Abstract

Objectives: The objectives of this study were to assess the quality of life (QoL), nutritional status, and quantitative food intakes of non-terminal admitted cancer patients receiving oral feeding. As well as to evaluate what kind of relation exists between the quality of life, and the nutritional status and current intake.

Scope: Medical Oncology and Radiotherapy Service ward at the Hospital Clínic de Barcelona.

Subjects: Fifty admitted patients in the Service ward.

Interventions: There was a follow-up of the dietary intake during 3 working days through direct observation, as well as an assessment of anthropometrical and biochemical parameters, a record of symptomatology related data, and a QoL assessment through the EORTC QLQ-C30 questionnaire.

Results: Our data show that 32.6% of the patients did not reach 25 kcal/kg/day, and 23.3% did not even fulfill 1 g protein/kg/day. Concerning QoL, mean score for global health status and overall QoL for all patients was 46.2. Compared to the general population, there were important deficits among cancer patients regarding physical, role and social functioning. The most pronounced differences in the symptom scales were for fatigue, and in single items for appetite loss and constipation. A low protein intake was associated to a poorer perception on physical functioning (p=0.01), and fatigue was close to significance (p=0.058). No significant differences were found regarding caloric intake and QoL.

Conclusions: A significant percentage of patients who received exclusive oral feeding did not cover a minimum acceptable quantity of their protein-energy requirements. Our results point-out that poor food intakes can affect QoL by themselves.

(Nutr Hosp. 2006;21:505-10)

Key words: Quality of life. Nutritional status. Food intakes. Cancer.

Original

Quality of life, dietary intake and nutritional status assessment in hospital admitted cancer patients

J. Trabal*, P. Leyes**, M.ª T. Forga** y S. Hervás*


CALIDAD DE VIDA, INGESTA DIETÉTICA Y VALORACIÓN DEL ESTADO NUTRICIONAL EN PACIENTES INGRESADOS CON CÁNCER

Resumen

Objetivos: Los objetivos de este estudio fueron valorar la calidad de vida (QoL), el estado nutricional y la ingesta dietética cuantitativa realizada en pacientes oncológicos no terminales ingresados que recibieron alimentación oral. Así mismo evaluar qué tipo de relación existe entre la calidad de vida, y el estado nutricional y la ingesta actual.

Ámbito: Servicio de Oncología Médica y Radioterapia del Hospital Clínic de Barcelona.

Sujetos: Cincuenta pacientes ingresados en el Servicio.

Intervenciones: Se realizó un seguimiento de la ingesta dietética durante 3 días hábiles mediante observación directa, así como una valoración de los parámetros antropométricos y bioquímicos, un registro de datos relativos a la sintomatología, y una valoración de la calidad de vida mediante el cuestionario EORTC QLQ-C30.

Resultados: Nuestros datos muestran que un 32.6% de los pacientes no alcanzaron 25 kcal/kg/día, y un 23.3% no llegaron a cubrir 1 g proteína/kg/día. Respecto a la QoL, la puntuación media para el estado de salud global y la QoL global para todos los pacientes fue 46.2. Comparado con la población general, hubo déficits importantes entre los pacientes oncológicos respecto a la funcionalidad física, de rol y social. Las diferencias más pronunciadas en la escala de síntomas fueron para la fatiga y en los ítems simples, para la pérdida de apetito y el estreñimiento. La baja ingesta de proteínas se asoció con una percepción disminuida en la función física (p=0.01), la fatiga estuvo cerca de la significación estadística (p=0.058). No se encontraron diferencias significativas respecto a la ingesta calórica y la QoL.

Conclusión: Un porcentaje significativo de pacientes que recibieron alimentación oral exclusiva no cubrieron una cantidad aceptable mínima de sus requerimientos energético-proteicos. Nuestros resultados apuntan que ingestas dietéticas escasas pueden afectar la QoL por sí mismas.

(Nutr Hosp. 2006;21:505-10)

**Introduction**

The difficulty to maintain a correct nutritional status is a common phenomenon among cancer patients. Protein-energy malnutrition may have a major clinical impact on the cancer patient, and is one of the main reasons for increased morbidity and mortality. At the time of diagnosis, the incidence of undernutrition oscillates between 15 and 40 per cent. It is generally agreed that an involuntary weight loss over 10% in cancer patients is an independent risk factor for reduced survival.

