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Relation between liposuction volume and perioperative intravenous fluid

Abstract

Balance in fluids as in any other surgical procedure, is obtained by having a balance between losses during surgery and fluids administered for replacement. The challenge in liposuction is to quantify bleeding with certainty, as well as the ingress and loss of transoperative fluid.

Objective: To find relation between vacuum volume and fluid replenishment in the perioperative of liposuction surgery.

Studio and design Observational, retrospective, longitudinal study.

Material and methods: Patients undergoing lipodystrophy of the abdomen or back under general anesthesia who were underwent to liposuction with conventional liposupctor or VASER type during August 2013 to May 2016. Demographic data such as ; age, gender, body mass index (BMI), anesthetic risk estimation by ASA classification (American Society of Anesthesiologists),liposuction technique performed, liposuction volume, administered IV fluids and diuresis in the trans and postoperative were recorded.

Statistical analysis: ni-varied descriptive analysis throughout the sample, the estimation of mean and standard deviation for numerical variables that follow a normal distribution and frequencies for qualitative variables. As well as a simple linear regression with Pearson correlation coefficient, perfect=1, to find a relation between lipoaspirated volume and intra and postoperative fluids IV, being considered significant with a $p< 0.05$.

Results: 112, clinical records were included, mostly for women 97.3%,with a mean of 34.46 years and a body mass index (BMI) of 25.4, 75% were ASA I, There is no significant relationships between transoperative solutions IV and lipoaspired. A low correlation was obtained between liposuction volume and postoperative solutions IV (r.216; with p<.05) as well as the correlation of trans operative solutions IV and diuresis (r.224; p<.05).

Conclusion: In this observational and retrospective study there was no direct and significant correlation between liposuction volume and the amount of trans operative fluids. Correlation with postoperative fluids IV was significant but low.

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Introduction

Liposuction is a surgical procedure through which fat deposits are removed from specific areas of the body by means of an aspiration-assisted cannula. Charles Dujarrier in 1921 was the first to attempt to remove subcutaneous fat for aesthetic purposes. Ilouz, a plastic surgeon from Paris supported with his publications the "wet technique" in which he infiltrated with a hypotonic and hyaluronidase saline solution, this modification in the technique made it easier to remove fat by dissection that caused infiltration and decreased bleeding.[1-3]

Balance in fluids as in any other surgical procedure, is obtained by having a balance between losses during surgery and fluids administered for replacement. The challenge in liposuction is to quantify bleeding with certainty, as well as the ingress and loss of transoperative fluid.

In the liposuction should always be taken in mind that the higher the volume is aspired, a greater amount of tumescent solution will have to be infiltrated into the dermoclysis, as this volume of infiltration increases, the risk of causing pulmonary edema is also increased, so in these conditions the management of intravenous fluids must be very cautious.[2]

Rohrich et al. suggest that in small volume liposuctions intraoperative liquids should be administered about 0.8 to 1.2 ml per ml aspirated when exceeding 5000 ml. Pitman et al. recommends that the total volume of liquid administered should be equal to twice the total aspirated volume. Matarasso recommends that the administration of postoperative intravenous fluid be 2 to 3 ml per ml of aspirate.[4,5]

Many of the proposed schemes are based on observation and experience of the authors. It is not very clear whether the endovenous water replenishment should be made on the basis of liposuction volume or guided by another goal.

Objective

To find relation between vacuum volume and fluid replenishment in the perioperative of liposuction surgery. Propose a fluid replenishment scheme if there is a correlation.

Studio design

Observational,retrospective, longitudinal study.

Material and methods

Patients undergoing lipodystrophy lipodystrophy of the abdomen or back under general anesthesia were reviewed at a short-stay clinic in Tijuana Baja California (TJ PLAST ®) during August 2013 to May 2016. Demographic data such as ; age, gender, body mass index (BMI), anesthetic risk estimation by ASA classification (American Society of Anesthesiologists),liposuction technique performed, liposuction volume, administered endovenous fluids (IV) and diuresis in the trans and postoperative were recorded.

