Original Article

Gustilo Type IIIB Open Tibia Fractures

Functional Outcome of Fasciocutaneous Flap Used for Soft Tissue Coverage For Open Tibia Fracture (Gustilo Type IIIB), Remote Area Hospital of Pakistan Experience

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ABSTRACT

Objective: To study the role fasciocutaneous flap as a method of soft-tissue reconstruction in Gustilo type IIIB open tibia fractures, LUMHS experience.

Study Design: Observational study.

Place and Duration of Study: This study was conducted at the Department of Orthopaedics, Liaquat Medical University Hospital, Hyderabad/Jamshoro from 18th Aug 2015 to 18th Jan 2016.

Materials and Methods: A total of 49 patients with open tibia fractures (type IIIB) were selected for this study. Patients were operated using a standard prescribed surgical technique. The quantitative variables were described by mean ±SD. The qualitative variables were presented by frequency and percentage. Effect modifiers were controlled by stratification. Chi-square test was applied post stratification and p-value ≤0.05 was considered as significant.

Results: Mostly young patients were involved in the tibia bone fracture with the mean age of the cases was 38.4years. Major cause of injury was road traffic accidents 32(65.3%). Anatomically leg was divided in three parts, proximal open tibia fracture were found in 15(30.6%) cases, middle in 20(40.8%) cases and distal in 14(28.6%) cases. Rotational pattern of fasciocutaneous flap was applied in majority of the cases 31(63.3%), while Random pattern fasciocutaneous was used in 11(22.4%) cases and Cross-leg fasciocutaneous was used in 07(14.3%) cases. According to the complications superficial infection was found in 05(10.20%), followed by Tenderness, Pintact infection, Deep infection, and Marginal Necrosis were found with percentage of 04(8.16%), 02(4.8%), 02(4.8%) and 01(2.4%).External fixation was applied in all the cases and union was found in 42(85.71%) of the cases, while malunion, nonunion, Muscle wasting, Knee stiffness and Ankle stiffness were found with percentage of 05(10.20%), 02(4.8%), 05(10.20%), 08(16.32?%) and 06(12.24%).

Conclusion: Fasciocutanous flap is best option to cover open tibia fracture specially gustillo type III B. It helps to achieve a safe and early durable coverage, avoid nosocomal infection and optimize the healing and facilitate the future reconstruction. The benefit of fasciocutaneous flap is that they have their own blood supply producing a good durable cover.

Key Words: Functional Outcome, Fasciocutaneous flap, Open tibia fracture, Gustilo type IIIB.

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INTRODUCTION

Open tibia fractures are serious wounds to a great extent influencing many peoples and take normally 43 weeks to unite[1]. There is 13% non-union rate in well developed centres. There have been various developments in the different procedures to enhance rate of early union of open tibia fractures and early wound coverage for open wounds[2].

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Multidisplinary and coordinated orthopedic methodology, has additionally prompted critical upgrades in patient outcomes. Gustilo Anderson type IIIB wounds with open tibia fractures is a real challenge for today's clinicians, it needs early and prompt attention, sufficient observation and early flap cover for delicate tissue defect[3].

The most widespread injury mechanism in these patients is road traffic accidents. Most of the traumatic injuries to the tibia are caused by motor cycle or automobile accidents. Motor cycle related tibia injuries have high incidence of skin and soft tissues loss. To decrease the morbidity, an activities spectrum is required, including injury prevention, injury surveillance and improvement in care of wound e.g. by use of fasciocutaneous flaps. Fasciocutaneous flaps have been utilized effectively as a part of huge clinical arrangement to early cover for open tibia fractures[4,5].

The vascularity of a bone is more important than alignment and fixation, and in case of subcutaneous bone, the status of soft tissue envelope is the one and only significant factor influencing the outcome. The significant playing point of neighbourhood fasciocutaneous folds is their relative effortlessness of strategy. In open tibia fractures, timing for soft-tissue coverage is controversial. Some promote early flap coverage, while others promote late wound closure. A healthy soft tissue envelope and good vascularity are fundamental factors in the management[6].

In open fractures delayed wound cover was established as standard of care prior to the advent of current antibiotics, modern debridement methods, and improved fracture stabilization procedures. Currently standard of treatment is early, and aggressive debridment of wounds, early stabilization of the fracture, and initiation of broad-spectrum antibiotics. wound dressings and debridements are done after every 48-72 h, with closure of the wound after final adequate debridement. It has been observed that delayed wound coverage are associated with high infection rate. That is why established open fracture management is based on initial wound debridement and lavage, stabilization of fracture, and early wound closure. Purpose of this study is to assess the efficacy of fasciocutaneous flaps, in covering soft tissue defects in open tibial fractures, Gustilo IIIB at Liaquat Medical university Hospital Hyderabad/Jamshoro (LUMHS).

