

EXPLORING RISK FACTORS AND COMPLICATIONS IN MAMOPLASTY: EMPHASIS ON THE INFLUENCE OF OBESITY

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Abstract: Objective: This study search summarizes recent information on risk factors associated with mammoplasty and examine its complications, particularly those related to obesity. The PubMed - MEDLINE database was used, identifying 11 articles out of 3789, between 2019 and 2024, on subcutaneous emphysema. Results: The review highlighted the importance of the patient's pre-surgical history and profile, highlighting relevant risk factors for complications and late recovery. Obesity is among the risk factors, associated with outcomes such as fatty gangrene, seromas and hematomas, requiring meticulous analysis for individualized treatment. The relationship between BMI and complications is clear, with each increase associated with a greater risk of fat necrosis, infection and postoperative asymmetry. Pre-existing comorbidities, surgical experience and technique selection also influence. Final considerations: Recent studies highlight sociodemographic and economic inequalities in determining outcomes, suggesting interventions for a more equitable and safe approach to breast reduction.

Keywords: Obesity; Breast enlargement; Mammoplasty.

INTRODUCTION

Mammoplasty, one of the most performed aesthetic surgical procedures globally, is highly valued for its high rate of satisfaction among patients, while associated complications remain relatively rare. However, the intrinsic complexity of this procedure requires advanced technical skills and a deep three-dimensional understanding, presenting significant challenges even for experienced surgeons. This level of complexity underscores the importance of a comprehensive assessment of medical history and a detailed physical examination to identify possible risk factors that may complicate the procedure or postoperative period (Pinsolle et al., 2019; Shestak & Davidson, 2016).

Among the complications frequently associated with mammoplasty, slow wound healing stands out as a considerable challenge. The ability to identify at-risk patients early allows us to customize the approach preoperatively, optimizing results and minimizing complications (Shestak & Davidson, 2016). Additionally, obesity is recognized as a significant risk factor for complications following breast reconstruction procedures. Research indicates that obesity independently contributes to an increased risk of perioperative adverse events, including skin flap necrosis and surgical site infections (Nelson et al., 2020).

Despite the clear association between obesity and increased surgical risks, the extent and exact nature of this relationship, especially in the context of mammoplasty, still require additional clarification. While some studies identify an increased risk of complications in patients with a higher Body Mass Index (BMI), others do not find substantial differences between obese and normal-weight patients (Gust et al., 2013).

In addition to obesity, it is crucial to evaluate other pre-existing comorbidities, such as smoking and diabetes, which can increase the risk of postoperative complications. Obtaining this information in the pre-surgical environment is essential to improve perioperative management and postoperative care planning in the face of possible complications (Liu et al., 2023).

In this context, the proposed literature review aims to summarize recent information on risk factors associated with mammoplasty and examine its complications, particularly those related to obesity. Potential causes of these complications and available treatment strategies will be addressed. In doing so, we hope to fill gaps in the literature, providing a more in-depth understanding that can guide clinical practice and advise patients effectively,

thus contributing to improving the safety and results of aesthetic breast augmentation procedures.

METHODOLOGY

This bibliographic review was structured following the criteria of the PVO strategy, which includes Population or research problem, Variables and Outcome. The review was guided by a guiding question, although the specific question is not detailed in the text provided, the methodology applied suggests a focus on the relationship between the emphysema subcutaneous and breast augmentation or mammoplasty procedures.

Data collection was carried out through a systematic search in the PubMed – MEDLINE (Medical Literature Analysis and Retrieval System Online) databases. For the search, specific descriptors were used in combination with the Boolean operators “AND”, “OR” and “NOT”: “Subcutaneous emphysema” AND “Breast enhancement” OR “Mammoplasty”. This initial strategy identified a total of 3789 articles.

