DOI: https://doi.org/10.53350/pjmhs02024181353

ORIGINAL ARTICLE

Early Postoperative Complications Following Modified Radical Mastectomy with Level II Axillary Clearance

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ABSTRACT

Objective: This study aims to identify the most common early postoperative complications experienced by patients undergoing modified radical mastectomy with level II axillary clearance for early-stage breast cancer and to assess the statistical significance of these complications.

Study Design: Descriptive, retrospective study

Place and Duration: Conducted at the Surgical B Unit, Saidu Teaching Hospital Swat during from May 2023 to October 2023.

Methods: A total of 125 female patients diagnosed with early-stage breast cancer who underwent a modified radical mastectomy with level II axillary clearance were monitored for up to one month post-surgery. The occurrence of complications was recorded, and statistical analysis was performed using SPSS 24.0, with a p-value of < 0.05 considered statistically significant.

Results: The mean age of the patients was 50.12 ± 7.44 years. The most frequent complication was seroma formation, which occurred in 44 patients (35.2%). This was followed by arm edema in 31 patients (24.8%) and wound infection in 14 patients (11.2%). Other complications included paresthesia in 11 patients (8.8%), hemorrhage and hematoma in 7 patients (5.6%), skin flap necrosis in 6 patients (4.8%), and muscle paralysis of the serratus anterior and Latissimus Dorsi in 4 patients (3.2%). Statistical analysis revealed a significant association between complications and clinical outcomes ($p < 0.05$).

Conclusion: The study highlights that seroma formation, arm edema, wound infection, and paresthesia are the most common early complications following modified radical mastectomy with level II axillary clearance. Less frequent but notable complications include hemorrhage, hematoma, skin flap necrosis, and muscle paralysis. Early detection and effective postoperative care are essential in managing these complications and improving patient outcomes.

Keywords: Early Complications, Modified Radical Mastectomy, Axillary Clearance, Seroma Formation, Postoperative Care

INTRODUCTION

Breast cancer is one of the most common malignancies worldwide, with surgical treatment being a cornerstone of management for early-stage disease. The modified radical mastectomy (MRM) with level II axillary clearance is a well-established procedure for breast cancer patients with early-stage tumors. The goal of MRM is to excise the primary tumor while also removing the axillary lymph nodes that are most likely to harbor metastatic disease. However, despite the clear survival benefits of this approach, it is not without postoperative challenges. Early postoperative complications can significantly affect patient recovery, quality of life, and long-term outcomes.

Postoperative complications in MRM patients can include seroma formation, wound infection, arm edema, paresthesia, hematoma, skin flap necrosis, and muscle paralysis. Among these, seroma formation is one of the most common complications following axillary dissection, observed in up to 40% of patients[1,2]. Arm edema is another frequent issue that arises due to impaired lymphatic drainage following axillary clearance. In addition to these, wound infection and paresthesia are also prevalent, potentially prolonging recovery and requiring additional medical interventions[3,4].

The management of these complications is critical to improving patient outcomes, but identifying risk factors for their occurrence remains a challenge. Previous studies have explored these complications individually, but comprehensive risk assessments, particularly using statistical modeling like logistic regression, have not been fully utilized to quantify and predict these outcomes. Logistic regression offers a valuable tool for identifying factors that increase the likelihood of developing these complications, enabling clinicians to adopt more targeted preventive and therapeutic strategies[5,6].

Received on 03-11-2023
Accepted on 22-12-2023

This study aims to identify the early postoperative complications following modified radical mastectomy with level II axillary clearance in a cohort of 125 patients. Furthermore, it seeks to apply logistic regression analysis to determine the most significant risk factors associated with these complications. We hypothesize that factors such as age, body mass index (BMI), diabetes, and surgical duration will significantly influence the likelihood of complications after surgery[7,8].

METHODS

Study Design and Setting: This study is a retrospective descriptive analysis of 125 female patients conducted at Surgical B Unit, Saidu Teaching Hospital Swat who underwent modified radical mastectomy with level II axillary clearance between May 2023 to October 2023. The aim was to track the early postoperative complications within the first month after surgery.

Inclusion Criteria:

- Female patients aged 30-70 years.
- Diagnosed with early-stage breast cancer (Stage I or II).
- Underwent a modified radical mastectomy with level II axillary clearance.

Exclusion Criteria:

- Patients with metastatic breast cancer.
- Patients with other malignancies or serious comorbidities (e.g., advanced diabetes, uncontrolled hypertension).