MATERIALS AND METHODS

This study was conducted in Department of Orthopaedics at Liaquat Medical University Hospital Hyderabad/Jamshoro Pakistan. Duration of study was one year between 18th Aug 2015 to 18th Jan 2016. In this study total 49 cases of open tibia fracture (Gustilo type IIIB) were included. Initial resuscitation of all trauma patients was carried out following advanced trauma life support guidelines. Soft tissue reconstruction was carried out within 2-5 days of initial trauma. Before the procedure complete blood base line (Blood CP, RFT, LFT. Coagulation profile, Blood sugar, Hepatitis B and C profile) workup was done, for preanasthesia assessment. Xrays were taken in two planes. Patients were resuscitated in A/E department . Analgesia, antibiotics, Iv fluids, Blood, and tetanus prophylaxis were given. Sounds were washed thoroughly with copious amount of normal saline, betadine, and hydrogen peroxide. wounds were classified according to gustilo Anderson classification system and only patients with type IIIB were sorted out for this study. Limbs were splinted After preop anasthesia assessment patients were prepared for operation theatre where fractures were fixed with external fixator. Soft-tissue defect with bone exposed at the fracture site were covered by using the fasciocutaneous flap. Donor site from where the flap was raised the secondary defect were covered with SSG harvested from thigh. All patients were kept on iv antibiotics for 7 days, changed to oral from 8th day for one wk . Analgesia was given and supportive treatment was given. Flap was monitored regularly for any hematoma or infection. Graft dressing was carried out on 7th post-operative day and flap sutures were removed on the 14th post-operative day. Patient was discharge with advised to follow up regularly in OPD. All patients were followed clinically and radiologically until bony union or for 1 year. Post-operatively, external fixation was removed once union was confirmed radiologically.

RESULTS

Generally young patients were involved in our study, the mean age was 38.4 years. Men were observed in the majority 41(83.67%), women 08(12.33%). Mean duration of the injury was found 8.2 ± 3.7 Months. Mostly patients were injured due to road traffic accident 32(65.3%), following by Fall from height, Slip, Gunshot with percentage of 06(12.2%), 08(16.3%) and 03(6.1%) respectively (Table No.1).

Table No.1: Demographic Variable

Variable	No.Patients	Percentage
Gender		
• Male	41	83.67%
• Female	08	12.33%
Mode of Injury		
• RTA	32	65.3%
• Fall from height	06	12.2%
• Slip	08	16.3%%
• Gun shot	03	6.1%
Site Of Fracture		
• Proximal	15	30.6%
• Middle	20	40.8%
• Distal	14	28.6%
Types of fasciocutaneous flap		
• Cross-leg	07	14.3%
• Random pattern	11	22.4%
• Rotational	31	63.3%

According to site of fracture proximal fracture were found in 15(30.6%) cases, middle in 20(40.8%) cases and distal in 14(28.6%) cases. Rotational pattern fasciocutaneous flap was applied in majority of the cases 31(63.3%), while Random pattern fasciocutaneous was used in 11(22.4%) cases and Cross-leg fasciocutaneous was used in the 07(14.3%) of cases. According to the complications, superficial infection was found in 05(10.20%), following by Tenderness, Pintact infection, Deep infection , and Marginal Necrosis were found with percentage of

04(8.16%), 02(4.8%), 02(4.8%) and 01(2.4%) (Chart No.1). External fixation was applied in all the cases and union was found in 42(85.71%) of the cases, while Male union, Non union, Muscle wasting, Knee stiffness and Ankle stiffness were found with percentage of 05(10.20%), 02(4.8%), 05(10.20%), 08(16.32%) and 06(12.24%) (Chart No.2).

