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ORIGINAL ARTICLE
Reconstructive

Fascia Lata Grafting Combined with Gluteal Flaps for Pelvic Floor Reconstruction after Oncologic Resection

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Background: Although recent methods of pelvic reconstruction using myocutaneous flaps have reduced postoperative morbidities, including pelvic abscess, the complication rates are still high due to the presence of a large dead cavity and poorly vascularized tissues secondary to preoperative chemoradiation therapy. We aimed to evaluate the usefulness and benefit of fascia lata autografting for pelvic floor reconstruction as a supplemental procedure for gluteal flap closure of perineal wounds.

Methods: Our retrospective study included 144 consecutive patients who underwent rectal cancer resection with or without pelvic reconstruction, from 2010 to 2020. For reconstruction, fascia lata autografts were harvested from the thigh and affixed to the pelvic floor. The perineal wound was closed using gluteal advancement flaps.

Results: The study included 33 reconstructed and 111 nonreconstructed patients (average age: 69.5 years). The reconstructed group was more likely to have undergone preoperative chemotherapy (81.8% versus 40.5%, $P < 0.001$) and radiotherapy (78.8% versus 48.6%, $P = 0.002$), compared with the nonreconstructed group. Additionally, the reconstructed group underwent fewer abdominoperineal resections (63.6% versus 94.6%, $P < 0.001$) and more pelvic exenterations (36.4% versus 5.4%). The mean size of fascia lata autografts was 8.3×5.9 cm. There were significant differences between the reconstructed and nonreconstructed groups, in the incidences of complications (15.2% versus 33.3%, $P = 0.044$) and pelvic abscess (3.0% versus 16.2%, $P = 0.049$).

Conclusion: Combination of fascia lata autografts and gluteal flaps is considered an effective method of pelvic reconstruction for its low incidence of complications and stable outcomes. *(Plast Reconstr Surg Glob Open 2022;10:e4528; doi: 10.1097/GOX.0000000000004528; Published online 11 October 2022.)*

INTRODUCTION

Reconstruction of pelvic defects following radical excision of locally advanced or recurrent pelvic malignancy remains challenging. One of the primary causes for major complications after pelvic surgery is the creation of a large dead cavity, where fluid accumulation leads to pelvic abscess, hematoma, and cellulitis.[1,2] Many researchers have reported that flap closure which reduces the dead space improves postoperative morbidity.[3–12] However, recent meta-analysis reported that overall complication rates after pelvic reconstruction were 51.9% after primary closure and 34.5% after flap closure,[1] indicating that pelvic oncologic surgery followed by reconstruction still has a higher risk of complications than conventional lower gastrointestinal surgery.[13–17]

The operative risk of surgery for pelvic malignancy comes from not only the radical excision, but also the nature of the patient population. The presence of healthy, vascularized tissue plays an important role in the healing and resistance to bacterial infection of wounds through the delivery of oxygen, leukocytes, and systemic antibiotics.[5,18] However, most of the patients with advanced

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malignancies have a history of neoadjuvant radiation therapy (which massively decreases cellularity,[19] vascularity,[20] and biomechanical strength[21,22] of the surrounding tissue) and neoadjuvant chemotherapy (which systemically inhibits cell division and protein synthesis).[23] Such adverse effects of preoperative therapy contribute to the development of various postoperative complications.

In our institution, following resection of rectal cancer, immediate reconstruction is requested of plastic surgeons if deemed necessary by the colorectal surgeons. Such a decision is based on the history of treatment factors, including the extent of resection and history of neoadjuvant therapies. Otherwise, the colorectal surgeons perform primary closure. In cases of reconstruction by our plastic surgeons, in addition to conventional gluteal flaps, free grafts of autologous fascia lata onto the bottom of the pelvic floor have been performed. The fascial grafting serves two purposes: strong protection of the pelvic floor and accelerated wound-healing by transplantation of living tissue. Herein, we conducted a retrospective study to evaluate the usefulness of fascia lata grafting as an extension of the gluteal flap procedure for improving outcomes of pelvic oncologic surgery.

Takeaways

Question: Pelvic oncologic reconstruction using flaps still has high rates of postoperative complication. Can the technique be improved further?

Findings: We found that combination of fascia lata autografts with gluteal advancement flaps produced excellent results in the incidences of any complication and pelvic abscess.

Meaning: The described modification in pelvic floor reconstruction is an easy, safe, and effective method for obtaining stable outcomes after radical excision of pelvic malignancies.

