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Abdominal Mesh Use in Pedicled Rectus Abdominis Flaps for Pelvic Reconstruction

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Background: Rectus abdominis flap coverage of high-risk perineal wounds following extirpative pelvic procedures can result in improved perineal outcomes. However, rectus abdominis flap harvest has morbidity associated with the donor site, including hernia or bulge development. The risk–benefit profile of mesh use in this scenario is not well-defined in the literature.

Methods: We performed a retrospective chart review of all patients who underwent rectus abdominis flap coverage of pelvic defects at our institution during July 2012–January 2021. Patient characteristics and postoperative outcomes were assessed. Patients were stratified into groups based on whether mesh was used and whether primary fascial closure was achieved. Donor site outcomes were analyzed between groups.

Results: One hundred consecutive patients were included. When considering all patients in whom primary fascial closure was achieved, the use of mesh did not significantly decrease rates of hernia development. Mesh use in this setting was associated with significantly greater rates of infection, requiring procedural intervention (12% versus 0%, $P = 0.044$). When considering all patients in whom mesh was used, primary fascial closure was associated with decreased rates of hernia development, and this trended toward significance (16.1% versus 0.0%, $P = 0.058$).

Conclusions: When closing a pedicled rectus abdominis flap donor site, if primary fascial closure is achievable, the addition of mesh to reinforce the repair does not have an added benefit. Mesh use in this setting was not shown to prevent hernia or bulge development, and was found to be associated with significantly greater rates of infection, requiring procedural intervention. *(Plast Reconstr Surg Glob Open 2024; 12:e6100; doi: 10.1097/GOX.0000000000006100; Published online 26 August 2024.)*

INTRODUCTION

Colorectal cancer is the third most common type of cancer in the United States, and 44,850 new cases of cancer localized to the rectum are diagnosed every year.[1] Combined with gynecologic, urologic, and other perineal cancers, this group of pelvic cancers creates significant surgical morbidity for patients. Neoadjuvant chemotherapy and radiation have become standard treatment for locally advanced cancers, and history of radiation is also frequently encountered in cases of recurrence.[2] In cases of locally advanced pelvic cancer, oncologic surgery involving abdominoperineal resection (APR) or pelvic exenteration (PE) may be required. In these cases, reconstruction of the resulting defect with a regional flap improves perineal outcomes,[3,4] particularly in cases with prior radiation.[5,6]

Although several options exist to reconstruct perineal defects, the rectus abdominis muscle is the most common and least morbid flap used in these settings to fill large defects.[7] The rectus muscle can be used to both fill dead space and prevent perineal hernia. If needed, it can be taken with the overlying skin to bring healthy tissue to an irradiated wound bed. Despite improved perineal outcomes, donor site morbidity occurs in 6%–21.4% of cases, and can include infection, delayed wound healing,

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seroma, and hernia or bulge at the abdominal surgical site.[6,8–12] In particular, incisional hernia rates have been reported ranging from 2.6% to 21.4% in the literature.[6,8–12]

The use of mesh during the abdominal closure is one technique used by surgeons to attempt to decrease the rate of hernia or bulge following rectus flap harvest for APR or PE. However, there are limited data in the literature to empirically support its use. In fact, one double-blind, randomized controlled trial found no benefit to the use of biologic mesh,[13] and multiple cohort studies have similarly found no benefit to the use of biologic or synthetic mesh, although this was not the central focus of these studies.[10,11,14] Although mesh use introduces added cost and the potential for additional complications, the potential to reduce long-term abdominal morbidity from hernias and bulges still may make its use worthwhile.[15–17] Given the uncertainty of the risk–benefit profile of mesh use in reconstructing the abdominal wall following pedicled rectus abdominis muscle or myocutaneous flap reconstruction in APR or PE, we aimed to compare outcomes between those who had mesh used and those who did not while controlling for potentially confounding surgical factors.

Takeaways

Question: This study investigates whether and in which circumstances we should be prophylactically using mesh in pedicled rectus abdominis flap donor site closure.

Findings: In our retrospective review of 100 patients, we found no added benefit to mesh use when closing a pedicled rectus abdominis flap donor site if primary fascial closure was possible. In fact, we found mesh use in this setting was associated with significantly greater rates of infection requiring procedural intervention.