Trans-anesthetic complications such as arrhythmia, hypotension (figures less than 80/40 mmHg), presence of nausea and postoperative vomiting, difficult airway (more than two attempts at intubation) were considered. Surgical complications included seromas, haematoma, surgical site infection or thromboembolism.

Inclusion criteria

Patients with hospital stay longer than 24 hours, over 17 years of age, diagnosed with lumbar and/or abdominal lipodistrophy, who were underwent to liposuction with conventional liposupctor or VASER type, either combined with other cosmetic procedures or alone. They would have received general anesthesia and with attention from the same anesthetistiologist and plastic surgeon.

Exclusion criteria

Patients under the age of 17, patients with a hospital stay of less than 24 hours.

Removal criteria

Patients with incomplete data in the clinical record or on the data collection sheet.

Statistical analysis

It was performed by uni-varied descriptive analysis throughout the sample, the estimation of mean and standard deviation for numerical variables that follow a normal distribution and frequencies for qualitative variables. As well as a simple linear regression with Pearson correlation coefficient, perfect = 1, to find a relation between lipoaspirated volume and intra and postoperative fluids IV, being considered significant with a $p< 0.05$. The SPSS version 24 program was used. 2017 for Windows.

Results

Population demographic characteristics are seen in Table 1, anesthetic and surgical complications were analyzed as categorical variables.

141 follow-up clinical records were included, excluding 29, analyzing 112, mostly for women 97.3%, with an average of 34.46 years and a body mass index (BMI) of 25.4. 75% (n-84) were ASA I, the most common surgery was liposuction with conventional liposupctor by 75%, with VASER 20.5% and 4.5% mixed (Table 1). 68% (n-77) of liposuctions were combined with other procedures, 73.2% were performed superh-measure infiltration technique, while 26.8% tumescent infiltration technique (Table 2).

Table 1 Demographics

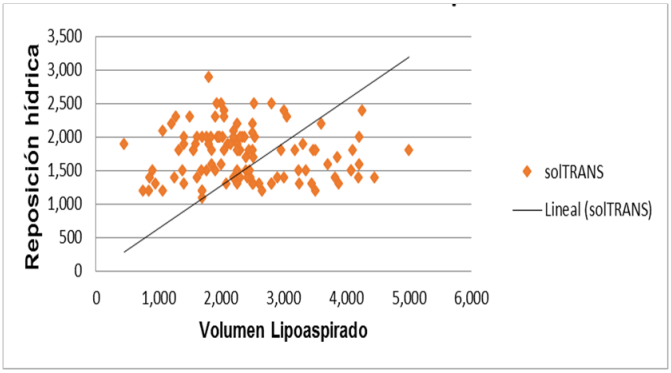
		n	%
Gender	Male	3	2.7
	Female	109	97.3
ASA	I.	84	75
	II.	28	25

Table 2 Descriptive statistics of numeric variables

	Volume Lipoaspired (ml)	Transoperative Solutions (ml)	Transoperative diuresis(ml)	Postoperative solution (ml)	Diuresis Post operative (ml)
N	112	112	103	112	110
Losses	0	0	9	0	2
Average	2,356.59	1,740.80	286.46	1,721.58	1,305.27
Standard deviation	928.725	388.233	243.893	633.776	748.036

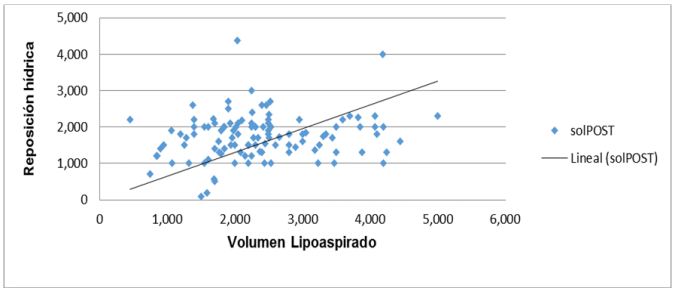
Of the trans-anesthetic complications presented 21.4% (n-24) had hypotension, 4.5 % (n.5) non-lethal arrhythmia, 14.2 % (n.16) nausea and / or postoperative vomiting.

