INTRODUCTION

Lipoabdominoplasty is a hybrid surgical procedure that combines liposuction and abdominoplasty, and lowers the rate of complications. This procedure, first reported in 2001 and 2003 by Dr. Osvaldo Saldanha, is gaining popularity within the plastic surgery community.

The aim of this procedure was the preservation of Scarpa’s fascia, to decrease the risk of seroma formation, preserve lymphatic and vascular structures, and reduce the length of the Pfannenstiel scar.

Liposuction is added to the abdominoplasty procedure to achieve better cosmetic results and maintain limited undermining. When this extensive area is treated with liposuction, the risk of seroma is increased.

This article highlights the outcomes of this procedure: low incidence of seromas, shorter hospitalization time, given that the patients mobilize more comfortably, and safety without the need for drains. Lastly, patient expenses are minimal and there is a low risk of readmission after the surgery.

Abdominoplasty is one of the most commonly performed aesthetic surgical procedures. Seroma is the most common local complication, with incidence rates ranging from 1% to 57% and an average incidence of 10% accepted by most authors. Recent publications have advocated the benefits of the lipoabdominoplasty technique, with low rates of seroma of 0–3%.

Background: Proactively preserving Scarpa’s fascia and thus its intrinsic lymphatic drainage and tensile strength for suture placement can eliminate the need for drains after lipoabdominoplasty and therefore reduce the rate of seroma development. In this article, we describe the effectiveness of a modified progressive traction suture (PTS) technique, which enables us to lessen the most common complications and avoid hospital readmission; these sutures take 3–5 minutes of additional surgery time.

Methods: Two hundred seventy-six patients (mean age, 38 years; range, 19–67 years), with a mean body mass index of 25 were included in this study. All patients underwent complete lipoabdominoplasty with ultrasound-assisted liposuction (VASER) throughout the abdomen and flanks. Abdominal rectus plication was performed in 100% of cases. All patients were operated on under spinal anesthesia and stayed overnight in hospital.

Results: Of the 276 patients, 1.8% developed postoperative seromas. No patients developed hematomas. New wound closure was needed in 1.4% of patients, performed within 7–10 days of surgery, scar revision in 4.7%, residual liposuction under local anesthesia in 9.7%, and liposuction under sedation in 1%; deep vein thrombosis without thromboembolic phenomenon developed in 1%, none resulting in death. In addition, the use of a PTS technique is a time-saving procedure because it takes the surgeons between 3–5 minutes of operative time, unlike that of adhesion and/or separate traction, which takes between 30 and 45 minutes.

Conclusions: The use of PTSs helped diminish complications such as seroma and hematoma and prevent additional cost involving hospital readmission and/or further surgery. Furthermore, use of these sutures required only 3–5 minutes of additional operative time. (Plast Reconstr Surg Glob Open 2017;5:e1338; doi: 10.1097/GOX.0000000000001338; Published online 29 June 2017.)

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and increased costs. In some cases, the patient needs to be treated with antibiotics. Close control of the seroma is essential to prevent pseudobursae that will eventually require further surgical intervention. The use of progressive traction sutures (PTSs) is simple and fast, takes minimal time, and eliminates the need for suction drains. They are also used to down the abdominal flap and simultaneously decrease the dead space pocket. Those sutures of adhesion (as described by Baroudi and Ferreira) or traction sutures (as described by Pollock and Pollock) avert the use of suction drains, thereby reducing the possibility of seroma. In addition, the patient is more comfortable in the immediate postoperative period, which allows early ambulation and decreases the risk of thromboembolism. The time of hospitalization is shortened and there are fewer complications, such as infection, given that there is no use of postoperative drains. In this article, we describe the effectiveness of a PTS technique to perform this procedure with lower complications rates.

**PATIENTS AND METHODS**

We retrospectively evaluated 290 patients, who underwent surgery between January 2011 and December 2014. Exclusion criteria were as follows: patients with a body mass index (BMI) of over 30 kg/m², postbariatric patients, patients who had lost more than 25 kg/m² before surgery, and patients who were pregnant (total excluded, 14). A total of 276 patients (272 female and 4 male patients) with a mean age of 38 years (range, 19–67 years) were included for final analysis. The mean BMI was 25 kg/m² (range, 19–29.8 kg/m²). All patients were treated using PTSs and had a minimum follow-up period of 2 years.

