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Fasciocutaneous Leg Island Flaps

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SUMMARY

Starting in January 1996 a random prospective study was carried out at Orthopaedic and Trauma Unit, Bahawal Victoria Hospital Bahawalpur to evaluate the role of fasciocutaneous island flaps for the coverage of skin defects in the leg resulting from trauma and chronic osteomyelitis. A total of ten island flaps have been done in nine patients. These island flaps were based on septocutaneous perforators originating from three major vessels in the leg. All patients were male ranging from 11 to 60 years. All the flaps were done for skin defects with exposed bone in the lower third of the leg which is a challenging area from skin coverage point of view. These flaps were selected instead of conventional cross leg and muscular flaps because of low morbidity associated with this procedure. In nine of these patients adequate skin coverage was obtained with minimal donor or recipient site morbidity. There was marginal necrosis in one patient and superficial epidermal necrosis in another but the flaps served the purpose. Nine flaps were well taken. There was necrosis of 1/3rd of flap in another patient. There was no other postoperative complication. In our opinion island fasciocutaneous flap, when applicable is extremely attractive option in the leg.

INTRODUCTION

Skin defects below the knee present difficult problem when combined with fracture pseudarthrosis, osteitis, osteomyelitis so forth. Local flaps useful elsewhere are fraught with danger. Skin defects in lower 3rd of the leg has been recognized as a challenging clinical problem. Proximal based fasciocutaneous flaps, muscle flaps such as soleus and distally based fasciocutaneous flaps are not feasible and are all unsafe.

The island flap needs thorough understanding of anatomy of perforator vessels. The stimulus to carry out investigations for blood supply to skin was provided by unreliable reputation of skin flaps in the leg. The evolution of fasciocutaneous flaps also aroused interest in vascular anatomy of the superficial planes of the leg[1,2,3].

In the leg, perforating arteries arise from all three major vessels of leg and pierce the deep fascia along the intermuscular septa and also through the muscles. Posterolateral septocutaneous vessels originate from peroneal artery and vein. They run through the posterior intermuscular septum. These cutaneous branches are distributed segmentally at intervals of 3-5cm and have a diameter of 0.1-0.2mm[2,3,4,5]. Lowest perforator is found at 5-8cm above the tip of the lateral malleolus and is constant[6].

The medial septocutaneous vessels originate from posterior tibial vessels and are enclosed in the deep transverse fascial septum of the leg i.e. septum that separates the soleus and gastrocnemius from deep muscular compartment of the leg. These vessels are found between 9 and 12cm, 17 and 19cm and 22 and 24cm from the tip of medial malleolus with external diameter of 0.5 to 1.5.

Operative Technique

The dimensions of the defect were measured and flap was designed in accordance with the size of the defect. Surgical plane of the flap lies deep to deep fascia. After identification and dissection of pedicle, the flap was raised from all its edges. The flap was then rotated and held with some stay sutures over the defect. Tourniquet was used in all cases. We used loupes only in peroneal island flaps. Approximate duration of operation was 90 minutes. Routine arteriography and Doppler were not used. Donor site was split thickness skin grafted. Light dressings covered the flap which can be assessed easily.

Table 1: Summary of record of 10 island flaps in 9 patients.

No. of Patients	*Mechanism of Injury*	*Size of Wound*	*Site of Wound*	*Size of Flap*	*Type of Flap*
5	Road side accident	8x15cm	Lower 3rd of leg	8x15cm	Peroneal island flap
1	Road side accident	10x20cm	Upper 3rd of leg	10x20cm	Medial island flap
1	Chronic Osteomyelitis	10x15cm	Lower 3rd of leg	10x15cm	Medial island flap
1	Road side accident	6x8cm	Lower 3rd of leg Exposed distal tibia and fibula	3x6cm 6x8cm	Dorsalis pedis Medial island
1	Unstable scar on heel	6x8cm	Heel	6x8cm	Medial planter

PATIENTS AND METHOD

Different types of island flaps were used in nine patients. The age of patient ranged from 11 to 60 years with a mean of 36 year. All patients were male, the duration of skin defects ranged from few days to 20 years. One patient with chronic osteomyelitis had four times split thickness skin grafted with recurrent ulceration. The number of patients, mechanism of injury, size and site of wound and the type of flap done is given in the Table 1.

RESULTS

Nine flaps achieved their objective with uneventful recovery. Marginal necrosis of the dorsalis pedis flap was excised and the flap served the purpose. One patient with peroneal flap had superficial epidermal necrosis and treated by dressings only. Only one patient had necrosis of distal 3rd of flap with exposed bone.

DISCUSSION

Interest in local fasciocutaneous flaps has increased since the concept of fasciocutaneous flaps was clearly introduced by Ponten[8]. Arrangement of fascial plexus in the lower leg allowed us to use an island fasciocutaneous flap which has the advantages of a fasciocutaneous flap without the disadvantages of its proximal skin pedicle. This kind of flap allows one to use only the amount of skin needed to fill the defect, decreasing donor site morbidity. It facilitates the arc of rotation around the pivot point. Although the free flap repairs of the lower leg are satisfactory in expert hands, they are very demanding in operating theatre, time, special skills and specialized early aftercare. The safety with which fasciocutaneous island flaps of lower extremity could be done has relatively recently been demonstrated[7].

Fig. 1: Wound on medial aspect of leg with exposed tibia.

In this report we observed following advantages.

1. These flaps are reliable and easy to elevate.
2. Almost any site can be covered.

Fig. 2: Proneal island flap rotated medially to cover the skin defect.

Fig. 3: Exposed tibia has been covered with peroneal island flap.

3. Pedicles are constant.
4. The arc of rotation is extensive.
5. Minimal donor site morbidity.
6. No special instruments are required.
7. Operation time is short.

CONCLUSION

Our experience with these flaps has convinced us that island should always be considered whenever one is faced with the challenging problem of soft tissue coverage in lower leg. Advantages are obvious.

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