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Incidence and factors associated with complications in surgical wounds of women after mastectomy

Incidência e fatores associados a complicações em feridas operatórias de mulheres mastectomizadas

Incidencia y factores asociados a complicaciones en heridas quirúrgicas de mujeres mastectomizadas

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ABSTRACT

Objective: to describe the incidence of complications in mastectomy surgical wounds and to identify associated factors. **Method:** this retrospective study was conducted in a hospital cohort of 545 women mastectomized for breast cancer in 2018 at a high-complexity cancer care center Rio de Janeiro City, Brazil, after approval by the research ethics committee. Data were collected from medical records, allowing incidence rate and incidence rate ratio to be calculated for each complication. **Results:** the complication with the highest incidence rate was bleeding (57.14/100 mastectomies-day), associated factors being non-white race/skin color (incidence rate ratio 3.11) and diabetes mellitus (incidence rate ratio 0.48). **Conclusion:** the factors associated with bleeding from the surgical wound point to the need for new practices in post-operative care for women with mastectomies.

Descriptors: Medical Oncology; Nursing; Mastectomy; Surgical Wound; Risk Factors.

RESUMO

Objetivo: descrever a incidência de complicações em feridas operatórias de mastectomia e identificar fatores associados. **Método:** estudo retrospectivo desenvolvido em uma coorte hospitalar de 545 mulheres mastectomizadas por câncer de mama no ano 2018 em um centro de assistência de alta complexidade em oncologia da cidade do Rio de Janeiro, Brasil, após aprovação por Comitê de Ética em Pesquisa. Os dados foram coletados a partir dos prontuários, permitindo cálculos da taxa de incidência e da razão da taxa de incidência para cada complicação. **Resultados:** a complicação que apresentou maior taxa de incidência foi o sangramento (57,14/100 mastectomias-dia), tendo como fatores associados a raça/cor da pele não branca (Razão da Taxa de Incidência: 3,11) e a diabetes mellitus (Razão da Taxa de Incidência: 0,48). **Conclusão:** os fatores associados ao sangramento da ferida operatória apontam para a necessidade de novas práticas no cuidado ao pós-operatório de mulheres mastectomizadas.

Descritores: Oncologia; Enfermagem; Mastectomia; Ferida Cirúrgica; Fatores de Risco.

RESUMEN

Objetivo: describir la incidencia de complicaciones en heridas quirúrgicas de mastectomía e identificar factores asociados. **Método**: estudio retrospectivo desarrollado en una cohorte hospitalaria de 545 mujeres mastectomizadas por cáncer de mama en 2018 en un centro de atención de alta complejidad en oncología de la ciudad de Río de Janeiro, Brasil, previa aprobación del Comité de Ética en Investigación. Los datos se obtuvieron de las historias clínicas, lo que permitió calcular la tasa de incidencia y el cociente de la tasa de incidencia para cada complicación. **Resultados**: la complicación que presentó mayor tasa de incidencia fue el sangrado (57,14 / 100 mastectomías-día), con factores asociados a la raza / color de piel no blanca (índice de tasa de incidencia: 3,11) y diabetes mellitus (índice de tasa de incidencia: 0,48). **Conclusión**: los factores asociados al sangrado de la herida quirúrgica apuntan a la necesidad de nuevas prácticas en el cuidado al postoperatorio de las mujeres con mastectomías.

Descriptores: Oncología Médica; Enfermería; Mastectomía; Herida Quirúrgica; Factores de Riesgo.

INTRODUCTION

The object of this study are the complications of mastectomy surgical wounds and their associated factors. Breast cancer is a heterogeneous disease, which can be divided into various clinical and histological subtypes[1]. Currently, it is one of the main public health problems. Except for non-melanoma skin cancer, breast cancer is the type of tumor that most affects women in Brazil and worldwide, and its incidence has been gradually increasing[2].

It is estimated that, for the 2020-2022 triennium, there will be 66,280 new cases of breast cancer each year. This is the type of cancer with the highest incidence in women from the Brazilian South, Southeast, Midwest, Northeast and North regions[1].

