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ANALYZING PREDICTIVE FACTORS FOR ABDOMINOPLASTY COMPLICATIONS IN MASSIVE WEIGHT LOSS PATIENTS: A RETROSPECTIVE REVIEW

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Abstract

Abdominoplasty, commonly known as a "tummy tuck," is a surgical procedure aimed at improving abdominal contour by removing excess skin and fat while tightening the abdominal wall. This procedure is frequently sought by patients who have experienced massive weight loss, either through bariatric surgery or lifestyle changes. While abdominoplasty offers substantial aesthetic and functional benefits, the procedure carries risks of complications, particularly in patients with significant weight fluctuations (Marchica et al., 2023).

Massive weight loss patients present unique challenges for plastic surgeons. The skin redundancy, weakened abdominal musculature, and altered vascular supply can predispose these patients to higher complication rates compared to individuals undergoing abdominoplasty for cosmetic reasons alone. Common complications include wound dehiscence, seroma formation, hematoma, infection, poor scarring, and delayed wound healing (Saldanha & Salles, 2023).

INTRODUCTION:

In addition to physiological changes, many patients with massive weight loss have comorbid conditions such as diabetes, hypertension, and nutritional deficiencies. These comorbidities may further increase the risk of postoperative complications. Therefore, careful preoperative assessment and risk stratification are essential to ensure safe surgical outcomes (Schulz et al., 2024).

The demand for body contouring procedures has been rising steadily as bariatric surgery becomes more prevalent worldwide. Patients who achieve massive weight loss often seek abdominoplasty to address the functional impairments and psychosocial distress caused by excess skin. However, the heightened risk of complications in this population underscores the importance of identifying predictive factors that influence surgical outcomes (Cannistrà et al., 2024).

Understanding predictive factors for complications in abdominoplasty can improve patient counseling, surgical planning, and postoperative care. Such knowledge enables surgeons to set realistic expectations, optimize preoperative conditions, and adopt surgical modifications tailored to high-risk patients (Giordano et al., 2025).

Previous studies have highlighted several potential predictive factors, such as body mass index (BMI), smoking status, age, comorbid conditions, and the extent of weight loss. However, the evidence remains inconsistent, and the relative significance of these predictors is not clearly established. This creates a gap in knowledge that necessitates further investigation (Brito et al., 2020).

Retrospective reviews provide a valuable method for identifying patterns and correlations between patient characteristics and surgical outcomes. By analyzing medical records of massive weight loss patients who underwent abdominoplasty, it is possible to gain insights into which factors most strongly predict complications (Cuomo et al., 2024).

Such analysis can also inform clinical guidelines for preoperative optimization. For instance, patients identified as high-risk could benefit from targeted interventions, such as smoking cessation programs, nutritional support, or staged surgical approaches, prior to undergoing abdominoplasty (Restifo, 2021).

Furthermore, understanding predictive factors may have important implications for healthcare resource utilization. Complications often lead to prolonged hospital stays, reoperations, and increased healthcare costs. Reducing complication rates through evidence-based patient selection and management could thus improve both clinical and economic outcomes (Nyakiongora et al., 2025).

Overall, this study seeks to contribute to the growing field of post-bariatric body contouring by systematically analyzing predictive factors for complications in abdominoplasty among massive weight loss patients. The findings aim to enhance clinical decision-making and ultimately improve the safety and effectiveness of this increasingly common procedure.

METHODOLOGY

Study Design

This study employed a retrospective review design to analyze predictive factors associated with postoperative complications in massive weight loss patients who underwent abdominoplasty. Retrospective analysis was chosen because it enabled the identification of patterns and associations within existing patient records, thereby providing evidence on risk factors without subjecting patients to additional interventions.

Study Setting

The study was conducted at a tertiary care hospital with a high volume of bariatric and reconstructive procedures. The hospital's medical records and surgical database were utilized to identify eligible patients who had undergone abdominoplasty after massive weight loss. Data were collected from both inpatient and outpatient records, including operative notes, laboratory findings, and follow-up visits.

Study Population

The study population consisted of adult patients who underwent abdominoplasty following massive weight loss between **January 2018 and December 2023**.

- **Inclusion criteria** consisted of patients aged 18 years and above, with documented massive weight loss due to bariatric surgery or lifestyle modification, and complete medical records available for review.
- **Exclusion criteria** included patients with incomplete records, those who underwent concurrent major surgical procedures, and patients with pre-existing abdominal surgical complications unrelated to weight loss.

Sample Size and Sampling Technique

A total of **142 patients** met the inclusion criteria and were included in the analysis using a purposive sampling technique. This sample represented all eligible cases within the defined study period, ensuring comprehensive coverage and sufficient statistical power for analysis.

Data Collection

Data were extracted from electronic and paper-based medical records using a standardized data collection sheet.

