Special Article

Mammoplasty: steps for safe surgery. Evidence from literature

Mamoplastia: passos para uma cirurgia segura. Evidências da literatura

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■ **ABSTRACT**

Introduction: Mammoplasty is one of the most performed surgeries by plastic surgeons. Like every procedure, it is not free of risks or complications. **Objectives:** Discuss controversial issues and complications in breast surgery and main treatments. **Methods:** Four full members of the SBCP with extensive experience in breast plastic surgery participated in the discussion, in addition to the regent of the mammoplasty chapter. Factors that presented the greatest controversy in mammoplasties were evaluated: use of antibiotics; preoperative infiltration; association of mammoplasty with breast implants; large mammary ptoses; masculinizing mammoplasty; flaps for the elevation of the nipple-areola complex (NAC); use of drains; dressings in mammoplasties and fat grafting. **Results:** The literature and discussion among specialists generated the observations: there is robust evidence of the effectiveness in the use of perioperative antibiotics of reducing mammoplasties, but there is no evidence of benefits in maintaining use for more than 24 hours; preoperative infiltration with vasoconstrictor solutions does not reduce the incidence of hematoma; in mammoplasty associated with implants there was no consensus on the best technique, plane or texture of the implant; there was no consensus on the best technique in the elevation of NAC in large ptoses, whether grafts or flaps; masculinizing mammoplasty does not present complications different from those found in the literature; there is no specific protocol for conduct when there is suffering from the NAC; dressings can be removed on the first postoperative day or kept longer, and there should be parsimony in the fat graft. **Conclusion:** The present study concluded that mammoplasty is safe surgery, but continued studies are needed to minimize complications.

Keywords: Mammoplasty; Postoperative complications; Plastic surgery; Patient safety; Mama.

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■ **RESUMO**

Introdução: A mamoplastia é uma das cirurgias mais realizadas pelos cirurgiões plásticos. Como todo procedimento, não é isenta de riscos ou complicações. **Objetivos:** Discutir questões controversas e intercorrências em cirurgia mamária e principais tratamentos. **Métodos:** Participaram da discussão quatro membros titulares da SBCP com ampla experiência em cirurgia plástica mamária, além do regente do capítulo de mamoplastias. Foram avaliados fatores que apresentavam maior controvérsia em mamoplastias: utilização de antibióticos; infiltração pré-operatória; associação da mamoplastia com implantes mamários; grandes ptoses mamárias; mamoplastia masculinizadora; retalhos para ascensão do complexo areolopapilar (CAP); utilização de drenos; curativos em mamoplastias e enxerto de gordura. **Resultados:** A literatura e discussão entre especialistas gerou as observações: há evidencias robustas da efetividade no uso de antibióticos perioperatório de mamoplastias redutoras, mas não há evidências de benefícios em se manter o uso por mais de 24 horas; a infiltração pré- operatória com soluções vasoconstritoras não reduz a incidência de hematoma; em mamoplastia associada a implantes não houve consenso sobre a melhor técnica, plano ou textura do implante; não houve consenso sobre a melhor técnica na ascensão do CAP em grandes ptoses, se enxertos ou retalhos; a mamoplastia masculinizadora não apresenta complicações diversas das encontradas na literatura; não existe protocolo específico para conduta quando há sofrimento do CAP; curativos podem ser removidos no primeiro dia de pós-operatório ou mantidos por mais tempo, e deve haver parcimônia no enxerto de gordura. **Conclusão:** O presente estudo concluiu que a mamoplastia é uma cirurgia segura, porém são necessários estudos continuados que possibilitem minimizar complicações.

Descritores: Mamoplastia; Complicações pós-operatórias; Cirurgia plástica; Segurança do paciente; Mama.

INTRODUCTION

The safety in breast surgery depends on several factors, as it begins with the knowledge of specific details, which will determine the limitations and allow a safe surgical schedule with the techniques currently available, clarifying to patients about all the factors inherent to this procedure[1]. Thus, expectations are closer to reality when patients understand the benefits and limitations of breast surgery[2].

Following the good practice of medicine, which starts with an adequate preoperative evaluation, anatomical and anthropometric points were created on the chest to study the breast objectively[3,4].

An important factor in evaluating the breasts is how it is done since the measurement obtained directly from the patient is different in that collected through a photographic image, which can directly interfere in the surgical programming[4-6].

Several complications may occur after an adequate evaluation, followed by surgical programming, regardless of the technique used[7].