Meaning: Mesh is not recommended when closing a pedicled rectus abdominis flap donor site if the fascia can be closed primarily.

METHODS

We performed a retrospective chart review of all patients who underwent rectus abdominis flap coverage of pelvic defects after APR or PE at our institution from July 2012 through January 2021. All patients were at least 2 years postoperative from their index surgery. Data on patient demographics, comorbidities, prior abdominal surgery, oncologic characteristics, adjuvant therapies, and surgical characteristics were collected. Postoperative abdominal complications were assessed, including any reoperation, incisional hernia, bulge, parastomal hernia, wound breakdown, fascial dehiscence, infection, hematoma, and seroma.

Performing a power analysis with an alpha of 0.05 and beta of 0.2, and looking to detect a difference between groups of 18.8% (the difference between the range of incisional hernia rates reported in the literature –2.6% to 21.4%), we determined that we would need at least 46 patients in each group.

In addition to comparing patients who did or did not have mesh used in the donor site closure, there were three cohorts of patients further identified based on the type of abdominal wall closure (Fig. 1). Cohort 1 had primary fascial closure without the use of mesh reinforcement. Cohort 2 had primary fascial closure with underlay mesh reinforcement. Cohort 3 had nonprimary fascial closure with bridging mesh. The primary endpoint in this study is development of incisional hernia. The secondary endpoints included other surgical outcomes associated with abdominal surgery and mesh use, including surgical site infection and need for procedural intervention.

Binary variables were compared between groups using a Fisher exact test, and continuous variables were analyzed with the Mann Whitney U test. Multi-categorical values were compared with the chi square test. Statistical analysis was performed using SPSS, v27.0 (Armonk, N.Y.). Values of P less than 0.05 were considered statistically significant.

RESULTS

We identified 100 consecutive patients who underwent pedicled rectus abdominis flap coverage of their APR or PE defect from July 2012 through January 2021 at a single institution by six plastic surgeons. All patients were at least 2 years out from surgery, and the median in-person follow-up period was 881 days [interquartile range (IQR):

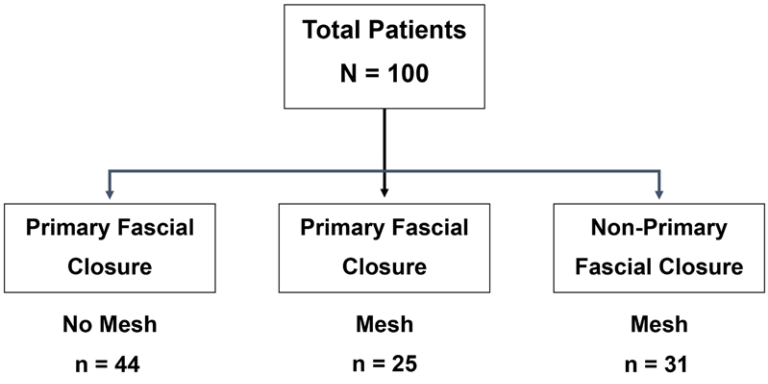

Fig. 1. Breakdown of patients by closure type.

Table 1. Overall Demographics, Comorbidities, Therapies, and Surgical Characteristics

Characteristics	N/ Median	%/ IQR
Patients (n)	100	100%
Age (y)	57.5	47.6–64.5
BMI (kg/m^2)	24.6	22–29.1
Female (n)	47	47%
Hypertension (n)	30	30%
Hyperlipidemia (n)	17	17%
Diabetes (n)	9	9%
Current tobacco use (n)	22	22%
Prior abdominal surgery	1	1–2
Hernia present (n)	7	7%
Neoadjuvant chemotherapy (n)	71	71%
Prior radiation (n)	90	90%
Primary abdominal closure	69	69%
Mesh use	56	56%
Follow-up (d)	385	98.5–935.8

369.3–1823.5.8]. Overall patient characteristics of the entire cohort are summarized in Table 1. Mesh was used in 56 patients, and primary fascial closure was achieved in 69 patients. Mesh was always used when primary fascial closure was not achieved. Within the group of patients who had primary fascial closure (N = 69), 25 patients (36.2%) had mesh placed as well (Fig. 1). Mesh use in the setting of primary fascial closure varied significantly when analyzed with respect to the plastic surgeon who performed the case ($P = 0.005$).

