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Research Article

Outcomes and Postoperative Complications Following Debridement and Split-Thickness Skin Grafting for Lower Limb Wounds: A Case Series of 30 Patients from a Tertiary Care Institution

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ABSTRACT

Background: Lower limb wounds are an enormously high surgical burden, especially when complicated by infection and trauma or systemic comorbidities. Surgical debridement and split-thickness skin grafting (STSG) has been one of the keys to wound reconstruction. However, graft uptake and functional results are still affected by complications after surgery.

Case Presentation: This case series presents 30 patients treated in a tertiary care institution and who underwent surgical debridement of the wounds on the lower limbs and subsequently STSG. Patients ranged in age from 22 to 68 years of age and included wounds secondary to trauma, diabetic foot disease, post-infective necrosis and chronic non-healing ulcers. Comprehensive clinical evaluation, microbiologic assessment and optimization of comorbid conditions predicted operative intervention. All patients were subject to serial debridement until a healthy granulating wound bed was established, then STSG harvested from the thigh and applied over the wound and outcomes were documented.

Interventions and Outcomes: Postoperative results were analysed in reference to: graft uptake; wound healing time; infection; graft loss; haemorrhage; and donor site morbidity. Complete uptake of the graft was seen in 21 patients (70%). Partial graft loss occurred in six patients (20%) and complete graft failure occurred in three patients (10%). The most common complications observed after the operation were surgical site infection (16.7%), formation of seroma or hematoma (13.3%), and delayed healing of incision (20%). Patients with diabetes mellitus and peripheral vascular disease showed higher rate of complications.

Conclusion: Debridement followed by STSG remains an effective reconstructive option for lower limb wounds. However, postoperative complications are influenced by systemic comorbidities, wound etiology, and local wound conditions. Careful patient selection, meticulous surgical technique, and vigilant postoperative monitoring are critical to optimizing outcomes.

Keywords: Lower Limb Wounds - Debridement, Split Thickness Skin Graft, Postoperative Complications, Caseload.

INTRODUCTION

Lower limb wounds are a frequent and difficult problem in surgical practice with considerable morbidity, length of stay and healthcare spend [1]. Etiologies range from trauma injuries and diabetic foot ulcers to post infective necrosis and chronic venous ulcers. These wounds are frequently overlaid with systemic comorbidities such as diabetes mellitus, peripheral vascular disease and malnutrition which compromise wound healing and predispose infection [2].

Surgical debridement is a key component of wound care and is central to the removal of necrotic tissue and reduction of bacterial burden, and the establishment of a healthy granulation bed [3]. Once sufficient wound bed preparation is obtained, split-thickness skin grafting (STSG) is often used, because of its relative simplicity of technique, high success rate, and capacity to cover large surface areas [4]. Despite all these advantages, STSG is plagued by several postoperative complications such as graft loss, infection, hematoma formation, and donor-site morbidity [5].

Reported graft take rates have ranged from 70% to 95% widely in the literature according to patient factors, wound characteristics and perioperative care [6]. In certain types of lower

limb wounds, particularly those that involve the distal leg and foot, vascular insufficiency and dependent edema progress to deteriorate outcomes [7]. Understanding the patterns of complications and the factors affecting the success of grafts is enabled the patient to achieve a better outcome.

This case series attempts to report the clinical profile, management and some postoperative complications for 30 patients underwent debridement followed by STSG for lower limb wounds in a tertiary care institution. Analyzing outcomes and complications, the aim of this study is to add to the existing literature and guide clinical practice.

Patient Information

The case series comprised 30 sequential patients who were treated between January 2024 and June 2024. There were 21 males and nine females with a mean age of 46.3 years (range: 22-68 years). The most common etiologies of wounds were traumatic soft tissue loss (n = 12), diabetic foot ulcers (n = 9), post-infective necrotizing wounds (n = 6) and chronic non-healing ulcers of mixed etiology (n = 3).

Comorbidities included diabetes mellitus in 14 patients (46.7%), hypertension in 10 patients (33.3%), peripheral vascular disease in six patients (20%) and chronic smoking history in eight patients (26.7%). All patients gave a detailed medical history and pertinent risk factors were noted.

