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Surgical Repair With Free Fascia Lata Graft in Patients at Risk of Surgical Site Infection: A Case Series

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Background: When anatomic structures are excised so widely that the resulting defect cannot be closed directly during an operation, reconstruction of the defect is necessary. Prosthetic mesh is often used to reconstruct large defects because it is readily available and technically easy to use. However, the use of prosthetic material is contraindicated in cases of concomitant contamination due to the risk of mesh infection. We describe our experience of surgical repair using an autologous free fascia lata graft in 5 patients at risk of such infection.

Methods: The procedure was performed for incisional hernia repair in 4 patients and reconstruction of the diaphragm after cytoreduction of recurrent ovarian cancer in 1. All patients underwent other concomitant procedures associated with contamination, such as colorectal resection, and these patients were included in a retrospective chart review.

Results: Wound-related morbidity was observed in 1 patient whose drain culture was positive. This infection was resolved conservatively. No postoperative wound events required removal of the fascia graft, and there was no hernia occurrence during follow-up.

Conclusion: Based on our clinical experience, we conclude that surgical repair using a free fascia lata graft is safe and effective, especially in patients with a risk of bacterial contamination.

Key words: Fascia lata graft – Incisional hernia – Prosthetic mesh

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Reconstruction of the abdominal wall and incisional hernia repair have been performed using various techniques.[1–5] Primary closure using non-absorbable suture material is simple, wherever possible. However, if the defect cannot be closed directly during an operation, reconstruction is necessary. Most surgeons use prosthetic materials for reconstruction of large defects, but such procedures are associated with a risk of graft dehiscence or infection.[6,7] Furthermore, use of prosthetic materials is also contraindicated in patients undergoing surgical procedures associated with bacterial contamination, such as intestinal resection. In such situations, use of an autologous tissue graft is an alternative to prosthetic materials.

Here we describe the use of a free fascia lata graft for a variety of indications, and discuss the results of this type of procedure with reference to postoperative complications in patients with a risk of infection.

Materials and Methods

Between December 2005 and May 2016, we used the free fascia lata graft for surgical repair in 5 patients at Juntendo Nerima Hospital, and these patients were included in a retrospective chart review. The procedure was performed for incisional hernia repair in 4 patients and reconstruction of the diaphragm after cytoreduction of recurrent ovarian cancer in 1. All 5 patients underwent surgical repair using a free fascia lata graft because of concomitant procedures with a risk of contamination; these included colorectal resection (n = 2); pancreatoduodenectomy (n = 1); infected incisional hernia repair (n = 1); and partial hepatic resection (n = 1).

The fascia lata was harvested unilaterally in all cases. An incision approximately 12 cm long was made on the lateral side of the thigh to allow for dissection of subcutaneous tissue and harvest of a piece of fascia lata. Suction drains were placed in the subcutaneous space to prevent serum accumulation. With regard to placement of the graft, the fascia lata may be sutured superficial to the primary repair or fascial edges (overlay), deep to the primary repair of fascial edges (underlay), or to the edge of the defect with minimal overlap (interpositional). The placement technique varies according to individual patient-related factors and the surgeon's preference.

Surgical Techniques

Reconstruction of diaphragm using a free fascia lata graft (Case 2)

A 72-year-old woman was referred to our clinic because of recurrent ovarian carcinoma. Magnetic resonance imaging clearly demonstrated that the tumor had invaded the liver surface and right side of the diaphragm (Fig. 1A). Magnetic resonance imaging clearly demonstrated that the tumor had invaded the liver surface and right side of the diaphragm (Fig. 1A). A right thoracolaparotomy was performed, and we divided the tumor from the liver surface parenchyma using electrocautery (Fig. 1B). After the liver had been widely mobilized by dividing the round ligaments, we achieved *en bloc* resection of the diaphragmatic tumors together with the full-thickness diaphragm, resulting in a large defect (Fig. 2A). Reconstruction of the diaphragm was performed using a free fascia lata graft patch (Fig. 2B).

Repair of incisional hernia using a free fascia lata graft (Case 3)

A 66-year-old woman presented with a recurrent ovarian tumor and incisional hernia. A computed tomography scan revealed a 2-cm recurrent tumor that invaded the lower rectum and a giant incisional hernia on the infraumbilical midline, measuring approximately 15 × 8 cm. After rectal resection along with the recurrent tumor, the patient underwent incisional hernia repair using a free fascia lata graft. The skin and subcutaneous tissue were dissected down to the level of the anterior rectus sheath on both sides of the defect (Fig. 3A). Bilateral anterior rectus abdominis sheath turnover flaps were used for incisional hernia repair, and reinforced the area with a fascia lata graft (Fig. 3B).

