



Analysis of risk factors for the formation of seroma in classical abdominoplasty

Análise dos fatores de risco na formação de seroma em abdominoplastia clássica

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■ ABSTRACT

Introduction: Abdominoplasty is one of the most common cosmetic surgeries in Brazil. The complications of this procedure are diverse, with seroma being one of the most frequent. The objective of this study was to identify the risk factors for the formation of seroma, such as increased body mass index, comorbidities, age, habits, and time of drain permanence. **Methods:** This was a retrospective study in which the medical records of 94 patients who underwent abdominoplasty at the Plastic Surgery and Burns Service of Santa Casa de Misericórdia de São José do Rio Preto-SP between November 2010 and November 2013 were reviewed. The risk factors for the formation of seroma were analyzed using Fisher's exact test and the Chi-square test, with the significance level set at $p < 0.05$. **Results:** Seroma was identified in 16 (17.02%) of the total patients ($n = 94$). No statistical significance was observed between increased incidence of seroma and increased BMI and other risk factors analyzed. Nevertheless, the time of drain permanence showed a clinical relevance. The patients who were maintained on the drain for > 1 day had a lower incidence of seroma. **Conclusion:** The causes of seroma should be considered multifactorial. The risk factors analyzed were not significantly related to the increased incidence of seroma. However, drain permanence for > 1 day was effective in the prevention of seroma.

Keywords: Abdominoplasty; Seroma; Postoperative complications; Body mass index; Risk factors.

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■ RESUMO

Introdução: A abdominoplastia é uma das cirurgias estéticas mais realizadas no Brasil. As complicações deste procedimento são diversas, sendo o seroma uma das mais frequentes. O objetivo do trabalho é identificar fatores de risco para formação de seroma tais como: índice de massa corporal (IMC), comorbidades, idade, hábitos e tempo de permanência de dreno. **Métodos:** Trata-se de um estudo retrospectivo com revisão de 94 prontuários de pacientes submetidos à abdominoplastia clássica no Serviço de Cirurgia Plástica e Queimados da Santa Casa de Misericórdia de São José do Rio Preto-SP, entre novembro de 2010 e novembro de 2013. Os fatores de risco para formação do seroma foram analisados utilizando-se o teste exato de Fisher ou Qui-quadrado. Considerou-se como resultado estatisticamente significativo o valor de $p < 0,05$. **Resultados:** O seroma foi identificado em 16 pacientes (17,02%) do total da amostra ($n = 94$). Não se observou significância estatística ao relacionar a elevação na incidência de seroma com o aumento do IMC, assim como os demais fatores de risco analisados. Houve relevância clínica quanto ao tempo de permanência do dreno. Pacientes que mantiveram o dreno por um período maior que um dia tiveram incidência menor de seroma. **Conclusão:** A formação do seroma deve ser considerada uma causa multifatorial. Os fatores de risco analisados não demonstraram estatisticamente aumento na incidência de seroma. Todavia, a permanência do dreno de sucção por um período maior que um dia demonstrou ser eficaz na prevenção do seroma. **Descritores:** Abdominoplastia; Seroma; Complicações pós-operatórias; Índice de massa corporal; Fatores de risco.

INTRODUCTION

The first reported cases of abdominoplasty date back to 1899, when Kelly conducted a wide elliptical transverse resection in an abdominal panniculus¹. Currently, abdominal plastic surgery has evolved, with a low transverse incision and with flap detachment up to exposure of the costal margin and the subxiphoid region. Plication of the aponeurosis of the rectus abdominis muscles is performed for the correction of its diastase and then the resection of excess skin and lipectomy is performed².

Abdominoplasty is responsible for restoring body contour with the removal of excess skin and fat associated with toning of the abdominal wall owing to the plication of the rectus abdominis muscle. Surgical complications can be local or systemic. Local complications include epitheliolysis, suture dehiscence, hematoma, seroma, infection, hypertrophic scars, keloids, and necrosis. Systemic complications include deep venous thrombosis and pulmonary thromboembolism. Seroma is among the most common complications of abdominoplasty; thus, it is important to recognize the risk factors to prevent such.

Body mass index (BMI) is an international measure used to determine whether an individual is of ideal weight. It was developed by Lambert Quételet at the end

of the 19th century. This is a quick and easy tool for the assessment of body fat and is the international predictor of obesity adopted by the World Health Organization.

