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ORIGINAL ARTICLE

Outcome of split-thickness skin graft (STSG) in complex orthopaedic trauma.

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ABSTRACT… Objective: Complex orthopedics wounds are challenges to surgeon and patient in operative management. Road traffic accidents, the major cause of open fracture, represent a massive global health problem with high mortality and morbidity rates. **Study Design:** Retrospective study. **Setting:** Ghurki Trust Teaching Hospital, Lahore. **Period:** January 2021 to January 2022. **Material & Methods:** Thirty eight patients with open fractures with skin loss, treated with graft, and wound where a flap was not possible were included in the study. The outcome was assessed in terms of the outcome of STSG in complex orthopaedic trauma. **Results:** A total of 38 patients were included who underwent STSG graft. Among these, more than half of cases, 33(86.8%), were males, while 5(13.2%) were female cases with a mean age of 25.82±13.09 ranging from (6-63) years. Graft loss was found in 4 cases (10.5%), graft contracture in 7 cases, altered sensation in three cases, skin pigmentation in 4 cases, episode infection in 8 cases, and skin breakdown in only one case observed. Average hospital stay ranged from 2-3 weeks in all cases. **Conclusion:** It is concluded that Acute complex orthopedics wounds present a unique challenge for surgeons. Good surgical technique, early appropriate surgical intervention, source control, early use of broad-spectrum antibiotic therapy, VAC dressing, and early tissue coverage prevent wound infection and decrease the chances of limb amputation.

Key words: Complex Orthopedics, Split-thickness Skin Graft (STSG), Skin Pigmentation, Vac Dressing.

INTRODUCTION

Complex orthopaedic wounds provide difficulties for the surgeon and the patient regarding operational treatment, long-term care, aesthetic result, self-image, and general health. Although there is no single globally recognized definition of the complicated wound, complex wounds are often defined as wounds involving several tissue plans that do not heal in a timely way or do not heal entirely.[1]

Open complex fractures are typically high-energy injuries linked with life-threatening traumas, skin degloving, soft tissue crushing, and contamination. This frequently leads to infection, sepsis, and a delay in soft tissue and bone recovery.[2] Despite the therapeutic intervention, open wounds contaminated with human or animal faecal pollutants are at significant risk of infection.[3] Open fractures create significant pain and cost hardship, particularly for individuals and the healthcare system.[4]

Road traffic accidents, a leading source of open fractures, are a large worldwide health issue with high death and morbidity rates.[5] They are among the most heinous traumas, causing physical deformities and significant mental, mental, and emotional impairment.[6,7]

Every year, traffic accidents cut around 1.3 million people's lives short. Non-fatal injuries affect between 20 and 50 million more individuals, with many becoming disabled due to their injuries.[7] Million more suffer from RTA are affected by RTA-related injuries and disfigurements, which have a major economic burden on survivors and their families.[8]

The goals of open fracture care are w`idely

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understood, including infection control, bone union, and function restoration.[9] Improved open fracture care includes stabilizing the fracture, better care for wounds through techniques such as multiple wound wash, debridements and dressings, better infection control, and early wound coverage with graft or flap[10] surgical treatment remains the cornerstone for treating the deep infected and traumatic injury.[11] This care strategy may lower morbidity, diminish and disability and greatly assist survivors in leading full and meaningful lives.in most high-energy trauma, there are associated vessel injuries or large open wound where flap coverage is not possible; coverage of these types of wounds was demanding and challenging. These wounds underwent VAC dressing and numerous debridements. With the vacuum effect, we could efficiently and quickly reduce bacterial tissue levels while promoting local vascularization and granulation, which helps coverage of complex wounds[12,13], Later, these wounds were covered with STSGS over fleshy granulation tissue. Patients were followed for up to 1 year to see the long-term outcome of STSG. Hence study's objective is to determine the outcome of STSG in complex orthopaedic trauma.

MATERIAL & METHODS

After taking ethical approval from the GTTH Institutional Review Board (2023/01/R-07), 38 patients were included from the period (January 2021 to January 2022). A retrospective study design was utilized. All cases with an open fracture with skin loss, treated with graft, and wound where a flap was not possible were included in the study. The study's exclusion criteria were; cases with closed primarily or with flap, GASTILLO ANDERSON Type 1. Type 2, Type 3A[14] Mangled Severity Score >7(mess score).[15] Informed consent was taken from each case. All wounds were thoroughly washed and fixed with an external fixator. For most of the multiple debridement and vac dressing, an STSG graft was performed after granulation. All the patients were followed up for one year. A predefined questionnaire was used to collect information about the demographic profile of patients and outcomes related to skin grafts in complex orthopaedic trauma. All the data were entered and analyzed using SPSS software version 28.

