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ORIGINAL

Food intake of children and adolescents submitted to allogeneic hematopoietic stem cells transplantation

Consumo alimentar de crianças e adolescentes submetidos ao transplante de células tronco hematopoiéticas

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ABSTRACT

Objective

Describe the dietary intake of children and adolescents submitted to allogeneic hematopoietic stem cell transplantation.

Methods

Data from 0 to 19-year-old patients' medical records who were submitted to the procedure from January 2012 to September 2017 were used. These medical records provided anthropometric, food intake control and symptoms data for three moments: three days before infusion (M1), the infusion day (M2), and 25 days after the cell infusion (M3). This study was approved by the Ethics in Research Committee (17-0267).

Results

The patients presented weight loss (p>0.001) and a decrease in body mass index (p>0.001) in M1 *versus* M2 and M3. The means of calorie intake (p=0.031), protein (p=0.006), lipid (p=0.017), dietary fiber (p=0.035), calcium (p=0.005), iron (p=0.012), and sodium (p=0.022) had a reduction from M1 to M2 and an increase from M2 to M3. There was a

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decrease in mean intake of carbohydrates and calories per kilo from M1 to M2 and an increase from M2 to M3. The nutritional status was related to temperature above 37ºC (p<0.001) and to mucositis (p=0.001), in M1 and M2. There was a correlation of dietary intake with the presence of temperature above 37ºC (p=0.019) in M2 and M3.

Conclusion

Reduced intake and worsening of the patients' previous nutritional status appear to interfere with allogeneic hematopoietic stem cell transplantation and its complications, such as the presence of temperature above 37ºC and mucositis.

Keywords: Adolescent. Child. Food intake. Nutritional status. Stem cells.

RESUMO

Objetivo

Descrever a ingestão de alimentos de crianças e adolescentes submetidos ao transplante alogênico de células-tronco hematopoiéticas.

Métodos

Foram utilizados dados de prontuários de pacientes de 0 a 19 anos submetidos ao procedimento no período de janeiro de 2012 a setembro de 2017. Esses prontuários forneceram dados antropométricos, de ingestão alimentar e de sintomas durante três momentos: três dias antes da infusão (M1), no dia da infusão (M2) e 25 dias após a infusão celular (M3). Este estudo foi aprovado pelo Comitê de Ética em Pesquisa (17-0267).

Resultados

Os pacientes apresentaram perda de peso (p>0,001) e diminuição do índice de massa corporal (p>0,001) no M1 versus M2 e M3. As médias de ingestão calórica (p=0,031), de proteínas (p=0,006), de lipídios (p=0,017), de fibra alimentar (p=0,035), de cálcio (p=0,005), de ferro (p=0,012) e de sódio (p=0,022) tiveram redução de M1 para M2 e aumento de M2 para M3. Houve diminuição na ingestão média de carboidratos e calorias por quilo de M1 para M2 e um aumento de M2 para M3. O estado nutricional foi relacionado à temperatura acima de 37ºC (p<0,001) e à mucosite (p=0,001), em M1 e M2. Houve correlação da ingestão alimentar com a presença de temperatura acima de 37ºC (p=0,019) em M2 e M3.

Conclusão

A redução na ingestão e a piora do quadro nutricional prévio dos pacientes parece interferir no transplante alogênico de células tronco hematopoiéticas e em suas complicações, como temperatura corporal acima de 37ºC e mucosite.

Palavras-chave: *Adolescente. Criança. Ingestão de alimentos. Estado nutricional. Células-tronco.*

INTRODUCTION

Stem cells are of embryonic, fetal, or adult origin, and have a great capacity for division. The best known are Hematopoietic Stem Cells (HSC), which present good self-renewal and differentiation capacity in specialized cells of the blood tissue and the immune system. Thus, Hematopoietic Stem Cell Transplantation (HSCT) is one of the treatments suggested for malignant and benign diseases in children and adults, mainly leukemias and lymphomas [1].