As for surgical complications, a seroma was presented in a patient.



Graph 1 Pearson Correlation. Lipo-aspirated volume and intraoperative fluids IV.

The relationship between transoperative solutions IV and lipoaspired volume was not significat. A low correlation was obtained between liposuction volume and postoperative solutions IV (r.216; with p<.05) as well as the correlation of transoperative solutions IV and diuresis (r.224; p<.05). The correlation between the number of transoperative solutions with postoperative diuresis was also low (r.210; p<.05). While the correlation between the number of solutions IV and postoperative diuresis was moderate (r.536; p<.01) (Table 3, Chart 1 and 2).



Graph 2 Pearson Correlation Coefficient. Lipo-aspirated volume and postoperative fluids IV.

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Table 3 Synthesized correlations

Independent variables	Transoperative solutions	Postoperative solutions
Lipoaspired volume	0.014	0.216*
	Transoperative solutions	Postoperative solutions
Transoperative diuresis	0.224*	0.054
Postoperative diuresis	0.210*	0.536**

**. The correlation is significant at level 0.01 (bilateral).

*. The correlation is significant at level 0.05 (bilateral).

Discussion

Our results determine that the correlation between lipoaspired volume and postoperative water replenishment is low. There was no significant correlation between liposuction and transoperative endovenous fluids. Liposuction is associated with major hemodynamic alterations such as an increase in heart rate, heart rate, average pulmonary blood pressure, ejection volume index, and right ventricle working rate, with a decrease in average blood pressure. Epinephrine, which is commonly used at considerable doses during liposuction may be responsible for tachycardia and increased heart rate. The decrease in mean blood pressure and systemic vascular resistances are likely due to the effects of general anesthesia and opioids used in the transoperative, although also the reduction of peripheral vascular resistance may be due to the dominant action of epinephrine on beta 2 receptors in skeletal muscle vessels, where increased blood flow is observed.

Aspiration removes approximately 30% of the infused tumescent solution, so of each liter of infiltrated tumescent solution 700 mL are absorbed, so they should be considered as part of the liquids administered to the patient. Water repositioning in these procedures is empirically based on schemes that consider insensitive losses, lipoa suction volume, diuresis and even the calculation of blood loss.[1] However, there is no study to date establishing the exact and objective amount of the amount of systemic absorption of the tumescent solution that orients a consideration of perioperative endovenous water management in liposuction. They are often overloaded or restricted from fluids favoring edema or thromboembolism as the case may be.[1,2]

Currently diuresis is a minor indicator of volemia due to the influence of inflammatory neurohormones involved in metabolic response to surgery. (Bibliography added as penultimate). Currently, goal direct fluid therapy with monitors that evaluate beyond traditional vital signs, such as infusion rate and pulse pressure variability, are a monitoring opportunity to be able to decide transoperative water management avoiding morbidity. This work shows that the perioperative water therapy schemes used in these patients and procedures are in consent and do not have a satisfactory correlation in order to be able to establish a margin of safety in treatment. Our limitations include being an observational and retrospective work, we do not consider the calculation of hematic loss because it is absent in several cases as well as the sample size may be insufficient to be able to issue a recommendation with a high level of evidence for or against the perioperative water management scheme in liposuction.

Conclusion

In this observational and retrospective study there was no direct and significant correlation between liposuction volume and the amount of transoperative fluids. Correlation with postoperative fluids was significant but low. More prospective monitoring studies are needed to assess perioperative water status in this group of patients and procedures to establish a more accurate and objective correlation and management schemes.

Financial disclosure statement

None.

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