

## Management of Post-Bariatric Marked Breast Ptosis: A Comparative Analysis of Subcutaneous Mastectomy and No Vertical Scar Reduction Mammoplasty

Vidyapati Choudhary<sup>1</sup>, Sanjay Kumar<sup>2</sup>

<sup>1</sup>Professor, Department of Plastic Surgery, Patna Medical College and Hospital, Patna, Bihar, India

<sup>2</sup>M.Ch Plastic Surgery, Department of Plastic Surgery, Patna Medical College and Hospital, Patna, Bihar, India

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Corresponding Author: Dr. Sanjay Kumar

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### Abstract:

**Objectives:** The study aimed to assess and compare the outcomes of two surgical techniques, subcutaneous mastectomy with free Nipple-Areola Complex (NAC) grafting and no vertical scar reduction mammoplasty, in managing post-bariatric marked breast ptosis.

**Methods:** A randomized-controlled interventional study was conducted on 60 participants experiencing post-bariatric marked breast ptosis for a period of one year. Surgical interventions included the no vertical scar reduction mammoplasty technique in Group A (n=30) and subcutaneous mastectomy with free nipple and areola grafting in Group B (n=30), with pre-operative assessments, detailed surgical techniques, and a 6-month follow-up period.

**Results:** The study involved 60 participants, with Group A (n=30) having a mean age of 35.12 years, and Group B (n=30) having a slightly older mean age of 48.74 years. No significant differences were observed in BMI, weight loss range, or preoperative comorbidities between the groups. Postoperative complications varied, with Group B exhibiting significantly higher rates of prolonged hypoesthesia, hypopigmentation, and sunken Nipple-Areola Complex (NAC) compared to Group A (47%, 53%, and 0% vs. 13%, 7%, and 20%, respectively).

**Conclusion:** The study highlights comparable preoperative characteristics between the two groups, with Group B showing higher rates of certain postoperative complications, particularly prolonged hypoesthesia, hypopigmentation, and sunken Nipple-Areola Complex (NAC). These findings underscore the need for careful consideration when selecting surgical techniques for post-bariatric marked breast ptosis, weighing the trade-offs between aesthetic outcomes and potential complications.

**Recommendation:** The study recommends future research with larger cohorts and extended follow-up to validate findings in post-bariatric marked breast ptosis. Additionally, refining surgical approaches to minimize complications while preserving aesthetics is advised.

**Keywords:** Post-Bariatric Breast Ptosis, Surgical Techniques, Aesthetic Outcomes, Complications.

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### Introduction

Bariatric surgery is primarily designed to reduce excess weight and mitigate associated health issues [1]. Nevertheless, a significant drawback of this procedure is the emergence of substantial skin and soft tissue sagging, often leading to referrals to plastic surgeons [2]. In males, particularly in the thoracic region like the breasts, this can trigger psychosocial challenges due to a feminized appearance conflicting with the traditional ideal of masculinity [3].

Post considerable weight loss, addressing the male breast region becomes intricate due to factors like abnormal nipple location, skin redundancy, enlarged parenchyma/fat, and the loss of the infra-

mammary fold [4]. The nipple-areola complex holds paramount importance in the aesthetic aspect of the male chest, making visible scars undesirable, especially if extensive skin resection is necessary [5-7].

Various techniques have been implemented to tackle this multifaceted issue, often derived from female breast reduction methods. These techniques involve the removal of excess breast tissue and redundant skin, coupled with repositioning the nipple-areola complex to its normal location [8,9]. This study focuses on comparing two distinct techniques used in managing post-bariatric breast ptosis, assessing factors such as patient satisfaction,

objective aesthetic outcomes, and complication rates.

### Materials and Methods

**Study design:** This interventional study employed a randomized-controlled design and included 60 participants who expressed concerns about post-bariatric marked breast ptosis. The research was conducted within the Plastic Surgery department at PMCH, Patna in Bihar, India for 1 year.

