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Factors Affecting the Outcome of Breast Reconstruction Surgery in Modified Radical Mastectomy Procedure

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ABSTRACT

Background: Breast cancer is the leading cause of death in women caused by cancer. The primary treatment for breast cancer is surgery, where several recommended surgical methods are breast-conserving surgery or mastectomy. Postoperative mastectomy reconstruction has provided an opportunity to overcome the emotional and aesthetic burden of malignancy. **Methods:** This research is a descriptive observational study with a retrospective approach. The sample was 45 breast cancer patients who had undergone a modified radical mastectomy operation at Dr. Kariadi General Hospital for January 2019 - April 2023. The data were processed using SPSS for Windows software, and a descriptive analysis was carried out. **Results:** Most of the patients who underwent post-MRM breast reconstruction were in the age group >40 years (71.1%), had stage 2 mammary carcinoma (44.4%) and stage 3 (40%), featured invasive ductal carcinoma (84.4%), breast on the right side (64.4%). Some suffer from hypertension (13.3%) or diabetes mellitus (22.2%). The most used type of reconstruction was STSG (82.2%). A small proportion of patients experienced dehiscence (17.8%). In the Karnofsky score assessment, the highest score was 70 (64.4%), followed by 60 (17.8%), 80 (11.1%), 50 (4.4%), and 40 (2.2%). **Conclusion:** The patients undergoing MRM are dominated by the age group > 40 years, not suffering from hypertension or diabetes mellitus, stage 2, histopathology of invasive ductal carcinoma, right-sided breast. STSG dominates the choice of reconstruction with postoperative complications in the form of dehiscence in a small proportion of patients. The Karnofsky score is dominated by a score of 70.

1. Introduction

Breast cancer is a disease that is found in millions of women in the world, with an incidence rate that shows an increasing trend every year. Based on WHO, breast cancer is the most diagnosed cancer in women, with the number of new cases reaching 2.26 million cases in 2020. Breast cancer is also the main cause of death in women caused by cancer, which has a level adjusted for age. 13.6 deaths/100,000 cases.^{1,2}

The main choice of therapy for breast cancer is surgery, where in cases of invasive breast cancer, several recommended surgical options are breast-conserving surgery or mastectomy.³ Over time, more

and more patients with breast cancer are diagnosed earlier at an early stage, so the rate of breast-conserving surgery is increasing. The absence of breasts has a big impact, both on the body and the psychology of the patient, especially those who are still young. Thus, in recent years, post-mastectomy reconstruction has provided an opportunity for breast cancer patients to overcome the emotional and aesthetic burden of their malignancy.⁴

Reconstruction of the breast can be done immediately or delayed, where the timing and method of surgery used are determined based on patient preferences, physical characteristics, and risk factors.

The cosmetic outcome of breast reconstruction has been found to be superior to that of mastectomy. Several studies have shown that quality of life and psychosocial outcomes are found to be better in patients undergoing breast reconstruction.^{5,6}

Techniques of breast reconstruction include autologous tissue reconstruction and implant reconstruction, or a combination of both. Autologous tissue provides the most natural and long-lasting outcome, whereas this method provides an aesthetic alternative and avoids the drawbacks of breast implants, such as capsular contractures, risk of infection, and rupture. However, implant reconstruction provides a faster operation, reduces donor site morbidity, and shortens the duration of postoperative recovery.⁷

The use of post-mastectomy breast reconstruction surgery still shows variations in patient outcomes and outcomes, where the differences found are based on various factors that are different for each individual. Thus, this study aimed to determine the factors that influence the outcome of post-malignant breast reconstruction surgery in patients with mammary carcinoma who have undergone modified radical mastectomy surgery.

