International Surgery Journal
Sachdev GS et al. Int Surg J. 2018 Feb;5(2):398-401
http://www.ijsurgery.com
pISSN 2349-3305 | eISSN 2349-2902

DOI: http://dx.doi.org/10.18203/2349-2902.isj20180023

Original Research Article

Management and outcome in patients with below knee soft tissue injuries

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Received: 01 December 2017
Accepted: 25 December 2017

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ABSTRACT

Background: Treatment of lower limb injuries pose a great challenge. Debridement is the key to success in the management of major limb injuries followed by soft-tissue coverage in the form of suturing, skin grafts, or flaps. Our aim is to study the management of various below knee soft tissue injuries.
Methods: The study was conducted in the Department of Surgery, Himalayan Institute of Medical Sciences (HIMS), Swami Ram Nagar, Dehradun, over a period of 12 months. Subjects were recruited from patients presenting in Emergency/Surgery OPD, HIMS, Dehradun with a primary diagnosis of below knee soft tissue injuries. A total of 64 patients were included in the study.
Results: Primary closure was done in 6 wounds and coverage in rest, with maximum in the form of split skin graft. Abrasion wounds were managed without any surgical intervention. Reconstructive surgery was performed two or more times in 39.06% patients. Local complications were seen in 23.43% of patients and general complications AKI and Tetanus in 2patients.68.75% of patients with local complications were observed to have contaminated wound status at the time of presentation. The average duration of hospital stays ranged between 3 to 56 days. Majority of the patients were discharged within 1 to 3 weeks with mean duration of hospital stay being 17.82±10.95 days.
Conclusions: Proper debridement, early coverage of wounds and prompt identification and management of complications is the key to success in the management of lower limb trauma.

Keywords: Debridement, Early coverage

INTRODUCTION

The rate of limb injuries has been increasing over the years, particularly accidental injuries; this trend can be attributed to modernization, industrialization, and an increased rate of violence in society.[1]

Clinical treatment of lower limb injuries poses a great challenge because the surgeons need to face serious complications such as shock, wound coverage and infection, and has to choose a right time to deal with the combined fractures and injuries of the blood vessels, nerves and tendons. Large area skin avulsion injuries, especially those caused by traffic accidents or machine injuries, often couple with secondary skin necrosis (80-95%). Uncovered wound, fracture malunion or non-union, scar contracture deformity and dysfunction, can lead to amputation and even death if handled inappropriately.[2]

Debridement is the key to success in the management of major limb injuries. The present-day concept of debridement is the even more aggressive form called wound excision. This encompasses excision akin to oncologic clearance with a 2-3mm margin around the contaminated and grit laden tissues. At the end of the procedure, the wound should be washed with copious quantities of saline, preferably as pulsed lavage and then soft-tissue coverage planned in the form of suturing, skin grafts, or flaps.[3]

The aim of our study is to study the management of various below knee soft tissue injuries.

METHODS

The study was conducted in the Department of Surgery, Himalayan Institute of Medical Sciences (HIMS), Swami Ram Nagar, Dehradun, over a period of 12 months. Subjects were recruited from patients presenting in Emergency/Surgery OPD, HIMS, Dehradun with a primary diagnosis of below knee soft tissue injuries. A written informed consent was taken from all the patients after obtaining ethical clearance certificate from ethics committee.

It was cross sectional observational study. Sample size was calculated based on convenient sampling, keeping in mind the previous hospital records, 64 patients were included in the study.

Inclusion criteria

- Patients of either sex and all age group
- All patients of below knee soft tissue injuries.

Exclusion criteria

- Patients who refused to consent.

Study tools

Structured Study instruments (formats/subject proformas) were developed, and used to generate data.

Interpretation and analysis of the data obtained was carried out after noting all the details in Microsoft Excel sheet. The data thus collected was subjected to descriptive analysis (e.g. mean, frequency, ratio etc.) and was presented in the form of table / charts.

RESULTS

A total of 64 patients with 86 below knee soft tissue injuries were included in the study. They were subjected to detailed history and thorough examination and following results were observed.

Primary closure was done only in 6 wounds (8.1%). Coverage consisted of split thickness skin grafting in maximum number of wounds i.e. 38 (51.35%) and flap coverage in 19 (29.68%). While in 11 wounds (17.18%) combination of different coverage techniques was used. Abrasion wounds were managed conservatively without any surgical intervention (Table 1).

Table 1: Distribution according to the surgical intervention.

Method	No. of wounds	Percentage
Primary closure	6	8.1
SSG	38	51.35
flap coverage	19	29.68
Muscle flap	1	
Fasciocutaneous flap	18	
Combined	11	17.18
Muscle flap + SSG	1	
F.C flap + SSG	3	
Primary closure + SSG	7	
Total	74	100

The reconstruction of lower limb injuries faced local complications in the form of partial graft rejection in 2 patients (3.1%), complete graft rejection in 1 patient (1.56%), marginal flap Necrosis in 6 (9.37%), Wound Infection in 3(4.68%), necrosis along suture line in 3patients (4.68%). General complication which included tetanus was seen in 1 patient (1.56%). While in one patient AKI was seen along with wound infection (Table 2).

