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CASE REPORT

Pediced Anterolateral Thigh Fasciocutaneous Flap with Fascia Lata for Reconstruction of Large Full-Thickness Abdominal Wall Defect

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ABSTRACT

Objective: To describe a successful method of reconstructing a difficult large full-thickness abdominal defect following tumor excision

Materials and Methods: Our patient had recurrent fallopian tube carcinoma with anterior abdominal wall metastasis. She had high anesthetic risk due to her previous popliteal deep vein thrombosis

Result: Following tumor excision, the defect extended from supraumbilicus till pubic symphysis and bilaterally to both iliac crest. It was successfully reconstructed with single-staged, anterolateral thigh with fascia lata fasciocutaneous pedicle flap which provided both skin and fascia support.

Conclusion: Lower abdominal wall defects of large sizes can be successfully reconstructed using an appropriately designed anterolateral thigh flap; providing a reliable, single-stage reconstruction with low morbidity.

KEY WORDS

full-thickness abdominal wall defect, abdominal reconstruction, anterolateral thigh flap, fascia lata, fallopian tube carcinoma

INTRODUCTION

Acquired complex abdominal wall defects may result from tumor extirpation, trauma, or infection. Management of these defects is a significant challenge, and different options have been proposed for the reconstruction of defects of varying sizes. In reconstruction of abdominal defects not amenable to primary closure, three problems need to be addressed: (i) the fascial support layer needs to be restituted; (ii) stable and sensate skin coverage is needed as the lower abdominal waistline area is subject to friction and pressure; (iii) it is required to re-establish the contour of the abdominal wall. The surgeon must also strive for satisfactory aesthetic results which are all too often neglected during this complex reconstructive surgery.

Extensive full-thickness abdominal wall reconstructive choices are limited. Options such as tissue expansion, delayed repair, and free tissue transfer are either expensive, unsuitable, or both, in patients complicated with high anesthetic risk. In addition, prosthetic material is expensive, and difficult to manage in the event of infection. Moreover, adequate soft tissue cover is required for its use¹⁾.

The literature describing major reconstructions of the abdominal wall is quite limited²⁾. In this case study, we report a case in which the anterolateral thigh flap with fascia lata that was used to reconstruct a large full-thickness defect of the lower anterior abdominal wall.

CASE REPORT

A 46-year-old nulliparous lady was diagnosed with fallopian tube carcinoma stage IIC since 1½ years prior to admission. At that time, she presented with brownish vaginal discharge for one month duration. She was treated with immediate laparotomy, hysterectomy, bilateral salpingo-oophorectomy and omentectomy. The histopathology report was high grade endometrial carcinoma.

Subsequently, she completed six cycles of chemotherapy. During the treatment, she developed left popliteal vein thrombosis and treated with low molecular weight heparin for six months. Repeated Duplex scan after completed treatment showed resolved popliteal vein thrombosis.

On follow-up review two months prior to admission, she was noted to have a hard, spherical, irregular mass at suprapubic area measuring 7 x 5 cm (Fig 1). The mass was fixed to the abdominal wall and skin. Preoperative computerized tomography scan demonstrated local tumor metastasis infiltrating full-thickness abdominal wall as well as enlarged bilateral inguinal nodes. Otherwise, there was no evidence of lung, liver, or other distant metastasis.

The patient underwent debulking surgery, bilateral deep inguinal lymphadenectomy and abdominal wall reconstruction. As the deep margin of the tumor invaded bilateral pubic bones, osteotomy of pubic bones was performed. It was done as a combined surgery with gynecologic, orthopedic and plastic surgery teams. The tumor resection ended up with skin defect 23 x 13 cm and fascial defect 20 x 20 cm. It extended superiorly from supraumbilicus to symphysis pubis inferiorly, and

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Fig 1. The tumour infiltrating full-thickness abdominal wall



Fig 2. The tumour after resection



Fig 3. Outline of the right anterolateral thigh fasciocutaneous flap donor site for reconstruction



Fig 4. Outcome after reconstruction

laterally it reached both iliac crests. The bowel and urinary bladder were not invaded by the tumor (Fig 2).

The abdominal wall reconstruction was performed with pedicled right fasciocutaneous anterolateral thigh flap with fascia lata. The skin paddle dimension was 21 x 10 cm (Fig 3). The flap was elevated based on the descending branch of right lateral circumflex femoral vessel, which became the pivot. Subfascial plane dissection was done. The flap was rotated from its vertical orientation at donor site to transverse orientation at recipient site. A closed drain was inserted before closure. Skin was closed with the hips flexed to ensure complete tensionless sutures. The resulting thigh donor site defect was able to close primarily (Fig 4).