All surgeries were performed by a single surgeon at our surgical facility in Salta, Argentina, Aesthetic and Laser clinic. Our work was performed in a private plastic surgery and followed the principles of the Declaration of Helsinki. All patients provided written informed consent, at least 2 days before their surgery.

**Operative Technique**

The surgery was performed using spinal anesthesia with intravenous sedation, administered by anesthesiologists. The procedure started with tumescent infiltration, of the flanks, supra- and infra-umbilical abdominal areas. Ultrasonic energy liposuction (VASER) was performed, and adipose tissue was aspirated. Assisted VASER ultrasonic liposuction was performed in all patients on the flanks, lower back, supra-umbilical abdomen, and pubis. The ultrasound was not used on the infra-umbilical area, but this area was aspirated, allowing pretunneling in the supra-umbilical midline and 2 in the infra-umbilical para-median. These sutures served to pull down the abdominal flap, decreasing scar stress in the supra-pubic and umbilical areas. Suction drains were not used.

The rectus abdominal muscle was infiltrated with hupi-vacaine as described by Dr. Aldo Mottura.

An intramuscular fat graft of the buttocks or liposuction in the neighboring areas was conducted in 70% of cases. Deep vein thrombosis (DVT) prophylaxis consisted of 40 mg of low molecular weight heparin in 80% of cases, administered 2 hours after the start of surgery. Sequential venous pump pressure therapy was used intraoperatively and up to 2 hours postoperatively in all cases.

Patients were hospitalized until the following day (Figs. 1, 2).

**RESULTS**

The mean BMI of all patients was 25.17. Forty-seven patients (17.0%) had undergone previous abdominoplasty or abdomen liposuction, 19 patients (6.8%) had umbilical hernias, and 3 patients (1%) had supra-umbilical hernias (Figs. 3, 4). An ultrasound of the abdominal wall is usually performed as part of the presurgical routine. All cases underwent full lipoabdominoplasty, given that minilipoabdominoplasty and reverse liposubcutanoplasty are seldom performed.

New sutures were needed within 7–10 days in 1.4% of the patients (4 cases) because of minor wound dehiscence. Scar revision was needed in 4.7% (13 cases), residual liposuction under local anesthesia was needed in 9.7% (27 cases), liposuction under sedation was needed in 1% (3 cases), seromas were present in 1.8% (5 cases), and DVT was present in 1% (3 cases). There were no cases of pulmonary embolism (PE), death, or hematoma.

Ultrasonic of the abdominal wall to check fluid collection was performed in all patients postoperatively in
the second and third weeks after surgery. Ultrasonography was carried out to measure the fluid volume in millimeters, with a volume of more than 20 mL considered positive for seroma. All fluids collected were aspirated and then examined. Doppler examination was used to evaluate flow speed and vessel perimeter and diagnosed DVT. Our study did not have an independent observer, as all personnel were part of our medical staff.

DISCUSSION
Seromas, hematomas, and wound dehiscence can result in time-consuming complications, risking patient satisfaction and cosmetic outcomes. Seroma typically presents 2–3 weeks postoperatively due to damage of the lymphatic vessel associated with tissue undermining and flap elevation. Treatment of the collection of lymphatic fluid can involve many aspirations to prevent the development of pseudocysts and pseudobursae.

When these conditions develop, the capsule will eventually contract, leading to a deformity of the anterior region of the abdomen. Another possible complication is infection of the fluid collection. Some of the techniques that have been developed to decrease the rate of seroma formation include tension sutures and quilting sutures.

