






Clinical and laboratory recovery of patients undergoing body liposuction associated with lipoabdominoplasty

Recuperação clínica e laboratorial dos pacientes submetidos à cirurgia combinada de lipoaspiração corporal e lipoabdominoplastia

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■ ABSTRACT

Introduction: Body liposuction and abdominoplasty are surgeries often performed together to obtain superior results in body modeling. Since associated surgeries often increase spoliation, being aware of the evolution of hemoglobin (Hb) in the postoperative period and during the recovery of the patients undergoing these associated surgeries is important for their safety. This study aimed to analyze the decrease in Hb and the clinical and laboratory results throughout the recovery of patients undergoing body liposuction associated with lipoabdominoplasty. **Methods:** A prospective study was conducted with patients undergoing body liposuction and lipoabdominoplasty. CBCs were collected before anesthetic induction, at the end of the surgery, before hospital discharge, after the 1st, 2nd, and 4th postoperative weeks, and during their clinical follow-up period. **Results:** The average Hb values at the end of surgery and hospital discharge were 10.4 g/dL (standard deviation (SD) 0.76) and 8.92 g/dL (SD 0.86), respectively. The average values during the recovery of Hb after the 1st, 2nd, and 4th weeks were 2.4% (SD 18.07), 41.6% (SD 18.4), and 74% (SD 15.2), respectively. This is in relation to the reduction between the initial Hb and at hospital discharge. Complaints of weakness and lipothymia were frequent until the second day. **Conclusion:** Clinical improvement was observed until the second postoperative day (PO day). Hemoglobin required approximately 1 month to normalize in most patients. These patients were treated only with oral iron replacement and did not require blood transfusions.

Keywords: Body contouring; Abdominoplasty; Lipectomy; Clinical evolution; Laboratory investigation; Anemia.

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■ RESUMO

Introdução: A lipoaspiração corporal e abdominoplastia são cirurgias muitas vezes realizadas em conjunto para obter melhores resultados na modelagem corporal. Cirurgias associadas sempre aumentam a espoliação, por isto conhecer o comportamento da hemoglobina (Hb) no pós-operatório e a recuperação do paciente submetido a estas cirurgias combinadas é importante para sua segurança. O objetivo deste trabalho foi estudar a queda da Hb e a recuperação clínica e laboratorial dos pacientes submetidos à cirurgia combinada de lipoaspiração corporal e lipoabdominoplastia. **Métodos:** Realizou-se um estudo prospectivo em pacientes submetidos à lipoaspiração corporal e lipoabdominoplastia, coletando-se hemogramas antes da indução anestésica, ao final da cirurgia, antes da alta hospitalar, após a 1^a, 2^a e 4^a semanas de pós-operatórios e também acompanhando suas evoluções clínicas. **Resultados:** A média da Hb ao final da cirurgia e na alta hospitalar foi de 10,4g/dl (desvio padrão (DP) 0,76) e 8,92g/dl (DP 0,86), respectivamente. A recuperação em média da Hb após 1^a, 2^a e 4^a semanas foi de 2,4% (DP 18,07), 41,6% (DP 18,4) e 74% (DP 15,2), respectivamente, em relação a redução que ocorreu entre a Hb inicial e a da alta hospitalar. Queixas de fraqueza e lipotimia foram frequentes até o segundo dia. **Conclusão:** A melhora clínica ocorreu até o segundo dia de pós-operatório (DPO) e a hemoglobina levou aproximadamente 1 mês para normalizar na maioria dos pacientes tratados apenas com reposição oral de ferro, sem necessidade de hemotransfusão.

Descritores: Contorno corporal; Abdominoplastia; Lipectomia; Evolução clínica; Investigação laboratorial; Anemia.

INTRODUCTION

Improvement of body contour is popular in the clinics of plastic surgeons. Flaccidity and localized fat in the abdomen are often associated with fat accumulation in other areas, such as thighs, flanks, back, and arms. For this reason, treating only the abdomen does not lead to satisfactory results in terms of body contouring, which also occurs when it is association with liposuction in other areas of the body. Patients usually seek treatment to improve their body silhouette by tapering the waist and increasing and shaping the buttocks in addition to reducing flaccidity and abdominal fat. Thus, lipoabdominoplasty associated with body liposuction and buttock fat grafting is currently the most appropriate treatment to achieve the results desired by most patients (Figure 1 to 9).