Results

Table 1 summarizes their characteristics of the patients and their clinical outcomes. In these 5 patients, the average maximum defect size was 11.6 cm (range: 3–18 cm), and the mean follow-up time after surgery was 12 months (range: 8–24 months). None of the patients suffered any postoperative complications associated with graft harvest. Only 1 patient (case 4), who had severe diabetes mellitus, suffered postoperative wound infection in the abdominal incisions, and a drain culture was

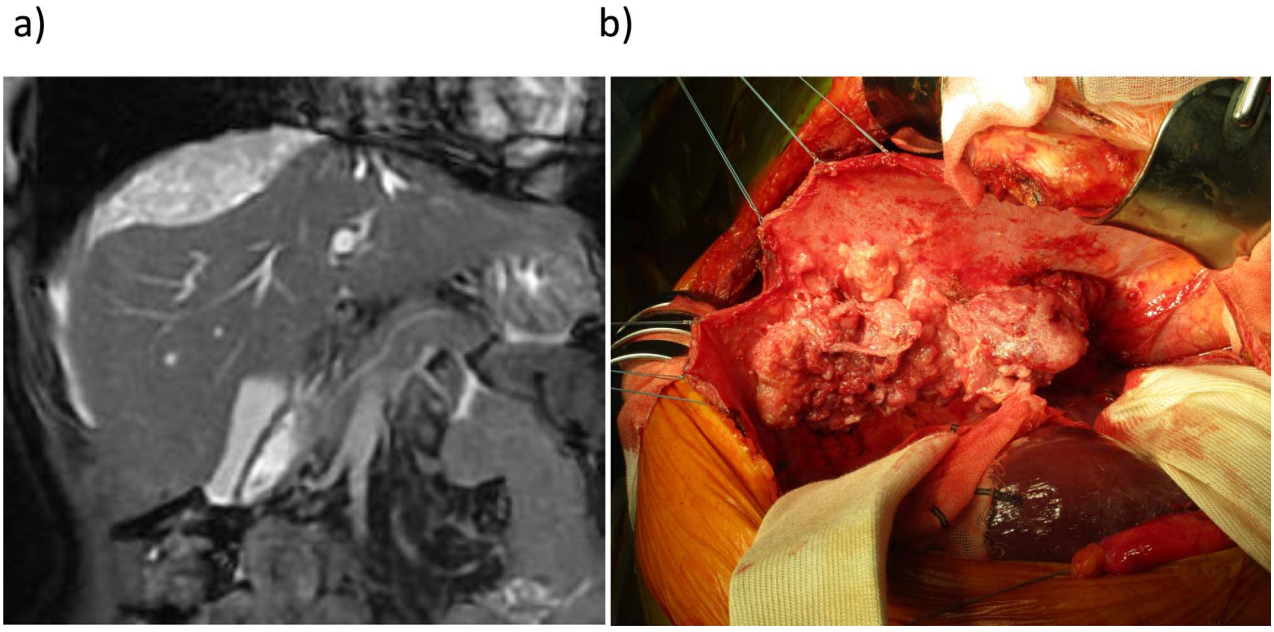

Fig. 1 (a) Abdominal MRI: A tumor measuring approximately 14 cm in diameter was detected under the right diaphragm. (b) Intraoperative view, through a right thoracolaparotomy; the tumor had invaded the diaphragm.

positive. However, this infection resolved with drainage and systemic antibiotics. The operative procedure was successful in all patients and there has been no evidence of hernia recurrence or free fascia graft loss during follow-up.

Discussion

The use of prosthetic materials to reconstruct large defects is associated with a risk of graft infection. Sugarbaker and colleagues[8] reported that infectious

