

Research Article

Home Enteral Nutrition in Oncogeriatrics: Infusion versus Energy Needs

Daniella Domingues Dziedicz*, Renata Carlyne Chavoni Zago, Cibele Pereira Kopruszynski and Maria Eliana Madalozzo Schieferdecker

Federal University of Paraná (UFPR), Curitiba, PR, Brazil

Abstract

Purpose: Oncogeriatric patients use enteral nutrition as an alternative means to supply the energy intake required. The aim of this study was to verify the nutritional energy delivery compared to the energy needs of oncogeriatric patients in home care.

Methods: Cross-sectional Retrospective study with data records from the Program of Nutrition Assistance to People with Special Needs of Food. Included were: patients aged over 60 years in home enteral nutrition and diagnosed with cancer. We collected the following data: age, sex, cancer location, home enteral nutrition time, access route, characteristic of EN used, presence of caregiver and the total energy infused based on 24-hour recall record. For the calculation of energy needs, we used 30Kcal / kg / day, comparing infused versus recommended enteral nutrition. The classification of nutritional status was established by calculating the body mass index.

Results: The sample was composed of 199 patients, the mean age was 71 (\pm 8.45) years, 65.4 % male, 37.1% had head and neck cancer, 78.9% were malnourished, 43.3% received nutrition through a nasogastric tube and 49.7% used mixed enteral diet. Patients with infusion energy greater than 75% represented the greatest number 80.87%. For all types of diets analyzed, there was a predominance of infusion higher than the recommended 75%, with a statistical difference for both enteral diet with foods and mixed enteral diet in malnourished patients ($p = 0.028$ and 0.000 respectively).

*Corresponding author: Daniella Domingues Dziedicz, Federal University of Paraná (UFPR), Curitiba, PR, Brazil, Tel: +55 4199246-2105; E-mail: danidziedicz1@gmail.com

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Conclusion: The cancer patients received higher energy intake than their needs indicated.

Keywords: Enteral nutrition; Home care; Oncogeriatrics

Introduction

The World Health Organization (WHO) considers the elderly in developing countries as those over 60 years of age [1]. A reduction in mortality rates and increased life expectancy has caused changes in global demographics, thus the elderly population is growing significantly. In addition, changes in disease profile arising from epidemiologic transition have replaced death by infectious and parasitic diseases leading to death and caused by chronic diseases such as cardiovascular disease and cancer, the latter being common in the elderly [2]. Early diagnosis and treatment, is expected to provide a longer and better quality of life for patients with cancer [3,4]. EN commonly used in cancer patients to maintain or restore nutritional status may be necessary for long periods, without the need for hospitalization when the patient is clinically stable, indicated as Home Enteral Nutrition (HEN) [5,6].

HEN is carried out in the home environment, guided by multidisciplinary health teams [7]. It promotes greater contact with family, quality of life and improves the nutritional status with a consequent reduction in morbidity and mortality [8]. Over the years, the use of HEN has increased considerably and as a result there has arisen a need for legislation and specific programs to support this practice [9]. These are still insufficient. Moreover, it is important to control EN management and monitoring to ensure that the nutritional needs are met within the recommended energy values, since proper nutrition therapy is beneficial to the quality of life of elderly patients, given their overall needs for treatment [10].

Since oncogeriatric patients suffer risk from compromised nutritional status, HEN can be seen as a tool to help in the recovery or maintenance of their health. The literature has no studies on the nutritional energy intake administered via probe in HEN oncogeriatric patients with respect to their individual needs. The aim of this study, then, was to determine whether the energy management of EN was in accordance with the HEN patient needs.

Methodology

Cross-sectional retrospective study of data from users of the Nutritional Care Program for People with Special Dietary Needs (PAN) in the city of Curitiba, State of Parana, Brazil. The study was approved by the Ethics Committee of the Federal University of Parana Research under Opinion N° 49265615.1.0000.0102/2016.

