A Comparison of Acellular Dermal Matrices in Abdominal Wall Reconstruction

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Background: There is a growing literature of evidence that the use of acellular dermal matrices (ADMs) in abdominal wall reconstruction (AWR) for high-risk patients provides superior complication profiles when compared with standard synthetic mesh. Here we compare Fortiva, Strattice, and Alloderm ADMs in AWR.

Methods: In a prospectively maintained database, all patients undergoing AWR between January 2003 and November 2016 were reviewed. Hernia recurrence and surgical site occurrence (SSO) were our primary and secondary endpoints. Kaplan-Meier survival curves and logistic regression models were used to evaluate risks for hernia recurrence and SSO.

Results: A total of 229 patients underwent AWR with 1 of 3 ADMs. Median follow-up time was 20.9 months (1–60 months). Cumulative recurrence rates for each mesh were 6.9%, 11.2%, and 22.0% ($P = 0.04$), for Fortiva, Strattice, and Alloderm groups. Surgical site occurrence for each mesh was 56.9%, 49.0%, and 49.2%, respectively. Seroma was significantly lower in the Fortiva group (1.4%; $P = 0.02$). Independent risk factors hernia recurrence included body mass index of 30 kg/m^2 or higher and hypertension. Adjusted risk factors included oncologic resection for hernia recurrence (odds ratio, 5.3; confidence interval, 1.1–97.7; $P = 0.11$) and a wound class of contaminated or dirty/infected for SSO (odds ratio, 3.6; confidence interval, 1.0–16.6; $P = 0.07$).

Conclusions: Acellular dermal matrices provide a durable repair with low overall rate of recurrence and complications in AWR. The recurrence and complication profiles differ between brands. With proper patient selection and consideration, ADMs can be used confidently for a variety of indications and wound classifications.

Key Words: abdominal wall reconstruction, AWR, ADM, acellular dermal matrix, Fortiva, Strattice, Alloderm, recurrence, hernia, porcine, human, noncrosslinked

(*Ann Plast Surg* 2018;00: 00–00)

Abdominal wall reconstruction (AWR) is becoming increasingly common in the United States. Its indications are many, but all involve loss of abdominal wall integrity or domain: tumor extirpation, fistulizing processes, complications following abdominal procedures, and critically ill or malnourished patients.[1] Recent estimates suggest that 350,000 AWRs are conducted annually.[2] It is well known that the use of a mesh provides a superior outcome in ventral and incisional hernia repair when compared with primary suture closure alone.[3–6] Synthetic mesh materials, such as vicryl and polypropylene, have traditionally been chosen for repair. However, synthetic meshes have associated complications including infection, erosion, and extrusion.[4,7–9] Whereas synthetic mesh has a comparatively well described complication profile for use in ventral hernia repairs, the profiles of biologic mesh devices in AWR remains variable.[10–14]

Use of acellular dermal matrices (ADMs), in lieu of synthetic meshes, has grown in popularity among reconstructive surgeons, as ADMs may allow for revascularization and integration into the surrounding tissue, stimulate regeneration, resist infection, and are associated with less overall complications including infection, extrusion, erosion, and adhesion formation.[13,15–18] Widespread adoption of ADMs in AWR has been tempered by a few factors, including concerns over long-term durability and cost. More recently, ADM mesh repair has been demonstrated to have similar hernia recurrence when compared directly and historically to synthetic mesh.[4,5,7,13,16–18] Therefore, there are compelling reasons to use ADMs in AWR. However, there are a multitude of ADMs to choose from, and there is some suggestion that not all of them have the same complication and recurrence profile.[18] In addition, many studies do not distinguish between brands of ADM, which may have the same molecular structure, but may also be processed or sterilized via different methods effecting the outcomes and complication profiles. Here we compare our experiences with 3 noncrosslinked matrices, Strattice (Porcine; Allergan, Dublin, Ireland), Fortiva (Porcine; RTI Surgical, Alachua, Fla), and Alloderm (Human; Allergan, Dublin, Ireland), in AWR and evaluate complications, hernia recurrence, and the risk factors for each at a single tertiary referral center.

