Original Article

Use of negative pressure therapy in closed surgical incisions of post-bariatric dermolipectomy

Uso da terapia de pressão negativa em incisões cirúrgicas fechadas de dermolipectomia pós-bariátrica

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■ **ABSTRACT**

Introduction: Negative pressure therapy gains ground in surgical practice as an intervention to improve healing. Post-bariatric patients undergoing abdominal dermolipectomy are at increased risk of local complications. There is a notable dearth of current Brazilian studies on this. This study aims to analyze the presence of complications in patients undergoing post-bariatric dermolipectomy surgery with negative pressure dressing in closed surgical incisions. **Method:** Descriptive study that evaluated complications of surgical incisions in 20 patients undergoing post-bariatric dermolipectomy surgery with negative pressure therapy. Data tabulated in Windows Excel software and analyzed in the Statistical Package for the Social Sciences 18.0 program. Qualitative variables were presented in simple frequency and quantitative as mean, standard deviation, and amplitude. CEP-UNISUL approved the study. **Results:** 20 patients undergoing negative pressure therapy, 80% (n=16) female, mean age 39.55 years (±9.08). Anchor incision was chosen in 70% (n=14) of the surgeries, with an average tissue removal of 1940 grams (±710.37) and hospitalization time of 40.20 hours (±19.18), corresponding to 1,66 daily. Only 15% (n=3) of patients had complications (dehiscence, seroma, and hematoma, which occurred in the same proportion). There was no case of necrosis. **Conclusion:** The use of negative pressure therapy in closed surgical incisions of post-bariatric dermolipectomy seems to contribute to reducing postoperative complications.

Keywords: Negative-pressure wound therapy; Reconstructive surgical procedures; Body contouring; Obesity; Wound Healing; Seroma; Bruise; Necrosis.

■ **RESUMO**

Introdução: Terapia de pressão negativa ganha espaço na prática cirúrgica como intervenção para melhorar cicatrização. Pacientes pós-bariátricos submetidos a dermolipectomia abdominal apresentam maior risco de complicações locais. Há uma notável escassez de estudos brasileiros atuais acerca disso. O objetivo desse estudo é analisar a presença de complicações em pacientes submetidos a cirurgia de dermolipectomia pós-bariátrica com curativo de pressão negativa em incisões cirúrgicas fechadas. **Método:** Estudo descritivo que avaliou complicações de incisões cirúrgicas de 20 pacientes submetidos a cirurgia de dermolipectomia pós-bariátrica com terapia de pressão negativa. Dados tabulados no software Windows Excel e analisados no programa Statistical Package for the Social Sciences 18.0. Variáveis qualitativas foram apresentadas em frequência simples e quantitativas através de média, desvio padrão e amplitude. O estudo foi aprovado pelo CEP-UNISUL. **Resultados:** 20 pacientes submetidos a terapia de pressão negativa, sendo 80% (n=16) do sexo feminino, com idade média de 39,55 anos (±9,08). Incisão em âncora foi escolha em 70% (n=14)

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das cirurgias, com retirada média de tecido de 1940 gramas (±710,37) e tempo de hospitalização de 40,20 horas (±19,18), correspondendo a 1,66 diárias. Apenas 15% (n=3) dos pacientes apresentaram complicações (deiscência, seroma e hematoma, que aconteceram na mesma proporção). Não houve caso de necrose. **Conclusão:** Uso da terapia de pressão negativa em incisões cirúrgicas fechadas de dermolipectomia pós-bariátrica parece contribuir na redução das complicações pós-operatórias.

Descritores: Tratamento de ferimentos com pressão negativa; Procedimentos cirúrgicos reconstrutivos; Contorno corporal; Obesidade; Cicatrização; Seroma; Hematoma; Necrose.

INTRODUCTION

Obesity is defined as an abnormal or excessive accumulation of body fat that can affect health[1]. Currently, about a third of the world's population is obese or overweight[2]. In Brazil, 18.9% of Brazilians are obese, and over half of the population is overweight[3].

