

How to Cite:

Naik, M. M., Harish, G. P., Nagaprasad, N. ., & Kantilal, A. (2022). Clinical study of upper one third leg defects. *International Journal of Health Sciences*, 6(S2), 803–814.
<https://doi.org/10.53730/ijhs.v6nS2.5071>

Clinical Study of Upper one Third Leg Defects

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Abstract---Large soft tissue leg defect involving upper and middle third remains a therapeutic challenge. Clinical study of management of upper one third defects was done to analyze the various reconstructive procedures for leg defects and also to enhance the quality of work done to produce good results with minimal complications as possible. This Prospective Clinical study conducted in the department of Plastic and Reconstructive surgery, includes 20 cases of upper one third of leg defects admitted. Patients >15years of age with Soft-tissue defects of upper one third leg requiring flap cover are included in this study. The operative procedure was chosen according to the nature and size of the defect. The earliest flap cover was given within 1 week of trauma. Primary flap cover was given in 10 (50%) patients, delayed primary flap cover in 9 (45%) patients and secondary flap cover in 1 (5%) patient. In 14 (70%) patients Gastrocnemius flaps were done, of which Gastrocnemius muscle flaps with SSG were done in 9 patients (45%) and Gastrocnemius Myocutaneous flap in 5 patients (25%). Fasciocutaneous Flaps in 4 patients (20%), Venous flap in one patient (5%) and Advancement Flap in 1 patient (5%) were done. The average hospital stay was 10 days following trauma and 24 days following electric burns. Minor complications were seen in 3 (15%) patients. Partial Graft loss was present in 2 patients (10%) over flap donor site which was managed conservatively. Flap tip necrosis (1cm) was present in one patient

which was debrided and grafted. The follow up period was upto six months with adequate physiotherapy. Large size defects can be reconstructed by Gastrocnemius myocutaneous flaps and small size defects by Fasciocutaneous and Local flaps have good results.

Keywords---soft-tissue defects, reconstructive surgery, gastrocnemius muscle flaps.

Introduction

Soft-tissue defects of upper one third leg is a common challenging problem in reconstructive surgery. Soft tissue management has improved over the recent years with a better understanding of local fasciocutaneous flaps, local muscle flaps and micro vascular free tissue transfers. Various reconstructive choices for the coverage of soft tissue defects of upper one third of leg are available depending on the location, size and depth of the defect. The reconstructive options include local axial pattern fasciocutaneous flaps, musculocutaneous flaps, muscle flaps, perforator based flaps, cross leg flaps and free flaps. Classification of the severity of wounds given by Gustillo have allowed us to make an appropriate plan for reconstruction and also to be aware of the eventual prognosis. Traditionally in reconstruction of lower limb soft tissue defects, muscle flaps have been the Gold Standard for Gustillo Anderson Grade III B fracture involving upper third defects. Among the traumatic injuries, open tibial fractures are the main cause of soft tissue defects in legs. The relatively unprotected anteromedial portion of tibia results in exposed bone after trauma, which requires specialized soft tissue cover. This Institute has more number of patients presenting with leg defects due to various etiological factors like electrical burns, trauma from RTA, post-operative wound or after arthroplasty with implant exposure and post oncological resection which have to be treated as early as possible in order to prevent complications. Clinical study of management of upper one third defects (including both simple and compound leg defects) was done to analyze the various reconstructive procedures for leg defects and also to enhance the quality of work done to produce good results with minimal complications as possible. ¹

While considering reconstructive options, the plan must always be tailored to the individual patients needs and due attention be given to functional outcome. Although primary closure is feasible in some cases, the main stay of treatment involves local tissue rearrangement with or without split thickness skin graft. Early surgical attempt to cover the defect with a well-vascularized tissue provides excellent healing, osteogenesis, low rate of infection and requires no surgical debridement of the bone in the early phase and has a short hospital stay.

Patients and methods

This Prospective Clinical study conducted in the department of Plastic and Reconstructive surgery, Osmania General Hospital, Hyderabad, Telangana includes 20 cases of upper one third of leg defects admitted between November 2019 to November 2021.

