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Lateral Calcaneal Artery Flap: A Versatile Flap for Coverage of Posterior Heel Defects in Moribund Patients

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Introduction

Defect on the heel is a difficult problem for the patients because it makes patient not able to wear normal shoes. This area is subject to weight-bearing and shearing forces that exceed those of any other area of the body. This problem becomes bigger in case of moribund patients because of their difficult health issues which make them unsuitable for surgery under general anesthesia.

The basic principal of healing is "tissue defects should be replaced with like tissue" [1]. This is often in case of posterior heel and lateral calcaneum due to its osseous or tendinous bed, poor area of vascularisation, paucity of expandable local tissue.

Conservative treatment usually fails at this site. Skin grafting usually gives unacceptable results. Several types of reverse flow fasciocutaneous flaps or cutaneous flaps were described but they require sacrifice of an important leg artery and create obvious deformity in the donor site [2,3].

Lateral calcaneal flap is an important surgical option for coverage of posterior heel defects (Figure 1). Its advantages include high success rate, low perioperative morbidity, good functional results as this flap can be done under local anesthesia.

Patients have comorbidities such as diabetes, hypertension, chronic renal disease, morbid obesity.

Figure 1: Preoperative photograph of posterior heel defect.

Methodology

This case series was conducted at department of plastic surgery Dr. RML hospital and PGIMER Between June 2016 to July 2017.

8 patients (5 male, 3 female) having soft tissue defects over posterior heel underwent reconstruction using a Lateral calcaneal artery skin flap. Cause of injury over posterior heel was acute trauma in 5 patients, chronic ulcer in 3 patients.

Patient's age ranges from 40 to 60 years.

Follow up period ranged from 3 months to 6 months. The position and course of the calcaneal artery was marked on the skin.

Planning reverse using a cloth pattern over the defect and transposing it to lie over previously demarcated artery. No distal extremity tourniquet was used during harvesting of the flap. Only Doppler was used to locate the vessel in the foot. No CT/MRI angiography was done previously.

The flap can be designed as a short vertical axis or long vertical axis. Dissection starts from the lateral aspect of calcaneal tendon and carried down distally to the periosteum of the calcaneum.

The plan was developed leaving the periosteum intact. The anterior incision was made immediately behind the lateral malleolus and carried down through the subcutaneous tissue. Finally the distal horizontal incision was made and the flap was raised in a retrograde fashion to the level of lateral malleolus.

The base of the flap should be at least 4 cm wide. A small split thickness skin graft was harvested via infiltrating local anesthesia to the donor site (opposite thigh) to cover the donor defect and compression dressing was done. Post op patients were immobilised for 5 to 7 days with leg elevation.

No DVT prophylaxis was given to any patient.

Results

All 8 flaps had good perfusion and survived completely. Flap oedema lasted for 3-4 days. No venous congestion was occurred in any flap. Skin graft over donor site had taken well in all 7 patients. Partial loss of STSG occurred in one patient which was healed spontaneously.

Number	Age /sex	Cause	Comorbidity	Follow-up (months)	Complication
1	55 yr/male	Acute trauma	Diabetes	3	No
2	50 yr/male	Acute trauma	Hypertension	2	No
3	52 yr/ female	Chronic ulcer	CKD	3	Partial loss of STSG
4	65yr/male	Chronic ulcer	Diabetes	5	No

5	52 yr/ female	Acute trauma	Diabetes ,CKD	3	No
6	57 yr/ female	Acute trauma	Diabetes	2	No
7	70 yr/male	Acute trauma	Hypertension	3	No
8	53 yr/male	Chronic ulcer	Hypertension	3	No

Table 1: Clinical data of patients.

Discussion

Lateral Calcaneal artery flap was first described by Grabb and Argenla in 1981 [4]. It is an axial pattern flaps that includes-lesser saphenous vein, the sural nerve and the lateral calcaneal artery [5]. This flap is simple, stable and sensate. It is preferred in small sized isolated posterior heal defects with exposed tendoarchilles or calcaneum (Figure 2) [6]. Peroneal vessels are last to be affected by age, Diabetes mellitus and smoking making it a safe flap in these patients [7].

Figure 2: preoperative photograph of exposed tendoarchilles.

As these moribund patients having difficulty to get general anesthesia this flap can be harvested under local anesthesia.

Over all, Lateral Calcaneal artery skin flaps should be included in the surgical armamentarium to cover difficult wounds of the posterior heel of the foot.

Flap is relatively thin. Do not required scarification of a major artery to the leg or foot. Several types of reverse flow island flaps have been developed in the form of fasciocutaneous or cutaneous flaps but they require sacrifice of an important leg artery and create obvious contour deformities at the donor site. The use of free flaps has improved the ability to cover soft tissue defects. However, the flap bulk, the need for secondary procedures, and the risk of vascular failure are considerable drawbacks. But this flap is based on a lateral calcaneal artery which is a branch of peroneal artery vascularity to the foot remains unaffected and patient having acceptable morbidly at the donor sites.

The flap dissecting technique is straight forward, vascular pedicle is constant and surgical transfer is easy.

In the present case series we can confirm the usefulness of LCA flap in the cure of intractable posterior heel defects with bone or tendon exposure with minimal donor site morbidly that if offers (Figure 3a and 3b).

Figure 3a: Intraoperative photograph of LCA flap.

Figure 3b: Intraoperative photograph of LCA flap.

Conclusion

LCA presents good function and aesthetical results for coverage of posterior heel and lateral calcaneum defects in moribund patient and can be harvested under local anesthesia (Figure 4a and 4b).

Figure 4a: Postoperative photograph after LCA flap.

Figure 4b: Postoperative photograph after LCA flap.

As it fulfill the goal to provide sensate and stable coverage over posterior heel soft tissue defect in a single stage. Moribund patients have difficult health issues which make then unsuitable for general anesthesia. This procedure can be done under local anesthesia and relieve the depression of the patient to wear shoes easily.

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