The high prevalence rate of obesity makes Brazil the second country where most bariatric and metabolic surgery is performed, the most effective treatment for the disease, which increased by 46.7% between 2012 and 2017, 76% of which in men and female[4]. Surgical success is considered when there are losses greater than 20% of the total body weight in 6 months[5]; however, the loss of excess weight in 5 years can vary between 59.1% and 69.3% when undergoing laparoscopic sleeve gastrectomy Roux-en-Y gastric bypass, respectively[6].

After significant weight loss, skin flaccidity associated with ptosis in different anatomical compartments are direct consequences[7], and about half of the patients feel dissatisfied with this result[8]. Plastic surgery receives them after weight stabilization and performs abdominal dermolipectomy, mammoplasty, brachioplasty, and cruroplasty, among others[9]. Such procedures are desired by 65% of male patients and 85% of female patients[10], mainly in the abdominal region[11].

Every surgery is subject to complications, whether major complications such as hemorrhage, deep vein thrombosis (DVT), and pulmonary thromboembolism (PTE); or smaller such as hematoma, surgical dehiscence, seroma, and surgical wound infection[12]. Preoperative evaluation and postoperative care are relevant to avoid them and obtain better functional and aesthetic results for the patient[13], especially in post-bariatric patients, who have a significantly higher risk of complications (48%) compared to non-bariatric patients undergoing surgery to reduce weight (29%)[14]. However, even with all care taken, 68% of cases present seroma, dehiscence, or hematoma, and 32% may present abscess, seroma infection, pathological scarring, DVT, and PE[15]. Seroma is the most frequent minor complication[16].

Postoperative dressings are essential for reducing minor complications and are basically divided into two types: the common ones, which include micropore, bandage, adhesive tapes, and modern dressings such as negative pressure therapy[17]. The latter is a modality gaining ground in surgical practice as an intervention method to improve the healing process, in risky closed incisions, by keeping the wound edges together, stimulating blood perfusion, reducing tension and edema, and protecting the wound against infections[18].

Current international literature recognizes the many benefits of using negative pressure therapy in closed surgical incisions, identifying its value in treatment[19-23]. In our midst, however, there is a notable lack of studies on the subject; that said, verifying the impact of negative pressure therapy in closed surgical incisions of dermolipectomy in post-bariatric patients becomes of great value to be studied.

OBJECTIVE

To analyze the presence of complications in patients undergoing post-bariatric dermolipectomy with negative pressure dressing in closed surgical incisions.

METHOD

Observational, descriptive study carried out from August to November 2019 with collection through the physical records of a clinic in Florianópolis, Santa Catarina, Brazil. Twenty patients who underwent post-bariatric dermolipectomy surgery comprised the study population. The sample is non-probabilistic for convenience. Clinical and surgical data of patients who underwent the procedure with a negative pressure dressing were included, including sex, age, type of bariatric surgery, body mass index (BMI) pre-bariatric surgery, total weight loss, time since bariatric surgery, pre-abdominal dermolipectomy BMI, smoking, type

of abdominal incision, tissue removed, length of stay and complications.

Data were tabulated in Windows Excel software and then analyzed using the Statistical Package for the Social Sciences 18.0 program. Qualitative variables were presented in simple and relative frequencies, and quantitative variables as mean standard deviation and amplitude. The study was submitted and approved by the Research Ethics Committee of Unisul under CAAE 16295519.0.0000.5369.

Surgical technique

Dermolipectomy surgery with extensive tissue removal without additional procedures, such as liposuction, was the surgical procedure all patients underwent. The surgically removed tissue was weighed and recorded in the medical record. Surgical wound closure was performed in all patients adequately to avoid dead space formation, after which negative pressure therapy was established continuously at 125mmHg. The procedure in this study can be seen in the figures below (Figures 1A, 1B, 1C, 2A, 2B, and 2C).

