



# Thromboembolic phenomena associated with mammoplasty at the PUC-Campinas Hospital Plastic Surgery Service

## *Fenômenos tromboembólicos associados a mamoplastia no Serviço de Cirurgia Plástica do Hospital PUC-Campinas*

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### ■ ABSTRACT

**Introduction:** The demand for plastic surgery has progressively increased, and breast enlargement and reduction surgeries are among the most frequent procedures. **Methods:** This retrospective study reviewed the medical records of patients who underwent reduction and augmentation mammoplasty between January 2015 and June 2018 at the PUC-Campinas Hospital. **Results:** Thirteen augmentation mammoplasties and 275 reduction mammoplasties were performed. Of the 288 patients who underwent surgeries, two patients developed postoperative pulmonary thromboembolism. **Conclusion:** The incidence of thromboembolic phenomena in augmentation and reduction mammoplasty is low. Patients in this study were considered at low risk for thromboembolic complications. According to prophylaxis protocols, this phenomena should be monitored postoperatively. Further studies are needed to standardize the use of venous thromboembolism prophylaxis measures. **Keywords:** Mammoplasty; Pulmonary embolism; Venous thrombosis; Plastic surgery; Breast

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## ■ RESUMO

**Introdução:** A demanda por cirurgia plástica tem aumentado progressivamente, dentre os procedimentos mais frequentes estão as cirurgias de mamas (aumento e redução). **Métodos:** Estudo retrospectivo de prontuários de pacientes que foram submetidas a mamoplastia redutora e de aumento, no período de janeiro de 2015 a junho de 2018, no Hospital PUC-Campinas. **Resultados:** Foram realizadas 13 mamoplastias de aumento e 275 mamoplastias redutoras. Das 288 cirurgias realizadas duas (n=2) evoluíram com TEP (tromboembolismo pulmonar). **Conclusão:** Portanto, a incidência de fenômenos tromboembólicos em mamoplastias de aumento e redutoras mostrou-se baixa no presente estudo, assim como na literatura. Já as pacientes acometidas no estudo eram consideradas de baixo risco para complicação tromboembólica, de acordo com protocolos de profilaxia, devendo-se atentar para tais fenômenos no pós-operatório. Ainda são necessários mais estudos para padronização do uso de medidas de profilaxia do tromboembolismo venoso.

**Descritores:** Mamoplastia; Embolia pulmonar; Trombose venosa; Cirurgia plástica; Mama.

## INTRODUCTION

The demand for plastic surgery has been steadily increasing, mainly due to new surgical techniques and greater social acceptance. Among the most common plastic surgery procedures are breast enlargement or reduction, followed by liposuction, abdominoplasty, and facial surgery<sup>1</sup>.

Venous thromboembolism (VTE), including deep vein thrombosis (DVT) and pulmonary thromboembolism (PTE), are relatively common severe complications in patients undergoing plastic surgeries. However, only few studies have reported the incidence of VTE post plastic surgery<sup>2</sup>.

Despite being a preventable cause of in-hospital death, PTE accounts for more than 200,000 annual deaths in the United States alone. Hence, recently more attention has been focused on VTE following plastic surgeries, aiming at increasing procedural safety<sup>3</sup>.

DVT and PTE remain opportunistic enemies; due to their low incidence, the plastic surgeon may downplay their risks<sup>4</sup>.

According to statistics from the American Society of Plastic Surgeons, approximately 275,000 liposuction procedures, nearly 59,000 abdominoplasties, and approximately 124,500 face lifts were performed in the United States. In these procedures, the incidence of DVT was 18,340 cases per year. This is of particular concern as 60% of plastic surgeons in the study by Rohrich et al. (2003)<sup>6</sup> did not use DVT prophylaxis.

VTE is a well-documented surgical risk. The incidence of fatal PTE in patients receiving no form of prophylaxis is 0.1%-0.8%, that in patients undergoing elective general surgery is 2%-3%, that in patients undergoing elective hip arthroplasty is 4%-7%, and that in patients undergoing hip fracture surgery is X%-X%. Although there is less information on the risk of VTE post plastic surgery, a large study reported a 0.39% risk of DVT and a 0.16% risk of PTE in patients who underwent face lift surgeries. Clearly, plastic surgery is not immune to the dangers of VTE. Based on these studies and given the wide scope of plastic surgery procedures, it is imperative to understand the risks of VTE following various surgeries and to use this information to help guide the use of VTE prophylaxis in plastic surgery<sup>7</sup>.

