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THE VERSATILITY OF ANTEROLATERAL THIGH FLAP: OUR EXPERIENCE OVER A PERIOD OF 2 YEARS

Plastic Surgery

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ABSTRACT

Introduction-The anterolateral thigh (ALT) flap was introduced by Song et al in 1984 based on septocutaneous branches of the descending branch of the lateral circumflex femoral artery.

Materials and methods- The study was carried out over a period of 2 years. Various defects over the body for head and neck reconstruction, upper extremity reconstruction, lower extremity reconstruction, abdominal wall reconstruction, groin defects, knee defects were considered. Pedicled and free anterolateral thigh flap was done in 22 patients over a period of 2 years.

Observation- of the 22 patients, 2 patients were ‹ 15 years. 10 patients were male & 12 patients were female. Free ALT flap was done in 14 patients and pedicled ALT was done in 8 patients. Free thin ALT flap was done in 2 cases of neck contracture. In 20 cases fasciocutaneous ALT flap was done. In 2 cases composite ALT flap was done. Donor site was closed primarily in 8 cases and STSG was done in 14 cases. There were minor complications in 2 cases but the flap could be revived by conservative means.

Conclusion- The ALT flap is a very versatile flap, as it can be used in virtually all areas of the body. The long pedicle length, the versatility in flap volume and variability in component construct, and the minimal donor site morbidity make ALT flap an ideal flap for soft tissue reconstruction.

KEYWORDS

INTRODUCTION-

In 1984, Song and colleagues introduced the anterolateral thigh flap based on septocutaneous branches of the descending branch of the lateral circumflex femoral artery. Since that time, the anterolateral thigh flap has gained popularity for use as a soft tissue flap for reconstruction of regional as well as distant defects. This flap can provide muscle, fascia, skin, or any of these in combination.

The anterolateral thigh flap can be harvested as a

1. CUTANEOUS FLAP septocutaneous or musculocutaneous perforator.
2. COMPOSITE FLAP fascial or muscular component.
3. COMBINED FLAP various other tissues (including rectus femoris muscle, tensor fascia lata, anteromedial thigh skin or vastus lateralis on a separate perforator) based on blood supply from the descending branch lateral femoral circumflex system.

FLAP MODIFICATIONS-

THIN FLAP- Thinned flaps have the advantage of regaining quicker and better sensory innervation without nerve coaptation. Preservation of at least a 2 cm radius of tissue around the pedicle is recommended to insure adequate perfusion of the flap. The flap can be thinned upto 3 mm without compromise to the blood supply provided that the flap is within 9 cm around the perforator.

CHIMERIC FLAP- compound and composite flaps
ADIPOFASCIAL FLAP- when skin is not required
INNERVATED FLAP- sensory innervations is provided by lateral femoral cutaneous nerve and motor innervations by nerve to the vastus lateralis

PEDICLED FLAP (PROXIMALLY AND DISTALLY BASED)-

Medial rotation of the flap over the rectus femoris muscle allows it to reach 8 cm above the umbilicus, to the perineum, and even the contralateral inguinal region. Lateral rotation and passage through a subcutaneous tunnel allows coverage of the trochanteric region. The pedicled flap can also be based distally on retrograde blood flow, with the pivot point at the anastomotic connection between the descending branch of the LCFA and the lateral superior genicular artery or profunda femoral artery approximately 3–10 cm above the patella, and rotated to cover defects at the knee joint.

FLOW-THROUGH FLAP- The pedicle can be used to bridge a vascular gap in the extremity or the distal end can serve as the blood supply to another free flap.

USE OF FASCIAL COMPONENT- The fascia lata can be included to reconstruct tendon, fascia, and dura defects, as well as oral commissure defects, by providing a fascial sling.

MUSCLE COMPONENT ONLY- the vastus lateralis can be harvested independently based on the muscular perforators arising from the descending branch of the LCFA.

SPLIT ANTEROLATERAL THIGH FLAP- to cover defects on the outer and inner sides of the oral cavity (bilateral buccal mucosal defects)

The anterolateral thigh flap (ALT), a perforator flap first described by Song et al. has the advantage of a large pedicle of 2–3 mm diameter, a long pedicle, a large skin island [4],[5] and it leaves an inconspicuous donor scar with minimal donor-site morbidity.

We share our experience of ALT flaps for reconstruction of various areas of the body over a period of 2 years in 22 patients

MATERIALS AND METHODS:

The study was carried out in the department of Plastic, aesthetic and reconstructive surgery from 1 January 2014 to 31 December 2016 over a period of 2 years. Various defects over the body for head and neck reconstruction, upper extremity reconstruction, lower extremity reconstruction, abdominal wall reconstruction, groin defects, knee defects were considered. Pedicled and free anterolateral thigh flap was done in 22 patients over a period of 2 years. Pedicled flap was done in groin defect, lower abdominal wall defect (desmoid tumor in right iliac fossa) and knee defects (reverse alt). Free flaps were done in head and neck defects (following resection of carcinoma of the oral cavity, carcinoma of orbit, vascular malformation in peritonsillar region), neck contracture release, lower extremity reconstruction, exposed tibial defect over lower 1/3 of leg, dorsum of foot contracture release, resection of sarcoma thigh, post traumatic contralateral knee defect[TABLE 1]. Reverse ALT flap was done in 2 cases of knee defect.