Although plastic surgery is considered a safe procedure, it requires a rigorous preoperative evaluation of the patient and trans and postoperative control, including the use of risk assessment tables for plastic surgery¹. Associated surgeries increase patient risk and require even greater attention. Iverson (2002)² indicates liposuction associated with other surgical procedures as one of the main transoperative factors



Figure 1. Clinical case: preoperative, front.



Figure 2. Clinical case: preoperative, profile.

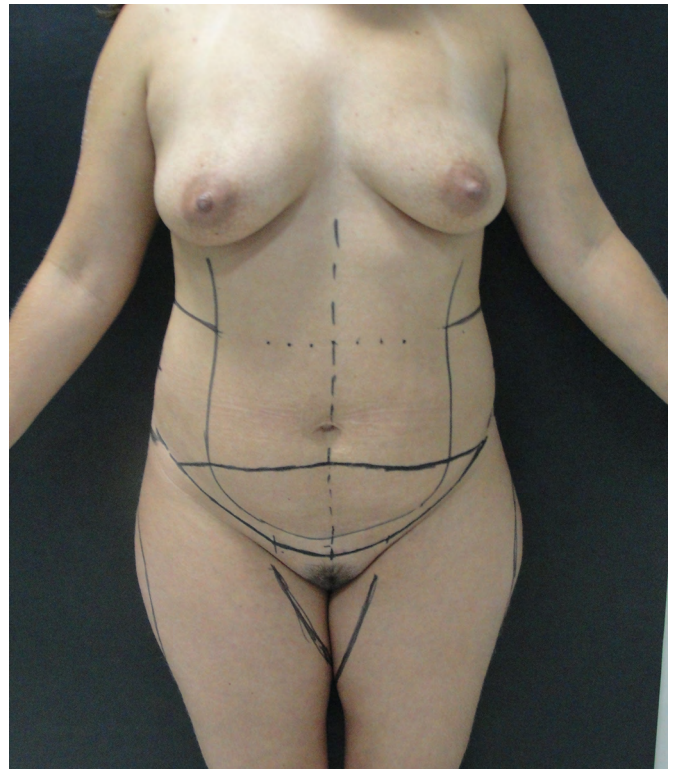


Figure 4: Clinical case: marking of the surgical planning, front.



Figure 3. Clinical case: preoperative, posterior.

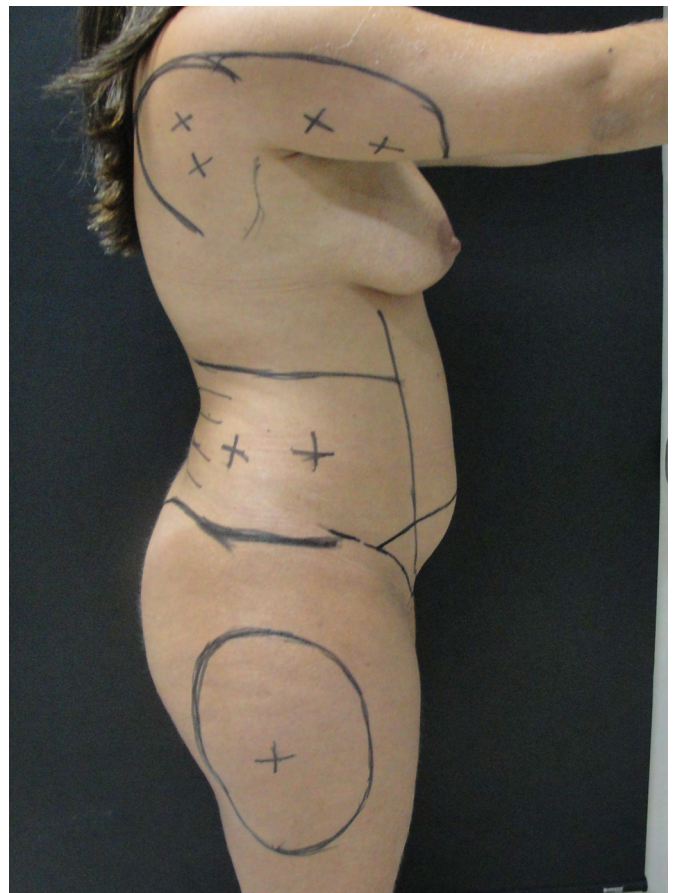


Figure 5: Clinical case: marking of the surgical planning, profile.

