



Reducing complications in liposuction

Reduzindo complicações em lipoaspiração

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Article received: April 14, 2024.
Article accepted: July 26, 2024.

Conflicts of interest: none.

DOI: 10.5935/2177-1235.2024RBCP0958-EN

INTRODUCTION

Liposuction is among the most commonly performed aesthetic procedures in plastic surgery and is increasingly being combined with other methods, making it a longer surgery and, therefore, with a greater possibility of complications^{1,2}.

Presented by Illouz in the early 1980s, the liposuction technique has undergone a major transformation resulting from the combination of vibrating equipment (Power assisted Lipoaspiration - PAL), fat release and harvesting (OneStep laser), and laser skin retraction (OneStep), Argoplasma, helium

plasma (RENUVION) and radiofrequency (Bodytite) to reach its current moment³.

In Brazil, according to data from the International Society of Aesthetic Plastic Surgery (ISAPS)⁴, this is the most performed aesthetic surgical procedure, totaling 231,604 (15.5%) among the procedures in 2019, in the pre-pandemic period.

Regarding complications, the incidence after liposuction varies from 0% to 10%⁵. Regarding mortality, a study of 25 years of experience with 26,259 patients⁶ observed a rate of 0.01%. In line with this, ISAPS published a study in which a mortality rate of 19.1 for every 100,000 liposuctions was reported⁴.

■ ABSTRACT

Introduction: Liposuction is the most commonly performed cosmetic surgical procedure, with the main complication being blood loss resulting from the procedure, which can lead to life-threatening situations. **Method:** This study evaluated the use of Medtronic's autoLog® equipment in the recovery of red blood cells from the infranatant liposuction in 10 patients. **Results:** The results demonstrated a significant reduction in the drop in hematocrit and hemoglobin levels in the postoperative period of patients when compared with the existing literature. **Conclusion:** The use of such equipment contributes to the prevention of complications, as well as allowing patients with restrictions on undergoing liposuction, such as those with chronic anemia, to be eligible for liposuction.

Keywords: Hemorrhage; Lipectomy; Postoperative complications; Adipose tissue; Intraoperative complications.

■ RESUMO

Introdução: A lipoaspiração é o procedimento estético cirúrgico mais realizado, tendo como principal complicação a perda sanguínea decorrente do ato, podendo levar a situações de risco de vida. **Método:** O presente estudo avaliou o uso do equipamento autoLog® da Medtronic na recuperação de hemácias do infranadante do lipoaspirado em 10 pacientes. **Resultados:** Os resultados demonstraram uma significativa redução na queda do hematócrito e hemoglobina no pós-operatório das pacientes, quando comparados com a literatura existente. **Conclusão:** O uso de tal equipamento vem a somar na prevenção de complicações, bem como permitir que pacientes com restrições à realização de lipoaspirações, como portadores de anemias crônicas, possam ser habilitados.

Descritores: Hemorragia; Lipectomia; Complicações pós-operatórias; Tecido adiposo; Complicações intraoperatórias.

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Liposuction as a single procedure or as an adjunct to other cosmetic procedures has stimulated its technical evolution from simple fat aspiration to more elaborate body shaping⁷. Larger areas and volumes aspirated cause greater surgical trauma, therefore requiring improvements in the safety processes involved. This discussion in the liposuction environment, as one of the most performed procedures, is at the forefront of debates^{8,9}.

Among these attitudes, the careful prior evaluation of patients is indicated as one of the pillars of the success of the procedure, contraindicating liposuction in patients with severe cardiovascular and pulmonary disease, severe coagulation disorders, including thrombophilia, as well as patients with diabetes and smoking^{10,11}. Patients with chronic anemia are almost always discouraged from undergoing liposuction due to blood depletion.