METHODS

All patients undergoing AWR between January 1, 2003, and November 30, 2016 were evaluated from a prospectively maintained database. Patients who underwent elective AWR with an ADM manufactured by Fortiva, Strattice, or Alloderm to close or support a hernia closure defect were included in this study. This study was approved by the Emory University Hospital Institutional Review Board.

The primary objective was to compare durability and outcomes of AWR with each respective ADM brand. All patients included underwent elective AWR with placement of an ADMs in underlay, overlay, or inlay fashion. Both primary and recurrent hernias were included as well as abdominal defects caused by tumor extirpation or fistula takedown procedures. Exclusion criteria included patients undergoing AWR with emergent or urgent operation indications (eg, strangulated bowel or trauma), use of non-ADM for primary defect closure or support, and age less than 18 years. Utilization of mesh size and brand was made at the discretion of the surgeon after history, clinical examination, and imaging studies were reviewed. In general, before 2010, Alloderm was the primary ADM used for AWRs. After 2010, Strattice and Fortiva were primarily used.

Our primary outcomes measure was hernia recurrence defined as a palpable abdominal defect or contour abnormality, with or without an appreciable underlying fascial defect. All hernias were confirmed with abdominal computed tomography (CT) imaging confirmation. Secondary outcomes of interest were surgical site occurrence (SSO), defined as the occurrence of at least 1 of the following: surgical site infection (SSI), seroma, hematoma, delayed wound healing, and skin necrosis or mesh erosion/extrusion. Development of postoperative enterocutaneous fistula formation was also included. All recurrences

Received June 5, 2018, and accepted for publication, after revision September 20, 2018.
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Conflicts of interest and sources of funding: A.L. is a speaker for RTI. The authors have no further disclosures to make and have not received funding from entities including National Institutes of Health, Wellcome Trust, Howard Hughes Medical Institute, Research Councils United Kingdom, and others.
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ISSN: 0148-7043/18/0000–0000
DOI: 10.1097/SAP.0000000000001692

or components of SSO were identified clinically on physical examination. Hernia recurrence was additionally confirmed with CT scan. Patients with bulging, but without actual hernia, were excluded.

Surgical site infections included cellulitis, abscess, or wound drainage without apparent abscess that resulted in positive wound cultures and required antibiotics with or without reoperation. Seroma and hematomas included palpable, subcutaneous collections of blood or serous fluids, confirmed with ultrasound or CT scan, and requiring drainage or reoperation. Delayed wound healing included wounds with prolonged requirement to heal or absence of surgical incision healing with or without the presence of dehiscence of previously healed incisions and/or skin necrosis. Wound dehiscence was previously approximated tissue, which separated or sloughed with apparent defect with or without presence of continuing necrosis. Necrosis included a full-thickness separation of devitalized tissue with clear demarcation, eschar formation, with or without infection that also required debridement. Current smoker was defined as any patient who smoked a cigarette within 1 month of surgery or who quit smoking specifically to undergo surgery. Former smoker was defined as anyone who has not smoked in more than 1 month before surgery. Most commonly, these patients had remote, prolonged histories of smoking 1 year or more. Previous surgeries included only intra-abdominal or pelvic surgeries performed open or laparoscopically. Nonabdominopelvic surgeries were omitted. Wound classification and SSI were defined using criteria required for inclusion in American College of Surgeons National Surgical Quality Improvement Program wound classification categories and the CDC guidelines for classification of SSI.[19,20]

Operative Technique

Abdominal wall reconstructions were performed by a single reconstructive surgeon. Patients who underwent concomitant enterocutaneous fistula takedown, tumor extirpation, or lysis of adhesions were managed with a multidisciplinary approach. All patients received preoperative evaluation of their defect in clinic with physical examination and CT evaluation before surgery scheduling. Those performed by a multidisciplinary approach were evaluated preoperatively but also underwent reevaluation intraoperatively after tumor excision or fistula takedown. The reconstructive surgeon defines the fascial defect, excised the hernia sac, and performed additional debridement if required. Techniques used during AWR included component separations (CSs) used to approximate the rectus abdominis muscle without significant tension on the fascia and complex AWR. All CSs were performed with an anterior release to preserve perforators. Most repairs were performed with 3 to 5 cm of overlap of the abdominal defect with ADM, which was sutured in place with polydioxanone or polypropylene suture. Fascial closure was also performed with a number 1 polydioxanone or polypropylene suture. Subcutaneous drains were placed in all patients during closure.