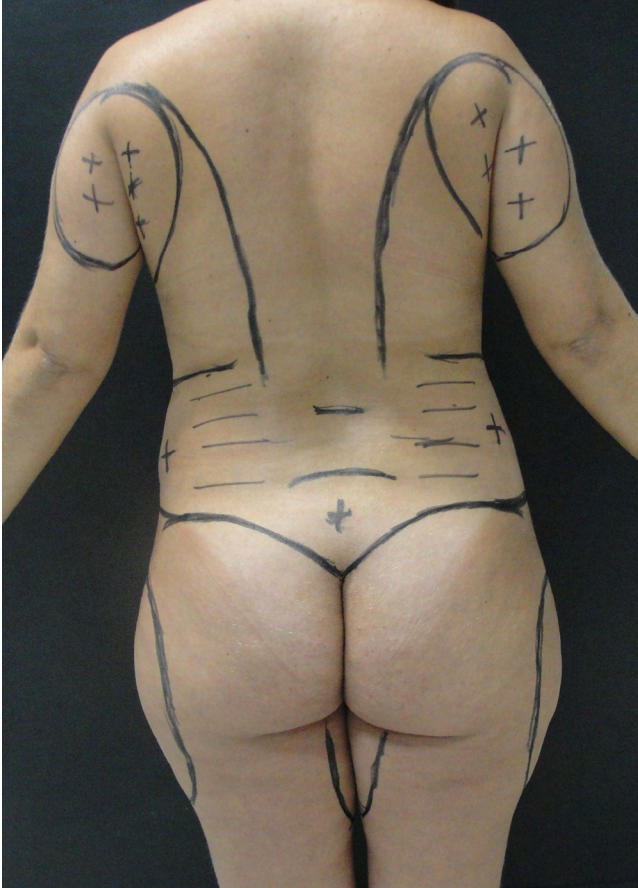


Figure 6. Clinical case: marking of the surgical planning, posterior

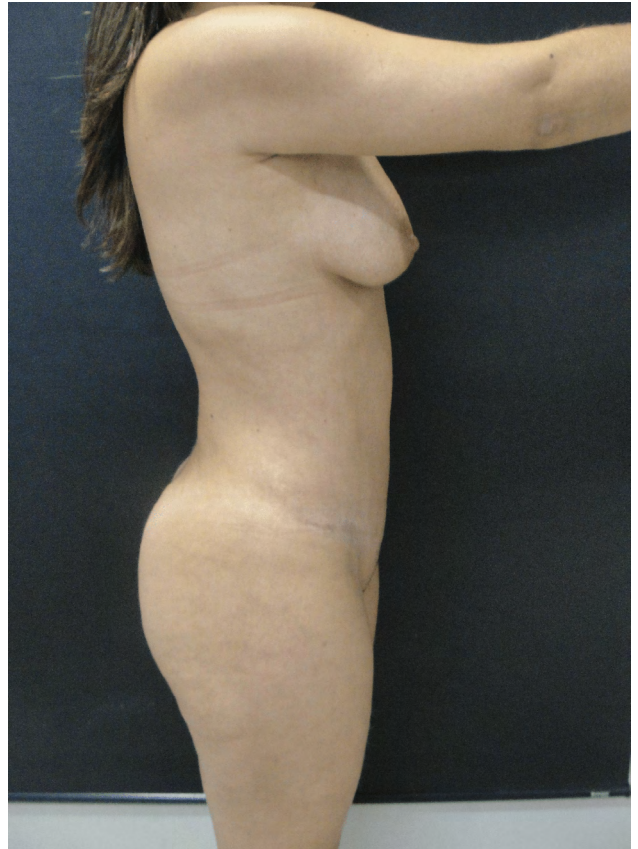


Figure 8. Clinical case: Six months postoperatively, profile.