Inclusion Criteria: Patients >15years of age with Soft-tissue defects of upper one third leg requiring flap cover are included in this study.

Exclusion Criteria: Paediatric cases (1-14 years), Pregnant women (1st trimester), Patients unfit for anaesthesia, Polytrauma with unstable conditions, with multiple comorbidities.

A total number of 20 cases with upper one third leg defects were admitted between November 2015 to November 2017. Detailed analysis of these 20 cases with upper one third leg defects are done in terms of age, sex, etiology, time of presentation, site of the defect, size of the defect, limb involvement, associated injuries, knee joint exposed/not, external fixator in situ/not, type of flap cover, timing of surgery, primary / Delayed Primary / Secondary flap, Complications and duration of the hospital stay

Methodology

Pre operative assessment

Most of patients came to plastic surgery department immediately after trauma (RTA). Few Patients were referred from orthopaedics department for coverage of soft tissue defect after stabilization of fracture site. After receiving patient, routine surgical profile was done for fitness for surgery .In addition to this, lower limb radiography was done to know the status of underlying bones and Color Doppler was done to know the status of lower limb vessels. Most of the patients were operated under spinal anaesthesia. Debridement of wound was done to create true defect, followed by primary flap cover.

Patients admitted with electric burns were initially resuscitated from burn shock. After hemodynamic stabilization of the patients, detailed systemic examination of the patient and the local examination of the wound was done. Swabs were collected for culture and sensitivity. Once the patient was found fit for surgery, patient was taken up for serial debridements & then was taken up for delayed flap cover.

Flaps used in this study

Gastrocnemius flaps- muscle and myocutaneous flaps Fasciocutaneous flaps- superiorly based and inferiorly based Lateral thigh flap Advancement flap

Harvesting techniques:

Gastrocnemius flap: The pre-operative localisation of the muscle to be harvested in an upright position, with and without muscular contractions, gives a good indication on the amount of muscle mass available which varies from one patient to another. The patient can be placed prone, but if an anterior wound is being resurfaced, the supine position with frog leg abduction and a bent knee is used. A thigh tourniquet is used sometimes. Lazy S shaped or longitudinal incision was made 2-3 cm behind the medial border of the tibia from the popliteal fossa to below the mid-calf level (to a point 10 cm above the ankle joint). The incision was deepened to the deep fascia, and the medial head of the gastrocnemius was

identified and separated from the underlying soleus muscle. The distal end of the muscle was divided sharply from the Achilles tendon taking care to include the portion of the tendinous material with the muscle belly, as this improved suture holding; it was then divided and separated from the lateral head of gastrocnemius at the midline raphae. Care was taken to avoid injury to the sural nerve and the short saphenous vein; the muscle was then tunneled anteriorly to cover the defect and fixed by suturing, and muscles were covered by the thiersch skin graft, if not taken as a myocutaneous flap. If taken as a myocutaneous flap, the skin graft needed to cover the donor area, the skin paddle taken with the muscle ranged from 5 to 7 cm in width and 10 to 15 cm in length. In the lateral head of gastrocnemius flap (better used only for small defects being less bulky), flap is accessed via a longitudinal incision 3 cm posterior to the fibula. The common peroneal nerve must be positively identified and safe-guarded; the rest of the procedure was completed as on the medial side. The wound was closed over the suction drain, and then supported with a splint.

Post op monitoring: The limb was immobilized for 1 week; the flap was checked at the third postoperative day for infection or necrosis. Primary dressing over grafted site and donor site grafted bolster dressing was changed on 3rd day and 5th day accordingly. Patient was followed up as an inpatient for 1 week and as an outpatient monthly for 6 months to assess the functional outcome. Follow-up of bone fractures was conducted by an orthopedic surgeon by serial radiographic scanning. Donor site care taken including dressing and splinting. Post operative physiotherapy including lubrication, massaging, active & passive exercises was advised.