RESULTS

In the current study, a total of 38 patients were included who underwent STSG graft; Among these, more than half of the cases, 33(86.8%), were males, while 5(13.2%) were female cases with a mean age of 25.82±13.09 ranging from (6-63) years. Graft loss was found in 4 cases as 10.5%, graft contracture in 7 cases, altered sensation in three cases, skin pigmentation in 4 cases, episode infection in 8 cases, and skin breakdown in only one case observed. Average hospital stay ranged from 2-3 weeks in all cases.

Parameters	N (%)
Gender	
Male	33(86.8)
Female	5(13.2)
Graft Loss	
Yes	4(10.5)
No	34(89.5)
Graft Contracture	
Yes	7(18.4)
No	31(81.6)
Altered Sensation	
Yes	3(8)
No	37(92)
Skin pigmentation	
Yes	4(10.5)
No	34(89.5)
Episode infection	
Yes	8(21.1)
No	30(78.9)
Breakdown Skin	
Yes	1(2.6)
No	37(97.4)

Table-I. Distribution of outcome of STSG in complex orthopaedic trauma

DISCUSSION

The current analysis revealed that young boys with complex orthopaedic trauma made up most of the patients who underwent skin grafts at GTTH. Burn patients in this cohort ranged in age from 18 to 40 (60%), with the majority being under the age of 30 years. The high incidence of complex orthopaedic trauma among the young age group is attributed to high-speed vehicle

trauma. The findings of our study showed that more than half cases were males compared to females. This finding is consistent with most of the global research demonstrating male dominance.[16] Generally, young males are more adventurous and do outdoor work.

The most common etiology was high-speed vehicle trauma. In our study, 38 patients underwent STSG grafts; on the other hand, a similar study performed by Al Shlash et al. included 85 burn cases of skin grafts and 56 patients who received STSG. Graft loss was found in 4 cases as 10.5%. While in another study, 16.0% of graft loss cases were observed.[17]

Skin graft contraction was observed in 18.4%, which is close to figuring of 12.5% in a similar study. Skin pigmentation was found in 4(10.5%) cases, While the Al Shlash et al. study revealed that the skin pigmentation of patients who got STSG differed significantly (in 21.4% of instances). It is advised to use garments or sun-blocking products to avoid long-lasting hyperpigmentation in fresh skin grafts since sunlight during the first six months may exacerbate pigmentation. Differences in color and pigmentation are often transient and progressively get better.[18,19]

In our study, only three cases of altered sensation were observed. Compared to other studies, Following STSG grafting, the altered sensation was seen in 7.1% of individuals. 18 After having skin transplants, individuals frequently don't fully restore their usual sensibility.[17,19] Sensation recovery is a gradual process that can start as early as one to two months following surgery and may continue to advance during the first year and beyond. In every case, the typical length of stay was two to three weeks. Another study evaluated the outcomes of flaps in the subacute repair of complicated upper extremity injuries. The results showed that two of 35 flaps entirely survived, while three flaps required microvascular re-exploration. Hospital stay depends on the kind of flap. The average hospital stay was 39 days, but it could have been as long as 103 days. This indicates that our trial was more successful in terms of LOS. 20 In the second research, Györi et al.[21] evaluated local and free flap restoration of distal lower extremity deformities. Postoperative complications and limb salvage were also examined, and the average length of stay for patients with local flap treatment was 33.5 days (SD 41.6 days).

Significant improvements were made in the outcome metrics for skin grafts in complicated traumatized patients, including graft failure, graft contraction, hyperpigmentation, altered feeling, infection rate, and hospital stay. To examine the relative pros and drawbacks of STSG, it is evident from this study that more multicenter randomized controlled trials with a bigger sample are required. When treating complicated wounds, especially those involving the extremities of patients, care should be taken to preserve function and maximize functional results for the patient. More research is required to further understand the impact on long-term functional results.

CONCLUSION

It is concluded that Acute complicated orthopaedic wounds constitute a special difficulty for surgeons. Good surgical technique, prompt, appropriate surgical intervention, source control, early administration of broad-spectrum antibiotic medication, Vac dressing, and early tissue covering reduce the risk of wound infection and amputation by preventing the infection from spreading to the surrounding tissues. When alternative wound covering options were not feasible because of the damage zone and wide surface wound, the premise of treating complicated wounds using STSG demonstrates noteworthy outcomes.

Limitations of the study were the small sample size and retrospective study design, making the results less generalized to the entire population.

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