Prevalence of Radiodermatitis and Associated Factors in Breast Cancer Patients Undergoing Radiotherapy at a Reference Oncology Center in Santa Catarina

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Prevalência de Radiodermite e Fatores associados em Pacientes com Câncer de Mama em Tratamento Radioterápico em um Centro Oncológico Referência de Santa Catarina

Prevalencia de Radiodermatitis y Factores Asociados en Pacientes con Cáncer de Mama en Tratamiento Radioterápico en un Centro Oncológico de Referencia en Santa Catarina

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ABSTRACT

Introduction: Radiotherapy is a common therapeutic approach for breast cancer. Despite its benefits, radiation exposure may result in acute toxicities such as radiodermatitis, characterized by skin lesions. **Objective**: To estimate the prevalence of radiodermatitis and evaluate factors associated with its occurrence in patients with breast cancer treated at an oncology center in Santa Catarina. **Method:** Cross-sectional, exploratory, and descriptive study. The study population consisted of 263 female patients who underwent radiotherapy in 2022. Sociodemographic and radiotherapy treatment data were analyzed. Statistical analysis was performed using multiple logistic regression. **Results:** The mean age of the population was 54 years. Unspecified malignant neoplasm of the breast was the most frequent diagnosis (79.08%), as well as stage IIA (20.53%). Radiodermatitis occurred predominantly in mild forms (grades 1 and 2), and pruritus was the most frequent adverse effect. Patients treated with the conventional fractionation regimen had a lower risk of developing radiodermatitis than those receiving 15–16 fractions (OR=0.14; 95% CI: 0.02–0.52). Stage IIA showed a higher chance of radiodermatitis compared with stage IA (OR=2.34; 95% CI: 1.05–5.39). **Conclusion:** The results highlight the relationship between fractionation regimen, tumor staging, and the occurrence of radiodermatitis, reinforcing the importance of systematic monitoring of relevant responses during radiotherapy treatment.

Key words: Radiodermatitis; Breast Neoplasms/radiotherapy; Radiotherapy/adverse effects.

RESUMO

Introdução: A conduta terapêutica para câncer de mama inclui a radioterapia. Apesar dos benefícios do tratamento, a exposição à radiação pode resultar em toxicidades agudas, entre elas, as radiodermites, caracterizadas como lesões cutâneas**. Objetivo:** Estimar a prevalência de radiodermite e avaliar os fatores associados à sua ocorrência em pacientes com câncer de mama em um centro oncológico de Santa Catarina. **Método:** Estudo transversal de caráter exploratório e descritivo. A população foi composta por 263 pacientes mulheres que realizaram o tratamento radioterápico em 2022. Para a coleta de dados, foram analisados dados sociodemográficos e dados do tratamento radioterápico. A análise estatística foi conduzida por meio de regressão logística múltipla. **Resultados:** A média de idade da população foi de 54 anos, a neoplasia maligna da mama não especificada foi a mais frequente (79,08%), assim como o estádio IIA (20,53%). A radiodermite ocorreu predominantemente em formas leves (graus 1 e 2) e o prurido foi o efeito adverso mais frequente. Pacientes submetidas ao fracionamento convencional apresentaram menor chance de desenvolver radiodermite em comparação àquelas tratadas com 15–16 frações (OR=0,14; IC 95%:0,02–0,52). O estadiamento IIA mostrou maior chance de radiodermite em relação ao estádio IA (OR=2,34; IC 95%:1,05–5,39). **Conclusão:** Os resultados destacam a relação entre o regime de fracionamento, o estadiamento tumoral e a ocorrência da radiodermite, reforçando a importância do monitoramento sistemático das reações cutâneas durante o tratamento radioterápico.

Palavras-chave: Radiodermatite; Neoplasias da Mama/radioterapia; Radioterapia/efeitos adversos.

