

Case Report

Liver Trauma During Combined Liposuction and Abdominoplasty: A Rare but Potentially Lethal Complication

Aesthetic Surgery Journal
2015, Vol 35(7) NP211–NP215
© 2015 The American Society for
Aesthetic Plastic Surgery, Inc.
Reprints and permission:
journals.permissions@oup.com
DOI: 10.1093/asj/sjv028
www.aestheticsurgeryjournal.com

OXFORD
UNIVERSITY PRESS

Eleftherios Gialamas, MD; Graziano Oldani, MD; Ali Modarressi, MD, PhD;
Philippe Morel, MD; and Christian Toso, MD, PhD

Abstract

Liposuction is a well-established procedure that is generally safe. However, rare complications can occur. The authors report on a 38-year-old woman who underwent combined abdominoplasty and liposuction at a private clinic. Four hours after the procedure, severe hypovolemic shock developed and required emergency transfer to a tertiary-care center. After primary fluid resuscitation, abdominal ultrasonography and computerized tomography revealed severe right-sided liver trauma, with active bleeding and free intra-abdominal fluid. Two attempts at right hepatic artery embolization failed to fully control the bleeding, and surgical hemostasis was required. After a 2-week hospitalization, the patient was discharged, and she returned to work 3 months later. Although it appears that this is the first reported case of liver trauma during liposuction, this potential complication should be kept in mind and identified early to permit efficient and effective management.

Level of Evidence: 5

Accepted for publication February 6, 2015; online publish-ahead-of-print August 8, 2015.



Although liposuction is generally regarded as safe,¹ minor adverse events such as contour irregularities, hematoma, and seroma are not unusual. Major complications are rare and include fat embolism, necrotizing fasciitis, deep venous thrombosis, and pulmonary embolism.^{2,3} Perforation of intra-abdominal organs has been reported¹⁻⁴ and represents an uncommon but possibly lethal complication, especially if diagnosis and treatment are delayed. We report on a patient who sustained severe liver injury induced by the liposuction cannula during combined abdominoplasty and liposuction. We also describe measures to prevent such complications and emphasize the need for their early diagnosis and management.

CASE PRESENTATION

A 38-year-old woman in hypovolemic shock was admitted to the emergency department. The same morning she had

undergone concomitant abdominoplasty and liposuction at another institution (a private clinic). Four hours after the surgery, her blood pressure was low (70/50 mm Hg), and she initially responded well to fluid administration. Preoperatively, her hemoglobin level was 13.5 g/dL.

Dr Gialamas is a Resident, Dr Oldani is the Registrar, and Drs Morel and Toso are Professors, Division of Abdominal Surgery, Department of Surgery, Faculty of Medicine, Geneva University Hospitals, Geneva, Switzerland. Dr Modarressi is an Assistant Professor, Division of Plastic, Reconstructive and Aesthetic Surgery, Department of Surgery, Faculty of Medicine, Geneva University Hospitals, Geneva, Switzerland.

Corresponding Author:

Dr Christian Toso, Division of Abdominal Surgery, Department of Surgery, Geneva University Hospitals Rue Gabrielle-Perret-Gentil, 1211 Geneva, Switzerland.
E-mail: christian.toso@hcuge.ch

The patient had no relevant medical or surgical history. She was a nonsmoker and did not consume alcohol. Her body mass index was 15.6 kg/m² (40 kg, 1.60 m). The main indication for her surgery was infra-umbilical skin excess and rectus muscle diastasis after pregnancy. A “mini-abdominoplasty” was performed, which did not include umbilical transposition or rectus muscle plication. To improve body contour, 150 mL of fat was aspirated from the flanks with a power-assisted liposuction (PAL) device through a 3.5-mm blunt cannula inserted into the lower part of the abdomen.

Six hours after the surgery, upon admission to the emergency department, the presence of severe hypotension (90/36 mm Hg) as well as right-upper-quadrant tenderness prompted emergency abdominal ultrasonography, which revealed free intra-abdominal fluid. At that time, the patient’s hemoglobin level was at 5.5 g/dL. After resuscitation with crystalloids, blood, and catecholamines, she underwent computerized tomography (CT), which showed a large subcapsular hematoma in the right side of the liver, multiple arterial and venous active bleeding sources, and a long thin area of penetrating trauma in segment 6 (Figure 1).

