

Evolution of nutritional status of patients with head and neck cancer during radiotherapy or radiotherapy concerning chemotherapy

Evolução do estado nutricional de pacientes com câncer de cabeça e pescoço durante radioterapia ou radioterapia relacionada à quimioterapia

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ABSTRACT

Introduction: Tumor resection, chemotherapy and / or radiotherapy are used in the treatment of head and neck neoplasms, and these therapies trigger side effects that interfere with the patient's nutritional status. Nutritional intervention makes it possible to recover nutritional status and contributes to reduce treatment morbidity. **Objective:** To verify the evolution of the nutritional status of patients with head and neck cancer who followed the treatment and attended the nutrition clinic. **Methods:** Nutritional status was evaluated based on data collection and weight, height, percentage of weight loss, body mass index, arm circumference, triceps skinfold, nutritional muscular area and nutritional intervention. **Results:** When comparing the nutritional status of the patients at the beginning and at the final moment of follow-up, we did not observe a statistically significant difference ($p=0.261$); however, moderate / intense weight loss was observed in 23.6% ($n=17$) at the end of treatment. When assessing adherence to targeted nutritional therapy and weight loss, it was observed that of the 48 (66.7%) patients who adhered fully to the guidelines, 39 (81.3%) had no significant weight loss ($p=0.091$). **Conclusion:** Although the study did not indicate a statistically significant difference in relation to the nutritional status of the patients, 81.3% of those who adhered to the nutritional guidelines did not have significant weight loss corroborating with the results presented in the studies that suggest that individualized nutritional monitoring during radiotherapy and / or radiotherapy concomitant with chemotherapy helps maintain nutritional status.

RESUMO

Introdução: A ressecção tumoral, a quimioterapia e/ou radioterapia são utilizadas no tratamento de neoplasias de cabeça e pescoço, e essas terapias desencadeiam efeitos colaterais que interferem no estado nutricional do paciente. A intervenção nutricional possibilita a recuperação do estado nutricional e contribui para reduzir a morbidade do tratamento. **Objetivo:** Verificar a evolução do estado nutricional de pacientes com câncer de cabeça e pescoço que acompanharam o tratamento e compareceram à clínica de nutrição. **Método:** O estado nutricional foi avaliado com base na coleta de dados e peso, altura, percentual de perda de peso, índice de massa corporal, circunferência do braço, prega cutânea tricipital, área muscular nutricional e intervenção nutricional. **Resultados:** Ao comparar o estado nutricional dos pacientes no início e no momento final do acompanhamento, não observamos diferença estatisticamente significante ($p=0,261$); no entanto, perda de peso moderada/intensa foi observada em 23,6% ($n=17$) no final do tratamento. Ao avaliar a adesão à terapia nutricional direcionada e à perda de peso, observou-se que, dos 48 (66,7%) pacientes que aderiram plenamente às orientações, 39 (81,3%) não apresentaram perda de peso significativa ($p=0,091$). **Conclusão:** Apesar de o estudo não indicar diferença estatisticamente significante em relação ao estado nutricional dos pacientes, 81,3% daqueles que aderiram às diretrizes nutricionais não apresentaram perda de peso significativa, corroborando com os resultados apresentados em estudos, que sugerem que a monitorização nutricional individualizada durante a radioterapia e/ou radioterapia concomitante à quimioterapia ajuda a manter o estado nutricional.

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INTRODUCTION

The development of tumors occurs in tissues that are exposed to carcinogens, and for this reason, they undergo alterations in cell homeostasis during the process of cell division¹, as for example, the appearance of head and neck neoplasms is associated with exposure to tobacco and alcohol. Other factors such as personal habits, occupational activity, place of housing, nutrition, poor dentition and predisposition and genetic susceptibility may also contribute to tumor formation².

According to the American Cancer Society (ACS)³, it is estimated that for the United States, in 2017, 49,670 new cases of oral cavity and pharyngeal cancer occur, with 35,720 new cases in men and 13,950 new cases in women.

The therapeutic methods adopted are: tumor resection, chemotherapy and / or radiotherapy⁴. The therapy chosen varies according to the location, staging, tumor resectability and functional outcome after treatment. The healing, in the early stages, can be obtained by surgeries or radiotherapy. Chemotherapy is not used at this stage of treatment⁵.

For more advanced stages, the use of radiotherapy concomitant with chemotherapy presents better results when compared to adjuvant radiotherapy alone⁶. The NCCN Clinical Practice Guidelines in Oncology⁷ in head and neck tumors recommends the use of concomitant cisplatin in radiotherapy.