Figure 7. Clinical case: Six months postoperatively, front.

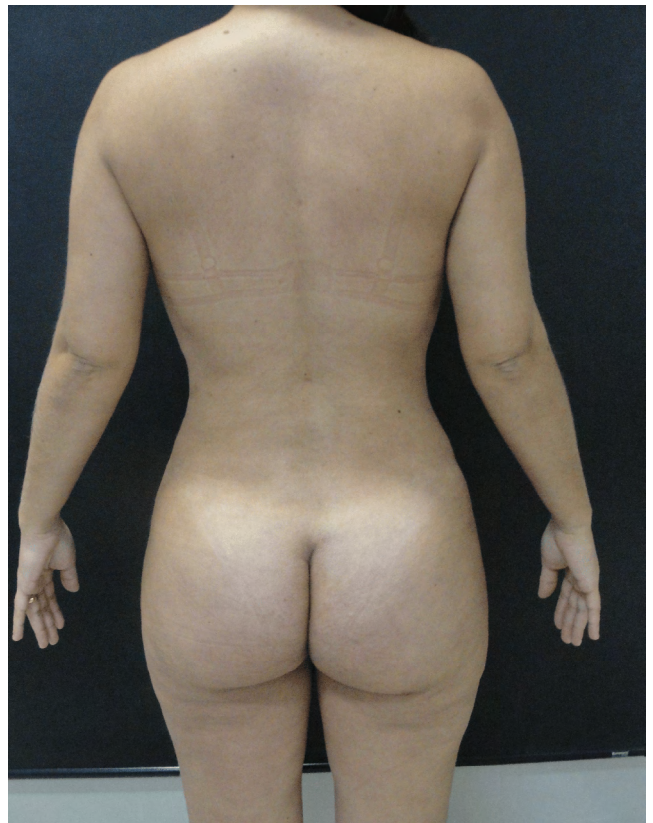


Figure 9. Clinical case: Six months postoperatively, posterior.

generating physiological fatigue, along with blood loss, hypothermia, and duration of surgery, among others². For this reason, investigating and realizing safe limits for the anticipated amount of surgery is extremely important for physicians. Resolution No. 1,711 of 2003 of the Federal Medical Council states that liposuction should be limited to a maximum of 40% of the body surface area and the aspirated volume should not exceed 5% of the patient's body weight using the dry technique and 7% of the patient's body weight when using the infiltration technique³. However, when other surgeries are associated with liposuction, common sense tells us to reduce these values. There is no common consensus on the volume limit that can be safely aspirated.

In liposuction, accurately determining the amount that requires aspiration to achieve appropriate results is not an easy task. There is possibility of exceeding safe limits in some cases. Cupello (2015)⁴ reported 1.76% of complications were due to hypovolemia as a result of excessive liposuction. Sozer (2018)⁵ reported that 1% of patients in his series required blood transfusions. Thus, having an estimate of the expected reduction in hemoglobin (Hb), by aspirated volume, would assist surgeons in surgical planning and clinical management of patients, thus reducing risks and avoiding blood transfusions.

Few studies correlate the decrease in Hb to liposuction associated with lipoabdominoplasty. This information is crucial as it provides parameters to guide surgeons on postoperative anemias and how they evolve throughout the patient's recovery.

OBJECTIVE

To examine the postoperative changes in Hb and the clinical recovery of patients undergoing body liposuction associated with lipoabdominoplasty.

METHODS

This cross-sectional, prospective, and descriptive study was conducted from December 2017 to March 2018 in the Spani Vendramin clinic. The inclusion criteria were patients who underwent body liposuction associated with lipoabdominoplasty and was performed by the primary author of this study. The exclusion criteria were patients who did not want to participate in the study, those who underwent bariatric surgery, and those who could not be followed up as required by the surgical methodology. All patients signed an informed consent form (ICF), and the research project was approved by the Research Ethics Committee of the João de Barros Barreto University Hospital under Opinion No. 2,735,756.