The patient underwent angiography, and selective embolization and coiling of the bleeding hepatic arteries was performed (ie, branches of the right and middle hepatic artery; Figure 2). The immediate result was satisfactory, with hemodynamic stability achieved, and she was transferred to the intensive care unit (ICU). However, 5 hours later, signs of active bleeding were apparent, and angiography was performed again. Smaller subcapsular bleeding sources were detected and were treated by additional embolization.

Three hours after readmission to the ICU, the patient’s hemoglobin declined again (to 7.3 g/dL), and she presented signs of abdominal compartment syndrome, including intra-abdominal pressure of 36 mm Hg. An emergency subcostal laparotomy was performed, and 3.5 L of partially clotted blood was removed. A large subcapsular hematoma was identified in the right side of the liver, and a deep fracture was observed in segment 6. The liver trauma occurred at the level of a 5-mm peritoneal hole compatible with the path of a liposuction cannula. After removal of all subcapsular hematomas, successful hemostasis was achieved by means of a coagulation device (argon), fibrin glue, and a hemostatic sponge (FloSeal [Baxter International, Deerfield, IL] and Tachosil [Nycomed, Zurich, Switzerland]). No further bleeding occurred, and perihaptic packing was not needed. Two abdominal drains were placed and remained intact for 7 days.

After 5 days of monitoring in the ICU, the patient was transferred to a surgical ward, where she recovered uneventfully. Overall, she received 13 units of red blood cells, 13 units of fresh frozen plasma, 6 units of platelets, and 2 g of fibrinogen. She was discharged from our hospital 2 weeks after the liposuction procedure. She returned to work after 3 months and demonstrated no significant