As BMI presents some disadvantages, such as the non-differentiation between the female and male sexes and inability to provide the relative percentage of fat in relation to lean mass (fat free), it should be ideally used in conjunction with other methods of evaluation of body composition (e.g., anthropometry and bio-impedance analysis). Despite these disadvantages, BMI is still one of the most widely used measures worldwide owing to its easy applicability.

OBJECTIVE

The purpose of this study was to associate excess weight as a risk factor for the formation of seroma. Risk factors, such as pre-existing diseases, habits, age, and time of drain permanence, were also analyzed.

METHODS

This was a retrospective study with review of medical records of 94 patients who underwent classical abdominoplasty in the Plastic Surgery and Burns Service

of Santa Casa de Misericórdia de São José do Rio Preto, SP from November 2010 to November 2013.

Patients who underwent anchor, hygienic, secondary abdominoplasty; postoperative follow-up in private clinics; and abdominoplasties combined with intracavitary surgery were excluded from the study. Smokers and patients with previous scars in the abdomen, such as those from open cholecystectomy (Kocher) or video-laparoscopic gynecological incision (Pfannenstiel) and median infraumbilical incision, were not excluded. The patients in this study were all women with conditions classified under American Society of Anesthesiologists class 1 or 2.

Abdominoplasty was indicated for patients who presented with excess skin and those with a possibility of undergoing total or partial resection of the infraumbilical flap, yielding an inverted-"T"-shaped scar (median scar perpendicular to the arciform scar resulting from classical abdominoplasty).

Data obtained from the medical records included as follows: age, sex, BMI, pre-existing diseases, habits, and time of permanence of vacuum drain, which was removed when the debit was equal to or less than 50 mL within 24 h. The patients who were smokers or employed contraceptives ceased their use at least 30 days before surgery.

The surgical technique was performed with the patients in the horizontal dorsal decubitus position under general or epidural anesthesia, with a low transverse suprapubic abdominal incision from one iliac crest to another. The abdominal flap was removed in the supra-aponeurotic plane, with the detachment of the umbilical scar extending up to the exposure of the costal arches and the subxiphoid region.

Plication of the aponeurosis of the rectus abdominis muscles was performed to correct diastasis; thereafter, dermolipectomy was performed. The new umbilical scar was repositioned, and the abdominal flap was fixed to the aponeurosis of the rectus abdominis muscle using

adhesive sutures. A vacuum suction drain was placed through an orifice in the pubic region.

Seroma was diagnosed on the basis of the findings of physical examination of the patients (i.e., bulging on abdominal palpation). At the first outpatient return (between the third and fourth postoperative visits), an abdominal binder was placed.

RESULTS

Seroma was diagnosed in 16 patients (17.02%), and the BMI varied from 26.87 to 36 kg/m² (mean, 26.87 kg/m²). Table 1 shows the distribution of seroma according to BMI.

Among all patients with above-normal weight (n = 73), 14 presented seroma (19.17%). Among patients with normal BMI (n = 21), only two presented with seroma (9.52%). However, this result was not statistically significant.

The age of the patients ranged from 17 to 62 years (mean, 40.32 years). As shown in Table 2, the patients with seroma were stratified according to age group. Regarding age as a risk factor, we observed that 10 patients aged above 40 years presented seroma compared with six patients aged below 40 years (*p* < 0.465).

Nineteen patients had pre-existing diseases; among them, four had two associated comorbidities. Systemic arterial hypertension had the highest prevalence (n = 10), followed by smoking (n = 4) as shown in Table 3.

The duration of suction drain use ranged from 1 to 12 days (mean, 2.93 days). The patients who had a high debit (> 50 mL during a 24-h period) were maintained on the drain until the recommended values for its withdrawal were reached.

Regarding the time of drain permanence, the following results were obtained: 56 patients used the drain for only 1 day, of which 13 presented seroma. Of the 38 patients who used the drain for > 1 day, only three presented seroma (*p* < 0.0554).

Table 1. Distribution of seroma according to body mass index (BMI).