General Comparison by Mesh Use

Patients who had mesh placed in the abdominal donor site were more frequently women, and significantly fewer of these patients received neoadjuvant chemotherapy or were diagnosed with hyperlipidemia compared with patients in whom mesh was placed (Table 2). Additionally, patients in whom mesh was used had significantly more prior abdominal procedures (mean of 1.57±1.42 versus 1.13±0.85 prior surgery, $P = 0.049$). Those who had mesh placed also had a significantly greater proportion of patients undergo myocutaneous flap reconstruction versus rectus muscle alone (73.2% versus 26.8%, $P = 0.0003$). Rates of creation of colostomies and ileal conduits were comparable between these groups.

In terms of abdominal morbidity, there were no statistically significant differences in rates of hernia, wound breakdown, or overall infections based on whether mesh was used (Table 3).

These groups are further broken down for subgroup analysis:

Primary Fascial Closure Cohorts (Cohorts 1 and 2)

Patients who had mesh placed in the setting of primary fascial closure (cohort 2) had a significantly greater proportion of women than patients with primary fascial closure alone (cohort 1) (60% versus 31.8%, $P = 0.041$). (Table 4) Otherwise, demographic, comorbidity, and therapeutic characteristics were comparable between the two groups. In terms of surgical characteristics, cohort 2 had a significantly greater proportion of patients undergo myocutaneous flap reconstruction versus rectus muscle alone (64% versus 36.4%, $P = 0.044$). Rates of creation of colostomies and ileal conduits were comparable between these groups.

In terms of abdominal morbidity, there were no statistically significant differences in rates of hernia, wound breakdown, or overall infections based on whether mesh was used (Table 5). Although there was a 20% overall infection rate in patients with mesh used compared with 4.5% in the cohort of patients without mesh used,

Table 2. Demographics, Comorbidities, Therapies, and Surgical Characteristics, by Mesh Use

	Mesh (N = 56)		No Mesh (N = 44)		
Characteristics	n/Median	%/IQR	n/Median	%/IQR	*P*
Age (y)	57.5	49.0–61.7	58	46.2–67.6	0.911*
BMI (kg/m^2)	24.3	21.2–29.4	24.9	22.5–29.1	0.984*
Female (n)	33	58.9%	14	31.82%	0.009
Hypertension (n)	14	25.0%	16	36.36%	0.273
Hyperlipidemia (n)	5	8.9%	12	27.27%	0.030
Diabetes (n)	3	5.4%	6	13.64%	0.176
Current tobacco use (n)	14	25.0%	8	18.18%	0.473
Prior abdominal surgery	1	1–2	1	1–2	0.049*
Hernia present (n)	3	5.4%	4	9.09%	0.696
Neoadjuvant chemotherapy (n)	35	62.5%	36	81.82%	0.046
Prior radiation (n)	48	85.7%	42	95.45%	0.179
Muscle flap (n)	15	26.8%	28	63.64%	0.0003
Musculocutaneous flap (n)	41	73.2%	16	36.36%	0.0003
Synthetic mesh	21	37.5%	n/a	n/a	n/a
Biologic mesh	35	62.5%	n/a	n/a	n/a
Colostomy (n)	55	98.2%	42	95.45%	0.581
Ileal conduit (n)	10	17.9%	10	22.73%	0.618
Follow-up (d)	489	169–1082	360	121.8–820.3	0.145*
Length of stay (d)	8	6-10	8	5.5-13	0.093*

*Mann Whitney U test.
All other statistics were computed using a Fisher exact test.

Table 3. Surgical Outcomes by Mesh Use

Outcomes	Mesh (N = 56) n	Mesh (N = 56) %	No Mesh (N = 44) n	No Mesh (N = 44) %	*P*
Any re-operation	6	10.7%	1	2.30%	0.131
Abdominal hernia	5	8.9%	4	9.10%	1.000
Abdominal bulge	3	5.4%	0	0.00%	0.253
Parastomal hernia	9	16.1%	7	15.90%	1.000
Wound breakdown	8	14.3%	4	9.10%	0.542
Fascial dehiscence	0	0.0%	1	2.30%	0.440
Any infection	7	12.5%	2	4.50%	0.292
Infection requiring IV antibiotics	2	3.6%	2	4.50%	1.000
Infection requiring drain	2	3.6%	0	0.00%	0.502
Infection requiring OR	2	3.6%	0	0.00%	0.502
Infection requiring any procedure	4	7.1%	0	0.00%	0.128
Hematoma	0	0.0%	0	0.00%	1.000
Seroma	2	3.6%	1	2.30%	1.000

Statistics computed using a Fisher exact test.