The main complications are direct blood loss (during surgery) and indirect blood loss (loss to the third space). A prospective study of 30 post-liposuction patients, directed by Campos¹², observed a drop in hemoglobin (Hb) between 2 and 6 g/dl, with an average of 3.01 g/dl, corresponding to 22.16% of the preoperative hematocrit, in which 15 patients complained of symptoms such as dizziness, dyspnea, tachycardia, and orthostatic hypotension. Vendramin et al.¹³ observed Hb at the end of surgery and hospital discharge in 16 patients, with values of 10.4 g/dl and 8.92 g/dl, respectively. The percentage reduction in Hb between the beginning and the end of surgery was, on average, 19.7%. Abdelaal & Aboelatta¹⁴ state in their work that blood loss reaches 100-200ml per liter aspirated according to their survey.

The tumescent technique, vibrating equipment such as Vaser/Safer, and the use of tranexamic acid are some measures implemented to reduce blood loss. However, there are no efforts in our specialty aimed at recovering this lost blood.

This study evaluated the use of a red blood cell recovery system (autoLog[®]- Medtronic) in patients undergoing liposuction; this equipment is widely used in other medical specialties such as thoracic and orthopedic surgery, but without literature addressing the risks and benefits of this therapy in plastic surgery, seeking to draw a safe line for its use, as well as improving the safety of patients undergoing plastic surgery.

OBJECTIVE

This work aims to evaluate the use of a red blood cell recovery system (autoLog[®]- Medtronic) in patients undergoing liposuction, seeking a protocol for its use

and assessing the hematocrit (Ht) and hemoglobin (Hb) of patients undergoing surgery in the preoperative period and at the time of discharge, as well as discussing its risks and benefits.

METHOD

Study location

The study was conducted in Recife-PE by the plastic surgery service of Hospital Agamenon Magalhães (HAM). The research followed all legal procedures determined by Resolution 466/2012 and its complementary resolutions of the National Health Council, with approval by the Ethics Committee CAAE: 77318823.2.0000.5197.

Study design

Intervention, sequential, and prospective study.

Technical procedures

Ten consecutive patients underwent liposuction with or without abdominoplasty, and red blood cell recovery was performed. Preoperative information (height, weight, body mass index, preoperative blood count) and intraoperative information (total volume aspirated, volume processed by the recovery equipment, Ht and Hb post-liposuction) were collected.

The surgical technique was tumescent liposuction with the patient undergoing anesthesia by spinal block (epidural and sedation) with infiltration of the areas to be aspirated with a 0.9% saline solution with adrenaline 1:500,000 IU in a 1:1 ratio. Use of 3.5mm, 4mm, and 4.5mm cannulas with vacuum suction equipment of 60mmHg and flow of 120L/min.

The total aspirated volume was decanted for 15 minutes in a specific collector (FAGA 2800ml) when the infranatant phase containing the figured elements was drained and processed by the autoLog equipment.[®](Medtronic). The recovered volume was then reinfused into the patient using a blood transfusion technique (Figure 1).

In the 24-hour postoperative period, a new blood count was performed for control in all patients. Hematimetries were performed using YUMIZEN H1500 equipment (Horiba Labs).

The information collected was presented in spreadsheets and analyzed using SPSS 29.0 (Statistical Package for the Social Sciences) for Windows and Excel 365. All tests were applied with 95% confidence; numerical variables are represented by measures of central tendency and measures of dispersion.

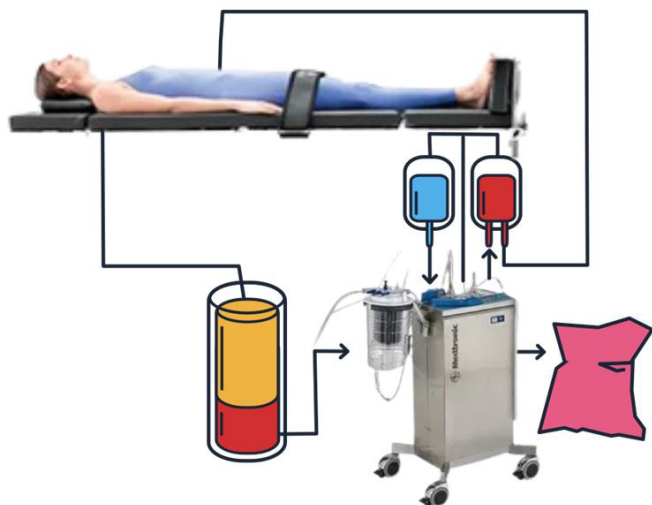


Figure 1. The total aspirated volume was decanted for 15 minutes in a specific collector (FAGA 2800ml), and the infranatant phase containing the formed elements was drained and processed by the autoLog® equipment (Medtronic). The recovered volume was reinfused into the patient according to the blood transfusion technique.