Results

Table 1
Demographic distribution in present study

Age at presentation	No. of patients	Percentage
20-30	9	45%
31-40	5	25%
41-50	3	15%
51-60	3	15%
<i>Sex</i>		
Male	19	95%
Female	1	5%
<i>Aetiology</i>		
Trauma (RTA)	16	80%
Electric Burns	3	15%
Post-operative defect exposing implant	1	5%
<i>Time of presentation</i>		
<1 week	10	50%
4 weeks	5	25%
2 months	3	15%
5 months	1	5%
1 year	1	5%

In this study, the commonest age group of patients was between 20 to 30 years seen in 9 (45%). The mean age is 35. In this study 19 (95%) patients were males and only one (5%) patient was female. In this study, common cause of upper one third leg defect was trauma (due to RTA) in 16(80%) patients, followed by Electric burns in 3(15%) patients and 1(5%) patient with post-operative defect exposing implant. In this study, 10 (50%) cases presented within one week of injury followed by 5 (25%) cases in 4 weeks. 3 (15%) cases presented in 2 months following injury. 1 (5%) case each presented within 5 months and 1 year duration following injury.

Table 2
Site of leg

Site of leg	Number of patients	Percentage
Anteromedial	11	55%
Anterolateral	9	45%
<i>Limb Involvement</i>		
Right	12	60%
Left	8	40%
<i>Compound fractures with external fixator</i>		
Present	20	100
Absent	0	0%
<i>Nature of defect</i>		
Only defect	6	30%
Defect with surrounding raw area	5	25%
Defect exposing the fracture segment	9	45%

In this study, defect on Anteromedial site of leg was found in 11 (55%) patients and 9 (45%) patients had defect over Anterolateral site. Anteromedial site was commonest site of the defect. In this study, defects on right leg were seen in 12 (60%) patients, followed by left leg in 8 (40%) patients. Right leg defects were seen commonly in this study. In this study, 20 (100%) cases were associated with fractures. Upper third of tibia was the component exposed in all the patients in this study. Defect exposing the fracture segment was the commonest type of defect seen in 9 patients (45%).

Table 3
Size of defect

Size of defect in cm ²	No. of patients	Percentage
4 cm ²	4	20%
9 cm ²	6	30%
12 cm ²	2	10%
15 cm ²	3	15%
24 cm ²	1	5%
25 cm ²	2	10%
30 cm ²	1	5%
36 cm ²	1	5%

Size of the defect in this study ranged from 4 sq.cm to 36 sq.cm. 11 patients (55%) had medium size defects of size 9 sq.cm to 15 sq.cm. 4 patients (20%) had small size defects of size 4 sq.cm. 5 patients (25%) had large size defects of size 24 sq.cm to 36 sq.cm. Mean size of the defect was 14 sq.cm.

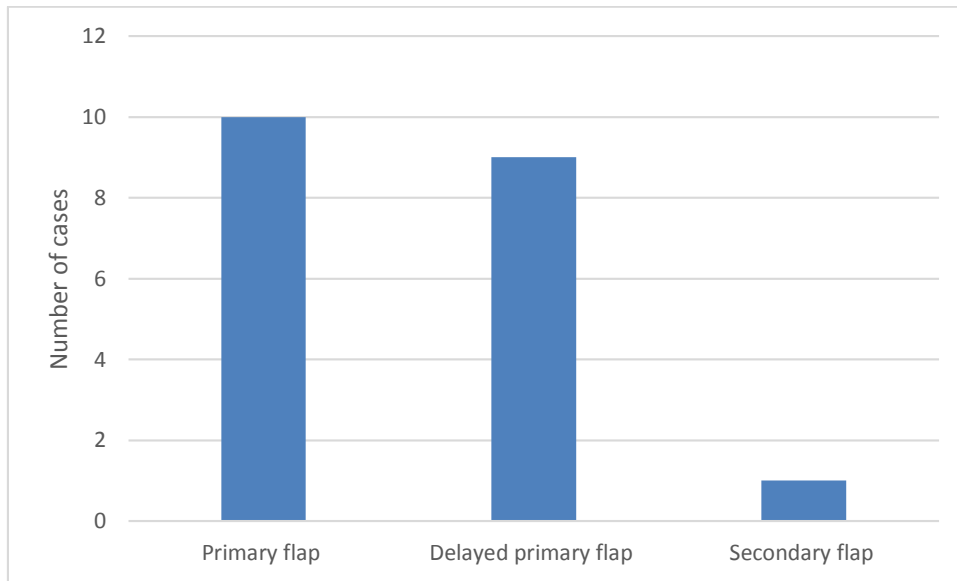


Figure 1. Timing of flap cover

Primary flap cover was given in 10 (50%) cases within a week. In 9 (45%) cases delayed flap cover was given. Secondary flap cover was given in one patient with post-operative defect exposing implant after 1 year.