Hematopoietic stem cell transplantation is based on the infusion of hematopoietic progenitor cells, which tend to multiply and differentiate themselves into other cells, replacing abnormal hematopoietic cells, which may be autologous and/or allogenic. Allogeneic transplantation presents higher mortality rates in the early period, when compared to autologous transplantation, and also high morbidity, due to the possibility of immunological incompatibility, even if there is compatibility of human leukocyte antigens [2]. This procedure might cause disorders such as mucositis associated with nausea, colic, diarrhea, and Graft Versus Host Disease (GVHD), which is common in this population. The occurrence of infectious or

hemorrhagic complications, organic failure, and symptoms such as fever and gastrointestinal tract disorders not related to mucositis or GVHD are also common [2-4].

The nutritional status of the individual is related to HSCT and its complications. Several authors have related children and adolescents' previous nutritional status with symptoms, hospital stay, mortality probability, and nutrient intake, [5-8]. The impairment in caloric-protein and nutrient absorption, the increase in the energy requirements imposed by the treatment and the length of hospitalization can lead to a worsening of the nutritional status of these patients, which are in a stage of growth and development [7-10].

Studies correlating the nutritional status of children and adolescents with food intake and symptoms resulting from HSCT are scarce [11-13]. This paper describes children and adolescents' nutritional status and dietary intake, assesses their relationship with symptoms and gastrointestinal disorders (nausea, vomiting, mucositis, diarrhea, constipation, temperature above 37ºC, and GVHD) before, during, and after the infusion with HSCs, and identifies variations in macro and micronutrients intake.

METHODS

This is a descriptive, cross-sectional, observational study carried out with patients between 0 and 19 years old, who underwent allogeneic HSCT while admitted at the Protected Environment Unit at *Hospital de Clínicas de Porto Alegre*, in the period between January 1, 2012, and September 30, 2017. Patients with no conditions for oral intake or who had not had food intake control in at least two of the three moments mentioned, one of which should be the day of the infusion (or the day before), were excluded from the study. Patients with enteral and parenteral nutrition were not included since it was not possible to ensure the specific amount of food intake at the analyzed moments. Patients transferred to another unit or those who died during the study period were also excluded.

The study sample was obtained by convenience through electronic medical records selected by consulting a list of patients provided by the hospital, which presented the patient's medical record, age range, type of transplant, and date of infusion. The electronic medical records were analyzed according to the inclusion and exclusion criteria. The WINPEPI software, version 11.44 (New York, United States of America) [14], was used to calculate the minimum sample size, which resulted in 47 subjects, considering a power of 90% and a significance level of 5% for the variable energy Ingested Orally (IO) per day (Kcal/day), as referred in Duggan *et al*. [15].

The data collection was performed through the subjects' electronic medical records review, where the following information was collected: patient medical record number; date of birth; gender; and date of cells infusion. The ingestion controls performed during admittance were reviewed, considering three moments: three days before infusion (M1), the infusion day (M2), and 25 days after the infusion (M3). Since it was a retrospective study and there was the possibility of large losses, all the data recorded in the same week of days M1 and M3, as well as the records of day M2 or the day before it, were also considered. Data collection also comprised: weight and height values; gastrointestinal disorders such as nausea, vomiting, mucositis, diarrhea, constipation; and symptoms such as temperature above 37°C (T>37°C) and GVHD.

Weight and height measurements were performed by the nursing and nutrition professionals, according to the hospital protocol, using an Urano® PS 180 scale (*Canoas*, *Rio Grande do Sul*, Brazil), with capacity of 180 kilograms (kg) and readability of 100 grams (g). The data measurement was performed according to Frisancho *et al*. [16].

