Lipoabdominoplasty Without Drains or Progressive Tension Sutures: An Analysis of 100 Consecutive Patients

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Abstract
Background: Subcutaneous surgical drains are commonly used in abdominoplasties to prevent seromas but are not tolerated well by patients and add additional discomfort after the procedure. The lipoabdominoplasty modification may create a more favorable surgical field to reduce the need for surgical drains without increasing seroma formation.

Objectives: The goal of this review was to determine if surgical drains can be completely eliminated in lipoabdominoplasty procedures without an increased risk of seromas.

Methods: The authors conducted a retrospective chart review of 100 consecutive standard, extended, and circumferential lipoabdominoplasty patients done by a single surgeon with at least a 3-month follow-up period.

Results: Seroma was identified in 5% of patients, hematoma and abscess each in 2% of patients, and granuloma, cellulitis, and delayed wound healing each in 1% of patients.

Conclusions: The use of discontinuous undermining with liposuction, limited direct undermining in the midline, preservation of a thin layer of fibrofatty tissue on the superficial abdominal wall fascia, and targeted surgical site compression can eliminate the need for surgical drains without increasing seroma rates.

Level of Evidence: 4

As in many plastic surgery body contouring procedures, subcutaneous drains are used in abdominoplasties in the hope of reducing seromas after surgery. Despite their common use, recent reports question the need for routine drain use.1 The use of either interrupted2,3 or continuous4,5 progressive tension sutures has been shown to be effective in eliminating drains in abdominoplasties without increasing seroma rates. Other reports suggest that the abdominoplasty flap-dissection plane may influence seroma formation. By using a more superficial plane, and preserving Scarpa fascia, lower drain outputs were seen, and the drains were removed sooner (but not totally eliminated).6 A more recent evolution of abdominoplasty is the lipoabdominoplasty, which minimizes direct abdominal flap undermining in favor of discontinuous undermining with liposuction,7 but still is reported with drains being used.8–10 An ultrasound comparison of seroma formation concluded that both standard abdominoplasty with quilting sutures and lipoabdominoplasty are effective in preventing seromas compared with standard abdominoplasty alone,11 but in all cases, drains were still

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used. The purpose of this study was to determine if drains could be completely eliminated in lipoabdominoplasty without increasing seroma rates or compromising aesthetic outcomes.

**METHODS**

A retrospective chart review was done on 100 consecutive lipoabdominoplasty patients performed by 1 of the authors.
The average age of the patients was 40 years (range, 21 to 64 years) and the average body mass index was 25.1 (range, 18.6 to 42.9). Ninety-seven of the 100 patients were women. Of the 100 cases, 74 were standard abdominoplasties (incision anterior to midaxillary line), 8 were extended abdominoplasties (incision extending posterior to midaxillary line), and 18 were circumferential abdominoplasties (body lifts). Five mini-abdominoplasties done during this time period were excluded from analysis. All patients were given an explanation of this technique and full informed consent was obtained.

All procedures were performed in an accredited office-based operating room, and patients recovered overnight at a nursing facility. A board certified anesthesiologist administered intravenous anesthetic (ie, Propofol, Ketamine, Fentanyl, Midazolam) with bispectral index and cardiac monitoring, and a laryngeal mask airway tube was used to maintain the airway. No inhalational anesthetics were used. Each patient was marked in a standing position with planned skin excision typically extending to the midaxillary line. After a circumferential skin preparation, the operative field was infiltrated with dilute lidocaine (500 mg/L) and epinephrine (1 mg/L) in normal saline for local anesthetic effects and hemostasis. The patient was placed in a...
The lateral decubitus position and liposuction was done in the intermediate tissue plane with 4 mm and 5 mm cannulas in the lateral trunk, extending anteriorly and posteriorly as determined by clinical exam (Figure 1A). The previously marked lateral skin and subcutaneous tissue was then excised (Figure 1B), leaving behind a thin layer of fibrofatty tissue on the truck fascia, which was then closed with running barbed sutures (Figure 1C). The patient was then turned to the opposite lateral decubitus position and the procedure was repeated. Then, in the supine position, liposuction was done in the intermediate tissue plane with 4 mm and 5 mm cannulas in the upper and lower abdomen (Figure 2A, B). A basket liposuction cannula (Figure 3) was used in areas where discontinuous undermining was intended. The lower abdominal skin and subcutaneous tissue was then excised, again leaving behind a thin layer of fibrofatty tissue on the abdominal wall fascia (Figure 4A). The abdominal flap was elevated only centrally, no more than 7 cm lateral to the midline superior to the umbilicus, leaving the liposuction-treated lateral tissue intact. The fibrofatty tissue over the area of rectus fascia plication was excised (Figure 4B) and standard fascia plication was done with size 0 braided polyester (Ethibond, Ethicon, Somerville, NJ) suture in 2 layers, so that the midline fascia had a thin layer of superficial fatty tissue matching the thin layer of tissue covering the remaining abdominal wall fascia (Figure 4C). The umbilicus was brought out through the abdominal flap at its normal anatomic position and inset with absorbable sutures. The patient was then placed in a gently flexed position and closure was done in 2 layers with running absorbable barbed sutures. No drains were placed.

Individually cut pressure pads with a thin layer of gauze on the skin surface applied over the areas of skin undermining before placement of post-surgical compression garment (same patient seen in Figures 1, 2, and 4).