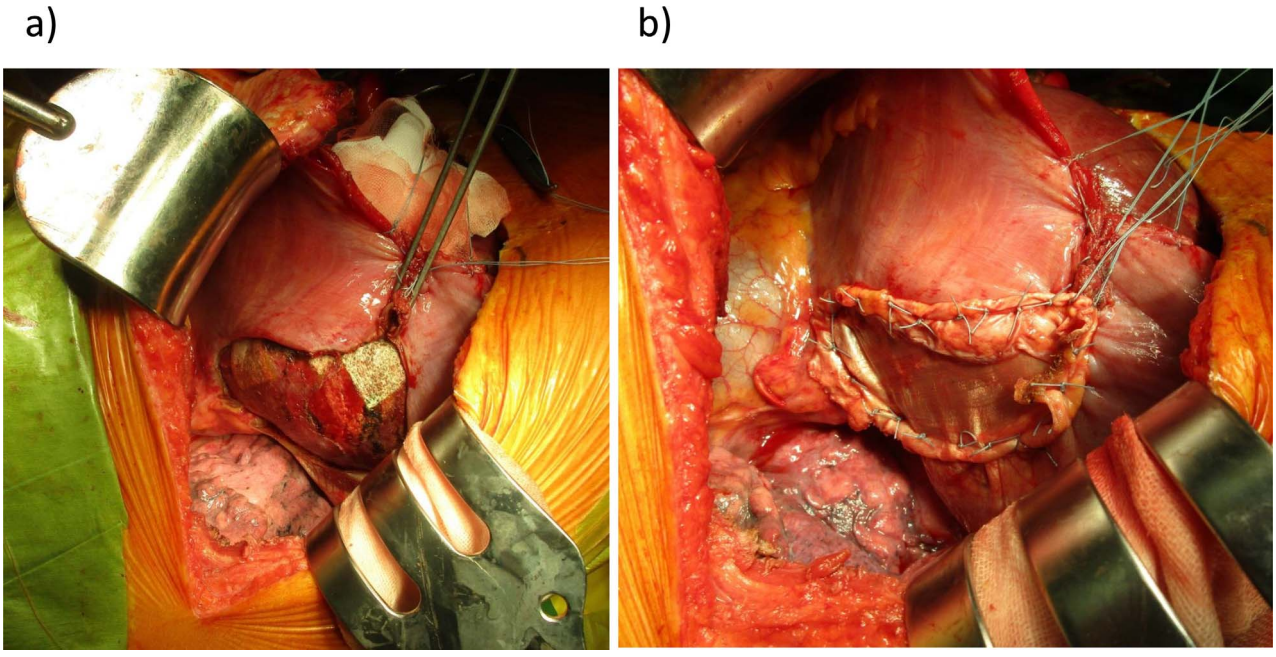

Fig. 2 (a) The patient underwent a wide local excision of the tumor, which resulted in a large defect in the diaphragm. (b) The diaphragm was reconstructed using a free lata fascia.

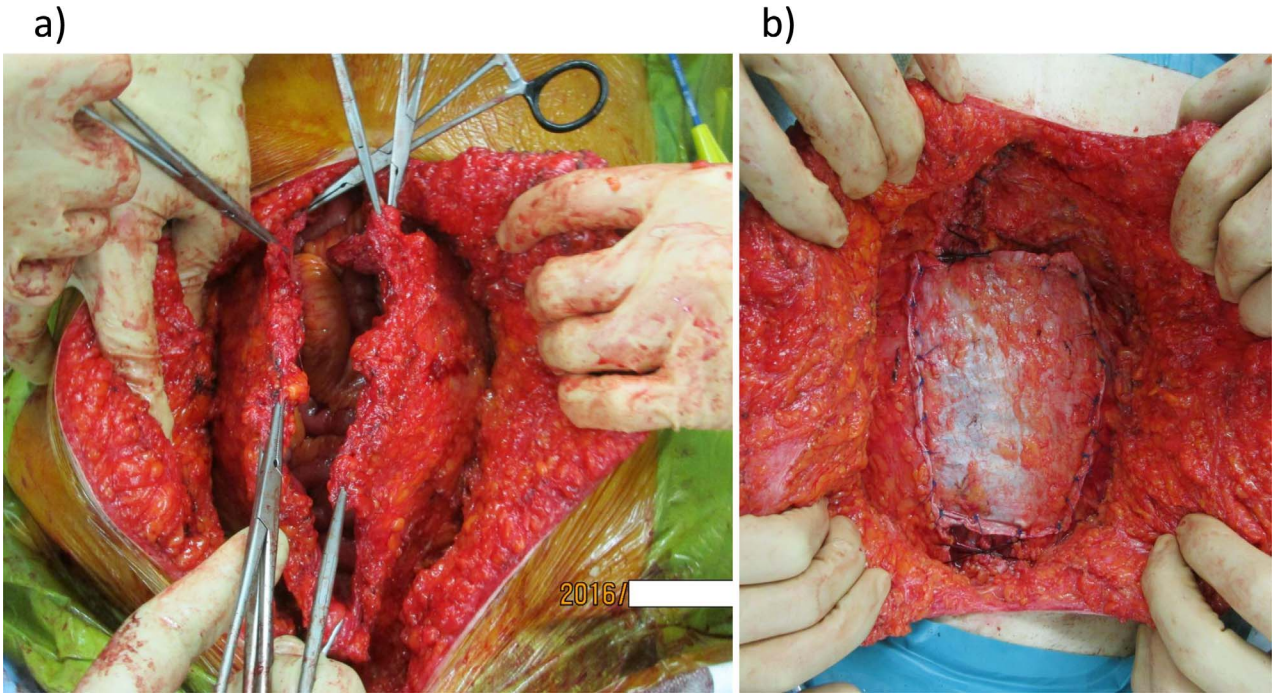

Fig. 3 (a) View of the abdominal wall after isolation of anterior rectus sheath on both sides of the defect. (b) The fascia lata patch was placed as an onlay graft, overlapping the anterior rectus fascia defect.