The specified inclusion criteria were: articles written in English, published between 2019 and 2024, that addressed the proposed themes and were available in full. Review, meta-analysis and observational studies were considered. The exclusion criteria adopted included duplicate articles, publications available only in abstract form, and those that did not directly address the topic investigated or that did not meet the other inclusion criteria.

After a meticulous application of the selection criteria, the number of articles was reduced to 3759. A more detailed evaluation led to the final selection of 11 relevant articles that were included in the collection of this study. This selection allowed a detailed and in-depth analysis of the clinical implications of the emphysema subcutaneous tissue associated

with breast augmentation and mammoplasty procedures, providing an updated view based on recent scientific literature.

DISCUSSION

Reduction mammoplasty (RM) is widely recognized for its effectiveness in treating macromastia, providing a significant improvement in patients' quality of life (Liao et al., 2023). However, the identification and management of risk factors associated with postoperative complications remain a challenge in clinical practice. According to Liu et al. (2023), a systematic review and meta-analysis identified that obesity, smoking, diabetes, a unilateral resection weight greater than 1,000 g, and exposure to preoperative radiotherapy are significantly related to the increased risk of complications after MR.

In addition to these factors, recent studies, including one carried out by Xia et al. (2023), also showed that advanced age, black ethnicity and unfavorable socioeconomic conditions are relevant predictors of postoperative complications in patients undergoing reduction mammoplasty. The research by Dow et al. (2022), who examined medical records of patients in Nova Scotia from 2008 to 2018, corroborated these findings, indicating that the presence of comorbidities, such as heart disease and active smoking, in addition to being over 60 years of age, significantly increases the risk of complications. The research also pointed to a BMI above 30 kg/m² as a critical risk factor, increasing the risk of surgical complications by 3% for each one-point increase in BMI.

Obesity is recognized as a significant risk factor in several health contexts, and this extends to mammoplasty procedures, as demonstrated by the studies reviewed in this literature. Nelson et al. (2020) analyzed a cohort of 182 reduction mammoplasties, finding that obesity, quantified by BMI, is

associated with a proportional increase in the risk of complications: specifically, an increase of 1,079 in risk for each point of increase in BMI. This finding is in line with the research by Gust et al. (2019), who segmented patients into subgroups based on BMI and observed a 4.7% increase in surgical risk when moving from a BMI < 25 to a BMI > 45, being statistically significant only for BMI > 40.

A randomized clinical trial conducted by Srinivasaiah et al. (2014) investigated the risk factors after reduction mammoplasty, reiterating that a greater resection weight, increased BMI, advanced age and smoking are defined risk factors. These results highlight the importance of advising patients on lifestyle changes, such as weight loss and smoking cessation, to reduce the risk of postoperative complications.

Furthermore, the retrospective and observational cohort study by Xia et al. (2023), who analyzed 414 patients undergoing reduction mammoplasty, identified a significant proportion of postoperative complications, including hematoma, need for blood transfusion and cardiovascular events. The research also highlighted that black ethnicity and lower income are significant predictive factors of an increased risk of postoperative complications.

Gust et al. (2019) also identified obesity as a relevant risk factor for complications at the surgical site, although they did not observe significant changes in the risk of systemic complications, such as pneumonia, pulmonary embolism, renal failure, prolonged ventilator dependence, coma, stroke, myocardial infarction, among other comorbidities, with an extremely low incidence rate (0.6%). No significant associations were observed with other factors such as age, surgical technique, mass of the resected area, hypertension, duration of the procedure, patient's physical condition, diabetes, hyperlipidemia, history

of preoperative radiation and Charlson comorbidity index.

On the other hand, Hinson et al. (2022) highlighted obesity as an independent risk factor for more serious events, such as fat necrosis of nipples and skin flaps, seromas and hematomas, without a direct correlation with weight variations among obese patients. It is also important to highlight that these patients are often more likely to have a history of smoking and larger pre-operative breast volumes, factors that contribute decisively to the increased risk of surgical complications.