Chemotherapy, radiotherapy and surgery stand out among the treatments offered for breast cancer. Surgical treatment can be classified as follows: 1) Breast conservative therapy, which consists of tumor exeresis preserving the tissue as much as possible, such as quadrantectomy and segmentectomy; 2) Mastectomy, which is the most effective treatment, despite its mutilating nature, and can be divided into six types: simple, double or bilateral, skin-sparing, nipple-sparing, modified radical, and radical[3].

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Breast surgeries can result in surgical wound complications, such as: infection[4-9], necrosis[4,6,10] seroma[4,6,7,9,10], dehiscence[4,9], bleeding[8,9], bruise[4,6,7,10] and epidermolysis[11]. Such complications have a direct repercussion on women's life because they can lead to readmissions, increase hospital costs, mobilize the entire health team, and cause psychosocial and incapacitating problems, even resulting in patient's death[12] or in delayed adjuvant therapy[13].

The aim of assessing the complications in mastectomy surgical wounds is to qualify the Nursing care provided to this population, focusing on the best stomatherapy interventions, in order to improve patients' quality of life. The relevance of studying this topic is also related to the disease epidemiology, being that breast cancer has the highest global incidence in women, with an estimated incidence rate of 61.61 new cases for each 100,000 women in Brazil[1].

Consequently, the objectives of this study are to describe the incidence of complications in mastectomy surgical wounds and to identify their associated factors.

LITERATURE REVIEW

The complications in mastectomy surgical wounds can be divided into three phases, namely: immediate, which occurs up to 24 hours after surgery; mediate, which emerges up to seven days after surgery; and late, which appears after removal of drains and sutures and when the patient is discharged from the hospital[14].

Of the impacts resulting from the surgical treatment, feelings of shame associated with body image disorder stand out as the main negative factors and have an influence on the quality of life and health of these women[15,16]. However, distress for losing the breast permeates several aspects, such as low self-esteem, not feeling like a woman, lack of meaning in life, withdrawal from or reduction of the daily living and work activities due to limitations resulting from mastectomy, and feelings of worthlessness[17].

Some factors that interfere with the process of surgical wound healing have been described in the literature. Of these, the following stand out: local infection, deficiency in the surgical technique, excessive tensioning of the wound borders, low perfusion in this area, wound trauma in the postoperative period, radiation therapy, and emergency surgery. In relation to the systemic factors, the most important are age, malnutrition, obesity, smoking, immune system impairment, and chronic use of steroidal or immunotherapy drugs[18]. Therefore, determining the factors that affect surgical wound healing is crucial for the implementation of measures to prevent and treat surgical wound complications.

METHOD

This is a retrospective cohort study having as its target population women subjected to mastectomy due to breast cancer in 2018 in a high-complexity Oncology care center located in the city of Rio de Janeiro, Brazil. Women subjected to breast reconstruction were considered ineligible for the study, for not undergoing outpatient postoperative follow-up by the Nursing team.

In order to identify surgical wound complications, the patients' outcomes were monitored during 60 days after the mastectomy based on their medical records. In this way, 545 records of mastectomized women were selected. The follow-up time herein selected was based on a study[19] that identified the occurrence of complications in surgical wounds up to 60 days after performing the mastectomy.

In order to know the profile of the mastectomized women, the following data were collected from their medical records: age (< 60 or ≥ 60 years old), skin color (white or non-white), smoking (smoker/former smoker or non-smoker), Body Mass Index (BMI)[20], (≤ 18.4 kg/m^2: low; 18.5 kg/m^2-24.9 kg/m^2: adequate; 25.0 kg/m^2-29.9 kg/m^2: overweight; ≥ 30 kg/m^2: obesity), arterial hypertension (yes or no), diabetes mellitus (yes or no), previous breast surgery (yes or no), and neoadjuvant chemotherapy. The following information were also collected: type of mastectomy (simple or modified radical) and complications during follow-up (infection, cellulitis, bleeding, bruise, necrosis, dehiscence, epidermolysis, or seroma).