Table 4
Operative Procedures

Procedure of Reconstruction	Number of patients	Percentage
Medial head of Gastrocnemius muscle flap + SSG	6	30%
lateral head of Gastrocnemius muscle flap + SSG	3	15%
Medial head of Gastrocnemius myocutaneous flap	3	15%
Lateral head of Gastrocnemius myocutaneous flap	2	10%
Superiorly based fasciocutaneous flap	2	10%
Inferiorly based fasciocutaneous flap	2	10%
Advancement flap	1	5%
Venous Flap	1	5%

In this study, commonest flap cover were Gastrocnemius flaps in 70% (14) cases followed by Fasciocutaneous Flaps in 20%(4) cases. Venous flap in one patient (5%) and Advancement Flap in 1 patient (5%) each. Gastrocnemius muscle flaps were done in 9 (45%) patients (6 medial head of Gastrocnemius flaps and 3 lateral

head of Gastrocnemius flaps). In 5 patients (25%) Gastrocnemius Myocutaneous flap were done (3 medial head of Gastrocnemius Myocutaneous Flaps and 2 Lateral head of Gastrocnemius Myocutaneous Flaps). Fasciocutaneous Flaps were done in 4 patients (20%), Superiorly based in 2 patients (10%) and inferiorly based in 2 patients (10%).

In this study, one patient was given secondary flap cover. He was an one year old post traumatic patient (RTA) for which local advancement flap was done previously, now presented with re- exposure of proximal tibia, for which Gastrocnemius muscle flap with SSG done ,which healed well.

Table 5
Post – operative complications

Surgery	No. of patients	Flaps	Complications	Follow up
within 1 week of admission	10	Gastrocnemius flaps (90%)	2 Donor site graft loss(conservatively managed)	good
after 1 week of admission	10	Gastrocnemius flaps (60%)	1 distal flap necrosis (Debridement+SSG)	good

Minor complications were seen in 3(15%) patients. Partial Graft loss was present in 2 patients (10%) over flap donor site which was managed conservatively. Flap tip necrosis (1cm) was present in one patient which healed well with debridement and grafting. In rest of 17 patients (85%) Complete closure of the wound was achieved with flap covers and Split skin grafting, which went on without any further complications. Grade IIIB Compound fractures in 10 (50%) patients and raw areas in 9(45%) patients were present for which fracture fixation and grafting was done respectively.

The average hospital stay is 10 days following trauma and following electric burns was 24 days. No morbidity was found. Dog ears settled well. Discharged patients were adviced post op physiotherapy. They were followed up initially twice weekly for 15 days followed by once a week for next one month and once in a month thereafter, with satisfactory results. Follow up was no more than six months as most of the patients are poor, illiterate and hail from remote places and did not return for follow-up.

		
Preoperative	Intraoperative	Postoperative
35 years old male presented with post traumatic defect over upper 1/3 rd leg of size 3 x 3 cm for which Superiorly based fasciocutaneous flap was done.		
		
Preoperative	Intraoperative	Postoperative
25 years old male Raju post traumatic defect of Right upper one third leg defect over medial side of size 4 cm x 3 cm for which Medial Gastrocnemius Myocutaneous Flap was done.		

Figure 2. Cases in present study

Discussion

Reconstruction of Upper 1/3rd leg soft-tissue defects is a challenging task. The goals of coverage of soft-tissue defects at upper 1/3rd leg defect is to provide aesthetically acceptable appearance and also to maintain the function of joint. Muscle flaps, musculocutaneous flaps, fasciocutaneous flaps and microsurgical techniques have provided a solution to the formidable reconstructive challenge posed by defects in the leg. Successful reconstruction of the leg defects requires careful preoperative planning and precise intra operative execution.

