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Research Article

A PROSPECTIVE RESEARCH ON THE FASCIO-CUTANEOUS FLAPS ROLE AS AN INTERVENTION OF THE COVERAGE OF SOFT TISSUE IN (TYPE 111 – B) OPEN TIBIAL FRACTURES

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Abstract:

Object: The determination of the fascio-cutaneous flap role as the coverage of the soft tissue in open tibial fractures of type 111 – B as experienced by the professor of Mayo Hospital, Lahore.

Material and Methods: Sample of this prospective research was of forty-one patients having tibia fractures of (type 111 – B). Every case was treated in the orthopedic surgery and traumatology department from September 2015 to September 2017. We did not include the patients diagnosed with peripheral vascular disease and diabetes mellitus. After antibiotic cover and resuscitation debridement was carried out followed by the application of back slab. Next day of the treatment again debridement was carried out and stabilization was also carried out with the help of external fixator. Wound became clean by numerous debridement's, it was now ready for flap subsequently covered with the fascio-cutaneous flap. After five days the dressing was replaced and at the interval of two weeks removal of stitching was carried out. The basic data of the patients was assessed regarding injury site, fascio-cutaneous flap type, complications and acceptance.

Results: The average age of the patients was observed as (31.8 years), as per the injury site 7 cases (16.66%) of proximal tibia were sustained, 12 cases of middle tibia (28.57%), 17 cases of distal tibia (40.47%), 4 cases of middle 2/3rd (9.52%) and 2 cases of distal 2/3rd (4.76%) tibia. Executed flaps pattern were based on the proximal medial flaps in 4 cases (9.52%), 3 cases were of proximal based lateral (7.14%), 8 cases were of distal based medial (19%), 17 cases of distal based lateral (40.47%), 2 cases of cross leg (4.76%), 2 cases of sural flap (4.76%), 4 cases of distal lateral retrograde (9.52%), 2 cases of random pattern flaps (4.76%) and 2 cases of soleus muscle flaps (4.76%). In the total of 42 cases 33 cases were good (78.57%), 6 cases were fair (14.28%) and 3 cases were poor (7.14%). Observed complications were as 6 cases of marginal necrosis (14.28%), 3 cases of complete or partial necrosis (7.14%), 3 cases of superficial infection (14.28%) and 5 cases of deep infection (11.9%).

Conclusion: Our research concludes that fascio-cutaneous flap is a procedure which is safe, simple and cost effective along with (type 111 – B) good acceptance of the open tibial fractures.

Key Words: Type (111 – B) open tibial fractures, fascio-cutaneous flaps and soft tissue coverage.

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INTRODUCTION:

The management and treatment of (type 111 – B) open tibial fractures has become a challenge for the trauma surgeons [1]. The primary objective of the treatment is infection prevention along with union of the bone and function restoring. But loss of tissues at the initial stage, fracture stability and wound contamination largely affect treatment outcomes [2]. A good bone vascularity and healthy envelop of the soft tissue are vital for the fracture management [3]. It may require before final coverage a serial debridement [4]. We can convert open wound into close through coverage of the soft tissue which also promotes revascularization of the bone and soft tissues which are damaged or fractured through fresh blood which helps in the prevention of the non-union and infection [5, 6].

Many reconstructive interventions are available for the better management of the (type 111 – B) tibial fractures such as direct closure, skin grafting, tissue expansion, muscle flap, fascio-cutaneous flap, free flaps and my-coetaneous flap [7]. Various cases are managed specific technique which suits the judgement of the surgeon [8]. Exposed bone cannot be covered through split thickness skin grafting, nerves, vessels and tendon. Because of the bulky and large muscle flaps cosmetic and functional deficit is provided at the site of the donor [9]. High reliability is associated to the free flaps which requires microvascular intervention which is extremely technical and required expertise, cost effective, expensive instruments, big institutions and prolonged operating time [10].