TABLE 1:

ETIOLOGY	NUMBER OF PATIENTS	FREE/ PEDICLED
CARCINOMA OF THE ORAL CAVITY	6	F
CARCINOMA OF ORBIT	1	F
VASCULAR MALFORMATION IN PERITONSILLAR REGION	1	F
NECK CONTRACTURE	2	F
EXPOSED TIBIAL DEFECT OVER LOWER 1/3 OF LEG	1	F
DORSUM OF FOOT CONTRACTURE	1	F
SARCOMA THIGH	1	F

CONTRALATERAL KNEE DEFECT	1	F
GROIN DEFECT	5	P
LOWER ABDOMINAL WALL DEFECT (DESMOID TUMOR IN RIGHT ILIAC FOSSA)	1	P
KNEE DEFECT (REVERSE ALT)	2	P

PROCEDURE- A two team approach was done in cases were free flaps were performed. The first team prepared the recipient site and the second team harvested the ALT flap. In most of the cases the perforators arised from the descending branch of the lateral circumflex femoral artery(LCFA), in one case it arised from the transverse branch of LCFA and in one case it arised directly from the profunda femoris artery. At the recipient site anastomosis of the flap vessels was done with the previously prepared recipient site vessels. The flap was monitored in terms of flap colour change, temperature, character of bleeding on scratching, doppler examination.

OBSERVATION:

Total number of patients reconstructed with ALT flaps were 22. Free ALT flap was done in 14 patients and pedicled ALT was done in 8 patients. Free ALT flap was done in two patients below 15 years of age, one for neck contracture and the other for dorsum of foot contracture. Split ALT flap was done in bilateral buccal mucosal defects. Free thin ALT flap was done in 2 cases of neck contracture. In 20 cases fasciocutaneous ALT flap was done. In one case of lower abdominal wall defect a combined flap (ALT with TFL). In another case of sarcoma of left groin leading to a large groin defect, ALT was harvested with vastus lateralis muscle in order to give bulk to the defect. Donor site was closed primarily in 8 cases and STSG was done in 14 cases. Complications- there was flap congestion in one case of free ALT for buccal carcinoma. The flap was reexplored after 6 hours and venous anastomosis was done and the flap could be salvaged. One case of pedicled ALT for groin defect had tip congestion which was later debrided and refashioning done. The follow up period varied from 6 months to 2 years.

Few cases are discussed in detail

CASE 1 (fig.1)- A 7 year old girl presented to us with dorsum of left foot contracture following accidental thermal burn injury at home one year back. First the excisional release of contracture was done under tourniquet followed by the k-wire insertion on great toe, 2nd , 4th, 5th toe. The resultant defect was about 15 x 8cm. the recipient bed was prepared by exposing the anterior tibial artery and bringing the great saphenous vein near to artery. Anterolateral thigh free flap of size 15x 8cm was harvested from the right thigh and insetting was done at the defect followed by anastomosis to the recipient vessels. The donor site was covered by split thickness skin graft. The flap was healthy and pressure garment was given at the time of discharge to reduce the hypertrophic scar at the margin of the flap and donor site. K wires were removed after 2 months. After six months, debulking of the flap was done. This gave good foot contour and aesthetics. The patient could ambulate satisfactorily even with footwear.

CASE 2 (fig.2)- A 50 years lady with carcinoma cervix underwent resection of the tumor followed by inguinal lymphadenectomy. The was a huge defect in the left groin which could not be closed primarily. This defect was covered by a pedicled anterolateral thigh flap.

CASE 3 (fig 3)- a 53 year old man presented to us with a huge lower abdominal wall defect following resection of desmoid tumor in the right iliac fossa. This defect was covered with a prolene mesh and pedicled anterolateral thigh flap with the tensor fascia lata.

CASE 4 (fig 4)- A 13 year old female presented with grade III neck contracture following childhood burn. The range of motion around the neck was restricted grossly. The scar was excised with the end point being full cervical extension. The defect of size 16*11 cm was covered with a free anterolateral thigh flap which was thinned to 1cm. the flap gave good neck contour and range of motion was improved in all directions. The functional capacity of patient measured in terms of improvements in neck flexion, extension, lateral flexion and rotation and the aesthetic appearance of the patient in terms of enhancing the cervicomandibular angle were improved.

CASE 5 (fig 5)- A 60 year old man presented with carcinoma of the left buccal cavity extending to the oral commissure and cheek. Wide local excision, modified radical neck dissection was done. Coverage was done by free anterolateral thigh flap for both skin and mucosal defect.

DISCUSSION-

There are various advantages of the anterolateral thigh flap that make it ideal for coverage of various defects of the body. The ALT flap has a relatively constant anatomy with a long pedicle length. The harvest of ALT flap is easy in experienced hands. There is flexibility of tissue volume and design which help in coverage of various defects. There is lack of significant donor site morbidity. Donor site can be closed primarily if the width of flap harvested is less than 8cm. As the donor scar is in the unexposed area, its location permits easy concealment with minimal clothing. There is decreased operative time with a two-team approach. Both proximally and distally based pedicled ALT flaps can be designed. The large skin paddle can be harvested even when only a single major cutaneous perforator is available. There occurs no

scarring of the surrounding skin in case of free ALT flap which is a disadvantage in case of local flaps. In case of neck contracture,

- prolonged periods of neck splintage not required,
- the pliability of the flap results in excellent neck mobility after postoperative rehabilitation,
- only a minimal chance of recurrence exists.
- the thinning of the flap provides good neck contour and avoid bulkiness.

CONCLUSION-

The ALT flap has become a very versatile flap, as it can be used in virtually all areas of the body. The long pedicle length, the versatility in flap volume and variability in component construct, and the minimal donor site morbidity make ALT flap an ideal flap for soft tissue reconstruction.