Majority of the patients in our study are males (19,95%). Only one female was there in our study, This is similar to S. Lagvankar study² on "Distally- based random fasciocutaneous flaps for one stage reconstruction of defects in the upper two-thirds of the leg" where all are males (10,100%). In Ayman M Adbelmoheed et al³ study on "Prospective study on Evaluation of the versatility of superiorly based pedicled gastrocnemius myo- or myo-cutaneous flap, in upper leg defects after trauma or tumor excision" also, out of 27 patients included in the study, of which 23 (85.2%) were males and 4 (14.8%) were females. In AH Khan, QG Ahmad⁴ "Gastrocnemius muscle flaps for coverage of knee and upper tibial defects" of the 25 patients, 19 (76%) patients were males and 6 (24%) were females. In Md. Sohaib Akhtar et al⁵ study also on "Inferiorly based thigh flap for reconstruction of defects around the knee joint" among 16 patients; 13 (81.25%) are male and 3 (18.75%) are females. Rao et al⁶ in their study on "Gastrocnemius Myocutaneous

Flap: A Versatile Option to Cover the Defect of Upper and Middle Third Leg” done on 25 patients out of which 22 (88%) were male and rest 3 (12%) were female. Males are most common in this study and this is similar to 5 other studies , i.e AH Khan, QG Ahmad study (76%)⁴, Md. Sohaib Akhtar et al⁵ study (81%), Ayman M Adbelmoheed et al³ study (85%), S.Lagvankar² study(100%), Rao et al⁶ study (88%) .

The commonest age group in this study is 20-30 years, with a mean age of 35 years. This is similar to Md. Sohaib Akhtar et al⁵ study in which common age group is 20-30 years. In Ayman M Adbelmoheed et al study, common age group is 21-40 years. In AH Khan⁴, QG Ahmad⁴ study, patients ranged from 9 months to 60 years (mean 35 years). In S. Lagvankar² study their ages varied from 19 to 60 years with mean age 31.7 years. In Rao et al study most patients belong to age group of 25 to 50 years.

Most common age group in this study is 20-30 years and this is similar to Md. Sohaib Akhtar et al study. Mean age in this study is 35 years and this is similar to AH Khan⁴, QG Ahmad⁴ study and S. Lagvankar ²study. Most common etiology in this study is trauma (Road traffic accidents) in 16 (80%) patients. This correlates with S. Lagvankar ²study where trauma is cause in all patients (10,100%). It is also similar to AH Khan, QG Ahmad study, where trauma is the etiology in almost all cases (24,96%). In Ayman M Adbelmoheed et al³ study, trauma is cause in 20 patients (74%). In Md. Sohaib Akhtar et al⁵ study, trauma is cause in 10 patients (62.5%). In Rao et al⁶ study all the patients with defect had trauma as aetiological factor (25,100%)

Most common aetiology in this study is trauma due to RTA and this is similar to 5 other studies, i.e AH Khan, QG⁴ Ahmad study, S. ⁴Lagvankar study², Ayman M Adbelmoheed et al³ study, Md. Sohaib Akhtar et al⁵ study and Rao et study. In this study, smallest size of defect is 2 cm x 2 cm and largest size of defect is 6 cm x 6 cm with mean size of 14 sq cm. In S. Lagvankar² study , the largest size of the defect is 4 cm x 16 cm, whereas the smallest size is 2.5 cm x 3 cm and mean size of defect is 28 sq cm. In Md. Sohaib Akhtar et al⁵ study, the smallest size of the defect is 17 cm x 8 cm whereas the largest size of is 28 cm x 10 cm. In Rao et al study the largest size of defect was 16 cm in length while most of the defects were 5 – 10 cm in size.