Table 4. Demographics, Comorbidities, Therapies, and Surgical Characteristics, by Comparison Groups

	Mesh Group					Primary Fascial Closure Group				
	Bridging Mesh N = 31		Primary Closure N = 25			No Mesh (N = 44)		Mesh (N = 25)		
Characteristics	n/Median	%/IQR	n/Median	%/ IQR	*P*	n/Median	%/ IQR	n/Median	%/IQR	*P*
Age (y)	57.7	50.8–67.3	56.7	46.6–60.6	0.232*	58	46.2–67.6	56.7	46.6–60.6	0.330*
BMI (kg/m^2)	25.5	21.1–32.0	24	21.2–27.7	0.438*	24.9	22.5–29.1	24	21.2–27.7	0.253*
Female (n)	18	58.1%	15	60%	1.000	14	31.8%	15	60%	0.041
Hypertension (n)	8	25.8%	6	24%	1.000	16	36.4%	6	24%	0.421
Hyperlipidemia (n)	2	6.5%	3	0.12	0.647	12	27.30%	3	0.12	0.225
Diabetes (n)	3	9.7%	0	0	0.245	6	13.60%	0	0	0.080
Current tobacco use (n)	6	19.4%	8	0.32	0.357	8	18.2%	8	0.32	0.422
Prior abdominal surgery	1	1–2	2	0.5–3	0.410*	1	1–2	2	0.5–3	0.075*
Hernia present (n)	2	6.5%	1	4.0%	1.000	4	9.1%	1	4.0%	0.646
Neoadjuvant chemotherapy (n)	19	61.3%	16	64.0%	1.000	36	81.8%	16	64.0%	0.146
Prior radiation (n)	28	90.3%	20	80.0%	0.445	42	95.5%	20	80.0%	0.090
Muscle flap (n)	6	19.4%	9	36.0%	0.227	28	63.6%	9	36.0%	0.044
Musculocutaneous flap (n)	25	80.6%	16	64.0%	0.227	16	36.4%	16	64.0%	0.044
Synthetic mesh (n)	14	45.2%	7	28.0%	0.268	n/a	n/a	7	28.0%	n/a
Biologic mesh (n)	17	54.8%	18	72.0%	0.268	n/a	n/a	18	72.0%	n/a
Colostomy (n)	31	100.0%	24	96.0%	0.446	42	95.5%	24	96.0%	1.000
Ileal conduit (n)	8	25.8%	2	8.0%	0.159	10	22.7%	2	8.0%	0.188
Follow-up (d)	695	205–1106	488	72–729	0.262*	360	121.8–820.3	488	72–729	0.915*
Length of stay (d)	8	7–14	6	6-9	0.036*	8	5.5–13	6	6–9	0.205*

*Mann Whitney U Test.
All other statistics were computed using a Fisher exact test.

this did not reach statistical significance ($P = 0.090$). However, a statistically significant difference was noted in patients requiring procedural intervention with either interventional radiology drain placement or re-operation (12% in the mesh group versus 0% in the no mesh group, $P = 0.044$). Biologic mesh was used in all cases that developed an infection requiring procedural intervention (N = 3).

We additionally looked at pattern of closure (interrupted stitches versus running stitches) and at suture type (absorbable versus nonabsorbable) within this cohort with respect to closure of the anterior rectus sheath. No hernias occurred in patients with a running pattern of closure (0 of 3 patients) or in patients in whom absorbable sutures were used (0 of 13 patients). Four hernias occurred in patients with an interrupted pattern of closure (4 of 66 patients) and in patients in whom permanent sutures were used (4 of 56) patients.

