Abstract

Serial anthropometrics, creatinine:height ratios, serum albumin levels, and elemental balances were compared for cachectic cancer and noncancer patients receiving hyperalimentation. Cancer patients compared unfavorably in all measurements except triceps skinfold increments, which were equal for both groups, suggesting that weight gain in cancer patients represented repletion of fat rather than restoration of normal lean body mass.

Significant undernutrition, with depletion of fat, skeletal muscle, and visceral protein, is common in cancer and is, below certain "threshold" levels, associated with decreased survival (3). Several possible mechanisms can contribute to this cachexia, including decreased food intake, malabsorption, abnormalities in metabolism of nutrients by the host, and diversion of nutrients to the tumor. These and perhaps other poorly understood factors involved in the complicated cachexia of cancer have made repletion attempts less successful than initially expected (1, 2, 5).

Because cancer patients do often gain some weight during nonvolitional feeding, our group was interested in whether or not this weight gain represented repletion of lean body mass. Serial anthropometrics, creatinine:height ratios, serum albumin levels, and elemental balances were performed in a group of patients with advanced neoplastic disease (N = 15) and were compared to the results of similar studies in cachectic noncancer patients (N = 10) during enteral or parenteral HA (4). Nine cancer patients received central and 6 received enteral HA; 5 of the noncancer group received central HA and 5 received enteral HA. HA provided approximately 30 cal per kg body weight per day and 0.2 g nitrogen per kg body weight per day and lasted from 17 to 28 days. Chemotherapy appropriate for the individual disease was given 10 to 14 days after HA was begun.

Central and enteral HA were well tolerated by both cancer and noncancer patient groups. Occasional rises in blood pressure, hyperglycemia, and pedal edema responded promptly to medical management.

The cancer patients were inferior to the noncancer (control) group in body weight increment (49% of control), albumin increment (12% of control), creatinine:height ratio increment (60% of control), and midarm muscle area increment (30% of control). Increases in triceps skinfold thickness were equal in the 2 groups. These differences were statistically significant with both enteral and parenteral routes for changes in body weight and albumin and for central HA in creatinine:height ratio and midarm muscle area increments.

The average daily balances for nitrogen, phosphorus, potassium, sodium, chloride, magnesium, and calcium were positive in the noncancer group (except for calcium in one patient). No differences between enteral and parenteral routes were seen. In contrast, calcium balance was negative in 3 and magnesium balance was negative in 4 of the 9 cancer patients given central HA. During enteral HA in the cancer group, average balances were lower (p < 0.05) for phosphorus, potassium, sodium, chloride, and magnesium than during central HA. Negative balances for phosphorus, potassium, chloride, and magnesium were common with enteral HA. Negative balances were accompanied by abnormally large urinary losses. Cancer patients retained the same amount of nitrogen as did noncancer subjects. Average balances were not altered significantly by chemotherapy.

This study indicates that nutritional supplementation is less successful in cancer patients than in noncancer patients as measured by standard indices. The balance studies suggest that abnormal ratios of elements were being retained in the cancer patients and do not permit the conclusion that weight gain represented restoration of normal lean body mass. Repletion of fat (triceps skinfold increments) was equal in both cancer and noncancer groups. The view that cancer cachexia is related to aberrations in host metabolism not present in noncancer patients is supported.

Discussion

Dr. Fischer: I ask, Dr. Nixon, have you decided what the appropriate caloric and nitrogen intake would be in these cases?

Dr. Nixon: We didn't decide. We just hyperalimented them on the basis of what we would have done with a malnourished noncancer patient.

Dr. Fischer: Well, then I would suggest that your conclusion should read that in a group of patients in whom the caloric needs and expenses are not known, a blind approach to the repletion does not give repletion...
Hyperalimentation in the Undernourished Cancer Patient

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