2. Methods

This research is a descriptive observational study using retrospective data collection methods. This research has received ethical clearance from the health research ethics commission (KEPK) Faculty of Medicine, Universitas Diponegoro No. 1459/EC/KEPK-RSDK/2023. Subjects in this study were patients with mammary carcinoma who had undergone modified radical mastectomy surgery at Dr. Kariadi General Hospital for the period January 2019 – April 2023. The inclusion criteria included patients with mammary carcinoma who had undergone a modified radical mastectomy at Dr. Kariadi General Hospital for the period January 2019 – April 2023 with complete medical record data, while the exclusion criteria in this study included patients with mammary carcinoma who had not undergone modified radical

mastectomy surgery. Research and data collection were carried out at Dr. Kariadi General Hospital Semarang in April – May 2023. The variables in this study include the independent variables, namely age, hypertension, diabetes mellitus, mammary carcinoma stage, mammary carcinoma histology, side of the breast, and choice of reconstruction, and the dependent variable, namely dehiscence and Karnofsky score. Data analysis in this study used the SPSS application with univariate analysis. The characteristics of the research sample obtained from the univariate analysis are presented in terms of frequency and percentage.

3. Results

This research was conducted from January to March 2023 using secondary data obtained from the medical records of Dr. Kariadi General Hospital Semarang. This research uses a total sampling method to determine the research sample. The research sample was patients with post-modified radical mastectomy mammary glands who underwent breast reconstructive surgery by the plastic surgery department at Dr. Kariadi General Hospital in the period January 2019 - March 2023. There were 45 prospective research subjects, and all of them were included in the inclusion criteria, so the number of research samples analyzed totaled 45 research samples.

Characteristics of post-MRM breast reconstruction were obtained through univariate analysis, which explained the description of each variable. In Table 4, it is known that the age distribution of the majority of patients who underwent post-MRM breast reconstruction was in the age group >40 years (71.1%). Most of the patients did not suffer from hypertension (86.7%) or diabetes mellitus (77.8%), but some of them suffered from hypertension (13.3%) or diabetes mellitus (22.2%). Most of the patients had stage 2 (44.4%) and stage 3 (40%) mammary carcinoma. On histological examination, almost all patients found invasive ductal carcinoma (84.4%).

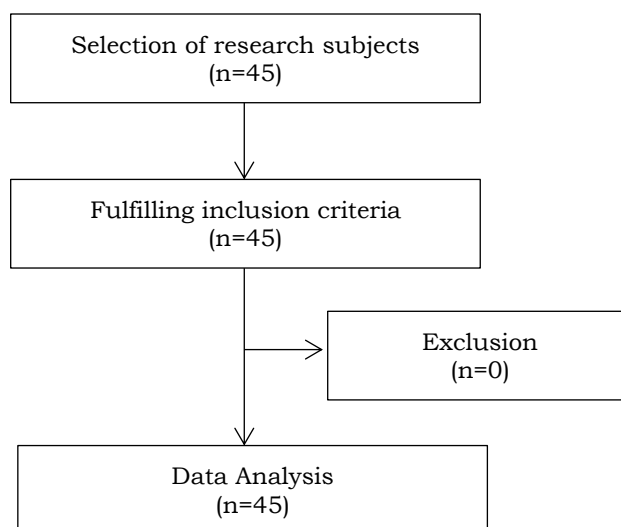


Figure 1. Consort diagram.

Table 1. Outcome characteristics of post breast reconstruction post MRM.

