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Case Report

Bilateral groin reconstruction with a single anterolateral thigh perforator flap as an alternative to traditional myocutaneous flaps

Albert H. Chao [a,*], Georgia A. McCann [b], Jeffrey M. Fowler [c]

[a] The Ohio State University, Department of Plastic Surgery, Columbus, OH 43212, USA
[b] University of Texas Health Science Center, Department of Obstetrics and Gynecology, San Antonio, TX 78229, USA
[c] The Ohio State University, Department of Obstetrics and Gynecology, Columbus, OH 43210, USA

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Introduction

Treatment of gynecologic malignancies such as primary or metastatic vulvar cancer can result in groin defects. Furthermore, inguinofemoral lymphadenectomy is associated with significant morbidity including wound infection, wound dehiscence, lymphocyst formation, lymphedema, and cellulitis/erysipelas. These complications have reported frequencies of up to 85% and are highest in patients requiring resection of recurrent disease in a previously radiated field (Gaarenstroom et al., 2003; Hinten et al., 2011).

Soft tissue reconstruction of groin defects is often necessary to protect neurovascular structures, attain wound closure, obliterate dead space, and minimize morbidity. Prophylactic muscle flaps placed at the time of resection may be more effective than salvage flaps in patients with multiple risk factors such as reoperative surgery, obesity, and smoking. Many flaps have been described for use in groin reconstruction, such as gracilis, sartorius, and rectus abdominis, including vertical rectus abdominis myocutaneous (VRAM) flaps. However, use of these flaps requires sacrifice of a muscle, and may be limited in their size and/or arc of rotation.

Perforator flaps are distinguished from muscle/myocutaneous flaps by their blood supply. In a perforator flap, the flap tissue is perfused by a branch (perforator) of a named vascular pedicle. For example, while the VRAM flap is based on the deep inferior epigastric artery (DIEA), the deep inferior epigastric artery perforator flap is based on smaller branches that originate from the DIEA. Perforator flaps possess numerous advantages. When they are harvested, the entire vascular pedicle is dissected from surrounding tissues including muscle, and only skin/subcutaneous tissue (with or without fascia) is transferred, minimizing donor site morbidity (Geddes et al., 2003). In addition, because the flap is supplied by a perforator vessel that is typically several centimeters (cm) long after it branches off of a named vascular pedicle, there is an overall longer vascular leash which confers a greater arc of rotation to reach more distant defects. Furthermore, perforator flaps may be based on any of a large number of cutaneous vessels throughout the body, which increases their versatility (Morris et al., 2010). Here we describe a case of reconstruction of bilateral groin defects using a single anterolateral thigh (ALT) perforator flap. Anatomy and surgical technique are described in a patient with extensive metastasis of squamous cell carcinoma (SCC) to the bilateral groin/pelvic nodes who required radical multimodality therapy.

Case report

The patient is a 63 year old with a history of chronic lymphocytic leukemia and vulvar/anal intraepithelial neoplasia who presented with lower extremity lymphedema and bilateral fixed inguinal adenopathy. She underwent bilateral groin lymph node sampling that revealed SCC and she was subsequently referred to gynecologic oncology. There were no obvious vulvar lesions on physical examination, only residual fixed inguinal adenopathy and large groin lymphocysts bilaterally (S1). PET/CT imaging revealed multiple enlarged nodes in the bilateral groins and pelvis (S2), many of which appeared necrotic and measured up to 5.4 cm in diameter. There was no evidence of other metastatic disease. A multidisciplinary treatment plan was developed consisting of bilateral inguinal/femoral and pelvic lymphadenectomy followed by adjuvant radiotherapy with concurrent chemotherapy.

At the time of surgery, large bilateral elliptical incisions were made to encompass areas of massive enlargement of the groins secondary to adenopathy, induration and lymphocysts. Multiple grossly positive nodes were encountered and noted to be fixed to the fascia as well as the femoral vessels. A retroperitoneal approach to the pelvic lymph nodes was performed using the inguinal canal to gain access to the retroperitoneal spaces. This required sacrifice of the DIEA on both sides, precluding use of a rectus abdominis flap. In the pelvis, bulky adenopathy

* Corresponding author at: 915 Olentangy River Road, Suite 2100, Columbus, OH 43212, USA. Fax: +1 614 293 9024.
E-mail address: Albert.Chao@osumc.edu (A.H. Chao).