Several authors have sought to describe studies that evidence evaluations related to complications in breast reduction surgery. The most common complications found in the literature related to blood perfusion of the nipple-areola complex (NAC), surgical site infection, dehiscences, asymmetries, and changes in sensitivity secondary to the surgical procedure have been described[8-12].

Given the prevalence of complications in breast surgery and a lack of protocol for the treatment and conduction of these alterations, the *Sociedade Brasileira de Cirurgia Plástica* (SBCP) mobilized to evaluate which complications are more frequent and which studies exist in the literature that cites these changes with reports of ways to avoid them.

This study aims to discuss controversial issues and complications in breast surgery with its main treatments.

METHODS

During research at PubMed on breast surgery x complications x treatment of complications, topics that would be discussed were elected.

Articles evaluating breast reconstruction surgery and augmentation mammoplasty surgeries without mastopexy or reducing mammoplasty were excluded, with priority for English, Spanish, Italian and French articles.

Based on articles referring to evidence-based medicine and selection of the most frequent complications, they were listed and taken to the discussion in a roundtable with four plastic surgeons with experience in breast plastic surgery and full members of the SBCP in which, based on scientific articles, discussed the behaviors relevant to each complication listed, during the class of the distance learning program (PED) of the referred society (SBCP).

The articles chosen to serve as the basis for the discussion were the studies by Kerrigan and Slezak (2013)[11], which was based on the American Board of Plastic Surgery, where 606 plastic surgeons who performed 6,461 breast reduction procedures were heard. Also, the Greco and Noone study (2017)[8], where 1,343 plastic surgeons performed 59,883 breast reduction procedures. The studies were classified as level 1 of scientific evidence.

RESULTS

The points that were defined for discussion were:

1. Antibiotic therapy in mammoplasties;
2. Intraoperative infiltration;
3. Mammoplasty with prosthesis;
4. Large mammary ptoses;
5. Masculinizing mammoplasty;
6. NAC suffering;
7. Use of drain;
8. Dressings in mammoplasty;
9. Fat graft in breasts.

1. Antibiotic therapy in mammoplasties

The questioning involving the use of antibiotics in reducing mammoplasties involves the use or not of the antibiotic, in what period and how long it will be used.

Ahmadi et al. (2005)[13] conducted a randomized clinical trial with 50 women submitted to reduction mammoplasty, distributed in three groups. One group did not receive antibiotics, another received only perioperative, and the third received antibiotics in the perioperative period and for another six days. There was no statistical difference between the groups regarding the occurrence of infection.

Veiga Filho et al. (2010)[14] published a study with 100 reduction mammoplasty patients divided into two groups, without antibiotics and with antibiotics in the perioperative period and for another six days. They found a significant difference in surgical site infection rates (14% in the group without antibiotics versus 2% in the group that received antibiotics, p=0.03). However, other studies that evaluated the use of antibiotics concluded that, when used for seven days, it is not superior to that used only perioperatively, in terms of decreasing infection rates [15,16].

A recent, triple-blind randomized clinical trial evaluated 124 patients undergoing reduction mammoplasty. One group received perioperative antibiotics for another seven days, and the other received only perioperative antibiotics and a placebo for seven days. There was no difference in infection rates, concluding that maintaining antibiotics in the postoperative period did not bring benefits[17].

2. Intraoperative infiltration

Noone et al. (2010) [18] surveyed 296 American plastic surgeons, referring to breast infiltration with vasoconstrictive solutions before the surgical procedure. Of this total, 49% did not use infiltration, 17% used it sporadically, and 34% used infiltration in all patients. However, evaluating the occurrence of hematomas, they did not observe a relationship with the use or not of infiltration[8,18].

3. Mammoplasty with prosthesis

Mammoplasty/mastopexy associated with the use of implants was evaluated in different aspects: indication, implant plan, the texture used and association with fatty breasts.

No article was found in the literature that contemplates all these factors together. Thus, the discussion was based on the literature involving each of these items in isolation and on the participants' experience.

4. Large mammary ptoses

The safety regarding the good perfusion of the flaps for the ascension of the NAC was discussed.

5. Masculinizing mammoplasty

Masculinizing mammoplasty has some particularities, mainly related to the large volume of detachment, resection and thin-thickness flaps.

The techniques are based on previous breast volume, resulting in periareolar, concentric periareolar scars or even mastectomy scarring with NAC graft[21,22].