Fascio-cutaneous flaps has become very popular in the recent days because of its versatility, reliability and simplicity. The selection of the flaps is made on the basis of the location, defect depth, local covering tissues availability and size [11]. The determination of the fascio-cutaneous flap role as the coverage of the soft tissue in open tibial fractures of type 111 – B as experienced by the professor of Mayo Hospital, Lahore.

MATERIAL AND METHODS:

Sample of this prospective research was of forty-one patients having tibia fractures of type 111 – B. Every case was treated in the orthopedic surgery and traumatology department from September 2015 to September 2017. We did not include the patients diagnosed with peripheral vascular disease and

diabetes mellitus. After antibiotic cover and resuscitation debridement was carried out followed by the application of back slab. Next day of the treatment again debridement was carried out and stabilization was also carried out with the help of external fixator. Wound became clean by numerous debridement's, it was now ready for flap subsequently covered with the fascio-cutaneous flap. After five days the dressing was replaced and at the interval of two weeks removal of stitching was carried out. The basic data of the patients was assessed regarding injury site, fascio-cutaneous flap type, complications and acceptance. A total of 41 cases with 42 legs were made a part of the research paper. After patient's resuscitation initial care was carried out by the analgesic, broad spectrum antibiotics, tetanus prophylaxis and aggressive debridement with the help of normal saline, pyodine scrub, back slab and sterilized dressing. At the end of the regular treatment an extensive debridement and assessment of the wound was also carried out along with external fixator and stabilization of the fracture. SPSS – 16 was used for the data entry and analysis.

RESULTS:

The average age of the patients was observed as (31.8 years), as per the injury site 7 cases (16.66%) of proximal tibia were sustained, 12 cases of middle tibia (28.57%), 17 cases of distal tibia (40.47%), 4 cases of middle 2/3rd (9.52%) and 2 cases of distal 2/3rd (4.76%) tibia. Executed flaps pattern were based on the proximal medial flaps in 4 cases (9.52%), 3 cases were of proximal based lateral (7.14%), 8 cases were of distal based medial (19%), 17 cases of distal based lateral (40.47%), 2 cases of cross leg (4.76%), 2 cases of sural flap (4.76%), 4 cases of distal lateral retrograde (9.52%), 2 cases of random pattern flaps (4.76%) and 2 cases of soleus muscle flaps (4.76%). In the total of 42 cases 33 cases were good (78.57%), 6 cases were fair (14.28%) and 3 cases were poor (7.14%). Observed complications were as 6 cases of marginal necrosis (14.28%), 3 cases of complete or partial necrosis (7.14%), 3 cases of superficial infection (14.28%) and 5 cases of deep infection (11.9%). The outcomes as shown in Table I, II and III reflect detailed factual information about the forty-one cases respectively about the patient's demographic characteristics, fixator type and flaps pattern which was carried out on the injured legs and post-operative outcomes and complications. These outcomes have been shown in percentage and frequency and mean values of various variables.

Table – I: Demographic characteristics of the Patients (Number = 41)

Characteristics		Number	Percentage
Mean age (Years)		31.8	
Mode of Injury	Motor cycle	17	40.47
	Vehicle injury	10	23.8
	Gunshot injury	5	11.9
	Pedestrian	3	7.14
	Fall of heavy objective	3	7.14
	Farm injury	3	7.14
Site of Injury	Proximal tibia	7	16.66
	Middle tibia	12	28.56
	Distal tibia	17	40.47
	Distal 2/3rd	2	4.76
	Middle 2/3 rd	4	9.52

