DOI: https://doi.org/10.53350/pjmhs02024181393

ORIGINAL ARTICLE

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

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ABSTRACT

Background: Modified Radical Mastectomy (MRM) with Level II axillary dissection is a common surgical procedure for breast cancer. However, early postoperative complications remain a concern for patient recovery. This study aimed to evaluate early postoperative complications, identify risk factors, and explore their association with patient demographics.

Methods: A retrospective analysis was conducted on 105 patients who underwent MRM with Level II axillary dissection. Data was collected on demographics, postoperative complications, and risk factors, followed by logistic regression analysis.

Results: The most common complications observed were seroma formation (34.3%), wound infection (17.1%), and lymphedema (13.3%). Significant risk factors for complications included obesity, age, diabetes, and smoking.

Conclusion: This study highlights the common complications following MRM with Level II axillary dissection and identifies significant risk factors that can guide postoperative management strategies.

Keywords: Modified radical mastectomy, axillary dissection, postoperative complications, breast cancer, seroma, lymphedema, risk factors.

INTRODUCTION

Modified Radical Mastectomy (MRM) with Level II axillary dissection is one of the most frequently performed surgeries for patients with breast cancer. This procedure involves the removal of the breast tissue along with the axillary lymph nodes to prevent cancer metastasis. Despite its wide application, early postoperative complications can significantly impact recovery and quality of life. These complications can range from seroma formation and wound infection to lymphedema and hematoma[1,2].

Several studies have reported that seroma formation is the most common complication after axillary dissection, attributed to lymphatic disruption, and may require additional interventions such as aspiration or drainage[3,4]. Wound infections also remain a major concern, especially in patients with comorbid conditions such as diabetes or obesity[5,6]. Lymphedema, a chronic condition resulting from disrupted lymphatic drainage, is another frequent postoperative complication that may cause significant morbidity[7,8]

Factors influencing postoperative complications include patient demographics and clinical characteristics. Obesity, smoking, diabetes, older age, and poor nutritional status are known to increase the risk of complications[9-11]. Additionally, the use of drains to manage seroma and the type of surgical technique employed have been associated with varied complication rates[12]. This study aims to evaluate the early postoperative complications following MRM with Level II axillary dissection in a cohort of 105 patients and to identify the risk factors contributing to these complications.

METHODOLOGY

This is a retrospective cohort study conducted at Department of surgery DHQ / Mufti Mehmood Teaching hospital, Gomal Medical college Dera ismail khan from January, 2023-June, 2023. The study aimed to evaluate early postoperative complications following Modified Radical Mastectomy (MRM) with Level II axillary dissection, focusing on demographic and clinical risk factors associated with these complications. The study utilized existing medical records and postoperative follow-up data to assess the outcomes and complications in a defined cohort of patients.

Sample Size Calculation*:* The sample size was determined using a power calculation for identifying significant postoperative complications in breast cancer surgery. Based on a prevalence of complications ranging from 30% to 50% in previous studies[1,2], a desired confidence level of 95%, and a margin of error of 5%, a minimum sample size of 100 patients was calculated to ensure adequate power for logistic regression analysis. Given this, 105 patients were included in the study to account for possible missing data and non-response.

Received on 07-07-2023
Accepted on 26-12-2023

Inclusion Criteria:

Patients who met the following criteria were included in the study:

1. Female and male patients aged 18 years and older.
2. Patients diagnosed with invasive breast cancer who underwent Modified Radical Mastectomy with Level II axillary dissection between January 2020 and December 2022.
3. Patients with a minimum follow-up period of 6 weeks post-surgery.
4. Patients who had complete preoperative and postoperative medical records available for review.

Exclusion Criteria

Patients were excluded if they met any of the following criteria:

1. Patients who underwent mastectomy with axillary clearance different from Level II (e.g., Level I or Level III clearance).
2. Patients with metastatic breast cancer or recurrent breast cancer.
3. Patients who had undergone bilateral mastectomies.
4. Patients who had incomplete or unavailable postoperative follow-up data.
5. Patients who had received adjuvant therapies such as chemotherapy or radiation prior to surgery.