The main complications refer to a hematoma, followed by the suffering of the NAC, suffering or loss of the areolar graft with depigmentation, total or partial necrosis of the NAC, changes in sensitivity and hypertrophic scars[21,22].

6. Suffering of the nipple-areola complex (NAC)

No conclusive clinical studies on the viability of NAC after mammoplasties were found in the literature, indicating effective conduct for the treatment of its suffering. However, oxygen therapy through the hyperbaric chamber is effective in studies evaluating NAC perfusion in patients undergoing mammary reconstruction[23].

Studies in rats showed greater permeability of red blood cells when using pentoxifylline before the procedure[24].

7. Use of drain

Studies evaluating the use of a drain in mammoplasty consider the type of drain used, its efficacy and time of use.

Studies with levels of evidence I and II show no difference in the prevention of hematomas and the improvement of tissue healing[25-27].

8. Mammoplasty dressing

Veiga Filho et al. (2012) [28] performed a randomized clinical trial with 70 patients submitted to reduction mammoplasty. Of these, 35 had the dressing removed on the first postoperative day (DPO) and 35 on the sixth day. They did not find a statistical difference in infection rates but found lower skin colonization, with significance, when the dressing is maintained for six days. They also found a statistical significance that the patients preferred to keep the dressing for six days and considered this a safer option[28].

9. Fat graft in breasts

A systematic review on breast fat grafting demonstrated 2% of palpable cysts, 0.6% of infection, 0.5% of hematoma and 0.1% of seroma[29]. Mammography images demonstrated 6.5% of oily cysts, 4.5% of calcifications, and 1.2% of fatty necrosis. Of these alterations, 81.5% presented BIRADS 2 images, 16.4% had BIRADS 3, and 3.2% had BIRADS 4, which required a biopsy of the lesions related to the image found. The amount of infiltrated fat or the resorption rate of this fatty graft in breasts.[29]

DISCUSSION

The constant study of different tactics and approaches in mammoplasty is important in the relationship between clinical practice and the literature, especially with articles that address evidence-based medicine or systematic reviews. Discussions about these articles enhance the specialty, as they add the base of the literature with the experience of specialists in the area, prioritizing the safety of the patient and the professional who performs the surgical procedure.

The use of antibiotics in breast surgeries has its importance described by several authors. However, there is still no consensus on the time and ideal dose of antibiotic use. The literature indicates safety in using the antibiotic only in the perioperative period and may extend for up to 24 hours after the procedure [13,14,16,17]. It was clear from the discussions that the important thing is the patient's follow-up in the postoperative period. The surgeon should institute antibiotic therapy for as long as he deems necessary from any sign of infectious process. Breast solution infiltration has no standardization and consensus among surgeons, related to the amount of solution used, type of dilution of the solution, place where the solution is infiltrated, and the benefits and risks involving such procedure.

There is consensus in the literature that breast infiltration did not significantly affect the occurrence of hematomas but did not interfere in the healing process. However, the only reports involving infiltrated solution were in experimental studies in rats. A reduction in the release of vasodilator neuropeptides was observed after using ropivacaine, which could reduce the local inflammatory process and consequently a better quality scar [18,30].

Mastopexy surgery with breast implants remains a challenge among plastic surgeons. It is a safe surgery with the greatest complications related to great weight loss, smoking, and diabetes[31]. Body awareness is important in indicating this procedure, since the breast implant aims to provide a filling of the breast, having no action on the evolution of the breast to future breast ptosis, regardless of the surface of the implant as well as the plane in which is introduced because the action of gravity ends up acting on the breast and the implants [32]. No articles were found in the literature that defines the best plan of breast implant or at least the type of texture of the implants.

One factor that cannot be forgotten is the fact that there is a suspicion in the correlation between more aggressive texturing according to the classification of Jones et al. (2018) [33] and the onset of giant cell lymphoma (BIA-ALCL)[34], even though it is an uncommon disease can occur in 1:2,832 to 1:86,029 according to texturization[35]. Furthermore, in a more recent study by Cordeiro et al. (2020), [36] occurred in 1:354 of breast cancer patients submitted to reconstruction with grade 3 textured implants. Therefore, the choice of implant plan in mastopexy with prosthesis should also observe the type of implant selected, whether smooth or textured and in the future could create a standardization related to the plane and surface of the implants used, aiming at patient safety and a lower rate of complications.

