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Original research article

Detection of risk factors that influence weight loss in patients undergoing radiotherapy

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ABSTRACT

Aim: To identify risk factors that influence weight loss in patients receiving radiotherapy.
Background: It is a well-known fact that cancer patients can be affected by malnutrition at the onset of the disease and during treatment due to the toxicity. Pretreatment weight loss alone does not predict those who will need nutritional supplementation. Instead, a variety of nutritional and tumor related factors needs to be taken into account.
Material and methods: A retrospective study was conducted on 129 patients with different tumor locations. Weight loss was evaluated during radiotherapy and one month after treatment. The impact of age, ECOG, chemotherapy, pretreatment weight loss, tumor location, previous surgery and TNM were analyzed. We aimed to identify a high-risk group of patients before starting treatment.
Results: The average net weight loss during radiotherapy and one month after treatment for this group of patients was 0.68 kg and 1.6 kg, respectively. Median weight loss during radiotherapy was 2.6 kg for head and neck (HN) patients and 0.27 kg for other tumor sites ($p = 0.028$). Median weight loss one month after radiotherapy was 3.7 kg for HN patients and 1.1 kg for the rest of the patients ($p = 0.034$). The median weight loss one month after treatment was 3.2 kg for patients receiving chemotherapy and 0.5 kg for those patients who did not receive chemotherapy ($p < 0.001$). A regression analysis determined that HN tumor location and the use of chemotherapy were independent risk factors.
Conclusions: Nutritional status must be monitored and managed before, during and after treatment. A variety of nutritional and tumor-related factors must be considered. According to our results, head and neck tumors and the use of chemotherapy are the only two factors considered statistically significant. Because patients continue to lose weight after treatment, we recommend close surveillance after radiotherapy.

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1. Background

Patients receiving radiotherapy and chemotherapy often have a compromised nutritional status preceding and during treatment due to irradiation of large areas of mucous membranes and salivary glands. Toxicities such as nausea, vomiting, diarrhea, anorexia or dysphagia can negatively affect the nutritional status by decreasing food intake and/or absorption of nutrients.[1,2] Considering the widespread prevalence of malnutrition, prompt identification is required, followed by an appropriate, effective treatment.

Weight loss during treatment not only increases the risk of adverse outcomes but also may interrupt the treatment, which compromises tumor control.[3,4] Therefore, dietetic intervention should be considered in the treatment plan, especially for head and neck (HN) patients.[5–7] In short, a high number of patients with cancer are affected by malnutrition; the occurrence of certain symptoms leads to an inadequate food intake. Patients who have malnutrition can be managed with a variety of oral dietary approaches including dietary modification, counseling by a dietician and/or oral nutritional supplements (ONS).[8]

2. Aim

The aim of this study was to assess the previous nutritional status of a cohort of 129 consecutive patients, to describe the characteristics of these patients before receiving treatment, and to detect which risk-factors may influence weight loss during radiotherapy.

3. Materials and methods

The medical records of 129 consecutive patients were retrospectively reviewed (July 2010 to December 2010). Ethical approval was obtained for this study from the Cruces University Hospital. We described our population, evaluated weight loss (during radiotherapy and one month after treatment) and analyzed any nutritional or disease related factors that might influence weight loss during radiotherapy. In deciding which factors were important, we concentrated on those associated with malnutrition, including pretreatment weight loss, tumor site and stage, age, influence of chemotherapy, previous surgery and performance status.

3.1. *Nutritional considerations*

Patients received individualized dietary counseling based on regular foods. All patients were encouraged to eat their normal diet ad libitum and were given nutritional counseling that included recommendations of a full liquid, puréed, or soft diets using common household foods when appropriate. Dietary recommendations were adjusted to control associated symptomatologies caused by tumor or treatment toxicity. No routine nutritional supplements were employed.

3.2. *Nutritional assessment*

At the first clinical visit, the medical staff registered the following information: patient's age, gender, cancer location, TNM stage, surgery prior to radiotherapy, chemotherapy protocol. All patients also had a nutritional assessment at their first clinic visit. Baseline body weight was defined as that measured at the time of initial consultation, and a physician assessed the patient's performance status at baseline using the ECOG (Eastern Cooperative Oncology Group) scale. Nutritional assessment (body weight and dietetic counseling) was performed at pretreatment and weekly during radiation therapy. Self-reported weight loss within the six months preceding enrollment in the study was recorded from the first clinical visit.

All patients were treated 5 days per week with continuous-course, once-daily radiation therapy. The patients' body weight was obtained, and nutritional counseling was provided at least once weekly during the course of radiation therapy. Patients were typically seen 4 weeks after radiation therapy was completed. At this time, body weight was obtained and compared with baseline weight. A blood count, including serum albumin, was obtained at pretreatment and at the end of radiotherapy.

All patients were considered eligible, regardless of whether the proposed radiotherapy was primary, adjuvant to surgery, combined with chemotherapy or of palliative intent.

In summary, this study aims to describe the nutritional status of a cohort of patients before starting treatment and to evaluate changes in their nutritional status (body weight) throughout radiotherapy. In our opinion, there are factors that may influence weight loss during radiotherapy. For patients undergoing radiotherapy, tumor location or type of antineoplasic treatment should be considered as a risk for malnutrition. Our aim is to identify a high-risk group of patients before starting treatment.

3.3. *Statistical analysis*

Continuous variables are expressed using a mean and standard deviation. Categorical variables are described as numbers and percentages.

Student's *t*-test and Mann–Whitney *U*-test were used to compare the following variables: weight loss during radiotherapy, weight loss one month after radiotherapy with previous surgery, TNM, chemotherapy, serum albumin level, ECOG and tumor location.

Student's *t*-test or Mann–Whitney *U*-test was performed depending on the distribution of the variable.

A univariate and multivariate linear regression model was developed to determine which variables were associated with weight loss.

Statistical significance was set for a p value less than .05.

Data were analyzed using statistical Package for the Social Sciences (SPSS, version 19.0).

4. Results

4.1. *Patient characteristics*

The results of 129 consecutive patients were retrospectively reviewed.