PATIENTS AND METHODS

Patient Population

Following approval by the institutional review board of our institution (No. 2263), 144 consecutive patients who underwent pelvic surgery for rectal cancer [abdominoperineal resection (APR) or pelvic exenteration (PE)] over a 10-year period from 2010 to 2020 were retrospectively analyzed. The operated patients were classified into two groups: (1) those who underwent primary closure by colorectal surgeons, and (2) those who underwent pelvic reconstruction by plastic surgeons. Data were collected from medical records regarding patients demographics (including history of neoadjuvant therapies), surgical details, and postoperative complications (superficial wound infection, pelvic abscess, dehiscence, perineal hernia, ileus, urinary tract infection, flap necrosis, and reoperation). Regarding the type of oncologic resection, PE included either anterior-, posterior-, or total-PE. The occurrence of hernia was evaluated by physical examination and computed tomography scan at every 6 months during follow-up.

Techniques of Pelvic Reconstruction

Oncologic resection was normally performed in the lithotomy position using laparoscopic or robotic procedures. In a few cases which required radical excision (eg, sacrectomy), resection was performed in the prone position. Then, pelvic reconstruction was performed by plastic surgeons according to the following procedure when requested.

In a prone position, the fascia lata autograft was harvested through an axially-oriented incision created in the lateral thigh. Flaps of skin and subcutaneous tissue were elevated, and deep fascia of the lateral thigh was harvested with the size 1 cm wider than the pelvic floor defect (Fig. 1). The defect of the deep fascia was covered with a polyglycolic acid sheet (Neovail, Gunze, Ltd., Kyoto, Japan), and the wound was closed in layers.

The fascia lata was then grafted onto the bottom of the pelvic floor from the perineal defect, by affixing it to the surrounding firm tissue (eg, ischium, pubis, sacrum, coccyx, and muscle body of lavator ani and piriformis) using absorbable braided sutures (3-0 Vicryl, Ethicon, N.J.). Finally, a gluteal fasciocutaneous V-Y advancement flap was raised from one or two sides for closure of the perineal wound with no tension. A small width (approximately 3 cm) of the medial skin island of the flap was de-epithelialized, and inserted into the bottom layer for further reduction of extrapelvic dead space. Suction drains were left between the fascial graft and flap, and a multilayer closure was performed. Following these procedures, the patient was placed in spine position, and laparoscopic colostomy was performed while confirming the fascia lata autograft was fixed to the pelvic floor (Fig. 2).

Statistical Analysis

Data were analyzed using SPSS package 23.0 (SPSS, Inc., Chicago, Ill.). Continuous variables were summarized as mean ± SD. Categorical variables were expressed as frequency and percentage. After confirming the normality of the data, continuous variables were compared

Fig. 1. A fascia lata autograft, which was to be 1 cm wider than the pelvic defect, was harvested from the right lateral thigh through an axially-oriented incision.

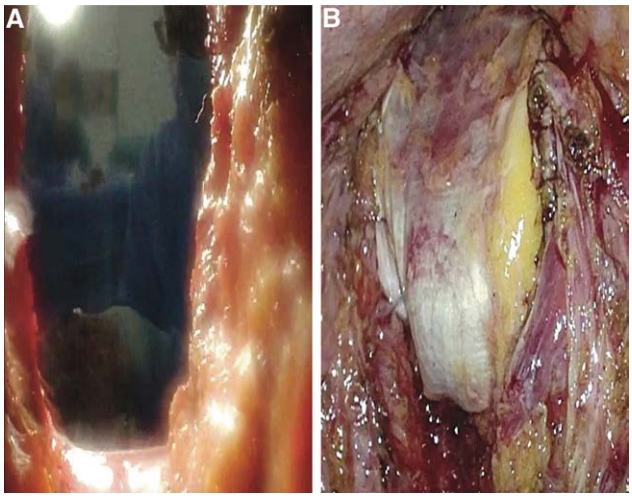

Fig. 2. Laparoscopic observation of the pelvic floor. A, Immediately after oncologic resection, the pelvic floor is absent. B, The pelvic floor is firmly reconstructed using the autologous fascia lata free graft.

using independent-samples *t*-test, and categorical data were compared using the chi-square test. In addition, a multivariate regression with forced entry was used to determine the predictors of complications from factors, including age, overweight (BMI < 25 kg/m^2), diabetes, hypertension, advanced-stage cancer (stage III–IV), neoadjuvant chemotherapy, neoadjuvant radiotherapy, type of resection, sacrectomy, and reconstruction. Values of *P* less than 0.05 were considered statistically significant.