Fig. 1. A 51-year-old patient preoperatively who underwent combined lipoabdominoplasty and liposuction of flanks, inner thigh, and pubis.
The placement of postoperative drains may lead to infection and discomfort in patients.\textsuperscript{8,19,20} There have been no cases of hematomas caused by limited space allowed by sutures for the formation of large collection areas of blood.\textsuperscript{25} Another possibility is infection of the hematoma or another fluid collection. Liposuction has been added to the abdominoplasty procedure to achieve better results and maintain limited undermining.\textsuperscript{7} Our routine used tumescent infiltration and application of (VASER). Liposuction increases risk of seroma development. Baroudi and Ferreira\textsuperscript{15} and Pollock and Pollock\textsuperscript{17} describe the use of a large number of traction sutures (30–40 stitches) to (1) obliterate dead spaces, (2) minimize movement and friction of the flap, (3) decrease the occurrence rate of seromas, and (4) reduce the use of drains. The PTSs have other indirect advantages such as reducing scar traction, decreasing the dead space pocket, spreading the traction on the flap to allow better scar healing, avoiding the upper stretch of the scar, and preventing flap necrosis. Furthermore, PTSs reduce stress on the umbilicus, preserve its vascularization and reduce umbilical complications. The main disadvantage compared with adhesion and/or tension sutures is that PTSs take between 30 and 45 minutes (average of 30 minutes) to place. The technique described herein uses 3 continuous absorbable sutures (Vicryl sutures 2-0), 1 suture in the supra-umbilical midline and the other 2 in

\begin{figure}[h]
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\caption{Three months postoperative with body contouring.}
\end{figure}
the infra-umbilical paramedians, requiring only an additional 3–5 minutes. PTSs may prevent the sharing effect that disrupts the early phase of the healing process between the aponeurotic and the abdominal flap. (See video, Supplemental Digital Content 1, which shows lipoabdominoplasty and how the procedure can be performed in 3–5 minutes. This video is available in the “Related Videos” section of the Full-Text article on PRSGlobalOpen.com or available at http://links.lww.com/PRSGO/A440.)

Ninety-eight percentage of surgeons report using drains for prevention of seromas, with drains removed an average of 8 days later.33 Suction drains have been used to treat and prevent development of seromas and hematomas. Seroma formation occurs during the first 2–3 weeks after surgery. The presence of drains complicates early ambulation, prolongs hospital stays, and increases the risk of acquired infections with antibiotic resistant organisms.25,35 Drains can be a source of retrograde infection and are a significant irritation for the patient.25,29,35 By avoiding the use of suction drains, the patient is able to walk 2 hours after surgery with greater comfort. It also allows the use of a moderate compression shaper girdle, which does not increase the intra-abdominal pressure29 and results in lower risk of DVT or PE. When intense compression of the shaper girdle was used, there was an increase in the perimeter area, and diameter of the femoral vein, which increases significantly in Fowler’s position. The use of these types of intense compressive garments and Fowler’s position may increase the risk of DVT and PE.

It is important to consider that if the patient has previously undergone liposuction in the abdominal area, the abdominal

Fig. 3. A 40-year-old patient preoperatively who underwent combined lipoabdominoplasty and suction of flanks and correction of umbilical hernia.

Fig. 4. Three months postoperatively of lipoabdominoplasty with liposuction. Satisfactory results as seen in lateral views.
flap has lower elasticity of traction. In such cases, we resect a lesser amount of tissue. The use of PTSs allowed a very low incidence of seroma in our study (1.8%), and no patients developed hematoma. In all cases, hospitalization was 1 night, with early ambulation, usually 2 hours after the surgery, and low molecular weight heparin used in 80% of patients. Seromas were small and resolved with 2 or 3 weekly punctures. All diagnoses were made using ultrasound. Patients can mobilize themselves better and without fear with no suction drains, indirectly preventing DVT and PE. No patient had to be readmitted to hospital. Minor complications were resolved on an outpatient basis under local anesthesia, which did not increase costs or major complications for new admissions. Therefore, ultrasound liposuction (Vasar) could be performed without difficulty and with excellent cosmetic results. Our study was limited by the small number of patients, and we did not have a control group. Our experience was limited to a private clinic.

CONCLUSIONS

Our modified technique showed a lesser frequency of complications such as hematoma and seromas. The use of PTSs helped prevent minor complications and adverse events such as the development of pseudo-bursae, which would need further surgical intervention. Use of PTSs required only an additional 3–5 minutes of operative time and helped avoid patient readmission, thus reducing costs for patients.

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