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INCIDENCE, CLINICAL PRESENTATION, AND PATHOLOGY OF BREAST CANCER: A COMBINED RETROSPECTIVE AND PROSPECTIVE STUDY

Govardhan Marutirao Gaikwad[1], Pandit L. Killarikar[1], Pratik Govardhan Gaikwad[3]

[1]*Associate Professor, Department of Surgery, Indian institute of Medical Sciences and Research, Warudi, Dist Jalna, India.*
[2]*Medical Officer, District Hospital Pune, India.*

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Corresponding Author:
Dr. Govardhan Marutirao Gaikwad, Associate Professor, Department of surgery, Indian institute of medical sciences and research.Warudi Dist Jalna, India.
Email: gaikwad.gm@rediffmail.com

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ABSTRACT

Background: Modified Radical Mastectomy (MRM) remains a primary surgical intervention for breast cancer in developing countries, particularly India, due to its affordability and oncologic efficacy. Despite its widespread use, MRM is frequently associated with early postoperative complications, notably seroma formation and skin flap necrosis. This study aimed to evaluate the incidence and risk factors associated with these complications.

Materials and Methods: A prospective observational study was conducted over 18 months in the Department of General Surgery at a tertiary care center. One hundred female patients undergoing MRM for operable breast cancer were enrolled. Clinical data were recorded, including age, BMI, tumor location, and comorbidities. Surgical technique, drain management, and type of dissection tool (electrocautery vs scalpel) were documented. Patients were monitored postoperatively for complications such as seroma, flap necrosis, and surgical site infections.

Results: The mean patient age was 52.3 years, with 42% aged between 51–60 years. Seroma formation occurred in 30% of patients, flap necrosis in 14%, and surgical site infection in 6%. Seroma was significantly associated with older age, higher BMI, and use of electrocautery. Flap necrosis was more common in smokers and patients with comorbidities. Most complications were managed conservatively without reoperation. The mean hospital stay was 7.4 ± 2.1 days.

Conclusion: Seroma and flap necrosis are common postoperative complications following MRM. Identifying and modifying patient and procedure related risk factors can reduce the incidence of these complications. Optimized surgical techniques and careful patient selection are essential to improve outcomes in breast cancer surgery.

Keywords: Breast cancer, Modified Radical Mastectomy, Seroma, Flap necrosis, Postoperative complications.

INTRODUCTION

Breast cancer remains one of the most prevalent malignancies affecting women globally, with its incidence steadily rising in both developed and developing countries. In India, breast cancer has surpassed cervical cancer as the most common cancer among women, reflecting a shift in disease burden that poses significant public health challenges.[1] Despite advancements in early detection and adjuvant therapies, surgical intervention continues to be the cornerstone of treatment for operable breast carcinoma.

Modified Radical Mastectomy (MRM) is widely practiced in India and other low to middle income countries due to its affordability, oncological safety, and applicability in late presentations.[2] However, the procedure is frequently associated with postoperative complications, including seroma formation, flap necrosis, hematoma, infection, and delayed wound healing.[3,4] Among these, seroma formation and skin flap necrosis are particularly prevalent and can adversely affect patient recovery, delay adjuvant therapies, and increase the risk of infection.[5-7]

Several studies have sought to identify the etiopathogenesis and predictive factors for these complications. Seroma, defined as the accumulation of serous fluid at the surgical site, is reported to occur in up to 85% of patients undergoing mastectomy depending on the surgical technique and patient profile.[5,8,9] Flap necrosis, particularly in thin or poorly perfused skin flaps, remains a critical concern in breast oncologic surgery, with incidence ranging from 10% to 30% in certain cohorts.[3,7,10] Contributing factors include older age, high body mass index (BMI), hypertension, extensive axillary dissection, and smoking.[5,6,11,12]

Efforts to reduce complication rates have included modifications in surgical technique, drain management, flap fixation, and the use of energy devices such as harmonic scalpels.[13,14] Nonetheless, the variability in reported outcomes underscores the need for context specific data to inform clinical practice. Indian studies on complication rates after MRM remain limited in number and scope, with variable methodology and regional heterogeneity.[2,6,13]

This study aims to evaluate the incidence and pattern of early postoperative complications following MRM in a tertiary care center, with particular attention to seroma formation and flap necrosis. We also assess patient and surgery related risk factors that may predict these outcomes. The findings are expected to contribute to improved surgical planning, risk stratification, and patient counseling in breast cancer care.

MATERIALS AND METHODS

This prospective observational study was conducted in the Department of General Surgery at a tertiary care hospital over a duration of 18 months.The study included all consenting female patients aged 30–75 years diagnosed with operable breast carcinoma who underwent Modified Radical Mastectomy (MRM) as a definitive surgical intervention.

Exclusion criteria comprised patients undergoing neoadjuvant chemotherapy, those with locally advanced or metastatic disease, patients unfit for surgery due to comorbid conditions, and individuals lost to follow-up during the postoperative period.

The surgical technique followed standard protocols described in surgical oncology literature.[16,17] Patients were placed in a supine position with the ipsilateral arm abducted to 90 degrees. Under general anesthesia, an elliptical incision was made, and flaps were raised in the plane of the superficial fascia. Hemostasis was meticulously achieved throughout the procedure. Axillary dissection was performed up to level II in all patients. After mastectomy and axillary clearance, two closed suction drains were placed, one in the axilla and one beneath the mastectomy flaps.

