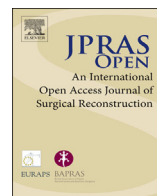




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Case Report

Incisional abdominal hernia repair with concomitant abdominoplasty: Maintaining umbilical viability

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ABSTRACT

Introduction: Abdominoplasty and abdominal hernia repair are often carried out in two-stage procedures, and those describing single-stage surgery require careful dissection to preserve often only partial blood supply to the umbilicus to maintain its viability. This paper aims to describe the surgical method of laparoscopic umbilical hernia repair in association with abdominoplasty.

Case presentation: A patient presents with an incisional hernia at a previous periumbilical port site of size 14 x 9 mm observed on ultrasound as well as a recurrent left inguinal hernia from previous bilateral laparoscopic inguinal hernia repair, oophorectomy, and laparoscopic cholecystectomy. A laparoscopic mesh repair of the hernia defect followed by abdominoplasty was performed. The patient made an uncomplicated recovery and was discharged home on day 5 post operation. There was complete healing of the umbilicus and remainder of the wounds. At 24-month follow-up, there was no recurrence of hernia.

Conclusion: Previously documented methods of concomitant abdominoplasty and hernia repair use an open technique to repair the hernia. A laparoscopic approach is faster, but it poses a significant risk to the vascular supply to the umbilicus. This not only

Compliance with Ethical Standards

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The patient has given informed consent for the use of nonidentifiable images and case presentation in this manuscript.

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increases positive aesthetic outcomes and patient satisfaction but also reduces rates of postoperative complications and recovery time.

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Introduction

Since the first documented abdominoplasty more than a century ago, the procedure has evolved significantly.¹ Major improvements in aesthetics are credited to Thorek, who documented the first umbilicus-preserving abdominoplasty in 1924.²

The procedure continues to become increasingly popular, and this is attributed to the increasing rates of obesity and subsequent use of weight loss surgery in Australia, with a significant 34-fold increase in Australians undergoing weight loss surgery.^{3,4}

Obesity has also been shown to contribute to skin and fascial laxity and subsequently abdominal wall hernias.⁵ With the increasing popularity of bariatric surgery, cases of postoperative complications such as incisional, umbilical port site, and ventral hernias are increasing, with some studies reporting postoperative hernias in up to 13% of patients who have undergone abdominal surgery.⁶

At the time of abdominoplasty, surgeons have the choice of concomitant hernia defect repair; however, such a procedure is not without the risk of umbilical necrosis due to the disruption of both the superficial and deep blood supply to the umbilicus. When undergoing a classical abdominoplasty, a circumferential incision is made around the umbilicus to free it from the surrounding skin, thereby disrupting the cutaneous supply from the subdermal plexus to the umbilicus. The umbilicus remains viable because of its deep blood supply from perforators arising from the umbilical branch of the deep inferior epigastric artery. However, classical open abdominoplasty and concomitant hernia repair pose severe risk to deep blood supply to the umbilicus.

We present an approach to this clinical problem that was highlighted in a case report in which a patient presents with an incisional hernia at her umbilical port as well as a recurrent left inguinal hernia. A laparoscopic mesh repair of her previous port site incisional hernia and concomitant abdominoplasty with umbilical transposition was carried out, without umbilical necrosis.

Case report and surgical technique

The patient, who had presented initially after weight loss achieved by nonsurgical means with excess abdominal tissue in conjunction with an incisional hernia and inguinal hernia (Figure 1), was marked preoperatively for skin incisions in the supine position. Once completed, the patient was administered with a general anesthetic agent. A transverse left groin incision was made in a manner such that the incision could also be used for the abdominoplasty approach. The recurrent inguinal hernia was repaired using a standard plug and patch technique. The deep ring was plugged and closed with a PerFix plug. A flat piece of ProGrip was trimmed and placed in the inguinal canal. A single suture anchored the mesh to the pubic tubercle. A 2-cm overlap from the pubic tubercle and 5 cm beyond the deep ring was allowed. The external oblique fascia was then closed.

Laparoscopic ports were inserted within the markings for skin incision to facilitate access, thus enabling no further scars. A 12-mm optical trocar was inserted under vision in the left flank. Two 5-mm ports were then inserted under vision. Multiple adhesions were divided. The omentum within the hernia was reduced. A 9-cm-diameter Parietex™ Composite polyester mesh was used to cover the defect. This was secured with 2/0 prolene transfascial sutures using an Endo Close and multiple firings of SecureStrap. All these procedures were performed laparoscopically.

The approach for abdominoplasty was executed as per routine markings, with these planned along the incisions that had been made to repair the hernia. The fascial basis for the umbilical blood supply



Figure 1. Preoperative anterior and lateral view of the patient.

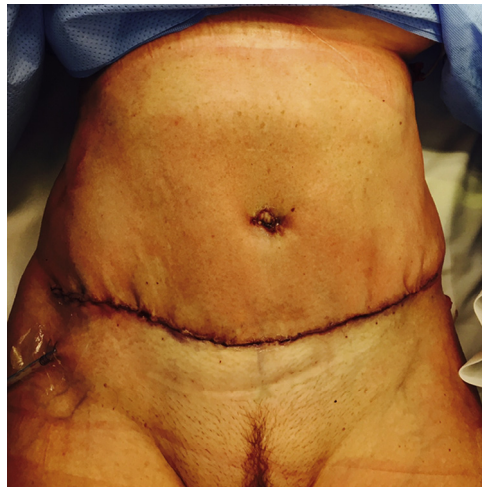


Figure 2. Postoperative anterior view of patient with umbilical hernia repair and concomitant abdominoplasty, thus highlighting umbilical viability after transposition.

was left uninterrupted (given the laparoscopic approach), and umbilical transposition was undertaken (with disconnection from any skin contribution). The abdominoplasty was completed in the routine manner, with upper flap undermining, excision of excess skin followed by layered closure. The umbilicus was transposed with complete viability maintained (see [Figure 2](#)). The patient had an uncomplicated recovery and was discharged home with minimal postoperative pain on day 5 postoperatively. There were no postoperative complications, and at the 24-month review, the patient had not developed recurrence of hernia, with umbilical viability still maintained.

