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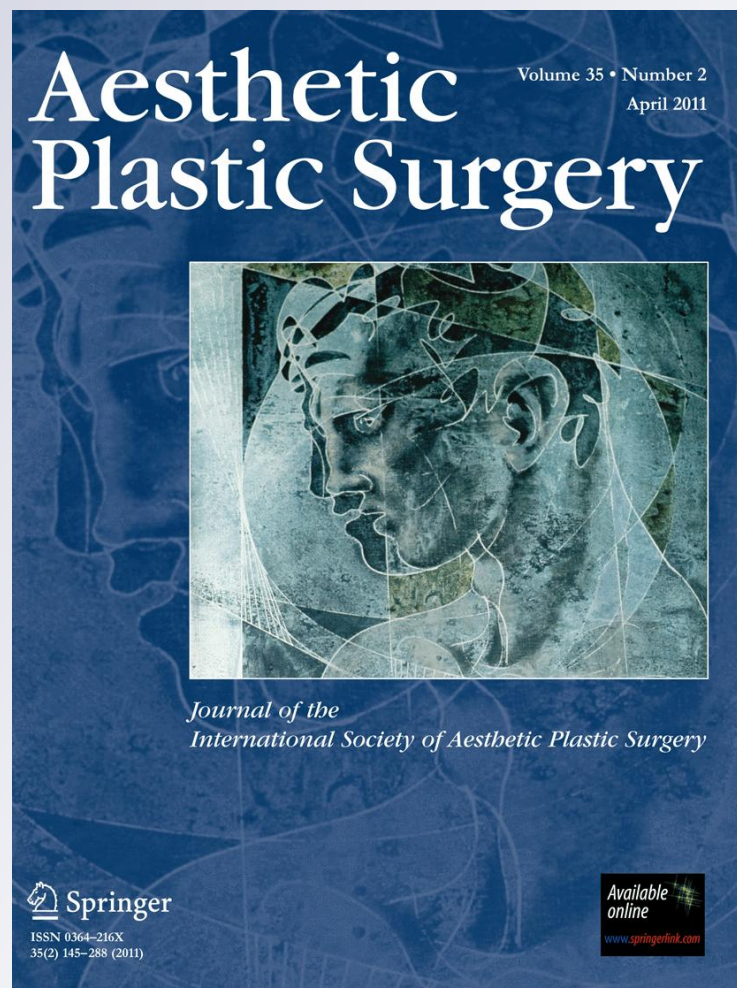
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## Aesthetic and Functional Abdominal Wall Reconstruction After Multiple Bowel Perforations Secondary to Liposuction

Michele Di Candia · Charles M. Malata

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**Abstract** This report describes a case of aesthetic and functional abdominal wall reconstruction performed to salvage a deformed, scarred, and herniated anterior abdomen after severe peritonitis and partial rectus muscle necrosis secondary to multiple bowel perforations sustained during liposuction performed in a cosmetic clinic. The diagnosis of intestinal perforation was missed intraoperatively and in the immediate postoperative period. The patient was admitted 4 days after the surgery to the intensive therapy unit in septicemic shock. After resuscitation and stabilization, she was treated by debridement of the abdominal wall, bowel resection, and temporary jejunostomy and colostomy (reversed 10 months later). She was referred 18 months after liposuction to the Plastic Surgery Service with a large central midline abdominal incisional hernia presenting with thinned out skin (14 × 11 cm) overlying adherent bowel. A components separation technique was successfully used to reconstruct the abdominal wall, with no recurrent herniation 2 years later. Survivors of bowel perforations sustained during abdominal liposuction may later present with challenging aesthetic and functional problems, as described in this report. These long-term sequelae have not been addressed hitherto in the literature.

**Keywords** Aesthetic surgery complications · Components separation technique · Incisional abdominal hernia · Intestinal perforation · Liposuction · Sepsis

Liposuction, one of the most commonly performed aesthetic surgery procedures, usually has a straightforward recovery with a reportedly low overall complication rate [1–3]. It is, however, not free from risks and can be associated with severe, sometimes fatal, complications, even when performed by experienced and well-trained surgeons [4].

The reported mortality rate from the most recent U.S. study is only 0.019% [1], and the most common causes of death [1–3, 5] are pulmonary thromboembolism and abdominal or viscus perforation [1, 6–8]. Penetration of the abdominal cavity with liposuction cannulas often remains undetected intraoperatively and in the early postoperative setting. The patient may thus present late with advanced complications [6–8]. To avoid this, particular care must be taken with patients who have ventral hernias, previous abdominal surgery, a high body mass index (BMI), and abnormal abdominal contour because their risk of intestinal perforations is higher [1, 2, 5].