In the case of radiotherapy, a major concern of the team in planning the area to be irradiated is the preservation of healthy tissues and organs⁸.

Side effects may be acute, which develop during or within three months after radiotherapy ends, or late, where symptoms manifest gradually over months or years after treatment⁹. The main acute symptoms triggered by radiotherapy are oral mucositis, xerostomia, dyspepsia, dysphagia, nausea and vomiting¹⁰, as well as changes in saliva viscosity, fatigue, altered taste, smell and infections¹¹ and the late symptoms that can be developed are oral candidiasis, trismus and osteoradionecrosis¹². These symptoms cause functional declines and hinder swallowing and / or food intake and consequently there is loss of weight and muscle mass¹³.

Nutritional follow-up during treatment should be adequate and intensive, since the weight loss associated with tumor malignancy has a negative impact on the patients' prognosis¹¹, since malnutrition is related to the reduction of functional capacity, worsening of the immune status, delayed or interrupted treatment, frequent re-hospitalizations, reduced quality of life and increased mortality and toxicity induced by radiotherapy¹⁴.

The nutritional intervention allows recovery of the nutritional status, contributing to reduce the treatment morbidity¹⁵.

Prescription of nutritional therapy should respect the patient's particularity, nutritional status, disease stage, treatment effects and gastrointestinal function¹⁶.

The nutritional orientation aims to provide information to the patient and caregiver about the behaviors to be adopted during the treatment, at which point the possible side effects of treatment and dietary conducts that may contribute to minimize the symptoms should be addressed¹⁷.

Considering that the involution of nutritional status has a negative impact on the prognosis of the patient, this study aims to verify the evolution of the nutritional status of patients with head and neck cancer during radiotherapy or radiotherapy concomitant with chemotherapy.

METHODS

The study was retrospective, observational and descriptive. The data collection was done through collections in medical records of patients with head and neck tumors. The data collected were from January 2012 to June 2017, previously approved by the Ethics and Research Committee of the A.C. Camargo Cancer Center.

The study used data from 347 patients with head and neck cancer who provided nutritional guidelines at the A.C. Camargo Cancer Center radiotherapy outpatient clinic. Inclusion criteria were: diagnosis of head and neck tumors; patients who received nutritional counseling prior to radiotherapy or radiotherapy concomitant with chemotherapy; patients who attended the nutrition outpatient clinic during radiation therapy and concomitant or radiotherapeutic chemotherapy; patients over 19 years of both sexes. Among the data collected, 275 patients were excluded because they did not meet the inclusion criteria and 72 were included in the study.

The evolution of the nutritional status and symptoms presented by the patients were evaluated in the consultation with the nutritionist in three moments: the first moment was at the beginning of the treatment; the second moment was in the middle of the treatment; and the third moment was at the end of treatment.

For the descriptive analysis of the variables, the absolute (n) and relative (%) frequency distributions were used for the qualitative variables, and the main summary measures, such as mean, median, minimum and maximum values for the quantitative variables.

The McNemar test was applied in order to compare correlated frequencies of nutritional diagnosis between the three moments of evaluation (moment 1 versus moment 3). The chi-square test was applied to relate adherence to nutritional guidelines and involuntary weight loss (adherence to guidance versus weight loss)

RESULTS

Of the 72 patients included in the study, the gender distribution was 53 (73.6%) of the patients belonging to the male sex and 19 (26.4%) of the patients belonging to the female sex. The patients' ages ranged from 19 to 89 years, with a median of 67 years (Table 1).

When comparing the nutritional status of the patients at the beginning and the final moment of nutritional monitoring, we did not observe a statistically significant difference ($p=0.261$) (Table 2).

Although there was no statistically significant difference in nutritional status, moderate to intense weight loss was observed in 23.6% ($n=17$) of the patients when comparing weight at the beginning and at the end of treatment (Table 3).

With regards to nutritional therapies oriented to patients in the follow-up period, it is observed that more than 50% of the patients received guidance to use oral nutritional supplement. When comparing the indication of enteral nutritional

Table 1 – Distribution of patient variables and frequencies.

Variable	Category	n (%)
Sex	Male	53 (73.6)
	Female	19 (26.4)
Age (years)	Minimum - Maximum	19 - 89
	Medium	66.5
Radiotherapy	3D technique	7 (53.8)
	IMRT Technique	6 (46.2)
	Total	13 (18.1)
Radiotherapy + chemotherapy	3D technique	1 (5.6)
	IMRT Technique	17 (94.4)
	Total	18 (25)
Surgery + adjuvant radiotherapy	3D technique	3 (9.7)
	IMRT Technique	28 (90.3)
	Total	31 (43.1)
Radio/chemotherapy neoadjuvante + surgery	3D technique	-
	IMRT Technique	2 (100)
	Total	2 (3.4)
Surgery + adjuvant radio/chemotherapy	3D technique	-
	IMRT Technique	8 (100)
	Total	8 (11.1)

Table 2 – Comparison of nutritional status of patients in the first and third moments of nutritional monitoring.