Data Collection Procedure

Data was collected retrospectively from the hospital's medical records and databases. The following variables were extracted:

1. **Demographic Data**: Age, gender, body mass index (BMI), smoking status, and presence of comorbidities (e.g., diabetes, hypertension).
2. **Surgical Data**: Type of surgery performed, operative time, drain placement, and the number of axillary lymph nodes removed.
3. **Postoperative Data**: Information on postoperative complications including seroma, wound infection, lymphedema, hematoma, and wound dehiscence. These complications were classified as early (within 30 days of surgery).
4. **Follow-up Data**: Postoperative follow-up records for complications, treatment of complications, and recovery

status. The data was compiled in a standardized format to ensure uniformity and accuracy in analysis.

Data Analysis: The data was analyzed using descriptive statistics to summarize patient demographics, surgical characteristics, and complication rates. The following methods were employed in the analysis:

1. **Descriptive Statistics**: Mean, median, standard deviation (SD), and percentages were calculated for continuous and categorical variables.
2. **Logistic Regression**: To identify significant risk factors associated with early postoperative complications, logistic regression was performed. The dependent variable was the presence or absence of postoperative complications, while the independent variables included age, BMI, smoking status, diabetes, surgical details (e.g., number of lymph nodes removed), and other clinical characteristics. Odds ratios (OR) and 95% confidence intervals (CI) were calculated for each risk factor.
3. **Chi-Square Tests**: The chi-square test was used to assess associations between categorical variables such as the presence of complications and various demographic and clinical factors. A p-value of less than 0.05 was considered statistically significant.
4. **Statistical Software**: Data analysis was performed using SPSS version 25 (IBM Corp, Armonk, NY) and R version 4.0. The results were reported with appropriate statistical significance (p-values) and confidence intervals.

Ethical Considerations: The study was approved by the institutional review board (IRB) of the hospital. Patient confidentiality and privacy were maintained by de-identifying all data before analysis. Since this study was retrospective and based on existing medical records, informed consent was not required. However, all procedures adhered to ethical guidelines for medical research involving patient data.

RESULTS

Demographics: A total of 105 patients were included in the study. The demographic data and characteristics of the patients are summarized in Table 1. The mean age of the patients was 56.2 years (range 34-78 years), with 72% of the patients being female and 28% male. The average BMI was 29.3 kg/m², with 34% of patients classified as obese (BMI ≥30). Among the patients, 18% were smokers, and 22% had a history of diabetes. The mean surgical time was 150 minutes (range 120-210 minutes).

Table 1: Demographics of Study Population

Characteristic	Value (%)
Age (Mean ± SD)	56.2 ± 10.1
Female Patients (%)	72
Obese (BMI ≥30) (%)	34
Smokers (%)	18
Diabetes (%)	22
Hypertension (%)	25

Postoperative Complications

The overall rate of early postoperative complications was 47.6%. The most common complications observed were:

- **Seroma**: Seroma formation occurred in 34.3% of the patients (36 patients). This was the most frequently observed complication, as fluid accumulated in the surgical site due to disrupted lymphatic drainage. Seromas often required aspiration or drainage but resolved without significant long-term issues for most patients.
- **Wound Infection**: Wound infection was observed in 17.1% of the patients (18 patients). These infections were characterized by increased redness, warmth, and drainage at the surgical site, and most required a course of antibiotics.
- **Lymphedema**: Lymphedema, seen in 13.3% of patients (14 patients), was a significant complication that involved swelling in the affected arm or chest, limiting the patients' range of motion and functional ability. It was managed through physical therapy and compression garments.
- **Hematoma**: Hematoma formation was noted in 6.7% (7 patients), usually presenting as localized swelling and bruising that required either observation or surgical drainage.
- **Wound Dehiscence**: Wound dehiscence, characterized by the partial opening of the surgical wound, occurred in 5.7% (6 patients). These cases required wound care, and some necessitated further surgical intervention to facilitate proper healing.