Table 1. Details of Patients with Complications

<table>
<thead>
<tr>
<th>Patient</th>
<th>Complication</th>
<th>Details</th>
<th>Resolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Seroma</td>
<td>Needle aspiration, &lt;20 mL</td>
<td>Resolved</td>
</tr>
<tr>
<td>2</td>
<td>Seroma</td>
<td>Needle aspiration, &lt;20 mL</td>
<td>Resolved</td>
</tr>
<tr>
<td>3</td>
<td>Seroma</td>
<td>Needle aspiration, &lt;20 mL</td>
<td>Resolved</td>
</tr>
<tr>
<td>4</td>
<td>Seroma</td>
<td>Recurred after needle aspiration</td>
<td>Drain placed in office</td>
</tr>
<tr>
<td>5</td>
<td>Seroma</td>
<td>Recurrent epigastric seromas, each &lt;10 mL</td>
<td>Resolved after needle aspiration x3</td>
</tr>
<tr>
<td>6</td>
<td>Hematoma</td>
<td>200 mL hematoma on POD 12</td>
<td>I&amp;D of hematoma in OR, surgical drain placed</td>
</tr>
<tr>
<td>7</td>
<td>Hematoma</td>
<td>100 mL hematoma on POD 5</td>
<td>I&amp;D of hematoma in office, surgical drain placed</td>
</tr>
<tr>
<td>8</td>
<td>Abscess</td>
<td>Infection due to fat necrosis on POD 30</td>
<td>I&amp;D of abscess and debridement of fat necrosis in OR</td>
</tr>
<tr>
<td>9</td>
<td>Abscess</td>
<td>Abscess POD 14</td>
<td>I&amp;D of abscess in OR</td>
</tr>
<tr>
<td>10</td>
<td>Cellulitis</td>
<td>Treated with oral antibiotics</td>
<td>Resolved</td>
</tr>
<tr>
<td>11</td>
<td>Granuloma</td>
<td>Persistent epigastric discomfort</td>
<td>Resolved after steroid injection</td>
</tr>
<tr>
<td>12</td>
<td>Delayed healing</td>
<td>5 cm × 5 cm inferior-flap necrosis</td>
<td>Healed without surgical intervention</td>
</tr>
</tbody>
</table>

I&D, incision and drainage; OR, operating room; POD, postoperative day.
Figure 6. A 39-year-old woman before (A, C, E, G) and 13 months after (B, D, F, H) no-drain lipoabdominoplasty with 1200 mL of lipoaspirate from trunk.
All patients were seen by a surgeon during postoperative visits, and routine clinical examinations were done to evaluate for any seroma formation.

RESULTS

Average volume of infiltration fluid in the trunk was 952 mL (range 500-2000 mL), and average trunk lipoaspirate was 1315 mL (range 200-4300 mL), of which typically 50% to 65% by volume was fat. Despite less-direct undermining of the abdominal flap, additional incision closure tension was not observed compared with traditional abdominoplasty. Although scar quality was not formally measured, there did not appear to be worse incision-line scar formation. Of the 100 consecutive patients, there were 5 patients with seromas, 2 with hematomas, 2 with an abscess, 1 with a superficial surgical-site infection, 1 with a symptomatic granuloma that resolved after a steroid injection, and 1 with delayed healing involving more than 3 cm of the incision. Of these 12 patients, 3 had a repeat procedure in the operating room related to the complication. Details of each of the 12 patients are shown in Table 1. Typical patient results are shown in Figure 6.

DISCUSSION

Previous studies report seroma rates ranging between 0% and 16.5%, with 2% to 4% being most commonly reported in studies with more than 100 patients. The complications seen in this series of 100 consecutive patients who had no surgical drains placed after trunk liposuction and abdominoplasty were similar to those seen in cases where drains are used in abdominoplasty. However, we avoided the problems associated with drains such as pain at the drain sites, patient anxiety about drain removal, decreased ambulation due to drain discomfort, and the potential for the drain serving as a source of infection.

Although many techniques have been described to reduce the length of time drains are used, only studies using progressive tension sutures, popularized by Pollock and Pollock and confirmed by others, and more recently modified by using barbed sutures, show consistently low seroma rates (0% to 4%) without using drains. However, progressive tension sutures add additional time to the procedure and have a learning curve before they can be used routinely.

The technique presented in this study relies on discontinuous tissue undermining (which eliminates large pockets of dead space), leaving a thin layer of fibrofatty tissue on the superficial fascia of the anterior abdominal wall (which may help with absorption of potential seroma fluid) and postoperative compression with specifically placed foam pads and circumferential compression garments to minimize seroma formation. The early and continuous pad and garment compression may decrease shear forces between the skin flap and the fat layer over the abdominal wall fascia, which may then allow for faster tissue-to-tissue adhesion and elimination of dead space. Unlike some other protocols that include patient bed rest and immobilization to decrease seromas, we encourage ambulation the day of surgery and avoiding bed rest as much as possible except to sleep. We do, however, minimize sitting and twisting at the torso for 2 weeks to minimize shearing forces.

While progressive tension sutures are being used more frequently to eliminate drains, the technique requires a short learning period. Likewise, adapting this technique in practice may require a brief change in the procedure and a bit of faith. Initially seeing patients more frequently after surgery to confirm no seroma formation may help in the transition of eliminating drains.

CONCLUSIONS

The evolution of abdominoplasty has resulted in less abdominal-flap undermining and more indirect undermining with liposuction. The use of drains, which many patients find uncomfortable, can be eliminated when lipoabdominoplasty is combined with postoperative compression of the treated areas.

Disclosures

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REFERENCES