**Inclusion and exclusion criteria:** Participants, aged between 18 and 55 years, were included if they exhibited marked breast ptosis subsequent to bariatric surgery, with a minimum of 18 months post-surgery or 6 months after achieving weight stability. Exclusion criteria encompassed individuals with uncontrolled diabetes mellitus, severe cardiac, hepatic, or renal issues. Additionally, those who declined participation and individuals still in the post-bariatric weight loss phase were not considered for the study.

**Study size:** The study included 60 patients who met the specified inclusion criteria were enrolled.

**Study setting:** Utilizing an automated system, participants were randomly allocated to two groups: Group A (30 patients) underwent the no vertical scar reduction mammoplasty technique, and Group B (30 patients) received treatment through subcutaneous mastectomy with free nipple and areola grafting.

**Pre-operative Assessment:** Before the surgical procedure, a comprehensive pre-operative evaluation took place, encompassing a detailed history, including age, body mass index (BMI), bariatric surgery date, and any associated comorbidities. Physical examinations involved assessing breast size and ptosis degree using the ASPS scale, with exclusion of suspicious breast masses. Laboratory investigations, including complete blood count (CBC), coagulation profile, renal and liver function tests, and glycated hemoglobin (HbA1C), were conducted. Additionally, breast ultrasound was performed to exclude any potential breast masses.

### Surgical Techniques

Photographs of the breast and chest wall, capturing frontal and oblique views, were taken before surgery and at the 6-month postoperative interval. In Group A, the procedure involved de-epithelialization of the inferiorly based flap, excision of breast tissue, and dissection of a superior fascio-cutaneous thoracic flap. This allowed for tissue removal and subsequent fixation to the inframammary fold, preserving the neurovascular flap carrying the Nipple-Areola Complex (NAC).

On the other hand, in Group B, a different approach was taken. NAC harvesting as a free full-thickness graft was the initial step, followed by breast tissue

resection. The procedure also included the dissection of a superior cutaneous thoracic flap, ensuring tension-free wound closure. Unlike Group A, there was no need for marking flaps or de-epithelialization areas in Group B. The flexibility of NAC harvesting allowed for individualized positioning, typically 6cm from the upper excision line along the lower border of the pectoralis major muscle.

**Operative Steps:** The surgical procedures for both groups were conducted under general anesthesia, with patients in a semi-seated position and arms abducted. Tumescence infiltration, containing diluted epinephrine (1/200,000), targeted the marked lines, breast, and de-epithelialization sites. Wound closure involved the insertion of one suction drain per breast, a three-layer approach using 0 Vicryl, 3-0 Vicryl, and 4-0 propylene sutures, followed by 2 months of wearing compressive clothing.

**Postoperative Follow-up:** The assessment period extended up to 6 months post-operation. Postoperative evaluation included both pre and postoperative photographic documentation. Additionally, an analysis of early and late post-operative complications was conducted, along with the scoring of patient satisfaction.

**Bias:** The study may exhibit selection bias as patients were assigned to treatment groups through a computerized program, potentially influencing the representativeness of the sample. Additionally, the reliance on patient-reported outcomes and the absence of blinding in the assessment could introduce measurement bias, impacting the study's internal validity.

**Ethical consideration:** The study secured approval from the research ethics committee and prioritized informed consent, ensuring confidentiality and privacy for ethical compliance.

**Statistical Analysis:** The data underwent analysis through self-paired t-Test utilizing SPSS version 26, and findings were expressed as mean  $\pm$  standard error. LSD was employed to establish significance. The significance of results was determined using the Medcalc program, with a p-value indicating non-significance when  $>0.05$  and significance when  $<0.05$ .

### Results/Outcomes

**Participants:** The study encompassed a total of 60 participants, evenly divided into Group A (n = 30) and Group B (n = 30). Group A exhibited a mean age of 35.12 years, while Group B had a slightly older mean age of 48.74 years. Body mass index (BMI) ranged from 21.2 to 35.7 in Group A and 27.1 to 38.1 in Group B, with no significant difference noted (p = 0.271). The weight loss range varied from 40 to 65 kg in Group A and 36 to 61 kg in Group B, showing no statistically significant dis-

tion (p = 0.318). The prevalence of preoperative comorbidities, such as diabetes mellitus, smoking, and cardiac diseases, demonstrated comparable distributions in both groups, without significant discrepancies (p > 0.05). Additionally, the distribution of prior bariatric surgeries, including gastric

placation, sleeve gastrectomy, and gastric bypass, varied across the groups. The time elapsed since bariatric surgery ranged from 15 to 30 months in Group A and 16 to 31 months in Group B, with no significant difference observed (p = 0.627) as shown in Table 1.