	3 rd moment				Total	p
	Severe malnutrition	Moderate malnourished	Light malnourished	Well nourished		
1 st moment	Severe malnutrition	3	0	0	0	0.261
	Moderate malnourished	0	5	1	0	
	Light malnourished	1	3	17	0	
	Well nourished	0	0	2	40	
Total	4	8	20	40	72	

Table 3 – Percentage of weight loss during the three evaluation moments.

Evaluation moments	No weight loss to mild loss n (%)	Moderate to severe loss n (%)
1 st to 2 nd moment	44 (61.1)	28 (38.9)
2 nd to 3 rd moment	52 (72.2)	20 (27.8)
1 st to 3 rd moment	55 (76.4)	17 (23.6)

therapy, it is noticed an increase in orientations from the beginning to the end of the moment. Approximately 10% of the patients had no indication of nutritional therapy, however they were under nutritional monitoring and remained well nourished. In addition to oral and enteral nutritional therapy guidelines, some patients were also advised: glutamine use, diet consistency / composition change, meal fractionation, water intake, fiber module utilization, and calorie meal reinforcement (Figure 1).

When analyzing the adherence to the oriented nutritional therapies, it is noticed that approximately 60% of the patients adhered to the nutritional guidelines.

When comparing adherence to targeted nutritional therapy and weight loss, it was observed that of the 48 (66.7%) patients who adhered to the nutritional guidelines and 39 (81.3%) patients did not have significant weight loss, whereas 24 (33.3%) had significant weight loss during the follow-up period, but there was no statistically significant difference ($p=0.091$) (Table 4).

With regard to the symptoms presented, the incidence of symptoms increased from the second moment of follow-up, in which only 4 (5.6%) patients did not present treatment-related symptoms. The most incident symptoms in the third moment were xerostomia, dysgeusia and mucositis (Figure 2).