In order to assess the frequency of complications in surgical wounds, the incidence rate of each type of complication was estimated. For this purpose, the number of each type of complication observed during the study period was divided by the sum of the individual follow-up times (in days), i.e., the person-time amount. The result of this division was then multiplied by 100, and the incidence rate was expressed as 100 mastectomies-day.

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The incidence rate for each complication and the Incidence Rate Ratio (IRR) were calculated, together with their respective 95% confidence intervals (95% CIs) according to exposure variables (age, skin color, smoking, BMI, arterial hypertension, diabetes mellitus, previous breast surgery, neoadjuvant chemotherapy, and type of mastectomy). IRR is a measure of association that assesses how many times the incidence rate is higher (or lower) in the group of exposed individuals when compared to the group of unexposed individuals[21]. With regard to infection, the incidence rate and IRR were calculated considering up to 30 days after surgery[22].

It is worth noting that the measures of frequency (incidence rate) and of association (IRR) herein calculated are the most appropriate for dynamic populations[21], such as that of this study, since women entered and left the cohort at different follow-up moments.

In compliance with the guidelines and regulatory standards for research studies involving human beings in Brazil, set forth in Resolution No. 466, of December 12th, 2012, of the National Health Council at the Ministry of Health, the conduction of this study was approved by the institution's Research Ethics Committee.

RESULTS

In relation to the participants' sociodemographic and clinical characteristics, most of them are women aged less than 60 years old (53.76%), with a minimum age of 23 and a maximum of 86, non-white race/skin color (63.17%), non-smokers (65.67%), obese (37.06%), hypertensive (52.39%), non-diabetic (79.48%) and not subjected to any previous breast surgery (94.00%). In relation to the treatment, most of the patients underwent neoadjuvant treatment (70.46%) and modified radical mastectomy (62.39%).

Table 1 shows the frequency of each complication and the respective incidence rate. The complication with the highest incidence rate was bleeding (57.14/100 mastectomies-day), followed by bruise (12.18/100 mastectomies-day) and epidermolysis (10.92/100 mastectomies-day).

TABLE 1: Incidence rate of each type of complication in surgical wounds at a high-complexity Oncology care center. Rio de Janeiro, RJ, Brazil, 2020.

Type of complication	N	Incidence rate per 100 mastectomies-day
Bleeding	20	57.14
Bruise	39	12.18
Epidermolysis	100	10.92
Cellulitis	02	7.40
Infection*	47	6.40
Seroma	380	5.72
Necrosis	151	5.46
Dehiscence	140	4.21

*Incidence in up to 30 days

In relation to bleeding, the only complication that presented an association with the exposure variables herein studied (Tables 2 and 3), higher incidence rates were observed among non-white-skinned women (IRR=3.11; 95% CI: 1.12-9.87) compared with white-skinned women, and lower incidence rates were observed among those with diabetes mellitus when compared to those without diabetes mellitus (IRR=0.48; 95% CI: 0.17-1.53).

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TABLE 2: Incidence rate ratios (IRR) of bleeding, bruise, epidermolysis and cellulitis, with their respective 95% confidence interval (95%CI), in a high-complexity Oncology care center. Rio de Janeiro, RJ, Brazil, 2020.