Nelson et al. (2020) described the pathophysiology of obesity, highlighting how this condition contributes to vascular insufficiency, oxidative stress, changes in immune mediators and nutritional deficiencies, which together result in difficulties in tissue healing and increase the risk of dehiscence. Thus, it is common for obese patients to require larger dissection areas, prolonged surgical time and present a greater probability of devitalized areas and postoperative tissue edema.

Although reduction mammoplasty in obese patients carries an increased surgical risk, Gust et al. (2013) and Hinson et al. (2022) emphasize that, despite the risks, the procedure is generally safe, with a low rate of serious complications. Furthermore, due to greater preoperative physical and aesthetic dissatisfaction, obese patients often report significant post-surgical satisfaction, overcoming the adversities associated with high risks.

Recent studies have explored the factors that may influence postoperative complications in patients undergoing reduction mammoplasty. Among these, the relationship between BMI and postsurgical complications has received significant attention. Dow et al. (2022) reported that patients with a BMI greater than 30 kg/m² face an increased relative risk of

developing surgical complications. There was also a trend towards an increase in the risk of infection and other complications as BMI increases. Specifically, a one-point increase in BMI corresponds to a 3% increase in the overall risk of complications, including a 7% increase in the risk of fat necrosis, a 6% increase in the risk of infection.

In addition to the risks associated with BMI, there are other factors that contribute to the increase in postoperative complications. Dow et al. (2022) also identified that comorbidities such as heart disease, active smoking, dyspnea, age over 60 years, history of hysterectomy/oophorectomy, and use of exogenous hormonal supplementation, are significantly associated with increased risks of complications. This finding reinforces the importance of a meticulous assessment of the patient's general health status before surgery to mitigate potential risks. Other factors, such as the presence of residents during the procedure, performing the surgery in a hospital environment, and the vertical incision technique, were also associated with an increased risk of complications, highlighting the relevance of surgical experience and selection of the appropriate technique.

In a recent study by Kim and Ascherman (2024), the interaction between reduction mammoplasty and sociodemographic and economic inequalities was examined. Analysis of 414 patients after surgery revealed that factors such as race, region of residence (urban or rural) and personal income are significant predictors of postoperative complications and prolonged periods of hospitalization. These findings suggest that these sociodemographic factors play a crucial role in the outcomes of breast reduction surgery, indicating areas for future interventions aimed at a more equitable and safe surgical approach.

The study by Xia et al. (2023) added another dimension to the understanding

of these complications, showing that sociodemographic factors such as ethnicity, relative income, and treatment in non-metropolitan or rural regions are significant predictors of postoperative complications and prolonged hospitalization periods. Black ethnicity emerged as an independent risk factor for complications and prolonged hospitalizations. The observed disparities may be attributed to a combination of factors, including limited access to hospitals with adequate capabilities to perform reduction mammoplasties, particularly among patients of lower income or who reside in rural or non-metropolitan areas. The prevalence and severity of liver disease, as part of the Elixhauser Comorbidity Index, has been linked to racial disparities in medical treatment, reflecting the complex interactions between medical conditions and socioeconomic gaps.

FINAL CONSIDERATIONS

The discussion about the risk factors associated with postoperative complications after reduction mammoplasty reveals a series of challenges in contemporary clinical practice. Recent studies, including systematic reviews and randomized clinical trials, highlight obesity, smoking, advanced age, black ethnicity and unfavorable socioeconomic conditions as significant predictors of complications. The relationship between BMI and complications is particularly evident, with each increase in BMI associated with a percentage increase in the risk of complications, including fat necrosis, infection, and postoperative asymmetry. Furthermore, factors such as pre-existing comorbidities, surgical experience, and selection of the appropriate technique also play a crucial role. Recent studies highlight the importance of sociodemographic and economic inequalities in determining surgical outcomes, highlighting the need for interventions to promote a more equitable and safe approach to breast reduction surgery.

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