Table 2: Distribution of patients according to complications of reconstruction (n=17).

Complication	No. of patients	Percentage
Local	15	23.43
Partial graft rejection	2	3.1
Complete graft rejection	1	1.56
Marginal flap necrosis	6	9.37
Wound infection	3	4.68
Necrosis along suture line	3	4.68
General	1	1.56
Both local and general complication	1	1.56
Total	17	26.56

The local complications were dealt with debridement and SSG in 43.75% of patients, Debridement and revision of flap in 25% and in rest 31.25% conservatively with regular dressings. Patients with general complications like AKI and Tetanus recovered with medical treatment (Table 3).

It was observed that 39 patients (60.93%) underwent surgery only once whereas 25 patients (39.06%) had to undergo surgery 2 or more times (Table 4).

Table 3: Distribution of patients according to management of local complications (n=16).

Management of local complication	No. of patients	Percentage
Conservatively with regular dressings	5	31.25%
Debridement + SSG	7	43.75%
Debridement + revision flap	4	25%
Total	16	100

Table 4: Distribution of patients according to number of times reconstructive surgery performed (n=64).

No. of times	No. of patients	Percentage
Single	39	60.93
Two or more	25	39.06
Total	64	100

The average duration of hospital stays ranged between 3 to 56 days. Only 9 patients (14.06%) were discharged within one week while majority of were discharged within 1 to 3 weeks (56.25%). In our study the mean duration of hospital stay was 17.82±10.95 days and 19 patients (29.68%) had an extended hospital stay of more than 3weeks (Table 5).

Table 5: Distribution of patients according to duration of hospital stay (n=64).

Duration of hospital stay	No. of cases	Percentage
<1 Week	9	14.06
1-3 Week	36	56.25
>3 Week	19	29.68
Total	64	100

DISCUSSION

Primary closure was done only in 6 wounds (8.1%). Coverage consisted of split thickness skin grafting in maximum number of wounds i.e. 38 (51.35%) and flap coverage in 19 (25.67%). While in 11 wounds (14.86%) combination of different coverage techniques was used. In a similar study carried upon one hundred patients suffering from lower limb soft tissue injury it was seen that initial coverage in these 100 patients required 59 split thickness skin graft, 6 local muscle flaps, 28 local fascio-cutaneous flaps, 5 free flaps and 2 cases were managed by simple closure.[4]

Early wound coverage has been documented to be vital to successful limb salvage. 0.75% failure rate of 532 free flaps when they were done within the first 72 hours after trauma. The failure rate of the free flaps was 21.5% when the procedure was carried out three days or more after the injury.[5] Similar favourable results shows when the free flaps were in place within the first week after trauma. The flap failure rate, deep infection rate, and non-union rate of the fractures were lower in the group with early wound coverage.[6] Exposed vital structures, such as vascular grafts, mandate coverage immediately. Some advocate coverage at the time of presentation, before the wound has been heavily colonized with bacteria,[7] others within 6 days.[8] Ideally, definitive coverage would be performed when the wound is clean, stable, and before it becomes colonized with pathogens.

The reconstruction of lower limb injuries faced local complications in the form of partial graft rejection (2cases), complete graft rejection (1 case), marginal flap Necrosis (6 cases) and wound infection (3 cases) while general complication which included tetanus in 1 patient and AKI along with wound infection was noted in 1 patient. The complications were dealt with debridement and SSG in 43.75% of patients, Debridement and revision of flap in 25% and in rest 31.25% conservatively with regular dressings. Patients with general complications AKI and Tetanus recovered with medical treatment. In study, in the entire study group of 52 patients, 16 patients (31%) developed a postoperative complication, which consisted of hematoma (10%), haemorrhage (2%), flap dehiscence (4%), or infection (23%). Six patients (12%) developed a partial flap failure, for which the necrotic skin was resected. Complete flap failure occurred in eight patients (15%). A secondary lower leg amputation had to be performed in three patients (6%).[9]

The mean duration of hospital stay was 17.82±10.95. The average duration of hospital stays ranged from 3-56 days. Majority of the patients were discharged within 1-3 weeks with only few being discharged within 1 week. In the study by Fiona et al, twenty-nine percent of patients were admitted to critical care for a median length of stay of 4 days. The median total hospital length of stay was 9 days, and 69% of patients underwent at least one surgical procedure.[10] In study by Youssef Saleh et al the mean hospital stay was 19.42 days in 60% of the cases and 34 days in rest 40% of the patients.[4]

CONCLUSION

Proper debridement, early coverage of wounds and prompt identification and management of complications is the key to success in the management of lower limb trauma.

ACKNOWLEDGEMENTS

Authors would like to thank Mr. Deepak Kumar, Mr. Balbeer, OT staff for his valuable support during study.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Sachdev GS, Rajan M, Dvivedi S, Agrawal S, Rawat KAV. Management and outcome in patients with below knee soft tissue injuries. Int Surg J 2018;5:398-401.