ORIGINAL RESEARCH PAPER

Plastic Surgery

PEDICLE ALT FLAP FOR RECONSTRUCTION OF HUGE ANTERIOR ABDOMINAL WALL DEFECT WITH USE OF CONTINUOUS LIGNOCAINE DRIP – CASE REPORT

KEY WORDS: ALT flap, lignocaine, abdominal defects, pedicled

Akshay K. Bora* Resident, Department of Plastic and Reconstructive Surgery, Osmania Medical College, Hyderabad*Corresponding Author

Rangaswamy MS, Mch Associate Professor, Department of Plastic and Reconstructive Surgery, Osmania Medical College, Hyderabad

Nagaprasad. N Professor, Department of Plastic and Reconstructive Surgery, Osmania Medical College, Hyderabad

ABSTRACT

Summary – A 83 year old male presented with lump in right lower quadrant of abdomen since 1 year. It was associated with pain since 3 months and was of pricking type. No other associated complaints. On HPE the lump was Spindle cell neoplasm. After thorough evaluation he was subjected to chemotherapy and then underwent surgery and the huge defect was reconstructed using pedicled ALT flap.

Background –

Onco-surgical reconstruction usually involves reconstruction of large defects in groin, abdomen, perineum, gluteal region, flank and back region after surgical resection of the tumor. Reconstruction of these massive defects without the use of complicated microsurgical procedures usually presents as a major challenge for plastic surgeon who are not well versed with microvascular surgery. Of all the pedicled flaps, anterolateral thigh (ALT) flap has the greatest advantage for coverage of these huge defects. Although less explored, there are reports of the use of ALT flap successfully as a pedicled flap for reconstruction of huge defects in the neighbouring regions.1–15 In this case report we want to express our experience for the use of pedicled ALT flap for reconstruction of huge abdominal wall defect.

Anatomy

The pedicled ALT flap has blood supply from the perforators of descending branch of the lateral circumflex femoral artery, a branch of the profunda femoris artery. It receives its blood supply through perforators– musculocutaneous/ septocutaneous, the former being the more common. The pivot point of the this flap is approximately 2 cm below the inguinal ligament, corresponding to the origin of lateral circumflex femoral artery. The cutaneous territory of this flap it large and it ranges from above the patella to greater trochanter involving more than half of the circumference of the thigh.[3,4] Figure 1 shows the arc of rotation of pedicled ALT flap. One can plan reconstruction of the defects in this regions by ALT flap.

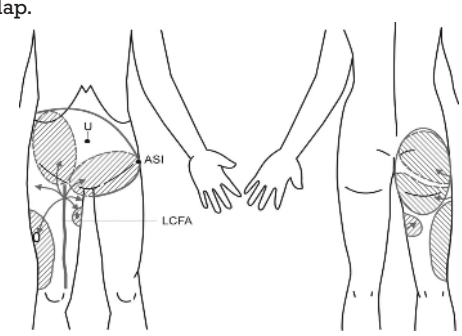

Figure 1: The arc of rotation pedicled ALT flap. Solid line showing the arc of rotation of the flap. (U - umbilicus; LCFA - lateral circumflex femoral artery; ASI – anterio-superior iliac spine)

Case Report –

A 83 year old male patient presented with lump in right lower quadrant of abdomen since 1 year as shown in fig. 2. It was associated with pain since 3 months and was of pricking type. No other associated complaints. On HPE the lump was Spindle cell neoplasm.

Subsequent radiological evaluation was done. Ct scan showed well – defined soft tissue dense lesion of size 7 x 4.3 x 7 cm (TR x AP X CC) noted in anterior abdominal wall in subcutaneous and fascial planes of RIF region, predominantly cystic changes noted within lesion with internal septa. On post contrast, lesion shows heterogenous enhancement. The extent of the lesion –

- Anteriorly reaching upto skin surface with mild overlying skin thickening.
- Posteriorly no clear cut demarcation with rectus abdominus and external oblique muscle - ?Infiltration
- Superiorly extending along anterior abdominal wall into right lumbar region.
- Medially limited by midline.
- No obvious intraperitoneal extension.

Rest CT study was normal.