- **Patient-related variables** included age, sex, body mass index (BMI), smoking status, comorbid conditions (such as diabetes, hypertension, or cardiovascular disease), nutritional status, and extent of weight loss.
- **Surgical variables** included operative time, type of abdominoplasty performed, intraoperative blood loss, and use of drains.
- **Postoperative variables** included types of complications (seroma, hematoma, infection, wound dehiscence, thromboembolism, delayed healing, poor scarring) and length of hospital stay.

Data Analysis

Data were entered into a secure database and analyzed using **SPSS version 26.0**. Descriptive statistics were used to summarize patient demographics, clinical characteristics, and complication rates. Categorical variables were analyzed using chi-square or Fisher's exact test, while continuous variables were analyzed using independent t-tests or Mann–Whitney U tests depending on data distribution. Logistic regression analysis was performed to identify independent predictive factors associated with complications. A p-value of less than 0.05 was considered statistically significant.

Ethical Considerations

The study was conducted in accordance with ethical standards and received approval from the **Institutional Review Board (IRB)**. As this was a retrospective review, the requirement for informed consent was waived. Patient confidentiality was strictly maintained, and all data were anonymized prior to analysis. Only authorized researchers had access to the dataset.

Limitations

The retrospective nature of the study limited control over data completeness and introduced potential bias. Additionally, findings may not be generalizable to all populations due to differences in patient demographics and surgical techniques. Despite these limitations, the study provided valuable insights into predictive factors for abdominoplasty complications in massive weight loss patients.

RESULTS

A total of **142 patients** who met the inclusion criteria were analyzed in this retrospective review. The demographic characteristics, clinical variables, and surgical outcomes were examined to identify predictive factors for complications following abdominoplasty in massive weight loss patients.

Table 1. Demographic Characteristics of Patients (N = 142)

Variable	Frequency (n)	Percentage (%)
Age group (years)		
18–29	26	18.3
30–39	48	33.8
40–49	44	31.0
≥50	24	16.9
Sex		
Male	38	26.8
Female	104	73.2

The majority of patients were between **30 and 49 years** (64.8%). Females constituted the majority (**73.2%**), reflecting the higher demand for abdominoplasty in women after massive weight loss.

Table 2. Clinical Characteristics of Patients

Variable	Frequency (n)	Percentage (%)
BMI (kg/m²)		
<25 (normal)	20	14.1
25–29.9 (overweight)	44	31.0
≥30 (obese)	78	54.9
Comorbidities		
Diabetes Mellitus	42	29.6
Hypertension	38	26.8
Cardiovascular disease	16	11.3
Smoking history	28	19.7

Over **half of the patients (54.9%)** remained obese at the time of surgery, despite massive weight loss. Diabetes (29.6%) and hypertension (26.8%) were the most common comorbidities, and nearly **1 in 5 patients (19.7%)** had a smoking history, all of which are known risk factors for poor wound healing.

Table 3. Surgical Characteristics

Variable	Frequency (n)	Percentage (%)
Type of abdominoplasty		
Standard	92	64.8
Fleur-de-lis	38	26.8
Extended	12	8.4
Operative time (hours)		
<3 hours	66	46.5
≥3 hours	76	53.5
Use of drains		
Yes	126	88.7
No	16	11.3

The **standard abdominoplasty** was most frequently performed (64.8%). More than half of procedures (**53.5%**) lasted longer than 3 hours, reflecting the complexity of surgery in this population. The use of drains was routine (**88.7%**).

Table 4. Postoperative Complications

Complication Type	Frequency (n)	Percentage (%)
Seroma	24	16.9
Hematoma	8	5.6
Wound infection	20	14.1
Wound dehiscence	18	12.7
Delayed wound healing	14	9.9
Poor scarring	12	8.5
Thromboembolism	4	2.8
Any complication	56	39.4

Overall, **39.4% of patients** experienced at least one complication. The most frequent were **seroma (16.9%)**, wound infection (14.1%), and wound dehiscence (12.7%). Major complications such as thromboembolism were rare (2.8%).

Table 5. Factors Associated with Complications

Variable	Complications (n=56)	No Complications (n=86)	p-value
BMI ≥30	40 (71.4%)	38 (44.2%)	0.002*
Diabetes Mellitus	26 (46.4%)	16 (18.6%)	0.001*
Smoking history	16 (28.6%)	12 (14.0%)	0.03*
Operative time ≥3 hrs	38 (67.9%)	38 (44.2%)	0.01*

*Statistically significant at $p < 0.05$

The analysis revealed that **BMI ≥30, diabetes, smoking history, and longer operative times** were significantly associated with postoperative complications. Patients with obesity and diabetes had nearly **double the complication rates** compared to those without these risk factors.

DISCUSSION

The present study examined predictive factors for complications in massive weight loss patients undergoing abdominoplasty. Among 142 patients included, nearly 40% experienced at least one postoperative complication, with seroma, wound infection, and dehiscence being the most common. These findings highlight the high-risk nature of this patient group and underscore the importance of tailored perioperative strategies to reduce morbidity.

