DOI: https://doi.org/10.17921/2447-8938.2022v24n2p97-98

Body Weight Loss is not Different between Patients with Digestion Gastrointestinal and Accessory Organs Cancer With High or low Neutrophils to Lymphocytes Ratio

Perda de Peso Corporal não é Diferente Entre Pacientes com Câncer Gastrointestinal e de Órgãos Acessórios da Digestão com Alta ou Baixa Relação Neutrófilos/Linfócitos

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Abstract

This study sought to assess if patients with cancer with high neutrophils to lymphocytes ratio (NLR) leads to body weight loss. A cross-sectional study was performed in a public hospital. A total of 97 patients with digestion gastrointestinal and accessory organs cancers were evaluated. Body mass index (kg/m^2) was calculated using the body weight (kg) divided by square of height (m) and body weight loss was obtained by percentage of body weight loss in the last months. The systemic inflammation was measured using the NLR and ≥6.5 values were considered as a high inflammation. It was found out that 11.3% of the patients have NLR ≥6.5. The NLR group ≥6.5 was younger than the NLR group <6.5 (NLR ≥6.5: 51.7 ± 14.1 *vs.* NLR <6.5: 61.9 ± 11.9 y, p=0.01), but without differences among sex, alcohol consumption, smoking, physical activity, body weight, body weight loss percentage and body mass index. In conclusion, it was found out that patients with digestion gastrointestinal and accessory organs cancers with NLR ≥6.5 did not differ in body weight loss when compared to patients with NLR <6.5.

Keywords: Inflammation. Immunity. Neoplasms.

Resumo

Este estudo procurou avaliar se pacientes com câncer com alta razão neutrófilos/linfócitos (RNL) apresentam maior perda de peso corporal. Foi realizado um estudo transversal em um hospital público. Foram avaliados total de 97 pacientes com cânceres gastrointestinais e de órgãos acessórios da digestão. O índice de massa corporal (kg/m2) foi calculado usando o peso corporal (kg) dividido pelo quadrado da altura (m) e a perda de peso corporal foi adquirida pela porcentagem de perda de peso corporal nos últimos meses. A inflamação sistêmica foi medida pelo RNL e valores ≥6,5 foram considerados como alta inflamação. Nós encontramos que 11,3% dos pacientes têm RNL ≥6,5. O grupo RNL ≥6,5 é composto de pacientes mais jovens do que o grupo RNL <6,5 (RNL ≥6,5: 51,7 ± 14,1 vs. RNL <6,5: 61,9 ± 11,9 anos, p=0,01), mas sem diferenças entre sexo, consumo de álcool, tabagismo, atividade física, peso corporal, porcentagem de perda de peso corporal e índice de massa corporal. Em conclusão, nós observamos que pacientes com cânceres gastrointestinais e de órgãos acessórios da digestão com RNL ≥6,5 não diferiram na perda de peso corporal quando comparados com pacientes com RNL <6,5.

Palavras-chave*: Inflamação. Imunidade. Neoplasias.*

1 Introduction

The digestion gastrointestinal and accessory organs cancers is responsible for one of the highest incidences of cancer in the world, being responsible for high death rates, which makes it an important public health problem[1]. This disease has consequences such as reduced body weight and survival. In addition, metabolic changes can lead to weight loss and immunological changes that potentiate disease progression and worse treatment response[2].

Inflammatory markers are therefore of great importance in the treatment, since inflammation plays an important role in tumor growth and progression. Likewise, the neutrophil-lymphocyte ratio (NLR) is a low-cost inflammatory marker, accessible in clinical practice and has been associated with a worse clinical prognosis[2-4]. The increase in NLR is reflected by the increase in neutrophils and the decrease in lymphocytes[4].

The increase in neutrophils causes an increase in tumor growth and promotion factors, in addition to suppressing the lymphocytes action, which result in decreased immunity and cancer worsening [5]. In a previous study, our group found out that NLR ≥ 6.5 is associated with an increased risk of sarcopenia in cancer patients[4].

Considering that NLR is a systemic inflammatory marker of low cost and popularly used in the hospital, it was hypothesized in this study that the increase in NLR is associated with increased body weight loss.