The causes of undernutrition are diverse. Alimentary tract neoplasms directly produce a partial or complete obstruction at one or more sites. Also, the production of various polypeptide hormones by a number of malignant tumors, have an effect over peripheral receptors producing distinct paraneoplastic syndromes. Likewise, the different type of treatments applied to the oncologic patient, such as chemotherapy or radiotherapy, have an important impact on the nutritional status.

Quality of life (QoL) is a subjective multidimensional construct reflecting functional status, psychosocial well-being, disease, and health perception related symptoms. QoL in cancer patients is affected by the interaction of different factors as the above-mentioned nutritional status, the own disease and antineoplastic treatment side effects.

If the reduction in food intake has a determining role in the development of undernutrition, and QoL can be affected by the nutritional status, it is of special interest to know what kind of relation exists between both aspects.

**Methods**

**Study design and patient sample**

This descriptive cross-sectional study was designed to assess the quality of life, nutritional status and quantitative food intakes of non-terminal admitted cancer patients who received oral feeding. From April until September 2004 all non-terminal consecutive patients admitted in the Medical Oncology and Radiotherapy Service ward at the Hospital Clínic de Barcelona were assessed for inclusion criteria; patients receiving enteral or parenteral nutrition were excluded. For every patient, the person responsible for the monitoring recorded clinical variables, cancer location, presence of metastases, duration of disease and side-effects of the antineoplastic treatment applied.

**Study measures**

**Nutritional assessment.** Patient’s body weight and height were determined with a mechanical balance beam scale and height measuring rod, the subject was also asked about it’s usual weight and the period of time of weight loss, if any. The values were used to calculate body mass index (BMI), percentage of usual weight, ideal weight percentage of ideal weight, and percentage of weight loss. The estimates of fatness and lean tissue were assessed with the measurement of the triceps skinfold thickness by a caliper (John Bull, British Indicators LTD, UK), mid-upper arm circumference and calculating the arm muscle area. The measurement of the following laboratory tests were performed once during admission: total proteins, albumin, prealbumin, and total cholesterol.

**Dietary assessment** Current dietary intake at hospital was assessed by direct observation during 3 working days by a dietitian or nursing staff. The software Dietsource 1.7 (Cath Soft, Barcelona, Europe) was used to analyze the nutrient contents of portions consumed.

**QoL instrument.** QoL was assessed with the 30-item questionnaire of the European Organization for Research and Treatment of Cancer Quality of Life Questionnaire version 3.0 (EORTC QLQ-C30). The QLQ-C30 is a validated, brief, self-reporting, cancer-specific measure of health related QoL. It is composed of five multi-item functional scales (physical, emotional, cognitive, social and role) and one global health status/QoL scale, three multi-item symptom scales (fatigue, pain, nausea/vomiting), and six single items assessing symptoms such as dyspnea, insomnia, appetite loss, constipation, diarrhea and financial difficulties. Higher scores on the functional scales indicate better functioning/QoL, whereas higher scores on the symptom scales and single items denote more severe symptoms.

**Statistical analyses**

Statistical analysis was conducted using the software SPSS 10.0 (SPSS, Chicago, USA). Descriptive analyses of clinical data were performed, cancer location and metastases, food intake and nutritional status were expressed as number and percentage, while age, disease duration and total values in QoL were expressed as mean and standard deviation. We compared QoL results of all groups with norm-reference data from the German population, due to the lack of similar data in our location. QoL scores were computed according to the EORTC scoring manual. All scores were linearly transformed to a 0 to 100 scale. There were no missing data in the filled out questionnaires. QoL data was compared according to age-specific mean scores between reference population and cancer patients. Differences between QoL mean scores of the patients and the norm reference population scores of over 10 points on the 0-100 range of the EORTC scoring system, were interpreted as ‘clinically meaningful’. Comparisons between groups were performed using Student’s $t$-test, categorical variables were compared using Chi-squared test and non-parametric tests when required. Normal distribution of data was verified with the Kolmogorov-Smirnov test. For all statistical significance levels were considered as $p$-values $<0.05$. ©

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Results

**Nutritional status**

Fourteen out of 50 studied patients (32.6%) did not reach a minimum of 25 kcal/kg/day, and 10 (23.3%) did not even fulfill 1 g protein/kg/day. Eleven out of 50 patients (22%) presented a weight loss superior to 10% in a period of time inferior to 6 months. Regarding the rest of the anthropometry, 7 out of 47 patients (14.9%) showed a tricipital skinfold below the 10th percentile and 8 (17%) an arm muscle area below the same percentile. Three out of 47 patients were overweight at the time of admission.