**Table 1: Characteristics of Study Participants and Bariatric Surgery Details**

| Characteristics                              | Group A (n = 30) | Group B (n = 30) | p-value |
|--|------------------|------------------|---------|
| Mean age (yrs)                               | 35.12            | 48.74            | 0.914   |
| Body mass index (range)                      | 21.2-35.7        | 27.1-38.1        | 0.271   |
| Weight loss range (kg)                       | 40 to 65         | 36 to 61         | 0.318   |
| Preoperative comorbidities                   |                  |                  |         |
| Diabetes mellitus                            | 12               | 18               | 0.423   |
| Smoking                                      | 12               | 10               | 0.491   |
| Cardiac diseases                             | 6                | 4                | 0.739   |
| Prior history of bariatric surgery           |                  |                  |         |
| Gastric placation                            | 8                | 6                |         |
| Sleeve gastrectomy                           | 18               | 20               |         |
| Gastric bypass                               | 4                | 4                |         |
| Duration since Weight Loss Procedure(months) | 15 to 30         | 16 to 31         | 0.627   |

The comparison of postoperative complications between Group A (n = 30) and Group B (n = 30) revealed no statistically significant differences in early complications, including seroma, wound dehiscence, and hematoma (p > 0.05). However, late complications such as breast asymmetry, contour irregularity, incomplete resection, and prolonged hypoesthesia displayed varying frequencies, with Group A reporting higher percentages in breast

asymmetry and contour irregularity (33 % and 27 %, respectively). Notably, prolonged hypoesthesia was significantly more prevalent in Group B (47 %). Nipple-areola complex (NAC) complications exhibited differing rates in asymmetry in position, hypopigmentation, hypoesthesia, partial and complete necrosis, and sunken NAC. Group B experienced significantly higher rates of hypopigmentation and sunken NAC (Table 2).

**Table 2: Complications Following Surgical Procedures in Groups A and B**

|                        | Group A (n = 30) | Group B (n = 30) | p-value |
|------------------------|------------------|------------------|---------|
| Early complications    |                  |                  |         |
| Seroma                 | 6 (20 %)         | 4 (13. %)        | 0.645   |
| Wound dehiscence       | 4 (13 %)         | 6 (20 %)         | 0.645   |
| Hematoma               | 2 (7 %)          | 4 (13 %)         | 0.541   |
| Late complications     |                  |                  |         |
| Breast asymmetry       | 10 (33 %)        | 2 (7 %)          | 0.068   |
| Contour irregularity   | 8 (27 %)         | 0 (0 %)          | 0.024   |
| Incomplete resection   | 8 (27 %)         | 2 (7 %)          | 0.126   |
| Prolonged hypoesthesia | 4 (13 %)         | 14 (47 %)        | 0.042   |
| NAC Complications      |                  |                  |         |
| Asymmetry in position  | 6 (20 %)         | 2 (7 %)          | 0.284   |
| Hypopigmentation       | 2 (7 %)          | 16 (53 %)        | 0.004   |
| Hypoesthesia           | 10 (33 %)        | 20 (67 %)        | 0.075   |
| Partial necrosis       | 4 (13 %)         | 10 (33 %)        | 0.214   |
| Complete necrosis      | 0 (0 %)          | 6 (20 %)         | 0.076   |
| Sunken NAC             | 6 (20 %)         | 0 (0 %)          | 0.076   |

## Discussion

Significant weight loss in males often leads to a reduction in breast size without a corresponding decrease in breast skin, posing challenges for conventional gynecomastia classification. To address this, a more practical classification is essential,

considering factors like glandular tissue, fat, and skin elasticity for effective management [9].