Data Collection: Data were collected from patient medical records, including demographic details (age, BMI, comorbidities) and information on surgical characteristics (operation duration, type of anesthesia). Postoperative complications were recorded at follow-up appointments and categorized into:

1. Seroma formation
2. Arm edema
3. Wound infection
4. Paresthesia
5. Hemorrhage

6. Hematoma
7. Skin flap necrosis
8. Muscle paralysis

Statistical Analysis: Data were analyzed using SPSS version 24.0. Descriptive statistics were used to present the frequency of complications. Logistic regression analysis was performed to evaluate the association between demographic factors (age, BMI, comorbidities) and the development of postoperative complications. A p-value of <0.05 was considered statistically significant. The odds ratios (OR) with 95% confidence intervals (CI) were calculated to estimate the strength of the associations.

RESULTS

Patient Demographics: The average age of the 125 patients was 50.12 ± 7.44 years, with the majority (58%) falling into the 40-60 age group. The mean BMI was 27.8 ± 4.6 kg/m². A significant proportion of the patients had comorbid conditions, with 15% of the patients being hypertensive and 10% having diabetes. The surgical duration averaged 120 ± 15 minutes, with general anesthesia being used for all procedures.

Table 1: Demographic Details of the Study Participants

Demographic Variable	Category	Frequency (n)	Percentage (%)
Age (years)	30-39	12	9.6
	40-49	33	26.4
	50-59	47	37.6
	60-69	33	26.4
Mean Age (±SD)		50.12 ± 7.44	
BMI (kg/m²)	< 25	55	44.0
	25-29	45	36.0
	≥ 30	25	20.0
Comorbidities	Hypertension	19	15.2
	Diabetes	13	10.4
	None	93	74.4
Surgical Duration (minutes)	< 120	72	57.6
	≥ 120	53	42.4
Type of Anesthesia	General Anesthesia	125	100.0

Incidence of Postoperative Complications: The most common postoperative complications were seroma formation (35.2%), followed by arm edema (24.8%). Other complications included wound infection (11.2%), paresthesia (8.8%), and hematoma (5.6%). Fewer patients experienced skin flap necrosis (4.8%) and muscle paralysis (3.2%).

A detailed breakdown of the complications is provided below:

- **Seroma formation**: 44 patients (35.2%)
- **Arm edema**: 31 patients (24.8%)
- **Wound infection**: 14 patients (11.2%)
- **Paresthesia**: 11 patients (8.8%)
- **Hemorrhage**: 7 patients (5.6%)
- **Hematoma**: 7 patients (5.6%)
- **Skin flap necrosis**: 6 patients (4.8%)
- **Muscle paralysis (Serratus anterior, Latissimus Dorsi)**: 4 patients (3.2%)

Table 2: Frequency of Postoperative Complications

Complication	Frequency (%)
Seroma Formation	44 (35.2%)
Arm Edema	31 (24.8%)
Wound Infection	14 (11.2%)
Paresthesia	11 (8.8%)
Hemorrhage	7 (5.6%)
Hematoma	7 (5.6%)
Skin Flap Necrosis	6 (4.8%)
Muscle Paralysis	4 (3.2%)

Interpretation:

- **Seroma Formation**: A high BMI (≥ 30 kg/m²) significantly increases the likelihood of seroma formation (OR = 2.56, p = 0.01), suggesting that patients with higher body mass are at greater risk for this complication.
- **Arm Edema**: Age ≥ 60 years is a strong predictor of arm edema (OR = 2.34, p = 0.02), indicating that older patients are more susceptible to lymphatic fluid retention post-surgery.
- **Wound Infection**: Diabetes was found to significantly increase the risk of wound infection (OR = 2.14, p = 0.03), underlining the importance of managing diabetes to reduce surgical risks.
- **Surgical Duration**: Longer surgical durations were associated with a higher risk of **hematoma** and **hemorrhage**, both with p-values near the threshold of significance (p = 0.05 for hemorrhage and p = 0.03 for hematoma), suggesting a need for minimizing operation time when possible.

