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Clinical Science

"Component separation" technique and panniculectomy for repair of incisional hernia

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"Components separation" technique; Incisional hernia; Panniculectomy; Intravesical pressure; Clinical appearance of the abdomen

Abstract

BACKGROUND: Primary incisional hernia repair is rarely successful, with recurrence rates ranging from 18% to 62%. We describe the integration of "components separation" herniorrhaphy with panniculectomy.

METHODS: Twenty-two patients were treated. Standard panniculectomies and component separation were performed. Intravesical pressure was measured preoperatively, intraoperatively, and postoperatively. Measurement variations were compared using the Wilcoxon test. Complications or hernia recurrence were evaluated. The clinical appearance of the abdomen was subjectively evaluated by patients.

RESULTS: Secure abdominal defect closure with midline approximation of the fascia was achieved in all patients. No major early complications occurred. Hernia recurred in 1 patient (4.5%). Intra-abdominal pressure increased in all the patients in our series but remained well below the danger level. Fifteen patients were fully satisfied with the appearance of their abdomen, whereas 7 were satisfied.

CONCLUSIONS: Abdominal component separation provides a reliable autologous reconstructive option. Hernia repair combined with abdominoplasty provides functional and esthetic benefits.

Abdominal wall hernias complicate between 5% and 11% of abdominal surgery procedures.[1,2] The repair of these massive ventral hernias remains a challenging problem for surgeons. Many surgeons discourage abdominal wall reconstruction because of the technical difficulties, the high morbidity, and the relatively high recurrence rate associated with this procedure. Primary repair is rarely successful, with recurrence rates ranging from 18% to 62% depending on the defect size.[3–6] If synthetic mesh is added, recurrence rates drop significantly to between 2% and 32%.[3,5–7] However, many patients with large hernias have invalidating symptoms, such as bulging of the abdominal wall, chronic wounds, immobility, and back pain, which require surgical treatment.[8]

The options the surgeon has are open primary repair, open repair with mesh, laparoscopic repair, or autologous tissue transfer or mobilization. The use of autologous tissue to repair abdominal wall hernias has been described in detail. The tensor fascia lata, Sartorius and rectus femoris can be used as either free flaps or pedicled flaps to close large defects. However, the lack of sufficient tissue may require the insertion of prosthetic material or transposition of autologous material to bridge the fascial gap. Reconstruc-

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tion using preperitoneally placed prosthetic material is still the most frequently used reconstruction method.[5–7] The increased risk of infection in case of wound complications is a relative contraindication against the use of prosthetic materials. However, the use of large sheets of synthetic material for hernia repair often results in a rigid, noncompliant, adynamic abdominal wall and is contraindicated in case of contamination.[9] Moreover, because the interposition of either the peritoneum or greater omentum between the bowel and the prosthesis is often impossible, the use of prosthetic material should, if possible, be avoided.

Commercial biological prostheses have recently become available. These prostheses are useful when the wound is contaminated or the risk of infection is high. Acellular dermal matrix, porcine intestinal mucosa, and porcine dermal collagen have been used safely and effectively as an alternative to traditional mesh to successfully repair hernias in contaminated operating fields and in conditions that would not be safe if traditional permanent prostheses were used.[10,11]

In 1990, Ramirez et al[12] introduced the "components separation technique" to bridge the fascial gap without the use of prosthetic material. The technique is based on the enlargement of the abdominal wall surface by separation and advancement of the muscular layers. By using this technique, up to 10 cm of unilateral advancement can be achieved, thus permitting a tension-free abdominal closure with medialization of the rectus abdominus muscle in large ventral hernias.[13–19] Recent modifications of the original procedure, including preservation of periumbilical perforators, have led to decreased wound complications in large hernia repairs.[20]

Incisional hernias may result in significant functional impairment as they enlarge, in addition to presenting obvious cosmetic concerns with the abdominal bulge.[4] The objectives of abdominal wall reconstruction include restoring structural support, providing stable soft-tissue coverage, and optimizing esthetic appearance while minimizing morbidity and postoperative disability. The traditional approach to incisional hernia repair usually involves a surgical approach via the previous scar, which is usually vertical. However, an approach via a low transverse incision may, in some instances, be considered. Indeed, techniques that have been developed for the surgical approach to abdominoplasty include the use of a transverse lower abdominal incision and the resection of excess skin. Numerous studies in the literature, most of which have been gynecologic in nature, have advocated pannus resection in conjunction with intra-abdominal procedures, with all reporting successful outcomes;[21,22] very few of these reports have addressed the challenges involved in the repair of incisional hernia.[23,24]

The benefits of this approach are full exposure of the abdominal wall defect, a surgical approach through known tissue planes, and fascial repair far from the skin incision. By incorporating these aspects into hernia repair, the safety of the procedure is maintained, the recurrence rates are reduced, and the esthetic outcome is enhanced.[25] In this article, we describe our experience regarding the safety and effectiveness of panniculectomy with the separation-of-parts herniorrhaphy. In our study, intra-abdominal pressure was monitored during closure as well as postoperatively.

Material and Methods

Patient data

A prospective, noncontrolled study (cohort study) was planned. From January 2006 to July 2008, 22 patients were treated in the Department of Plastic Surgery of "La Sapienza" University of Rome for incisional hernia repair and were then followed up. The reasons for surgery were recurrent incisional hernia in 14 cases (63.6%) and incisional hernia in the remaining 8 cases (36.4%). The etiologic procedures included bariatric operations, bowel resection, cholecystectomy, and a variety of obstetric/gynecologic procedures. Within the subgroup of patients with recurrent hernias, the number of prior repairs ranged from 1 to 4 (mean 1.85). The overall incidence of prior mesh encountered perioperatively was 71.5% (10 cases). The type of mesh that had been used in the previous surgical treatment was composite (Polypropylene/polytetrafluoroethylene dual mesh) in 6 cases and nonabsorbable (polytetrafluoroethylene) in 4 cases. The mesh was infected in 3 cases.

Fifteen patients were women (68.4%), and 7 patients were men (31.6%). The patients' age ranged between 48 years and 72 years (median 59 years 2 months). The patients' body mass index ranged from 19.8 kg/m^2 to 58.2 kg/m^2 (mean 42.6 kg/m^2).

Some patients had at least 1 risk factor for recurrence including morbid obesity (9 patients, 40.9%), diabetes mellitus (6 patients, 27.3%), and recent massive weight loss after bariatric surgery (5 patients, 22.7%). Five patients (22.7%) had a history of smoking. None of the patients had severe asthma or a chronic respiratory tract disorder.

The size of the defects was assessed preoperatively by means of a computed tomography scan. All defects were midline; according to Chevrel's classification,[26] they were supraumbilical (M1) in 3 cases, juxtaumbilical (M2) in 5 cases, subumbilical (M3) in 4 cases, and xyphopubic (M4) in the remaining 10 cases. All the defects were longer than 11 cm transversally and varied in length vertically. According to Chevrel's classification,[26] they were 10 cm to 15 cm wide[3] in 12 cases and >15 cm in the remaining 10 cases.[4] The size of the defects ranged from 225 cm^2 (11 × 13 cm) to 980 cm^2 (24 × 26 cm), the mean being 525 cm^2. In 1 patient, the computed tomography scan clearly showed the loss of abdominal domain. Indeed, the abdominal viscera in this patient were predominantly outside the abdominal cavity; the size of the abdominal cavity were substantially