Discussion

The umbilicus is an important cosmetic structure; abdominoplasty together with concomitant hernia repair poses severe risk to the umbilicus. Approaching this operation in one stage has inherent risks, with multiple authors proposing various techniques to overcome the inherent risk of umbilical necrosis.

The umbilicus receives a rich vascular supply from both superficial and deep sources. The blood supply is provided predominantly by bilateral umbilical branches from the deep inferior epigastric arteries that ascend just posterior to the rectus abdominis. The umbilical branches anastomose across the midline with contributions from the ligamentum teres hepaticum and the median umbilical ligament. The umbilical cutaneous blood supply is from the subdermal plexus.^{7–9}

Traditionally, abdominoplasty involves an incision around the circumference of the umbilicus, thereby detaching it from the surrounding anterior abdominal wall. When performing this procedure, blood supply from the subdermal plexus is disrupted, but the umbilicus remains viable because of ongoing perfusion from deep arteries passing through the umbilical stalk. This becomes complicated if a classical open hernia repair is attempted, with extensive dissection of the hernia sac resulting in a significantly increased risk of umbilical necrosis due to disruption of the deep blood supply.

This theoretical risk of compromised umbilical viability has been studied and demonstrated to be valid in several papers. Saxe *et al.* in their study reported that 11 out of 71 patients who underwent concomitant hernia repair and panniculectomy developed umbilical necrosis, whereas 16 patients who underwent panniculectomy alone did not develop this complication.¹⁰ Ortega *et al.* investigated abdominoplasty alone versus concomitant incisional hernia repair and/or cholecystectomy and reported that 6 out of 96 patients developed umbilical necrosis, whereas only 1 in 34 patients who underwent panniculectomy alone developed this complication.¹¹ Le Gall *et al.* in their study reported that among 15 patients who underwent a laparoscopic approach to ventral hernia repair along with abdominoplasty, only 1 patient suffered partial necrosis of the umbilicus.¹²

Various modifications to the above techniques have been proposed to minimize umbilical necrosis when performing a single-staged procedure. Brunner *et al.* (2009) described a modification of classical hernia repair to incorporate abdominoplasty. An abdominal flap is raised followed by incision through the linea alba where the hernia was subsequently identified and reduced from the undersurface of the umbilicus either in the preperitoneal or intraperitoneal space. This method was reported in 17 cases over a 6-year period with no postoperative reports of umbilical necrosis or hernia recurrence.⁵

Other articles describe the use of a vertical abdominoplasty technique and open hernia repair. The procedure involves a midline incision to raise an abdominal flap followed by an infraumbilical incision through the linea alba for hernia identification, reduction, and repair.⁵ However, postoperative complications have been reported to occur in up to 40%, and the operation results in a large vertical scar from the xiphoid to the pubis.^{13,14}

Mesh-based hernia repairs are being used more commonly and are preferred by many surgeons owing to significant reduction in rates of hernia recurrence, up to 10 times lower than classical hernia repair.¹⁵ It must be noted, however, that when combining this technique with abdominoplasty, large anterior abdominal wall incisions are required, and hence, localized dissection places umbilical viability at risk.

One proposed technique includes raising the flap followed by incising the right rectus muscle and dissecting the preperitoneal plane adjacent to the hernia. The hernia is subsequently reduced, followed by the contralateral rectus peritoneal plane dissection, and mesh placement from the right side where the rectus muscle was incised, thus allowing for the preservation of unilateral perforating vessels. This case report noted no hernia recurrence 12 months postoperatively.¹⁶

Neinstein *et al.* 2015 reported good success in umbilical hernia repairs with the Ventrallex hernia patch using minimal access incision in 4 patients. The patches were of 6.4 x 6.4-cm size, and there were no reported incidences of ischemia or necrosis in the umbilicus.¹⁷ Martin *et al.* (2008) who also noted good outcomes from Ventrallex hernia patch repair, however, specified that its use was safe and effective in the repair of small abdominal wall hernias.¹⁸

Laparoscopic surgery has been a rapidly emerging field, with many studies on its application demonstrating superiority when used for umbilical and ventral hernia repair versus open hernia repairs. The postulated advantages include a decreased rate of postoperative infections as less-invasive procedures need to be carried out, reduced rates of ileus, hematomas, seromas, wound dehiscence, reduced duration of hospital stay, and, importantly, reduced hernia recurrence.^{19,20} Laparoscopic repair of hernias also allows for repair of large hernias with reduced abdominal scarring and reduced disruption to the umbilical blood supply.

Conclusions

Laparoscopic repair of a periumbilical incisional hernia at the time of abdominoplasty proved to be safe because sparing a surgical insult to the anterior rectus sheath and preserving the deep blood supply to the umbilicus obviated the risk of umbilical necrosis. Concomitant abdominoplasty and hernia repair is not without risk; however, with the technique described, this approach is a useful option in this setting, hence reducing perioperative risk to the patient by undergoing only one operation rather than two to achieve the same outcome.

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