Nonprimary Fascial Closure Cohort (Cohort 3)

There were 31 patients who had nonprimary fascial closure of the abdominal wall utilizing bridging mesh, with 45.2% of these patients receiving synthetic mesh and 54.8% receiving biologic mesh (Table 4). The majority of

Table 5. Surgical Outcomes by Comparison Group

	Mesh Group					Primary Fascial Closure Group				
	Bridging Mesh		Primary Closure			No Mesh		Mesh		
	N = 31		N = 25			N = 44		N = 25		
Outcomes	n	%	n	%	*P*	n	%	n	%	*P*
Any re-operation	4	12.9%	2	8.0%	0.682	1	2.3%	2	8.0%	0.296
Abdominal hernia	5	16.1%	0	0.0%	0.058	4	9.1%	0	0.0%	0.289
Abdominal bulge	1	3.2%	2	8.0%	0.581	0	0.0%	2	8.0%	0.128
Parastomal hernia	6	19.4%	3	12.0%	0.716	7	15.9%	3	12.0%	0.737
Wound breakdown	3	9.7%	5	20.0%	0.445	4	9.1%	5	20.0%	0.268
Fascial dehiscence	0	0.0%	0	0.0%	1.000	1	2.3%	0	0.0%	1.000
Any infection	2	6.5%	5	20.0%	0.223	2	4.5%	5	20.0%	0.090
Infection requiring IV antibiotics	1	3.2%	1	4.0%	1.000	2	4.5%	1	4.0%	1.000
Infection requiring drain	1	3.2%	1	4.0%	1.000	0	0.0%	1	4.0%	0.362
Infection requiring OR	0	0.0%	2	8.0%	0.195	0	0.0%	2	8.0%	0.128
Infection requiring any procedure	1	3.2%	3	12.0%	0.314	0	0.0%	3	12.0%	0.044
Hematoma	0	0.0%	0	0.0%	1.000	0	0.0%	0	0.0%	1.000
Seroma	0	0.0%	2	8.0%	0.195	1	2.3%	2	8.0%	0.296

Statistics computed using a Fisher exact test.

these patients had myocutaneous abdominal flaps (80.6%) and had a postoperative hernia rate of 16.1% (Table 5).

Patients Stratified by Use of Mesh (Cohorts 2 and 3)

In patients who had mesh used in their abdominal wall closure, there were no significant differences in demographic, comorbidity, therapeutic, or surgical history characteristics between the group of patients who had primary fascial closure (cohort 2) compared with those with nonprimary fascial closure (cohort 3) (Table 4). There was trend towards higher use of myocutaneous flaps in both cohort 2 (80.6%) and cohort 3 (64.0%) when compared with cohort 1 (36.4%); however, this was not a statistically significant difference when comparing the primary fascial closure and bridging mesh cohorts. In terms of type of mesh utilized, patients in the primary closure cohort had a greater proportion of biologic mesh (72.0% versus 28% synthetic), when compared with patients with bridging mesh closure (54.8% biologic versus 45.2% synthetic); however, this was not statistically significant ($P = 0.268$). Additionally, there were no statistically significant observed differences in concurrent colorectal or urologic procedures such as colostomy or ileal conduit creation. Patients with a bridging mesh repair had a significantly longer length of stay by a median of 2 days (8 days versus 6 days, $P = 0.036$).

Rates of development of abdominal hernia were higher in the group with nonprimary fascial closure, and this trended toward significance (Table 5, 16.1% versus 0.0%, $P = 0.058$). Biologic mesh was used in three cases, and synthetic mesh was used in two cases that developed a hernia. There was symptomatic abdominal wall laxity presenting as a bulge without hernia in three patients. All these patients had biologic mesh placed. There were no other significant differences in abdominal outcomes between these groups.

Myocutaneous versus Muscle-only Flaps

We compared patients who underwent muscle-only rectus abdominis flaps with those who had myocutaneous flaps (Table 6) and found that the myocutaneous flap group had a greater proportion of women (61.4% versus 27.9%, $P = 0.001$) and lower rates of hyperlipidemia (7.0% versus 30.2%, $P = 0.003$). Additionally, we found that the myocutaneous flap group had higher rates of mesh used in the abdominal wall closure (71.9% versus 34.9%, $P < 0.001$) and lower rates of primary fascial closure (86% versus 56.1%, $P = 0.002$). When comparing postoperative complications between flap type, we found that significantly more patients with muscle-only flaps developed parastomal hernias (Table 7, 25.6% versus 8.8%, $P = 0.029$). All other outcomes were comparable between groups. A subgroup analysis of myocutaneous compared with muscle-only flaps controlling for mesh use and primary fascial closure did not demonstrate any significant differences between subgroups. (**See table, Supplemental Digital Content 1,** which displays flap types: subgroup analysis of surgical outcomes. **http://links.lww.com/PRSGO/D450**.)