Patients underwent CBC tests before the induction of anesthesia, at the end of the surgery, on the morning of the day before hospital discharge, and at the 1st, 2nd, and 4th postoperative weeks. A questionnaire was completed at the patients' clinical follow-up requesting information on lipothymia, fainting, and duration of weakness. The decrease in Hb post-surgery, after hospital discharge, and its recovery over the 1st, 2nd, and 4th weeks were evaluated. During this period, oral iron replacement (120 mg BID) was administered. The association between the frequency of complaints of weakness and/or lipothymia and the reduction in hemoglobin were examined. The reduction in hemoglobin and the percentage of aspirated volume were also evaluated. In the transoperative period, the aspirated volume, the percentage of area treated with liposuction, and the quality of the aspirate were measured. We used the relative percentages of the Lund-Browder chart to establish the percentage of treated area, similar to Matos Júnior (2005)⁶. The volume of supernatant fat was divided by the total aspirated volume, including the fluid with solution and blood, to determine the quality of liposuction. The closer the value was to 1, the better the quality of the aspirate.

Surgical technique

The infiltration technique for liposuction was used, with an approximate ratio of 1:1 between the infiltrated volume and the aspirated volume (superwet). A physiological solution was prepared with adrenaline 1:500,000. The surgery began with the patient in prone position, and liposuction and fat grafting were performed in the planned areas, such as the thighs, buttocks, back, and arms, with a 3.5 mm and a 4.0 mm cannulae. After this step, the patient was placed in a supine position, and the abdomen was aspirated followed by plastic surgery. Dissection was performed from the central region up to the xiphoid appendix to perform aponeurosis plication of the rectus abdominis muscles with inverted "X" sutures using polypropylene 0 threads. The excess flap was removed, and some adhesion sutures were made between the flap and the muscle aponeurosis using 2.0 polyglactin thread. Umbilicoplasty, vacuum drainage, and suturing by planes with polyamide 3.0, 4.0, and 5.0 threads, as well as poliglecaprone 4.0 sutures were completed. The patient wore a modeler in the postoperative period, which was kept open in the abdomen area for the first 5 days and then closed after this period. She also received daily lymphatic drainage from the 2nd PO day forward. Prophylaxis for deep vein thrombosis with 40 mg of enoxaparin was administered once a day for 7 days.

RESULTS

Sixteen patients, all female, aged between 33 and 45 years (average 36.2 years) participated in the study. The average of aspirated volume, the percentage of aspirated volume in relation to the patient's weight, and the percentage of body surface area treated were 4.26 liters, 6.5%, and 33.1%, respectively. The average Hb at the end of surgery and at hospital discharge was 10.4 g/dL and 8.92 g/dL, respectively. The percentage of the reduction in Hb between the beginning and end of surgery was, on average, 19.7%, and between the beginning of surgery and discharge was 30.2%. Table 1 summarizes the main results.

Regarding laboratory results and the evolution of Hb, at the end of 1 week 37.5% of patients had an average reduction of 15.6% compared to HB levels at hospital discharge. However, the overall average of HB recovery was 2.4% (SD 18.07) in the first week compared to the decrease in the initial Hb and in relation to hospital discharge. In the second week, there was a recovery of 41.6% (SD 18.4), on average. At 4 weeks postoperatively, 12 of the 16 patients had Hb levels normal or very close to normal (Hb \geq 11.5 g/dL). The average Hb of the patients in this study period was 11.85 g/dL, which corresponded to a recovery of 74% (SD 15.2) compared to the initial decrease in Hb after hospital discharge. Table 2 summarizes the laboratory results and the evolution of Hb of the patients in the postoperative period.

Clinically, symptoms of lipothymia and weakness were observed in 43.75% (7 out of 16) of the patients who passed out within 2 days post-surgery (Table 2). There were no cases of fainting. There was no statistically conclusive correlation between the symptoms and the drop in Hb at hospital discharge nor between the symptoms and the percentage of aspirated volume.

DISCUSSION

Liposuction associated with abdominoplasty is one of the plastic surgeries most frequently performed⁷. Although several authors show safe and consistent results^{5,8}, few studies define safety parameters on aspirated volume and the evolution of Hb in the postoperative period. Oliveira Junior (2018)⁹ investigated the change in Hb and hematocrit in the immediate postoperative period and at hospital discharge in patients undergoing lipoabdominoplasty, without associating it with liposuction in other areas of the body. He reported a 20% reduction in the Hb level, with most patients being discharged from the hospital with Hb values above 10 g/dL, and the lowest value being 9.3 g/dL⁹. However, Campos (2018)¹⁰ conducted a study with patients undergoing liposuction and/or abdominoplasty and compared the decrease in hemoglobin between the preoperative period and 7 to 10 postoperative days and reported a 22.16% reduction of Hb, with a minimum value of 7.8 g/dL¹⁰. These studies did not report the clinical complaints of patients in the postoperative period.