RESUMEN

Introducción: El manejo terapéutico del cáncer de mama incluye la radioterapia. A pesar de los beneficios del tratamiento, la exposición a la radiación puede provocar toxicidades agudas, como la radiodermatitis, caracterizada por lesiones cutáneas. **Objetivo:** Estimar la prevalencia de radiodermatitis y evaluar los factores asociados a su ocurrencia en pacientes con cáncer de mama atendidas en un centro oncológico de Santa Catarina. **Método:** Estudio transversal, de carácter exploratorio y descriptivo. La población estuvo compuesta por 263 pacientes mujeres que recibieron tratamiento radioterápico en 2022. Para la recolección de datos se analizaron variables sociodemográficas y datos del tratamiento radioterápico. El análisis estadístico se realizó mediante regresión logística múltiple. **Resultados:** La edad promedio de la población fue de 54 años; la neoplasia maligna de mama no especificada fue la más frecuente (79,08%), así como el estadio IIA (20,53%). La radiodermatitis ocurrió predominantemente en formas leves (grados 1 y 2) y el prurito fue el efecto adverso más frecuente. Las pacientes sometidas al fraccionamiento convencional presentaron menor probabilidad de desarrollar radiodermatitis en comparación con aquellas tratadas con 15–16 fracciones (OR=0,14; IC95%:0,02–0,52). El estadio IIA mostró mayor probabilidad de radiodermatitis en relación con el estadio IA (OR=2,34; IC95%:1,05–5,39). **Conclusión:** Los resultados ponen de relieve la relación entre el régimen de fraccionamiento, la estadificación del tumor y la aparición de radiodermatitis, lo que refuerza la importancia del seguimiento sistemático de las respuestas cutáneas durante el tratamiento de radioterapia.

Palabras clave: Radiodermatitis; Neoplasias de la Mama/radioterapia; Radioterapia/efectos adversos.

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INTRODUCTION

The estimation for the 2026-2028 triennium[1] indicates that the most common type of cancer will be female breast neoplasm, a profile observed in women from every region of Brazil, in most Federation Units, and the Federal District. In Santa Catarina, for the year 2026, a crude rate of 106.07 new breast cancer cases per 100 thousand inhabitants was estimated, being the most frequent cancer type in the State[2].

Based on the diagnosis, users are referred to oncology services for definition of therapeutic conduct. The indication of treatment modalities depends on staging, a factor that determines the severity of the illness[3]. The treatment can be done with local therapies (surgery and radiotherapy) and with systemic therapies (chemotherapy, endocrine therapies, and ERBB2-targeted antibody therapy)[4].

Radiotherapy is divided into teletherapy and brachytherapy. For breast cancer treatment, teletherapy is the most frequently used[5]. The radiation dose received by the patient is administered in fractions. Fractionation can be done in the classic form, in which a total dose of 50 to 54 Gy is fractionated into 25 to 30 daily fractions of 1.8 to 2 Gy; or hypofractionated, in which there is an increased dose per fraction and a decreased number of sessions, that is, one total dose of 40 Gy will be fractionated into 15 daily fractions of doses exceeding 2 Gy[6,7].

As this is a treatment with high radiation doses, it is important to reinforce possible acute effects, such as radiodermatitis, nausea, and fatigue, and delayed effects, such as cardiopathy and pneumonitis[8]. Radiodermatitis, the focus of the present study, is a cutaneous reaction induced by radiation the patient receives[9].

Radiodermatitis is caused by cellular damage in the skin induced by exposure to ionizing radiation[10]. Cutaneous tissue is more radiosensitive because it is an organ in constant renovation due to proliferative cells, like the basal cells that constitute the epidermis[11]. These acute lesions are a consequence of a set of inflammatory reactions, in which the first reactions are observed 24 hours after exposure, with visualization of a transitory erythema[12]. As the therapy progresses from two to four weeks of treatment, there is dose accumulation, followed by an imbalance in the healing system, by tissue degeneration and, therefore, by changing the integrity of the epidermis and cutaneous barrier[10-12]. Toxicity reactions in the skin are painful, occur mainly in skinfold areas, such as armpits or below the breasts, and manifest as erythema, hyperpigmentation, dry and humid flaking due to the dermis exposure to radiation[13]. However, dermatological alterations are not exclusively associated with radiation therapy. The study conducted by Kameo et al.[14] highlights the occurrence of alopecia, hyperpigmentation, pruritus, erythema, flaking, and nail changes in chemotherapy treatment, whether or not associated with radiotherapy for breast cancer.

According to the Scoring Criterion for Acute Radiation Morbidity, developed by the Radiation Therapy Oncology Group (RTOG)[9] to classify the effects of radiotherapy, radiodermatitis grades were identified. Grade 0 for non-reactive skins, grade 1 for light erythemas, flaking, hair removal, and low sweating, grade 2 for moderate erythema and edema and purulent dermatitis, grade 3 for an intense edema and more extant purulent dermatitis and, finally, grade 4 when the skin reaches an ulceration state, hemorrhage and even necrosis.