A Portovac-type continuous suction drain was used in the suprafascial space as a routine. All participants used negative pressure therapy for 7 days and then migrated to a simple dressing with micropore until the surgical stitches were completely removed on the 14th day.

Patients had follow-up appointments on the seventh, fourteenth, and thirtieth postoperative days for clinical evaluation of the surgical incision, with the results recorded in the physical record.

RESULTS

Twenty patients underwent negative pressure therapy in a closed surgical incision of post-bariatric dermolipectomy. The clinical and surgical characteristics identified in each patient are described in Table 1. 80% of the participants were female (n=16), and the mean age was 39.55 years (±9.08), with an age range of 29 and 59 years old.

Roux-en-Y gastric bypass was the most prevalent bariatric and metabolic surgery technique in 90% (n=18), with a mean pre-surgical BMI of 43.85 kg/m2 (±5.31) and weight loss average weight of 39.41% (±8.72). The mean time to perform the post-bariatric dermolipectomy surgery was 32.45 months (±18.31). A pre-dermolipectomy BMI of 26.55 kg/m2 (±2.18) was demonstrated, with a minimum and maximum value of 23 and 30 kg/m2, respectively. Smoking was absent in 85% (n=17).

The anchor incision was chosen in 70% (n=14) of the procedures. There was an average tissue resection of 1940 grams (±710.37), corresponding to an average excision of 2.75% (±1.04) concerning weight before dermolipectomy. Post-dermolipectomy hospitalization was 40.20 hours (±19.18), equivalent to 1.66 days.

Only 15% (n=3) of the patients had complications, namely dehiscence, seroma, and hematoma, which occurred in the same proportion. No case of necrosis of any extent was identified (Table 2).

Figure 1. A. Preoperative plastic surgery of post-bariatric dermolipectomy (right profile); **B.** Preoperative plastic surgery of post-bariatric dermolipectomy (front); **C.** Preoperative plastic surgery of post-bariatric dermolipectomy (left profile).