RESULTS

Patient Demographics

Among a total of 144 patients who underwent pelvic surgery for rectal cancer, 33 patients were treated by immediate reconstruction using fascia lata grafting and gluteal flaps, whereas the other 111 patients were treated by primary closure (without reconstruction). There were 88 men and 56 women , aged 69.2±13.0 years in average (range: 27–94 years). As shown in Table 1, there were a few statistically significant differences in patient demographic characteristics between the reconstructed and nonreconstructed groups. The average duration of follow-up was shorter for the reconstructed group than for the nonreconstructed group (2.2 years versus 3.0 years; $P < 0.001$). Reconstructed patients were more likely than nonreconstructed patients to have undergone neoadjuvant chemotherapy (81.8% versus 40.5%, $P < 0.001$) and radiotherapy (78.8% versus 48.6%, $P = 0.002$). The reconstructed group included fewer stage I cancers (3.0% versus 17.1%) but more stage III cancers (60.6% versus 36.9%) than the nonreconstructed group; however, there were no significant differences in the percentages of early-stage (I–II) cancers (33.3% versus 45.0%) and advanced-stage (III–IV) cancers (66.7% versus 55.0%) between the two groups ($P = 0.2$).

Surgical Details

Operative details are shown in Table 2. The type of resection in the reconstructed group was APR in 21 patients (63.6%) and PE in 12 patients (36.4%), whereas that of the nonreconstructed group was APR in 105 patients (94.6%) and PE in six patients (5.4%) ($P<0.001$). Sacrectomy was performed for five patients in the reconstructed group (15.2%) and two patients in the nonreconstructed group (1.8%, $P = 0.002$). The mean size of fascia lata autografts was 8.3×5.9 cm. The largest graft was 16×10 cm, while the smallest was 5×4 cm. With regard to the gluteal flap, a single flap was used in 28 patients and bilateral flaps were used in five patients.

Postoperative Complications

The overall number of postoperative complications was five (15.2%) in the reconstructed group and 37

Table 1. Patient Characteristics

	Reconstructed (%)	Nonreconstructed (%)	Total	*P*
No. patients	33	111	144	
Age at surgery, yr				
Mean ± SD	68.5±9.8	69.5±13.7	69.2±13.0	0.149
Range	44–83	27–94	27–94	
Gender				
Men	20 (60.6)	68 (61.3)	88 (61.1)	0.946
Women	13 (39.4)	43 (38.7)	56 (38.9)	
Mean follow-up ± SD, yr	2.2±1.45	3.3±2.29	3.0±2.21	<0.001*
BMI at surgery				
<25 kg/m^2	27 (81.8)	96 (86.5)	123 (85.4)	0.505
25–30 kg/m^2	6 (18.2)	12 (10.8)	18 (12.5)	0.261
>30 kg/m^2	0	3 (2.7)	3 (2.1)	0.340
Diabetes	5 (15.2)	20 (18.0)	25 (17.4)	0.703
Hypertension	12 (36.4)	31 (27.9)	43 (29.9)	0.353
Stage of cancer				
I	1 (3.0)	19 (17.1)	20 (13.9)	0.040*
II	10 (30.3)	31 (27.9)	41 (28.5)	0.791
III	20 (60.6)	41 (36.9)	61 (42.4)	0.016*
IV	2 (6.1)	20 (18.0)	22 (15.3)	0.094
Low stage (I–II)	11 (33.3)	50 (45.0)	61 (42.4)	0.232
Advanced stage (III–IV)	22 (66.7)	61 (55.0)	83 (57.6)	
Neoadjuvant chemotherapy	27 (81.8)	45 (40.5)	72 (50.0)	<0.001*
Neoadjuvant radiation therapy	26 (78.8)	54 (48.6)	80 (55.6)	0.002*

BMI, body mass index.
*Statistically significant.

