
Abdominal Wall Reconstruction with Concomitant Ostomy-Associated Hernia Repair: Outcomes and Propensity Score Analysis



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BACKGROUND: The optimal strategy for abdominal wall reconstruction in the presence of a stomal-site hernia is unclear. We hypothesized that the rate of ventral hernia recurrence in patients undergoing a combined ventral hernia repair and stomal-site herniorraphy would not differ clinically from the ventral hernia recurrence rate in patients undergoing an isolated ventral hernia repair. We also hypothesized that bridged ventral hernia repairs result in worse outcomes compared with reinforced repairs, regardless of stomal hernia.

STUDY DESIGN: We retrospectively reviewed prospectively collected data from consecutive abdominal wall reconstructions performed with acellular dermal matrix (ADM) at a single center between 2000 and 2015. We compared patients who underwent a ventral hernia repair alone (AWR) and those who underwent both a ventral hernia repair and ostomy-associated herniorraphy (AWR+O). We conducted a propensity score matched analysis to compare the outcomes between the 2 groups. Multivariable Cox proportional hazards and logistic regression models were used to study associations between potential predictive or protective reconstructive strategies and surgical outcomes.

RESULTS: We included 499 patients (median follow-up 27.2 months; interquartile range [IQR] 12.4 to 46.6 months), 118 AWR+O and 381 AWR. After propensity score matching, 91 pairs were obtained. Ventral hernia recurrence was not statistically associated with ostomy-associated herniorraphy (adjusted hazard ratio [HR] 0.7; 95% CI 0.3 to 1.5; $p = 0.34$). However, the AWR+O group experienced a significantly higher percentage of surgical site occurrences (34.1%) than the AWR group (18.7%; adjusted odds ratio 2.3; 95% CI 1.4 to 3.7; $p < 0.001$). In the AWR group, there were significantly fewer ventral hernia recurrences when the repair was reinforced compared with bridged (5.3% vs 38.5%; $p < 0.001$).

CONCLUSIONS: There was no statistically significant difference in ventral hernia recurrence between the AWR and AWR+O groups. Bridging was associated with an increased rate of hernia recurrence and should be avoided if possible. (*J Am Coll Surg* 2017;224:351–361. © 2016 by the American College of Surgeons. Published by Elsevier Inc. All rights reserved.)

Disclosure Information: Dr Mericli received support from Acelity for travel to the European Association of Plastic Surgeons' annual meeting to present this paper. All other authors have nothing to disclose.

Support: This work was supported in part by the NIH/NCI under award number P30CA016672 and used the Clinical Trials Support Resource.

Presented at the European Association of Plastic Surgeons Annual Meeting, Brussels, Belgium, May 2016.

Received August 24, 2016; Revised November 21, 2016; Accepted November 22, 2016.

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Development of a ventral hernia after laparotomy is a relatively common complication, affecting 11% to 22% of all laparotomies and 350,000 operations annually.^{1,2} Parastomal hernias occur even more often, affecting up to 48% of all ostomies.³ These 2 types of hernias often coexist: a recent study identified the risk for ventral hernia to be 7 times greater in those with an existing parastomal hernia.⁴ The presence of a ventral hernia and concomitant ostomy-associated hernia is a challenging scenario for the reconstructive surgeon. These abdominal wall defects are among the most complicated to repair, necessitating thoughtful consideration of multiple variables: the

Abbreviations and Acronyms

ADM	= acellular dermal matrix
ASA	= American Society of Anesthesiologists
AWR	= abdominal wall reconstruction
AWR+O	= abdominal wall reconstruction with concomitant repair of an ostomy-associated hernia
IQR	= interquartile range
SSI	= surgical site infection
SSO	= surgical site occurrence
VHWG	= Ventral Hernia Working Group

presence of a contaminated field; a scarred, multiply reoperated abdominal wall; poor musculofascial quality; a large surface-area defect; and the frequent presence of medical comorbidities.⁴⁻⁸ The optimal reconstructive strategy for abdominal wall reconstruction in the presence of an ostomy is unclear. Aspects to consider include staging the reconstruction vs repairing both hernias simultaneously, the role of mesh and the technique of mesh placement, and the use of component separation.⁴⁻⁹ The influence that an ostomy-associated hernia repair has on the success and longevity of a concomitant ventral herniorraphy is also unknown.

Despite the fact that ostomy-associated hernias are commonly associated with factors that are predictive of poor wound healing, based on our clinical experience and before our review of the data, we hypothesized that the ventral hernia recurrence rate in patients undergoing a combined ventral hernia repair and stomal-site herniorraphy would not differ from the ventral hernia recurrence rate in patients undergoing an isolated ventral hernia repair. Additionally, we hypothesized that patients undergoing reconstruction with primary fascial coaptation and bioprosthetic matrix reinforcement experience lower hernia recurrence rates compared with those with bridged matrix repairs, regardless of the presence of an ostomy.

METHODS**Patients and outcomes evaluated**

We performed an institutional review board-approved retrospective cohort study, evaluating all consecutive patients who underwent midline repair of an abdominal wall hernia or oncologic defect, for which the fascia could or could not be primarily closed without undue tension, at The University of Texas MD Anderson Cancer Center between February 2000 and November 2015. Necessary informed consent was obtained for a retrospective study of this nature. All data were obtained from our department's prospectively maintained abdominal wall

reconstruction database as well as our institution's electronic medical record.

For this analysis, inclusion criteria included age 18 years or older and the use of bioprosthetic acellular dermal matrix (ADM) mesh in the reconstruction. Exclusion criteria included use of synthetic mesh, lateral abdominal wall defects (defects lateral to the semilunar line), and/or defects that could be closed primarily without tension (no ADM). Patients with synthetic mesh were excluded because there were so few (<2%) (Fig 1).

Patients were divided into 2 groups: those who underwent abdominal wall reconstruction for ventral hernia alone (AWR group), and those who underwent AWR for ventral hernia with simultaneous ostomy-associated herniorraphy (AWR+O group). For the purpose of this study, we considered both parastomal hernias (hernias associated with a functioning stoma) and stoma-site hernias (hernias located at the site of a past stoma) ostomy-associated hernias. We analyzed patient, treatment, and defect characteristics and directly compared surgical outcomes between the AWR and AWR+O groups. Subgroup analysis compared outcomes for bridged vs matrix-reinforced repair between the AWR and AWR+O groups.

Electronic medical records were reviewed for patient baseline characteristics and comorbidities. Previous abdominal wall radiation was defined as radiation directly to the abdominal wall or radiation to intra-abdominal organs. Defect characteristics assessed included the Ventral Hernia Working Group (VHWG) classification,¹⁰ defect width, and defect surface area. Obesity was defined as a BMI greater than or equal to 30 kg/m². Any patient who smoked tobacco within 1 month of surgery was considered an active smoker. The primary outcome was ventral hernia recurrence, defined as a contour abnormality associated with a fascial defect; a contour abnormality without a fascial defect was considered bulging. Hernia and bulge were considered mutually exclusive conditions and were diagnosed by physical examination and/or CT imaging. Secondary outcomes were ostomy hernia recurrence, surgical site occurrence (SSO; ie 1 or more of the following: hematoma, seroma, wound skin dehiscence, fat necrosis), reoperation due to complication, surgical site infection (SSI) occurring within 30 days of the reconstruction (cellulitis requiring antibiotics, abscess, intra-abdominal sepsis, mesh/matrix infection), enterocutaneous fistula, mesh/matrix infection alone, and mesh/matrix explantation.

Surgical technique

All repairs were performed through a midline laparotomy. Our technique for isolated ventral hernia repair and

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