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Long-term outcomes of sandwich ventral hernia repair paired with hybrid vacuum-assisted closure

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ABSTRACT

Background: Sandwich ventral hernia repair (SVHR) may reduce ventral hernia recurrence rates, although with an increased risk of surgical site occurrences (SSOs) and surgical site infections (SSIs). Previously, we found that a modified negative pressure wound therapy (hybrid vacuum-assisted closure [HVAC]) system reduced SSOs and SSIs after ventral hernia repair. We aimed to describe our outcomes after SVHR paired with HVAC closure.

Methods: We conducted a 4-y retrospective review of all complex SVHRs (biologic mesh underlay and synthetic mesh overlay) with HVAC closure performed at our institution by a single surgeon. All patients had fascial defects that could not be reapproximated primarily using anterior component separation. Descriptive statistics were used to report the incidence of postoperative complications and hernia recurrence.

Results: A total of 60 patients (59.3 ± 11.4 y, 58.3% male, 75% American Society of Anesthesiologists class ≥3) with complex ventral hernias being underwent sandwich repair with HVAC closure. Major postoperative morbidity (Dindo–Clavien class ≥3) occurred in 14 (23.3%) patients, but incidence of SSO ($n = 13$, 21.7%) and SSI ($n = 4$, 6.7%) was low compared with historical reports. Median follow-up time for all patients was 12 mo (interquartile range 5.8-26.5 mo). Hernia recurrence occurred in eight patients (13.3%) after a median time of 20.6 months (interquartile range 16.4- 25.4 months).

Conclusions: Use of a dual layer sandwich repair for complex abdominal wall reconstruction is associated with low rates of hernia recurrence at 1 year postoperatively. The addition of the HVAC closure system may reduce the risk of SSOs and SSIs previously reported with this technique and deserves consideration in future prospective studies assessing optimization of ventral hernia repair approaches.

The data herein were presented as a podium presentation at the first World Hernia Conference (April 25-29, 2015, Milan, Italy) and in part as a poster presentation at the 55th Annual Meeting of the Society for Surgery of The Alimentary Tract (May 3-6, 2014, Chicago, IL).

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Introduction

Surgeons face a particular challenge when attempting to reconstruct large, complex abdominal wall defects. Currently, the surgical community lacks a widely accepted, optimum approach to repair large (>300 cm^2) fascial defects that cannot be closed primarily.[1,2] Although several techniques have been described for repairing such defects,[2-8] the anterior component separation technique paired with a double-layered sandwich repair (biologic mesh underlay and synthetic mesh overlay) is an approach that has gained increasing popularity, mainly due to reduced hernia recurrence rates.[8-10] However, existing reports for this approach have recognized high rates of postoperative surgical site occurrences (SSOs), ranging from 30% to 39%.[8-10]

Extensive research has been conducted to reduce the rates of SSO and surgical site infections (SSIs) after ventral hernia repairs (VHRs).[2,11] One approach is the use of negative pressure wound therapy, or vacuum-assisted closure (VAC) therapy. Use of a VAC dressing has been associated with reduced surgical site complications after complex VHR by more than 33%,[12] and is particularly effective in the treatment of higher risk grade II hernias.[12,13] However, the specific effect of the hybrid vacuum-assisted closure (HVAC) on patients undergoing components separation paired with sandwich ventral hernia repair (SVHR) has not been previously reported.

In the present study, we describe our outcomes after SVHR paired with HVAC closure, including the incidence of hernia recurrence and postoperative surgical site complications among patients undergoing complex abdominal wall reconstruction.

Materials and methods

Design and patient cohort

This was a preliminary study designed to assess the utility of an SVHR technique with concomitant HVAC wound management system. After obtaining institutional review board approval, we conducted a retrospective review of a prospectively maintained database of all complex SVHRs (biologic mesh underlay and synthetic mesh overlay) with HVAC system closure performed consecutively at our institution by a single surgeon (F.E.E.) between November 1, 2010 and August 15, 2014. The study population included all patients with massive fascial defects that could not be reapproximated primarily after anterior components separation (Fig. 1) and thus underwent SVHR followed by HVAC closure. Patients who did not undergo SVHR and those who did not receive the HVAC wound management system were excluded from the study.

For each patient, demographic data and the presence of comorbidities, American Society of Anesthesiologists (ASA) classification, hernia defect size, operative characteristics, length of hospital stay, 30-d postoperative complications (including SSO, defined by Kanters *et al.*[13] as the occurrence of seromas, wound dehiscences, enterocutaneous fistulas, or SSI), hernia recurrence rate, and length of follow-up were recorded. In addition, we used the Dindo–Clavien classification (DCC)[14] to characterize postoperative overall morbidity (including medical complications) and dichotomized the patients into those with DCC < 3 and those with DCC ≥ 3. Overall morbidity was defined by the presence of any of the following: myocardial infarction, deep venous thrombosis, arrhythmias, pneumonia, SSO, reoperation, postoperative bleeding, and renal failure.

Surgical technique

All patients underwent anterior components separations as previously described.[3] Briefly, after skin incision, wide soft-tissue flaps extending from the xiphoid process to the pubic symphysis and the anterior superior iliac spines to the costal margins were raised to mobilize the musculofascial components of the abdominal wall from the more superficial lipocutaneous layers. The hernia sac was entered, and the abdominal wall was separated from the underlying viscera. In cases of multifenestrated hernias, all fascial bridges were divided to produce a single defect for closure. The hernia sac was excised back to the edge of normal fascia, and bilateral anterior components separation was performed to gain additional mobility.

Once mobilization was complete, a 2-mm-thick acellular dermal matrix (Surgimend; TEI Biosciences, Boston, MA)

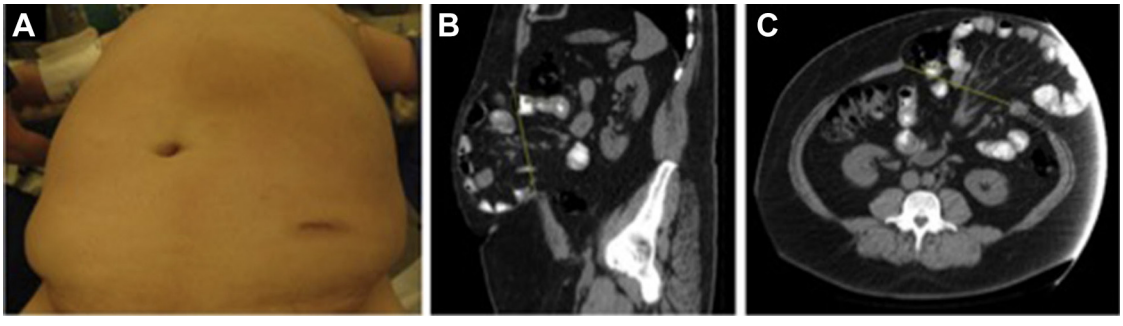

Fig. 1 – Complex ventral hernia with massive fascial defect. The study population included all patients with massive fascial defects that could not be reapproximated primarily after anterior components separation. A 50-y-old male patient with complex ventral hernia is presented as an example (A), with computed tomography images of his massive fascial defect presented as a sagittal (B) and transverse (C) sections. (Color version of figure is available online.)