Due to the aggressive nature of the lump patient was initially subjected to chemotherapy. Then after undergoing surgical resection and a huge defect was created exposing bowel loops. The tumor was crossing midline when the patient was taken for surgery. WIDE LOCAL EXCISION was done with 5 cm margin as shown in fig. 3. The defect created was of size 20 x 18 cm. After resection bowel loops were exposed. The surgical oncologist first covered the bowel with omentum (fig.4) and then secured it with Biological mesh(fig.5). Over the mesh reconstruction of the defect was done with pedicled ALT flap taken from right thigh. The mid-thigh circumference was 35 cm. Flap marking was done as shown in fig. 6. After raising the flap the identifying the pedicle as shown in (fig. 7) the flap was raised upto the origin of the LCFA and was rotated to cover the defect and inset was given over the defect as shown in (fig. 8). We had placed an IV line whose opening was just 1 cm lateral to the pedicle for continuous lignocaine infusion to avoid vasospam of the pedicle which would hinder the blood supply of our flap. The infusion was continued for 3 days post operatively and then the line was removed. Daily monitoring of flap was done. As seen in photo of (fig. 9 and 10) continuous follow up of the patient was done up to 3 months. There was no flap and donor site morbidity.

Discussion

Though the use of the ALT free flap has been well described in literature, reconstruction of anterior abdominal wall defects with the pedicled ALT flap is not frequently reported in the

literature[16]. In a study done by Song et.[17] al 1984, they described the various application of ALT flap after which it had gained popularity and thereafter it's been frequently used as a free flap for head and neck cancer reconstruction. Although frequently not used, pedicled ALT flap has been used for reconstruction of defects in anterior abdominal wall, groin, perineum, gluteal and lateral/medial thigh region.

Reconstruction of defects after oncosurgical resection in lower abdomen, perineum and upper thigh includes various options - pedicled flaps like tensor fascia lata myocutaneous flaps, sartorius, rectus femoris, gracilis, rectus abdominis, ALT flap and local skin flaps or free flaps[1-2]. But out of all we selected pedicled ALT flap in this case because of long length of the pedicle, wide arc of rotation of the flap which increases its reach to cover the defects, consistent and reliable skin territory and the vicinity of ALT flap to our defect. Other regional flaps which can be used include tensor fascia lata myocutanous flap, rectus femoris flap, rectus abdominis flap, gracilis flap, sartorius muscle. But there are some or the other limitations for the use of these options as compared with Pedicled ALT flap.

There are many advantages for the use of pedicled ALT flap over the available options of other regional flaps. With ALT flap, more than half of the circumference of the thigh skin is available which is extending from the greater trochanter to above the patella,[3,4] so we have more flexibility for designing our flap due to the availability of large skin replacement potential for reconstruction of defect. Mosahebi et al[18] in their study had reported 15 cases in which ALT flaps was used for reconstruction of huge post oncosurgical defects; 16 x 40 cm^2 (640 cm^2) was the largest size of the defect reported in the series. Chen, Tsen[19] in their study had reported the use of ALT flap with dimension 20 x 40 cm (800 cm^2). The ALT flap used in this case has dimensions - 20 x 18 cm^2 (360cm^2) The pedicle length of Alt flap is long and is of larger calibre. The pedicle length ranges from 4 – 20 cm [14,19-22] In this case we dissected the pedicle upto the origin of descending branch of LCFA which helped us to gain the extra length of the pedicle.

In many cases of pedicled ALT flap the surgeon needs to create an tunnel or raise the lower abdominal flap to decrease the chances of venous congestion but in this case we need not require a creation of a tunnel so the chances of venous congestion were minimised. [23] There can be inconsistencies in anatomy of perforator and over the more the difficult and tedious perforator dissection. But the location of the defect is the main limiting factor for the use of this flap for anterior abdominal wall defects reconstruction. Some authors have described the use of free flap for upper abdominal wall defects and pedicled ALT for lower abdominal wall defects. [24]

Sacks et al.[25] in their study had reported the ability to use pedicled ALT for reconstruction of any defect in anterior abdomen. Ting et al.[26] has also said the use of pedicled ALT flap for a defect in epigastric region. Recent evidence suggest the use of pedicled ALT flap as a reliable option for reconstruction of complex anterior abdominal wall defects. Kayano et al.[24] in his study had reported that longer mean operative time required for free flap surgeries was the main difference between pedicled versus free ALT flap for abdominal wall defects. So the pedicled ALT flap is a good option of reconstruction for wide range of defects in anterior abdominal wall due to its ability to maximize excursion of flap and the added advantage of reconstruction with pedicled autologous tissue.