ANOVA with repeated measures: used to compare the moments as comparison factors, followed by Mauchly’s sphericity test. Sidak’s post hoc test was used to identify specific differences in effects.

Inclusion and exclusion criteria

The patients were women without chronic diseases and complaining of lipodystrophy in various regions of the body. Exclusion criteria were diabetes

mellitus, heart problems, vascular diseases, history of previous surgery in the same area, therapy with anticoagulant or antiplatelet drugs, and replacement with blood products in the last 90 days. An informed consent form with potential benefits and risks was presented to all patients, and their consent was obtained.

RESULTS

The operated patients had an average age of 44.6 years (44.60 ± 7.79) with an average body mass index of 28.45 (28.45 ± 2.32), and liposuction was performed with an average volume of 2020 ml (2020.00 ± 922.16). The patients had an average preoperative hematocrit of 40.73% (40.73 ± 1.89) and hemoglobin of 13.66 g/dl (13.66 ± 0.61), and in the intraoperative period after liposuction, it was 11.81 g/dl (11.81 ± 0.76), representing an average reduction of 13.54% (Table 1).

An average of 198.5 ml (198.50 ± 136.60) of recovered red blood cells were processed and reinfused. The Ht/Hb results in the 24-hour postoperative period were 33.62% (33.62 ± 3.39) and 11.29 g/dl (11.29 ± 1.15), a reduction of 4.4% compared to that collected during surgery, representing the drop caused by the loss to the third space as opposed to the replacement performed through the reinfusion of blood processed by the autoLog®.

Table 2 presents Spearman’s correlation coefficients between body mass index (BMI), weight, and different volumes at various stages of the surgical

Table 1. Sample variables in measures of central tendency and dispersion.

Variables	Mean ± SD	Median (P ₂₅ ; P ₇₅)	Minimum – Maximum
Age	44.60±7.79	47.00 (38.75; 50.00)	30.00 – 56.00
Height	1.61±0.07	1.61 (1.55; 1.69)	1.49 – 1.70
Weight	73.80±9.80	73.50 (66.00; 81.25)	59.00 – 89.00
BMI	28.45±2.32	28.53 (27.98; 30.39)	22.76 – 30.80
Volumes			
Recovered Aspirated	2020.00± 922.16	1630.00 (1415.00; 3017.50)	1100.00 – 3700.00
Reinfused	449.00±239.66	383.50 (291.00; 563.25)	170.00 – 996.00
Reinfused	198.50±136.60	134.00 (128.50; 251.00)	124.00 – 560.00
Pre-Operative			
Ht	40.73±1.89	40.45 (39.28; 42.63)	37.50 – 43.50
Hb	13.66±0.61	13.60 (13.18; 14.20)	12.60 – 14.50
Transoperative			
Ht	35.06±1.87	34.45 (33.53; 36.55)	33.20 – 38.30
Hb	11.81±0.76	11.84 (11.25; 12.13)	10.80 – 13.30
Postoperative - 24hr			
Ht	33.62±3.39	33.40 (30.65; 35.98)	28.10 – 39.20
Hb	11.29±1.15	11.40 (10.28; 12.25)	9.30 – 12.90

Ht: Hematocrit; Hb: Hemoglobin; BMI: Body mass index.

process. There was no statistical correlation between the volumes aspirated, recovered, and reinfused with BMI/weight. During the intraoperative period, both BMI and weight showed statistically significant and negative correlations with hematocrit (Ht), while hemoglobin (Hb) only showed a significant correlation ($p \leq 0.05$) with BMI. These results highlight the importance of controlling BMI and weight during surgical preparation since the higher the BMI/weight, the greater the blood loss due to liposuction, with clinical relevance in perioperative management.