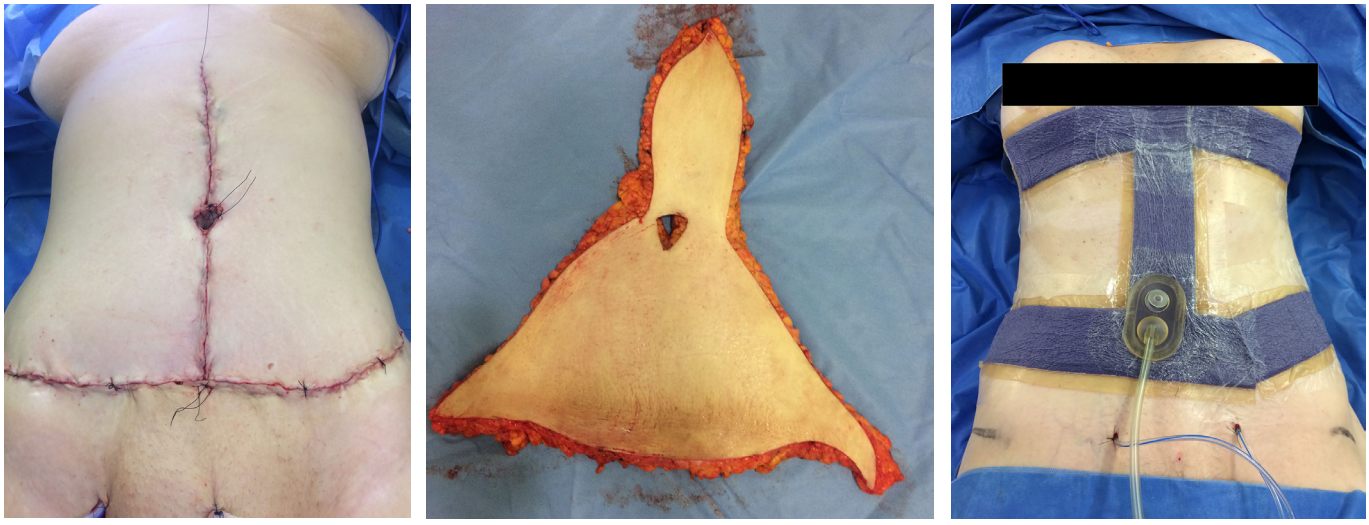

Figure 2. A. Immediate postoperative; **B.** Surgical specimens removed in the transoperative period of post-bariatric dermolipectomy surgery using the anchor technique; **C.** Installation of negative pressure therapy and Portovac drain.

Table 1. Clinical and surgical characteristics and outcome of each patient.

#Case Sex Age years)	Type of bariatric surgery (pre-OP BMI) Total weight loss (%) Time since surgery (months) Pre-dermolipectomy BMI (kg/m²) Smoking	Type of incision Tissue removed (grams) Tissue removed (%) Hospitalization time (hours)	Complications
#1 ♀ 33 years old	*Roux-en-Y* gastric bypass (40.27 kg/m²) 46.72% 48 months 26.34 kg/m²	In anchor 1900.00g 2.71% 24 hours	-
#2 ♀ 45 years	*Bypass*Roux-en-Y gastric (45.72 kg/m²) 41.66% 36 months 26.67 kg/m²	In anchor 2100.00g 3% 72 hours	-
#3 ♀ 36 years old	*Roux-en-Y* gastric bypass (39.54 kg/m²) 34.18% 60 months 25.68 kg/m²	Classic 1900.00g 2.50% 36 hours	-
#4 ♀ 37 years	*Roux-en-Y* gastric bypass (49.47 kg/m²) 42.10% 26 months 30.04 kg/m²	In anchor 2000.00g 2.66% 72 hours	-
#5 ♀ 59 years old	Sleeve gastrectomy (32.84 kg/m²) 14.63% 36 months 28.04 kg/m² Smoker	In anchor 2000.00g 2.85% 72 hours	-
#6 ♀ 31 years	Sleeve gastrectomy (53.23 kg/m²) 43.47% 78 months 30.47 kg/m²	In anchor 2000.00g 2.53% 72 hours	-
#7 ♀ 34 years	*Roux-en-Y* gastric bypass (36.57 kg/m²) 31.37% 17 months 26.89 kg/m²	at anchor 2900.00g 3.86% 24 hours	-
#8 ♂ 31 years	*Roux-en-Y* gastric bypass (53.62 kg/m²) 47.48% 15 months 24.3 kg/m²	Classic 600.00g 0.95% 24 hours	Bruise

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Table 1. Clinical and surgical characteristics and outcome of each patient.