Nine of 36 patients (25%) showed values of serum albumin below 30 g/L, 10 out of 26 (38.5%) pre-albumin values below 0.15 g/L and 8 out of 45 (17.8%) had rates of total cholesterol below 3.9 mmol/L (150 mg/dL).

An insufficient caloric intake during admission was not related to the percentage of weight loss, nor to a tricipital skinfold below the 10th percentile. Patients with hepatic metastases had a greater probability to present a 10% weight loss or greater (p<0.05). A weight loss superior to 10% was not associated with statistically significant differences in albumin, pre-albumin and cholesterol levels.

Finally, regarding symptomatology control, it was observed that 28 out of 50 patients (56%) presented xerostomia, 23 (46%) anorexia, 21 (42%) some type of intermittent pain, 18 (36%) constipation, 12 (24%) hypoguesia, 9 (18%) nausea, and 8 (16%) estomatitis.

**Patient sample**

This study included a final sample of 50 non-terminal cancer patients, 28 men and 22 women, mean age 61±14 years. Duration of disease was 18±35 months. Diagnostics were as follows in table I.

Eight out of 50 patients presented pulmonary metastases, 7 liver metastases and 5 peritoneal metastases. At the time of the study, 9 out of 50 patients were receiving chemotherapy and 7 radiotherapy.

**Quality of life**

Of the 50 patients enrolled, 42 filled out the QoL questionnaire. Table II summarizes the mean scores for the QLQ-C30 subscales, results are shown by age for admitted patients compared to general population. Mean score for global health status and overall QoL for all patients was 46.2. Highest functional scores were observed for cognitive and social functioning. Role function was scored lowest (fig. 1). Regarding symptoms, QoL among cancer patients was most severely affected by fatigue, pain and appetite loss (fig. 2).

Compared to a reference population, admitted cancer patients did not show clinically meaningful differences in emotional and cognitive functioning scales; nausea/vomiting in the symptom scales; and dyspnea, diarrhea and financial difficulties in single items. In contrast, there were important deficits among cancer patients regarding physical (△=25.3), role (△=28.5) and social functioning (△=17.6). The most pronounced differences in the symptom scales were for fatigue (△=23.4), and in single items for appetite loss (△=22.4) and constipation (△=22.6). Global QoL differences between sample and general population was 24.6.

Of particular interest are the age-specific comparisons in functional scores. Those revealed the largest differences between cancer patients and general population among the youngest age groups (< 60 years), and smaller differences among the elderly.

Additional statistical analysis of nutrition-related factors and their relationships with QoL showed that patients with hypoalbuminemia reported more problems with diarrhea (p=0.05). Protein intake below 0.9 g / kg was associated to a poorer perception on physical functioning (p=0.01), and fatigue was close to significance (p=0.058). No significant differences were found regarding caloric intake though, being fatigue (p=0.06) the closest relation. No other nutritional parameters, like percentage of weight loss, were statistically related to changes in QoL.

**Discussion**

It is already a studied issue that hospitalization plays an important role in the deterioration of nutritional status in cancer\textsuperscript{17,18} and other malignant diseases\textsuperscript{19}. Also functional impairment is accepted to be related to the deterioration of nutritional status\textsuperscript{20,21}, but few studies have paid attention to the relations between nutrition and QoL. We focused our interest then, in doing an approach on the relationships between QoL and the nutritional status of these patients. For this purpose, nutritional parameters were preferred against screening tools as the Subjective Global Assessment.

Some studies relate artificial nutrition in cancer patients with maintaining the nutritional status and QoL\textsuperscript{21,22}. We have to be aware though, that artificial nutrition by itself can have a negative impact in QoL.

