Nutritional Care in Hospitalized Patients with Breast Cancer and COVID-19

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Assistência Nutricional a Pacientes Hospitalizadas com Câncer de Mama e Covid-19

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ABSTRACT

Introduction: Cancer patients are more susceptible to infection and to the greatest severity of the disease caused by the new coronavirus (COVID-19). **Objective:** To present the scenario of nutritional care, clinical and nutritional profile of patients hospitalized with COVID-19 in a breast cancer treatment institution. **Method:** The nutritional care practices performed at the Hospital of Cancer III of the National Cancer Institute José Alencar Gomes da Silva (HC III/INCA) during the COVID-19 pandemic were presented. Clinical data from patients with breast cancer and COVID-19 were collected from medical records. **Results:** Some changes in the routine were the suspension of consultations with the nutritionists in confirmed cases, the use of personal protective equipment and changes in nutritional assessment. A total of 23 patients were included, hypertension was the most frequent comorbidity (56.5%), and the most frequent clinical staging was IV (43.5%). Dyspnea (60.9%), fever (30.4%), cough (13%), anemia, neutrophilia, high C-reactive protein, hypoalbuminemia and need for oxygen therapy during hospitalization (73.9%) were the main characteristics found. The majority received a liquid oral diet (52.2%) and 43.5% were prescribed a nutritional supplement. Overweight was the most prevalent nutritional status. **Conclusion:** In addition to breast cancer, an increased risk of complications from COVID-19 in these patients was associated with high prevalence of comorbidities, overweight and lung metastasis. The presence of symptoms influencing food intake led to the necessity of changes in the diet for better food acceptance.

Key words: Breast Neoplasms; Coronavirus Infections; Food Service, Hospital; Nutritional Support.

RESUMO

Introdução: Pacientes com câncer são mais suscetíveis à infecção e à maior gravidade da doença causada pelo novo coronavírus (Covid-19). **Objetivo:** Apresentar o cenário da assistência nutricional e o perfil clínico-nutricional de pacientes hospitalizadas com Covid-19 em uma instituição de tratamento de câncer de mama. **Método:** Foram apresentadas as práticas da assistência nutricional realizadas no Hospital do Câncer III do Instituto Nacional de Câncer José Alencar Gomes da Silva (HC III/INCA) durante a pandemia da Covid-19. Os dados clínicos das pacientes com câncer de mama e Covid-19 foram coletados em prontuários. **Resultados:** Algumas mudanças na rotina foram a suspensão das visitas dos nutricionistas em casos confirmados; a utilização de equipamentos de proteção individual; e as alterações na avaliação nutricional. Um total de 23 pacientes foi incluído, sendo hipertensão a comorbidade mais comum (56,5%) e o estadiamento clínico IV o mais frequente (43,5%). Dispneia (60,9%), febre (30,4%), tosse (13%), anemia, neutrofilia, proteína C reativa elevada, hipoalbuminemia e necessidade de oxigenioterapia durante a internação (73,9%) foram as principais características encontradas. A maioria recebeu dieta via oral líquida (52,2%) e, para 43,5%, foi prescrito suplemento nutricional. O excesso de peso foi o estado nutricional mais prevalente. **Conclusão:** Além do câncer de mama, podem se associar ao aumento do risco de complicações por Covid-19 nessas pacientes a alta prevalência de comorbidades, o excesso de peso e a metástase pulmonar. A presença de sintomas que influenciam na ingestão alimentar levou à necessidade de modificações na dieta para melhor aceitação alimentar.

Palavras-chave: Neoplasias da Mama; Infecções por Coronavírus; Serviço Hospitalar de Nutrição; Apoio Nutricional.