Variable	Total	Dehiscence	Karnofsky					
			40	50	60	70	80	
Age								
≤40 years	13 (28,9%)	2 (25%)	0 (0%)	1 (50%)	0 (0%)	7 (24,1%)	5 (100%)	
>40 years	32 (71,1%)	6 (75%)	1 (100%)	1 (50%)	8 (100%)	22 (75,9%)	0 (0%)	
Hypertension								
Yes	6 (13,3%)	4 (50%)	0 (0%)	1 (50%)	0 (0%)	5 (17,2%)	0 (0%)	
No	39 (86,7%)	4 (50%)	1 (100%)	1 (50%)	8 (100%)	24 (82,8%)	5 (100%)	
Diabetes mellitus								
Yes	10 (22,2%)	6 (75%)	0 (0%)	1 (50%)	2 (25%)	7 (24,1%)	0 (0%)	
No	35 (77,8%)	2 (25%)	1 (100%)	1 (50%)	6 (75%)	22 (75,9%)	5 (100%)	
Mammary carcinoma stage								
I	5 (11,1%)	1 (12,5%)	0 (0%)	0 (0%)	0 (0%)	2 (6,9%)	3 (60%)	
II	20 (44,4%)	3 (37,5%)	0 (0%)	0 (0%)	1 (12,5%)	17 (58,7%)	2 (40%)	
III	18 (40,0%)	4 (50%)	0 (0%)	1 (50%)	7 (87,5%)	10 (34,4%)	0 (0%)	
IV	2 (4,4%)	0 (0%)	1 (100%)	1 (50%)	0 (0%)	0 (0%)	0 (0%)	
Histology of mammary carcinoma								
Invasive ductal carcinoma	38 (84,4%)	8 (100%)	1 (100%)	1 (50%)	8 (100%)	24 (82,8%)	4 (80%)	
Phyllodes tumor	2 (4,4%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	2 (6,9%)	0 (0%)	
Other	5 (11,1%)	0 (0%)	0 (0%)	1 (50%)	0 (0%)	3 (10,3%)	1 (20%)	
Breast sides								
Dekstra	29 (64,4%)	7 (87,5%)	0 (0%)	2 (100%)	3 (37,5%)	21 (72,4%)	3 (60%)	
Sinista	16 (35,6%)	1 (12,5%)	1 (100%)	0 (0%)	5 (62,5%)	8 (27,6%)	2 (40%)	
Reconstruction options								
Stsg	37 (82,2%)	8 (100%)	1 (100%)	2 (100%)	8 (100%)	24 (82,8%)	2 (40%)	
Flap	8 (17,8%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	5 (17,2%)	3 (60%)	
Total	45 (100%)	8 (17,8%)	1 (2,2%)	2 (4,4%)	8 (17,8%)	29 (64,4%)	5(11,1%)	

In this study, most of the patients had breast carcinoma and breast reconstruction on the right side (64.4%). The most used type of reconstruction was

STSG (82.2%). In this study, post-reconstruction outcomes were assessed from dehiscence and the Karnofsky score. In this study, only a small proportion

of patients experienced dehiscence (17.8%). In the Karnofsky score assessment, the highest score was 70 (64.4%), followed by 60 (17.8%), 80 (11.1%), 50 (4.4%), and 40 (2.2%).

4. Discussion

This study involved 45 breast cancer post-modified radical mastectomy who underwent breast reconstructive surgery by the plastic surgery department of Dr. Kariadi General Hospital. The age distribution of the majority of patients undergoing post-MRM breast reconstruction was in the age group >40 years, which was 71.1%, similar to Qin et al., who stated that the average age of patients undergoing post-mastectomy breast reconstruction was 41.0±5.6 years.⁴ Most of the patients did not suffer from hypertension, namely 86.7%, and only a few patients suffering from hypertension, namely 13.3%. In a study conducted by Chang et al., the results were lower. That is, out of 230 patients, 22 patients, or 9.2%, had hypertension.⁸ Meanwhile, Morzycki et al. reported higher results, namely 15 patients, or 23%, who underwent breast reconstruction suffered from hypertension.⁹ As many as 22.2% of patients, higher than the study by Chang et al., who reported as many as 10 patients or 4.2% who underwent breast reconstruction who had diabetes mellitus.⁸ Lower results were also found in the study by Morzycki et al. In this study, there were 9 patients, namely 9% of patients who underwent breast reconstruction, suffered from diabetes mellitus.⁹

The most common description of the stage of mammary carcinoma is found in stage 2. Similar results were found in a study by Morzycki et al., where in that study, the highest incidence of stage 2 (40%) and 3 (46%) of breast cancer.⁹ Qin et al. also found that the highest percentage for the distribution of breast cancer stages was stage 2, which was 58.3%.⁴ The histological type of mammary carcinoma found in the study sample was invasive ductal carcinoma (84.4%). This type is the most common type of invasive mammary carcinoma, which refers to the malignant abnormal proliferation of neoplastic cells together with

stromal invasion, either with or without ductal carcinoma in situ.¹⁰ Chung et al. found that 79.1% of mammary carcinoma patients had invasive ductal carcinoma histological type.¹¹ Knollmann-Ritschel et al. also reported that the prevalence of invasive ductal carcinoma histological type among patients with mammary carcinoma was between 40% to 75%. The variation in reported rates occurs due to differences in the studies that have been conducted, the various risk factors that influence it, and the various patient characteristics.¹²