Variables		Bleeding IRR (95% CI)	Bruise IRR (95% CI)	Epidermolysis IRR (95% CI)	Seroma IRR (95% CI)
Age	< 60 years old	1.00	1.00	1.00	1.00
	≥ 60 years old	0.40 (0.14-1.07)	0.87 (0.43-1.86)	1.04 (0.69-1.58)	0.96 (0.78-1.18)
Race/Skin color	White	1.00	1.00	1.00	1.00
	Non-white	**3.11 (1.12-9.87)**	1.28 (0.62-2.72)	1.09 (0.70-1.70)	0.97 (0.78-1.21)
Smoking	Non-smoker	1.00	1.00	1.00	1.00
	Smoker/Former smoker	0.48 (0.18-1.33)	1.02 (0.50-2.03)	1.05 (0.69-1.59)	0.96 (0.77-1.20)
Body Mass Index	Low/Adequate	1.00	1.00	1.00	1.00
	Overweight/Obesity	-	-	-	-
Arterial hypertension	No	1.00	1.00	1.00	1.00
	Yes	0.48 (0.17-1.53)	1.44 (0.72-2.94)	1.07 (0.70-1.63)	0.96 (0.78-1.19)
Diabetes Mellitus	No	1.00	1.00	1.00	1.00
	Yes	**0.31 (0.08-0.91)**	0.95 (0.45-1.93)	0.99 (0.53-1.61)	1.01 (0.77-1.28)
Previous breast surgery	No	1.00	1.00	1.00	1.00
	Yes	1.78 (0.43-11.25)	0.79 (0.92-3.10)	1.64 (0.33-4.95)	1.05 (0.67-1.57)
Neoadjuvant chemotherapy	No	1.00	1.00	1.00	1.00
	Yes	2.18 (0.81-5.84)	0.94 (0.45-2.05)	0.95 (0.61-1.51)	1.01 (0.80-1.27)
Type of mastectomy	Simple	1.00	1.00	1.00	1.00
	Modified radical	-	-	-	-

TABLE 3: Incidence rate ratios (IRR) of infection, seroma, necrosis and dehiscence, with their respective 95% confidence intervals (95% CI), in a high-complexity Oncology care center. Rio de Janeiro, RJ, Brazil, 2020.

Variables	Infection IRR (95% CI)	Seroma IRR (95% CI)	Necrosis IRR (95% CI)	Dehiscence IRR (95% CI)
Age				
< 60 years old	1.00	1.00	1.00	1.00
≥ 60 years old	1.01 (0.52-1.90)	0.96 (0.78-1.18)	0.95 (0.68-1.33)	0.94 (0.66-1.33)
Race/Skin color				
White	1.00	1.00	1.00	1.00
Non-white	0.77 (0.38-1.70)	0.97 (0.78-1.21)	1.01 (0.69-1.45)	1.15 (0.79-1.69)
Smoking				
Non-smoker	1.00	1.00	1.00	1.00
Smoker/Former smoker	0.97 (0.52-1.80)	0.96 (0.77-1.20)	1.08 (0.77-1.51)	1.08 (0.75-1.53)
Body Mass Index				
Low/Adequate	1.00	1.00	1.00	1.00
Overweight/Obesity	-	-	-	-
Arterial hypertension				
No	1.00	1.00	1.00	1.00
Yes	0.88 (0.47-1.68)	0.96 (0.78-1.19)	1.03 (0.73-1.47)	0.90 (0.64-1.28)
Diabetes Mellitus				
No	1.00	1.00	1.00	1.00
Yes	1.08 (0.54-2.06)	1.01 (0.77-1.28)	0.98 (0.66-1.41)	0.98 (0.65-1.43)
Previous breast surgery				
No	1.00	1.00	1.00	1.00
Yes	0.86 (0.02-5.07)	1.05 (0.67-1.57)	1.17 (0.52-2.29)	1.17 (0.31-3.08)
Neoadjuvant chemotherapy				
No	1.00	1.00	1.00	1.00
Yes	1.08 (0.56-2.20)	1.01 (0.80-1.27)	0.99 (0.69-1.44)	1.05 (0.72-1.57)
Type of mastectomy				
Simple	1.00	1.00	1.00	1.00
Modified radical	-	-	-	-

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DISCUSSION

The objective of this study was to describe the incidence of complications in mastectomy surgical wounds and to identify their associated factors. Among the investigated complications, bleeding was the only one that presented an association with the exposure variables, with non-white race/skin color emerging as a risk factor and diabetes mellitus, as a protective factor.

Bleeding is a hemorrhage complication often resulting in surgical reintervention, prolonging length of hospital stay by 1.3 days and increasing hospital costs by USD 5,495 per admission[23]. In comparison, the results of this study evidence a higher incidence of bleeding in breast surgery than that observed in studies conducted in the USA: 2.54%[23] and 12%[24]. The following stand out among the main risk factors: obesity, congestive heart failure, and chronic lung disease[23]. Contrary to data analysis, other studies identified diabetes as a predicting factor for bleeding[23,25]. In addition to that, no studies were found relating bleeding to race/skin color.