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Fig. 1. Surgical resection resulted in bilateral groin defects involving skin and subcutaneous tissue measuring 5 cm × 13 cm on the right and 4 cm × 12 cm on the left.

was discovered along the external iliac vessels and the obturator space. The groin nodes were resected down to minimal residual disease, however only 75% of the pelvic disease was amenable to resection. Surgical resection resulted in bilateral groin defects measuring 5 × 13 cm on the right side, and 4 × 12 cm on the left side (Fig. 1). An ALT flap from the right thigh was harvested based on a single perforator vessel. This vessel was meticulously dissected while preserving a small cuff of vastus lateralis (VL) muscle on it to prevent injury during dissection (S3). The flap was passed beneath the sartorius and rectus femoris (RF) muscles (Fig. 2), and the flap insets into the bilateral defects following excision of the intervening skin bridge (Fig. 3). The donor site was closed primarily. The patient had an uncomplicated postoperative course. She was ambulating independently on postoperative day three and subsequently discharged on postoperative day four. Pathology was consistent with metastatic SCC of the vulva. After an uncomplicated recovery, she was referred to radiation oncology where she received 45 Gy to the vulva, groins and pelvis (S4, S5). The patient was found to have a new supraclavicular lesion and progressive disease two months after completion of radiation therapy. Treatment options of chemotherapy versus supportive care were discussed, and the patient elected to proceed with hospice and ultimately expired.

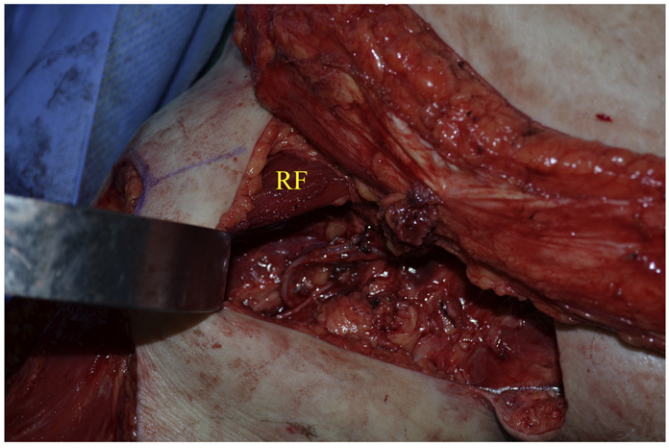

Fig. 2. Anterior view through right groin defect demonstrating the descending branch of the LCFA that has been dissected to its origin from the LCFA in order to maximize length, and passed beneath the RF muscle (RF) into the defect.

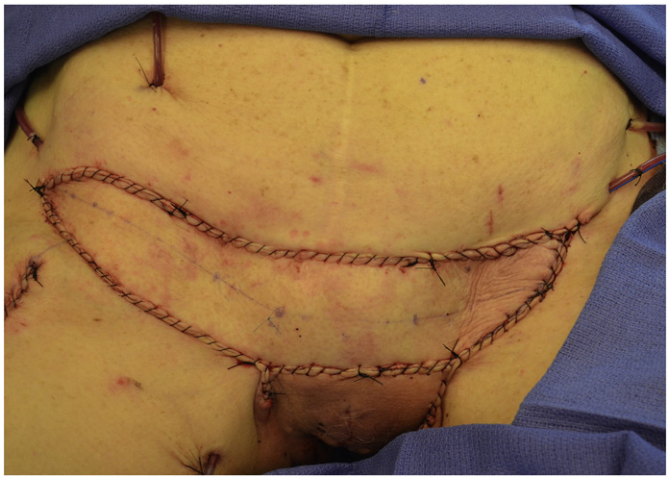

Fig. 3. Final flap inset into the bilateral groin defects.

Anatomy

The ALT flap is supplied by the descending branch of the lateral circumflex femoral artery (LCFA), which is typically the first branch of the LCFA (S6). In the proximal thigh, the descending branch travels between the VL and RF muscles, and enters the substance of the VL muscle in the distal thigh. The descending branch of the LCFA gives off a variable number of perforator vessels that supply the skin and subcutaneous tissue of the ALT flap, which as its name suggests involves the territory of the anterolateral thigh. These perforators may be septocutaneous (13%) and travel within the intermuscular septum between the VL and RF muscles, or musculocutaneous (87%) through the VL muscle (Wei et al., 2002). The location of the intermuscular septum can be approximated by a line slightly lateral and parallel to a line adjoining the anterior superior iliac spine (ASIS) and the superolateral patella, with the majority of perforator vessels residing within a 5 cm radius of its midpoint (Yu, 2004). Septocutaneous perforators generally require less tedious dissection than musculocutaneous perforators and are therefore preferred.

Surgical technique

Preoperatively, a line is drawn between the ASIS and superolateral patella. The flap may be tentatively designed on the midpoint of this line, since most perforators are located in this region (S7). The medial flap incision is made first, and then dissection is performed in a subfascial plane from medial to lateral over the RF muscle until the intermuscular septum. Septocutaneous perforators, if present, can be identified at this point, otherwise dissection is continued to identify musculocutaneous perforators. The perforator(s) is then dissected from distal to proximal to the descending branch of the LCFA. The remaining flap incisions are then made and dissection in a subfascial plane is performed to join the plane created during the medial dissection, thereby completing flap elevation. For defects of the groin and abdominal wall, tunneling the flap beneath the sartorius and RF muscles shortens the distance the flap must travel and increases its reach. The donor site can typically be closed primarily if the ALT flap is no wider than approximately 7–8 cm, and a closed suction drain should be placed. In cases where a larger flap is needed, the site can be reconstructed with a split-thickness skin graft.