Data collection was carried out in the Center of Support for Family Health (NASF) of each health district, which encompasses the Basic Health Units (BHU). Data were collected from nutrition monitoring records used by PAN nutritionists according to the anthropometric measurements and dietary protocol of the municipality [11] in the

period 2006 to 2015. The following inclusion criteria were used in the present study: patients aged over 60 years, diagnosed with cancer and using HEN. Patients whose records did not contain all the data for the calculation of their energy needs, characteristics of the enteral nutrition used, and energy infusion were excluded from the analyses.

At the first visit, the nutritionist collected the following data: the age, gender, cancer type, time in HEN, characteristic of EN used, caregiver presence and caregiver kinship, and value of infused energy based on the 24-hour recall recorded and calculated by the assistant nutritionist according to protocol [11]. The Body Mass Index (BMI) was calculated by the current weight ratio (kg) and height squared (m²). For the nutritional status by BMI, calculations as employed by Lipschitz [12] were the second reference values for individuals over the age of 60 years. For the calculation of the energy needs, 30 kcal/kg/day as recommended for cancer patients was used [13]. For the evaluation of the infused versus recommended enteral diets, the recommendation of the Brazilian National Consensus on Cancer Nutrition [14] was used with a 75% cut-off bridge, considering less than this as inadequate, and more as adequate.

The collected data were analyzed by descriptive and inferential statistical tests. A normality test was applied and Student's t-test used for parametric variables as well as the Wilcoxon test for non-parametric variables paired with a degree of significance of $p \leq 0,05$. The analyses were performed using the Statistical Package for the Social Sciences software (SPSS®) Version 22.0.

Results

We analyzed data from 223 patients, twenty-four were excluded for not meeting the criteria pre-established by inclusion or absence of data. The 199 valid data patients, had a mean age of 71 ± 8.45 years, the majority were male ($n = 130, 65.4\%$). The diagnosis of head and neck cancer ($n = 74; 37.1\%$) predominated in the sample. In relation to nutritional status, 78.9% ($n = 158$) were malnourished. To the caregiver, 85.4% ($N = 170$) were members of the patient's family, while five patients had no caregivers. Other data are shown in table 1.

Table 2 shows that patients with infusion energy greater than 75% represented the greatest number ($n = 161; 80.87\%$) compared to those with lower infusion or equal to 75% ($n = 38, 19, 13\%$). For all types of diets analyzed, there was a predominance of infusion higher than the recommended 75%.

When the energy amount of the infusion diets was compared with the recommended energy amount for malnourished patients, a statistical difference was found. The infusion diet provided a higher energy amount than the recommended, for enteral diets with foods and mixed enteral diets, for the malnourished. Regarding the type of cancer, there was a statistical difference for patients with head and neck cancer who used a mixed diet. Also, for the access route there was a statistical difference for patients with a nasogastric tube for both commercial and mixed diets. Data for each group together with the recommendations are shown in table 3.

Discussion

Most of the patients in the study were elderly men. The diagnosis of head and neck cancer was prevalent, as was malnutrition. The time in HEN was less than 6 months enteral nutrition being a mix of both food and commercial preparations. The infused energy was greater than 75% of the nutritional recommendations in all forms

of EN preparations. When the infused energy as compared to the recommended energy, it was observed that the malnourished patients were receiving diets with more energy in the enteral nutrition diet, especially with hand-prepared foods. The fact that most of the patients in this study were male, with head and neck cancer is explained by common male exposure to tobacco and alcohol, the main causal factors associated with the development of this type of cancer [3]. In addition, the occurrence was higher in individuals over the age of 50 years [15].