RESUMEN

Introducción: Los pacientes con cáncer son más susceptibles a la infección y a la mayor gravedad de la enfermedad provocada por el nuevo coronavirus (Covid-19). **Objetivo:** Presentar el escenario de asistencia nutricional y el perfil clínico y nutricional de pacientes hospitalizadas con Covid-19 en una institución de tratamiento de cáncer de mama. **Método:** Se presentaron las prácticas de asistencia nutricional realizadas en el Hospital do Cáncer III del Instituto Nacional del Cáncer José Alencar Gomes da Silva (HC III/INCA) durante la pandemia de Covid-19. Los datos clínicos de pacientes con cáncer de mama y Covid-19 se obtuvieron de los registros médicos. **Resultados:** Algunos cambios en la rutina fueron la suspensión de visitas de nutricionistas en casos confirmados, el uso de equipo de protección personal y cambios en la valoración nutricional. Se incluyeron un total de 23 pacientes, siendo la hipertensión la comorbilidad más común (56,5%) y la estadificación clínica IV más frecuente la (43,5%). Disnea (60,9%), fiebre (30,4%), tos (13%), anemia, neutrofilia, proteína C reactiva alta, hipoalbuminemia y necesidad de oxigenoterapia durante la hospitalización (73,9%) fueron las principales características encontradas. La mayoría recibió dieta líquida por vía oral (52,2%) y al 43,5% se le prescribió un suplemento nutricional. El sobrepeso fue el estado nutricional más prevalente. **Conclusión:** Además del cáncer de mama, un mayor riesgo de complicaciones por Covid-19 en estas pacientes se asoció con una alta prevalencia de comorbilidades, sobrepeso y metástasis pulmonares. La presencia de síntomas que influyen en la ingesta de alimentos llevó a la necesidad de cambios en la dieta para una mejor aceptación de los alimentos.

Palabras clave: Neoplasias de la Mama; Infecciones por Coronavirus; Servicio de Alimentación en Hospital; Apoyo Nutricional.

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INTRODUCTION

On December 2019, the outbreak of the new coronavirus (2019-nCoV) spread in China causing an epidemic of the severe acute respiratory syndrome coronavirus 2 – Sars-CoV-2, that causes the coronavirus disease 2019 – COVID-19[1]. The virus spread throughout China rapidly and in many other countries and on January 30, 2020, the World Health Organization (WHO) declared the outbreak of the 2019-nCov as an International Public Health Emergency – the highest WHO warning level according to the International Sanitary Regulations[2].

The spread of the disease occurs mainly by respiratory droplets and typically the patients infected have fever and dry cough, can also present breathing difficulties, muscle/articulation pains, headache, dizziness, diarrhea and nausea. The severe cases progress to acute respiratory distress syndrome (ARDS)[3].

Everyone is vulnerable to COVID-19 infection, however, patients with cancer are more susceptible to the infection and greater severity of the disease than individuals without cancer because of their systemic immunosuppressive status caused by anticancer treatments as chemotherapy or surgery further to advanced age[4,5]. In addition, this population presents high risk of malnutrition and this condition mainly characterized by loss of muscle mass appear to lead to worse outcomes and higher mortality the COVID-19 infection has caused[6].

Breast cancer is the malignant neoplasm of higher incidence and mortality in the world female population, representing nearly 24.2% of all types of cancer[7]. The treatment of these patients depends on multi-disciplinary and high-quality interventions[8].

In face of the COVID-19 pandemic, contention measures to prevent infections are recommended, both for patients and health professionals. These actions have a strong impact in the routine process of providing care to these patients[8]. The lack of nutritional procedures could, on its turn, prolong the patients' recovery and increase the infectious complications[9].

Little is known about the nutritional profile and care to COVID-19 patients and the professional practice to patients at high risk of infection as the oncologic ones. To ensure the safety of health professionals and patients is essential, in addition to the required support for their appropriate recovery. It is necessary to address the experiences of the institutions in this scenario. Thus, the objective of this study is to introduce the nutritional care setting and the clinical-nutritional profile of patients hospitalized with COVID-19 in a breast cancer treatment institution.

METHOD

Observational cross-sectional, descriptive and retrospective study, with review of nutritional practices and care protocols conducted at Cancer Hospital III of the National Cancer Institute José Alencar Gomes da Silva (HC III/INCA) during the COVID-19 pandemic for breast cancer patients hospitalized.