The main post-mastectomy complications reported in the literature are infection[4,9,26], bruise[4,27], seroma[4,5,9,27-29], dehiscence[4,9,27], necrosis[4,27], bleeding[9] and cellulitis[27]. This study corroborates these findings and also includes epidermolysis as an incident complication in the post-mastectomy period.

Although epidermolysis has not presented a significant association, it is worth noting that, in a previous study, this complication occurred in 28% of the patients subjected to restorative breast surgery[11]. Epidermolysis is associated with the surgical technique, where the suture line tensioning leads to skin injuries in this region, usually found in abdominoplasties, with incidence values from 5.8%[30] to 12.8%[31]. Other authors did not identify epidermolysis as a mastectomy complication, possibly due to lack of knowledge and ease in the treatment with dressings; thus, more studies are needed to elucidate this topic.

With regard to seroma, it is defined as the accumulation of serous fluid under the skin flaps of the chest wall, occurring in more than 50% of the breast surgeries[28]. Although seroma has not shown an association with any of the investigated exposure variables, a number of studies revealed that its occurrence in mastectomy surgeries was related to BMI[29], obesity[32], dissection technique[29], and total duration of the surgical wound drainage[29]. In breast reconstruction surgeries, seroma is associated with suture[33] and with arterial hypertension[34]. Despite being a high-incidence complication, it presents low need for surgical reintervention[33].

Although this study did not find any association between the exposure variables and the incidence of surgical wound dehiscence, the latter presented an incidence rate of 4.21/100 mastectomies-day, which corroborates with studies reporting an incidence of 2.1% in mastectomy[35], and between 7.2% and 10% in reconstructive mastectomies[10,35]. The most important risk factors for the occurrence of dehiscence include local infection[18], excessive stress on the wound borders[18], hypoperfusion in the area[18], neoadjuvant radiation therapy[36], advanced age[18], and emergency surgery[18].

Surgical site infection, characterized as a complication occurring in the first 30 days after the surgical procedure, is an event that deserves special attention, since it is the third most common Health Care-Related Infection and accounts for 14% of the infections reported in hospitalized patients, thus increasing mortality and length of hospital stay[22]. The analysis found an incidence rate of 6.40/100 mastectomies-day for surgical site infection, which corroborates with studies that present occurrence values from 2.05% to 16.2%[4,8,26,37]. Data analysis did not present any significant association for this complication; however, previous studies revealed that its main risk factors are obesity[4,8,32], diabetes[4,25], hypertension[4], smoking[4], postoperative seroma[26], bruise[26], prolonged use of drainage devices in the postoperative period[26], and connection and disconnection of proximal tubes without standardized aseptic practices[26]. In relation to the surgical factors, bilateral mastectomy and immediate reconstruction stand out[4]. Therefore, it is recommended to remove the drain when the drained volume is below 30 ml/day-50 ml/day or with a time interval of 7 to 10 days[28].

Study limitations

One of the most remarkable limitations of this study is the possibility of classification bias for the race/skin color and presence of surgical wound complication variables, since this study used secondary data recorded by different professionals. In addition, the non-collection of intraoperative data (e.g., time of the surgery) limited data analysis. Despite the study limitations, its originality should be emphasized, since the data were collected from a large sample through an association measure that is not commonly used in Nursing studies, although appropriate to the study population. Finally, it is suggested to conduct new studies including analysis of intraoperative characteristics, in order to assess the association of these factors with the incidence of postoperative complications.

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CONCLUSION

In the high-complexity Oncology care center under study, there were 879 complications in the 545 mastectomies assessed in 2018, the most frequent ones being bleeding, bruise and epidermolysis. Non-white race/skin color was found to be a risk factor for the incidence of mastectomy surgery wound bleeding, and presence of diabetes mellitus was found to be a protective factor. Therefore, the study contributes to a reflection on the need for new practices in the postoperative care of mastectomized women.

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