Characteristics	N (%)
Sex	
Feminine	69 (34.6)
Male	130 (65.4)
Age	
60-69 years	104 (52.2)
70-79 years	67 (33.7)
> 80 years	28 (14.1)
Type of Cancer	
Cancer of the head and neck	74 (37.1)
Esophageal cancer	64 (32.3)
Cancer TGI *	27 (13.5)
Others	34 (17.1)
HEN time *	
≤ 3 months	76 (38.2)
> 3 months to ≤ 6 months	49 (24.6)
> 6 months to ≤ 12 months	31 (15.5)
> 12 months	24 (12.1)
Uninformed	19 (9.6)
Nutritional status according to BMI *	
Malnutrition (BMI <22.0)	158 (78.9)
Normal weight (BMI 22.0 ≤ BMI ≤27.0)	38 (19.4)
Overweight /obesity (BMI> 27.0)	3 (1.7)
Access way route	
NG*	86 (43.3)
Nasal Probe	25 (12.6)
PEG*	33(16.5)
JST*	55 (27.6)
Features of enteral nutrition used	
With foods	70 (35.2)
Commercial	30 (15.1)
Mixed	99 (49.7)
Caregiver	
Family	170 (85.4)
Hired	3 (1.5)
Had no caregivers	5 (2.5)
Friends	2 (1.1)
Uninformed	19 (9.5)

Table 1: General characteristics of oncogeriatric patients in home enteral nutrition.

*NOTE: TGI = Gastrointestinal Tract; HEN = Home Enteral Nutrition; BMI = Body Mass Index classified according to Lipschitz; NG = Nasogastric Tube; PEG= Percutaneous Endoscopic Gastrostomy; JST = Jejunostomy

Diet	<75% N (%)	> 75% N (%)
With foods	17 (8.5)	53 (26.6)
Mixed	15 (7.53)	84 (42.2)
Commercial	6 (3.1)	24 (12.07)
Total	38 (19.13)	161 (80.87)

Table 2: Characteristics of the diet and the energy percentage in relation to the nutritional recommendations.

Regarding the caregivers, most were family members of the patient. The use of EN with cancer patients justifies the data found, as self-care in this case becomes complex and limited. In the study of P Jukic et al., [16] with HEN patients, 30 had caregivers and of these, 22 were relatives. The individual patient needs physical and social care, so the caregiver is the person involved in meeting these needs, usually one or more of the individual's family members. The family is essential during this period, given the patient's vulnerability, as support and family protection may result positively in treatment [17].

As for the HEN time, it usually lasts for extended periods. Cancer and its complications are frequent reasons for HEN indication since cancer patients have specific signs and symptoms of the condition or reaction to treatments undergone that prevent proper food intake. Furthermore, it is known that malnutrition processes and cachexia in

oncogeriatric patients are common: the disease leads to progressive loss of lean and fat tissue caused by metabolic changes. Thus, the appropriate EN optimizes the supply of energy and nutrients to seek the improvement of the nutritional status of these patients [18], not necessarily just in weight gain, but in the supply of energy and nutrients.

The most common access route applied to patients was found to be by Nasogastric Tube (NG). In addition, when assessing the access route in relation to diets, the study identified differences for NG in commercial and mixed diets. This data can be explained by the fact that many patients might have been in a transition phase and still adapting to enteral tube use. Also, there were many patients who had started HEN less than 6 months before. It is physiologically advisable for NG to be used for up to 6 weeks after switching to ostomy, preferably with a gastric location [19]. In a study in Madrid, Spain, 40 moderate or severe malnutrition patients with head and neck cancer were evaluated. It was observed that either Percutaneous Endoscopic Gastrostomy (PEG) or NG use were effective methods for providing EN in cancer patients, i.e., there was no difference between these two access routes for administration of the enteral diet when the objective was to avoid greater nutritional compromise [20]. The assessment of nutritional status reflects the health condition as identified by the correlated information obtained from medical history, social, nutritional, physical examinations, anthropometric measurements and biochemical data. This suggests that a nutritionist's assessment is an essential part of a comprehensive approach [21].