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**Table I**

<table>
<thead>
<tr>
<th>Distribution of the sample according to diagnostic (n=50)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Number of patients</strong></td>
</tr>
<tr>
<td>------------------------</td>
</tr>
<tr>
<td>Lung cancer</td>
</tr>
<tr>
<td>Breast cancer</td>
</tr>
<tr>
<td>Gynecologic cancers</td>
</tr>
<tr>
<td>Esophagus cancer</td>
</tr>
<tr>
<td>Other types of cancer</td>
</tr>
</tbody>
</table>

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QOL and nutritional status in cancer patients  Nutr Hosp. 2006;21(4):505-10
too. The only placement of a feeding tube or not wishing to be seen in public, can be factors of psychosocial distress for patients\textsuperscript{21,23,24}. Regarding oral feeding, a recent study about the use of an eicosapentaenoic acid enriched nutritional supplement and nutritional counseling in patients with cancer cachexia, resulted in an improvement not only of the nutritional status but also of their quality of life\textsuperscript{25}.

In our study we observed that a significant percentage of patients who received exclusive oral feeding did not cover a minimum acceptable quantity of their protein-energy requirements. Although current intake

Table II

QoL mean scores of scales and items by age groups in comparison to the general population

<table>
<thead>
<tr>
<th>Group</th>
<th>Admitted Cancer Patients</th>
<th>General Population</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&lt; 60</td>
<td>60-69</td>
</tr>
<tr>
<td>Physical scale</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Role</td>
<td>55.7</td>
<td>53.6</td>
</tr>
<tr>
<td>Emotional</td>
<td>62.5</td>
<td>75.0</td>
</tr>
<tr>
<td>Cognitive</td>
<td>77.8</td>
<td>77.4</td>
</tr>
<tr>
<td>Social</td>
<td>64.6</td>
<td>71.4</td>
</tr>
<tr>
<td>Global QoL</td>
<td>41.6</td>
<td>38.7</td>
</tr>
<tr>
<td>Symptom scale</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fatigue</td>
<td>47.4</td>
<td>41.3</td>
</tr>
<tr>
<td>Nausea/vomiting</td>
<td>8.4</td>
<td>7.1</td>
</tr>
<tr>
<td>Pain</td>
<td>44.4</td>
<td>27.4</td>
</tr>
<tr>
<td>Single items</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dyspnoea</td>
<td>18.8</td>
<td>21.4</td>
</tr>
<tr>
<td>Insomnia</td>
<td>35.0</td>
<td>28.6</td>
</tr>
<tr>
<td>Appetite loss</td>
<td>36.7</td>
<td>33.3</td>
</tr>
<tr>
<td>Constipation</td>
<td>37.5</td>
<td>26.2</td>
</tr>
<tr>
<td>Diarrhea</td>
<td>4.2</td>
<td>9.5</td>
</tr>
<tr>
<td>Financial difficulties</td>
<td>26.7</td>
<td>7.1</td>
</tr>
</tbody>
</table>

Fig. 1.—Mean functional scores of admitted cancer patients in comparison with mean scores from the general population.
in hospitalized patients may not reflect long-term changes, it must warn us on a situation of nutritional risk. From our point of view, nutritional assessment in hospitalized patients should pay more attention on current intake, because it is an aspect that could be dismissed with usual screening tools.

As we already described in the results, our admitted cancer patients showed clinically meaningful differences in various aspects of their QoL, but those differences were more pronounced in the youngest groups. This can be caused because of the fact that perception of certain aspects that shape QoL, like physical functioning, are inferior at the time of illness with respect to normality. That makes younger groups of patients to present more difficulties in the adaptation to the new situation generated by the illness with respect to older patients. Since these patients already have certain aspects diminished due to their age, thus having been able to adapt along time.

Nutritional deterioration is very much related to cancer site and stage of the disease, but the reduced sample size made it impossible to give results by stratification. Although the study is also limited by the cross-sectional design, the results point-out that a reduction in energy and protein intakes can affect QoL by themselves, as it is already known that poor food intake impairs functional status and psychological abilities.

Nutrition is only one of the factors that influence QoL in cancer patients, but nutritional evaluation of cancer patients needs to be improved and individualized nutritional counseling should be done, so as to offer better treatment of symptoms and to improve patients’ QoL.

Future studies assessing the relationships between QoL and nutritional status should include longitudinal data, in order to increase the strength of the results.

Acknowledgements

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References