Table 2. Surgical Details

	Reconstructed (%)	Nonreconstructed (%)	Total	*P*
No. of patients	33	111	144	
Type of resection				
APR	21 (63.6)	105 (94.6)	126 (87.5)	<0.001*
PE	12 (36.4)	6 (5.4)	18 (12.5)	
Sacrectomy	5 (15.2)	2 (1.8)	7 (4.9)	0.002*
Size of fascia lata graft, cm				
Mean ± SD	(8.3±2.9) × (5.9±1.6)	—	—	N/A
Largest	16×10	—	—	
Smallest	5×4	—	—	
Donor side of gluteal flap				
Unilateral	28 (84.8)	—	—	N/A
Bilateral	5 (15.2)	—	—	

APR, abdominoperineal resection; PE, pelvic exenteration; N/A, not applicable.
*Statistically significant.

Table 3. Postoperative Complication Rates

	Reconstructed (%)	Nonreconstructed (%)	Total	*P*
No. of patients	33	111	144	
Complications	5 (15.2)	37 (33.3)	42 (29.2)	0.044*
Wound infection	3 (9.1)	12 (10.8)	15 (10.4)	0.776
Dehiscence	2 (6.1)	10 (9.0)	11 (7.6)	0.591
Pelvic abscess	1 (3.0)	18 (16.2)	19 (13.2)	0.049*
Perineal hernia	0	1 (0.9)	1 (0.7)	0.584
Ileus	2 (6.1)	14 (12.6)	16 (11.1)	0.293
Urinary tract infection	0	10 (9.0)	10 (6.9)	0.074
Re-operation	0	1 (0.9)	1 (0.7)	0.584

*Statistically significant.

(33.3%) in the nonreconstructed group ($P = 0.044$), as shown in Table 3. There was a significant difference in the incidence of pelvic abscess between the reconstructed and nonreconstructed groups (3.0% versus 16.2%, $P = 0.049$). All other complications did not significantly differ between the two groups, including superficial wound infection, dehiscence, perineal hernia, ileus, urinary tract infection, and reoperation. In the reconstructed group, there were no observable cases of total flap loss or lateral knee instability due to fascia lata harvest. A multivariate logistic regression analysis revealed that patients who underwent pelvic reconstruction had a significantly lower rate of postoperative complications ($P < 0.001$), whereas those who underwent neoadjuvant radiotherapy had a significantly higher rate of postoperative complications ($P < 0.001$, Table 4).

Table 4. Multiple Logistic Regression Analysis of Risk Factors Associated with Postoperative Complications

Factor	β Coefficient	SE	*P*
Reconstruction of pelvis	–0.3292	0.0982	< 0.001*
Age	0.0369	0.0029	0.6545
Overweight	–0.0337	0.1043	0.6716
Diabetes	0.0499	0.1004	0.5516
Hypertension	–0.0045	0.0863	0.9590
Advanced-stage cancer	0.0096	0.0741	0.9055
Neoadjuvant chemotherapy	0.0937	0.0843	0.3144
Neoadjuvant radiotherapy	0.3727	0.0819	<0.001*
Type of resection (APR or PE)	–0.0054	0.1376	0.9573
Sacrectomy	0.1317	0.1917	0.1489

APR, abdominoperineal resection; PE, pelvic exenteration.
*Statistically significant.

Case Reports

Case 1

A 60-year-old woman was found to have rectal cancer (RbP: cT3N2M0, cStage IIIb). Three months after neoadjuvant chemoradiation therapy, posterior PE (including resection of the uterus, sacrum, and lateral/posterior-wall of the vagina) was laparoscopically performed (Fig. 3A), followed by immediate pelvic reconstruction. Two fascia lata autografts of 8×10 cm were harvested from bilateral thighs, horizontally combined into one sheet (16×10 cm), and grafted on the pelvic outlet by suturing with surrounding tissues, including the piriform muscles and the remaining body of the sacrum (Fig. 3B). Then, bilateral gluteal V-Y flaps (26×10 cm in each) were raised and interposed into the extrapelvic dead space, whereas de-epithelialized medial tips of the flaps were fixed to the anterior wall of the vagina for vulval reconstruction. After placing two suction drains, the wound was closed (Fig. 3C). The drains were removed at 1 week postoperatively. The wound healed well with no complications at 3 months after the operation (Fig. 3D), and the patient's condition has been favorable without recurrence of cancer for 6 years.