	With foods (N= 70; 35.2%)			Commercial (N=30; 15.1%)			Mixed (N= 99; 49.7)		
	Recommended	Infused	P*	Recommended	Infused	P*	Recommended	Infused	P*
Nutritional status according to BMI									
Malnourished	1428 (795-2070)	1700 (403-3000)	0.028	1357.5 (870-1950)	1500 (252-2187)	0.517	1440 (768-2235)	1620 (613-3613)	0,000
Not malnourished	1896 (1500-2565)	1500 (900-3729)	0.047	1773 (1527-2040)	1938.7 (1500-2500)	0.144	1930.5 (1545-2253)	1776.4 (450-2500)	0.211
Type of Cancer									
	(N=23; 11.6%)			(N=7; 3.5%)			(N=36; 18%)		
Cancer of the head and neck	1546 (825-2550)	1799 (403-3613)	0,125	1378 (870-1740)	1837 (1500-2100)	0,009	1568 (825-2253)	1809 (613-3613)	0,022
	(N=33; 16.5%)			(N=7; 3.5%)			(N=31; 15.6%)		
Esophageal cancer	1599 (930-2565)	1681 (615-3729)	0,185	1575 (1260-1040)	1387 (571-2500)	0,245	1469 (768-2235)	1603 (450-3000)	0,276
	(N=24; 12%)			(N=3; 1.5%)			(N=8; 4.1%)		
Cancer TGI *	1504 (795-1875)	1230 (550-2000)	0,974	1492 (1140-1866)	1407 (252-2187)	0,803	1547 (1320-1860)	1630 (876-2750)	0,671
	(N=10; 5.1%)			(N=6; 3.1%)			(N=11; 5.5%)		
Others	1496 (900-2400)	1481 (781-2481)	0,756	1356 (1095-1950)	1469 (1000-2180)	0,401	1499 (832-2100)	1734 (900-2500)	0,089
Access way route									
	(N=27; 13.6%)			(N=15; 7.5%)			(N=44; 22.1%)		
NG*	1625 (930-2550)	1537 (403-3000)	0,508	1405 (870-1917)	1707 (832-2500)	0,035	1475 (768-2253)	1721 (450-3613)	0,034
	(N=8; 4.1%)			(N=4; 2%)			(N=13; 6.5%)		
Nasal Probe	1417 (900-2136)	1521 (900-2025)	0,622	1455 (1165-1950)	1217 (571-1800)	0,561	1582 (1080-2100)	1840 (900-2550)	0,116
	(N=14; 7.1%)			(N=4; 2%)			(N=15; 7.5%)		
PEG*	1380 (795-2400)	1571 (600-2513)	0,262	1443 (1149-1596)	1504 (1075-1944)	0,663	1624 (1008-1962)	1592 (945-2755)	0,797
	(N=21; 10.5%)			(N=7; 3.5%)			(N=27; 13.6%)		
JST*	1627 (930-2565)	1751 (615-3729)	0,181	1549 (1140-2040)	1354 (252-2187)	0,401	1512 (1008-2235)	1691 (876-2750)	0,098

Table 3: Recommendation versus nutritional energy infusion in relation to the enteral nutrition diet to nutritional status, type de cancer and access way route.

NOTE: *Significance level = 0.05.

In this study we used anthropometric data, weight/height, and BMI calculation. Anthropometry is a widely used technique to evaluate, classify, and monitor nutritional status, enabling the perception of variations in the size and proportions of the patient. Changes reflect variations in the balance between intake and nutrient requirements, beyond the body's ability to digest, absorb and use nutrients [21]. It was not possible to evaluate other aspects of each condition because this was a retrospective study. Also, it was not possible to assess whether there were changes in weight during HEN, as not only did the study use retrospective data and the basis for the calculations was estimated, but also there was no equipment to measure the weight of bedridden people under home care.

Regarding the nutritional status, malnourished patients predominated in our study. As we mentioned earlier malnutrition is common in oncogeriatric patients. Metabolic, hormonal, and characteristic signs and symptoms of the disease as well as age promote marked weight loss and serve to increase the malnourishment statistics patients. Among the problems in oncogeriatric, nutritional assessments, both malnutrition and nutritional risks have been noted [22]. Malnutrition may lead to a negative prognosis, resulting in sarcopenia, decreased functional capacity and death [23-25]. Therefore, the multidisciplinary team should pay attention to these issues arising with oncogeriatric patients.