Toxicities from the radiotherapy treatment for breast cancer influence women's quality of life, since radiotherapy may be related to a predisposing factor to pain and occurrence of radiodermatitis, the latter being one of the aspects that most negatively compromise the quality of life of these women[15].

Considering the aforementioned discussions regarding the impact of toxicities during and after oncological treatment, the objective of this study is to estimate the prevalence of radiodermatitis and assess the factors associated with its occurrence in patients with breast cancer who underwent radiotherapy at an oncological reference center in Santa Catarina in 2022.

METHOD

Cross-sectional, exploratory, and descriptive study, with a quantitative approach. The field research was conducted at an oncology treatment reference facility specialized in Radiotherapy located in Santa Catarina.

The population was defined by census, that is, all patients who met the inclusion criteria participated in the study — female sex patients who initiated and concluded the radiotherapy treatment for breast cancer from January to December 2022. The exclusion criteria were patients who treated breasts bilaterally, who treated the breast with electron beam, and who did not finish the treatment.

Data collection consisted of sociodemographic and clinical information, as well as data related to oncological treatment and adverse effects on the skin caused by teletherapy, from electronic records. Data referring to skin toxicity was collected weekly from retrospective information described by the nursing and radio-oncologists' team clinical evolution reports.

In the researched service, there is variability in the frequency of medical and nursing appointments. Thus, for some participants in the study's population, there was

no weekly continuous description of the clinical evolution of toxicities. Data referring to consultations (nursing and radio-oncologists) were collected in the *Philips Tasy*[16] (*Philips Healthcare*, Amsterdam, Holland) system and the teletherapy information were collected in the *Eclipse*™ *Varian*[17] (*Varian Medical Systems*, Palo Alto, CA, EUA) system. The information collected was organized on a Microsoft Excel® spreadsheet. Statistical analyses were done in the R software, version 4.2.2[18].

The statistical analysis was conducted using multiple logistic regression, with the interest outcome represented by the binary dependent variable of the occurrence of radiodermatitis in breast cancer patients (grades 1 to 4). Initially, there was a univariate analysis of the predicting potentials (age, marital status, education, alcohol intake, smoking, international classification of the disease, disease laterality, chemotherapy, surgery, fractionation, and clinical staging) which presented $p<0.25$ by the Wald test, to be included in the first multivariate model.

Continuing with the analysis, with the full model, we proceeded with the sequential exclusion of covariates with a higher value of p in the Wald test[19]. The adjustment of the reduced models in relation to the complete model was compared through the Likelihood Ratio Test[19], adopting as a criterion that values of p lower to 0.05 would indicate that the models explained the variability of the outcome in an equivalent manner. The final model included fractionation and staging variables. Moreover, odds ratios (OR) and their respective confidence intervals (CI) in 95% were estimated.

This study has been approved by the Research Ethics Committee, report number 6225672 (CAAE (submission for ethical review): 55381522.2.3001.5355), following ethical aspects related to research with human beings, according to Resolutions 466/2012[20] and 510/2016[21] of the National Health Council.

RESULTS

The study sample was composed of 263 patients who underwent teletherapy for breast cancer treatment in the period from January to December 2022, with a mean age of 54 years. Table 1 shows the sociodemographic characteristics and life habits of the studied population. Regarding race/color, 87.83% of patients self-identified as white and 12.16% as non-white.

Table 2 shows the clinical characteristics of the illness. Malignant breast neoplasm, unspecified represents 79.08% of the population.

Considering the findings from this research, in the population of women who underwent breast cancer teletherapy, three dosage fractionation methods were employed. In 86.69% of cases (n=230), there was hypofractionation with a prescribed dose of 40 Gy in 15 fractions; 9.5% (n=24) had classic fractionation with a prescribed dose of 50.4 Gy in 28 fractions; and 3.8% of the population (n=9) had the ultra-hypofractionated treatment with an average prescribed dose of 20 Gy in 5 fractions.

