

Reconstruction of Pelvic Exenteration Defect with Free Anterolateral Thigh Flap: A Case Report

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Summary: The pedicled anterolateral thigh flap, with or without the vastus lateralis muscle, has been described for pelvic exenteration defect reconstruction. However, its use as a free flap for this type of defect is not routinely followed. To reconstruct an extensive pelvic defect in the presence of two ostomies, we describe a free anterolateral thigh flap with deep inferior epigastric pedicles as recipient vessels. (*Plast Reconstr Surg Glob Open* 2021;9:e3774; doi: [10.1097/GOX.0000000000003774](https://doi.org/10.1097/GOX.0000000000003774); Published online 19 August 2021.)

Pelvic exenteration (PE) is typically reserved for advanced pelvic and colorectal cancers that are not suitable for sphincter-saving resections. The procedure leaves an extensive defect with a large dead space that, along with a poorly vascularized irradiated field left by neoadjuvant radiotherapy, leads to a wound that is difficult to treat and has a high risk of morbidity from infection sequelae. Primary wound closure after PE is associated with high morbidity; whereas the benefits of immediate reconstruction with vascularized tissue are well documented.^{1,2}

Numerous locoregional flaps have been described for reconstruction, including the vertical rectus abdominis myocutaneous (VRAM) flap, gluteus maximus myocutaneous (GM) flap, superior and inferior gluteal artery perforator (SGAP/IGAP) flaps, and gracilis flap.³⁻⁶ However, the superior and the inferior gluteal arteries are often divided during PE; thus, eliminating the GM and the SGAP/IGAP flaps as reconstruction options.⁷ The gracilis flap has limited muscle mass, whereas the VRAM flap is associated with an increased risk of parastomal hernia when more than one ostomy is present.¹

Free tissue transfer can be done when locoregional flaps are not available for reconstruction. This may include a free latissimus dorsi myocutaneous flap, in combination with the adjacent serratus anterior muscle, though

it can lead to impaired ability to actively flex and abduct the shoulder.⁷ Although the pedicled anterolateral thigh (ALT) flap, with or without the vastus lateralis muscle, has been described for PE defect reconstruction, its use as a free flap for this type of defect is not routinely followed.⁸

To reconstruct extensive pelvic defects in the presence of two ostomies, we present the case of a free ALT flap with deep inferior epigastric (DIE) pedicles as recipient vessels.

CASE PRESENTATION

Ten years after undergoing an ultralow anterior resection and adjuvant chemoradiotherapy for rectal cancer, a 63-year-old man presented with a recurrence that required PE and the formation of a colostomy and ileal conduit. His postoperative course was complicated by a bowel obstruction, requiring a further laparotomy for adhesiolysis and revision of the ileal conduit. He subsequently developed a pelvic collection caused by enteroconduit and enterocutaneous fistulas. Despite conservative management over the next 3 months, little healing was seen and the cavity size remained the same.

A laparotomy was performed to drain the pelvic collection and repair the enterocutaneous fistula. This resulted in a raw surface of 5.5 × 7 × 8.5 cm inside the pelvic cavity (Fig. 1).

Immediate reconstruction was performed. With a skin island measuring 32 × 8 cm, the ALT flap was raised in a standard manner in the subfascial plane, with two perforators included. The flap was de-epithelialized to be inset within the pelvic cavity (Fig. 2).

As there was no external skin defect, an inguinal route was required for the pedicled ALT flap to pass over the superior pubic bone. A subcutaneous tunnel was created over the inguinal region; however, its reach was inadequate with a risk of pedicle stretching or avulsion, leading to the decision to convert the pedicled ALT flap to a free flap.