In the majority of cases, electrocautery was used for tissue dissection; however, a subset of patients underwent scalpel dissection, permitting comparative evaluation of postoperative outcomes including seroma formation and flap necrosis.[16] The flap edges were approximated with interrupted sutures, and the drains were secured. Flap fixation sutures were not employed in this study. Skin closure was done using non-absorbable sutures in two layers.

Drain output was monitored daily, and removal was performed when output was consistently less than 30 ml over 24 hours. The total amount of drainage, duration of drain placement, and time to complete wound healing were recorded. Seroma formation was defined as clinically evident fluid collection after drain removal, confirmed by aspiration. Flap necrosis was noted based on visual evidence of skin discoloration, blistering, or eschar formation.

Seroma prevention measures adhered to recommendations from prior systematic reviews on axillary dissection and postoperative management.[15] The decision to use electrocautery or scalpel technique was at the discretion of the operating surgeon, consistent with comparative evidence from regional trials.[16] Foundational surgical principles and procedural details aligned with accepted standards as outlined in authoritative surgical texts.[17-19]

RESULTS

A total of 100 patients underwent Modified Radical Mastectomy (MRM) over the study period. The age of patients ranged from 30 to 75 years, with a mean age of 52.3 years. The majority of the patients (42%) were in the 51 to 60 years of age group. The most common presenting complaint was a painless breast lump, and the upper outer quadrant was the most frequent tumor location (56%).

Table 1: Patient Demographics and Tumor Characteristics (n = 100)

Variable	Frequency (%)
Age group (years)	
30–40	18 (18%)
41–50	22 (22%)
51–60	42 (42%)
61–75	18 (18%)
Tumor location	
Upper outer quadrant	56 (56%)
Upper inner quadrant	18 (18%)
Lower outer quadrant	14 (14%)
Central/Retroareolar	12 (12%)

Postoperative complications were observed in 48% of the patients. Seroma formation was the most common complication, seen in 30% of cases, followed by flap necrosis in 14% and surgical site infection (SSI) in 6%.

Table 2: Postoperative Complications Following MRM

Complication	Incidence (%)	Predisposing Factors
Seroma	30 (30%)	Age > 50, BMI > 25, electrocautery use
Flap necrosis	14 (14%)	Smoking, comorbidities
Surgical site infection (SSI)	6 (6%)	Comorbidities, poor hygiene
Drain retention > 10 days	12 (12%)	Seroma formation, flap edge ooze
Reoperation	0	—

Seroma was more frequently seen in patients aged over 50 years, those with a BMI >25, and in patients where electrocautery was the primary dissection tool. Flap necrosis occurred more commonly in smokers and those with comorbidities such as diabetes and hypertension.

The mean duration of hospital stay was 7.4 ± 2.1 days. The average drain removal time was 7.8 ± 1.9 days. Most complications were managed conservatively, and none of the patients required reoperation.

DISCUSSION

Modified Radical Mastectomy (MRM) remains the predominant surgical treatment for operable breast cancer in many developing countries due to its oncologic safety, cost-effectiveness, and accessibility.[1] In this study, we examined the early postoperative complications associated with MRM, with a particular focus on seroma formation and flap necrosis, two complications that significantly impact patient recovery, prolong hospital stay, and delay adjuvant therapies.

Our observed seroma incidence aligns with previous findings by Pogson et al., who reported seroma as the most common complication following breast surgery.[3] The pathogenesis involves lymphatic leakage and dead space under the flaps, especially in obese patients or when excessive electrocautery is used.[4,5] In our cohort, seroma was significantly more frequent in patients with higher BMI and large tumor size, confirming earlier reports on these risk factors.[6,7]

Flap necrosis, noted in a notable subset of our patients, was predominantly superficial and managed conservatively. The correlation between necrosis and flap thickness, smoking, and comorbidities has been well documented.[8,9] Our findings reinforce the importance of meticulous flap dissection and preservation of subdermal plexus during surgery.[10] Optical perfusion assessment tools, though not used in this study, have shown promise in predicting necrosis risk intraoperatively.[18]

The choice of dissection tool also impacted postoperative outcomes. A higher seroma rate was associated with electrocautery compared to scalpel dissection, in agreement with studies such as those by Yaseen et al., who demonstrated reduced seroma with scalpel use.[16] However, electrocautery offers benefits such as reduced blood loss and operative time, making it a practical choice in centers with high number of patients.

Our study did not utilize flap quilting sutures or fibrin sealants, which have been proposed to reduce seroma rates in other trials.[15,16] Despite this, the incidence of clinically significant seroma in our patients remained within reported ranges, suggesting that basic surgical principles and proper drain management remain effective.

When comparing MRM to other operative approaches for breast cancer, including breast-conserving surgery, radical mastectomy, or oncoplastic approaches, our data supports the continued relevance of MRM in the Indian context. As Turner noted decades ago, MRM evolved as a compromise between efficacy and morbidity, an observation that continues to be supported by current evidence.[19]

The limitations of our study include a relatively small sample size, single institution design, and lack of long term follow-up. However, the study's prospective nature and focus on meaningful clinical endpoints strengthen the validity of our findings.

CONCLUSION

This prospective observational study highlights that seroma formation and flap necrosis remain the most common early postoperative complications following MRM. Patient factors such as age, BMI, and comorbidities, along with surgical techniques like the use of electrocautery, influence complication rates. Despite these issues, most complications were minor and manageable with conservative approaches.

This underscores the clinical value of assessing modifiable risk factors before surgery and individualizing operative strategies to improve outcomes. Further multicentric studies with larger sample sizes and longer follow-up are warranted to validate these observations and develop standardized protocols for minimizing postoperative morbidity in breast cancer surgery.

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