#Case Sex Age years)	Type of bariatric surgery (pre-OP BMI) Total weight loss (%) Time since surgery (months) Pre-dermolipectomy BMI (kg/m²) Smoking	Type of incision Tissue removed (grams) Tissue removed (%) Hospitalization time (hours)	Complications
#9 ♀ 32 years old	*Roux-en-Y* gastric bypass (48.47 kg/m²) 44.64% 26 months 28.99 kg/m²	At anchor 3600.00g 5.37% 24 hours	-
#10 ♀ 29 years old	*Roux-en-Y* gastric bypass (40.27 kg/m²) 38.31% 14 months 24.84 kg/m² Smoker	In anchor 2000.00g 3.03% 24 hours	Dehiscence
#11 ♀ 57 years old	*Roux-en-Y* gastric bypass (40.26 kg/m²) 43.87% 22 months 22.6 kg/m²	In anchor 1800.00g 3.27% 24 hours	-
#12 ♀ 38 years	*Roux-en-Y* gastric bypass (48 kg/m²) 42.59% 30 months 26.22 kg/m²	Classic 1200.00g 2.03% 24 hours	-
#13 ♀ 31 years	*Roux-en-Y* gastric bypass (39.51 kg/m²) 47.61% 36 months 22.58 kg/m² Smoker	Eat anchor 3000.00g 5.00% 24 hours	-
#14 ♀ 51 years	*Roux-en-Y* gastric bypass (47.25 kg/m²) 45.21% 32 months 25.88 kg/m²	In anchor 1000.00g 1.58% 48 hours	-
#15 ♀ 36 years olds	*Roux-en-Y* gastric bypass (40.61 kg/m²) 37.93% 16 months 25.9 kg/m²	Classic 1500.00g 2.02% 24 hours	-
#16 ♂ 40 years	*Roux-en-Y* gastric bypass (45.63 kg/m²) 29.62% 48 months 30.42 kg/m²	In anchor 2500.00g 2.77% 48 hours	-
#17 ♂ 34 years	*Roux-en-Y* gastric bypass (41.09 kg/m²) 24.39% 17 months 29.4 kg/m²	Classic 2200.00g 2.50% 48 hours	-
#18 ♂ 46 years	*Roux-en-Y* gastric bypass (45.16 kg/m²) 43.33% 8 months 25.21 kg/m²	In anchor 1800.00g 2.68% 24 hours	-
#19 ♀ 39 years old	*Roux-en-Y* gastric bypass (46.84 kg/m²) 49.12% 60 months 24.65 kg/m²	Classic 1800.00g 3.00% 48 hours	-
#20 ♀ 52 years	*Roux-en-Y* gastric bypass (41.62 kg/m²) 40% 24 months 26.22 kg/m² 26,22 kg/m²	In anchor 1000.00g 1.58% 48 hours	Seroma

♀ Women; ♂ Male gender; BMI: body mass index; - Absence of complications

Table 2. Complications related to the use of negative pressure therapy in closed surgical incisions in patients undergoing post-bariatric dermolipectomy surgery (n=20).

Outcomes	n	(%)
Total complications	3	15
Dehiscence	1	5
Seroma	1	5
Bruise	1	5
Necrosis	-	-

DISCUSSION

It is known that massive weight loss, such as that in patients undergoing metabolic and bariatric surgery, is directly related to aesthetic deformities that often make the individual not have a good perception of himself[8]. Body contouring plastic surgery, dermolipectomy, becomes relevant for improving self-image acceptance[9]. However, post-bariatric patients have higher rates of surgical complications when compared to those who did not undergo weight reduction surgery[14].

It is indisputable that the greatest demand for post-bariatric abdominal dermolipectomy surgery is female. In the present study, 80% corresponded to this group, in line with several studies published both nationally and internationally[16,24-27]. The mean age was 39.50 years, similar to that found in the literature[24,26,27], but with a discrepancy of 4 years compared to a Colombian study by García Botero et al.[25].

The surgical technique of Roux-en-Y gastric bypass deserves to be highlighted as a surgical method for weight reduction in 90% of the patients analyzed. The pre-surgical BMI ranged, according to the formal indication of the Brazilian Society of Bariatric and Metabolic Surgery (SBCBM)[4], between 33 and 54 kg/m^2, with a mean value of 43.85 kg/m^2, which also corresponds to the value found in studies by Donnabella et al.[24] and Staalesen et al.[14].

The mean post-bariatric weight loss was 39.41% of the total body weight, which means that these patients achieved the efficacy goal proposed by the SBCBM with the procedure[5]. This shows how considerable the weight reduction is, to the point that the surgeon in charge foresees the likely need for post-bariatric reconstructive surgery as a method to improve the patient's quality of life. It is reiterated that the indication is not only aesthetic but also a hygienic-prophylactic method, as there are risks of eczema formation due to the accumulation of sweat and fetid odor, in addition to the proliferation of fungi and bacteria in regions with greater skin ptosis[9].

