Dermatological Alterations Associated with Oncological Treatment of Women with Breast Cancer

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Alterações Dermatológicas Associadas ao Tratamento Oncológico de Mulheres com Câncer de Mama

Alteraciones Dermatológicas Asociadas con el Tratamiento Oncológico de Mujeres con Cáncer de Mama

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ABSTRACT

Introduction: Several side effects can affect the skin and its attachments during cancer treatment of women with breast cancer, compromising the therapy. **Objective:** To identify the occurrence of dermatological changes during cancer treatment of women with breast cancer. **Method:** Quantitative approach, documentary and retrospective study, using secondary data obtained from 190 clinical records (n=190) from a private oncology service. **Results:** The participants had a mean age of 53 years (±11.2), with histopathological diagnosis of invasive ductal carcinoma (85.8%). All participants were exposed to chemotherapy, 65.3% to radical mastectomy and 34.2% to radiotherapy. The dermatological alterations identified, and the occurrences verified in the sample were alopecia (94.2%), hyperpigmentation (48.4%), pruritus (36.3%), erythema (6.8%), desquamation (25.8%) and nail alterations (77.9%). In all, 550 dermatological alterations were identified, resulting in an average of 2.9 (±1.3) changes per patient. Radiotherapy was associated with a higher occurrence of erythema (p<0.001) and women exposed to taxanes were more likely to manifest dermatological alterations than those unexposed (p<0.001), sociodemographic factors were not associated. **Conclusion:** The occurrence of dermatological alterations identified in the participants was significant, reinforcing that these manifestations may be frequent in women with breast cancer during oncological treatment, requiring prevention and treatment actions.

Key words: Radiotherapy/adverse effects; Antineoplastic Agents/adverse effects; Drug-Related Side Effects and Adverse Reactions/radiotherapy; Breast Neoplasms; Skin Diseases.

RESUMO

Introdução: Diversos efeitos colaterais podem acometer a pele e seus anexos durante o tratamento oncológico de mulheres com câncer de mama, comprometendo a terapia. **Objetivo:** Identificar a ocorrência de alterações dermatológicas durante o tratamento oncológico de mulheres com câncer de mama. **Método:** Estudo documental e retrospectivo, de cunho quantitativo, com uso de dados secundários obtidos por meio de 190 prontuários clínicos (n=190) de um serviço privado de oncologia. **Resultados:** As participantes apresentaram média de idade de 53 anos (±11,2), com diagnóstico histopatológico de carcinoma ductal invasivo (85,8%). Todas foram submetidas à quimioterapia, 65,3% à mastectomia radical e 34,2% à radioterapia. As alterações dermatológicas identificadas e as ocorrências verificadas na amostra foram alopecia (94,2%), hiperpigmentação (48,4%), prurido (36,3%), eritema (6,8%), descamação (25,8%) e alterações ungueais (77,9%). Ao todo, foram identificadas 550 alterações dermatológicas, resultando em uma média de 2,9 (±1,3) por paciente. A radioterapia esteve associada a uma maior ocorrência de eritema (p<0,001) e mulheres expostas a taxanos apresentaram maior probabilidade de manifestar de alterações dermatológicas do que as não expostas (p<0,001), bem como fatores sociodemográficos não estiveram associados. **Conclusão:** A ocorrência de alterações dermatológicas identificadas nas participantes foi significativa, reforçando que essas manifestações podem ser frequentes em mulheres com câncer de mama durante o tratamento oncológico, requerendo medidas de prevenção e tratamento.

Palavras-chave: Radioterapia/efeitos adversos; Antineoplásicos/efeitos adversos; Efeitos Colaterais e Reações Adversas Relacionados a Medicamentos/radioterapia; Neoplasias da Mama; Dermatopatias.