Still regarding teletherapy, 98.85% of cases underwent planning and treatment using the 3D Conformational Radiotherapy (3D-RT) technique, and only 1.14%

Table 1. Individual characteristics of breast cancer patients treated in 2022, Florianópolis-SC

Individual characteristics	Patients Mean (standard deviation)
Age in years	54.49 (12.25)
Race/self-declared skin color	n (%)
White	231 (87.83)
Non-white	32 (12.16)
Location	n (%)
Great Florianópolis	212 (80.60)
Outside the Great Florianópolis	50(19.01)
Not informed	1 (0.38)
Marital status	n (%)
Single	44 (16.73)
Stable union	15 (5.70)
Married	147 (55.89)
Divorced	32 (12.16)
Widow	20 (7.60)
Not informed	5 (1.90)
Education	n (%)
Elementary school	85 (32.31)
High school	75 (28.51)
Higher education	44 (16.73)
Post-graduate degree	3 (1.14)
No formal education	3 (1.14)
Not informed	53 (20.15)
Family income*	
1 to 3 minimum wages	97 (37)
3 to 5 minimum wages	29 (11)
>5 minimum wages	7 (2.6)
Not informed	130 (49.4)
Life habits	**n (%)**
Alcohol intake	8 (3.04)
Smoking	30 (11.40)

Caption: *Based on the national minimum wage in 2022, R$1,212.00.

Table 2. Clinical characteristics of breast cancer patients treated in 2022, Florianópolis-SC

Clinical characteristics	Patients n (%)
Disease laterality	
Left breast	133 (51%)
Right breast	130 (49%)
ICD - International Classification of Diseases	
Malignant neoplasm of nipple and areola	1 (0.38)
Malignant neoplasm of central portion of breast	6 (2.28)
Malignant neoplasm of UIQ of breast	9 (3.42)
Malignant neoplasm of LIQ of breast	14 (5.32)
Malignant neoplasm of UOQ of breast	18 (6.84)
Malignant neoplasm of LOQ of breast	6 (2.28)
Malignant neoplasm of axillary tail of breast	1 (0.38)
Malignant neoplasm of breast, unspecified	208 (79.08)
Staging	
IA	49 (18.63)
IB	8 (3.04)
IIA	54 (20.53)
IIB	34 (12.92)
IIIA	34 (12.92)
IIIB	14 (5.32)
IIIC	14 (5.32)
IV	4 (1.52)
Inconclusive	52 (19.77)
Previous chemotherapy and hormone therapy	n (%)
Yes	134 (50.95)
No	33 (12.54)
Concomitant	9 (3.42)
Hormone therapy	70 (26.61)
Not informed	17 (6.46)
Previous surgery	n (%)
Yes	249 (94.67)
No	14 (5.32)
Types of previous surgery	n (%)
Quadrantectomy (sectorectomy and quadrantectomy with lymphadenectomy)	192 (73%)
Total mastectomy	50 (19%)
Adenomastectomy	7 (2.6%)
Previous radiotherapy	n (%)
Yes	8 (3.04)
No	250 (95.05)
Not informed	5 (1.90)

Captions: UIQ = Upper-inner quadrant; LIQ = Lower-inner quadrant; UOQ = Upper-outer quadrant; LOQ = Lower-outer quadrant.

underwent Intensity-Modulated Radiotherapy (IMRT). In addition to the dose prescription, in 59% of cases there was a prescribed boost dose of 8 Gy in 3 fractions. All these cases were treated in a hypofractionated manner.

The clinical information related to toxicity was obtained from consultations with radio-oncologists and nursing teams. Table 3 presents the occurrence of adverse effects according to the period of treatment. For analysis purposes, the intervals were organized as follows: the 2nd week corresponded to the 5th to 10th fraction of treatment; the 3rd week, to the 11th to 15th fraction; the 4th week, to the 16th to 20th fraction; and the 5th week, to the 21st to 28th fraction of treatment.

Pruritus was the most prevalent adverse effect, presenting a progressive increase from the second to the fifth week, with greater incidence observed in patients who underwent 25–28 fractions (29.1% in the fifth week), in comparison to those with lower fractions of 15–16, who showed less frequency over time. Other symptoms, such as burning sensation, fatigue, nausea, and breast pain, showed low occurrence and no consistent temporal pattern.

In the first two weeks, it was already possible to observe grade 1 radiodermatitis in 44.4% of patients who received between 5 and 10 fractions. With treatment progression, there was a gradual increase in grade 1 radiodermatitis, affecting 34.3% of patients who received 15–16 fractions and up to 41.6% in the group who received 25–28 fractions after four weeks. Grade 2 cases presented a rising trend over time, reaching 16.6% after four weeks, while grade 3 radiodermatitis, although less common, was identified in up to 4.1% of patients in the fifth week.