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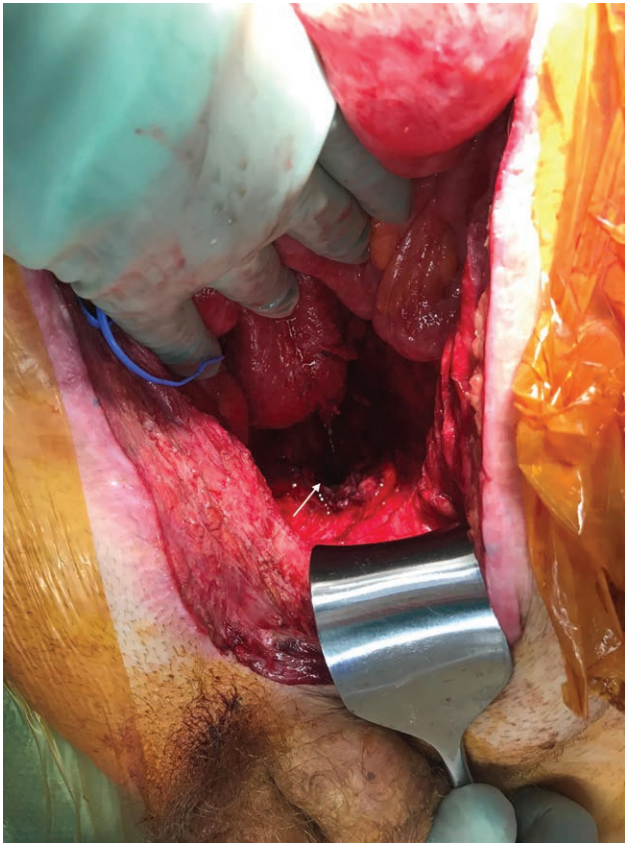


Fig. 1. Defect within the pelvic cavity measuring 5.5 × 7 × 8.5 cm (arrow).

The DIE artery and vein were identified as recipient vessels. Poor flow from the left DIE artery due to traction and diathermy use during laparotomy brought the decision to perform microanastomosis to the right DIE vessels, which displayed better circulation (Fig. 3).

Laparotomy and the donor site were closed primarily. Furthermore, computed tomography angiogram taken 4 weeks after the laparotomy revealed a viable flap (Fig. 4).

DISCUSSION

A VRAM flap is traditionally seen as a reconstructive workhorse for post-PE defects. However, as the ileal conduit and colostomy in this case were brought out through the rectus muscles, VRAM would weaken the abdominal wall significantly. Even when the stomas are matured through the rectus abdominis muscle, colostomies and ileostomies have a high incidence of peristomal hernias.¹ The de-epithelialized fasciocutaneous ALT flap provided an adequate volume of soft tissue from outside the irradiated field and obliterated the pelvic dead space without the donor site morbidity associated with VRAM.

Unlike common post-PE defect which has a more posterior pelvic defect with external skin component; in our case, the perineal skin and anal canal were left intact during PE which created two issues. First, reconstruction of the defect with either VRAM, pedicled ALT, or free ALT would lead to a completely buried flap without access to a



Fig. 2. Free anterolateral thigh flap, with de-epithelialized skin island measuring 32 × 8 cm, harvested on a subfascial plane from the right thigh.