RESUMEN

Introducción: Varios efectos secundarios pueden afectar la piel y sus uniones durante el tratamiento del cáncer de mujeres con cáncer de mama, comprometiendo la terapia. **Objetivo:** Identificar la aparición de alteraciones dermatológicas durante el tratamiento del cáncer de mujeres con cáncer de mama. **Método:** Estudio documental y retrospectivo, de carácter cuantitativo, utilizando datos secundarios obtenidos de 190 registros clínicos (n=190) de un servicio oncológico privado. **Resultados:** Los participantes tenían una edad media de 53 años (±11,2), con diagnóstico histopatológico de carcinoma ductal invasivo (85,8%). Todas fueran sometidas a quimioterapia, el 65,3% a mastectomía radical y el 34,2% a radioterapia. Las alteraciones dermatológicas identificadas y las ocurrencias verificadas en la muestra fueron alopecia (94,2%), hiperpigmentación (48,4%), prurito (36,3%), eritema (6,8%), descamación (25,8%) y alteraciones en las uñas (77,9%). En total, se identificaron 550 alteraciones dermatológicas, lo que resultó en un promedio de 2,9 (±1,3) por paciente. En total, se identificaron 550 cambios dermatológicos, lo que resultó en un promedio de 2,9 (±1,3) alteraciones por paciente. La radioterapia se asoció con una mayor incidencia de eritema (p<0,001) y las mujeres expuestas a taxanos tienen más probabilidades de manifestar alteraciones dermatológicas que las no expuestas (p<0,001), además de que no se asociaron factores sociodemográficos. **Conclusión:** La ocurrencia de alteraciones dermatológicas identificadas en las participantes fue significativa, reforzando que estas manifestaciones pueden ser frecuentes en mujeres con cáncer de mama durante el tratamiento oncológico, requiriendo acciones de prevención y tratamiento.

Palabras clave: Radioterapia/efectos adversos; Antineoplásicos/efectos adversos; Efectos Colaterales y Reacciones Adversas Relacionados con Medicamentos/radioterapia; Neoplasias de la Mama; Enfermedades de la Piel.

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INTRODUCTION

Breast cancer is one of the most frequent malignant tumors worldwide, being the main cause of cancer-related death among women (except non-melanoma skin cancer). Among the available therapeutic options to treat breast neoplasms, chemotherapy and radiotherapy have been widely utilized isolated or associated[1].

As side effects of these treatments, the onset of dermatological alterations is frequent. It is a fact that skin and its attachments can be more susceptible than other organs to the occurrence of antineoplastic related adverse events because high metabolism and accentuated cellular proliferation contribute to this susceptibility and make this organ a toxicity target[2].

Regardless of being a highly effective intervention to treat several types of neoplasms because of high energy rays whose boundaries of action are not yet so accurate, it also affects healthy cells of the patient. Due to the inaccuracy of the radiation margin, until 85% of the patients can suffer any form of dermatological alteration[3].

Radiation-induced cutaneous reactions are one of the main side effects associated with radiotherapy treatment. Said reactions, in addition of being distressful and painful for the patients, if as severe as they may be, can justify the discontinuation of the treatment or reduction of the intensity of exposure to radiation. These reactions can be classified as acute or chronic and in different grades, since a simple desquamation of the skin until ulcerations, fibrosis and necrosis of tissues which calls for the necessity of understanding and follow up of these phenomena[4].

Furthermore, dermatological alterations also occur in patients who have submitted to chemotherapy because of interaction among the skin and antineoplastic agents administered systemically. Despite the different mechanisms of action in relation to radiotherapy, skin and cutaneous attachments reactions are noticed during the chemotherapeutic treatment frequently. Similar to radiotherapy, hyperpigmentation, desquamations, erythema and skin ulcers are common in patients' skin who have submitted to this therapeutic modality[5]. Consequently, the appearance of dermatological alterations associated with radiotherapy and/or chemotherapy can lessen the quality of life of the patients and demand multi-disciplinary care[6].

Whereas women diagnosed with breast cancer, radiotherapy treatment has been widely disclosed, reducing the rates of local recurrence after surgical procedures and/or chemotherapy. However, the concern with adverse cutaneous reactions associated with radiotherapy has been constant although well-tolerated by the patients[7,8].

On the other hand, it is also important to recognize that dermatological occurrences can affect women more during the systemic antineoplastic treatment than men according to studies which evaluated the quality of life, considering that these side effects to the skin and its attachments can be associated with the compromise of the well-being, self-esteem, functionality and sexuality of women in oncologic treatment[9,10].