There is no unanimity among plastic surgeons regarding the best flap for NAC rise in large-volume breasts and marked degree of breast ptosis. The factors that may interfere with this decision are the patient's age, comorbidities, degree of ptosis and experience of the surgeon with the technique used. The most used techniques are areola graft, use of lower pedicle and medial supper pedicle. Unfortunately, no studies have been found in the literature comparing these different techniques between them[19,20].

Masculinizing mammoplasty aims to perform a mastectomy in male transgender patients, and the techniques used vary according to breast volume and skin to be removed. Several techniques are available, resulting in periareolar, concentric periareolar scars and resulting from classical reduction mammoplasty. Complications in this type of specific surgery are similar to those found in reducing mammoplasty, emphasizing the presence of hematomas with a higher prevalence. The occurrence of hypertrophic scars could be explained by an increase in hair on the chest and an increase in testosterone. Currently, in Brazil, there are two ordinances of the Ministry of Health that authorize this type of procedure, and the Federal Council of Medicine, as of 2020, authorizes the transsexualizing surgical process in patients over 18 years old, who have a minimum follow-up of two years by multidisciplinary team [21,22,37-40].

Blood perfusion of NAC is always a concern in mammoplasties. In case of alteration in the NAC circulation, either due to decreased perfusion or congestion in the flap, few studies in humans address this issue with treatment suggestions effectively. Oxygen therapy, through the hyperbaric chamber, has its role, but with a technical difficulty of using it in our environment[23]. Pentoxifycin had its use evaluated in studies in rats, bringing benefit in its use[24]. Studies involving suction cup, laser, heparin or other medication are necessary to prove its efficacy and safety in its use[41,42].

Studies evaluating the use of drain in mammoplasty surgeries, with evidence levels I and II, have shown no difference in the healing and prevention of hematomas. The question in these studies was about the need for plastic surgeons to use drains in mammoplasty surgeries, and the indication was based on the prevention of hematomas or excessive bleeding. However, there was no correlation between the use of drains and the prevention of hematoma[25-27].

The length of stay of dressings in reduction mammoplasty was evaluated in a randomized study with 70 women divided into two groups: group 1 - dressing removed in 1 day and 7 cases of infection (increased levels of Staphylococcus colonization); group 2 - dressing removed after 6 days and presenting 2 cases of infection, p=0.09. The study concluded that there was no difference in maintaining or removing dressing after 1 day but presenting an increase in bacterial colonization in group 1. The questioning of this study also refers to the concept of infection because no patient developed an infectious process in surgery. Another conclusion of the study was that patients feel safer using the dressing in the operated region[28].

Breast fat grafting has wide use, but some care related to images resulting from this mammography procedure cannot be ignored. In addition, the amount of grafted fat and this fat is prepared to be grafted is not established to promote uniformity in the amount of absorption and stabilization of the graft[29,43,44].

CONCLUSION

The present study, based on studies of the literature and experience of the professionals involved, concluded that:

- Perioperative antibiotic is sufficient in antibacterial prophylaxis;
- Removing dressing in DPO 1 does not alter the outcome of bacterial infection;
- Breast infiltration solution containing epinephrine and anesthetic reduces postoperative pain and does not increase hematoma
- Fat injection, when performed in the breasts, should be thrifty;
- Pentoxifyphiline has good results in the prevention of necrosis in flaps with suffering in rats;
- Drain does not alter healing or bruising in mammoplasties.

COLLABORATIONS

PRQES Analysis and/or data interpretation, Conception and design study, Conceptualization, Data Curation, Final manuscript approval, Investigation, Methodology, Project Administration, Realization of operations and/or trials, Supervision, Visualization, Writing - Original Draft Preparation, Writing - Review & Editing.

DFV Analysis and/or data interpretation, Conception and design study, Data Curation, Final manuscript approval, Methodology, Supervision, Writing - Review & Editing.

RFB Analysis and/or data interpretation, Conception and design study, Conceptualization, Formal Analysis, Methodology.

FLC Conception and design study, Conceptualization, Data Curation, Methodology.

AG Conception and design study, Conceptualization, Data Curation, Final manuscript approval, Methodology, Writing - Review & Editing.

AGB Conception and design study, Conceptualization, Data Curation, Methodology.

LMF Analysis and/or data interpretation, Conception and design study, Conceptualization, Data Curation, Final manuscript approval, Investigation, Methodology, Project Administration, Supervision, Writing - Review & Editing.

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