In order to evaluate the patients' dietary intake, all meals served during the day were registered, which is a protocol used by the Protected Environment Unit nutritionist for all patients in the unit who undergo this procedure. This registry is performed by directly weighing the food during the time of hospitalization on

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specific days, before it is served to the patient and after the end of the meal. In order to weigh the food, a Toledo® (*São Bernardo do Campo*, *São Paulo*, Brazil) electronic weighing scale was used, with a capacity of 3kg and readability of 1g. The total amount of food ingested by the patients was obtained by the difference between the quantity offered and the amount of each meal left in the heat plate or disposable plastic packaging. The weight of the plates or packages was not considered in the weighing. Then, the values were placed by the nutritionist and the duly trained interns in the Nutwin® software, version 1.5 (*São Paulo*, Brazil) [17], in order to verify the amount of macro and micronutrients such as kilocalories (Kcal), kilocalories per kilogram of weight (Kcal/kg of weight), carbohydrates (g) proteins (g), Proteins per kilogram of weight (PTN in g/kg of weight), lipids (g), fibers (g), calcium (mg), phosphorus (mg), magnesium (mg), iron (mg), sodium (mg), potassium (mg), and zinc (mg) ingested by the patient. These data were inserted into the electronic medical record.

After building up the database, the information was transferred to the *Statistical Package for the Social Sciences* (SPSS) software, version 18.0 (IBM®, New York, version 18.0) [18]. The analysis was made by the Generalized Estimating Equations (GEE) method, which is an analysis of repeated measures, meaning it works with the same subject over time. From this, it was necessary to perform a logarithmic binding function in order to create a *gamma* distribution, the most suitable function for the variables of the study which presented such arrangement. For the variables that had binary distribution, a probity binding function was also performed. Throughout the analysis, a non-structured correlation matrix and a robust estimation covariance matrix were used. *Gamma* distributions were represented by means and 95% Confidence Intervals (CI95%), and binary distributions through probabilities and CI95%. The interactions that showed a significance by the Wald chi-square test presented a value of $p<0.05$.

The *"Nutritional status and food intake of children and adolescents submitted to allogeneic hematopoietic stem cells transplantation"* was carried out at the *Hospital de Clínicas de Porto Alegre*, approved by its Research Ethics Committee registration number 17-0267, and is in accordance with Resolution 466/12 of the National Health Council and the Declaration of Helsinki. All procedures with the participants were performed only after they signed the Informed Consent Form (ICF).

RESULTS

Between January, 2012 and September, 2017, 111 allogeneic HSCTs were performed in children and adolescents in the hospital. Due to lack of ingestion data in the medical record, 49 transplants were not considered for analysis, totaling 62 patients in this study. The average age of the participants was 9.82 years (CI95%=8.35;11.29), and boys composed 61.3% (n=38) of the sample. Regarding the types of transplantation, 50% (n=31) were of unrelated allogeneic and 50% (n=31) were of related allogeneic (Table 1).

Through the analysis of the anthropometric data of the patients, it was possible to verify a relationship of weight and Body Mass Index (BMI) over time. The mean weight in M1 was 38.83kg (CI95%=33.22;44.43); in M2, 38.35kg (CI95%=32.83;43.88); and in M3, 37.66kg (CI95%=32.26;43.06), with a statistically significant decrease in weight ($p<0.001$). The same behavior is seen in the BMI value over time: the mean decreases from 19.77kg/m² (M1) to 19.52kg/m² (M2), decreasing again to 19.16kg/m² (M3), showing their significant difference ($p<0.001$). In both variables, this behavior was significant at moments 1 *versus* 2 (weight*:* $p=0.011$; BMI: $p=0.007$) and 1 *versus* 3 (weight $p=0.002$; BMI: $p<0.001$), indicating a worsening of the patients' nutritional status over these moments.

The description of food intake is shown in Table 2. The number of patients in each variable was modified due to the information described in the medical records. By analyzing the mean of the energy IO, a decrease was found from M1 (1195.05Kcal/day) to M2 (957.84Kcal/day), increasing again in M3

Table 1 – Characteristics of study population. *Porto Alegre* (RS), Brazil, 2017.