Thus, the objective of this study was to identify the occurrence of dermatological alterations during the oncologic treatment of women with breast cancer.

METHOD

Documental, retrospective approach, quantitative study using secondary data extracted from clinical charts of patients with breast cancer in an Oncology Service of Aracaju, State of Sergipe, Brazil. The choice of the service was based in the availability and high flow of information that matched the study objective, ensuring access to a satisfactory volume of clinical charts. In the beginning of the collection, 560 patients were in oncologic treatment.

To screen the initial volume of patients and determine the sample pursuant to the objective, clinical charts of women aged or older than 18 years with cytopathological diagnosis of breast cancer and undergoing oncologic treatment (regardless of the modality or combinations) since legible and complete with the variables investigated were selected (traditional, non-electronic charts).

Two investigators of the oncology nursing department conducted the data collection independently matched to the study purpose, utilizing a customized form containing the variables investigated to identify and register the pertinent information of each patient enrolled. The period was from February 2014 to February 2015 (one year) and each chart was accessed only once.

The overall variables selected were age, origin (State), neighborhood, race/color, marital status, with or without spouse (regardless of marital status), education, religion, monthly family income, regular physical activity before the oncologic treatment and family support after cancer diagnosis. The clinical variables were cytopathological diagnosis, time of diagnosis, staging, surgical procedures, radiotherapy and chemotherapy treatment including the chemotherapic agents taken.

In addition to these, the dermatological alterations investigated were alopecia (partial or total), cutaneous hyperpigmentation (localized or generalized), ungual alterations (discolorations/irregularities or partial/total loss of the bed), pruritus (localized, generalized or disabling), desquamation and multiform erythema (localized or generalized/severe), according to the Common Terminology Criteria for Adverse Events - CTCAE[11].

The data collected in the forms were tabulated in a single Google Sheets. The statistical procedures selected were performed with the software PAST: Paleontological Statistics Software Package for Education and Data Analysis. Descriptive and inferential statistics were calculated to obtain the frequency of the events and the relation among the variables.

The normality of the set of data was verified by the Kolmogorov-Smirnov test with the correction of Lilliefors (test *L*). The comparison among the means was performed through the Mann-Whitney test while the associations were verified by the chi-square test of Pearson (x^2) or exact test of Fisher when the expected values of the contingency tables were lower than five.

To verify the association of radiotherapy with the occurrence of dermatological alterations, the participants were divided in Group A (n=56; only women who submitted to more than 20 sessions of radiotherapy) and Group B (n=125; only women who were unexposed to radiotherapy). In addition, they were divided in Groups C (n=131; women who presented zero to three dermatological alterations) and D (n=59; four to six dermatological alterations) for association with sociodemographic factors.

Upon the Institutional Review Board of the Nursing School of Ribeirão Preto/University of São Paulo (EERP/USP) approval, report number 531.146, the study was initiated. The regulations of Resolution 466/2012 of the National Health Council[12] for studies with human subjects were thoroughly complied with during data collection, keeping the secrecy and trustworthiness of the information obtained. The Informed Consent Form was waived because there was no direct contact with the participants.

RESULTS

Of the 560 patients registered at the oncology service investigated, 206 (36.8%) were females and in oncologic treatment for breast cancer, of which 190 (33.9%) met the eligibility criteria and were enrolled in this study (n=190). Thus, 16 patients and their charts were excluded for not meeting the inclusion criteria or for failing to include all the data listed for the variables in investigation whose charts were deemed as incomplete.

Most of the patients of the sample were natural from Sergipe (78.9%), mean age of 53 years old (±11.2). In addition, 67.9% were Brown or Black, 47.3%, married, 56.3% had spouse, 84.2%, incomplete university, 76.2% lived in urban area and 82.1% had family income between one and three minimum-wages. Similarly, 65.3% were active Catholics, 87.9% had family support during cancer treatment and 55.3% practiced physical activities regularly prior to cancer diagnosis. Table 1 describes the general occurrence of dermatologic alterations in the sample investigated.