Univariate Analysis of Variables with Respect to Development of Surgical Site Infection

We performed a univariate analysis of variables related to and predictive of infection within our group of nine patients with an occurrence of any surgical site infection. These variables included age, body mass index (BMI), diabetes mellitus diagnosis, current smoking, receipt of chemotherapy pre- or postoperatively, receipt of radiation therapy pre- or postoperatively, use of mesh, and synthetic mesh compared with biologic mesh (Table 8). We found that none of these variables were statistically significantly associated with development of infection.

DISCUSSION

Through this retrospective review of 100 consecutive cases performed at our institution, we sought to investigate the impact of mesh use on abdominal wall outcomes after pedicled rectus abdominis muscle or myocutaneous flap pelvic reconstruction. There are two main scenarios

Table 6. Flap Type: Demographics, Comorbidities, Therapies, and Surgical Characteristics

	Muscle Only (N = 43)		Myocutaneous (N = 57)		
Characteristics	**n/Median**	**%/IQR**	**n/Median**	**%/IQR**	***P***
Age (y)	56.9	49.8–67.7	57.6	45.5–61.7	0.163*
BMI (kg/m^2)	24.9	22.4–29.1	24.5	21.2–29.7	0.885*
Female (n)	12	27.9%	35	61.4%	0.001
Hypertension (n)	12	27.9%	18	31.6%	0.826
Hyperlipidemia (n)	13	30.2%	4	7.0%	0.003
Diabetes (n)	5	11.6%	4	7.0%	0.493
Current tobacco use (n)	10	23.3%	12	21.1%	0.812
Prior abdominal surgery	1	1–2	1	0–2	0.286*
Hernia present (n)	2	4.7%	5	8.8%	0.695
Neoadjuvant chemotherapy (n)	28	65.1%	43	75.4%	0.275
Prior radiation (n)	38	88.4%	52	91.2%	0.741
Primary fascial closure (n)	37	86.0%	32	56.1%	0.002
Mesh (n)	15	34.9%	41	71.9%	<0.001
Colostomy (n)	42	97.7%	55	96.5%	1.000
Ileal conduit (n)	8	18.6%	12	21.1%	0.806
Follow-up (d)	374	118–709	461	87.5–1033	0.986*
Length of stay (d)	7	6–11	8	6–11	0.689*

*Mann Whitney U Test.
All other statistics were computed using a Fisher exact test.

Table 7. Flap Types: Surgical Outcomes

	Muscle (N = 43)		Myocutaneous (N = 57)		
Outcomes	**n**	**%**	**n**	**%**	***P***
Any re-operation	3	7.0%	4	7.0%	1.000
Abdominal hernia	2	4.7%	7	12.3%	0.293
Abdominal bulge	0	0.0%	3	5.3%	0.257
Parastomal hernia	11	25.6%	5	8.8%	0.029
Wound breakdown	4	9.3%	8	14.0%	0.547
Fascial dehiscence	0	0.0%	1	1.8%	1.000
Any infection	3	7.0%	6	10.5%	0.728
Infection requiring IV antibiotics	2	4.7%	2	3.5%	1.000
Infection requiring drain	0	0.0%	2	3.5%	0.502
Infection requiring OR	1	2.3%	1	1.8%	1.000
Mesh removal	0	0.0%	1	1.8%	1.000
Hematoma	0	0.0%	0	0.0%	1.000
Seroma	2	4.7%	1	1.8%	0.576

Statistics computed using a Fisher exact test.

in which mesh would be used during abdominal wall closure. First, in cases where primary fascial closure can be achieved, the mesh can be used in several different planes to reinforce the closure and prevent the development of a hernia or bulge (prophylactic mesh use). This may be done in an effort to take tension off of a tight fascial closure, especially when fascia was removed in a myocutaneous flap, or if prior abdominal procedures and ostomies limit advancement of the abdominal wall. In our series, we did not find that patients with primary fascial closure benefited from mesh reinforcement in terms of decreased rates of hernia or bulge development. Although rates of other complications were not significantly different between mesh use versus no mesh use, we did see a trend toward more infections with mesh use (20% versus 4.5% overall, $P = 0.090$). When combining both operations and drain placement for infections, the total rate of procedural interventions for infections was significantly higher in the mesh group (12% versus 0%, $P = 0.044$). As additional procedures increase hospital stay, cost, and burden to patients, we believe it is imperative that the decision to use mesh is thoughtful and evidence based, with a clear benefit, and we did not find such benefit in this population. Our results corroborate the data of other studies that have found no protective effect against hernias from prophylactic donor site mesh use,[10,11,13,14] and further, we show that mesh use is associated with morbidity in the form of infections requiring procedural intervention.