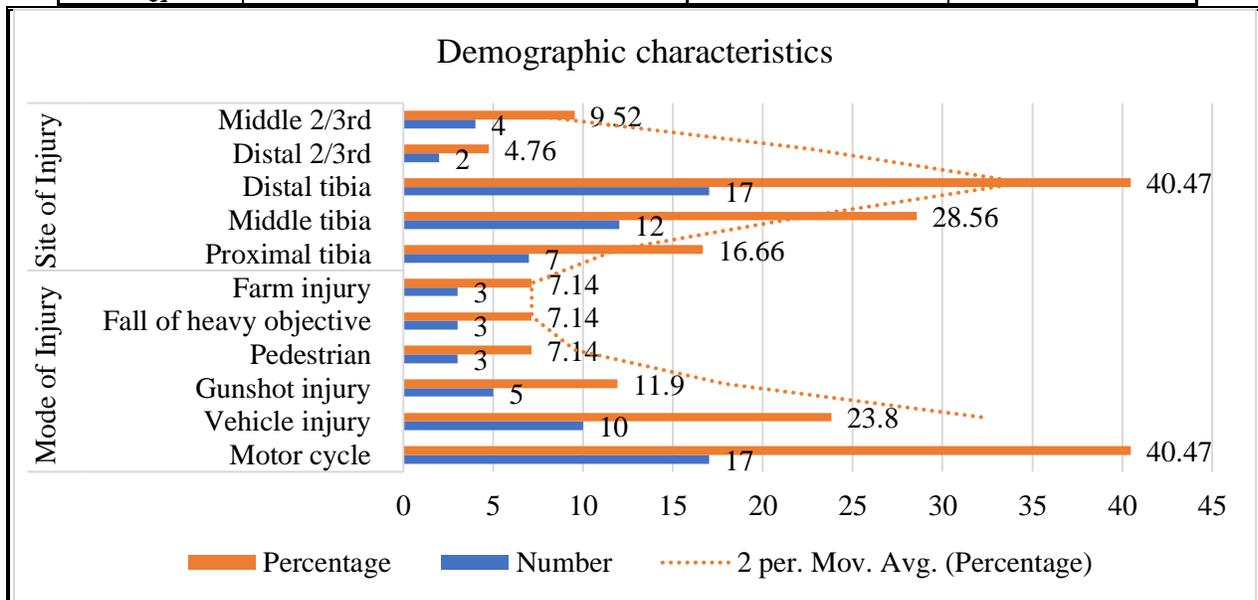


Table – II: Types of fixator and pattern of flaps done (Number = 41)

Characteristics		Number	Percentage
Type of Fixators	AO fixator	15	35.71
	N A fixator	12	28.57
	T clamp	13	30.95
	Illizrov Ext. Fixator	2	4.75
Pattern of Flaps Done	Proximal based lateral	4	9.52
	Proximal based medial	3	7.14
	Distal based lateral	17	40.47
	Distal based medial	8	19
	Cross leg flaps	2	4.17
	Sural flap	2	4.17
	Distal retrograde flap	4	9.52
	Random pattern flap	2	4.76
	Soleus muscle flap	2	4.76