Table 1. Demographic Characteristics, Etiology, and Comorbidities of the Study Population (N = 30)

Variable	Number of Patients (%)
Age (years)	
20–30	5 (16.7)
31–40	7 (23.3)
41–50	9 (30.0)
51–60	6 (20.0)
>60	3 (10.0)
Sex	
Male	21 (70.0)
Female	9 (30.0)
Etiology of Wound	
Traumatic soft tissue loss	12 (40.0)
Diabetic foot ulcer	9 (30.0)
Post-infective necrotic wound	6 (20.0)
Chronic non-healing ulcer	3 (10.0)
Comorbidities	
Diabetes mellitus	14 (46.7)
Hypertension	10 (33.3)
Peripheral vascular disease	6 (20.0)
Smoking	8 (26.7)

Table 2. Postoperative Outcomes and Complications Following Split-Thickness Skin Grafting

Outcome / Complication	Number of Patients (%)
Graft Take	
Complete graft take	21 (70.0)
Partial graft loss	6 (20.0)
Complete graft failure	3 (10.0)
Postoperative Complications	
Surgical site infection	5 (16.7)
Hematoma / Seroma	4 (13.3)
Delayed wound healing	6 (20.0)
Donor site infection	2 (6.7)
Need for re-grafting	4 (13.3)
Mean hospital stay (days)	14 ± 4