Intra operatively we used a IV line placed 1 cm lateral to the pedicle of the flap and we continuous lignocaine (30ml dissolved in 500ml of NS @ 3ml/min) for 5 days post operatively. This prevented the vessel to go under vasospasm and ensuring continuous flow to the flap. This also reduced the problem of venous congestion in this patient. In old age patients vessels would have undergone atherosclerotic changes and vasospasm and other blood flow disturbances will be common in these patients. This novel approach was observed to have benefitted in the survival of such large flap in an very old age patient as vasospasm is avoided which will lead to a constant flow of blood to the flap improving the survival of flap and 100% flap acceptance.

CONCLUSION

The Pedicled ALT flap is a very adaptable flap with large skin and soft tissue reconstruction potential and a dependable blood supply. The flap has a lengthy pedicle. The arc of rotation is also wide enough to cover almost entire anterior abdomen, lower back and upper thigh including perineum and groin region. This flap is not technically demanding as myocutaneous /septocutaneous flap is simple to harvest and give inset as compared with free flap surgeries technique involving microsurgical reconstruction and the associated donor site morbidity is also minimal. The pedicled ALT flap is a good option and should be frequently used for reconstruction of complex abdominal wall defects, due to the ability to cover large skin defects with minimal donor site morbidity and dependable blood supply. With a well - planned multidisciplinary approach, large composite abdominal wall defects where muscle, fascia, adipose tissue and skin is required for reconstruction, this flap can be used safely.

The use of continuous lignocaine infusion near the pedicle of the flap will help to counter the vasospasm and this can improve the overall flap survival chances in cases of large flap in elderly patients with co morbidities.

Figure 2: Tumor present in right lumbar region with skin involvement.

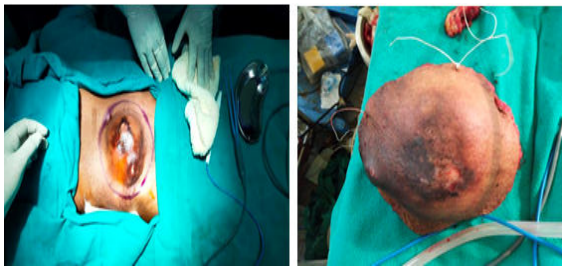

Figure 3: Showing resection margin for tumor and resected tumor specimen

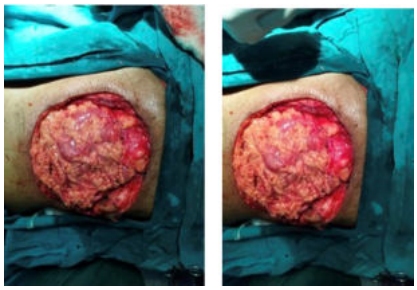

Figure 4: Omentum covering the bowel loops

Figure 5: Image showing placement and fixation of mesh over the exposed bowel.

Figure 6: Showing defect size and flap marking of pedicled ALT flap taken from right thigh.

Figure 7: Arrow showing pedicle of ALT flap

Figure 8: Showing Flap rotation and after giving flap inset immediately post op. The arrow showing the iv line placement used for continuous lignocaine infusion near the pedicle.

Figure 9: a. showing flap on post op day 1. b. Showing flap and donor area on post op day 10. c. Showing flap and donor area after 15 days. d. Showing flap on post op day 15 with patient standing

Figure 10: Follow up after 3 months post operatively

References:

1. Luo S, Raffoul W, Piaget F, et al. Anterolateral thigh fasciocutaneous flap in the difficult perineogenital reconstruction. *Plast Reconstr Surg*. 2000;105: 171–173.
2. Ahmad Q, Reddy M, Shetty K, et al. Groin reconstruction by anterolateral thigh flap: a review of 16 cases. *Indian J Plast Surg*. 2004;37:34–39.
3. Evriviades D, Raurell A, Perks GB. Pedicled anterolateral thigh flap for reconstruction after radical groin dissection. *Urology*. 2007;70:996–999.
4. Kimata Y, Uchiyama K, Sekido M, et al. Anterolateral thigh flap for abdominal wall reconstruction. *Plast Reconstr Surg*. 1999;103:1191–1197.
5. Chang SH. Anterolateral thigh island pedicled flap in trochanteric pressure sore reconstruction. *J Plast Reconstr Aesthet Surg*. 2007;60:1074–1075.
6. Cunha-Gomes D, Bembde R, Bhathena H, et al. The pedicled anterolateral thigh island flap for inguinal defects. *Eur J Plast Surg*. 2000;23:97–100.
7. Cunha-Gomes D, Bhathena H, Kavarana NM. The anterolateral thigh flap: a versatile pedicled and free flap transfer. *Eur J Plast Surg*. 2001;24:80–84.
8. Gravvanis AI, Tsoutsos DA, Karakitsos D, et al. Application of the pedicled anterolateral thigh flap to defects from the pelvis to the knee. *Microsurgery*. 2006;26:432–438.
9. Hsieh CH, Huang KF, Jeng SF, et al. Reconstruction of open pelvic fracture skin defect with an anterolateral thigh island flap: a case report. *J Trauma*. 2007;62:1277–1280.
10. Lee JT, Cheng LF, Lin CM, et al. A new technique of transferring island pedicled anterolateral thigh and vastus lateralis myocutaneous flaps for reconstruction of recurrent ischial pressure sores. *J Plast Reconstr Aesthet Surg*. 2007;60:1060–1066.
11. Ng RW, Chan JY, Mok V, et al. A modification of technique to cover a large posterior thigh defect using an anterolateral thigh flap. *Ann Plast Surg*. 2008;61:201–203.
12. Ng RW, Chan JY, Mok V, et al. Clinical use of a pedicled anterolateral thigh flap. *J Plast Reconstr Aesthet Surg*. 2008;61:158–164.
13. Rees L, Moses M, Clibbon J, et al. The anterolateral thigh (ALT) flap in reconstruction following radical excision of groin and vulval hidradenitis suppurativa. *J Plast Reconstr Aesthet Surg*. 2007;60:1363–1365.
14. Tzeng YS, Yu CC, Chou TD, et al. Proximal pedicled anterolateral thigh flap for reconstruction of trochanteric defect. *Ann Plast Surg*. 2008;61:79–82.
15. Wang X, Qiao Q, Burd A, et al. Perineum reconstruction with pedicled anterolateral thigh fasciocutaneous flap. *Ann Plast Surg*. 2006;56:151–155.
16. Sacks JM, Broyles JM, Baumann DP. Flap coverage of anterior abdominal wall defects. Seminars in plastic surgery. 2012; 26:36-39.
17. Song YG, Chen GZ, Song YL. The free thigh flap: a new free flap concept based on the septocutaneous artery. *Br J Plast Surg*. 1984;37:149–159.
18. Mosahebi A, Disa JJ, Pusic AL. The use of the extended anterolateral thigh flap for reconstruction of massive oncologic defects. *Plast Reconstr Surg*. 2008;112:492–496.
19. Chen H, Tsen Y. Anterolateral thigh flap: an ideal soft tissue flap. *Clin Plast Surg*. 2003;30:383–401.
20. Wei FC, Jain V, Celik N, et al. Have we found an ideal soft-tissue flap? An experience with 672 anterolateralthigh flaps. *Plast Reconstr Surg*. 2002;109: 2219–2226
21. Xu DC, Zhong SZ, Kong JM, et al. Applied anatomy of the anterolateral thigh flap. *Plast Reconstr Surg*. 1988;82:305–310.
22. Malhotra K, Lian TS, Chakradeo V. Vascular anatomy of anterolateral thigh flap. *Laryngoscope*. 2008;118:589–592.
23. Walia GS, BS, Broyles JM, Christensen JM, Lo AY, Rochlin DH, et al. Pedicled Anterolateral Thigh Flaps for Salvage Reconstruction of Complex Abdominal Wall Defects. Clin Surg. 2017; 2: 1298.
24. Kayano S, Sakuraba M, Miyamoto S. 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 Aesthet Surg. 2012; 65: 1525-1529.
25. Sacks JM, Broyles JM, Baumann DP. Flap coverage of anterior abdominal wall defects. Seminars in plastic surgery. 2012; 26: 36-39.
26. Ting J, Trotter D, Grinsell D. A pedicled anterolateral thigh (ALT) flap for reconstruction of the epigastrium. Case report. J Plast Reconstr Aesthet Surg. 2010; 63: e65-67.