Original article

Evaluation of the nutritional profile of patients with total laryngectomy

Clara Inés Flórez Almonacid [a,b,c,]*, Alfredo Jurado Ramos [d,e], María Aurora Rodríguez Borrego [c,f]

[a] Research Unit, Innovation and Care, Department of Nursing, Reina Sofia University Hospital, Cordoba, Spain
[b] School of Nursing, University of Cordoba, Spain
[c] Institute of Biomedical Research Maimonides (IMIBIC), Reina Sofía University Hospital and University of Córdoba, Spain
[d] Department of Otolaryngology, Reina Sofía University Hospital, Cordoba, Spain
[e] Faculty of Medicine, University of Cordoba, Spain
[f] Nursing Department, School of Nursing, University of Cordoba, Spain

ARTICLE INFO

SUMMARY

Background and aims: Nursing care requires knowledge of the best possible care techniques and plays a significant role in the nutritional status of cancer patients. The main purpose was assessing the changes in the nutritional profile between the preoperative and postoperative periods for patients with laryngeal cancer and their relationship to pharyngocutaneous fistula.

Methods: Observational study of 40 patients. During April 2010 and December 2011 nutritional risk assessment on admission and evaluation of nutritional parameters on admission (t_0), at 7 (t_1) and 14 (t_2) days were carried out. Statistical techniques for longitudinal (or repeated) data were used and Generalised Estimating Equations models (GEE),

Results: On admission, 37.5% of patients had reduced their usual weight by a percentage greater than or equal to 5%, and had a moderate risk of suffering malnutrition; of the patients, 62.5% for $[t_0, t_1]$ and 80% for $[t_1, t_2]$ reduced their weight by a percentage greater than or equal to 2%. The average of weight loss was 4328 (SD 2.20 [3.62–5.03]) for $[t_0, t_2]$ kg. Biochemical parameters decreased for $[t_0, t_1]$ and recovered for $[t_1, t_2]$. Twenty seven point five percent of the patients had a pharyngocutaneous fistula, which was significantly associated with the percentage of weight loss (p-value = 0.032), lower levels of albumin, and prealbumin, with a mean difference of 0.365 g/dl (p-value = 0.014) and 7.65 mg/dl (p-value = 0.005), respectively.

Conclusion: Patients lose weight before and during treatment and the weight loss is a poor prognosis in the development of pharyngocutaneous fistula in patients with total laryngectomy.

1. Introduction

Laryngeal cancer patients are at risk of severe nutritional exhaustion due to several factors, such as lifestyles abusing alcohol, tobacco and bad eating habits. The tumour's location often results in dysphagia and odynophagia with significant reduction in food intake. The level of malnutrition could be thought to be partly caused by the location and size of the tumour, which leads to secondary anorexia resulting from chronic pain.[1]

Up to one third of the patients with head and neck cancer (HNC) suffer severe malnutrition and 50% suffer some degree of malnutrition, which has been linked to postoperative complications and a worse response to treatment, and even a higher rate of tumour recurrence. Therefore, HNC patients, even with a successful cancer treatment, may die from malnutrition.[2,3] Unintentional weight loss percentages of HNC patients higher than 2% weekly or than 5% in a month are a reliable sign of malnutrition, which is a large contributor to morbidity during and after treatment, whether surgical, radiotherapy or chemotherapy.[4]

Nevertheless, the importance of the nutritional status of patients with surgical treatment for laryngeal cancer is presently under examination.[5] Some recent studies have found that

* Corresponding author. Outpatient Building, 4th Floor, Reina Sofia University Hospital, Avd. Menéndez Pidal s/n, 14004 Córdoba, Spain. Tel.: +34 620 878 155, +34 957 0112 38 (mobile).
E-mail addresses: cifa@mundivia.es, clarai.florez.sspa@juntadeandalucia.es (C.I. Flórez Almonacid), md1juraa@uco.es (A. Jurado Ramos), en1robom@uco.es (M.A. Rodríguez Borrego).

nutritional indices such as the Body Mass Index (BMI) and the total number of lymphocytes are lower in cancer patients than in normal subjects.[6,7] Other studies show that weight loss is the best parameter to evaluate the nutritional status of surgical HNC.[8] Despite this, the weight loss of HNC patients is rarely perceived in the everyday practice.[9]

Another fact to highlight is the high incidence of postoperative complications in laryngeal cancer patients, such as pharyngocutaneous fistulas with a prevalence rate between 3.5% and 65%, anastomotic dehiscence and wound infections.[10,11] However, the available studies have not found a link between the onset of pharyngostome and the patient's nutritional status.[12]

Recognition and treatment of disorders associated with malnutrition are essential to ensure the best quality life for laryngeal cancer patients. Severe forms of malnutrition are associated with depression in cellular immunity, which puts patients at an increasing risk of postoperative sepsis.[13] This, in turn, might undermine the success of clinical and surgical therapies, adds costs to hospital care and increases morbidity.[14–16] While there are available data describing the nutritional status and postoperative complications in patients with head and neck cancer, just a few studies consider nutritional parameters in patients with total laryngectomy.[17]

The present study aims at evaluating changes in the nutritional parameters of laryngeal cancer patients with total laryngectomy between the preoperative and postoperative periods and their connection with the presence of pharyngocutaneous fistula.