Case 2

A 71-year-old man was found to have rectal cancer (RbP: cT3N3M0, cStage IIIb). One month after neoadjuvant chemoradiation therapy, robotic APR followed by pelvic reconstruction was performed (Fig. 4A). A fascia lata autograft harvested from the left thigh (7×5 cm) was grafted on the pelvic floor by fixing to surrounding muscles (**See figure, Supplemental Digital Content 1,** which shows that a fascia lata autograft from the left thigh (7×5 cm) was grafted onto the pelvic floor, and the right gluteal flap was raised to close the wound. **http://links.lww.com/PRSGO/C157**). A right gluteal flap (24×10 cm) was raised and interposed into the extrapelvic dead space,

and a 3 cm width of medial skin was de-epithelialized and inserted into the bottom of the space for further reduction of the dead space (Fig. 4B). Two suction drains were placed between the flap and fascia for 1 week. The patient had no complications and is alive without recurrence of cancer for 9 months postoperatively (Fig. 4C).

DISCUSSION

Along with increasing use of neoadjuvant chemoradiation therapies as standard components for pelvic cancer treatment, their adverse effects such as diminished vascularization make successful healing more problematic, precipitating various complications.[19–23] Although previous studies

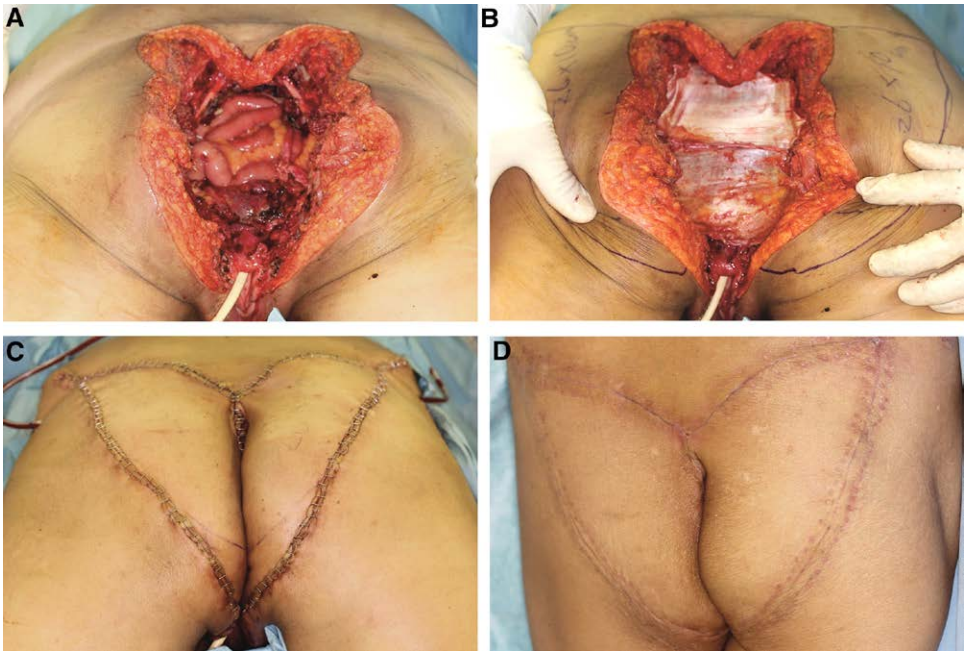

Fig. 3. A 60-year-old woman with rectal cancer underwent laparoscopic posterior pelvic exenteration followed by pelvic reconstruction. A, Immediately before reconstruction. B, Two fascia lata autografts (8×10 cm) were harvested from bilateral thighs, horizontally aligned to make one sheet (total size: 16×10 cm), and affixed to the pelvic floor. C, The wound was closed using bilateral gluteal flaps. D, Three months postoperatively, the wound healed well without complications.

Fig. 4. A 71-year-old man with rectal cancer underwent robotic abdominoperineal resection followed by pelvic reconstruction. A, Immediately before reconstruction. B, A small width of the medial skin was de-epithelialized and inserted into the bottom of the defect to further reduce the dead space. C, Eight months postoperatively, the wound healed well without complications.

have shown that skin flaps reduce postoperative complications, the morbidity rate remains unsatisfactorily high, suggesting further modification is needed for further relief of pelvic reconstructive surgery.[3–12] We initially used fascia lata grafts for strengthening the physically frail pelvic floor; however, we gradually became aware of other benefits. Because the peritoneum plays an important role in recruitment of wound repair cells and supports a rich vascular supply,[24–27] its removal likely worsens local healing. Moreover, we considered the fascia lata autograft to be an advantageous substitute for the missing peritoneum, which accelerates wound healing and improves resistance to bacteria when used in addition to conventional gluteal flaps (Fig. 5).