The final histopathology report confirmed endometrial adenocarcinoma with metastasis to anterior abdominal wall and bilateral inguinal lymph nodes involvement. Post-operatively, the abdominal wound was complicated with seroma formation and wound dehiscence at the lateral margins. After negative pressure wound therapy for 2 sessions, the wounds were closed.

DISCUSSION

Traditional reconstruction options for coverage of abdominal defects after tumor extirpation include components separation, tissue expanders with local tissue advancement, expanded or extended loco-regional flaps, distant flap or free flaps. Besides autologous tissue, alloplastic materials are available. The choices depends on the size, location (upper or lower abdomen; midline or lateral quadrants), and wound conditions.

For this patient, the defect was full-thickness from supraumbilicus till pubic symphysis and extended to both iliac crest bilaterally. The available options are tissue expansion, local flaps, distant flaps, and free flaps. Meanwhile, the available options of fascial support for this patient are prosthetic, bioprosthetic material or fascia lata.

The determination of an immediate versus staged repair depends on the clinical situation. Immediate reconstruction is preferred because it is

more cost-effective and less time-consuming in the medically stable patient with a clean wound bed and reliable reconstructive options. Moreover, subsequent adjunctive treatments such as chemotherapy and radiotherapy could be instituted early. Immediate reconstruction may need to be aborted, however, if significant abdominal distension or inflammation is present.

There are several options for staged repair. One example is tissue expansion. The advantages are it is simple, and brings in well-vascularized, innervated, autologous tissue for coverage. It replaces the missing tissue following the "like with like" principles. However, the drawbacks are it is a staged procedure that requires a lengthy time period and a significant incidence of expander exposure and infection. Besides that, the high price of the tissue expanders and the long time delay for tumor resection makes it unsuitable for this patient.

For cutaneous coverage of prosthetic material in lower abdomen, the options of local flaps are groin, superficial inferior epigastric and deep inferior epigastric flaps. For larger full-thickness defects not amenable to components separation or local flaps, distant flaps are needed. Besides anterolateral thigh flap, other distant flaps commonly used are pedicle rectus femoris, gracilis, vastus lateralis, and latissimus dorsi flaps. Latissimus dorsi is particular tedious because it requires changes in position intra-operatively which will prolong surgery time.

Anterolateral thigh fasciocutaneous flap with fascia lata remains as the flap of choice for repairs of the middle and lower abdominal wall. The fasciocutaneous flap provides skin cover as well as fascia support. Flaps from the lower limb are generally not involved in the pathological process. The anterolateral thigh flap is based on the descending branch of the lateral femoral circumflex artery. Handheld Doppler can be used to identify its skin perforators. It is limited by donor morbidity because harvesting more than 8 cm requires skin grafting for closure of donor site. Anterolateral thigh flap also able to provides bulk and a robust sensate skin which is essential in the lower abdominal region⁹.

Another option is the freestyle 'propeller' flap which was introduced by Hyakusoku *et al.* in 1991 and has evidenced to be useful for reconstruction when a conventional local flap is not an option⁴. It is a fasciocutaneous flap based on a central subcutaneous perforator, which once dissected, allowed a freedom of up to 180 degree rotation on its axis, to cover a tissue defect. The advantage is that the perforator vessels can withstand torsions up to 180 degree, thus giving the surgeon an almost unlimited flexibility in planning the reconstruction. A long and robust vascular pedicle is needed to rotate to reach the adjacent abdominal wall

defects. For the patient in our case study, our reconstructive surgeon has applied certain concepts of 'propeller' flap such as rotating the anterolateral thigh flap 90 degree from its vertical orientation at donor site to transverse orientation at recipient site.

Previously the 'propeller flap' has largely been demonstrated in extremity surgery, however recent successful usage to reconstruct large abdominal wall defect have been reported. The deep inferior epigastric artery and its perforators are particularly suitable, as a long vascular pedicle (even with minimal intramuscular perforator dissection) can enable advancement to relatively distant regions of the anterior and lateral trunk. The design of the deep inferior epigastric artery perforator propeller flap can be constructed within the borders of the anterior axillary lines laterally, the xiphisternum superiorly and the pubis inferiorly. However, it is advised to perform preoperative imaging to substantially improve perforator localization and flap reliability⁵⁾.