The early problems associated with liposuction-induced bowel perforation such as peritonitis, overwhelming sepsis, tissue necrosis, and multiorgan failure are well documented [1–8]. The abdominal wall infection and tissue necrosis can result in wound dehiscence, difficult closure of the laparotomy and, in the long-term, weakness of the abdominal wall with frank herniation. Although intestinal perforation is a widely reported complication of abdominal liposuction, the literature remains sparse regarding its late sequelae [6–9].

We present a case of multiple intestinal perforations resulting from liposuction complicated by tissue necrosis, multiorgan failure, and a prolonged intensive care unit

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M. Di Candia · C. M. Malata (✉)  
Department of Plastic and Reconstructive Surgery,  
Addenbrooke’s University Hospital, Cambridge University  
Hospitals NHS Foundation Trust, Box 186, Hills Road,  
Cambridge CB2 2QQ, UK  
e-mail: cmalata@hotmail.com

(ICU) stay. The patient needed multiple laparotomies and presented with a central musculofascial defect of her anterior abdominal wall covered only by a thin unstable and adherent scar. The surgical management of this late complication is highlighted.

### Case Report

A 52-year-old woman underwent day-case abdominal liposuction at a private cosmetic clinic apparently uneventfully and was discharged the same day. But 48 h later, she experienced increasing abdominal distension, vomiting, and constipation. On seeking medical attention from the same clinic, she was sent away with reassurance and advised to increase her analgesia intake.

She, however, became more unwell and on the fourth day was admitted to the intensive therapy unit (ITU) in septicemic shock with a grossly distended abdomen. After fluid resuscitation, intravenous antibiotics, and inotropic support to stabilize her vital parameters, she underwent an emergency exploratory laparotomy. This showed partial necrosis of the right rectus muscle and sheath, copious bilious fluid leakage, and multiple perforations in the large and small bowel. Thorough washout of the gross fecal peritonitis and partial bowel resection were performed.

The patient remained in the ITU for 3 weeks requiring several laparotomies and bowel resections. She was left with an end jejunostomy and a colostomy. The relatively high jejunostomy impeded adequate nutritional input and weight gain, thus leading to a very slow postoperative recovery. Both stomas were reversed after 10 months.

Because of the multiple laparotomies and previous abdominal wall necrosis, the resulting abdominal wound was difficult to close, so the patient was treated initially by VAC therapy. After two failed split-thickness skin grafts, the wound was left to close by secondary intention. The healing of the abdominal wound was poor, with frequent breakdowns and recurrent abscess formation.

The patient was referred 18 months after the liposuction to the Plastic Surgery Service (CMM) due to significant divarication of the rectus muscles and a massive incisional hernia. Clinically, her bowels were tightly adherent to the thin overlying skin (Fig. 1), with visible peristalsis.

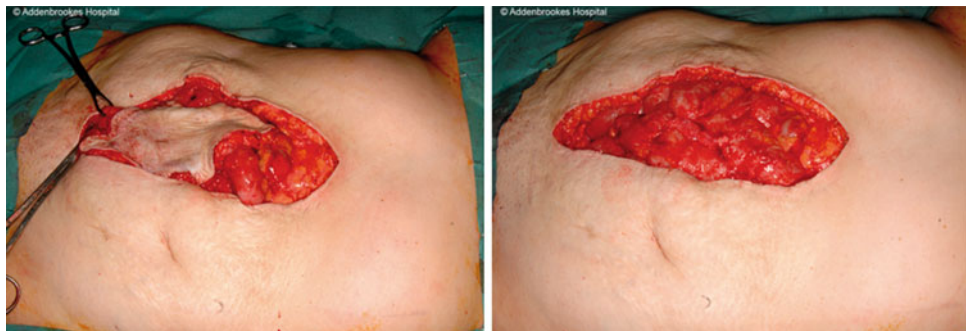
A joint colorectal–plastic surgical operation that consisted of aesthetic and functional abdominal wall reconstruction to salvage the deformed, scarred and herniated anterior abdominal wall was planned. The thin skin overlying the bowel was carefully excised (Fig. 2). The bowel loops were meticulously freed up and reduced into the abdominal cavity. The resultant massive abdominal wall defect was repaired using the components separation