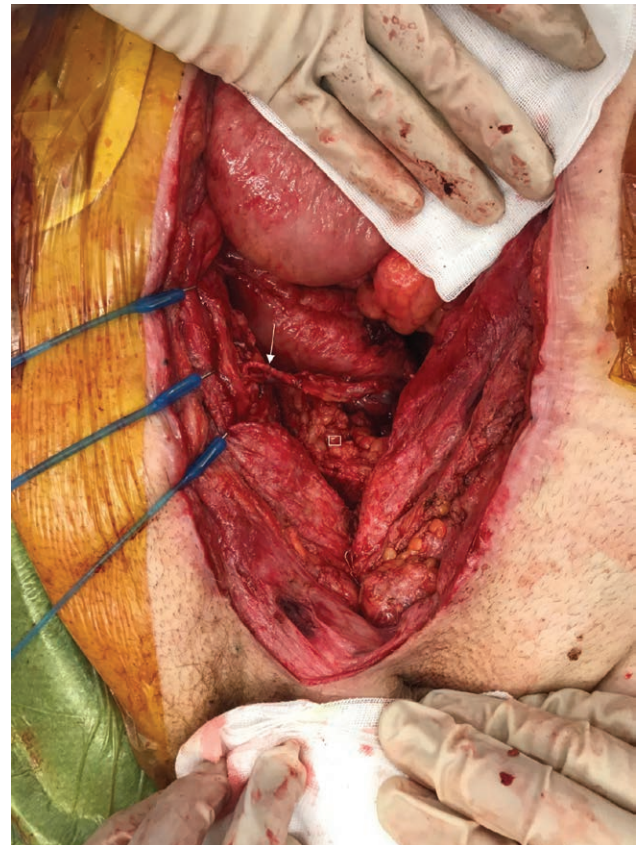


Fig. 3. Free anterolateral thigh flap (square) after microanastomosis to the right deep inferior epigastric vessels (arrow) and inset of the flap.

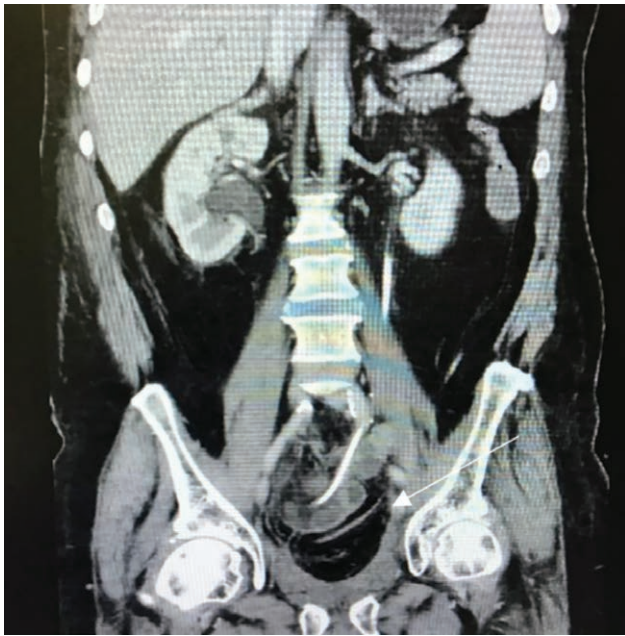


Fig. 4. A computed tomography scan of the patient 4 weeks postoperatively, showing a complete viable flap (arrow).

skin paddle for monitoring. Second, a longer pedicle and a greater arc of rotation were needed for the pedicled ALT flap to be tunneled subcutaneously through the inguinal area and passed over the superior border of the pubic symphysis to reach the pelvic cavity defect.

An implantable Doppler probe is one adjunct to consider to assist in postoperative free flap monitoring in this case. Although a high false-positive rate challenges its use, recent studies have shown high sensitivity and specificity, including when used in buried free flaps.^{9,10}

Several modifications have been described to increase the arc of rotation and length of pedicle in pedicled ALT. These include choosing a more distal perforator, ligating the main rectus femoris pedicle, tunneling under the rectus femoris and sartorius muscles, and dividing the inguinal ligament. Such maneuvers are associated with risks, however, including ischemic damage and denervation of the rectus femoris, perforator avulsion during tunneling, and a more tedious dissection.^{1,8}

Abdou et al⁷ described the conversion of pedicled ALT to a free flap using a saphenous vein graft to the femoral artery. The inferior mesenteric vessels are among other recipient vessels that have been described.^{7,12} In our case, the laparotomy gave us access to the DIE vessels, without the need for extensive dissection which could further damage the rectus muscle. The anatomy of these vessels is well known to reconstructive surgeons since the DIE perforator flap is commonly used in breast reconstruction. Furthermore, the availability of two DIE vessels provides a backup in case one is damaged during laparotomy, either because of traction or diathermy.

CONCLUSION

An extensive pelvic defect, along with a poorly vascularized irradiated field, led to a challenging case of delayed reconstruction. A free ALT flap provided an excellent alternative when locoregional flaps were not available, and the presence of ostomies prevented the use of a VRAM flap.

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