

Outcome of Fasciocutaneous Flaps in Exposed Bones of Leg

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Abstract: For the coverage of lower leg defects excellent alternatives are the fascial and fasciocutaneous flaps. The aim of present study is to document the etiology of the leg defect and to highlight the role of different reconstructive techniques for the management of exposed leg bones over a period of 4 years from January 2009 to December 2012. The reconstructive technique used includes the different fasciocutaneous flaps used includes posterior calf flap, lateral fasciocutaneous flap, medial fasciocutaneous flap, sural flap, double fasciocutaneous flap, retrograde peroneal and retrograde supramalleolar. Age range of the patients was from 1 to 70 years. There were 43 male and 08 female. The traumatic wounds defects were 46(98.38%), after electric burn 02(5.76%); dog bite and chronic osteomyelitis in 02 and 01 patient respectively. The site of the tibia exposed was proximal 1/3 in 07, middle 1/3 in 09, distal 3rd in 11, middle 2/3 in 02, proximal and distal 3rd in 02, over knee joint 02, heel in 13 and tendo calcaneus was exposed in 05 patients. The different fasciocutaneous flaps used includes posterior sural flap 14, calf flap 09, retrograde peroneal in 07, lateral fasciocutaneous flap 06, double fasciocutaneous flap 06, medial fasciocutaneous flap 05 and retrograde supramalleolar in 04 patients. Complete flap necrosis in 02, partial flap necrosis in 04 and partial skin loss in 06 patients. We conclude that exposed bone at any site of tibia can be covered by fasciocutaneous flap and exposed heel, dorsum and sole of foot and ankle joint can be covered by retrograde sural flap.

Key words: Flaps • Fasciocutaneous • Outcome and Exposed Leg Bones

INTRODUCTION

Although the microvascular reconstruction has very largely revolutionized during last decade, however simultaneous better understanding of the blood supply to skin from perforators/fasciocutaneous vessels has yet not eliminated the use of fasciocutaneous flaps which was described in leg by PONTEN in 1901 [1]. These flaps contain only skin, subcutaneous tissue and fascia, therefore less bulky than the muscle flap and also offer less functional morbidity as compare to muscles flaps [2,3].

The urbanization during last 2 decade has resulted in increased frequency of trauma, most common cause being road traffic accidents. Leg is commonest site when trauma

to the extremities is taken into consideration. This frequently involves not only the bone but also the skin, soft tissues and muscles as well. The management of trauma victim therefore demands team approach involving plastic surgeon, orthopedic surgeon and vascular surgeon. Delay to provide skin cover may lead to infection, which in most cases difficult to eradicate, while in some cases salvage of the limb become almost impossible. Therefore timely intervention to provide skin cover to the defect is of prime importance.

Various reconstructive options are available; each has its own limitation therefore some centers even use modified technique to fit to the individual case [4]. Therefore indications for selection of any particular technique are not clearly defined but rather depend upon

personal judgment, experience and expertise. Muscle flap coverage remains the first choice for many surgeons because of the high vascularity and the high tolerance and resistance to infection of these flaps. The fascial and fasciocutaneous flaps have regained popularity as excellent alternatives for coverage of lower leg defects. For lower limb reconstruction fasciocutaneous flaps remains one of the useful methods of skin cover for leg wounds / defects. However before contemplating the use of fasciocutaneous flap, it would be essential to gauge the damage to the overall vascularity of the skin, which it is proposed to use as the flap. The fasciocutaneous flaps of lower limb are classified according to blood supply as follows.

Cormack and Lamberty Classification

TYPE A: Multiple vessels enter at base of flap. e.g. ponten flap

TYPE B: Single vessel run along base of flap. e.g. scapular and para scapular

TYPE C: Multiple small perforating arteries reaching in flap from deep artery running along septum. e.g. radial forearm flap

TYPE D: It is type c, when contain bone.

This study was design to evaluate different etiological factors that leads to the defect of the leg and the reconstructive options in the management of compound injury to the leg.

Objective: The aim of the present study is to document the etiology of the leg defect and to highlight the role of different reconstructive techniques for the management of leg wounds/defects.

MATERIALS AND METHODS

We carried out this study at the Department of Plastic Surgery and Orthopaedic Surgery and Traumatology at Liaquat University of Medical and Health Sciences Jamshoro over a period of 4 years from January 2009 to December 2012.

The patients of both sex and age, presenting with simple or compound defect of the leg from any cause were included in the study. During period of the study 52 patients having simple or compound defect of leg were managed by different reconstructive technique.

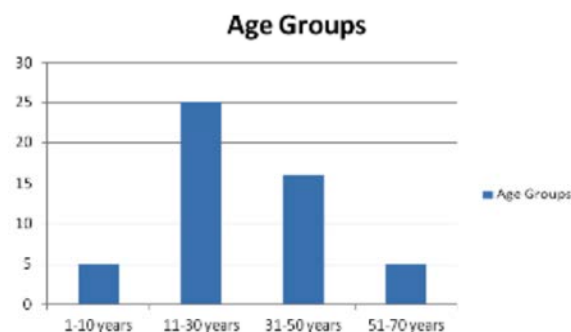
One patient managed by primary closure of the wound involving calf and therefore excluded from the study. Data of 51 patients having leg defects, managed by different fasciocutaneous flap depending upon the site and nature of the injury was available. The reconstructive technique used includes The different fasciocutaneous flaps used includes posterior calf flap, lateral fasciocutaneous flap, medial fasciocutaneous flap, sural flap, double fasciocutaneous flap, retrograde peroneal and retrograde supramalleolar.