In this study smallest size of defect is 2 cm x 2 cm and this is almost similar to S.Lagvankar ²study but mean size of defect of this study is 14 sq cm, whereas in S. Lagvankar ²study, it is 28 sq cm. In Md. Sohaib Akhtar et al⁵ study, size of defect is much larger than the present study. All cases in this study are upper one third leg defects. It is similar to AH. Khan⁴, QG Ahmad study and Ayman M Adbelmoheed et al³ study where all patients are of upper one third leg defects (100%).In Md. Sohaib Akhtar et al ⁵study, only 1patient(6.25%) with upper one third leg defect. In S. Lagvankar² study, 5 patients had upper one third leg defect (50%).

This study is conducted only in upper one third leg defects and is similar to 2 other studies,i.e AH Khan, QG Ahmad study⁴ and Ayman M Adbelmoheed et al ³study.

In this study, knee joint is involved in 6 patients (30%). In Md. Sohaib Akhtar et al⁵ study, knee joint is involved in 3 patients (18.75%). In AH Khan, QG Ahmad study, knee joint is involved in 2 patients (8%). Along with this study, knee joint involvement is present in 2 other studies, i.e. Md. Sohaib Akhtar et al⁵ study (18.75%) and AH Khan, QG Ahmad study⁴ (8%).

In this study, Grade III B compound fractures are present in 20 patients (100%). It is similar to S. Lagvankar² study in which 3 patients (60%) had compound fractures. In AH Khan, QG Ahmad⁴ study, 22 patients (88%) and In Ayman M Abdelmofeed et al study, 20 (74%) patients had compound fractures. In this study Grade III B compound fractures are present in 100% cases almost similar to AH Khan, QG Ahmad study (88%). In this study, the earliest flap cover was given within 24 hrs of trauma. In AH Khan⁴, QG Ahmad and Ayman M Abdelmofeed et al³ study, earliest flap cover was provided 1-4 weeks after the trauma. In S. Lagvankar² study, earliest flap cover was given within one month after injury.

In this study, earliest flap cover was given within 24 hrs of trauma but in 3 other studies (S. Lagvankar² study, Ayman M Abdelmofeed et al³ study and AH Khan, QG Ahmad study) 1-4 weeks variation was there in giving flap cover. In this study, common flap cover given was Gastrocnemius flaps (70%). It is similar to AH Khan, QG Ahmad and Ayman M Abdelmofeed et al³ study, where common flap cover was Gastrocnemius flaps (100%) in all patients. In S. Lagvankar² study, all patients were given Fasciocutaneous Flaps (100%). In Md. Sohaib Akhtar et al study, it was Fasciocutaneous Flaps (100%). In this study Gastrocnemius flap was given in majority of cases. This is similar to Ayman M Abdelmofeed et al³ study and AH Khan, QG Ahmad study where they conducted study exclusively on Gastrocnemius flap covers for upper one third leg defects. This study differs from Md. Sohaib Akhtar et al⁵ study and S. Lagvankar² study where Fasciocutaneous Flap covers (100%) were given for upper one third leg defects.

In this study, in 9 patients (45%), leg defects were covered by Gastrocnemius muscle flaps with SSG and 5 patients (25%) were covered by Gastrocnemius Myocutaneous flaps. In AH Khan, QG Ahmad study⁴, 23 patients (92%) with Gastrocnemius muscle flaps and Gastrocnemius Myocutaneous flaps in 2 (8%) patients. In Ayman M Abdelmofeed et al³ study 14 (51.8%) patients with Gastrocnemius muscle flaps and Gastrocnemius Myocutaneous flaps in 13 (48.2%) patients. This study is similar to AH Khan, QG Ahmad study⁴ where Gastrocnemius muscle flaps were done more than Gastrocnemius Myocutaneous flaps. In Ayman M Abdelmofeed et al³ study both flap covers were done equally.