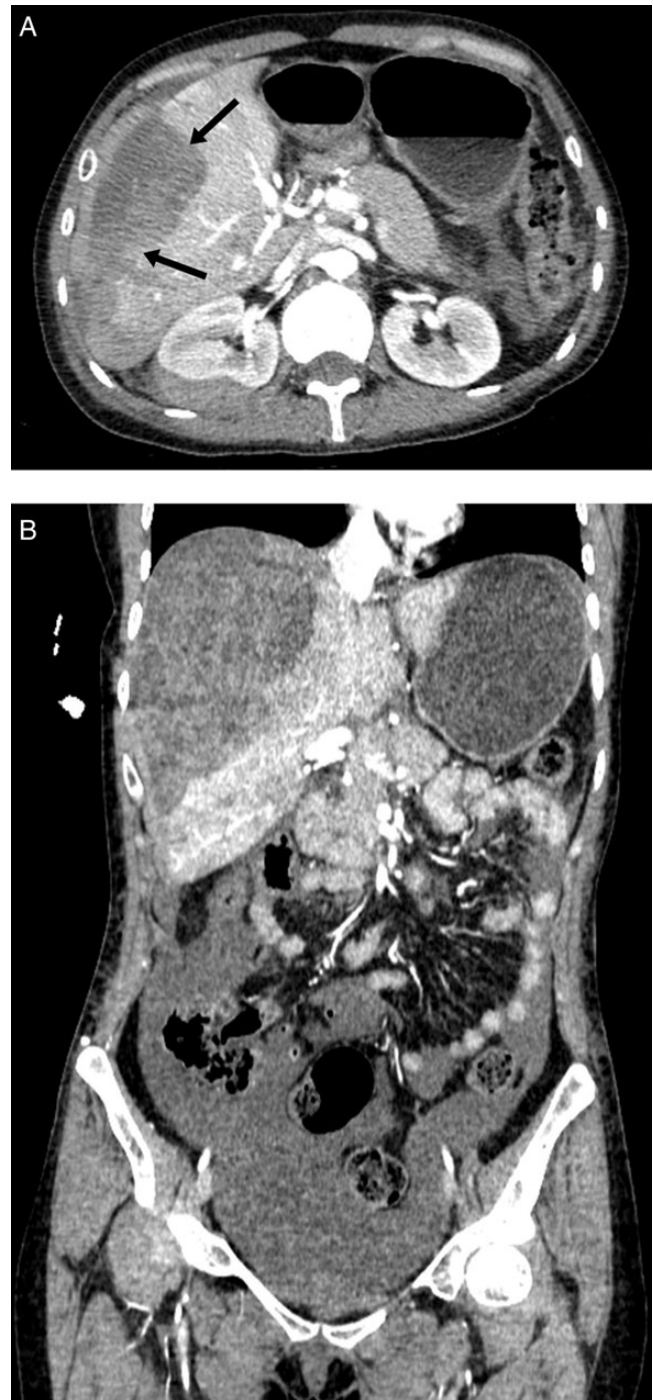


Figure 1. This 38-year-old woman presented with hypovolemic shock 6 hours after combined abdominoplasty and liposuction. (A) Axial and (B) coronal computerized tomography images obtained at admission demonstrated thin and deep injury to segment 6 of the liver. This was associated with a large subcapsular hematoma in the right side of the liver (arrows) and multiple active bleeding sources.

residual symptoms at her last outpatient visit, which was 6 months after the initial surgery.

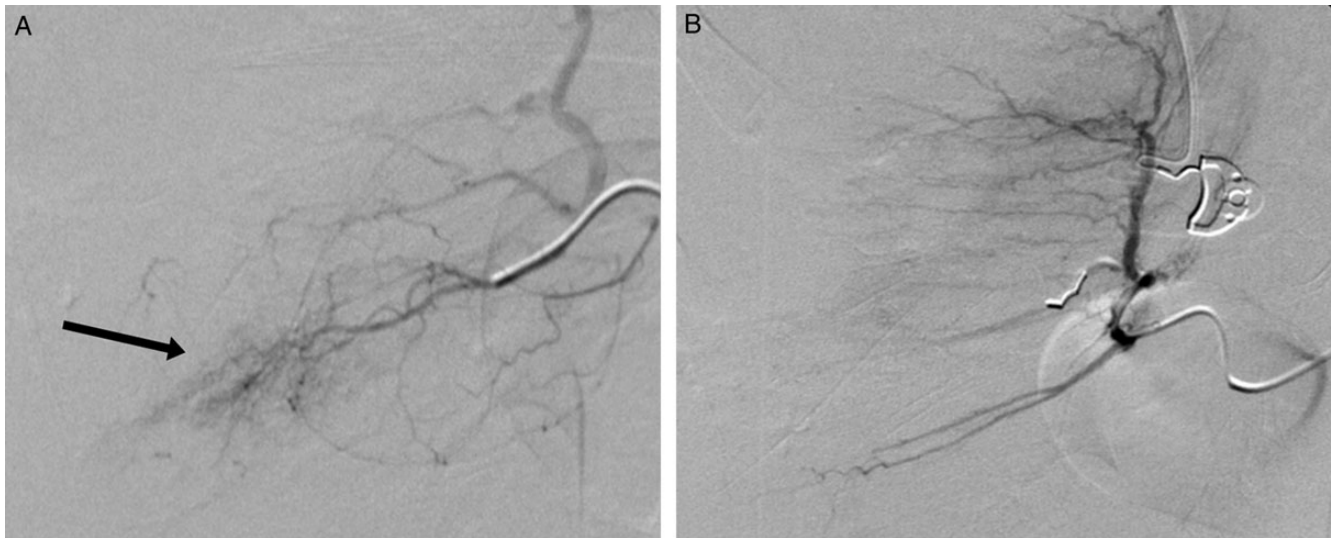


Figure 2. Angiograms of the liver demonstrate (A) active bleeding (arrow) and (B) control after embolization.