## OBJECTIVE

To evaluate the incidence and profile of patients with thromboembolic phenomena (DVT and/ or PTE) who underwent augmentation and reduction mammoplasty and compare them with literature data.

## METHODS

We retrospectively reviewed medical records of patients who underwent augmentation and reduction mammoplasty at the PUC-Campinas Hospital between

January 2015 and June 2018 and who developed postoperative thromboembolic complications.

A total of 288 patients underwent augmentation or reduction mammoplasty during the study period. A total of 13 augmentation mammoplasties and 275 reduction mammoplasties were performed during the study period. A greater number of reduction mammoplasties than augmentation mammoplasties were performed due to the scope of procedures that can be performed by the Unified Health System in the medical residency service of the School Hospital. Patients who underwent breast reconstruction surgeries were excluded.

The following data were evaluated for patients with thromboembolic complications: age, surgery type, contraceptive use, body mass index (BMI), presence of varicose veins in the lower limbs, associated comorbidities, combined surgery, smoking, previous gestational history, DVT and/or PTE location, elastic stockings use, pharmacological prophylaxis use, and postoperative days when thromboembolic complication was diagnosed.

In the present study, all patients provided an informed consent form (ICF) prior to the surgical procedure. All principles of the Declaration of Helsinki were followed.

## RESULTS

The incidence of thromboembolic complications was 0.69%. Of the 288 patients who underwent surgeries, two patients developed postoperative PTE without DVT.

The patients' age was 24 to 33 years. Both the patients were nonsmokers, had a normal BMI (between 21 and 24), did not use contraception, were nulliparous, and had no sign and/or presence of varicose veins in the lower limbs.

Regarding the type of procedure, one patient underwent augmentation mammoplasty via the mammary sulcus and implantation of textured silicone prosthesis in the subglandular plane, with one-hour surgical time. The other patient underwent reduction mammoplasty by the technique of superomedial pedicle, with five-hours surgical time, and resected 470 g of right breast tissue and 550 g of left breast tissue. In both the procedures, the patients wore elastic compression socks and no VTE drug prophylaxis was administered.

Both the patients developed PTE without DVT on postoperative Day 7, and the main complaint was resting dyspnea. Both the patients underwent tomographic imaging to diagnose PTE. Venous Doppler ultrasound examination of the lower limbs did not

show any signs of DVT in the areas evaluated. No investigation was conducted in the upper limbs, despite the fact that thromboembolic events can occur in the upper limbs as well.

In the patient who underwent augmentation mammoplasty, chest tomography revealed that the PTE was located at the right subsegmental thrombus.

In the patient who underwent reduction mammoplasty, chest tomography revealed that the PTE was located at the left sub-segmental thrombus figure 1.

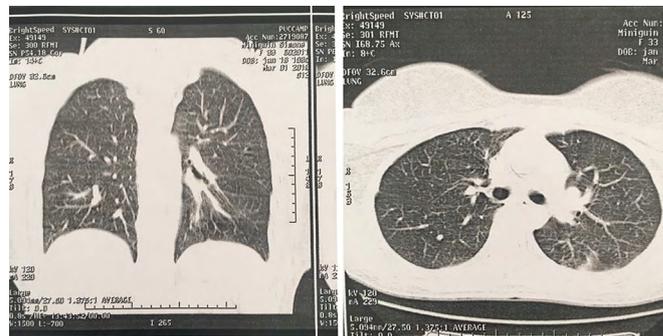


Figure 1. Computed tomography scan showing a small area of a left subsegmental pulmonary infarction.

Regarding the patients' evolution in question, both underwent treatment with full anticoagulation and low molecular weight heparin for 5 days, were hospitalized under the medical clinic's care, started oral anticoagulation with warfarin, and underwent dose adjustment and monitoring with international normalized ratio (INR) examinations. Hospital discharge happened on the seventh day after INR target confirmation (2-3). After discharge, outpatient follow-up consisted of consultation with the cardiology team and hematological investigation. Both the patients used oral anticoagulants for 6 months. No causes of antiphospholipid antibody syndrome were found. They were discharged from the medical and outpatient clinics after 1 year of follow-up.