Characteristics	Study population (n= 62)	
	n	%
Male sex	38	61.3
	Mean	CI95%
Age (years)	9.8	8.4-11.3
Type of transplantation		
	n	%
Unrelated allogenic	31	50
Related allogenic	31	50
	Mean	CI95%
Weight at M1	38.83	33.22;44.43
Weight at M2	38.35	32.83;43.88[T]
Weight at M3	37,66	32.26;43.06[i]
BMI at M1	19.8	18.7-20.9
BMI at M2	19.5	18.5-20.6[T]
BMI at M3	19.2	18.2-20.3[i]

Note: BMI: Body Mass Index; CI: Confidence Interval; M1: Moment 1; M2: Moment 2; M3: Moment 3; [T]: Statistical significance identified between moment M1 versus M2, [i]: Statistical significance identified between moment M1 versus M3, (Wald Chi-square test).

Table 2 – Food intake of children and adolescents submitted to allogeneic transplantation at the three moments of the study. *Porto Alegre* (RS), Brazil, 2017.

Variables	Mean Score									*p*-value
	M1			M2			M3			
	n	Mean	CI95%	n	Mean	CI95%	n	Mean	CI95%	
Energy IO (Kcal/day)	56	1196.1	1058.7;1351.2	62	957.8	824.1;1113.3	56	1083.4	927.2;1265.9	0.031*
Kcal/Kg	56	40.2	34.5;46.9	62	32.8	27.1;39.8	56	38.9	31.7;47.7	0.061
CHO (g)	54	170.5	150.7;192.9	61	136.1	117.8;157.3	56	174.2	146.7;206.7	0.013*
PTN (g)	55	40.6	34.9;47.2	62	29.7	24.8;35.5	56	37.6	30.1;47.0	0.006*
PTN/Kg	55	1.3	1.1;1.6	62	1.0	0.8;1.3	56	1.4	1.1;1.9	0.012*
LIP (g)	54	43.7	37.6;50.8	61	32.9	27.5;39.4	56	36.0	28.7;45.0	0.017*
Fibers (g)	22	4.6	3.5;6.1	23	2.9	2.1;3.8	22	3.9	2.6;5.8	0.035*
Ca (mg)	52	596.8	505.4;704.7	59	455.1	379.1;546.3	55	489.9	393.3;610.2	0.005*
P (mg)	21	403.6	293.7;554.8	24	353.1	263.5;473.3	20	369.6	262.8;519.9	0.741
Mg (mg)	16	89.3	67.0;119.2	19	66.0	48.3;90.2	17	69.3	47.2;101.8	0.059
Fe (mg)	53	4.3	3.7;4.9	59	3.1	2.5;3.8	55	4.2	3.2;5.5	0.012*
Na (mg)	30	1327.7	1043.3;1689.6	32	906.2	699.9;1173.2	31	1044.7	731.6;1491.8	0.022*
K (mg)	31	895.9	680.6;1179.3	33	726.7	554.8;951.9	31	758.1	551.6;1041.9	0.335
Zn (mg)	51	2.7	2.2;3.2	58	2.0	1.6;2.5	53	2.5	1.9;3.3	0.085

Note: Wald Chi-square test; *Values with $p<0.05$; Ca: Calcium; CHO: Carbohydrate; CI: Confidence Interval; Fe: Iron; G: grams; IO: Ingested Orally; K: Potassium; Kcal/day: Kilocalorie per day; Kcal/kg: kilocalorie per weight; LIP: Lipid; M1: Moment 1; M2: Moment 2; M3: Moment 3; Mg: Magnesium; Mg: Milligrams; Na: Sodium; P: Phosphorus; *p*: Significance Probability; PTN/Kg: Protein per weight; PTN: Protein; Zn: Zinc.