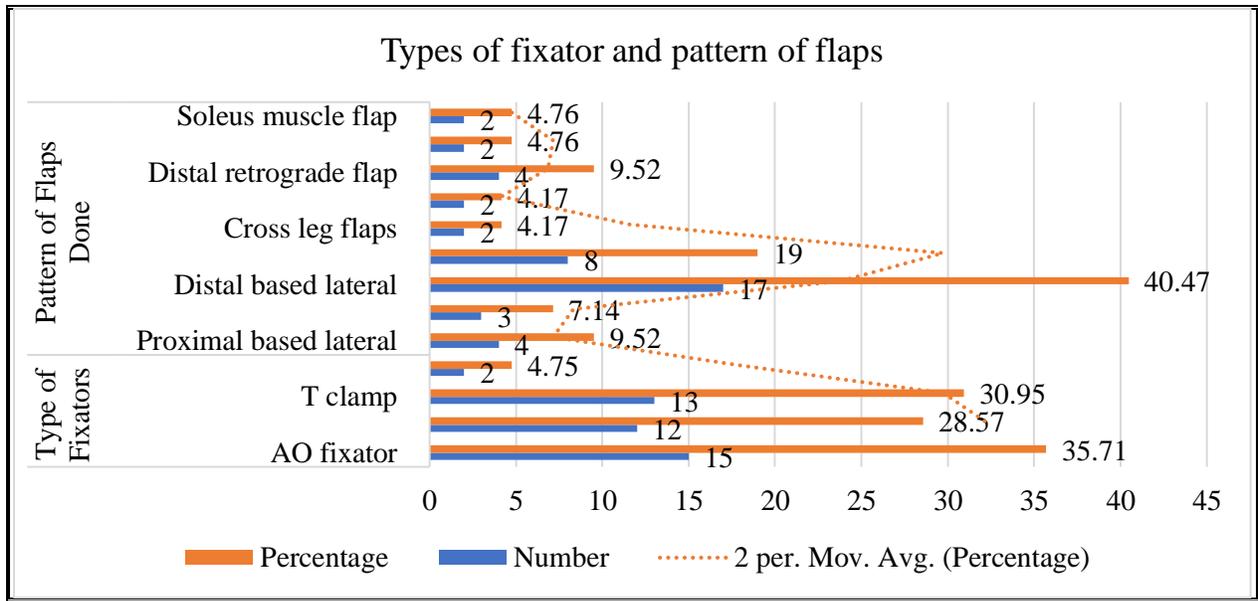
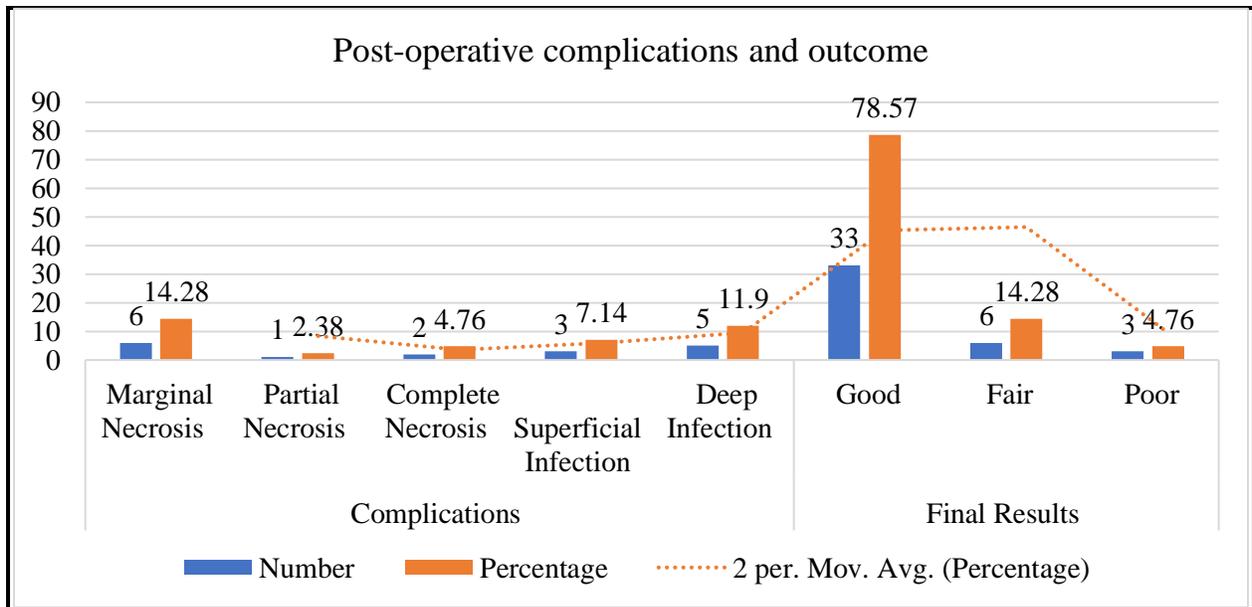


Table – III: Post-operative complications and outcome (Number = 41)