RESULTS

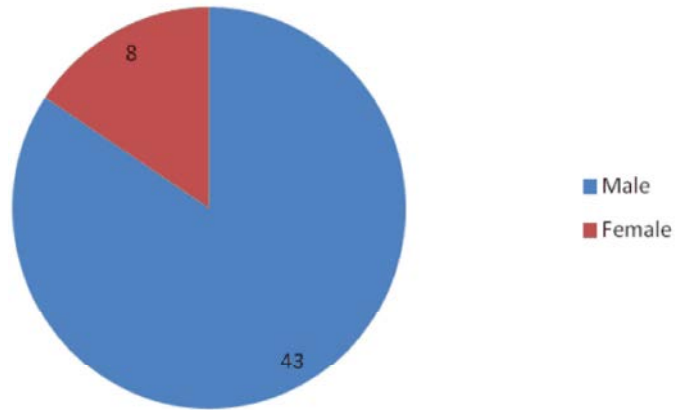
Age range of the patients was from 1 to 70 years. Almost 50% (25) patients were between 11-30 years of age while 10% were in 1st decade of life and 10% patients were between 50-70 years of the their life as shown in Graph 1. There were 43 male and 08 female as shown in Graph 2.

The most common cause of the defect was trauma, followed by electric shock injury dog bite and chronic osteomyelitis. The traumatic wounds defects were 46(98.38%), defects after electric burn were 02(5.76%); dog bite and chronic osteomyelitis lead to defects in 02 and 01 cases respectively. All patients having compound defect having exposed tibia as well. The site of the tibia exposed was proximal 1/3 in 07 cases, middle 1/3 in 09 cases, distal 3rd in 11 cases, middle 2/3 in 02, proximal and distal 3rd in 02, over knee joint 02, heel in 13 cases and tendo calcaneus was exposed in 05 patients.

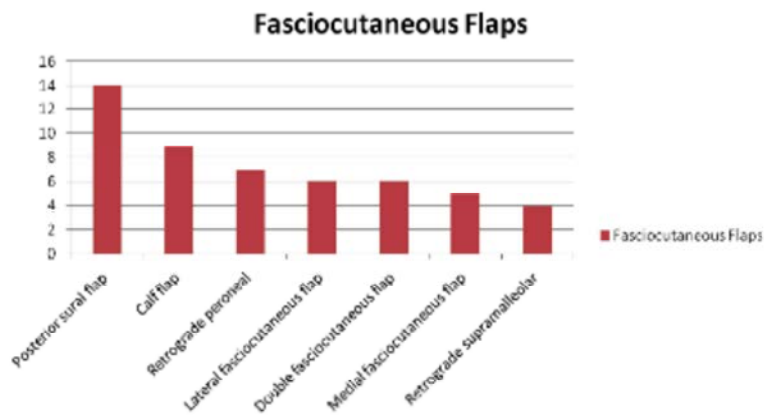
The different fasciocutaneous flaps used includes posterior sural flap 14, calf flap 09, retrograde peroneal in 07, lateral fasciocutaneous flap 06, double fasciocutaneous flap 06, medial fasciocutaneous flap 05 and retrograde supramalleolar in 04 patients Graph 3. The rejection of the flap was seen as follows. We observed complete flap necrosis in 02case, partial flap necrosis in 04 cases and partial skin loss in 06 patients.



Graph 1: Age distribution by various decades of life.



Graph 2 : Gender distribution



Graph 3: Distribution of various procedures to cover the exposed leg bones.



Fig. 1: Trauma to spoke wheel injury. A. Exposed calcaneum & TA. B. sural island flap C. After completion of procedure D. After one week postoperatively



Fig. 2: Operated case of open fracture of tibia by Ilizarov with exposed distal tibia. A. Pedicle Sural flap B. Covering of exposed bone by flap. C. After healing



Fig. 3: Traumatic lower 2/3 exposed bone A. Exposed Tibia B. Covered by ponten flap and supramalleolar flap C. Secondary defect covered by split skin graft.

DISCUSSION

The most common cause of the trauma now-days is road traffic accidents including spoke wheel injury (36 cases) followed by fall from height (8 cases) and 2 cases were result of gunshot injury. a finding consistent with the study of Suri MP *et al.* [6]. The sural flap was the most common flap used in this series of the patients. This is an island flap with dependable blood supply and was originally describe by Masquelet in 1992 [7]. Among those who received sural flap 3 were having diabetes and 2 were smoker, however in all cases flap taken well and survived, these results are consistent with other studies [8-10]. Partial marginal necrosis seen in 2 non-diabetic patients and partial loss observed in a patient 68 years of age. Picture No 1. In this series Calf flap used in 09 cases. This flap is based on perforator of peroneal or posterior tibial artery. We observed no marginal or partial flap necrosis in any case of calf flap which is in contrast to the results of Erdmann *et al.* [11] who reported a failure rate of upto 10%. The retrograde peroneal flap based on septocutaneous and septosynovial perforators of peroneal vessels was performed in 7 cases. These perforators are almost always constant [12] and therefore flap can be raised with reasonable dependability, however the size of the flap is the only limitation and therefore it is best suited for defect of tendoachilles and pericalcaneal region. Lateral and medial fasciocutaneous flaps raised in this series of the patients were type A flap.

The results of this study showed that if observing blood supply of the adjacent area of the defect than one can have very good if not excellent results raises fasciocutaneous flaps.

CONCLUSION

We concluded that exposed bone at any site of tibia can be covered by fasciocutaneous flap and exposed heel, dorsum and sole of foot and ankle joint can be covered by retrograde sural flap.

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