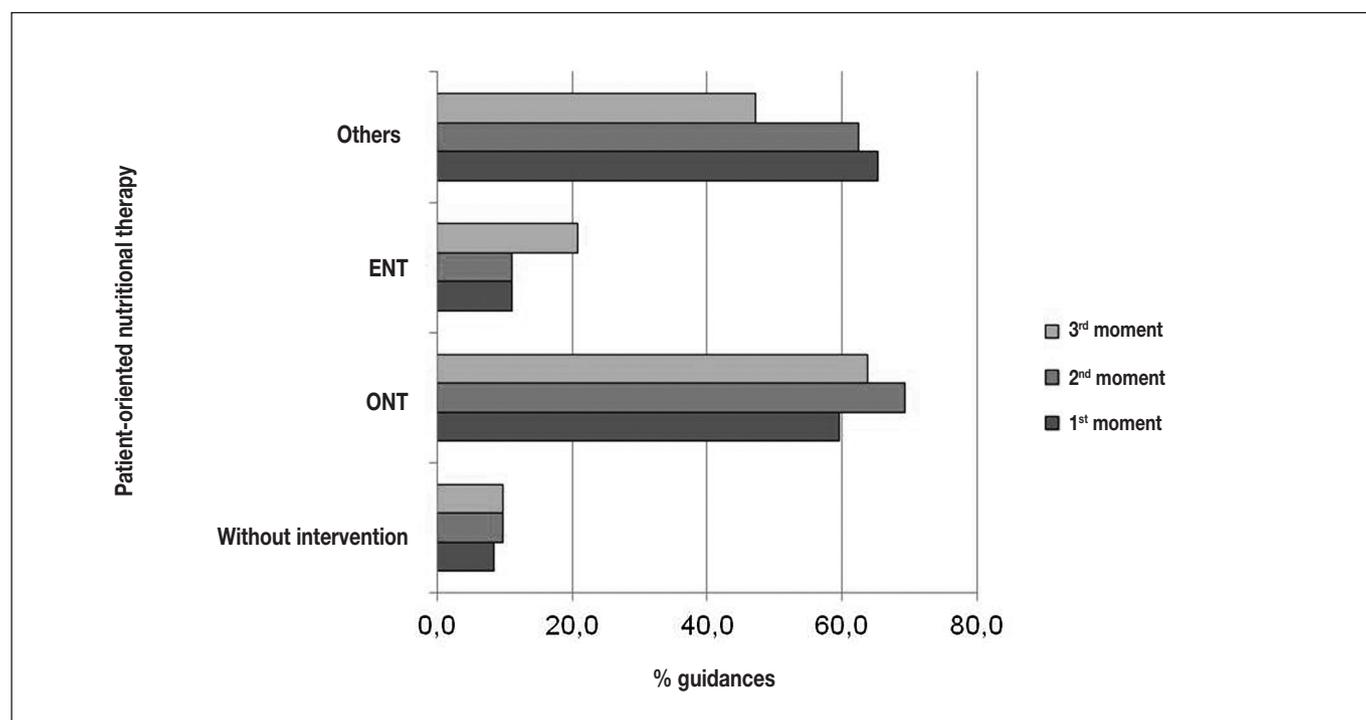


Figure 1 - Patient-oriented nutritional therapy.

ENT: Enteral nutrition therapy; ONT: Oral nutrition therapy.

Table 4 - Relationship between weight loss and adherence to nutritional intervention.

	Classification of weight loss from the 1 st to the 3 rd moment		Total n (%)	p
	No weight loss to mild loss n (%)	Moderate to severe loss n (%)		
Adhered to nutritional intervention	39 (81.3)	9 (18.8)	48 (66.7)	0.091
Did not adhere to nutritional intervention	16 (66.7)	8 (33.3)	24 (33.3)	
Total	55 (76.4)	17 (23.6)	72 (100)	

DISCUSSION

Some patients with head and neck tumors require radiotherapy treatment concomitant with chemotherapy. The most commonly used drugs for chemotherapy are Cisplatin and Cetuximab¹⁸.

Radiotherapy concomitant with chemotherapy in the study group is associated with an increased incidence of acute toxicity¹⁹. In this way, the adopted treatment is associated with the triggered symptoms. As in Souza et al.²⁰ study, from the second moment of follow-up there was an increase in side effects, suggesting that the acute manifestations of the treatment begin approximately 13 days after the start of radiotherapy.

In the systematic review developed by Alshadwi et al.²¹, the main symptoms resulting from the treatment (radiotherapy and chemotherapy) were mucositis, dysgeusia, xerostomia, trismus, nausea and vomiting. In this study, the most incident symptoms in the third moment of follow-up were mucositis, xerostomia, odynophagia, digeusia and inappetence.

As a consequence of these symptoms, oral intake becomes limited and there is weight loss, an important parameter for nutritional diagnosis¹¹. In this study, 38.9% (n=28) of the patients presented moderate to severe weight loss between the first and second follow-up and 27.8% (n=20) of the patients presented moderate to severe weight loss between the second and third follow-up time. However, only 2.7% (n=2) of the patients presented weight loss greater than 10% during the whole follow-up period.

Malnutrition is common in patients with head and neck tumors with an incidence of 30 to 50%¹¹. In the present study, at the beginning of the treatment, 41.3% of the patients were already malnourished and when assessing percentage of weight loss, it is noted that approximately 25% of the patients present heavy weight loss during the follow-up period.

A study of 75 patients with head and neck cancer submitted to RT were randomized into groups: a group with nutritional support and usual diet (n=25), a group that maintained the usual diet and received oral nutritional supplementation (n=25) and group that maintained the usual diet (n=25). At three months, patients receiving dietary