Table 4 presents the complete binary logistic regression model, which indicated an association between fractionation regime and staging with the occurrence of radiodermatitis during radiotherapy.

Patients who received between 25 and 28 fractions had lower chances of presenting with radiodermatitis when compared to the reference category (OR=0.14; 95% CI: 0.02–0.52; p= 0.011). Regarding tumoral staging, patients classified with a IIA stage had higher chances of developing radiodermatitis compared to patients in the IA stage (OR=2.34; 95% CI: 1.05–5.39; p= 0.041).

DISCUSSION

Patients with advanced tumors and metastases in lymph nodes can have greater reactions of grade 3 radiodermatitis, considering the need for a more aggressive treatment due to the more advanced stage. In the first disease stages, patients presented with grade 1 to 2 radiodermatitis[13]. In this respect, there was a higher

Table 3. Adverse effects in patients who underwent radiotherapy for breast cancer according to fractionation and duration of treatment

	Weeks of treatment							
	2nd			3rd		4th		5th
	n (%)							
Fractions	**5-10 (n=9)**	**15-16 (n=230)**	**25-28 (n=24)**	**15-16 (n=230)**	**25-28 (n=24)**	**15-16 (n=230)**	**25-28 (n=24)**	**25-28 (n=24)**
Pruritus	-	14 (6.0)	-	15 (63.5)	-	18 (7.8)	3 (12.5)	7 (29.1)
Burning sensation	-	5 (2.1)	-	9 (3.9)	-	2 (0.8)	1 (4.1)	-
Redness	-		-	3 (1.3)	-	1 (0.4)	-	-
Fatigue	-	10 (4.3)	-	7 (3.0)	1 (4.1)	1 (0.4)	-	-
Nausea	-	5 (2.1)	-	3 (1.3)	1 (4.1)	-	-	-
Pain in upper limb	-	3 (1.3)	1 (4.1)	1 (0.4)	-	-	-	-
Pain in breast	-		-	4 (1.7)	1 (4.1)	4 (1.7)	1 (4.1)	-
Radiodermatitis								
Grade 1	4 (44.4)	30 (13.0)	3 (12.5)	79 (34.3)	5 (20.8)	34 (14.7)	10 (41.6)	9 (37.5)
Grade 2	1 (11.1)	2 (0.8)	-	9 (3.9)	1 (4.1)	7 (3.0)	4 (16.6)	3 (12.5)
Grade 3	-	1 (0.4)	-		-	2 (0.8)	-	1 (4.1)

Table 4. Bivariate logistic regression model with the outcome of radiodermatitis in patients with breast cancer treated in 2022, Florianópolis-SC

Variables	Category	Yes n (%)	No n (%)	OR (adjusted) (95% CI)	*p*
Fractionation	15–16 *	131 (56.9)	99 (43.1)	1.00	–
	25–28 §	22 (91.7)	2 (8.3)	0.14 (0.02-0.52)	0.011
	5–10 †	5 (55.6)	4 (44.4)	1.40 (0.16-12.5)	0.749
Staging					
	IA	34 (69.4)	15 (30.6)	1	–
	IB	7 (87.5)	1 (12.5)	0.31 (0.02-1.95)	0.287
	IIA	26 (48.1)	25 (51.9)	2.34 (1.05-5.39)	0.041
	IIB	18 (52.9)	16 (47.1)	2.40 (0.94-6.24)	0.069
	IIIA	21 (61.8)	13 (38.2)	1.55 (0.60-4.02)	0.359
	IIIB	9 (64.3)	5 (35.7)	1.44 (0.38-5.15)	0.579
	IIIC	13 (92.9)	1 (7.1)	0.20 (0.01-1.21)	0.146
	IV	3 (75)	1 (25)	0.51 (0.02-10.04)	0.136
	Inconclusive	8 (53.3)	7 (46.7)	2.58 (0.74-9.26)	0.136

Captions: * = Hypofractionation; § = Classic fractionation; † = Ultra-hypofractionation; OR = Odds Ratio; CI = Confidence interval.

frequency of cases in the initial stages of the illness, which confirms the finding that relates lower severity with a lower prevalence of radiodermatitis.