2. Material and methods

2.1. Design and sampling

Observational study of all consecutive patients with total laryngectomy whose final diagnosis was T4 squamous cell carcinoma during their stay in the otolaryngology clinical management unit of a level 3° Hospital, in the Autonomous Community of Andalusia, between April 2010 and December 2011.

Patients diagnosed with laryngeal cancer admitted through the emergency room for tracheotomy caused by severe dyspnoea were excluded from this study.

2.2. Variables

Variables studied included: the assessment of nutritional risk by NRS-2002,[18] which classifies patients according to the degree of malnutrition and the severity of the underlying disease. This includes two phases, and if the score is greater than or equal to 3, the patient is considered at risk of malnutrition.

Nutritional assessment [anthropometric parameters: Nutritional profile [Body Mass Index (BMI), weight loss percentage, Arm Muscle Circumference (AMC), Triceps skinfold thickness (TSF) and biochemical parameters: Albumin, Transferrin, Prealbumin and Total number of lymphocytes],[19] Complications [Pharyngocutaneous fistula] Caloric and nitrogen ingestion at 7 and 14 days and demographic data [Gender, age, hospital stay] (Table 1).

A nutritional profile was built for each patient, including the anthropometric and biochemical parameters upon their admission (t_0), 7 (t_1) and 14 (t_2) days after surgical intervention.

2.3. Procedure

An interview with the patient took place on the admission day to provide him with a detailed explanation of the purpose of this study and to take preoperative measurements. The patient's height was measured when standing, to the nearest cm; all patients were

Table 1
Variables studied included.

Parameters[19]	Criteria[19]	Formula and normal value (NV)[19]
Anthropometric	Usual weight in the last 3 months Current weight (Kg) & size (cm)	
	Ideal weight	Men = 45 + 0.9 × (size in cm-150) Women = 50 + 0.9 × (size in cm-150)
	Weight loss percentage	Shortfall rate = [(usual weight (Kg) − current weight (Kg))/usual weight (Kg)] × 100
	Arm muscle circumference (AMC)	AMC = [AC-0.31 × triceps skinfold thickness (TFT)] Normal values 25.3 in men and 23.2 in women
	Body mass index (BMI)	BMI = weight in Kg/size in m^2 NV 25−24.9 Kg/m^2 18.5 Kg/m^2, malnourished [18.5,25] Kg/m^2, normal [25,30] Kg/m^2, overweight >30 Kg/m^2, obesity
	Triceps skinfold thickness (TSF)	NV 12.5 mm men and 16.5 mm women
	Weight loss percentage	In a week > 2%, severe In a month > 5%, severe
Biochemical systemic markers of inflammation	Albumin	NV [3.5,5] gr/dl
	Prealbumin	NV ≥ 17 mg/dl
	C-reactive protein	<5 mg/dl
	Glucose	<110 mg
	Leukocytes	<11.10^3 µl
Complications	Pharyngocutaneous fistula, feeling of satiety	
Demographic data	Gender, age, hospital stay	

measured in pyjamas, with no shoes and after emptying their bladder.

The measurement of the triceps skinfold thickness (TSF) was made with an instrument for measuring the panniculus adiposus with a skinfold caliper.[19] Measurements were made at the midpoint between the clavicular acromion and the olecranon, where the arm circumference was measured with a tape measure. The triceps skinfold thickness was measured 3 times, using the average of the three measurements for sampling purposes.

2.4. Ethical procedures

The research protocol was approved by the Research Ethics Committee of the hospital. Each patient was informed about the purpose, methods and strict confidentiality guarantees, and subsequently signed the written consent.

2.5. Statistical analysis

The qualitative characteristics are described by frequencies and percentages, as the quantitative characteristics are described by their average, standard deviation (SD), minimum and maximum. Statistical techniques for longitudinal (or repeated) data were used in the analysis of anthropometric and biochemical variables. The quantitative variables are described by the averages of the differences between the several periods in the study (preoperative period, 7 and 14 days postoperatively) and their standard deviations.