(1083.35Kcal/day), with significant difference (p=0.031). This same behavior was followed by macro and micronutrients such as protein (p=0.006), lipid (p=0.017), fiber (p=0.035), calcium (p=0.005), iron (p=0.012), and sodium (p=0.022). The carbohydrate mean had a different behavior, reaching 170.49g/day in M1, decreasing in M2 to 136.13g/day, and increasing above the M1 value in M3, accounting for 174.16g/day, with significant difference (p=0.013). The same occurred with the PTN/kg mean (p=0.012). Other variables were not statistically significant over time, such as Kcal/kg (p=0.061), phosphorus (p=0.741), magnesium (p=0.059), potassium (p=0,335), and zinc (p=0.085). Significance analysis was performed to evaluate the differences between times (Table 3). Significant correlations were found between moments M1 and M2, such as energy IO (p=0.023), Kcal/kg (p=0.050), carbohydrate (p=0.014), protein (p=0.004), PTN/Kg (p=0.033), lipid (p=0.019), calcium (p=0.008), iron (p=0.009), and sodium (p=0.031). As for the other

nutrients and the analysis between moments M1 and M3, no significant difference was found. In addition, although some patients (12 out of 62 subjects) had ingested food from outside the hospital, this data was not significant in relation to the energy IO (p=0.984).

The relationship between nutritional status and the presence of symptoms was analyzed. The results obtained were a BMI correlation with the presence of T>37ºC (p<0.001) and mucositis (p=0.001). Statistical significance was identified between M1 and M2 (p<0.001 in both). The individuals who presented T>37ºC in M1 had a lower BMI mean (19.77kg/m²) than those who had absence (19.78kg/m²) of this symptom, as well as in M2 (presence=18.31kg/m², absence=19.55kg/m²). Patients who had mucositis also had a lower BMI mean in both M1 (presence=19.75kg/m², absence=20.47kg/m²) and M2 (presence=18.92kg/m², absence=19.65kg/m²) (Table 4). The other symptoms did not present a correlation with the nutritional status, such as nausea/vomit (p=0.941), diarrhea (p=0.857), and constipation (p=0.814). These same symptoms were studied with dietary intake, presenting a relationship with the presence of T>37ºC (p=0.019), with statistical significance between M2 and M3 (p=0.003). Despite the increase in food intake identified between these moments in the previous data, the patients who presented T>37ºC had, in average, a lower energy IO than those who did not present this symptom, both in M2 (presence=349.11Kcal/day, absence=978.03Kcal/day) and in M3 (presence=989.27Kcal/day, absence=1100.09Kcal/day). Regarding nausea/vomit (p=0.990), mucositis (p=0.774), diarrhea (p=0.434), and constipation (p=0.345), there was no significant difference. Due to the low occurrence of GVHD at the proposed moments, quantifying only four cases in M3 among 62 patients, it was not possible to perform any statistical analysis on this data.

Table 3 – Food intake of children and adolescents submitted to allogeneic transplantation comparing the three moments of the study. *Porto Alegre* (RS), Brazil, 2017.