DISCUSSION

Historically, Highmore, in 1874, tried to reinfuse blood lost by obstetric patients, undergoing multiple attempts until, after the Second World War, the advent of blood banks discouraged the search for recovery of the patient's own blood. Only after the 1990s, with the increase in the occurrence of diseases transmitted by blood transfusion between people, new impetus was given, whether in preservation, auto-hemotransfusion, and recovery of intraoperative red blood cells, notably in surgeries with large associated blood losses, especially cardiac, orthopedic and neurological procedures, obstetric and general surgeries^{15,16}. The formal contraindications for red blood cell recovery are infection and neoplastic disease, which are already excluded in the preparation of patients for aesthetic plastic surgery as a whole.

In the plastic surgery field, we have seen in the recent past (last 5 years) an explosion in the equipment and technical refinements involved in liposuction. Definition liposuction, fat grafts, as well as the use of skin retraction, vibrolipo, and ultrasound technologies,

have considerably increased the surgical duration, as well as the scope of the procedure, consequently with greater blood loss and potential instability in patients¹⁷.

The development of red blood cell recovery equipment, with the capacity to safely separate them from contaminants (leukocytes, heparin, fat, surgical debris), as well as the equalization of their costs with heterologous blood transfusion, brought a new horizon in their application in liposuction by allowing the recovery of the infranatant that was purely discarded¹⁸.

When comparing the numbers obtained, the 13.54% drop in hematocrit resulting from the surgical procedure in our study was considerably lower than the 22.16% reported by Campos et al.¹² and the 19.7% reported by Vendramin et al.¹³. We observed that the volume reinfused into the patient was 9.82% of the aspirated volume, which, when compared with the findings of Abdelaal & Aboelatta¹⁴, represents a substantial replacement of the blood that is lost during liposuction (Figure 2).

Clinically, no transfusion reactions or instabilities were observed at the time of reinfusion, which is performed in the surgical environment itself, under the supervision of the anesthesiologist, without requiring time or attention from the surgeon. Patients report no dizziness, fatigue, and increased energy, culminating in an earlier return to their usual activities.

The association with technologies and/or medications such as tranexamic acid was not evaluated in the present study. However, by acting on the mechanism of recovering "already lost" blood, we should have a positive association in the sense of avoiding large blood losses and hypovolemia.

Table 2. Correlation between blood loss during surgery and BMI/weight of patients.

Variables	Spearman's Correlation Coefficient	
	BMI	Weight
Volumes		
Aspirated	0.116	0.079
Recovered	0.115	0.298
Reinfused	0.097	0.457
Pre-Operative		
Ht	-0.042	-0.067
Hb	-0.250	-0.229
Transoperative		
Ht	-0.867*	-0.638*
Hb	-0.848*	-0.599
Post-Operative - 24hrs		
Ht	-0.158	-0.323
Hb	-0.188	-0.261

(*) Statistically significant correlation (p -value ≤ 0.05); Ht: Hematocrit; Hb: Hemoglobin; BMI: Body mass index.



Figure 2. 9.82% of the aspirated volume was reinfused into the patient.

CONCLUSION

In addition to other methods of blood preservation in surgical management, red blood cell recovery in plastic surgery contributes to safety and cost-effectiveness when compared to the need for blood transfusions. Evidence suggests less blood loss, increasing the safety and scope of surgeries, as well as allowing groups previously deprived or restricted from performing such surgeries (post-bariatric patients or those with chronic anemia, for example) to be operated on.

COLLABORATIONS

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

CLAA Analysis and/or data interpretation, Software, Supervision, Writing - Review & Editing.

JPSS Data Curation, Methodology, Resources.

ASC Realization of operations and/or trials, Visualization.

LCA Realization of operations and/or trials, Visualization.

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