2 Material and Methods

A cross-sectional study enrolled 97 adults and older patients diagnosed with digestion gastrointestinal and accessory organs cancers undergoing chemotherapy or radiotherapy or surgery treatments. This study was approved by the Research Ethics Committee under the number 2.039.65.

Demographic, socioeconomic, and clinical data, such as age, sex, current alcohol and smoke use, and physical activity

were collected from medical records. Anthropometric and biochemical analysis were collected within the first 48 hours of admission. Body weight (kg) and height (m) were assessed to calculate the body mass index (BMI). Body weight loss was calculated using the formulae (habitual weight – current weight)/habitual weight x 100. In previous six months, body weight loss up to 10% was classified as moderate loss and >10% as severe loss. Neutrophils by lymphocyte count were measured to peripheral blood collected from morning period. NLR was calculated by dividing absolute neutrophils by lymphocyte values. Thus, the sample size was dichotomized as high NLR when ≥ 6.5 values were obtained, as previous demonstrated in cancer patients[4]. The data normality was tested using the *Shapiro-Wilk* test. Data are expressed as mean and standard deviation. Chi-square test was used to assess the variables sex, current alcohol and smoke status, and physical activity. The Student's *t*-test or Mann–Whitney were used to compare patients between NLR ≥ 6.5 or <6.5. The data were analyzed in the software MedCalc®, Belgium. Significant difference was set at 5%.

3 Results and Discussion

It was found out that 11.3% presented high NLR values. Although, NLR ≥6.5 group presented lower age than NLR <6.5 group, there was no difference in sex, alcohol, smoke, and physical activity among the groups (**Table 1**). There was no difference in anthropometric variables (body weight, weight loss and BMI) among the groups. Neutrophils count was higher and lymphocytes lower in NLR ≥6.5 group than NLR <6.5 group (p<0.0001) (**Table 1**).

Table 1 – Patient's characteristics

Variables	NLR <6.5 (n=86)	NLR ≥6.5 (n=11)	p*
Age (years)	61.9 ± 11.9	51.7 ± 14.1	0.01
Sex Female Male	 39 47	 6 5	0.26
Current alcohol Yes	 5	 0	0.19
Current smoke			0.39
Yes	6	1	
Current physical activity Yes	 15	 1	0.25
Body weight (kg)	54.4 ± 12.6	57.3 ± 16.7	0.25
Body weight loss (%)	16.9 ± 12.3	21.1 ± 13.8	0.15
Height (m)	1.6 ± 0.1	1.6 ± 0.07	0.26
Body mass index (kg/m^2)	21.4 ± 4.3	22.0 ± 6.6	0.35
Lymphocytes (mm^3)	1887.1 ± 797.3	800.1 ± 472.0	<0.0001
Neutrophils (mm^3)	3929.0 ± 2511.9	9998.5 ± 5760.9	<0.0001
Neutrophils to lymphocytes ratio	2.4 ± 1.4	15.0 ± 7.8	<0.0001

*p<0.05 was considered as significant.
Source: Resource data.

In the present study, it was found out that the NLR ≥6.5 do not show difference in body weight loss when compared with NLR <6.5 group. Although, the systemic inflammatory response induces pathogenic susceptibility to tumor growth and progression[5], the tumor stage was not assessed.

Although malnutrition is linked to poor survival, change was not found out in weight loss among the groups. As strengths points, the following ones were hightlighted: i) it was used a low-cost systemic inflammation marker with good relevance in clinical practice, ii) the cutoff point used was previously demonstrated in cancer patients[4].

However, this study has some limitations: i) it is a retrospective study conducted in a single hospital, therefore, it does not reflect overall results; ii) a single blood NLR exam was evaluated; thus, further studies should evaluate it more often during the oncologic treatment to validate the effectiveness of this systemic inflammation marker in cancer patients; iii) tumor stage was not assessed.

4 Conclusion

It was found out that patients with digestion gastrointestinal and accessory organs cancers with NLR ≥6.5 values did not differ in body weight loss when compared to patients with NLR <6.5.

Acknowledgement

We are grateful to the the patients.

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