In this study flap size ranged from 4cm x 4cm to 8cm x 8cm. Flap width to length ratio is 1:1.3. In S. Lagvankar² study, flap width to length ratio is 1:3. Flap size ranged from 4cm x 8cm to 8cm x 24cm. In Md. Sohaib Akhtar et al⁵ study, ratio is 1:3, flap size ranged from 11 x 32cm to 9 x 20cm. In Rao et al study, flap size ranged from 4 cm x 4 cm to 15 x 12 cm, flap width to length ratio was 1:1.5. In this study Flap width to length ratio is 1:1.3 where as in S. Lagvankar² study, Md. Sohaib Akhtar et al⁵ study flap width to length ratio is 1:3 and in Rao et al study the flap width to length ratio is 1:1.5

In this study, post operative complication was flap tip necrosis in one patient (5%). It is similar to Md. Sohaib Akhtar et al⁴ study, with distal flap loss in 1 patient (6.25%) for which debridement and grafting done. In S.Lagvankar² study, 2 patients (20%) had persistent post operative discharge, which stopped after sequestrectomy. In Ayman M Adbelmoheed et al³ study partial graft loss in 2 patients (7.4%) for which grafting was done. In S.Lagvankar² study, 2 patients (20%) had persistent post operative discharge, which stopped after sequestrectomy. In Ayman M Adbelmoheed et al³ study partial graft loss in 3 patients (7.4%) for which grafting was done. In Rao et al⁶ study partial flap necrosis was seen in 2 patients (8%) for which debridement and split thickness skin grafting was done.

This study is similar to Md. Sohaib Akhtar et al⁵ study where, there was one case with flap tip necrosis for which debridement and grafting done. In this study, the average hospital stay was 10 days following trauma. In AH Khan, QG Ahmad study, the period of hospital stay was 10-20 days. In Ayman M Adbelmoheed et al³ study, it was for 1- 2 weeks. In Rao et al⁶ study the average hospital stay was 5 – 7 days. Average hospital stay in this study is almost similar to 3 other studies, i.e Ayman M Adbelmoheed et al³ study, AH Khan, QG Ahmad⁴ study and Rao et al⁶ study.

In this study, post operative Follow up was for six months. It is similar to Ayman M Adbelmoheed et al³ study, with follow up for 6 months. In AH Khan, QG Ahmad⁴ study, it was more than 2 years. In Rao et al⁶ study the follow up was upto 6 months. Follow up in this study was for 6 months, similar to Ayman M Adbelmoheed et al³ study and Rao et al study whereas in AH Khan, QG Ahmad⁴ study follow up was done for 2 years.

We feel that fewer complications would result with careful preoperative evolution and surgical planning, adequate debridement of bone and soft tissue and transfer of healthy, non-traumatized muscle. When these basic surgical tenets are not violated, gastrocnemius muscle flap provides the best form of coverage for the defect located over upper 3rd of leg [tibia] and knee joint. Tarek⁹ successfully used the distally based hemigastrocnemius flap in covering the middle third leg defects in 19 patients and concluded that the flap was useful for reconstruction of the middle third of the leg. Magdy¹⁰ successfully used the distally based medial head hemigastrocnemius muscle flap based on the blood supply through communicating arteries with the lateral head to cover the defects in the middle third of the leg in seven cases. There was no flap necrosis or failure, one case lost graft and need re grafting, one case had hematoma in the donor site, and one case had wound dehiscence, which was healed by local wound care. The author concluded that the flap was a simple technique allowing rapid, durable, and reliable coverage of these defects without sacrificing a nerve or a major vessel.

Conclusions

Upper one third leg defects were more common in males in this study. The common age at presentation was mostly young males between 20 to 30 years. Trauma (RTA) was the major cause followed by Electric burns in this study. Right

leg was commonly involved and most common site being anteromedial. Most of the patients presented within 1 week of injury. Tibia was the common component exposed with all the patients associated with Grade III B compound fractures with external fixator in situ. Most of the patients had medium size leg defects of size ranging from 9 to 15 sq cm. The most common reconstructive procedure done for medium size leg defects was Gastrocnemius muscle flaps with SSG. Large size defects were reconstructed mostly by Gastrocnemius myocutaneous flaps and small size defects by Fasciocutaneous and Local flaps.

Most of the patients were given primary flap cover within 1 week which facilitated early wound healing, decreased incidence of infection, short duration of hospital stay and less morbidity. Complication rate was very minimal with partial graft loss and flap tip necrosis. The average hospital stay was 10 days as reconstruction was done primarily. The follow up period was upto six months with adequate physiotherapy. In most of the cases, satisfactory results with good aesthetic appearance was present. Morbidity was minimal.

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