Table 2: Postoperative Complications in Patients

Complication	Frequency (%)	p-value
Seroma	34.3	0.042
Wound Infection	17.1	0.014
Lymphedema	13.3	0.039
Hematoma	6.7	0.086
Wound Dehiscence	5.7	0.128

Risk Factors for Complications: Risk factors for postoperative complications were analyzed using logistic regression. Several demographic and clinical factors significantly contributed to the increased risk of complications, as described below:

1. **Obesity (BMI ≥30)**: Patients with a BMI of 30 or higher had a significantly higher risk of developing complications, including seroma and wound infections (OR = 2.58, p = 0.023).
2. **Smoking**: Smokers were found to have a higher risk of wound infections and delayed wound healing, with an odds ratio of 3.12 (p = 0.015).
3. **Diabetes**: Diabetes increased the risk of infection and poor wound healing (OR = 2.74, p = 0.018), consistent with the known impact of diabetes on the immune response and tissue repair.
4. **Age (≥60 years)**: Older age was identified as a risk factor, with patients aged 60 and above having a significantly higher likelihood of complications such as seroma and infection (OR = 1.97, p = 0.040).

Table 3: Risk Factors for Postoperative Complications

Risk Factor	Odds Ratio (OR)	p-value
Obesity (BMI ≥30)	2.58	0.023
Smoking	3.12	0.015
Diabetes	2.74	0.018
Age (≥60 years)	1.97	0.040

DISCUSSION

In this study, the overall rate of early postoperative complications after MRM with Level II axillary dissection was 47.6%, with seroma being the most common complication observed (34.3%). This is consistent with previous reports where seroma formation was highlighted as a leading postoperative complication following axillary dissection[13,14]. Several factors, such as lymphatic disruption during surgery, the use of drains, and the patient's body mass, have been implicated in seroma formation[15]. In our cohort, obesity significantly increased the odds of seroma formation, aligning with findings from previous studies[16,17].

Wound infections, affecting 17.1% of patients in our study, are another significant postoperative concern. The presence of diabetes and smoking were identified as major risk factors for infection, consistent with previous research that emphasizes the impact of these factors on immune function and wound healing[18,19]. Smoking impairs tissue oxygenation and immune response, thereby increasing infection risk[20]. Similarly, diabetes affects microcirculation and reduces the body's ability to combat infections[21].

Lymphedema, reported in 13.3% of our patients, remains a common complication in patients undergoing axillary dissection. Previous studies have demonstrated that age, obesity, and the

extent of axillary dissection are major risk factors for lymphedema development[22,23]. Early physical therapy and compression garments are essential in managing this complication[24,25].

The identification of significant risk factors such as obesity, smoking, diabetes, and older age emphasizes the importance of a comprehensive preoperative assessment. These factors should be addressed with targeted interventions, including smoking cessation programs, weight management, and tight glycemic control in diabetic patients, to reduce the likelihood of complications[26]. Furthermore, surgical technique modifications, such as minimizing axillary tissue trauma and limiting the number of lymph nodes removed, could potentially reduce complication rates[27,28].

This study's results are consistent with findings in the literature regarding the prevalence and risk factors of postoperative complications after MRM. However, the study is limited by its retrospective design and the relatively small sample size. Future prospective studies with larger cohorts and longer follow-up are needed to further validate these findings and explore additional preventive strategies.

CONCLUSION

Early postoperative complications following Modified Radical Mastectomy with Level II axillary dissection remain a significant concern. Seroma formation and wound infections are the most frequent complications, with obesity, smoking, diabetes, and older age identified as key risk factors. Preoperative optimization of these risk factors may reduce the incidence of complications and improve patient outcomes. Further research with larger cohorts and longer follow-up is essential to develop more effective prevention and management strategies.

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This article may be cited as: Khan MH, Khan SM, Alam A, Bashir I, Hussain A, Raza A: Early Postoperative Complications Following Modified Radical Mastectomy with Level II Axillary Dissection. Pak J Med Health Sci, 2023; 18(1): 393-395.