For an even larger abdominal defect, the 'propeller' flap can be pre-expanded. Pre-expansion can help thin the flap, enlarge the available skin paddle, enable primary closure of donor site, and increase vascularity due to delay phenomenon. Perforator-based propeller flaps are also recommended for minimizing donor site morbidity, providing similar quality loco-regional tissue, and avoiding the need for microsurgical techniques. Angela Cheng and Michel Saint-Cyr in 2013, has reported successful reconstruction of a large (30 x 24 cm) soft tissue abdominal wall defect due to previous full-thickness burn using pre-expanded "propeller" deep inferior epigastric perforator (DIEP) flap⁶⁾.

Free flaps would be considered when local tissues are not available or when a pedicled flap is insufficient in size to reach the defect without significant tension. It is the ultimate option at the end of the reconstructive ladder⁷⁾. For microvascular anastomosis, the frequently used recipient vessels are the inferior epigastric, deep circumflex iliac, superior epigastric, and internal thoracic arteries. However, it is technically demanding and requires prolonged operative time and microsurgical expertise⁸⁾. A range of free flaps has been reported in the journals, but the free anterolateral thigh flap is discussed most frequently.

An article by Shuji Kayano et al comparing pedicled and free anterolateral thigh flap for reconstruction of 20 complex defects of the abdominal wall published in 2012. The study showed that complication rates do not differ between free and pedicled ALT flaps in terms of total flap loss and infection rate. Partial loss of one pedicled flap occurred for defects of the upper midline region. The partially lost flap was the one furthest from the pivot point. The cause of partial flap loss was insufficient venous return, which led to flap congestion. Therefore, the authors recommended that surgeons should not hesitate to convert a pedicled flap to a free flap if the vascular pedicle is too short⁹⁾.

For the wound breakdown complication, our concern is deep incisional infection, possibly secondary to preoperative neoplasm infection

and excessive intra-operative dissection performed. Negative pressure wound therapy, consisting of a polyurethane sponge, a suction tube, and an occlusive drape, is effective to evacuate infectious fluid and accordingly promote wound healing. The main potential complication of the flap was tension on the pedicle when the patient's hip was extended, especially in the first few days. The patient was therefore kept in bed in a flexed position (60°) for five days.

CONCLUSION

Anterolateral thigh with fascia lata fasciocutaneous pedicle flap has been shown to be successful to reconstruct the full-thickness defect of large lower anterior abdominal wall. We conclude that lower abdominal wall defects of large sizes can be successfully reconstructed using an appropriately designed pedicle anterolateral thigh flap; providing a reliable, single-stage reconstruction with low morbidity.

REFERENCES

- 1) Fei Yang. Radical tumour excision and immediate abdominal wall reconstruction in patients with aggressive neoplasm compromised full-thickness lower abdominal wall. *Am J Surg* 2013; 205; 15-21.
- 2) Sinna R, Gianfermi M, Benhaim T, et al; Reconstruction of a full-thickness abdominal wall defect using an anterolateral thigh free flap; *J Visc Surg*. 2010; 147, e49-53.
- 3) Ting J, Trotter D, Grinsell D. A pedicled anterolateral thigh (ALT) flap for reconstruction of the epigastrium: case report. *J Plast Reconstr Aes* 2010; 63: e65-67.
- 4) Hyakusoku H, Yamamoto T, Fumiiri M. The propeller flap method. *Brit J Plast Surg* 1991; 44: 53-54.
- 5) Gleda A, Warren MR, Ajay C, et al. The pedicled 'propeller' deep inferior epigastric perforator (DIEP) flap for a large abdominal wall defect. *J Plast Reconstr Aes*. 2011; 64: 133-135.
- 6) Angela Cheng, Michel Saint-Cyr. Use of a pre-expanded "propeller" deep inferior epigastric perforator (DIEP) flap for a large abdominal wall defect. *J Plast Reconstr Aes* 2013; 66; 851-854.
- 7) Jeffrey E. Janis, Robert K. Kwon, Christopher E. Attinger. The New Reconstructive Ladder: Modifications to the Traditional Model. *Plast. Reconstr. Surg* 127 (Suppl): 2011; 205S-212S.
- 8) Melek RK. Surgical Flaps. *Selected Readings in Plastic Surgery* 1999; 9; 2.
- 9) Shuji Kayano, Minoru Sakuraba, Shimpei Miyamoto, et al; Comparison of pedicled and free anterolateral thigh flaps for reconstruction of complex defects of the abdominal wall: Review of 20 consecutive cases; *J Plast Reconstr Aes* 2012; 65; 1525-1529.