Variables	Difference among means								
	M1 *vs* M2			M1 *vs* M3			M2 *vs* M3		
	Mean	CI95%	*p*-value	Mean	CI95%	*p*-value	Mean	CI95%	*p*-value
Energy IO (Kcal/day)	238.2	24.8;451.6	0.023*	112.7	-119.6;345.0	0.736	-125.5	-362.7;111.7	0.616
Kcal/Kg	7.4	0.01;14.8	0.050*	1.4	-7.5;10.2	1.000	-6.0	-15.3;3.3	0.364
CHO (g)	34.4	5.3;63.5	0.014*	-3.7	-43.2;35.9	1.000	-38.0	-79.7;3.7	0.087
PTN (g)	10.9	2.8;19.0	0.004*	2.9	-7.3;13.8	1.000	-7.9	-18.9;3.0	0.247
PTN/Kg	0.3	0.2;0.6	0.033*	-0.1	-0.583;0.4	1.000	-0.4	-0.8;0.1	0.101
LIP (g)	10.8	1.3;20.3	0.019*	7.8	-2.2;17.8	0.190	-3.1	-13.6;7.5	1.000
Fibers (g)	1.8	-0.06;3.6	0.061	0.7	-1.0;2.5	0.991	-1.0	-3.3;1.2	0.827
Ca (mg)	141.7	29.2;254.2	0.008*	106.9	-32.4;246.1	0.199	-34.8	-176.9;107.3	1.000
P (mg)	50.5	-110.5;211.5	1.000	34.0	-182.6;250.6	1.000	-16.5	-227.4;194.4	1.000
Mg (mg)	23.3	-7.6;54.3	0.212	20.0	-19.2;59.3	0.667	-3.3	-50.7;44.1	1.000
Fe (mg)	1.2	0.2;2.2	0.009*	0.1	-1.6;1.8	1.000	-1.1	-2.7;0.5	0.267
Na (mg)	421.5	28.8;814.2	0.031*	283.0	-179.5;745.5	0.429	-138.5	-615.1;338.0	1.000
K (mg)	169.2	-125.7;464.2	0.509	137.8	-170.2;445.8	0.852	-31.4	-318.0;255.1	1.000
Zn (mg)	0.7	-0.1;1.4	0.104	0.1	-1.0;1.2	1.000	-0.5	-1.5;0.4	0.521

Note: Bonferroni Test. *Values with p<0.05; Ca: Calcium; CHO: Carbohydrate; CI: Confidence Interval; Fe: Iron; G: grams; IO: Ingested Orally; K: Potassium; Kcal/day: Kilocalorie per day; Kcal/kg: kilocalorie per weight; LIP: Lipid; M1: Moment 1; M2: Moment 2; M3: Moment 3; Mg: Magnesium; Mg: Milligrams; Na: Sodium; P: Phosphorus; p: Significance Probability; PTN/Kg: Protein per weight; PTN: Protein; Zn: Zinc.

DISCUSSION

Studies with similar populations presented data close to the present paper. Weight and BMI value of children and adolescents before, on the day, and after the procedure did not differ from studies with this group [7,10,19]. The comparison between times also follows the same tendency of a study with children and adolescent submitted to HSCT, which identified weight decrease between the moments before and after the infusion [15].

Table 4 – Symptoms of children and adolescents submitted to allogeneic transplantation at the three moments of the study. *Porto Alegre* (RS), Brazil, 2017.

Mean Score BMI (Kg/m²)							
Variables	M1		M2		M3		*p*-value
	Mean	CI95%	Mean	CI95%	Mean	CI95%	
Temperature above 37ºC	19.77[T]	18.67;20.93	18.31[T]	17.30; 19.37	19.45	18.15; 20.84	<0.001*
Nausea/Vomit	19.77	18.74;20.86	19.47	18.44; 20.57	19.16	18.05; 20.34	0.941
Mucositis	20.47[T]	19.25;21.77	18.92 [T]	17.76; 20.17	19.71	18.28; 21.26	0.001*
Diarrhea	19.57	18.53;20.68	19.49	18.31; 20.74	19.12	17.96; 20.36	0.857
Constipation	19.49	18.41;20.63	19.36	18.18; 20.63	18.71	17.67; 19.81	0.814
GVHD	–	–	–	–	19.29	17.93; 20.76	–
Mean Score Energy IO (Kcal/day)							
Variables	M1		M2		M3		*p*-value
	Mean	CI95%	Mean	CI95%	Mean	CI95%	
Temperature above 37ºC	724.86	580.84;904.60	349.12 [T]	151.59;804.03	989.27 [T]	779.37;1255.69	0.019*
Nausea/Vomit	1075.40	913.44;1266.08	852.14	672.05;1080.49	919.54	666.90;1267.87	0.990
Mucositis	1059.68	653.79;1717.56	960.01	664.58;1386.76	1199.65	777.32;1851.43	0.774
Diarrhea	1156.39	864.95;1546.02	980.73	659.59;1458.23	716.20	413.51;1240.46	0.434
Constipation	855.81	654.69;1118.69	888.10	626.58;1258.78	879.48	588.06;1315.32	0.345
GVHD	–		–		19.29	370.70;1443.45	–