Discussion

The groin presents an often challenging and complicated platform for reconstructive surgery. Groin defects are often substantial and thus

require large, well-vascularized flaps. Specific to the management of gynecologic malignancies, groin resections can occur in a previously radiated field, highlighting the importance of transfer of healthy tissue outside of the zone of radiation conferred by a soft tissue flap. Reconstruction plays an important role following radical oncologic surgery, especially if the expectation is additional multimodality therapy (Richardson et al., 2009).

Traditionally, the rectus abdominis flap has been the reconstructive option of choice for lower abdominal and groin defects. Its reliable anatomy and options for skin paddle design make it a versatile option. However, donor site complications including abdominal wall weakness and hernia remain an issue, and may occur at higher frequency in medically compromised patients, such as those with gynecologic malignancies. Furthermore, prior abdominal surgeries may have compromised the patency of the DIEA, and prior ostomy placement or transverse abdominal incisions can make the rectus abdominis flap less appealing.

The advent of perforator flaps represented a major advancement over traditional types of flaps in reconstructive surgery. As described earlier, perforator flaps possess numerous advantages, including larger arcs of rotation, less donor site morbidity, and greater versatility. Since the initial description of the ALT flap, it has been widely used with minimal donor site morbidity (Hanasono et al., 2010). However, there are relatively few descriptions of the ALT flap in patients with gynecologic malignancies. Wong et al. presented a series of patients who underwent reconstruction of pelvic exenteration defects with anterolateral thigh-VL myocutaneous flaps (Wong et al., 2009). Huang et al. reconstructed a large vulvar defect following resection of SCC with an anterolateral thigh-VL myocutaneous flap (Huang et al., 2000). To our knowledge, this is the first description of bilateral groin reconstruction using a single flap. In this case, use of a rectus abdominis flap was precluded while patient and defect characteristics favored use of an ALT perforator flap. We believe that the ALT flap is a useful option in the reconstruction of groin defects, and allows for repair of both unilateral and bilateral defects, with minimal donor site morbidity.

Supplementary data to this article can be found online at http://dx.doi.org/10.1016/j.gynor.2014.04.003.

Conflict of interest statement

The authors have no commercial associations or financial disclosures that might pose or create a conflict of interest with information presented in this manuscript. No funding was received for this work.

References

Gaarenstroom, K.N., Kenter, G.G., Trimbos, J.B., et al., 2003. Postoperative complications after vulvectomy and inguinofemoral lymphadenectomy using separate groin incisions. Int. J. Gynecol. Cancer 13, 522–527.

Geddes, C.R., Morris, S.F., Neligan, P.C., 2003. Perforator flaps: evolution, classification, and applications. Ann. Plast. Surg. 50, 90–99.

Hanasono, M.M., Skoracki, R.J., Yu, P., 2010. A prospective study of donor-site morbidity after anterolateral thigh fasciocutaneous and myocutaneous free flap harvest in 220 patients. Plast. Reconstr. Surg. 125, 209–214.

Hinten, F., van den Einden, L.C., Hendriks, J.C., et al., 2011. Risk factors for short- and long-term complications after groin surgery in vulvar cancer. Br. J. Cancer 105, 1279–1287.

Huang, L.Y., Lin, H., Liu, Y.T., ChangChien, C.C., Chang, S.Y., 2000. Anterolateral thigh VL myocutaneous flap for vulvar reconstruction after radical vulvectomy: a preliminary experience. Gynecol. Oncol. 78, 391–393.

Morris, S.F., Tang, M., Almutari, K., Geddes, C., Yang, D., 2010. The anatomic basis of perforator flaps. Clin. Plast. Surg. 37, 553–570.

Richardson, D.L., Seamon, L.G., Resnick, K.E., Martin, D., Fowler, J.M., 2009. Isolated groin recurrence of vulvar cancer salvaged with multimodality therapy. Gynecol. Oncol. 115, 306–307.

Wei, F.C., Jain, V., Celik, N., Chen, H.C., Chuang, D.C., Lin, C.H., 2002. Have we found an ideal soft-tissue flap? An experience with 672 anterolateral thigh flaps. Plast. Reconstr. Surg. 109, 2219–2226.

Wong, S., Garvey, P., Skibber, J., Yu, P., 2009. Reconstruction of pelvic exenteration defects with anterolateral thigh-VL muscle flaps. Plast. Reconstr. Surg. 124, 1177–1185.

Yu, P., 2004. Characteristics of the anterolateral thigh flap in a Western population and its application in head and neck reconstruction. Head Neck 26, 759–769.