DISCUSSION

Liposuction is one of the most common aesthetic surgery procedures.⁵ It is generally safe, with low overall complication rates (0.7%); most complications are minor and include local hematoma and seroma.³ This overall safety led to establishing liposuction as an outpatient ambulatory procedure, often performed with local anesthetic in an office-based setting. Despite the public perception of liposuction as a minor intervention, the potential exists for major—even life-threatening—complications.²

In 2000, Grazer and de Jong⁴ noted a fatality incidence of 19.1 among 100,000 liposuctions performed between 1994 and 1998. Major and fatal complications include thromboembolism, fat embolism syndrome, necrotizing fasciitis, sepsis, and lidocaine toxicity during tumescent liposuction.¹⁻³ Although traumatization and perforation of abdominal organs is particularly rare, it represents a common cause of death related to liposuction, second only to pulmonary embolism.⁶ Lehnhardt et al² reported that 9 abdominal visceral perforations occurred in Germany between 1998 and 2002. Such perforations usually involve the small bowel and, less frequently, the colon, spleen, or gallbladder^{2,3,7} and are responsible for 15% of fatal outcomes from liposuction.⁴ In addition, various types of vascular trauma to the deep circumflex iliac artery or superior epigastric artery have occurred.^{2,7} In the present report, we described liver penetration during liposuction. Iatrogenic hepatic injuries such as this often occur after biliary or liver procedures. To our knowledge, there has been no previous report of liver perforation after abdominoplasty or liposuction.

Early identification of organ-penetration complications is essential, and all patients who undergo liposuction should be monitored closely for the first 2 postoperative

hours. The presence of unusual abdominal pain, fever, and/or low blood pressure (shock) should raise suspicion of an adverse event (Table 1). Patients who exhibit these symptoms should be transferred to a facility familiar with acute management of critically ill patients (eg, emergency department, ICU). Following early aggressive fluid resuscitation, abdominal ultrasonography and/or CT are mandatory to establish an accurate diagnosis.

Successful management of hepatic injury usually requires a multidisciplinary approach combining interventional radiology and surgery. Interventional radiology plays a key early role in managing liver trauma and is often able to control the bleeding.⁸ However, surgical treatment by emergent laparotomy, hemostasis, and (sometimes) perihepatic packing may be required for patients who are hemodynamically unstable or if nonoperative management is unsuccessful.⁹

Several risk factors for penetrating injury during liposuction have been identified. Patients with abdominal wall hernias or recti diastasis are more susceptible to this complication, as are patients with a history of abdominal surgery or liposuction.^{1,10} Although obesity is another known risk factor, our patient had a very low body mass index (15.6 kg/m²). However, her very thin layer of subcutaneous fat could have contributed to the liver trauma (Figure 1).

A number of recommendations can be made to decrease the risk of penetrating trauma during liposuction.¹¹ First, the use of blunt-tipped cannulas should be mandatory, as well as shorter cannulas and potentially subcostal incisions, when the upper abdomen is treated. Moreover, during liposuction, the tip of the cannula should always be felt with the surgeon's free hand. Toledo and Mauad¹² recommend hyperextending the abdomen during liposuction to reduce the risk of visceral penetration. Newer devices have been proposed and applied in an attempt to improve the safety of

Table 1. Main Symptoms of Acute (≤ 72 h) Complications of Liposuction that Require Emergency Resuscitation

Intra-abdominal injury
Abdominal symptoms: pain, distension, nausea, vomiting
Hemodynamic instability ^a
Lung/diaphragm injury
Pulmonary distress ^b
Hemodynamic instability ^a
Ipsilateral/bilateral chest pain
Cardiovascular dysfunction
<i>Deep vein thrombosis:</i>
Calf tenderness, pain, swelling
<i>Pulmonary embolism:</i>
Pulmonary distress ^b
Chest pain
Tachycardia
<i>Fat embolism:</i>
Pulmonary distress
Cerebral dysfunction
Petechial rash (chest, conjunctiva, axilla, neck)
<i>Pulmonary edema:</i>
Pulmonary distress
Orthopnea
Cough
Lidocaine toxicity
Peribuccal numbness with or without lightheadedness
Confusion/coma
Hypotension
Cardiac arrhythmia
Adrenaline toxicity
Severe headache/dizziness
Syncope/weakness
Hypertension
Cardiac arrhythmia
Shock
<i>Hypovolemic (ie, blood loss, third-spacing):</i>
Hemodynamic instability