Chart 1 shows the data of the two cases.

## DISCUSSION

The search for understanding of the pathophysiological mechanisms involved with thromboembolism dates back to 1859, when German pathologist Rudolf Virchow described the following three major factors that he believed were responsible for this phenomenon: 1. venous stasis caused by changes in blood volume or flow, 2. damage to vascular endothelium by inflammation or injury, and 3. hypercoagulability<sup>3</sup>.

Specifically, in the surgery case, all aspects of Virchow's triad are intensified. Venous stasis is

**Chart 1.** Profile of pacientes with thromboembolic phenomena

	Case 1	Case 2
Age	24 years old	33 years old
Body mass index	24	21
Type of surgery	Augmentation mammoplasty	Reduction mammoplasty
Smoking	No	No
Presence of varicose veins	No	No
Use of elastic stockings	Yes	Yes
Gynecology history	Nullipara/nulligesta	Nullipara/nulligesta
Thromboembolic complications	PTE/subsegmental to the right	PTE/subsegmental to the left
Surgery time	1 hour	5 hours
Combined surgery	No	No
Use of drug prophylaxis	No	No

PTE: Pulmonary thromboembolism.

aggravated by prolonged immobilization on the operating table<sup>3</sup>.

The prevention of VTE has occupied increasingly prominent space in recent years, as are the proposals for protocol standardization to be adopted. Specifically, plastic surgery, where the dilemma in which the plastic surgeon finds himself having as a tormentor: thromboembolism on one side and postoperative hemorrhagic complications on the other<sup>3</sup>.

In the literature, the incidence of VTE in plastic surgery differs among surgery types, being approximately 0.35% for facelift, 1.3% for breast reconstruction, 1.4%-2% for abdominoplasty, 9.4% for circumferential liposuction, and 6.6% for abdominoplasty associated with other surgery. Compared to other data in the literature, the incidence of complications due to PTE in mammoplasty is 0.2-0.7%, as reported in the article by Montandon in 2014<sup>5</sup>, which obtained a PTE complication rate of 0.36% in augmentation mammoplasty. It is noteworthy that, in this study, the number of augmentation mammoplasty surgeries should not be compared to the other study since they had (n) much higher, a fact that explains the 7.7% incidence of PTE related to this procedure performed in our service and within the period described. Regarding the strategy for preventing complications with thromboembolic events, VTE prophylaxis protocols can be used according to the risk factors of each patient. The Anger protocol is adopted at the PUC-Campinas Hospital service by the plastic surgery team, the same protocol that is described in the *Brazilian Journal of Plastic Surgery* by Justino et al. in 2018<sup>2</sup>. In both cases of PTE, despite the patients being classified as low risk and non-pharmacological measures for VTE prophylaxis were adopted, they developed complications. Thus, attention should be paid to these complications since they can develop despite the low incidence<sup>1,3,5</sup>.

Mechanical prophylaxis, characterized by intermittent compression of the calves and the use of elastic stockings, as well as early ambulation, can reduce the incidence of VTE by up to 60% and should be initiated before anesthetic induction. On the other hand, chemical prophylaxis, characterized by prophylactic heparin therapy, reduces the incidence of VTE by 78%. Despite these benefits, many plastic surgeons do not use thromboprophylaxis because they believe in the low incidence of VTE and have bleeding concerns. Regarding the fear of bleeding, studies suggest that there is no significant increase in the risk of bleeding with the use of low molecular weight or unfractionated heparin<sup>4</sup>.

## CONCLUSION

Our data analysis demonstrated a 0.69% incidence of thromboembolic phenomena in augmentation and reduction mammoplasty procedures, that is, a low incidence of complications, which is also in agreement with other data in the literature since patients were classified as being at low risk for developing thromboembolic complications according to prophylaxis protocols.

## COLLABORATIONS

<b>RSRN</b>	Analysis and/or data interpretation, Conception and design study, Data Curation, Methodology, Project Administration, Writing - Original Draft Preparation, Writing - Review & Editing
<b>ACCV</b>	Final manuscript approval, Project Administration, Supervision, Visualization
<b>GLD</b>	Supervision, Visualization
<b>TSS</b>	Supervision, Visualization
<b>RAMA</b>	Critical content review, Final manuscript approval, Supervision

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