The average time between the bariatric surgery and the abdominal dermolipectomy was 32.45 months, a lower value than that found in the literature since the study by Donnabella et al.[24] showed 47 months. Notably, the procedure is indicated from when weight loss is stable, with no ideal minimum limit, but it has already become routine to indicate it from 6 months[9].

In that study, the mean pre-dermolipectomy BMI was 26.55 kg/m^2, and three patients were in the grade I obesity group (30.42; 30.47 and 30.04 kg/m^2), while the remaining were eutrophic or overweight, which is in line with several published articles[14,24,25,27]. It is essential to highlight that post-bariatric dermolipectomy surgery does not have weight loss as its main function; therefore, the plastic surgeon should consider it for those with a BMI below 30 kg/m^2 or with specific indications for those over 30 kg/m^2 [9].

Smoking was present in only 15% (n=3) of the participants in this study, and only one had partial dehiscence of the surgical incision, even with negative pressure therapy. It is already established both in the literature and in clinical practice that nicotine, a product present in cigarettes, hinders the healing process since the collagen fibers become disorganized and the granulation tissue deficiency prevents adequate cell proliferation for proper wound closure operative[28]; therefore, if the patient is an active smoker, a month-long cessation prior to the surgical act is requested.

The type of dermolipectomy surgical incision choice depends on clinical and surgical factors. In that study, there was a predominance of the proposed anchor incision in 70% of the patients, converging with the study by Donnabella et al.[24], however diverging from the article by Rosa et al.[27], in which it was only indicated in 19.42%. This difference can be attributed to the specific characteristics of the patients in this study, for example, time after bariatric surgery, skin flaccidity, and total weight loss. The average tissue resection was 1940 grams, with an average excision of 2.75% concerning the total body weight, confirming data obtained in the literature[14,26]. It is reiterated that the main objective of post-bariatric surgery is to correct flaccidity and not to reduce weight.

In this study, patients who had the installation of negative pressure therapy in the surgical incision of post-bariatric dermolipectomy had an average

hospital stay of 40.2 hours, equivalent to only 1.66 days, while in several studies, which did not have the use of negative pressure therapy as an intervention, hospital stays varied between 2 and 5 days[16,27]. This reduction can be associated with the immobilization of the surgical wound maintained by the dressing; this results in less local pain stimulation, greater comfort, and early return of the patient to his daily activities.

There are several risk factors for complications in patients with significant weight loss due to bariatric surgery compared to those who lost weight through diet and physical activity, 48% vs. 29%[14]. In the cohort study by García Botero et al.[25], the rate of minor complications in wide abdominal dermolipectomy surgery was 53.7%, mainly seroma, and dehiscence. These data remain high in the literature, following the pattern of rates greater than 20%[14,16,26,27].

Only 15% of the participants in this study had minor complications, in equal proportions, in the case of dehiscence, seroma, and hematoma. No case of necrosis of any extent was found in all patients who underwent the post-bariatric abdominal dermolipectomy procedure using negative pressure therapy. These results seem to indicate that negative pressure can improve the healing process by stabilizing the wound edges close to the suture line, increasing local blood perfusion, and decreasing tension and edema[18].

COLLABORATIONS

LGF Analysis and/or data interpretation, Conception and design study, Conceptualization, Data Curation, Methodology, Project Administration, Visualization, Writing - Original Draft Preparation.

DFL Conception and design study, Final manuscript approval, Supervision.

CONCLUSION

The present study is not exempt from design, population, and sample size limitations. However, the scarcity of national studies demonstrating a causal relationship between the use or not of negative pressure therapy in the surgical incision of post-bariatric abdominal dermolipectomy and its complications demonstrates its importance.

The use of negative pressure therapy in closed surgical incisions of post-bariatric abdominal dermolipectomy seems to indicate that it contributes to the reduction of postoperative complications, suggesting a significant decrease in the complications associated with this procedure. New studies are needed to confirm this outcome.

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