(Continued)

Table 1. (Continued)

Pallor
<i>Anaphylactic (ie, allergy)</i>
Hemodynamic instability ^a
Skin symptoms: urticaria, erythema
Pulmonary distress: tachypnea, dysphonia, cough
<i>Septic</i>
Hemodynamic instability ^a
Fever
Leukocytosis

^aIncluding tachycardia and hypotension. ^bIncluding tachypnea and hypoxia.

traditional suction-assisted liposuction, such as those that employ ultrasound, laser, power (PAL), or water jets. However, these techniques also have complications (eg, skin necrosis, hepatic dysfunction) and a risk of intra-abdominal lesions. Comprehensive preoperative assessment of the patient (including careful clinical examination), selection of an appropriate surgical procedure, and avoidance of combined procedures are mainstays in the prevention of undesirable and potentially dangerous complications of liposuction.

CONCLUSIONS

Although liposuction is generally a safe procedure, severe complications can occur. Awareness of the risk for penetrating complications (including liver trauma) is essential for permitting early identification and effective management. Patients should be monitored closely during the early postoperative period.

Disclosures

The authors declared no potential conflicts of interest with respect to the research, authorship, and publication of the article.

Funding

The authors received no financial support for the research, authorship, and publication of the article.

REFERENCES

- Sharma D, Dalencourt G, Bitterly T, Benotti PN. Small intestinal perforation and necrotizing fasciitis after abdominal liposuction. *Aesthet Plast Surg.* 2006;30(6):712-716.
- Lehnhardt M, Homann HH, Daigeler A, Hauser J, Palka PSteinau HU. Major and lethal complications of liposuction: a review of 72 cases in Germany between 1998 and 2002. *Plast Reconstr Surg.* 2008;121(6):396e-403e.

3. Harnett P, Koak Y, Baker D. Splenic trauma during abdominal wall liposuction: a case report. *J R Soc Med.* 2008;101(4):201-203.
4. Grazer FM, de Jong RH. Fatal outcomes from liposuction: census survey of cosmetic surgeons. *Plast Reconstr Surg.* 2000;105(1):436-446; discussion 47-48.
5. Cosmetic Surgery National Data Bank: Statistics 2013. *Aesthet Surg J.* 2014;34(1 Suppl):1S-22S.
6. Yoho RA, Romaine JJ, O'Neil D. Review of the liposuction, abdominoplasty, and face-lift mortality and morbidity risk literature. *Dermatol Surg.* 2005;31(7 Pt 1):733-743; discussion 43.
7. Choi H, Shin T. Rupture of a deep circumflex iliac artery after abdominal liposuction: treatment with selective arterial transcatheter embolization. *Cardiovasc Intervent Radiol.* 2009;32(6):1288-1290.
8. Badger SA, Barclay R, Campbell P, Mole DJ, Diamond T. Management of liver trauma. *World J Surg.* 2009;33(12):2522-2537.
9. Dellaportas D, Nastos C, Psychogiou V, et al. Iatrogenic liver trauma managed with mesh-wrapping and ligation of portal vein branch: a case report. *Int J Surg Case Rep.* 2011;2(8):261-263.
10. Raman SR, Pokala N, Cosgrove J, Jamil Z. Colocutaneous fistula after suction lipoplasty: case report and literature review. *Ann Plast Surg.* 2010;64(4):503-505.
11. Thomas M, Menon H, D'Silva J. Surgical complications of lipoplasty—management and preventive strategies. *J Plast Reconstr Aesthet Surg.* 2010;63(8):1338-1343.
12. Toledo LS, Mauad R. Complications of body sculpture: prevention and treatment. *Clin Plast Surg.* 2006;33(1):1-11.

Experience the Global Gathering of Aesthetic Innovators and Experts



April 2–7, 2016

Mandalay Bay
Resort and Casino

THE AESTHETIC MEETING 2016



THE ANNUAL MEETING OF
The American Society for Aesthetic Plastic Surgery, Inc.
and Aesthetic Surgery Education and Research Foundation

Las Vegas

**WE ARE
AESTHETICS**

www.surgery.org/meeting2016