Note: Wald chi-square test. *Values with $p<0.05$; [T]: Statistical significance was identified between moments; BMI: Body Mass Index; CI: Confidence Interval; GVHD: Graft versus host disease; IO: Ingested Orally; Kcal/day: Kilocalorie per day; Kg/m²: Kilogram per square meter; M1: Moment 1; M2: Moment 2; M3: Moment 3.

There was a change in food intake, especially in the first two moments. All the nutrients studied had an intake decrease in M2 in relation to M1, with energy IO, Kcal/kg, carbohydrates, proteins, PTN/Kg, lipids, calcium, iron, and sodium being statistically significant. Afterwards, a resumption of intake of all nutrients from M2 to M3 (except carbohydrates) was identified, but below the values found in M1. Carbohydrates had a different behavior, averaging above the M1 average. However, there was no statistical significance between moments M2 and M3 or M1 and M3. In an observational cohort there was a decrease between the week prior to transplantation (D-7 to D0) and the week after transplantation (D+1 to D+7), and an increase in the fourth week (D+22 to D+28) in relation to the amount of carbohydrate intake. Regarding energetic value, proteins, and lipids, there was also a decrease in oral intake from the week after transplantation in relation to the previous week. However, in the fourth week, higher values of ingestion of these nutrients, in relation to the previous week, were obtained [20].

In another study with pediatric patients, oral intake decreased before transplantation and increased after transplantation, but this increase was not quantified [20]. In the same study and in another one, the patients presented a significant decrease in resting energy expenditure in the first weeks after transplantation, a very important fact that should be taken into consideration in the moment of oral and other dietary prescriptions, such as enteral and parenteral nutritional therapy, since there is a risk of overfeeding in these patients [15,21]. This information corroborates the oral intake data found in the present study, because just as the resting energy expenditure has this decrease in this first moment, the intake would also be reduced until it is restored to adequate levels.

Another finding was that the worsening of the nutritional status of the patients presented a relationship with the presence of T>37ºC and mucositis between M1 and M2; however, with symptoms such as nausea and/or vomiting, diarrhea, and constipation there was no statistically significant difference. The decrease in dietary intake was related only to the presence of T>37ºC between M2 and M3, with no statistically significant results regarding the other symptoms. On the other hand, another study indicated that the manifestation of mucositis and GVHD in relation to intake after HSCT was significant, showing a significant decrease during the following eight weeks. According to these studies, the occurrence of GVHD can be manifested from 25 to 100 days post-transplantation, which represents a milestone in the

treatment trajectory, and it is possible that the low incidence of such symptom in this study is due to its short period, insufficient to be evidenced [4,19,21,22]. The considerable presence of symptoms in these patients is noticeable, although there are no significant differences.

This study holds significance because shows that the patient's previous nutritional status seems to interfere with the prognosis of allogeneic HSCT. Since this was a retrospective study, it was not possible to accurately measure the nutritional status of this population, such as loss of fat free mass or edema, and there was lack of registration of some consumption data.

CONCLUSION

In conclusion, this study demonstrates the importance of evaluation and nutritional interventions throughout the process to reduce the impact of the treatment, especially considering patients with symptoms such as T>37ºC and mucositis.

CONTRIBUTORS

MC BUENO, AMK JOCHIMS, and EB BEHLING contributed to the conception and design of the study, search, collection, analysis and interpretation of data, writing of the manuscript and approval of the final version of the article.

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