Statistical Analysis

Data analysis was performed using SPSS version 24 (IBM Corp). Comparisons of proportions between 2 groups were made using χ^2 or Fisher exact test. Continuous data were analyzed using 2-sample *t* tests for means or Mann-Whitney tests for medians where appropriate. Analysis of variance (ANOVA) was used for grouped variables. Univariate analysis was used to compare comorbidities and operative outcomes between selected groups. Multivariate regression analysis was performed using logistic regression of potentially predictive strata and estimate of the odds ratios (ORs) of predictive factors for overall complications using 95% confidence intervals (CIs). A forward multivariable model was used to fit our multivariate regression model. Candidate factors for model fitting required a univariate P value <0.20. All statistical tests were 2-sided, and homogeneity of samples was confirmed. Significance was determined at a P value <0.05. Data are presented as mean values with standard deviations, medians with ranges, or as counts.

RESULTS

Patients Characteristics

A total of 240 patients who underwent complex abdominal reconstruction were identified from a prospective database. After exclusions, 229 patients were included into the study. Patients underwent AWR with Fortiva (n = 72, 31.4%), Strattice (n = 98, 42.8%), and Alloderm (n = 59, 25.8%) ADMs. Patient demographics and clinical features are detailed in Table 1. The mean ± SD age was 55 ± 13 years, 52.3% had hypertension, and 22.7% had diabetes. The average body mass index (BMI) was 31.1 ± 7.6. The median hospital length of stay (LOS) was 8.0 days (range, 2–53 days), and the median follow-up time

TABLE 1. Baseline Characteristics, Demographics, and Repair Details

Variable	Fortiva (n = 72)	Strattice (n = 98)	Alloderm (n = 59)	*P*
Age, mean (SD)	58 (±12.0)	55 (±13.2)	51 (±13.2)	0.150
Sex, female, n (%)	41 (56.9)	48 (49.0)	29 (49.2)	0.590
Race, n (%)				0.001*
White	47 (65.3)	83 (84.7)	50 (84.7)	
African American	23 (31.9)	15 (15.3)	6 (10.2)	
Other†	2 (2.8)	0	3 (5.1)	
BMI, mean (SD), kg/m^2	32.1 (±8.3)	30.8 (±7.0)	30.5 (±7.8)	0.960
Comorbidities, n (%)				
HTN	42 (58.3)	48 (49.0)	31 (52.5)	0.480
DMII	16 (22.2)	21 (21.4)	15 (25.4)	0.840
Current smoker	7 (9.7)	14 (14.3)	18 (30.5)	0.004*
Former smoker	27 (37.5)	12 (12.2)	5 (8.5)	<0.001*
Indication for AWR, n (%)				0.570
Hernia repair	86 (83.3)	87 (88.8)	50 (84.7)	
Post–tumor resection	12 (16.7)	11 (11.2)	9 (15.3)	
Wound class, n (%)				0.001*
Clean	31 (43.1)	62 (63.3)	42 (71.2)	
Clean-contaminated	38 (52.8)	30 (30.6)	14 (23.7)	
Dirty or infected	3 (4.2)	5 (5.1)	3 (5.1)	
History of abdominal surgery, n (%)‡	49 (68.1)	62 (63.3)	38 (64.4)	0.800
Mesh placement, n (%)				0.460
Inlay	33 (45.8)	41 (41.8)	26 (44.1)	
Onlay	9 (12.5)	11 (11.2)	12 (20.3)	
Underlay	30 (41.7)	46 (46.9)	21 (35.6)	
Closure method, n (%)				<0.001*
Primarily	54 (75.0)	48 (49.0)	24 (40.7)	
Fascial bridging	18 (25.0)	50 (51.0)	35 (59.3)	
Type of repair, n (%)				<0.001*
Mesh only	53 (73.6)	56 (57.1)	25 (45.4)	
CS	15 (20.8)	41 (41.8)	34 (57.6)	
LOS, mean (SD), day	14.9 (±14.3)	10.4 (±9.2)	10.4 (±8.6)	0.710

*Denotes significance of $P \leq 0.05$. Significance determined by ANOVA.