In this study, we compared 33 patients who underwent pelvic reconstruction with combination of fascia lata grafting and gluteal flaps, and 111 patients without reconstruction. Our results showed the reconstructed group had a significantly lower rate of complications than the nonreconstructed group (15.2% versus 33.3%) , particularly for the most severe complication of pelvic abscess (3.0% versus 16.2%). Patients in the reconstructed group tended toward higher operative risks: a higher rate of preoperative chemoradiation therapy and radical excision (PE against APR and sacrectomy). Despite this, the reconstructed group had more favorable outcomes than did the nonreconstructed group. Additionally, regression analysis revealed that the complication rates were lower in the presence of reconstructive surgery and the absence of neoadjuvant radiotherapy ($P < 0.001$ in both). The average follow-up period was statistically shorter for the reconstructed group than the nonreconstructed group, possibly because the number of reconstruction referrals has been increasing yearly due to their level of successful outcomes.

One of the limitations in this study is that we did not include patients reconstructed solely using gluteal flaps. Thus, we cannot conclude that the addition of a fascia lata graft to gluteal flaps definitively improves the outcome. However, we alternatively performed comparison with a recent systematic review,[28] and found that outcomes of reconstructed patients in this study were superior to those from reconstruction using only gluteal flaps in terms of wound infection (9.1% versus 16%), dehiscence (6.1% versus 15%), pelvic abscess (3.0% versus 5%), perineal hernia (0 versus 6%), and flap necrosis (0 versus 2%). Furthermore, we performed pelvic oncologic reconstruction consisting of the fascia lata insertion and the direct closure of the perineum in four patients when reconstruction was requested but the dead space was not so large, which resulted in no complication in all four cases (unpublished data). These results offer further support to the value of fascia lata autograft in pelvic reconstruction.

Since autologous fascia lata was used for hernia repair in 1923,[29] it has been applied for various problematic conditions, including abdominal wall defects,[30] dural defects,[31] and rotator cuff tears.[32] Although artificial materials have recently been used in some of such cases, their commercial availability varies between countries (eg, use of acellular dermal matrix is not permitted in Japan). In addition, plastic surgeons prefer to use an autograft particularly in cases involving a risk of local infection. Similarly, though synthetic materials such as meshed products have been considered for closing pelvic floor,[33,34] these have significant risks of poor tissue integration, infection, and foreign body reaction.[2] Although a harvesting procedure at the donor site is necessary for a fascia lata graft, the technique is relatively easy. We usually use the fascia of vastus lateralis located along the superolateral aspect of the thigh,[35] and avoid involving the tensor fasciae latae, which is a gluteal muscle serving to tense the fascia lata.[36] The fascial defect at the donor site was covered with absorbable polyglycolic acid sheets, which were reported to reduce seroma formation after latissimus dorsi flap harvest.[37] No patient reported persistent pain, seroma, hematoma, or dysmobility of the donor site caused by fascia harvesting.

We consider that the therapeutic effect of fascia lata autografts in pelvic reconstruction derives from two mechanisms. First, reinforcement of the pelvic floor prevents perineal hernia and reduces bacterial penetration between extra- and intrapelvic spaces. According to Matsumiya et al, the most common causative bacteria in pelvic abscess following APR were the *Staphylococcus* species (detected in 72.1 % of 43 cases), followed by the *Enterococcus* species (34.9 %).[38] Their findings mean that pelvic abscess frequently occurs