In our study, the decrease in Hb at the immediate postoperative period was 19.6% (SD 3.31), with an average Hb of 10.4 g/dL and a minimum Hb of 9.3 g/dL. There was no hemodynamic instability in any patient. Patients remained hospitalized until the following day and received hydration and analgesia, prophylaxis for infection, and prophylaxis for deep vein thrombosis. Hb decreased even further in patients' pre-discharge exams. The average Hb reduction between pre-surgery and discharge was 30.2% (SD 4.93), with an average Hb of 8.92 g/dL and a minimum Hb of 7.9 g/dL (Table 1). At the time of writing, 7 of the 16 patients

Table 1. Data Overview

Variable	Average	Standard Deviation
Age (years)	36,2 anos	4,64
Aspirated volume (ml)	4.260ml	1.451
Percentage of aspirated volume in relation to body weight (%)	6,5%	1,86
Quality of the aspirate	0,7 70% supernatant fat: 30% fluid with blood	0,08
Percentage of BS treated with liposuction (%)	33,1%	3,99
Hb in IPO (mg/dl)	10,4mg/dl	0,76
Percent reduction of Hb in IPO (%)	19,6%	3,31
Percent reduction of Hb in IPO per liter(%)	4,95%	1,9
Percent reduction of Hb at discharge per liter aspirated (%)	8,3%	4,26
Hb in hospital discharge (mg/dl)	8,92mg/dl	0,86
Percent reduction in Hb at hospital discharge compared to preoperative Hb (%)	30,2%	4,93
Percent reduction in Hb at hospital discharge compared to Hb in IPO (%)	13,3%	5,3

% = percentage; BS = body surface; Hb = hemoglobin; IPO = immediate postoperative.

Table 2. Clinical and laboratory evolution of Hb

Hb at hospital discharge (mg/dl)	Percent Hb reduction (%)	No complaints	1 day	1 day	Hb after 1 week (mg/dl)	Hb after 2 weeks (mg/dl)	Hb after 4 weeks (mg/dl)
			Lipothymia +	Lipothymia +			
			1 day	2 days			
			Weakness	weakness			
8.6	33.3			X	9.4	11.9	12.6
8.8	37.1			X	8.6	9.8	12.2
8.0	33.3		X		9.1	10.3	11.7
8.5	32.4	X			7.5	9.6	10.9
10.8	20.0	X			11.1	11.7	12.4
9.5	29.6	X			10.2	11.0	12.1
9.6	27.6	X			10.8	11.5	12.8
8.5	34.6	X			7.2	9.1	10.5
8.2	32.2		X		8.2	11.2	11.8
8.9	29.9			X	8.4	10.7	12.0
9.1	22.4	X			9.5	9.8	11.8
7.9	35.8			X	7.6	9.4	11.1
8.4	31.7		X		8.6	10.2	11.5
10.6	26.5	X			11.3	12	13.2
9.3	29.1	X			9.6	11.4	12.3
8.1	30.9	X			7.9	9.5	10.7

Hb = hemoglobin (g/dl); % = percentage.

demonstrated symptoms of lipothymia and weakness, however without hemodynamic instability. All patients were discharged for recovery at their homes with oral iron supplementation. Of the 7 patients with clinical complaints, only 4 continued to report symptoms on the following day, and on the third day, no patient showed symptoms of weakness or lipothymia. These complaints generally occurred in patients who experienced larger volumes of aspirate and/or had greater reductions in Hb, although statistically this was inconclusive. We noted that other individual factors may be associated with the presence of symptoms of weakness and lipothymia in patients. Some patients who had below-average volumes of aspirate reported clinical complaints and others with larger volumes of aspirate and lower Hb levels did not report symptoms.