†Includes Hispanic, Asian, and American Indian Native.

‡Defined as intra-abdominal or pelvic surgeries performed open or laparoscopically.

DMII, diabetes mellitus type II; LOS, length of stay.

was 20.9 months (range, 1.0–60.0 months). Notably, more patients in the Alloderm group were current smokers, whereas the Fortiva group had significantly more former smokers in comparison.

The most common indication for repair was recurrent ventral hernia (148, 64.6%), which composed of greater than 60% of all repairs in each group. The Alloderm group used smaller mesh sizes overall compared with Strattice and Fortiva groups (18 ± 4.1 vs 24 ± 7.2 vs 22 ± 7.9 cm; $P = 0.007$). Acellular dermal matrices were more commonly placed in inlay or underlay orientations with mesh only repairs. Primary closure was attained in 55.0% of patients with significantly more primary closures and significantly fewer CSs in the Fortiva group. Overall, only 5 patients required a flap for completion of their AWR: 4 in the Fortiva group and 1 in the Strattice group.

Postoperative Recurrence and Complications

The postoperative recurrence and SSO complications are detailed in Table 2. The cumulative overall incidence of hernia recurrence was 11.8%. The incidence of recurrence was significantly higher in the Alloderm group compared with the Fortiva and Strattice groups, respectively (20.3% vs 10.2% vs 6.9%; $P = 0.040$). When we looked at time to hernia recurrence at 1-, 3-, and 5-year intervals, we found that the overall hernia rates changed from 4.3% to 10.4% to 11.8%, respectively (Fig. 1). By ADM brand, the 1-, 3-, and 5-year survivals were as follows: Fortiva, 1.4% and 6.9%, with all recurrences accounted for before 3 years; Strattice, 5.1%, 9.2%, and 10.2%; and Alloderm, 6.8%, 18.5%, and 20.3%. Although patients in the Alloderm group had the longest median hernia-free interval, 26.8 months (2–60 months), this was not found to be significantly different from the other groups. Otherwise, there were no significant differences in recurrence between ADMs.

On separate analysis, incidence of recurrence for ADM placement in inlay, onlay, and sublay fashion sorted by mesh type (Table 3) are as follows: Fortiva, 3.0% (1/33), 0.0% (0/9), and 12.9% (4/31); Strattice, 4.8% (2/42), 0.0% (0/11), and 17.4% (8/46); and Alloderm, 28.0% (7/25), 25.0% (3/12), and 10.0% (2/20), respectively. Further stratification by wound class and mesh type yields the following recurrence rates: Fortiva, 6.1% (2/33) and 8.1% (3/37); Strattice, 6.3% (4/63) and 13.3% (4/30); and Alloderm, 23.7% (9/38) and 12.5% (2/16).

The overall complication rate was 51.5%. The most common complication was SSI (26.2%) followed by delayed healing (24.0%). Seroma formation was significantly lower in the Fortiva group compared with the Strattice and Alloderm groups (1.4% vs 13.3% vs 11.9%; $P = 0.021$). There were no other significant differences in SSO between groups.

Predictors of Hernia Recurrence and SSO

Predictive multivariate models are found in Tables 3 and 4. Logistic regression was used to identify predictors of hernia recurrence and complications. For hernia recurrence, unadjusted predictors included BMI of 30 kg/m^2 or greater (OR, 1.07; CI, 1.02–1.12; $P = 0.003$) and hypertension (OR, 2.18; CI, 1.03–4.87; $P = 0.050$). After controlling for hypertension and BMI, multivariate analysis revealed oncologic extirpation (OR, 5.3; CI, 1.1–97.7; $P = 0.11$) as the only adjusted risk factor with a CI that did not cross 1.0. However, it was not statistically significant. Alternatively, no unadjusted risk factors were found for predicting SSO. Multivariate analysis, controlling for operative year and common risk factors of impaired wound healing (age, smoking status, and diabetes mellitus), identified wound classifications of either contaminated or dirty/infected (OR, 3.6; CI, 1.0–16.6; $P = 0.07$) as a predictor of SSO (Table 5).