Table 1. Dermatologic alterations associated with the oncologic treatment of women with breast cancer

Dermatological Alterations	Absolute Frequency	Relative Frequency
Alopecia	179	94.2%
Partial	13	6.8%
Total	166	87.4%
Hyperpigmentation	92	48.4%
Localized	33	17.4%
Generalized	59	31.1%
Ungual Alterations	148	77.9%
Discoloration/ irregularities	111	58.4%
Partial or total loss of the bed	37	19.5%
Pruritus	69	36.3%
Localized	56	29.5%
Generalized	9	4.7%
Disabling	4	2.1%
Desquamation	49	25.8%
Multiform Erythema	13	6.8%
Localized	12	6.3%
Generalized	1	0.5%

Only four women did not manifest dermatological alterations until the data were collected. However, 550 dermatological alterations were identified in the 190 patients with breast cancer in oncologic treatment resulting in mean of 2.9 (±1.3) manifestations per participant. Table 2 describes the occurrence of cumulative dermatological alterations (not necessarily simultaneous) regardless of the moment when they occurred during the oncologic treatment.

In relation to breast cancer diagnosis obtained from biopsy, the histological subtype most frequent was invasive ductal carcinoma (85.8%) and only two patients had bilateral cancer (1%). In addition, 59.5% were diagnosed with breast cancer for more than one year, 75.8% had spread to regional lymph nodes, 65.3% have already submitted to radical mastectomy and 34.2% to radiotherapy. All the patients were undergoing chemotherapic treatment. Table 3 describes the occurrence of dermatological alterations in women submitted to

Table 2. Cumulative dermatological alterations associated with oncologic treatment of women with breast cancer

Cumulative dermatological alterations (quantity)	Simple absolute frequency	Cumulative absolute frequency	Relative frequency	Cumulative relative frequency
None	4	4	2.1%	2.1%
1	24	28	12.6%	14.7%
2	48	76	25.3%	40%
3	55	131	28.9%	68.9%
4	32	163	16.8%	85.7%
5	25	188	13.2%	98.9%
6	2	190	1.1%	100%

Table 3. Occurrence of dermatological alterations in relation to the chemotherapic treatment associated or not with the use of radiotherapy

Dermatological alterations	Group A		Group B		Value of p (x^2)
Participants	56§		125		
	N	%	N	%	
Alopecia	56	30.9	115	63.5	0.325†
Partial	4	2.2	7	3.9	0.740†
Total	52	28.7	108	59.7	0.315
Hyperpigmentation	26	14.4	63	34.8	0.621
Localized	10	5.5	22	12.2	0.966
Generalized	16	8.8	41	22.7	0.571
Ungual Alterations	42	23.2	98	54.1	0.613
Discoloration or irregularities	29	16	76	42	0.256
Partial or total loss of the bed	13	7.2	22	12.2	0.417
Pruritus	24	13.3	42	23.2	0.231
Localized	19	10.5	35	19.3	0.420
Generalized	4	2.2	5	2.8	0.461†
Disabling	1	0.6	2	3.3	1†
Desquamation	17	9.4	31	17.1	0.433
Multiform erythema	10	5.5	3	1.7	0.000†*
Localized	2	1.1	3	1.7	0.299†
Generalized/severe	8	4.4	0	0	0.094†

Captions: §: Only women submitted to more than 20 radiotherapy sessions resulting in the exclusion of nine women who did not reach this parameter in the sample irradiated. N: Absolute frequency. %: Relative frequency. x^2: Chi-square test. †: Fisher exact test (values expected lower than five in the contingency table 2x2). *: $p<0.05$.

chemoradiotherapy comparing with non-irradiated women.

Table 4 describes the occurrence of cumulative dermatological alterations (not necessarily simultaneous) among women who underwent chemoradiotherapy compared with women non-irradiated. The mean of dermatologic alterations in the irradiated group was 3.1 (±1.4), while the non-irradiated group was 2.8 (±1,3). There was no statistically significant difference among the means ($p>0.05$).