Female patients older than 18 years of age, admitted at the infirmary for hospitalization of suspected and/or confirmed cases of COVID-19 were enrolled to analyze the nutritional profile of patients with breast cancer and COVID-19 from May 4 to July 4, 2020. Patients with negative nasopharynx and/or oropharynx swabs to detect viral antigen (PCR) to confirm the diagnosis of COVID-19 and patients who reiterated in the period were excluded.

The sociodemographic data and clinical history were collected through search of the institution's clinical charts and entered in Excel spreadsheet.

The following variables were analyzed: age, length of hospitalization, and outcome (discharge, referral to another hospital or death), comorbidities, current clinical staging, site of the progression of the disease, histologic type, histologic grade, hormone receptor, human epidermal growth factor receptor 2 (HER2), current treatment, lab tests (blood count, leukogram, C-reactive protein and albumin), symptoms of nutritional impact and/or related to COVID-19 infection, necessity of oxygen therapy, type of diet prescribed, use of oral nutritional therapy and body mass index.

For lab tests, the following methodologies were adopted: Horiba Pentra 60 C+ automate device for blood count; serum albumin using Bromocresol green solution; ultrasensitive nephelometry (monoclonal antibody against human – CRP) for PCR.

The cutoff values established by the methods were: red cells 3.9-5.6 millions /dL; hemoglobin 11.5-16.4g/dL; hematocrit 36-47%; leukocytes 4,000-10,000/mm^3; neutrophils 1,600-7,500/mm^3; PCR <0.5mg/dL; albumin 3.5-5.2g/dL.

The WHO classification[10] for body mass index was utilized for adults and of the Pan American Health Organization for older adults[11].

Measures of central tendency and dispersion for the continuous variables and measures of frequency and percentage for the categorical variables were utilized to describe the sample.

INCA's Institutional Review Board approved the study, number CAAE 35602720.5.0000.5274.

RESULTS

The HC III, an INCA treatment unit for breast cancer patients during the COVID-19 pandemic underwent

operational changes, adopting prevention measures and control of visits for suspected or confirmed cases of 2019-nCoV infection according to institutional protocol.

One of the measures taken was the implementation of a screening room for COVID-19 where the patients with respiratory symptoms identified in the reception by health professionals were transferred. In this room a nurse and a physician evaluated the patients and if a suspicion of COVID-19 was detected needing hospitalization, the patient was transferred to the Prompt Care Service (PCS). These patients remained hospitalized at the PCS until referred to a hospital exclusively for COVID-19 treatment controlled by the "*Núcleo Interno de Regulação* – NIR (Internal Regulation Nucleus)", a sector responsible for the inclusion of the patient in the state referral hospitalization system.

Because these patients demand substantial attention at the unit, difficulty and delay of transference to a reference clinic, one floor of the Hospital Admission with ten beds was assigned for the admission of suspected and/or confirmed cases of COVID-19 cases as of May 4, 2020.

The direct consulting team to the patient of this floor was reduced to the following professionals: physician, nurse, licensed nursing practitioner and physiotherapist in order to diminish the flow of personnel.

Other measures were taken to reduce the flow of personnel and risk of intra-hospital infection. Patients admitted in this period did not receive visits. In the case of law-approved companion, it should not be an individual classified in risk group for COVID-19. Professionals with flu-like or suspected COVID-19 symptoms should be put on administrative leave for 14 days and avoid attending the hospital.

Nutritional care

During the pandemic, the visits of the nutritionists to patients in bed suspected or confirmed with COVID-19 were suspended according to the guidelines of INCA III's Hospital Infection Control Committee – HICC. The nutritional conduct was determined from information collected with the physicians, nurses and in physical and electronic charts.

To avoid physical contact, nutritional screening routines and anthropometric evaluation of all the patients hospitalized were modified. For COVID-19 suspected or confirmed patients, screening and nutritional evaluation screening tools were not utilized, all the patients with COVID-19 were considered at nutritional risk. In the daily revaluation, other parameters were utilized as evaluation of food intake, symptoms of nutritional impact, lab tests and clinical data of patients collected in charts.

Nutritional guidance of hospital discharge for all the patients based in nutritional anamneses, lab tests, comorbidities and symptoms started to be qualitative only because of the absence of anthropometric evaluation.