On separate analysis, fistula takedown as an indication for hernia repair was an unadjusted predictor for postrepair fistula formation (OR, 5.46; CI, 1.30–22.73; $P = 0.20$). Indications including other than fistula take downs, where colon resection and anastomosis were performed, did not reach significance as a risk factor for fistula formation. A bridging repair did not reach significance as a predictor for recurrence.

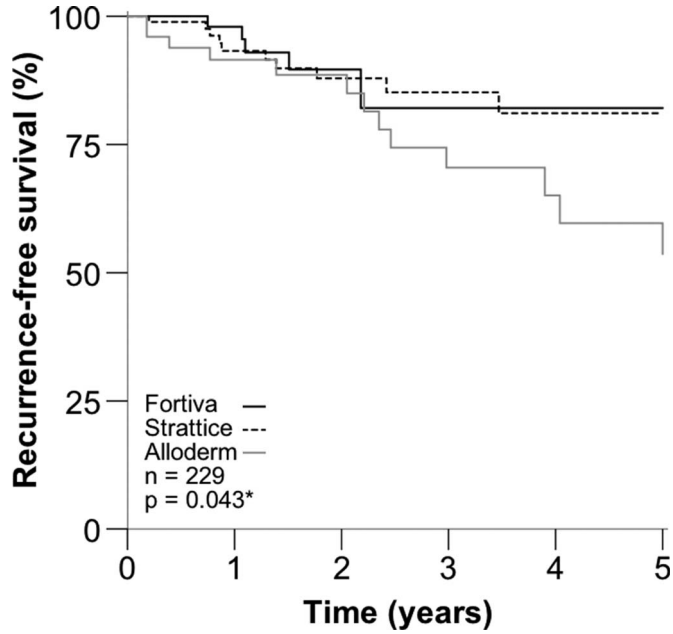

FIGURE 1. Kaplan-Meier survival curve demonstrating recurrence-free survival between Fortiva, Strattice, and Alloderm ADMs at 5 years of follow-up.

TABLE 2. Recurrence and SSO Stratified by Mesh Type

Variable	Fortiva (n = 72)	Strattice (n = 98)	Alloderm (n = 59)	*P*
Recurrence, n (%)	5 (6.9)	10 (10.2)	12 (20.3)	0.040*
Any SSO, n (%)	41 (56.9)	48 (49.0)	29 (49.2)	0.540
Delayed healing	16 (22.2)	24 (24.5)	15 (25.4)	0.900
Skin necrosis	4 (5.6)	8 (8.2)	6 (10.2)	0.570
Fistula	7 (9.7)	5 (5.1)	6 (10.2)	0.400
Seroma	1 (1.4)	13 (13.3)	7 (11.9)	0.021*
Hematoma	3 (4.2)	3 (3.1)	2 (3.4)	0.900
SSI	20 (27.8)	23 (23.5)	17 (28.8)	0.710

*Denotes significance of $P \leq 0.05$. Significance determined by ANOVA.

DISCUSSION

This study sought to directly compare the use and outcomes of 3 major ADMs in AWR and is the first of its kind. Our primary outcome

TABLE 3. Subgroup Analyses of Recurrence by Mesh Orientation and Wound Class

Variable	Overall	Fortiva	Strattice	Alloderm
ADM placement, n (%)				
Inlay	12/100 (12.0)	1/33 (3.0)	2/42 (4.8)	7/25 (28.0)
Onlay	3/32 (9.4)	0/9 (0.0)	0/11 (0.0)	3/12 (25.0)
Sublay	14/97 (14.4)	4/31 (12.9)	8/46 (17.4)	2/20 (10.0)
Wound class, n (%)				
Clean	16/135 (11.8)	2/33 (6.1)	4/63 (6.3)	9/38 (23.7)
Clean-contaminated	8/82 (9.8)	3/37 (8.1)	4/30 (13.3)	2/16 (12.5)