Conservative surgery followed by radiotherapy is associated with lighter grades of radiodermatitis, whereas total mastectomy is attributed to grade 2 to 3 radiodermatitis[13]. In this study, it was not possible to observe this association, which can be explained by the higher frequency of conservative surgery cases (73%), instead of mastectomy (19%).

Regarding the planning technique, most patients underwent 3D-RT. This conventional modality can be associated with lower doses of radiation to at-risk organs; however, techniques such as IMRT and modulated volumetric arc therapy (VMAT) exhibit better uniformity and conformity of the dose distributed in the target volume, minimizing the adverse effects of radiodermatitis[22].

Despite techniques such as IMRT and VMAT favoring greater dose homogeneity, thus contributing to radiodermatitis reduction and intensity, it was not possible to establish a statistical association between radiotherapy technique and the occurrence of severity or cutaneous effects in the present study. This is due to

the predominance of 3D-RT in the sample (98.85%), which limited comparisons between treatment modalities. Therefore, the under-representation of alternative modalities impairs statistical comparisons between the groups, limiting inferences about the direct impact of the radiotherapy technique on the observed cutaneous outcomes.

Pruritus was the most frequently reported adverse effect during radiotherapy for breast cancer, being commonly observed in patients who develop radiodermatitis[23,24]. In addition to its high frequency, evidence indicates that this symptom can harm daily life, causing emotional suffering, compromising daily activities, and influencing the quality of sleep of patients in treatment[25,26].

In this study, radiodermatitis emerged early, with grade 1 in the first two weeks, particularly in patients who received between 5 and 10 fractions, in addition to a progressive increase in incidence throughout the weeks of treatment. These findings are consistent with literature. In a study conducted by Cavalcanti et al.[23], radiodermatitis was observed in 98.2% of patients, grade I being the most prevalent (85.6%), followed by grade II (12.6%), while the more severe grades were rare, with an average reaction time of 5 to 17 days after radiotherapy start.

Similarly, an investigation conducted by Rades et al.[27] involving 327 patients with breast cancer identified a 31.2% prevalence of grade 2 or higher radiodermatitis, reinforcing that the severity of toxicity tends to increase with the continuity of radiation exposure. Therefore, radiodermatitis is a frequent adverse effect of breast radiotherapy, characterized by an early start and gradual progression of severity throughout the treatment.

The clinical findings suggest that treatment plan characteristics and disease stage may influence the occurrence of this cutaneous adverse effect during radiotherapy. However, some estimations showed wide confidence intervals, indicating low estimation precision. This limitation is probably related to the low number of observations in some categories; thus, the findings must be interpreted with caution.

There was a correlation between cutaneous toxicity and fractionation regimes in patients who underwent conventional fractionation (25-28 fractions), who presented a lower risk of radiodermatitis in relation to hypofractionation (15-16 fractions). This finding diverges from the results reported by Costa et al.[13] and Langhe et al.[28], in which hypofractionation is related to lower grades of radiodermatitis when compared to the classic plan.

The utilization of hypofractionation in replacement of classic fractionation is reported as advantageous by patients and doctors, as it demonstrates differences in toxicities, such as lower occurrences of pain, fatigue, and skin reactions during and after hypofractionation treatment[7,13,29]. It is worth highlighting that the use of hypofractionation has been well assessed, mainly in patients with higher risks of developing radiodermatitis, such as those with higher body mass index (BMI), voluminous breasts, or folds[29].

In addition to the association with the fractionation plan, the occurrence of radiodermatitis was related to disease staging. A study by Rades et al.[27] also demonstrated that advanced disease stages (T3 or T4), along with factors such as smoking, history of chronic inflammatory diseases, conventional fractionation, and dosage boost, are associated with a higher risk of developing grade ≥2 radiodermatitis during adjuvant radiotherapy.

These findings are consistent with the literature evidence suggesting that both radiotherapy treatment characteristics and clinical factors related to patients and their tumors may influence the risk and severity of cutaneous reactions induced by radiation. According to Behroozian et al.[30], factors such as high BMI, voluminous breasts, smoking, and conventional radiotherapy fractionation (50 Gy in 25 fractions) are among the main determinants of increased risk and severity of radiodermatitis in patients with breast cancer. Similarly, the study by Cavalcanti et al.[23] identified that the body mass index has a significant influence on the severity of the radiodermatitis, demonstrating that each increased point in the BMI increases in 14% the chance of developing more severe forms of cutaneous lesions (grades 2 to 4), in addition to highlighting that the concomitant use of statins can increase in up to four times the risk of severe cutaneous lesions.