Regarding patients' meals, they were served in disposable material to avoid utensils sharing. Kitchen-maids did not enter the infirmaries with suspected or confirmed COVID-19 patients, the meals were left at the nursing station and offered to the patients by the direct caring team.

Nutritional-clinical profile of patients diagnosed with breast cancer and covid-19

In the period studied, 30 patients were admitted at the infirmaries destined to the admission of suspected or confirmed COVID-19 cases, seven of them had negative oropharynx and/or oropharynx swab to detect viral antigen (PCR), totaling 23 patients with COVID-19 confirmed in the sample.

In Table 1, the general characteristics of the patients with breast cancer and COVID-19 and period of hospitalization are presented. Hospital discharge was the outcome most found in the population followed by hospital referral and death.

Hypertension was the most frequent comorbidity in the sample studied followed by *diabetes mellitus* and dyslipidemia. No patients with pulmonary chronic diseases as asthma or chronic obstructive pulmonary disease (COPD) were found.

According to the clinical history of the disease, most of the patients presented invasive ductal carcinoma (IDC) with positive hormone receptor and negative HER2.

Clinical staging IV at the admission was the most frequent, that is, presence of metastasis for one or more organs. Most usual metastases sites were lung and/or pleura and bones.

At the admission, more than one third of the total patients of the sample were in chemotherapy treatment (the majority with neoadjuvant finality) and in hormone therapy (the majority of adjuvant finality).

The clinical nutritional profile of the patients is presented in Table 2.

The lab tests revealed that the mean of hemoglobin and hematocrit levels was below the reference level while of the neutrophils was above. Only 17 patients of the sample had PCR results available and 12 patients of albumin. The PCR mean was elevated in these patients and the mean of albumin was below the reference level utilized in the institution.

The majority of the patients of the present study complained of dyspnea at admission, the most frequent symptom. Other commonly COVID-19 related

Table 1. General characteristics of the patients with breast cancer and COVID-19 and period of hospitalization in a breast cancer treatment unit

Variables	N	Mean	Standard deviation
Age (years)	**23**	55.6	14.6
Length of hospitalization (days)	**23**	6.9	4.2
Variables	**N**		**%**
Outcome	**23**		
Death	6		26.1
Discharge	10		43.5
Transference	7		30.4
Comorbidities	**23**		
Hypertension	13		56.5
Diabetes mellitus	5		21.7
Dyslipidemia	1		4.3
Clinical Stage at admission	**23**		
SI	1		4.3
SIIa	2		8.7
SIIb	2		8.7
SIIIa	2		8.7
SIIIb	6		26.1
IV	10		43.5
Site of progression of the disease	**23**		
Lung/Pleura	8		34.8
Central Nervous System	2		8.7
Bone	8		34.8
Liver	5		21.7
Peritoneum	1		4.3
Histological Type	**23**		
IDC	17		73.9
IDC + DCIS	4		17.4
ILC	1		4.3
Papillary carcinoma	1		4.3
Histological grade	**22**		
1	3		13.6
2	10		45.5
3	9		40.9
RH	22		
Positive	15		68.2
Negative	7		31.8
HER2	21		
Positive	2		9.5
Negative	19		90.5
Treatment in course at admission	**23**		
Chemotherapy	9		39.1
Neoadjuvant	7		77.8
Palliative	2		22.2
Hormone therapy	8		34.8
Adjuvant	5		62.5
Palliative	3		37.5
Treatment-naive	2		8.7
Control	2		8.7
Palliative Care	2		8.7

Captions: IDC: Invasive ductal carcinoma; DCIS: Ductal carcinoma *in situ;* ILC: Invasive lobular carcinoma; HR: Hormone receptor; HER2: Human Epidermal Growth Factor Receptor Type 2.