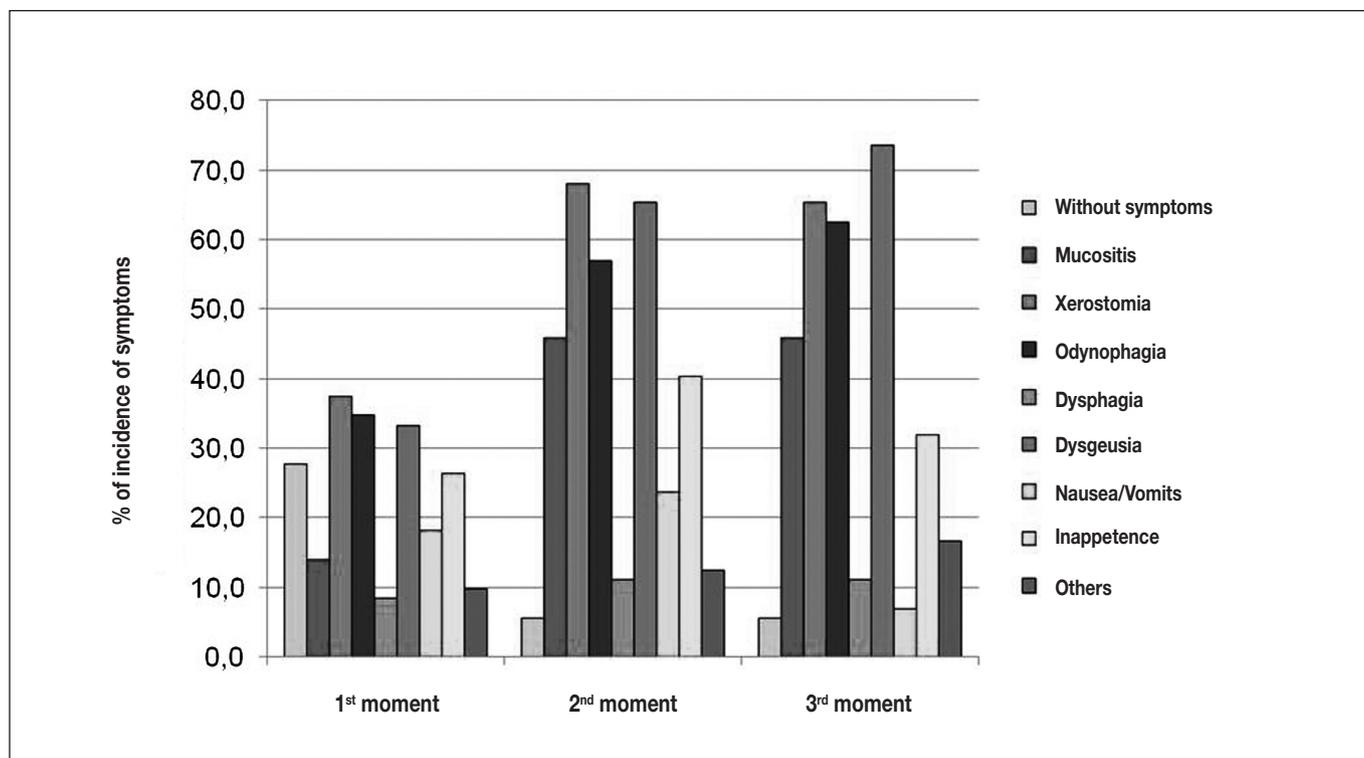


Figure 2 - Symptoms presented by patients in the three moments of follow-up.

counseling improved oral intake, anorexia, xerostomia, and dysgeusia. Better results than those presented by the other groups, demonstrating the importance of nutritional monitoring during radiotherapy²².

A prospective clinical study with 38 patients with head and neck cancer that verified the value of individualized care based on nutritional care and use of nutritional supplement pointed to a statistically significant difference in the nutritional status of the group in charge of providing nutritional information and supplementation. When compared to the non-nutritional intervention group, within two weeks after starting treatment two months after treatment, a prevalence of malnourished patients was higher than the non-nutritional intervention group²³. At the end of this study, approximately 60% of the patients were given oral nutritional supplementation guidance and, although 10% of the patients had no indication to initiate oral or enteral nutritional therapy, these patients remained well-nourished and maintained nutritional monitoring.

A retrospective study of 83 patients with head and neck cancer evaluated the relationship between weight loss and use of enteral nutritional therapy and presented a statistically significant difference between the group that used TNE and the group that did not use it. The TNE group lost less weight¹⁹.

A comparative descriptive study, with 20 patients with head and neck cancer, evaluated the influence of the use of early nutritional therapy (via nasogastric tube) without BMI of the

patients under study, and showed positive and statistically significant results in relation to the difference of the BMI over the 5-week study between the groups receiving early enteral nutrition and the group indicating enteral nutrition during treatment²⁴.

There is still no evidence on the best nutritional intervention to prevent weight loss and reduce treatment interruptions. However, it is observed that nutritional monitoring and the use of oral nutritional therapy help maintain nutritional status and in cases where there is obstruction of the nutritional route, mucositis and / or dysphagia, enteral feeding should be advocated²⁵.

CONCLUSION

In the present study, although there was no statistically significant difference in the nutritional status of the patients, 81.3% of those who adhered to the nutritional guidelines did not have significant weight loss, corroborating with the results presented by the studies cited above, which suggest that nutritional monitoring individualized during radiotherapy and / or radiotherapy concomitant with chemotherapy helps maintain nutritional status. More studies are needed to evaluate the effectiveness and adherence of nutritional guidelines.

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Place of study: AC Camargo Cancer Center São Paulo, SP, Brazil.

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