



Pretibial Defects of Legs: Coverage Management

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Abstract

Paucity of protective subcutaneous fat layers, muscles, presence of only tendons, vessels in tight compartments with little collateral circulation make coverage of wounds in lower third of leg and down a challenging problem. Free flap operations are gold standard these days but need high microsurgical skills and operating Loupes or microscope.

Small to medium sized defects can be covered with perforator based flaps from the vicinity of the defect without much difficulty. Preoperative Doppler mapping of perforators is must. Secondary defects covered with split thickness skin grafts.

Keywords: *Pre tibial defects, perforator based faciocutaneous flaps, Doppler study.*

Introduction

There is increasing incidence of Road Traffic Accident (RTA). Commonly injured parts of body are face and legs. Due to relatively poor collateral blood supply of structures in leg particularly of skin put challenges of coverage of exposed Tibia and tendons. There are several options available for coverage but perforator based faciocutaneous flaps are much better over others. In last 10 years we have performed 120 cases of compound fracture with pre tibial defects mainly in middle third and lower third of the leg. It is preferred to cover the defects within 5 days of injury before serious infection sets up. But unfortunately orthopedicians still hesitate to refer cases to Plastic Surgeons. Preoperative hand held Doppler mapping of perforators were done, reconfirming on exploration and suitable superior or inferior, proximally or distally based, medial or lateral compartment perforator flaps were done. We

believe these are simple flaps for this complex problem once operative procedure is mastered.

Due to compound fractures of leg bones loss of skin and soft tissue are a common occurrence leading to exposed bones, hardware, tendons, etc. Since long time many flaps have been described from cross leg flaps to free microvascular transfer of flaps.

To name few of these are-

- Gastrocnemius muscle or myocutaneous flaps
 - Soleus proximally or distally flaps + skin grafting
 - Peroneus longus or brevis flaps + STSG
 - Faciocutaneous proximally or distally based flaps.
 - Distally based sural artery flaps.
 - Saphenous venous flaps.
 - Adipofacial flaps.
 - Cross leg flaps.
 - Bipedical faciocutaneous flaps, etc.
- All above flaps having their advantages and disadvantages particularly with distant pivot point.

For small to medium sized pretibial defects perforator based flaps from nearby area are safe simple with minimum secondary defect and with good cosmesis.

Patients and Method

From January 2008 to June 2018 a total of 120 patients with small to moderate size soft tissue defects ranging from 3 x 4 cm to 10 x 13 cm with an average size of 48 cm² were treated in age group from 5 years to 70 years with mean age of 26 yrs with various perforator based flaps.

As most defects were in middle third and lower third legs so mainly distally based perforator flaps were done with STSG to cover the secondary defects.

Male: female ratio:: 4:1, as male are more prone for trauma.

For bony fixation orthopedicians used O R I F with plates and screws, interlocking nails, Anders nails, external fixators as per need and level of contamination, soft tissue and bony defects. As mostly cases come late (not referred by orthopedicians in more than 90% cases) patients came from 2 months to 30 years post trauma, even with maggots in few cases.

Mostly patients visited them self to us through the world of mouth, this is still a dilemma in management of compound fractures in India. Usually infection with resistant poly microbial multi drug resistant bacteria sets up, with foul smelling purulent discharge, osteomyelitis, sequestrum, maceration of surrounding skin in Plaster of Paris to very weak flabby ischemic edematous muscles and osteoporotic bones.

Methods

All cases were investigated in routine way. Asked to give up tobacco for minimum 14 days before operation (but usually patients do not give up).

Therapeutic doses of broad spectrum antimicrobial antibiotics given as infection in these cases are mixed resistant type. Pus culture and drug sensitivity test was mandatory. Recent digital x rays are must. In all cases preoperative

mapping of nearest good perforators were done with hand held Doppler (EMCO 500, 8 MHz).

Spinal anesthesia is sufficient in most of the cases. Even nerve blocks are good for these surgeries.

Meticulous debridement, scooping and scrapping done under pneumatic tourniquet control.

Mostly vertical incision near or at the margin of lateral or medial of the defect is given and dissected under 4X loupes magnification (Zeiss) near the perforator located site. If needed to facilitate the dissection horizontal cut is given. Intra operative Doppler can be done if needed.

Dissection plane is deep to the deep fascia +/- epimycium. Close dissection near the perforator is avoided as almost all cases were chronic with factors of fibrosis.

Sufficient size flap usually distally based were dissected out. Tourniquet deflated, vascularity at flap's distant margin checked for oozing. Then flap sutured with few bolsters Ethilon 3-0 sutures. Simple thin CRD drain left in situ for few days. Secondary defect covered with medium thickness spilt thickness skin grafts. This was easy to harvest from ipsilateral medial thigh without change in position. Suitable dressings were done with immobilization and leg elevation.

Primary dressing usually done in 4-6 days. A window is left in dressing to watch flap's vascularity. Sutures are usually taken out around 15 days. Few cases required subsequent bone grafting. Normally bones unite well by the end of maximum 8-12 months. Only marginal rim/ strip necrosis of flap seen in 4 cases of long standing infection.

Discharging sinuses take long time to heal if occurs and it is better if these sinuses drain out.

Patients were satisfied with operation's good results with minimum scars.

Perforator flaps served their purpose well to cover pretibial defects.



Fig: 1A Exposed middle/3 tibia.



Fig: 1B Coverage with adjoining perforator flap.



Fig: 2A Exposed middle /3 tibia.

Fig: 2B Coverage with adjoining perforator flap.

Discussion

There are various flaps described to cover leg defects. But mostly their pivot point is far away with wide arc of rotation. Many flaps require expertise in surgical dissection.

Some are pedicled and require second surgery for inseting; some are to be tunneled as an island flap with associated risk of pedicle compression due to edema or position. Pedicled fasciocutaneous flaps leave unsightly scar visible in short dresses.

Perforator based flaps suffice many purpose, relatively early to raise, only one procedure is enough, good color - texture match, fairly large flap can be raised in acute/ fresh cases, compatible with future bone grafting procedures and withstand local infections, less operative time, no change in position during surgery thus economic to patients.

But one important issue to be addressed if Orthopedician include Plastic Reconstructive Surgeon in the initial stage of compound fracture management then overall prognosis remarkably improve with better prognosis of patients.

So we conclude that Perforator based flap are better choice for small to medium sized leg defects with promising results.

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