BMI	Total number of patients by BMI category	Number of patients with seroma	Percentage of patients by BMI category who developed seroma
< 25 kg /m ²	21	2	9.52%
25-29.9 kg/m ²	58	12	20.68%
30-34.9 kg/m ²	14	2	14.28%
35-39.9 kg/m ²	1	0	0%
≥ 40 kg/m ²	0	0	0%
Total	94	16	17.02%
All patients with above-normal weight (BMI of ≥ 25 kg/m ²)*	73	14	19.17%

**p* < 0.325 when compared with patients with normal weight (BMI of < 25 kg/m²). BMI: Body Mass Index.

Table 2. Patients with seroma distributed by age range.

Age range	Number of patients with seroma	%
20-29	2	12.50
30-39	4	25.00
40-49	5	31.25
50-59	3	18.75
≥ 60	2	12.50
Total	16	100

p < 0.465 when compared with patients aged below and above 40 years.

Table 3. Prevalence of comorbidities and habits.

Comorbidities	Number of patients	%
SAH	7	7.44
Smoking	3	3.19
Hypothyroidism	2	2.12
Arthritis	2	2.12
Sickle cell trait	1	1.06
Treated breast cancer + SAH	1	1.06
SAH + diabetes mellitus	1	1.06
Smoking + diabetes mellitus	1	1.06
SAH + hypothyroidism	1	1.06
Total	19	20.21

SAH: Systemic arterial hypertension; *p* < 0.435 when comorbidities were analyzed as risk factors for the formation of seroma.

DISCUSSION

Seroma is one of the most frequent complications in abdominoplasties³, and surgeons should be aware of its causes to prevent it. The proposed mechanisms for the formation of serous fluid are interruption of the lymphatic vascular structures and the development of dead space during extensive subcutaneous abdominal flap detachment, shearing displacement forces between the flap and the abdominal wall, and the release of inflammatory mediators⁴.

The main predisposing factors for the formation of seroma include obesity, weight loss (resulting in a hypertrophic lymphatic system), extension of the detachment area of the dermofat flap, prior supraumbilical scar (acting as a barrier to lymphatic drainage), and association of lipoaspiration^{2,5}.

Kim and Stevenson⁶ analyzed the formation of seroma in patients who underwent abdominoplasty and observed that patients with overweight or obesity presented a higher incidence of seroma (38%) than patients with normal weight (19%). Similarly, Najera et al.⁷ reported that patients with above-normal weight have an increased risk of seroma when compared with those with normal BMI.

In this study, 14 of the 73 patients with above-normal weight (19.17%) and 2 of the 21 patients with normal BMI presented seroma (9.52%). However, these data do not allow us to affirm that an increased BMI increases the incidence of seroma (*p* < 0.325).

Regarding the time of permanence of the suction drain, 13 of the 56 patients who used the drain for 1 day and only 3 of the 38 patients who were maintained on the drains for > 1 day presented seroma. These data were not statistically significant (*p* < 0.0554); however, the result has a clinical relevance, suggesting that patients who are maintained on the drain for > 1 day have a lower incidence of seroma. Nurkim et al.² believe that suction drains with prolonged active drainage are effective in the prevention of seroma or hematoma.

In this study, age, pre-existing diseases, and smoking were not related to a higher incidence of seroma when analyzed using the Fisher's test and Chi-square test than when compared alone. Matarasso⁵ reported that age alone is not considered a risk factor.

New surgical techniques have shown promising results in reducing complications in abdominoplasty. With the advent of lipoabdominoplasty, Saldanha et al.^{8,9} described the benefits of vascular and lymphatic preservation by standardizing selective detachment between the inner edges of the rectus abdominis muscles, thereby significantly reducing complication rates; Di Martino et al.³ also reported a reduction in the incidence of seroma in lipoabdominoplasty when compared with classic abdominoplasty.

CONCLUSION

The formation of seroma is multifactorial. Large detachments of the abdominal flap must be avoided, and other measures, such as reduction in the surgical time, use of adhesive sutures, use of an abdominal binder, and adequate rest for patients, should be considered. In this study, the risk factors analyzed showed no statistical significance in relation to the incidence of seroma. However, the permanence of the suction drain for > 1 day has been shown to be effective in the prevention of seroma.

COLLABORATIONS

- TMN** Analysis and/or interpretation of data.
- FGLS** Statistical analyses.
- LFA** Conception and design of the study.
- ERBRG** Final approval of the manuscript.
- VMS** Writing the manuscript or critical review of its contents.

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