High-grade radiodermatitis can trigger treatment interruption, affecting treatment efficacy, causing greater discomfort and pain, and impairing the quality of life of patients. Care strategies to avoid severe consequences of radiodermatitis are considered simple and easy to follow. Care protocols, including recommendations for using ointments and creams, are conveyed by the nursing team before and during treatment. Following the protocols recommended by the nursing team can delay the occurrence and grade of radiodermatitis. These care instructions are conveyed to patients and their families[9,10].

In this study, the statistical analyses did not show an association between the guidance provided by the nursing team and the occurrence of radiodermatitis. However, the lack of association does not necessarily mean there is no relationship between these variables. Moreover, factors related to the homogeneity of guidance received by patients, considering that preventive care is part of the institutional assistance routine, might have limited variability between the analyzed groups, impairing the identification of statistical differences.

Considering the prevalence of radiodermatitis identified in this study, we highlight the importance of adopting strategies directed at the prevention and management of cutaneous toxicity in patients who undergo breast cancer radiotherapy. Care recommendations, such as skin hydration with ointments, creams, and lotions that cause no lesions — nanoparticle creams containing vitamin E and hydrogel —, have protective effects to avoid radiodermatitis[31,32]. For already injured skin, the use of hydrocolloids can help reduce dermatitis, and applying sunscreen can help keep the skin protected from UVA/UVB sun rays, mainly after the daily radiotherapy dose[11,33].

In this context, the nursing team plays a fundamental role in preventing and managing cutaneous toxicity in patients who undergo radiotherapy, from initial assessment through treatment and follow-up. These care actions manifest through periodic nursing consultations, in which the professional does a clinical assessment and monitors the irradiated skin, enabling the early identification of toxicity signs for later management and intervention[34].

Retrospective data from medical records are a limitation of this study, due to the lack of data insertion, which can result in standardization and completeness obstacles of the recorded information. Additionally, a small number of observations were made in some categories, which might have reduced the precision of estimations, resulting in large confidence intervals and possible instability in the model parameters, which, in turn, can lead to overestimation or underestimation of the associations found. Thus, we recommend that further studies with larger samples and prospective designs be conducted to confirm these associations and deepen the understanding of factors related to the development of radiodermatitis in patients with breast cancer who undergo radiotherapy.

CONCLUSION

The clinical-epidemiological profile of patients who underwent teletherapy for breast cancer in the oncological center is mainly composed of white women, with a family income of 1 to 3 minimum wages and complete elementary school education. There is a predominance of cases of breast cancer in the left breast, as well as a higher number of cases with neoplasm of breast, unspecified, with stage IIA being the most frequent. Regarding teletherapy, most cases were treated with hypofractionated 3D-RT.

Considering the radiodermatitis grades, light lesions were more frequent (grades 1 and 2). Grade 1 was identified in every week of treatment, more frequently observed in the third and fourth weeks of treatment, while grade 2 presented a higher frequency in the fourth week. Pruritus stood out as the most prevalent adverse effect, presenting a gradual increase during treatment.

An association was observed between the occurrence of radiodermatitis and both the radiotherapy fractionation regimen and tumor staging, demonstrating that patients undergoing conventional fractionation had a lower likelihood (approximately 86%) of developing radiodermatitis compared to those who received 15–16 fractions. Whereas stage IIA presented around 2.3 times more chances of developing radiodermatitis in comparison with patients in stage IA. These findings reinforce that treatment and disease characteristics can influence the development of cutaneous reactions during radiotherapy.

The results strengthen the importance of systematic monitoring of cutaneous reactions during radiotherapy treatment through periodic consultations, especially with the nursing team. These professionals also work directly by guiding patients to adopt preventive and early management strategies for inherent treatment toxicities to minimize effects and improve the quality of oncological care.

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CONTRIBUTIONS

All the authors have substantially contributed to the study design, data acquisition, analysis, interpretation, wording, and critical review. They approved the final version for publication.

DECLARATION OF CONFLICT OF INTERESTS

There is no conflict of interest to declare.

DATA AVAILABILITY STATEMENT

Data is not publicly available and must be requested from the corresponding authors if needed, as these are sensitive patient data.

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