complications requiring removal of the prosthetic patches occurred in 8 of 328 patients (2.4%). According to previous studies, wound infections develop in ~5% of open mesh repairs,[9] with a slightly lower rate for laparoscopic repairs.[10] Wound and mesh infections can be grave complications. Once mesh infection occurs, it is very difficult to cure, and the situation usually requires complete removal of the mesh and sometimes multiple surgical treatments.[6]

On the other hand, Birolini *et al*[11] reported that the risk of mesh-related morbidity did not exceed 15.8% in patients undergoing procedures with a risk of contamination and simultaneous incisional hernia repair using an onlay polypropylene mesh technique. They concluded that synthetic mesh can be used safely for treating such patients. However, we consider that 15.8% is too high to justify the use of prosthetic materials if mesh infections occurred in

Table 1 Clinical characteristics of 5 patients

Case	Age, y/ Sex	Indication	Primary disease	Size of defect, cm	Concomitant procedure	Technique of placement	Postoperative complications	Follow-up period, mo
1	37/Male	Infected Incisional hernia	Crohn disease	10 × 10	Incisional hernia with infection	Overlay	–	24
2	72/Female	Reconstruction of Diaphragm	Recurrent ovarian carcinoma	15 × 5	Partial hepatectomy	Interpositional	–	9
3	66/Female	Incisional hernia	Recurrent ovarian carcinoma	15 × 8	Rectal resection	Interpositional	–	11
4	46/Male	Incisional hernia	Ileus	5 × 4	Stoma closure enterocolostomy	Overlay	Wound infection	10
5	74/Female	Incisional hernia	Bile duct cancer	13 × 8	Pancreatoduodenectomy	Interpositional	–	8

cases with diaphragmatic reconstruction, as such complication can be potentially fatal.

In comparison with prosthetic materials, autologous tissue grafts or biologic materials have better adaptability and a lower risk of infection.[1] The autologous graft in particular provides a tissue source ideally suited to an infected environment. The free fascia lata graft is used to reconstruct various anatomic structures in different regions of the body.[1–3] The Ventral Hernia Working Group (VHWG) recommends that biologic repair materials should be preferred over synthetic mesh for use in infected fields, and should be strongly considered when contamination is suspected.[7] Certain specific characteristics are thought to contribute to the successful use of particular biologic repair materials in the setting of low-grade infection, whereas other materials are contraindicated. However, Sbitany *et al*[12] reported a postoperative wound infection rate of 15% in patients with grade 3 or grade 4 hernias, who underwent repair with component separation techniques and biologic mesh reinforcement. In our series, all 5 patients also had grade 3 (potentially contaminated) or grade 4 (infected) hernias or defect, as classified by the hernia grading system of the VHWG. As result, we opted to use a free fascia lata graft to avoid the risk of mesh infection.

Regarding other techniques for the repair of ventral hernias, component separation is the preferred approach for reapproximating the midline with minimal or no tension.[13] The VHWG recommends the use of component separation or other appropriate techniques to reapproximate the midline for all ventral hernias, except in cases where reapproximation is not feasible. In our 4 patients with ventral hernia, reapproximation of the midline was difficult because of an existing stoma.

Use of a free fascia lata graft is a reconstructive option for the treatment of defects in various anatomic regions, including the abdominal wall and diaphragm, and for incisional hernia repair. In this series, we used a free fascia lata graft for incisional hernia repair and reconstruction of the diaphragm, and wound-related morbidity occurred in 1 patient, even though all patients underwent concomitant procedures with a risk of contamination. Furthermore, the infection was resolved conservatively. In this study, no postoperative wound events required removal of the fascia graft, and no hernia occurrence was observed.

From these clinical results, we conclude that surgical repair using a free fascia lata graft is safe and effective, especially in patients with a risk of bacterial contamination.

Ethical committee of Juntendo University Nerima Hospital approved this retrospective study (approval number: 17-14). Written consent was obtained from the patients for their information to be stored in the hospital database and used for research.

Acknowledgments

Conflict of interest statement: Sugo and other coauthors have no conflict of interest.

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