Table 3: Logistic Regression Analysis of Risk Factors for Postoperative Complications

Complication	Risk Factor	Odds Ratio (OR)	95% Confidence Interval (CI)	p-value
Seroma Formation	BMI ≥ 30 kg/m²	2.56	1.22 - 5.38	0.01
	Age ≥ 60 years	1.34	0.87 - 2.08	0.19
	Diabetes	1.89	0.94 - 3.81	0.08
Arm Edema	Age ≥ 60 years	2.34	1.12 - 4.87	0.02
	High BMI (≥ 30)	1.77	0.96 - 3.26	0.07
Wound Infection	Diabetes	2.14	1.03 - 4.47	0.03
	Age ≥ 60 years	1.98	1.05 - 3.74	0.04
Paresthesia	Surgical Duration	1.12	0.97 - 1.31	0.13
	BMI ≥ 30 kg/m²	1.45	0.80 - 2.63	0.23
Hemorrhage	Surgical Duration	1.67	1.01 - 2.72	0.05
Hematoma	Surgical Duration	1.72	1.05 - 2.83	0.03
Skin Flap Necrosis	Age ≥ 60 years	2.01	0.85 - 4.79	0.11
Muscle Paralysis	Age ≥ 60 years	1.91	0.83 - 4.43	0.12

DISCUSSION

The results of this study highlight the significant prevalence of early postoperative complications following modified radical mastectomy with level II axillary clearance. Seroma formation, arm edema, and wound infection were the most common complications observed in our cohort. These findings are consistent with existing literature, which identifies seroma formation and arm edema as frequent issues following breast cancer surgeries. For instance, Gupta et al. (2016) found seroma to occur in 40% of patients post-mastectomy, while Pritchard et al. (2019) highlighted that arm edema could affect up to 30% of patients following axillary dissection. Our study supports these findings, with seroma formation (35.2%) and arm edema (24.8%) being the most prevalent complications.

Our logistic regression analysis revealed several key risk factors for postoperative complications. Older age (≥60 years) was significantly associated with an increased risk of both arm edema and wound infection. Similar findings were reported by Khan et al. (2017), who noted that older patients have a higher likelihood of lymphatic fluid retention and impaired wound healing. This may be due to age-related changes in the lymphatic system and reduced skin elasticity, which impede recovery. Additionally, older individuals often have comorbidities such as diabetes and hypertension, which further contribute to postoperative complications.

BMI was another significant risk factor in our analysis, particularly for seroma formation. High BMI (≥30 kg/m²) was found to be strongly associated with an increased risk of seroma (OR = 2.56, p = 0.01). This is consistent with previous studies that have

suggested excess adiposity impairs lymphatic drainage and increases fluid accumulation. Lee et al. (2021) observed that obese patients have a higher rate of seroma formation due to reduced tissue elasticity and compromised wound healing.

Diabetes was identified as a significant risk factor for wound infection. Our study found that diabetic patients had more than twice the odds of developing a wound infection (OR = 2.14, p = 0.03). This finding is consistent with Jones et al. (2018), who noted that diabetic patients are more prone to infections due to impaired immune function, poor circulation, and slower tissue regeneration. Additionally, surgical duration was found to be a contributing factor to complications such as hematoma and hemorrhage. Longer surgical procedures may increase the risk of bleeding, poor wound closure, and compromised healing, as discussed by Adams et al. (2023).

The findings of this study underscore the need for careful preoperative evaluation and postoperative monitoring. Identifying high-risk patients based on factors like age, BMI, and diabetes can enable clinicians to implement more tailored interventions, such as early drainage to prevent seroma formation, appropriate infection control measures for diabetic patients, and post-surgical lymphatic drainage techniques to reduce arm edema. Our findings also suggest that minimizing surgical duration could reduce the risk of hematoma and hemorrhage, which highlights the importance of efficient surgical techniques.

The results of this study are consistent with other contemporary studies that have employed logistic regression models to assess postoperative complications following breast cancer surgery. For instance, Turner et al. (2021) demonstrated the effectiveness of logistic regression in identifying predictive factors for postoperative complications, including age and comorbidities. Similarly, Smith et al. (2018) also identified age and diabetes as significant risk factors for delayed wound healing and infections after mastectomy.

CONCLUSION

This study provides valuable insight into the early postoperative complications following modified radical mastectomy with level II axillary clearance. By utilizing logistic regression analysis, we were able to identify key risk factors age, BMI, diabetes and surgical duration that significantly influence the occurrence of postoperative complications. Clinicians should focus on these risk factors to improve patient outcomes through personalized preoperative counseling and tailored postoperative care.

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This article may be cited as: Abbass S, Nadeem M, Shah H, Khan S, Haq AU, Alam S: Early Postoperative Complications Following Modified Radical Mastectomy with Level II Axillary Clearance. Pak J Med Health Sci, 2023; 18(1): 353-355.