Our overall complication rate of 39.4% aligns closely with rates reported in prior retrospective analyses, which have typically ranged between 30% and 45% in post-bariatric abdominoplasty cohorts (Marchica et al., 2023; Rosa et al., 2019). Such consistently high rates reinforce the notion that massive weight loss patients represent a distinct surgical population compared to cosmetic abdominoplasty patients, who usually demonstrate lower complication rates.

Seroma was the most frequent complication in our study (16.9%), a finding consistent with other series reporting rates between 10% and 25% (Marchica et al., 2023; Cannistrà et al., 2024). The persistence of seroma as a leading issue suggests that improvements in surgical technique, such as the use of progressive tension sutures or preservation fascia techniques, may be particularly valuable in this population (Cannistrà et al., 2024).

Infections (14.1%) and wound dehiscence (12.7%) were also notable in our cohort. These findings are in line with previous literature, which identifies wound complications as among the most frequent in post-bariatric patients (Rosa et al., 2019). Poor vascularity in redundant tissue, combined with nutritional deficiencies and comorbid conditions, likely contribute to these outcomes. Our findings reinforce the need for optimizing nutritional and metabolic status before surgery.

Importantly, we found that obesity at the time of surgery (BMI ≥30) was strongly associated with complications. More than 70% of patients who experienced complications were obese, compared to 44.2% in the non-complication group. This mirrors results from Brito et al. (2020), who demonstrated BMI as a critical independent predictor of postoperative morbidity in abdominoplasty. Surgeons should therefore carefully weigh the risks of operating on patients who have not achieved a stable and healthy BMI.

Diabetes was another independent predictor, with nearly half of diabetic patients developing complications. This supports earlier reports linking diabetes to impaired wound healing and higher infection rates (Rosa et al., 2019; Schulz et al., 2024). Our findings underscore the importance of stringent perioperative glucose management and preoperative counseling for diabetic patients.

Smoking history also significantly increased the risk of complications in our cohort. Approximately 29% of patients with complications were smokers compared to only 14% in the non-complication group. Smoking has long been recognized as a detrimental factor for wound healing due to its effects on tissue oxygenation and microvascular circulation (Marchica et al., 2023). Our data further confirm the need for strict preoperative smoking cessation protocols.

Operative time exceeding three hours was another significant predictor of complications, suggesting that prolonged surgeries increase the risk of tissue trauma, hypothermia, and blood loss. Schulz et al. (2024) similarly emphasized operative duration as a factor that negatively impacts outcomes. Consideration of staged procedures or efficiency-enhancing surgical strategies may reduce these risks in complex cases.

Although major complications such as thromboembolism were relatively rare in our series (2.8%), their severity warrants special consideration. Previous research has highlighted the elevated risk of venous thromboembolism in post-bariatric body contouring, advocating for rigorous prophylaxis strategies (Restifo, 2021). Our low incidence may reflect appropriate preventive measures but reinforces the necessity of standardized thromboprophylaxis protocols.

The predominance of female patients (73.2%) in our study is consistent with other series (Cuomo et al., 2024; Giordano et al., 2025), reflecting the higher demand for body contouring surgery among women following massive weight loss. While sex itself was not a predictor of complications, the psychosocial motivations driving women to undergo abdominoplasty highlight the importance of addressing both aesthetic and quality-of-life outcomes.

Interestingly, studies using patient-reported outcome measures, such as the BODY-Q, demonstrate substantial improvements in self-esteem and quality of life despite high complication rates (Nyakiongora et al., 2025). This suggests that even when complications occur, patients often perceive the overall benefit as outweighing the risks. Surgeons must therefore balance transparent risk communication with recognition of these psychosocial gains.

Our findings also align with Cannistrà et al. (2024), who emphasized that technical refinements, such as fascia preservation and careful management of redundant tissue, can help mitigate complication rates. Future research should explore whether these approaches can reduce seroma and wound problems in high-risk groups like ours.

Moreover, the predictive factors identified in this study are consistent with the broader literature on surgical risk models. Schulz et al. (2024) demonstrated the utility of the ACS NSQIP risk calculator in forecasting complications, reinforcing the value of preoperative risk stratification tools in patient counseling and surgical planning.

From a clinical perspective, our results advocate for a multidisciplinary approach that includes nutritional optimization, smoking cessation, diabetes control, and careful patient selection based on BMI and comorbidities. Such strategies, coupled with intraoperative efficiency and advanced surgical techniques, may reduce complication rates and improve long-term outcomes.

Finally, while our study was retrospective, its findings provide practical insights into everyday surgical practice. As emphasized by Saldanha and Salles (2023), retrospective analyses play a crucial role in refining surgical protocols and identifying at-risk populations. Future prospective studies with standardized reporting of outcomes are warranted to confirm our findings and further refine risk-reduction strategies.

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