Breast cancer was found to be more common in the right side of the breast (64.4%) compared to the left side of the breast (35.6%). These results are different from the literature, which says that, consistently, mammary carcinoma is more likely to be diagnosed on the left side of the breast than on the right side. Although a tumor growing on the left side was found to have no impact on survival rates, it could influence the planned management of the patient. In a cohort study in the UK involving 1.25 million cancer patients, the incidence of breast cancer was significantly higher on the left side, whereas this proportion held for all races, stages of the disease, and invasive cancer.¹³ Abdou et al. found that breast cancer was more common in the left breast. There were significantly more cell proliferation gene pools on the left side, indicating an underlying biological characteristic between the 2 breast sides. The lower complete pathologic response rate in left-sided tumors suggests a complex relationship between the biology of left-sided tumors and response to therapy, apart from other clinical characteristics. Thus, breast cancer on the left side is associated with a more proliferative genomic profile, a lower response to neoadjuvant chemotherapy, and poorer long-term outcomes compared to the right side.¹⁴

The majority of patients underwent breast reconstruction surgery using the STSG method (82.2%) compared to the flap method (17.8%). This result is higher than that reported by Qin et al., where only 39.1% of patients underwent the autologous tissue reconstruction method.⁴ Skin graft (SG) is the

simplest method for closing wounds that are too large to be closed by primary intent. The advantage of this method is that it can achieve immediate coverage of the network. Meshing the tissue will also increase the surface coverage area of the wound. However, some of the disadvantages of this method are the formation of a defect at the secondary donor site, it cannot be performed when there is exposed bone and tendons, so blocking the adhesions requires repeated procedures and dermal replacement, and more time is required for healing.¹⁵ Unlike SG, the flap method involves the use of tissue along with its blood supply which is still connected to skin tissue and has many variations. Park et al. evaluated the outcomes of 3 types of local skin flaps used in post-mastectomy patient reconstruction, namely bilateral advancement (BA), thoracoabdominal (TA), and thoracoepigastric (TE) flaps, and reported that these three flap methods could be used for cancer surgery. Breast forming a large postoperative thoracic wall defect.¹⁶

A total of 17.8% of patients were found to have dehiscence in the wound after breast reconstruction surgery, similar to Nahabedian, who showed dehiscence in 10-15% of patients with breast cancer who underwent staged breast reconstruction. Dehiscence is one of the early wound complications reported after mastectomy. The main causes of surgical wound dehiscence are local infection, surgical technique, excessive stress on the edges of the wound, and low perfusion in the area.¹⁷ Kiziltan et al. reported a slightly higher rate of dehiscence in 23.4% of patients. In addition, researchers also found that age and hypertension are risk factors for dehiscence. Older age can inhibit wound healing, whereas hypertension has been associated with a negative impact on healing.¹⁸

The majority of patients had a Karnofsky Score of 70 and 80, and none had a score below 40. These results indicate that the majority of post-mastectomy reconstructive surgery patients have relatively good performance and function. Research by Larasati et al. reported that the majority of post-mastectomy breast cancer patients (91.3%) had mild impairment of

function in carrying out daily activities based on the Karnofsky score, which was associated with a better quality of life compared to patients who had a Karnofsky score which lower. Symptoms and complaints experienced by patients greatly affect the Karnofsky score, where each patient has various levels of interference experienced in carrying out daily activities due to their malignancy.¹⁹ Aryanti et al. also reported a similar matter, in which the study examined pre-therapy risk factors that could predict survival rates in patients with breast cancer in Indonesia. The study shows that a Karnofsky score below 70 is associated with a greater risk of mortality.²⁰

5. Conclusion

The characteristics of patients undergoing post-malignant breast reconstruction in patients with postoperative mammary carcinoma MRM are dominated by the age group > 40 years, not suffering from hypertension or diabetes mellitus, stage 2, invasive ductal carcinoma histopathology, and right side breast. The choice of reconstruction is dominated by STSG with postoperative complications in the form of dehiscence in a small proportion of patients. The Karnofsky score is dominated by a score of 70.

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