Long-term Enteral Nutrition Facilitates Optimization of Body Weight

a report by

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Introduction

Enteral nutrition following cancer treatment can be used to optimize body mass index and potentially reduce morbidity and mortality.

Body mass index (BMI; weight in kilograms divided by height in meters squared) is one of the best general measures of nutritional status. A normal BMI falls between 19.0 and 24.9kg/m^2.[1] A BMI outside of the normal range is associated with increased morbidity and mortality.[2,3] This is especially true for cancer survivors. In fact, recent reports from the National Cancer Institute and the American Cancer Society suggest that achieving a healthy body weight should be a priority for long-term cancer survivors.[4,5]

Enteral Nutrition in Head and Neck Cancer Patients

Cancer of the head and neck with an annual incidence of over 41,000 cases in the US is the most common underlying malignancy in patients on home enteral feedings.[6,7] The most common nutrition-related problem resulting from head and neck cancer and its therapy is dysphagia.[8]

In some patients, dysphagia may persist long after eradication of the underlying cancer. Permanent enteral nutrition is then required to provide adequate nutrition and hydration. It is estimated that 10% of long-term head and neck cancer survivors require permanent enteral nutrition.[9] This can be utilized to affect changes in BMI.

Traditionally, nutritional support for cancer patients has focused on helping them gain weight. However, an increasing number of cancer patients and cancer survivors are overweight or obese and would not benefit from additional weight gain. Instead, for these patients the goal of nutritional support should be to optimize BMI. Enteral nutrition is a safe and effective method for providing nutrition.[10-12] However, the effect of prolonged enteral nutrition on BMI has not been well studied.

Long-term Enteral Nutrition and Body Weight

A recent investigation conducted a retrospective review of head and neck cancer survivors dependent on enteral nutrition at Memorial-Sloan Kettering Cancer Center. Patients were grouped according to their BMI at initiation of enteral feeding. Patients with normal, low, or elevated BMI were assigned a goal of weight maintenance, weight gain, or weight reduction, respectively. Changes in BMI over time were recorded. Data from 39 patients were included in the study. Median time on enteral nutrition was 32 ± 39.6 months.

The study demonstrated that, by setting appropriate goals, long-term enteral feedings can be used to optimize body weight and therefore possibly reduce the morbidity associated with being underweight, overweight, or obese.

Underweight patients who began enteral feeding gained weight, patients of normal weight maintained their weight, and overweight patients gradually lost weight. In all, 85% of patients achieved the nutritional goal of either maintaining a normal BMI, trending toward a normal BMI, or achieving a normal BMI. For the subgroup of patients with a gradual weight reduction goal, 100% achieved or trended toward a normal BMI.

These patients used enteral feeding for a median time of 36 ± 41 months. On average, these patients infused 1,892 calories through their feeding tube with a range of 750–3,250 calories per day. They also took an average of 339 calories by mouth with a range of 0–1,000 calories. The average total caloric intake was 2,231 calories per day.

It was found that most patients needed approximately 2,000 calories per day to maintain their body weight. This is consistent with the Estimated Energy Requirements recommended by the Institute of Medicine.[13] Even patients with a weight loss goal received a median of 1,875 ± 340 calories. The amounts

of standard enteral formula needed to provide this caloric intake also contained adequate protein, vitamins, minerals and trace elements.

Enteral feeding was well tolerated and complications related to enteral nutrition or enteral access were minimal. In all, 20% of patients experienced mild leakage at the tube site, 20% had infections near the tube site that required antibiotics, and 5% had embedded bumpers that required tube changes. It is interesting to note that the two patients with embedded bumpers both gained weight (56kg to 59.5kg and 61kg to 76.3kg). This weight gain may have contributed to the embedded bumper if the external bolster was not loosened sufficiently. Fifteen per cent of patients experienced constipation or diarrhea, likely related to enteral feeding.

There were also limited reports of mild, clinically insignificant metabolic complications, such as hypo- or hyperglycemia and hypo- or hypernatremia; it is difficult to determine how many of these episodes were caused by enteral nutrition. All complications were of minor significance and none resulted in a clinical complication or required hospitalization.

The conclusion was that the results offer a preliminary view of the ability of long-term enteral feeding to facilitate body weight optimization among ambulatory head and neck cancer survivors. These findings may potentially be generalized to all ambulatory patients who are dependent on enteral nutrition.

Discussion

This is the first study of its kind to report on the ability of enteral nutrition to optimize body weight. It offers a unique opportunity to examine the effect of long-term calorie control on BMI. Due to the fact that most patients had minimal—if any—oral intake, we were able to evaluate the effects of changes in caloric intake on BMI.

The primary study limitation is its retrospective analysis. Introduction of error could have occurred at various points. For example, much of the analysis was based on prescribed calories and not actual intake. We do, however, believe there was a high correlation between prescribed and actual calories even though objective measures were not available. Similarly, body weights were obtained at clinical visits, but because follow-up was dictated by clinical care we did not have weights at set intervals for all patients. However, all patients were closely followed in a nutrition clinic specifically designed to optimize the management of their nutrition.

Cancer is the most common indication for home enteral nutrition, accounting for more than 40% of patients.

The results of this study warrant further investigation. Future studies should include prospective analyses of patients on long-term enteral nutrition related to the adequacy of nutritional status—including evaluation of trace elements, vitamins, and minerals—bone mineral density, and quality of life. Further studies on body weight optimization should also evaluate changes in the comorbidities associated with obesity, including diabetes, hypertension, and secondary cancers.

The exact number of patients currently receiving home enteral nutrition is difficult to determine, but the most recent survey demonstrates that Medicare pays home enteral nutrition for more than 73,000 patients at a cost exceeding US$137 million annually.[14]

Cancer is the most common indication for home enteral nutrition, accounting for more than 40% of patients.[15] Outcome in these patients is dependent on the underlying cancer; however, a significant percentage do well. This is particularly true if the underlying cancer can be eradicated or controlled. A review of the North American Registry showed 36% of all cancer patients on home enteral nutrition were alive after one year.[14]

In a 1979 landmark report, the observed relationship between BMI and mortality was described as a J-shaped curve.[2] Other studies have confirmed this relationship and have shown that the lowest all-cause mortality rate was found for BMIs of 23.5–24.9kg/m^2 in men and 22.0–23.4kg/m^2 in women.[16-18] Being underweight poses an increased risk of morbidity and mortality from infections and

cancer, whereas being overweight or obese significantly increases the risk for cardiovascular disease, cancer, and diabetes.[19-25] ■

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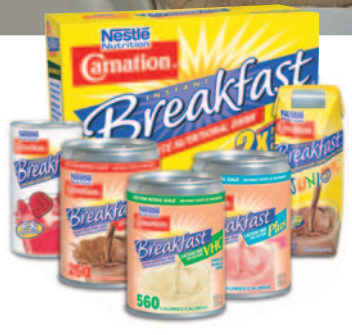

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