**Fig. 1** Late sequelae after multiple intestinal perforations in a 52-year-old woman who underwent abdominal liposuction. At presentation, she had a deformed, scarred, and herniated anterior abdominal wall with significant divarication of the rectus muscles, massive

incisional hernia, and wide displacement of the umbilicus. The bowels were tightly adherent to the thin overlying scar, with visible peristalsis

**Fig. 2** A joint colorectal–plastic surgical operation was performed. The thin overlying skin was carefully excised, and the bowel loops were freed up, then reduced into the abdominal cavity. This intraoperative photograph shows the resultant massive abdominal wall defect, which was repaired using a components separation technique



technique [10], as previously described by Ramirez et al. [11] and others [10, 12]. The skin and subcutaneous fat were dissected free of the anterior rectus sheath and the aponeurosis of the external oblique muscles extending laterally up to the level of the anterior superior iliac spine and the anterior axillary line. The aponeurosis of the external oblique muscle was transected longitudinally about 2–3 cm lateral to the rectus sheath. This was extended to the muscular part that inserts onto the thoracic wall.

Next, the external oblique muscle was separated from the internal oblique muscle (in the avascular plane between the two) as far laterally as possible to maximize the movement of the rectus sheath medially. The left posterior rectus sheath then was divided longitudinally from the level of the umbilicus to the rib cage and then separated from the rectus abdominis muscle (Fig. 3). The release of the external oblique aponeuroses and the left posterior sheath was adequate to cover the reduced hernia. The fascia was closed centrally from the xiphisternum to the symphysis pubis region with a double layer of running looped O nylon sutures (Ethicon, Edinburgh, UK). Two suction drains then were inserted. The scarpas layer was closed with 2/0 PDS, and the skin was closed in two layers (deep dermal and subcuticular) of 3–0 Monocryl.

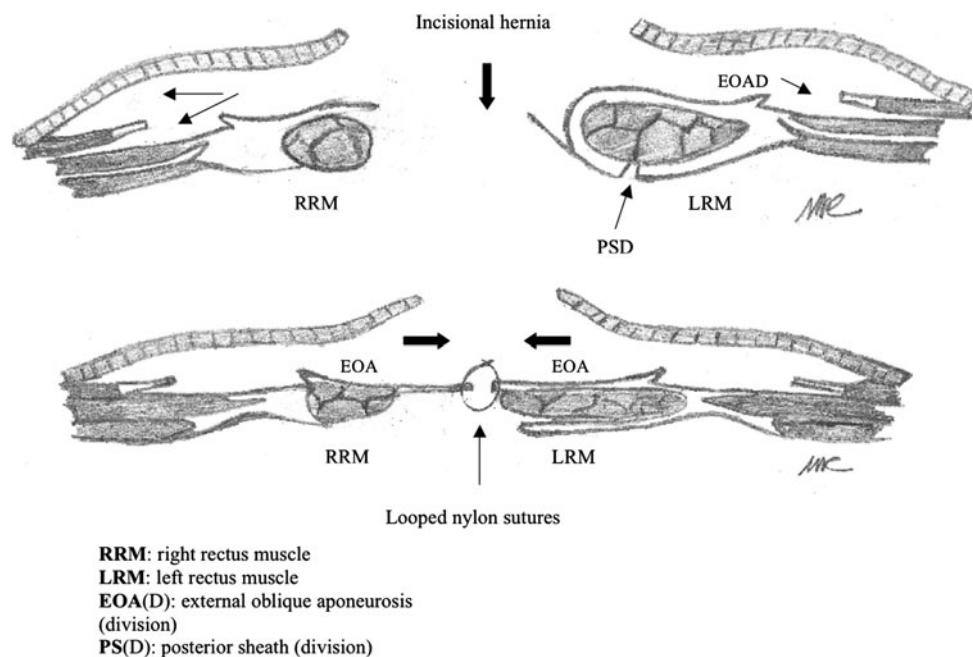
The patient had an uneventful recovery and was discharged home 5 days after the procedure in corset support for 3 months. The functional and cosmetic outcome was acceptable, with no recurrence of the hernia or bulge at the 2-year follow-up assessment (Fig. 4a, b).