The second scenario in which mesh is used in abdominal wall repair after rectus flap harvest is when the fascia cannot be brought back together primarily. In this scenario, it is widely recognized that mesh must be used in a bridging fashion to prevent a hernia. Our study was designed to also examine the outcomes of patients who

Table 8. Univariate Analysis of Relevant Variables with Respect to Development of Surgical Site Infection

	n (%) with Infection	Odds Ratio	95% Confidence Interval	*P*
Age (by 10-y increase)	—	1.49	0.86–2.60	0.16
BMI	—	1.08	0.99–1.19	0.10
Diabetes	2 (22.2)	3.80	0.70–20.00	0.12
Smoking	2 (9.1)	1.16	0.25–5.40	0.85
Chemotherapy	8 (8.8)	0.58	0.08–4.10	0.58
Radiation	9 (9.8)	1.93	0.09–43.00	0.68
Mesh	7 (12.5)	2.60	0.57–11.60	0.22
Synthetic versus biologic mesh	4 (11.4) versus 3 (14.3)	1.32	0.28–6.20	0.72

underwent bridging versus underlay mesh repair of the abdominal wall. We found that both groups had similar rates of complications, with a trend towards higher rates of hernia in the bridging mesh group (16.1 versus 0%, $P = 0.058$). Our results further underscore the importance of achieving primary fascial closure of the anterior rectus sheath. Utilization of techniques such as an anterior or posterior component separation, which aid in achieving primary fascial closure in cases of a fascial gap or high tension, may be warranted.

We found a higher rate of bridging mesh utilized in patients undergoing myocutaneous flap reconstruction. because myocutaneous flaps involve partial loss of the anterior rectus sheath to preserve cutaneous perforators, this potentially contributes to the significantly increased mesh use and decreased rates of primary fascial closure seen in these cases. Fascial-sparing techniques can serve to ameliorate this issue, and they are associated with significantly lower hernia rates compared with nonfascial-sparing techniques.[18] Still, when the group of patients who had myocutaneous flaps were compared with those who had muscle-only flaps, the outcomes were comparable between groups, with the only significant difference being increased rates of parastomal hernias in the muscle-only flap group. The outcomes were persistently comparable in a subgroup analysis comparing myocutaneous and muscle-only flap outcomes while controlling for mesh use and primary fascial closure, supporting that the observed differences in groups with or without mesh used and with or without primary fascial closure were in fact related to those respective variables.

Our study had several limitations including those related to the retrospective nature of the study. There was heterogeneity within patient disease that required various key surgical decisions to be made that cannot be controlled for and lacked randomization. Given the retrospective nature of this study, we were unable to control for surgical decisions like selection bias with respect to fascia quality. Although our median follow-up was over 2 years, hernias may take several years to present. Given the relatively low event rate of postoperative hernias, particularly in our population, our study may lack adequate power to detect a difference in hernia rates between patients with prophylactic mesh use and those without. A larger study or meta-analysis may still be warranted. Still, our study was powered to demonstrate a significantly larger rate of infections requiring procedural intervention in patients with prophylactic mesh placed. Future studies should also focus on assessing the cost associated with mesh use in this setting to further delineate practice guidelines. Lastly, no patient-reported metrics were included in this study, and patient functionality following major surgery is a critical component to recovery that should be analyzed further.

CONCLUSIONS

Prophylactic mesh use does not significantly decrease rates of hernia or bulge when used to reinforce primary fascial closure of the anterior rectus sheath after a pedicled rectus abdominis flap for pelvic reconstruction. Mesh use in the setting of primary fascial closure is associated with significantly greater rates of infection requiring a procedure (interventional radiology or operating room). In uncomplicated cases in which primary fascial closure is achieved, prophylactic mesh use is not indicated.

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DISCLOSURE

The authors have no financial interest to declare in relation to the content of this article.

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