The maximum safe volume for liposuction is a controversial issue in the literature^{2,11,12}. The limit established by the CFM in Brazil, although consensual, was not obtained by Evidence-Based Medicine criteria¹³. Chow (2015)¹¹, demonstrated that a greater volume can be aspirated in liposuction in patients with a higher body mass index (BMI). We noted that the quality of the aspirate of obese patients is higher, which would allow for aspirating a larger volume. Thus, we agree that BMI is a superior reference than the patient's

weight, (as currently occurs in Brazil), in order to establish the maximum volume that can be aspirated,

In an abdominoplasty surgery with circumferential liposuction, Sozer (2018)⁵ aspirated an average of 2,540 mL (1,650 to 6,200 mL) and reported that 1% of patients required blood transfusion⁵. Sanza performed megaliposuctions with a volume ranging from 6 to 10 liters and reported Hb values between 6 and 9 g/dL, with an average of 8.2 g/dL on the 1st PO day. However, he did not report information on blood transfusions¹². In the study by Leão (2010)¹⁴, the aspirated volume in lipoabdominoplasty associated with liposuction was 800 to 6910 mL, with an average of 2,524 mL¹⁴. In our study, the average aspirated volume was 4.26 liters, corresponding to 6.5% of body weight, and no patient had hemodynamic instability or received blood transfusions (Table 1).

The balance between the possible risks and the need for transfusion should always be considered. Transfusions always imply potential risks to the patient. Symptoms of weakness, lipothymia, and fainting, and signs such as tachycardia, hypotension, and reduced diuresis should be observed before deciding the need for a transfusion¹³.

According to the criteria of Carson and Kleinman (2017)¹⁵, in patients without active bleeding and that

are hemodynamically stable, a transfusion should only be performed in cases with Hb less than 6 g/dL. A transfusion is usually indicated in cases with a Hb between 6 and 7 g/dL, and a transfusion is recommended only if the patient has symptoms such as orthostatic hypotension, tachycardia, and myocardial ischemia that do not respond to fluid replacement in cases with an Hb between 7 and 8 g/dL¹⁵.

Formulas determining the reduction in Hb value after surgery would be useful to estimate the Hb levels in patients undergoing liposuction. It is estimated that the blood lost during a superwet liposuction corresponds to 1 to 2% of the aspirated volume^{11,13,16}. The average Hb reduction per liter aspirated in this study was 4.95% between the beginning and the end of the surgery. The reduction was even greater on the following day, with an average reduction in Hb between the preoperative period and hospital discharge of 8.3% per liter aspirated (Table 1). This information may be used for calculating the Hb expected at the end of the surgery and patient's discharge. Being aware of the patient's initial Hb, in order to estimate the volume that can be safely aspirated is a more personalized approach to surgery.

Clinical and laboratory recovery with only oral iron administration is considered satisfactory. In 2 weeks, the Hb of our patients had recovered 41.6%, on average, in relation to its value at hospital discharge. This is considering that the preoperative Hb, reached 74%, on average, at the end of the 4th week (Table 2). It is important to note that at the end of the 1st week, the Hb decrease was even greater, on average 15.6%, in 37.5% of the patients. Thus, special attention is required to monitor patients who are predicted to have an Hb between 7 and 8 g/dL. The percentage of reduction of Hb at discharge compared to preoperative Hb should be calculated. In these patients Hb can decrease even more during the first week. It would be prudent to request a CBC before hospital discharge for these patients.

CONCLUSION

The implementation of liposuction and lipoabdominoplasty within the limits of liposuction established by the CFM is safe. The patient may have a Hb reduction of approximately 20% to 30% between the immediate postoperative period and hospital discharge the next day. Even with an average Hb value of approximately 8.92 g/dL, hospital discharge was safe, and home recovery with oral ferrous sulfate supplementation was satisfactory.

COLLABORATIONS

FSV	Analysis and/or data interpretation, Conception and design study, Data Curation, Final manuscript approval, Formal Analysis, Methodology, Project Administration, Realization of operations and/or trials, Supervision, Writing - Original Draft Preparation, Writing - Review & Editing
DRF	Analysis and/or data interpretation, Data Curation, Methodology
MGC	Analysis and/or data interpretation, Data Curation, Methodology

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