Table 5 compares group C (patients who manifested from zero to three dermatological alterations) and group D (patients who manifested from four to six dermatological alterations) in relation to the demographic factors investigated.

In addition, 150 patients were exposed to antineoplastic taxanes (paclitaxel or docetaxel) during the chemotherapeutic treatment. Comparing the means of the dermatological alterations of these patients with non-exposed patients, it was observed that the mean of

Table 4. Occurrence of cumulative dermatological alterations in relation to the chemotherapeutic treatment associated or not with radiotherapy

Dermatological alterations	Group irradiated		Group non-irradiated		Value of p (x^2)
Participants	56§		125		
	N	%	N	%	
None	0	0	4	2.2	0.312†
1	8	4.4	15	8.3	0.669
2	11	6.1	32	17.7	0.384
3	15	8.3	39	21.5	0.548
4	11	6.1	20	11	0.547
5	10	5.5	14	7.7	0.222
6	1	0.6	1	0.6	0.524†
0 to 3	34	18.8	90	49.7	0.130
4 to 6	22	12.2	35	19.3	

Captions: §: Only women submitted to more than 20 radiotherapeutic sessions resulting in the exclusion of nine women who did not meet this parameter in the sample irradiated. N: Absolute frequency. %: Relative frequency. x^2: Chi-square test †: Fisher exact test (expected values lower than five in the contingency table 2x2).

Table 5. Cumulative occurrence of dermatological alterations in relation to sociodemographic factors

Dermatological alterations	Group C		Group D		Value of p (x^2)
Participants	131		59		
	N	%	N	%	
Whites	41	21.6	20	10.5	0.722
Brown or Black	90	47.4	39	20.5	
Age <55 years	58	30.5	22	11.6	0.366
Age ≥55 years	73	38.4	37	19.4	
Countryside	19	10	4	2.1	0.130
Urban area	112	58.9	55	28.9	
With spouse	72	37.9	35	18.4	0.575
Without spouse	59	31.1	24	12.6	
Complete high school	69	36.3	32	16.8	0.841
No high school	62	32.6	27	14.2	
Catholic	98	51.6	38	20	0.141
Non-catholic	33	17.4	21	11.1	
Regular physical activity†	73	38.4	31	16.3	0.683
Non-regular physical activities†	58	30.5	28	14.7	
Family income ≤3 minimum wages	114	60	50	26.3	0.672
Family income >3 minimum wages	17	8.9	9	4.7	

Captions: Group C: From zero to three simultaneous dermatological alterations. Group D: From four to six simultaneous dermatological alterations. N: Absolute frequency. %: Relative frequency. x^2: Chi-square test. †: Before oncological treatment.

dermatologic alterations of those who did utilize taxanes agents in any moment of the therapy was 3.1 (±1.3), and 2 alterations (±1.1) for those who did not. Among them, statistically significant difference was found (p<0.001).

DISCUSSION

In a general view of the main findings of this investigation, the occurrence of dermatological alterations varied from 6.8% to 94.2% being multiform erythema the less frequent and alopecia, most frequent, respectively. Whereas the severity of these alterations, alopecia and hyperpigmentation were more frequent in their severest manifestation: total alopecia and generalized hyperpigmentation. On the other hand, ungual alterations and multiform erythema were more frequent in their mildest manifestation, discolorations/irregularities of nails, localized pruritus and localized multiform erythema.

The exposure to radiotherapy (more than 20 sessions) was associated with better odds of multiform erythema manifestations alone among the dermatological alterations investigated. In addition, women who submitted to this therapeutic modality did not present more odds of greater quantity of cumulative dermatological alterations (simultaneous or not) during cancer treatment and of any of the sociodemographic factors investigated was associated with this outcome. This array of observations suggest that the occurrence of dermatological alterations in the sample investigated may hold more association with chemotherapy in relation to radiotherapy and to sociodemographic factors, considering that all the participants have submitted to chemotherapic protocols and the use of taxanes agents by 150 participants of the sample was associated with higher mean of dermatologic alterations (simultaneous or not). It is important to consider that the modifications the oncologic treatment provoked in the patients' body have been associated with several experiences and biopsychosocial impacts of cancer. Often, these modifications are related to other health negative outcomes[13] in women.