Following bariatric surgeries, the deformities observed in the male chest exhibit considerable variability. While various techniques have been proposed for treating gynecomastia, addressing cases

of marked breast ptosis poses significant challenges [10]. For instance, Webster's 1946 technique, relying on an intra-areolar semicircular incision, encountered a limitation in effectively eliminating excess skin in ptotic breasts, representing a drawback in its application [11].

Another technique, designed by Ibrahim, introduces a small circumareolar scar and relies on a superiorly based Nipple-Areola Complex (NAC) flap through a circumareolar incision to address excess skin and submammary tissue. However, despite leaving a discreet scar, this technique falls short in restoring pectoral projection [12].

Over the years, several suggestions have emerged to address ptotic skin, including concentric circle or circumareolar reduction. However, a recurring challenge for such techniques has been the development of corrugated scars around the NAC [13-15]. In this study, we opted for the utilization of two distinct techniques, each sharing commonalities in scar location, quantity, and visibility. The objective was to scrutinize their impact on both early and late outcomes, as well as discern patient satisfaction. A cohort of 60 patients grappling with post-bariatric marked breast ptosis underwent these procedures, with 30 individuals subjected to the no vertical scar reduction mammoplasty technique and an equal number undergoing subcutaneous mastectomy with free Nipple-Areola Complex (NAC) grafting. The outcomes of the study shed light on the efficacy of the no vertical scar reduction mammoplasty technique. This method proved advantageous, facilitating substantial resection of mammary gland tissue and excess skin, all while safeguarding NAC sensation and color. Despite these merits, a significant drawback was identified- the incomplete resection of the mammary gland led to the development of an inferiorly based flap, contributing to potential breast asymmetry. Furthermore, postoperative irregularities manifested, particularly in the inferior and central breast zones. Conversely, patients subjected to the subcutaneous mastectomy with free NAC grafting technique expressed pronounced satisfaction, primarily attributed to the overall enhancement of the chest wall shape and skin tightening. However, this contentment was tempered by the prevalence of minor breast asymmetries or contour irregularities. Notably, a noteworthy proportion of these patients voiced dissatisfaction due to NAC hypoesthesia and hypopigmentation. Comprehensive analysis of the study cohort revealed that both patient groups exhibited comparable rates of other minor complications, such as seroma, hematoma, and wound dehiscence. These findings underscore the intricate balance between the advantages and drawbacks of each technique, emphasizing the multifaceted nature of post-bariatric marked breast ptosis management.

## Conclusion

The present study underscores the advantages and drawbacks associated with the two techniques employed in managing post-bariatric marked breast ptosis. The no vertical scar reduction mammoplasty technique exhibits notable benefits, preserving Nipple-Areola Complex (NAC) sensation and color. However, it comes with common drawbacks such as breast asymmetry and contour irregularities. Conversely, the subcutaneous mastectomy with free NAC grafting technique yields a superior breast contour with fewer irregularities. Nonetheless, this approach entails a higher risk of NAC complications. The study's findings emphasize the nuanced decision-making required when selecting between these techniques, considering the trade-offs in outcomes and potential complications to achieve optimal patient satisfaction in post-bariatric breast ptosis cases.

**Limitations:** The limitations of the study include the relatively small sample size of 30 patients, which may limit the generalizability of findings. Additionally, the short follow-up period of up to 6 months may not capture long-term outcomes and complications.

**Recommendations:** The study recommends conducting larger-scale investigations with extended follow-up periods to enhance the generalizability and comprehensiveness of findings in post-bariatric marked breast ptosis cases. Additionally, exploring innovative techniques that address the drawbacks of both approaches may contribute to refining surgical options and improving overall patient outcomes.

**Generalizability:** The generalizability of the study findings may be constrained by the specific patient population of post-bariatric marked breast ptosis cases and the limited sample size of 60 patients. Extrapolation to broader populations should be approached with caution, necessitating further research with diverse cohorts for robust generalization.

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## List of Abbreviations

NAC - Nipple-Areola Complex  
BMI - Body Mass Index  
CBC - Complete Blood Count  
HBA1C - Glycated Hemoglobin

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