TABLE 4. Regression of Factors Predicting Hernia Recurrence

	Univariable			Multivariable		
Variable	**OR**	**95% CI**	***P***	**OR**	**95% CI**	***P***
Age	0.98	0.96–1.01	0.26			
Caucasian race	0.75	0.33–1.81	0.50			
BMI ≥30 kg/m^2	**1.07**	**1.02–1.12**	**0.003***			
Sex	1.17	0.57–2.43	0.66			
Current smoker	0.59	0.17–1.60	0.34			
Former smoker	0.66	0.22–1.69	0.42			
Hypertension	**2.18**	**1.03–4.87**	**0.05***			
Diabetes mellitus Type II	1.22	0.51–2.71	0.65			
Oncologic extirpation	**6.47**	**1.31–117.03**	**0.07**	**5.34**	**1.06–97.67**	**0.11**
Contaminated or dirty/infected wound	1.93	0.41–6.87	0.34	1.61	0.33–6.13	0.51
Inlay mesh placement	0.96	0.46–1.98	0.92	1.07	0.50–2.25	0.87
Bridging closure	1.11	0.54–2.32	0.78	0.98	0.46–2.11	0.96
Mesh repair	0.82	0.40–1.70	0.78	0.84	0.40–1.78	0.96
Fortiva mesh used	0.52	0.20–1.20	0.58	0.42	0.16–1.00	0.65

Bold: 95% CIs that do not cross 1.0.
*$P \leq 0.05$.

was hernia recurrence, and the overall incidence was 11.8%, which is similar to other published recurrence rates of ADM used in AWRs (11.2%–27%)[13,21–24] and synthetic mesh repair for index primary and AWRs (12.0%–44.0%).[7,8,22] Comparatively, Strattice and Fortiva groups demonstrated superior durability of repair compared with Alloderm. However, the recurrence rate of the Alloderm group in our study is similar to other reported recurrence rates for Alloderm, including in meta-analysis.[23,24] It has previously been reported that donated cadaver ADMs, such as Alloderm, have a higher quantity of elastin fibers and are subsequently more likely to stretch than porcine-derived ADMs and is likely the reason for this finding.[25,26] In addition, one study reported CS as protective of hernia recurrence in AWR.[27] Our findings did not corroborate this conclusion because there were no differences between CS and mesh only repair. Specifically, in the Alloderm group, CS was used more often than the Strattice group and significantly more often than the Fortiva group ($P < 0.01$) yet still demonstrated a higher but well-established recurrence rate. This effect may be secondary to the overall larger size of the hernia defect, thus necessitating a CS for closure, or the higher number of active smokers in this group, leading to a greater recurrence rate.

Data on mesh orientation and outcomes with ADM in AWRs are sparse. Recurrence by mesh type and ADM orientation can be found in

TABLE 5. Regression of Factors Predicting SSO

	Univariable			Multivariable		
Variable	**OR**	**95% CI**	***P***	**OR**	**95% CI**	***P***
Age	0.99	0.97–1.01	0.22			
Caucasian race	0.83	0.44–1.57	0.57			
BMI ≥30 kg/m^2	1.02	0.98–1.06	0.18			
Sex	1.10	0.65–1.85	0.73			
Current smoker	1.27	0.64–2.57	0.50			
Former smoker	1.30	0.67–2.55	0.44			
Hypertension	1.29	0.77–2.18	0.33			
Diabetes mellitus type II	0.84	0.45–1.55	0.57			
Oncologic extirpation	1.07	0.51–2.28	0.85	1.12	0.52–2.44	0.65
Contaminated or dirty/infected wound	2.97	0.86–13.67	0.11	**3.55**	**1.01–16.57**	**0.07**
Inlay mesh placement	1.03	0.61–1.75	0.90	1.01	0.59–1.72	0.98
Bridging closure	0.71	0.41–1.19	0.19	0.74	0.43–1.26	0.38
Mesh repair	1.15	0.68–1.95	0.60	1.17	0.68–1.99	0.62
Fortiva mesh used	1.38	0.79–2.45	0.26	1.4	0.77–2.57	0.21

Bold: 95% CIs that do not cross 1.0.
*$P \leq 0.05$.

Table 3. Although our patients in Fortiva and Strattice groups did not receive ADM repair in sublay positions, the rates of recurrence in the inlay and underlay positions are superior or similar except for sublay repairs in the Alloderm group. In the Alloderm group, it appears that ADM positions, which may draw increasing tension on the mesh itself (eg, inlay and onlay), do not provide adequate durability of repair. However, we did not measure the tension at which each mesh was placed in our analysis. The rates are significantly higher for inlay orientations of Alloderm ($P = 0.02$) compared with the Fortiva and Strattice groups. With exception of these 2 ADM locations, Alloderm still appears to provide satisfactory support in AWR. Comparatively, our rates of overall recurrence among the mesh types are similar to those published by Garvey et al[27] who used ADMs primarily in an underlay fashion in AWR and report a 3- and 5-year recurrence rate very near our own: 11.5% and 14.6%, respectively.