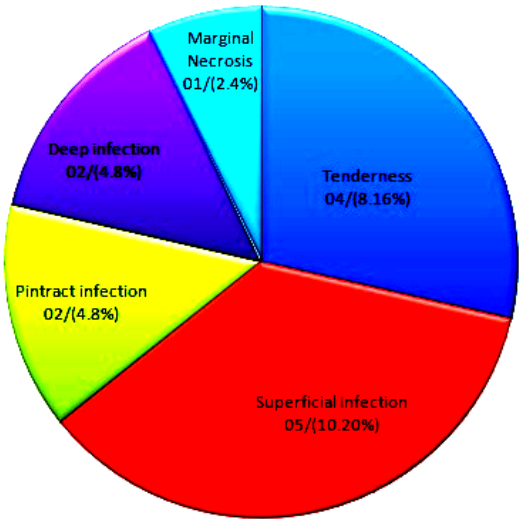

Chart No.1: Distribution of the Cases According To Complications N=49

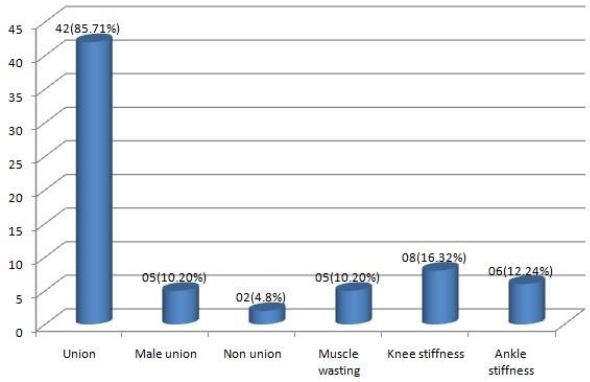

Chart No.2: Distribution of the Cases According To Final Assessment N=49

DISCUSSION

Tibia is the most usually fractured long bone because of its superficial position. Fracture of tibia is common in all ages and is a major reason for morbidity in cases with lower limit injuries. **T**he mean age of 50 cases was (33.28 ± 13.83 years) with the youngest patient being 17 years of age and oldest 60 years. Similarly in this series mostly young patients were involved in the tibia bone fracture with the mean age of the cases was 38. ± 7.2 years. In this study male were found in the majority 41(83.67%) as compare to female 08 (12.33%). 88% patients were male and 12% patients were female. This shows that in our society male are more exposed to accidents. 56 cases of tibia fractures in India in which 52 were male and only 4 were female and road traffic accidents was cause in most of cases. Another study by Ali et al[7] conducted in Karachi, Pakistan, also noted a demography of 88.39% male patients and 14.6% female patients with tibia fractures. In this study rotational pattern fasciocutaneous was applied in majority of the cases 31(63.3%), while Random pattern fasciocutaneous was used in 11(22.4%) cases and Cross-leg fasciocutaneous was used in the 07(14.3%) of the cases. There are several procedure that have been described for the coverage of defects in distal third Leg and foot starting from the simple split thickness skin graft [10,11] to the different types of the flaps including muscle flap[12] septocutaneous flap, axial flaps and free flaps[6] . In this study external fixation was applied in all the cases and union was found in 42(85.71%) of the cases, while Male union, Non union, Muscle wasting, Knee stiffness and Ankle stiffness were found with percentage of 05(10.20%), 02(4.8%), 05(10.20%), 08(16.32%) and 06(12.24%). Irfanullah Khan et al[7] reported that overall union rate was 92% and average time to union was comparable to previous studies. Drososet al.[13] fixed 157 fractures and shown overall union rate of 97.5% with average time to union 25.8 weeks. In another study by Nork et al.[14] who operated 36 tibial fractures and had mean union time of 23.5 weeks. In another study, the overall union rate was 90.6% and average time to union was 24 weeks. Shah et al [15.] fixed 36 tibial fractures and his overall union rate was 97.2% and mean time to union was 22 weeks.

In our study according to the complications superficial infection was found in 05(10.20%), followed by Tenderness, Pintact infection, Deep infection, and Marginal Necrosis were found with percentage of 04(8.16%), 02(4.8%), 02(4.8%) and 01(2.4%). Shah et al.[15] reported 36 fractures achieved 86.1% union within 6 months, 11.1% delayed union and 2.77% non-union. Drososet al.[13] had 75.2% union in 6 months, 12.4% delayed union and 12.4% nonunion. The external fixation techniques enables early postoperative functioning and rehabilitation of limits which decrease the treatment period and offers good outcome. Shaw et al.[16]chieved100% union in a 44 closed group of tibial shaft fractures and open fractures Gustilo type I and Gustilo type II, treated with the external fixation technique. Keating et al[17]. achieved 95% union proportion after the external fixation of 100 fractures of tibial shaft (53 open and 47 closed) with Orthofix external fixator. The same authors had 6 per cent nonunion in the same series after the external fixation, 14 per cent malunion after the external fixation of closed tibial shaft fractures, and 32 per cent malunion after the external fixation of open fractures. Krettek et al [18] obtained 10.9 per cent nonunion after the external fixation of 202 tibial shaft fractures (70 closed and 132 open).

CONCLUSION

The goals of soft-tissue coverage in open fractures are to achieve a safe and early durable coverage, avoid nosocomial infection and optimize the healing and facilitate the future reconstruction. Advantages of fasciocutaneous flap is that they have their own blood supply produce good durable cover and can be reopened for bony surgery. The timing of wound closure is debatable and that delayed primary closure at 5-7 days is probably optimal. This is study provides better outcome with early local fasciocutaneous flap coverage with less hospital, early rehablitation, help in early fracture union, and decreased infection.

Conflict of Interest: The study has no conflict of interest to declare by any author.

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