Table 2. Clinical-nutritional profile of patients with breast cancer and COVID-19 admitted to a breast cancer treatment unit

Variables	N	Mean	Standard deviation
Red cells	23	4.0	0.,8
Hemoglobin	23	11.0	2.0
Hematocrit	23	33.6	6.2
Leukocytes	23	9,234.8	8,412.8
Neutrophils	23	7,700.3	7,990.4
PCR	17	15.1	10.7
Albumin	12	3.1	0.3
Variables	**N**		**%**
Symptoms			
Constipation	7		30.4
Diarrhea	8		34.8
Dyspnea	14		60.9
Hyporexia	8		34.8
Nausea	10		43.5
Vomits	7		30.4
Dysgeusia	1		4.3
Mucositis	2		8.7
Fever	7		30.4
Cough	3		13.0
Headache	3		13.0
Oxygen therapy at admission	11		47.8
Nasal cannula	10		43.5
Mask with canister	1		4.3
Necessity of oxygen therapy during admission	17		73.9
Mechanic ventilation	5		29.4

Variables	N	%
Characteristics of the diet at admission		
Route of the diet at admission		
Oral	23	100.0
Change of route of the diet during hospitalization		
Zero	7	30.4
NC	3	13.0
Consistency of the oral diet at admission	23	100
Liquid	12	52.2
Soft	2	8.7
Bland	8	34.8
Normal	1	4.3
Change of consistency of the oral diet during hospitalization	14	60.9
Liquid to soft	1	7.1
Liquid to bland	3	21.4
Soft to liquid	3	21.4
Use of oral nutritional therapy	10	43.5
BMI	10	43.5
Low weight	1	10.0
Eutrophy	2	20.0
Overweight	2	20.0
Obesity	5	50.0

Captions: CRP: C-reactive protein; NC: Nasoenteral catheter; BMI: Body Mass Index.

symptoms and that can cause nutritional impact as fever, cough, nausea, vomits diarrhea and headache were also present.

Oxygen therapy at admission with nasal cannula was necessary for 43.5% of the patients and one patient needed mask with canister. During hospitalization, large part of the patients required oxygen therapy, among which, nearly 30.0% needed mechanic ventilation.

Regarding the characteristics of the diet, all the patients were in oral diet at admission, and most of them on liquid diet and a relevant portion needed oral supplement prescription.

During hospitalization, the consistency of the diet needed to be changed for more than half of the patients according to the symptoms presented along the period. Furthermore, some patients evolved with important clinical worsening, being necessary to suspend the oral diet, but only for three of them it was possible to start nutritional therapy with nasoenteral catheter.

Anthropometric data (weight and height) to calculate BMI were available for less than half of the sample, with emphasis in overweight.

DISCUSSION

The nutritionists did not consult the patients with suspected or confirmed COVID-19 at the bed. The Federal Council of Nutritionists recommends avoiding physical contact for suspected or confirmed COVID-19 patients in the hospital. This change has the objective of protecting the professionals' health and the population in general[12].

No nutritional screening and anthropometric evaluation tools were used, all the patients were considered at nutritional risk. The necessity of continuing applying the methods of anthropometric evaluation should be thoroughly evaluated for being a risk population because of the immunosuppression[13]. The Nutrition Oncologic Brazilian Society[14] recommends that, if not possible to perform the nutritional screening, assume that every confirmed oncologic patient with COVID-19 is in nutritional risk.

The mean age of the participants of the present study was 55.6 ± 14.6 years. Vuagnat et al.[15], in a study with 59 patients with breast cancer and COVID-19 followed up in a French hospital found a mean age of 58 years, a figure close to what was encountered in the present study and occurrence of death in only 6.7% of the patients, lower than in the present study, which was 26.1%.

Most of the patients was hypertense. Evidences show there is an increased risk of worsening of COVID-19 in patients with hypertension, diabetes, cardiovascular disease, cerebrovascular disease and COPD[16].

The majority of the patients had IDC. The invasive ductal and lobular carcinomas are the most common forms of breast cancer. Prevalence data indicate that IDC ranges from 50% to 75% of all the invasive breast neoplasms[17].

Clinical staging IV was fairly frequent, lung/pleura and bone, the most metastatic common sites. Patients with lung cancer are more propense to develop additional severe anoxia and progress more rapidly to COVID-19, pointing out the urgent and increased necessity to treat patients with cancer infected by COVID-19, with emphasis for patients with lung cancer[18].