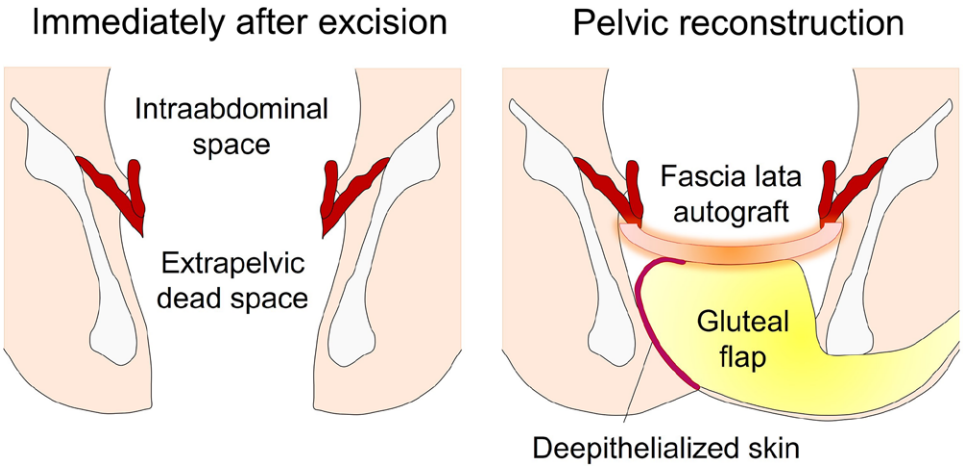

Fig. 5. Schematic image of our pelvic reconstruction method using a fascia lata graft and a gluteal flap.

due to normal bacteria from the patient's skin, suggesting a preventive effect of the transplanted fascia lata against severe infections. Second, fascial autograft is considered to enhance the wound-healing capability of the surgical site. Transplanted fascia lata has a viable nature,[39] with previous studies showing its beneficial bioactive effects, including enhanced collagen synthesis,[40] revascularization,[41–43] and resistance to bacterial infection.[43] Human fascia lata has also been experimentally used as a biocompatible scaffold for primary culture of human fibroblasts.[44] These facts indicate the potential advantage of fascia lata transplantation for cell survival and function, and also for possible acceleration of post-surgical regeneration of the peritoneum, which has various biologic functions, including immunomodulation, angiogenesis, and tissue remodeling.[24–27,45]

The fascia lata grafts were harvested to be 1 cm wider in size than the pelvic floor defect for providing an adequate margin for suturing to the surrounding tissues, although the edge of the fascia was folded back when suturing to maintain sufficient tension. Considering that the fascia grafts were sized 8.3×5.9 cm on average, oncologic defects were not small; however, we used bilateral gluteal flaps for only five cases. This is because we give more importance to the insertion of de-epithelialized flap tip into the pelvic floor for elimination of the extrapelvic dead space. Although many of the reconstructed patients had undergone preoperative radiotherapy, a major portion of the irradiated skin had been removed by oncologic resection, and thus the tip of gluteal flap was usually composed of fresh tissue. Suction drains between the flap and fascia graft are very important to further reduce the dead space and to facilitate favorable adhesion of the fascia and the flap. We instructed patients not to sit for 3 weeks after the surgery, because extensively loading on and/or bending of the hip could hinder postoperative healing.

The question as to which type of flap is superior in filling a pelvic defect is beyond the scope of our study. However, we preferred gluteal pedicled flap because it generally has a uniform anatomy with a robust blood supply,[46–48] and avoids concerns related to a colostomy (which limits the size of abdominal flaps[49]) and laparotomy (if together with laparoscopic or robotic procedures). Since the first report by Taylor et al in 1983,[50] vertical rectus abdominis myocutaneous (VRAM) flaps, which bring vascularized musculature through intrapelvic space, have been the gold standard of pelvic reconstruction. In contrast, our method, using a combination of fascia lata grafting and gluteal flap, is rather a pelvic "floor" reconstruction. However, we consider that obliteration of intrapelvic space is not an absolute necessity, as the remainder of the intestine can fill the space. When pelvic abscess occurs, a large dead space appears to develop inside the pelvis; however, it is not a cause, but is a result of a deep infection. Therefore, we believe that shifting focus from the primary modality of the VRAM flap to our method of pelvic floor reconstruction can be a choice based on clinical outcome evaluations.

Another limitation of this study is that the operator-dependent difference can be a confounding variable: reconstruction was performed by plastic surgeons while primary closure was performed by colorectal surgeons. Lastly, the therapeutic mechanism of fascia lata grafting described in the present manuscript is based on the authors' speculations. Additional studies such as time-course visualization of the transplanted fascia or basic research on molecular basis are needed for further elucidation of the therapeutic mechanism.

CONCLUSIONS

We retrospectively investigated the effectiveness of a reconstructive technique of pelvic oncologic defects using fascia lata grafting combined with gluteal flap closure. Although 33 reconstructed patients more frequently underwent neoadjuvant chemoradiation and radical oncologic resection than 111 nonreconstructed patients, outcomes in rates of overall complications and pelvic abscess were superior for the reconstructed group. Thus, we consider fascia lata autograft transplantation to be a beneficial extension of the gluteal flap for pelvic reconstruction, although further studies are required to provide more definitive evidence for the therapeutic effect of fascia lata grafting.

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