Alopecia

Partial or total alopecia can be considered one of the major emotional challenges for women with breast cancer, compromising self-esteem and self-image. It is not uncommon to see high levels of stress and depression in women affected by alopecia and some of them report it is easier to cope with the loss of the breasts than with the loss of hairs[14].

Total alopecia as concluded in this study was the most prevalent dermatological alteration. The occurrence of this outcome is expected because taxanes agents as paclitaxel and docetaxel were utilized in 78.9% of the sample and were strongly associated with damages provoked to the hair follicles which trigger alopecia, affecting more than 80% of the patients who submit to this class of chemotherapics[14]. In addition, the mean of cumulative dermatological alterations was bigger in women exposed to taxanes agents. These facts can explain the occurrence of alopecia in this sample.

Considering the previously alopecia impacts pointed out in women with cancer, several approaches have been investigated for the management of this dermatological alteration[15]. They range from drug strategies aimed to diminish the damage of antineoplastics in the hair follicles until non-drug strategies to prevent and cope with the condition as scalp cooling and wigs, respectively[14,15]. Thus, oncology professionals should be aware of the impact this dermatological alteration in women with cancer, providing psychological and therapeutic support, minimizing alopecia-associated harms[16,17].

Ungual alterations

Nail changes is one of the classical side effects of systemic anticancer therapies. Although they are not severe and can disappear/reduce with the end or discontinuation of the treatment, these changes can be painful and debilitating for the patients and some may not be totally avoided[18,19].

Conceptually, nail alterations can involve changes of pigmentation and reduction of the thickness and growth, further to structural modifications as Beau's lines. Periungual and onycholysis alterations are observed less usually[18]. Periungual alterations can also mimic signs and symptoms of ingrown toenails demonstrating initial signs of an inflammatory process, occurring mainly in feet nails, especially hallux, although it affects thumbs as well. The development of these alterations begins after weeks or months of exposure to systemic antineoplastics. As risk factor, the use of paclitaxel for more than 12 weeks can also be associated with this outcome[5,19].

In addition to taxanes, cyclophosphamide and other antimetabolites can provoke ungual alterations. The measures to prevent these alterations consist in avoiding traumas and abrasion, irritating products, regular use of moisturizers, local hygiene, wear comfortable shoes and regular consultations with the podiatrist. In cases of multiple and/or severe lesions, the patients should be provided supporting oncodermatology. The use of gloves and chilled socks can bring benefits in reducing ungual alterations, including those associated with the use of taxanes[5,9,18,19].

Hyperpigmentation

Oncologic treatment related hyperpigmentation is common as well. The literature reports that the use of taxanes as paclitaxel can be associated with the appearance of these alterations either local or generalized. The onset of hyperpigmentation in women with breast cancer varies from weeks to months after the beginning of oncotic therapy although patients receiving 5-fluorouracil may present it faster[20,21]. It is also possible that skin hyperpigmentation is secondary to the increase of the quantity of melanin, carotene or hemoglobine[5].

Reports of hyperpigmentation associated with antineoplastic therapy indicate that these dermatologic alterations can occur in different patterns and affect several regions of the body as hands palms and feet sole, continuing during the chemotherapeutic treatment. In general, hyperpigmentation can provoke reduction of self-esteem and quality of life[20,21]. Typically, they disappear after months or years after the discontinuation of the drug. Doxorubicin and cyclophosphamide, further to paclitaxel are commonly associated with skin hyperpigmentation[22].

Erythema and desquamations

In addition to the systemic effects of chemotherapy, some patients with breast cancer can present dermatological alterations provoked by ionizing radiation known as radiodermatitis. Clinically, erythema associated with skin desquamation further to oedema of the breasts, chest pain and skin retraction are observed. The severe cases of radiodermatitis can lead to the interruption of radiotherapy and increase of mortality by cancer, in addition to reducing the quality of life of these patients[23]. Clinical protocols involving topic applications of corticosteroids and silver sulfadiazine 1% during radiotherapy can reduce the occurrence of these cutaneous alterations in the breast, although they may manifest months or years after the beginning of the ionizing radiation[23,24].