## Discussion

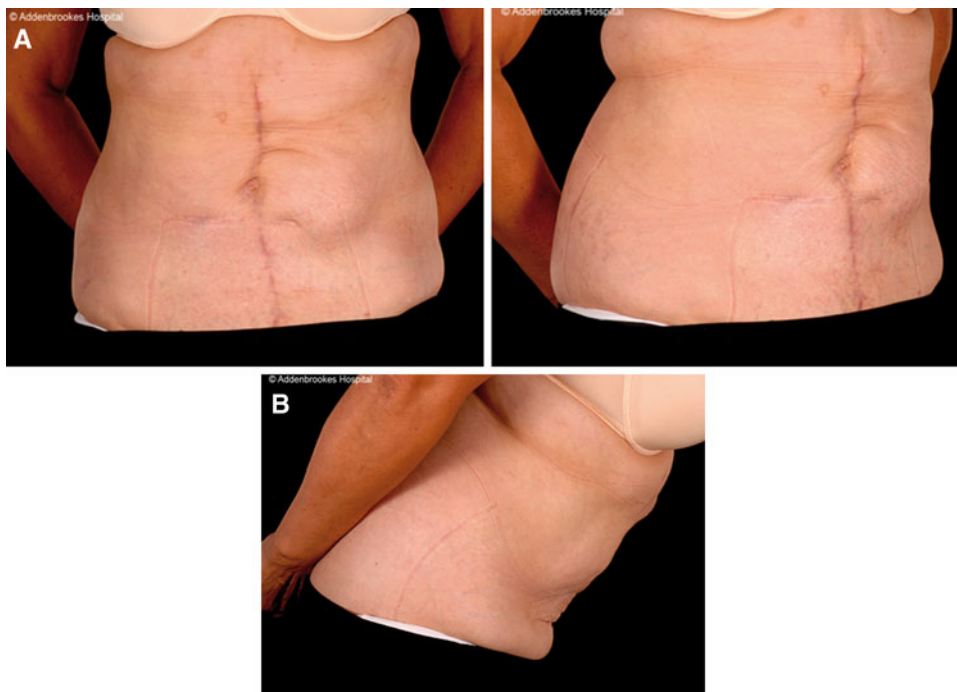
Abdominal wall perforation with visceral injury has an incidence of 14 in 100,000 abdominal liposuctions performed [1]. If not recognized and treated early, it has a high probability of morbidity and mortality [1–3, 6–9]. Although this complication is very serious, rated as the second most common cause of death after pulmonary embolism in three large liposuction outcome surveys by members of the American Society of Plastic and Reconstructive Surgeons [1–3], the literature on it is sparse, with only 11 such cases reported to date [7–10]. Additionally, none of the reports mention the late sequelae [7–10] from intestinal perforation. As illustrated in the reported case, peritonitis and sepsis can cause partial abdominal wall necrosis, dehiscence, and subsequent herniation. Such defects are difficult to treat, as confirmed by the failed VAC therapy and repeated skin grafts.

Reconstruction of large midline abdominal wall hernias that cannot be closed primarily is surgically challenging for a number of reasons including technical difficulties, the high morbidity rate, and the relatively high recurrence rate associated with these procedures. Although the lack of sufficiently strong tissue often requires insertion of a mesh and transposition of autologous tissue to bridge the fascial gap, prosthetic material was deliberately avoided for the reported patient to reduce the risk of mesh infection in case of wound complications. Specifically a preperitoneal mesh position can be complicated by extensive visceral adhesions with subsequent chronic mechanical irritation. The

**Fig. 3** Division of the external oblique aponeuroses bilaterally and the left posterior sheath. There was minimal posterior sheath on the right rectus muscle. The components separation technique allowed for repair of the central hernia



**Fig. 4 a, b** Acceptable functional and cosmetic outcome with no recurrence of the hernia or bulge, as confirmed at a 2-year follow-up assessment



newer dual meshes with smooth inner surfaces can circumvent this problem. Although overlay meshes avoid possible bowel adhesions and are easier to place, they are not as mechanically efficient as inlay preperitoneal meshes.

In the reported case, the interposition of either the peritoneum or the greater omentum between the bowel and any prosthesis was not possible because of the previous multiple laparotomies the patient had undergone. The components separation technique enabled us to avoid these other surgical procedures such as fascia lata, pedicled flaps, and dermal substitutes, which are static and more prone to future recurrence. This allowed us to obtain not only acceptable cosmetic results but also good functional rehabilitation with no recurrence of herniation or bulge during a 24-month follow-up period.

Survivors of intestinal perforations after liposuction can present with plastic surgical problems requiring reconstruction. This is a subject that needs to be highlighted in the literature because it merits further study. We recommend a multidisciplinary surgical approach to optimize the outcome and minimize the risk of further complications such as inadvertent damage to the bowel.

**Conflict of interest** None

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