More than one third of the total patients of the sample were in chemotherapy treatment and in hormone therapy. It is widely accepted that cancer patients can have weakened

immunity secondary to their underlying neoplasm or anti-cancer treatments. In particular, receipt of chemotherapy (within the past three months) or ongoing extensive radiotherapy, predisposes cancer patients to SARS-CoV-2 infection and severe complications of COVID-19, making mitigating and infection prevention measures for these vulnerable subgroups paramount. Clinical exigency, treatment intent, the anticipated extent of therapeutic benefit, disease biology and patient factors influence the prioritization of cancer treatments during the COVID-19 era[19-21].

Studies show that the most frequent lab alterations in COVID-19 patients are in the increase of PCR, reduction of serum albumin and total count of leukocytes with considerable variation sometimes, appearing high or low, but with evident presence of lymphopenia. There is also reduction of hemoglobin. In addition, anemia and hypoproteinemia are considered consequences of the nutritional deterioration in patients with cancer, which can affect negatively the immunocompetence and increase the susceptibility to respiratory pathogens[18,22].

Most of the patients at admission complained of dyspnea. It is remarkable that the most important symptomatic treatment for COVID-19 patients is oxygen therapy. The higher proportion of COVID-19 patients with cancer requiring oxygen therapy and mechanical ventilation may be related to more severe disease and an immunosuppressive state in cancer patients, who are more susceptible to secondary lung infection by other pathogens[23].

All the patients were in oral diet at admission, the majority, liquid diet and a relevant portion needed oral supplements prescription. More than half of the patients were submitted to change of diet consistency. Oncologic patients and with COVID-19 evolve with several symptoms involving food intake. It is recommended to consider the patient's reported symptomatology in the evaluation and nutritional monitoring to establish dietary adaptations to promote a proper food acceptance[24].

Oral nutritional supplements should be used whenever possible to meet the necessities of the patients in case diet counseling and food fortification are insufficient to increase the food intake and reach nutritional goals[6].

Overweight was most frequent for patients for whom it was not possible to calculate the BMI. In women with breast cancer, weight gain is common after the diagnosis, occurring in 50% to 95% of the patients. Both the patients with overweight at the diagnosis and those who gain weight during the treatment have worse prognosis with increased risk of disease recurrence and mortality[25].

Hussain et al.[26] conducted a meta-analysis to investigate whether obese patients have more odds of dying by COVID-19 in comparison with non-obese patients and concluded that obesity is a risk factor for mortality in patients with the virus[26].

For better nutritional care and conduct during the COVID-19 pandemic, multi-disciplinary teamwork is essential. The information collected by the direct caring team of the patient are critical to determine the characteristics of the diet, route of nourishment, implementation of nutritional therapy and favor early nutritional intervention avoiding the risk of malnutrition and consequently better prognosis of COVID-19 infected oncologic patients.

The small size of the sample, the retrospective and descriptive design are limitations of the study, but it is relevant because of the paucity of studies addressing the profile and nutritional care to patients with COVID-19 and breast cancer. Sharing experiences related to the nutritional care for these patients is important to improve clinical practice in face of a new disease.

CONCLUSION

In the current scenario of the COVID-19 pandemic, important changes were necessary in the institutional routines to prevent and control the infection in the hospital environment in order to lessen the risk of spread among professionals and patients.

The patients with breast cancer can have increased risk of COVID-19 related complications by the baseline disease. High prevalence of comorbidities, overweight and progression of the disease to sites compromising even more the respiratory function as lung and pleura can augment this risk.

The presence of symptoms influencing food intake as dyspnea, cough and nausea has been more frequent in patients with COVID-19 and breast cancer, leading to the necessity of changing the diet consistency for better food acceptance, being necessary oral nutritional therapy for those patients with poor food intake.

The absence of the nutritionist in the direct care team of the patient is compensated by the multi-disciplinary team which ensures that the information about the clinical status of the patient are disclosed and the better conduct is taken for maintenance or recovery of the patient nutritional status.

CONTRIBUTIONS

Both authors contributed for the study conception and/or design, collection, analysis and interpretation of the data, wording, critical review and approved the final version to be published.

DECLARATION OF CONFLICT OF INTERESTS

There is no conflict of interests to declare.

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