The occurrence of erythema was proportionally higher in the group of women irradiated as the results of this study indicate. When addressing the occurrence of radio-induced dermatological alterations, it is worth mentioning, several factors must be considered while investigating them as the technique of radiotherapy and preventive measures adopted. Further, the concomitant administration of systemic therapies is relevant to measure these outcomes. At last, it is important to consider and inform the patients that post-radiotherapy dermatological alterations in the breast, especially erythema, not always mean recurrence of the disease[23,24].

Epidemiology

Naveed et al.[25] investigated dermatological reactions in 226 individuals. The results they reached showed that the most frequent alterations were encountered in the nails (85.8%), followed by cutaneous (84.5%) and hair (70.3%). In addition, skin hyperpigmentation was noticed in 45.4% of the participants and pruritus in 44.7%[25]. The results of this study indicate that nail alterations were not more frequent than hair alterations although the frequency of hyperpigmentation has been higher and pruritus, lower.

It is important to note that the results these authors reached were based in a mixed sample of men and women with 64 women with breast neoplasm. In the referenced study, all the patients were in chemotherapic treatment, nevertheless, the number of patients who were exposed to radiotherapy was higher than in this study (100 *versus* 56). Similarly, the authors used the criteria CTCAE[25].

As opposed to the results of this study and of Naveed et al.[25], Pavey et al.[26] reported low frequency of hair alterations (37.7%) and high frequency of ungual alterations (62.2%)[25,26]. Changes of these occurrences can in part be associated with the appearance of new combinations of chemotherapic agents which provoke dermatological alterations with differentiated clinical characteristics[25].

In fact, chemotherapic agents are associated with the occurrence of ungual alterations often reported in studies with several populations. The variety and the classifications of these alterations remain vast. In a general way, quite often modifications of color, structure and adjacent soft tissues are reported with possibilities of evolution. Among the drugs most associated with these outcomes, stand out cyclophosphamide, doxorubicin and taxanes[27,28].

The advance of breast cancer therapies demonstrates that the association between chemotherapy and therapy with ionizing radiation have shown good results in mortality reduction. In advanced stages of the disease, the use of this modality can bring more favorable outcomes for inoperable tumors, allowing the surgical approach[29]. However, both modalities provoke dermatological alterations requiring care during the oncologic treatment. Within breast cancer scenario, it is estimated that more than 70% of the women irradiated present some sort of radiodermatitis[30].

Often, ionizing radiation related dermatological alterations are acute in the first 90 days of radiotherapy treatment. In this first moment, it is anticipated that more than 80% of these initial reactions are moderate or severe, frequently described in clinic as a combination of erythema and pain, although they can lead to blistering or ulceration[31]. Radiation-induced dermatological alterations can contraindicate the continuity of the treatment with radiation and worsen the prognosis of women with cancer, in addition to damaging self-esteem and quality of life[32].

Finally, because of the correlation between breast cancer multimodal treatment and the occurrence of dermatological alterations, the necessity of understanding these events and develop therapeutic strategies to prevent and treat them properly is ratified. The monitoring of cutaneous toxicities can favor the oncologic treatment. Thus, oncology professionals should be well cognizant of the best evidences to support the patients and their families[33].

The lack of an accurate chronological evaluation of the beginning and duration of the dermatological alterations investigated is a limitation of this study. In addition, the professionals were not trained about the registration of the data in the medical charts and the chemotherapic protocols were not thoroughly detailed in comparisons, only taxanes were considered.

CONCLUSION

Dermatological alterations were frequent in women with breast cancer in this study. Radiotherapy and

sociodemographic factors were not associated with higher odds of manifesting large quantity of these alterations in the course of the treatment while taxanes presented higher mean. In this context, measures of prevention and management should be considered to reduce the impacts of the dermatological alterations and prospective studies can expand the understanding of the cutaneous manifestations, especially in cause-effect perspective.

CONTRIBUTIONS

All the 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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