Regarding the most commonly used enteral diet, there was a predominance of mixed enteral diet. For prescribing an enteral diet, these things should be taken into consideration: the nutritional needs of the individual, socioeconomic conditions, and the underlying disease of the patient [26]. It is noteworthy that in the PAN of the Municipal Health Secretariat (SMS)/Curitiba, there is a follow-up protocol for patients with criteria for guidance regarding enteral diet with foods, whether mixed or commercial. The choice of the prescribed enteral diet will depend on a personal assessment of each patient [11].

There was a predominance of patients who were using a commercial enteral diet and presented malnutrition; many of them, however were receiving a higher percentage of nutritional infusion than recommended. Overall, among those who were using an enteral diet with foods, inadequate infusion was high and many of them were malnourished although subject to infusion higher than the percentage considered adequate. This apparent contradiction in the data can be indicative of cachexia, which is a result of unintentional weight loss, anorexia, gastrointestinal symptoms, asthenia, and/or metabolic stress, among others, all common symptoms of cancer [27]. Thus, nutrition can contribute to the improvement of the nutritional status of these patients, but it will not always be able to fight malnutrition. That is, although the patient receives a higher intake of energy, due to the catabolic profile of the disease, this diet may be unable to maintain and/or gain weight.

A comparison of the recommended energy value with the value of the infused actually employed showed a statistical difference for the latter in relation to the malnourished patients both in an enteral diet with foods and mixed enteral diets. The present study showed a satisfactory relationship between the value of infused energy and that recommended for the majority of the population, especially for the malnourished. Regarding the groups on an enteral diet with foods or a mixed enteral diet, the infused value was significantly higher than the recommended. This can be explained by the fact that there is a

recommendation to increase the intake of fresh foods. Considering that there may be losses in nutritional energy before and during the preparation of the infusion, the correction and cooking factors require orientation concerning the relative increase of energy in these diets [28]. And when segregating by groups in relation to the type of cancer, patients with head and neck cancer using a mixed diet also obtained a statistical difference for greater infusion compared to that recommended. Patients with head and neck cancer generally have greater impairment of nutrition status due to the location of the cancer, therefore, their nutritional need via the enteral diet must be evaluated effectively [29].

Food infusions with nutritional energy higher than 75% of the recommended guidelines predominated among patients for all types of diets analyzed. This data reflects the realization of practices in accordance with home guidance from the health teams of the basic units working to achieve the nutritional goal of patients towards improved nutritional status. In contrast, in a study of Intensive Therapy Unit (ICU) patients receiving EN, Oliveira et al., [30]. Indicated that the achievement of an energy adequacy above 70% of the needs of patients did not seem to contribute to the reduction of mortality. They suggested that indices close to 100% be used for most satisfactory results in reducing mortality of patients using EN. It is noteworthy that this recommendation was for hospitalized patients; in the case of cancer patients under HEN who are chronically ill but clinically stable, the recommendation might vary.

There are few studies with oncogeriatric patients and home care that have considered the energy needs of this population. It is important that the elderly cancer patient receives individualized nutritional assistance to prevent nutritional deficiencies, resulting in better nutritional prognosis and minimizing the loss of weight [16]. As limitations to the present study, the fact that the study was retrospective, often the medical records were incomplete. There was a lack of equipment available to measure anthropometric changes, which might have been able to assess the benefits of an increased EN energy supply. In addition, no study has been found in the literature so far that demonstrates the relationship between prescription and energy infusion in patients using EN at home. These results are important to support the professionals of the multidisciplinary team, especially the nutritionist in monitoring patients with this profile.

Conclusion

It was observed in this study that most elderly cancer patients receive HEN with energy values above or equal to the recommended. It emphasizes the importance of nutritional monitoring at home to control the EN, to promote the maintenance or improvement of nutrition and quality of life. It is suggested that other studies be developed to consider other variables for monitoring nutritional assessment criteria, as well as the supply of macronutrients, especially the amount of protein to verify whether the patients showed a positive evolution in nutritional recovery.

Conflict of Interest

On behalf of all authors, the corresponding author states that there is no conflict of interest.

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Disclosures and Declarations

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