The American Journal of Surgery (2015) 209, 170-179

The American Journal of Surgery®

Clinical Science

Large and complex ventral hernia repair using "components separation technique" without mesh results in a high recurrence rate

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KEYWORDS:
Component separation technique;
Ventral hernia;
Mesh;
Incisional hernia;
Complex hernia

Abstract

BACKGROUND: Recurrence rates after component separation technique (CST) are low in the literature but may be underestimated because of inadequate follow-up methods.

METHODS: Prospective patient follow-up was performed of consecutive patients who underwent repair of large and complex ventral hernias using CST without mesh utilization. Primary outcome was recurrent hernia determined by clinical examination at least 1 year after surgery in all living patients. Current literature underwent meta-analysis regarding outcomes and mode of follow-up.

RESULTS: Seventy-five patients were included with a mean age of 52.2 years and a mean defect size of 214.9 cm^2, respectively. Twenty-nine patients (38.7%) had a recurrent hernia after a mean of 40.9-month follow-up, and this was significantly higher than in the literature (14.0%, $P < .01$). Sixty-four percent of studies in the literature were unclear about the method of determining recurrent hernia or included telephone follow-up and questionnaires.

CONCLUSIONS: CST coincides with a high recurrence rate when clinical follow-up is longer than a year. Reported recurrence rates are probably underestimated because the method and duration of follow-up are inadequate.

The reconstruction of a large and complex ventral hernia is challenging and technically demanding. There is no consensus regarding the best treatment despite new developments and evolution of existing surgical techniques.[1] The common method to bridge the fascial gap of a ventral hernia is placement of a synthetic prosthetic material. However, this may not be sufficient for very large defects and leaves a significant surface of the abdominal wall void of the myofascial contracting apparatus. Other concerns of prosthetic bridging are infection and organ injury caused by mesh erosion. Biologic grafts are being recommended as an alternative to synthetic mesh to avoid infectious

N.J.S. and H.V.G. had full access to all the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.

N.J.S. declares conflict of interest not directly related to the present work (Bard/Davol: speaking honorarium). H.V.G. declares conflict of interest not directly related to the present work (Ethicon: member advisory board on biomaterials). R.P.B. declares no financial tie or conflict of interest related to the present work.

The present work was presented at the 14th Annual Meeting of the American Hernia Society, New York, March 28–31, 2012.

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Manuscript received October 26, 2013; revised manuscript February 4, 2014

0002-9610/$ - see front matter © 2015 Elsevier Inc. All rights reserved.
http://dx.doi.org/10.1016/j.amjsurg.2014.02.013

complications and erosion, but proof of their superiority is lacking[2] and serious doubts are being raised concerning their long-term durability.[3]

An autologous method of ventral hernia repair that precludes the implantation of foreign materials is the component separation technique (CST), first described by Ramirez et al in 1990.[4] Since then, several modifications have been reported to deal, for example, with threatened skin ischemia or concomitant enterostomy placement.[5–8] Besides ameliorating complications related to mesh implantation, restoration of the integrity and contour of the abdominal wall is a major advantage of CST over prosthetic bridging.

Determining reliable recurrence rates for different surgical options in hernia repair is important for patients and for decision making regarding choice of treatment. Published studies of CST without mesh for repair of large and complex abdominal wall defects show very low recurrence rates, with the majority lying between 0% and 10%.[9–22] This study was undertaken because the literature does not seem to be corroborated by our own clinical observations despite long-term and extensive experience with the CST technique.[6,23–25] The aim of this study was to evaluate the outcomes of CST to repair large and complex ventral hernias at our institution, with a focus on hernia recurrence.

A potential flaw in determining long-term outcomes is the lack of rigorous and reliable follow-up, utilizing telephone and postcard questionnaires. In the present study, we performed an outpatient clinical follow-up in every patient at least 1 year after surgery. Our findings are compared with the literature, which was analyzed regarding outcomes and mode of follow-up using systematic review and meta-analysis.

Methods

Institutional chart review

Inclusion criteria. All patients who underwent reconstruction of their ventral hernia with CST over a 10-year period (2000 to 2010) at our institution were identified. No patients included in previous reports by the authors were included. Adult patients (aged 18 to 75 years at the time of operation) who underwent repair including bilateral release of the external oblique fascia were eligible for inclusion, including patients with enterocutaneous fistulas and open abdomen. Patients who underwent CST including placement of biologic or nonabsorbable synthetic mesh were excluded.

Outcomes and data extraction. The primary outcome was recurrent hernia for which all living patients were clinically assessed in the outpatient clinic at least 12 months after surgery. Ultrasonography or computed tomography imaging was used to determine recurrent hernia in cases of suspicion of recurrence or inconclusive physical examination. Secondary outcomes were mortality and wound and medical morbidity.

Medical records of all patients were reviewed comprehensively, and the following data were extracted: demographic variables (sex, age, and body mass index), history (type and amount of laparotomies), comorbidities (pulmonary, cardial, renal, gastrointestinal, metabolic), risk factors (smoking, alcohol, steroids, medication, American Society of Anesthesiologists score, wound class, blood pressure, heart rate, blood and electrolyte values), cause and size of abdominal wall defect, intraoperative variables (duration, blood loss, technique, iatrogenic damage), early postoperative ($\leq$30 days after operation) variables, length of hospital and intensive care stay, major surgical (hematoma, seroma, skin necrosis, infection, wound dehiscence) and medical complications (pneumonia, postoperative ileus, urinary tract infection), reoperations, long-term follow-up (>12 months) mortality, and reherniation. The Ventral Hernia Working Group grade was determined for each patient. This is a grading system (1: Low risk; 2: Comorbid, 3: Potentially contaminated, and 4: Infected) devised for risk assessment of surgical site occurrences in hernia patients.[26] Characteristics of the hernia were determined by computed tomography imaging in all patients preoperatively, including the length and width, which were transformed into the surface area (cm^2) by using the formula for an ellipse: $\pi \times$ ½ length $\times$ ½ width.

Statistical analysis. Univariate logistic regression analysis was performed to identify risk factors associated with recurrent hernia, wound morbidity, and medical morbidity, using chi-square test to examine differences in proportions. Kaplan–Meier curve was generated to estimate the cumulative hernia recurrence-free "survival" in time. Analyses were performed with SPSS, version 16.0 (SPSS, Chicago, IL).

Operative technique. Antibiotic prophylaxis was started preoperatively and continued for 24 hours postoperatively in patients with wound classes I to III. Patients with wound class IV received antibiotics for 5 to 7 days. CST was performed as described previously.[23,25] Briefly, the skin is opened via midline incision, or in cases of skin defects, just lateral to the defect. Viscera are dissected free from the ventral abdominal wall, identifying the lateral border of the rectus abdominis muscle from within the abdomen. Bowel procedures are performed as necessary. Skin and subcutaneous fat are dissected free from the anterior rectus sheath and the fascia of the external oblique muscle. The fascia of the external oblique muscle is released 1 to 2 cm lateral to the lateral border of the rectus abdominis muscle. Release continues longitudinally including the muscular part that inserts on the thoracic wall extending 5 to 7 cm cranially. The avascular fibrous plane between the external and internal oblique muscles is disunited up to the midaxillary line, taking care not to incise the internal oblique muscle. If tension-free midline closure is not possible at this point, the posterior rectus sheath is mobilized from the rectus abdominis muscle after a full-length incision posteriorly. Skin necrosis may occur using CST,