Complications		Number	Percentage
Mean of hospital stay (Days)		30.6	
Complications	Marginal Necrosis	6	14.28
	Partial Necrosis	1	2.38
	Complete Necrosis	2	4.76
	Superficial Infection	3	7.14
	Deep Infection	5	11.9
Final Results	Good	33	78.57
	Fair	6	14.28
	Poor	3	4.76



DISCUSSION:

Soft tissue defects coverage in (type 111 – B) in the open tibial fractures is presently frequent intervention because of the high trauma incidences in this prominent setting [15]. Skilled orthopedic surgeons are required for the management of these fractures and related complications [5]. British plastic surgeon's association and British orthopedic association has forced on the combined treatment by plastic and orthopedic surgeons for the management of the severe cases of the open tibial fractures; whereas, a number of the healthcare facilities are functioning without any plastic surgeons [16]. Availability of the plastic surgeons is an issue because of the overburdened routine and less number of the plastic surgeons. An orthopedic surgeon sound in the practical and theory about the vascular anatomy manages the soft tissue coverage procedure expertly specially in these kind of injuries through less damage, simple operation and in the non-availability of the specific tools [1]. The reliability of the fascio-cutaneous flaps is sure and another associated advantage is their simplified execution [17]. The utilization of the flaps can be made on the distally across leg transverse or ipsilateral limb, which depends on the size and site of leg defect [18]. An improved blood supply awareness and design of the flaps makes it longer, safer and useful flap [19]. According to the Debarma S. et al, survival rate was observed as 76.5% in the application of the fascio-cutaneous flaps and deep infection was observed in 23.33% cases [20]. Naique SB is of the view that fascio-cutaneous flaps were used in 35 patients in (type 111 – B) serial of the open tibial fractures with 80% rate of the full acceptance, 8.57% cases of minor tip necrosis and 11.42% cases were observed with flap failure [16]. Various outcomes have also been reported by various other authors about the fascio-cutaneous flaps and success rates [13, 21, 22].

We harvested two sural flaps over 1/3rd distal of leg. Two cases were treated with cross-leg transverse flaps with extensive defect in 2/3rd middle of tibia. Two cases were of soleus muscle flap with an extensive soft tissue loss in 2/3rd middle of leg which was additional to the SSG and fascio-cutaneous flaps. Development of six flaps was observed in the marginal necrosis, one cross leg flap and one sural flap also observed with the development of the marginal necrosis. One heavy smoker case was also noticed in this research. Without the application of any other procedure proper and complete healing was observed in all the cases. Although there were three cases of poor outcomes of various necrosis at various stages but with eh continued treatment of the

antibiotics and multiple debridement, covering of the wound was performed with soleus muscle flap, distal based lateral flap and SSG. Severe infection and necrosis of the fascio-cutaneous flap was also seen one of the poor cases, revised flaps treatment was carried out in all these three cases.

Multiple dressings were carried out in the patients of superficial infections. Severely infected wound was observed in one case who reported after ten days of being injured at his farm and during this lapse he was under the treatment of a local bone setter, he was treated with the discharging sinus after flap healing. Gunshot cases were also observed as four cases were registered having an infected non-union and multiple piece of sequestrum. One case of the head injury was kept under observation in the department of the neurosurgery for number of days with a neglected open tibial fracture. Severe infection and necrosis was also developed in his flap. In the non-unions cases illizrov external fixator was applied along with sequestrum. Two other cases were treated with the removal of the small stones of the sand from the sight of the wound.

It is encouraging that our outcomes can be compared to all the nationally held research studies on the same topic including international and regional research studies. The results also agree with the outcomes of the Booplan PR, as he states about the failures attribution to the infected wound state and nature of the bed at arrival instead of the flap [23].

CONCLUSION:

Our research concludes that fascio-cutaneous flap is a procedure which is safe, simple and cost effective along with (type 111 – B) good acceptance of the open tibial fractures. With the provision of the restricted sources orthopedic surgeons with local vessels awareness can be helpful in the overall independent and composite improvement of the (type 111 – B) care of the open tibia fractures for the timely and improved treatment in under-developed nations.

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