Surgical fields in which contamination is present, specifically clean-contaminated fields, are another area of interest for proponents of ADM in AWR. Acellular dermal matrices are felt to be able to withstand the degradative processes of infection and resist colonization and, therefore, not require removal in a contaminated field. It is thought that ingrowth and vascularization of ADMs are responsible for this attribute.[1,13,15–17] Although data are lacking, one study reports hernia recurrence in a clean-contaminated field at 17.8%.[21] In our cohort, Fortiva mesh was used significantly more in clean-contaminated wounds (52.8%; $P = 0.012$), compared with Strattice and Alloderm groups. On separate analysis, stratified by wound class with recurrence rate as the outcome, the overall recurrence for clean and clean-contaminated wounds were 11.8% (16/135) and 9.8% (8/82), respectively. Recurrence stratified by wound class for each individual ADM can be found in Table 3. It appears that a clean-contaminated field is well tolerated by each ADM and does not significantly increase the rate of recurrence above each ADMs overall rate. The increased overall recurrence rate in clean wound classes appears to be an effect attributed to Alloderm, which is not different from its overall recurrence rate, and is likely related to previously discussed characteristics of the mesh and a bridging plane of placement rather than its performance specifically in clean and clean-contaminated wounds.[23,24] Currently, in light of new and favorable complication profiles for synthetic mesh in clean surgical fields, we have adopted the use of lightweight synthetic mesh in clean-class AWRs.

Except for seromas, there are no significant differences in rates of SSO between groups. Published seroma rates vary between ADM types (11.3%–32.5%).[17,21–24,28,29] Comparing our cohort to studies that specify ADM types and include Strattice or Alloderm show that our seroma rates (13.3% and 11.9%, respectively) are like those published.[23,24] The significant difference between the decreased seroma rate in the Fortiva group compared with the Strattice and Alloderm groups is likely multifactorial and might be best explained by the difference in active smokers in each group (9.7% vs 14.3% vs 30.5%; $P < 0.01$).

Limitations of this study include its retrospective and nonrandomized design. Although comparisons were made between the ADMs we analyzed, there are little historical data available regarding these data points, and so no norm was available for comparison of many metrics. Our patient population represents and exceedingly multicomorbid group, usually with many multiple surgeries and repairs, which likely exceeds the complexity of hernia repair experienced in general practice. Multiple hernia repairs or abdominal surgeries and comorbidities only serve to undermine the integrity of the abdomen, reduce domain, and increase the likelihood of further recurrences. Therefore, the findings within may be out of scope for the general practitioner.

To date, this is the first study to evaluate 2 noncrosslinked porcine ADMs (Fortiva and Strattice) and a donated cadaver ADM (Alloderm) with long term follow-up in AWR. An increased recurrence rate should be expected with Alloderm oriented in onlay or inlay position; seroma rates are significantly lower in AWRs using Fortiva mesh. Oncologic resections in which large abdominal domains are resected are a significant risk factor for recurrence, whereas contaminated and dirty/infected surgical wounds are risk factors for SSO. Although data are increasingly becoming available and continuous demonstrating excellent outcomes for ADM for AWR, the field lacks a prospective and randomized trial comparing ADMs and their respective features of repair.

CONCLUSIONS

Acellular dermal matrices provide a durable repair with low overall rate of complications and recurrence in AWR. However, the complication profiles differ between brands. An increased recurrence rate should be expected with Alloderm oriented in onlay or inlay position. Seroma rates are significantly lower in AWRs using Fortiva mesh. Oncologic resections in which large abdominal domains are resected are a significant risk factor for recurrence, whereas contaminated and dirty/infected surgical wounds are risk factors for SSO. Fortiva and Strattice, and, with careful selection and placement, Alloderm ADMs can be used confidently in AWRs with or without the presence of contamination and acceptable recurrence rates.

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