutrition for the patient in whom oral intake is not possible for more than 7 to 10 days following surgery. Similarly, it is common to institute nutritional support in the postoperative period when the patient has been without oral

intake for more than 10 days and is expected to continue in this state for a prolonged period of time. The basis for these decisions can be related to studies where surgical outcome has been adversely affected in patients who were unable to eat for more than 14 days.

From a practical perspective, Copeland¹² has identified the following guidelines for intravenous nutrition in cancer patients: (1) Patients who meet the criteria for malnutrition and have a reasonable chance of responding to appropriate oncologic therapy, (2) patients who have been previously treated with oncologic therapy yet are incapable of adequate enteral nutrition because of malnutrition imposed by the therapy, and (3) clinically nourished patients whose treatment plan necessitates multiple courses of chemotherapy, radiotherapy, or surgery, when optimal nutritional status must be maintained as a treatment goal. Further studies have suggested a proactive approach to nutritional assessment and supplementation.²

The Route of Nutritional Support

It is not always immediately clear whether or not the patient should receive enteral or parenteral nutrition. It is, however, well established that the enteral route is always preferred over the parenteral route largely due to benefits of directly feeding the gut. These benefits include a reduction in infectious complications, the documented benefit of preventing intestinal

atrophy, and a clear cost benefit. To determine whether or not the patient should have enteral or parenteral nutrition, the physician must first determine if access to the gut can be easily obtained. Today, the managing physician has numerous options ranging from the non-invasive placement of a nasogastric tube to more invasive procedures such as insertion of the PEG (percutaneous gastrostomy) tube for gastric feeding or the feeding jejunostomy tube (generally requiring an open laparotomy or laparoscopic procedure) for small intestinal feeding. If none of these options is possible, the managing physician must then consider the use of intravenous feeding or total parenteral nutrition (TPN). TPN is significantly more expensive than enteral nutrition and is associated with more complications such as line sepsis, venous thrombosis, and thrombophlebitis. More laboratory values are required to follow the patient, and it is difficult to deliver this form of nutritional support outside of the hospital setting. However, when indicated, TPN can be an effective and life-saving approach. Its use does not necessarily contradict the use of enteral feeding. In fact, TPN may be used as a bridge to enteral feeding or to supplement enteral feeding until the latter can be completely resumed.

Conclusions

Nutritional support of the surgical oncology patient is now possible on many different levels. Technology has evolved to permit parenteral and enteral support in a

majority of patients. The principal questions are which patients will truly benefit from enteral support, when the support should be delivered, and by what route.

Randomized clinical trials have established that only patients with severe malnutrition defined by significant unintended weight loss and/or low albumin levels will actually benefit from preoperative parenteral nutritional supplementation. In the postoperative period, the majority of cancer patients will not need nutritional support because their gut will return to normal function within 10 to 14 days. For the patient in whom oral nutrition will not or cannot be resumed by 10 to 14 days after surgery, nutritional supplementation is indicated, and the enteral route is preferred if possible. Additional indications for nutritional support may include the support of patients undergoing chemotherapy or radiotherapy who would otherwise be unable to complete the course of treatment without nutritional supplementation.

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