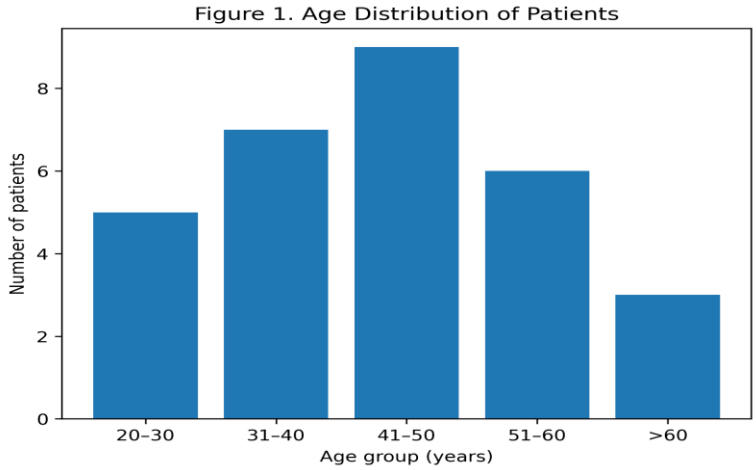

Figure 1. Age Distribution of Patients

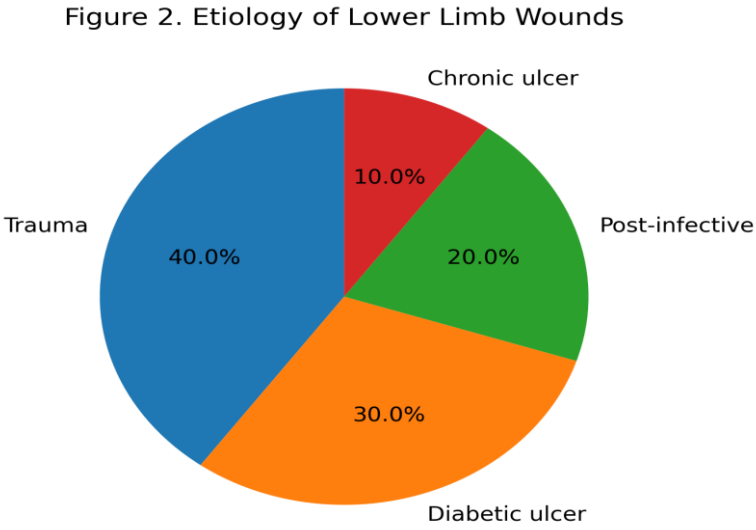

Figure 2. Etiology of Lower Limb Wounds

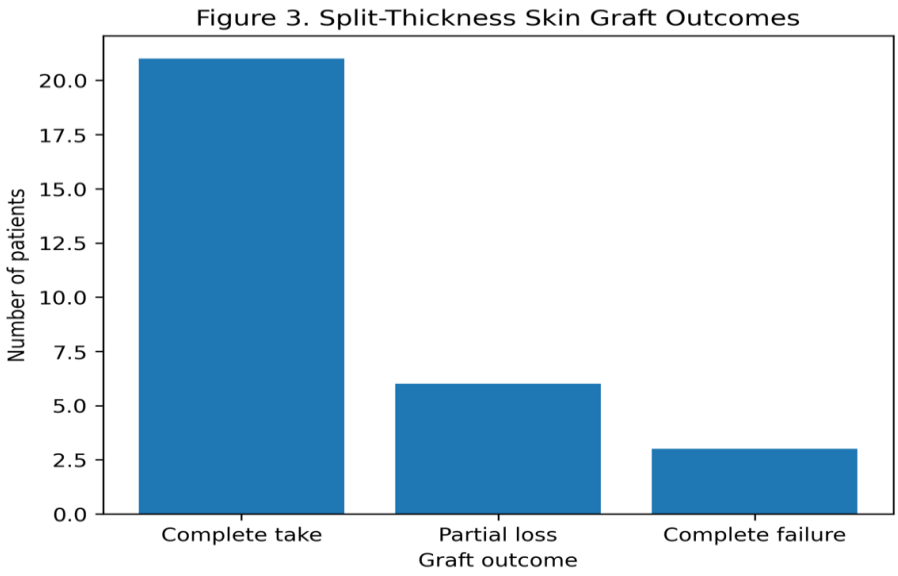

Figure 3. Split-Thickness Skin Graft Outcomes

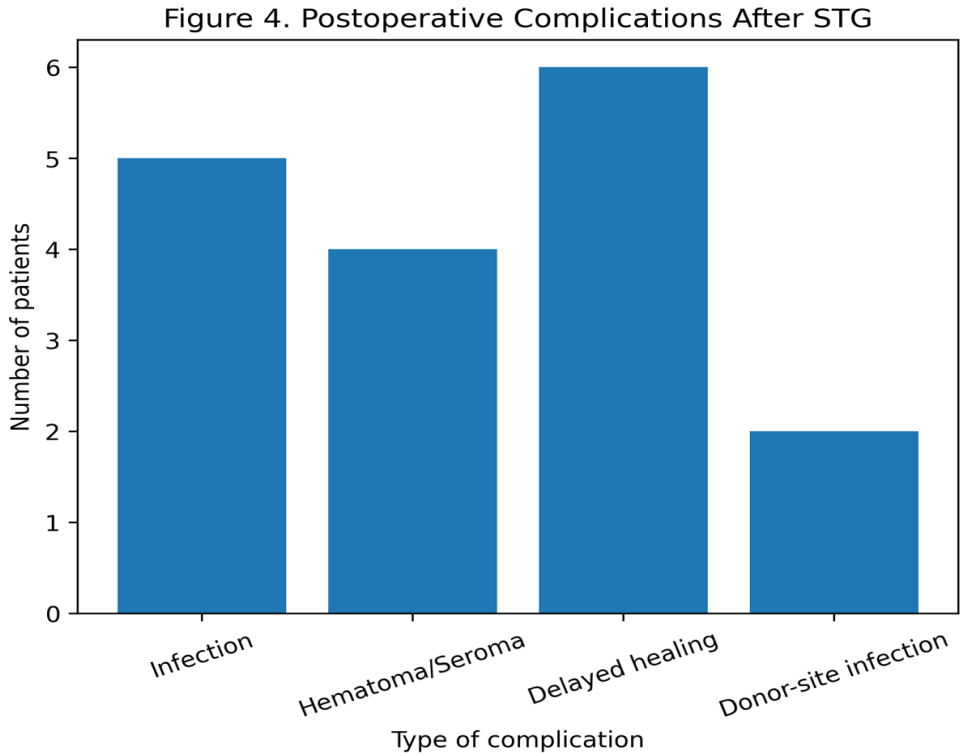

Figure 4. Postoperative Complications after Stg

Clinical Findings

On presentation, all patients had open wounds in the lower limbs with various degrees of necrosis, slough or exposed underlying structure. Wound sizes ranged from 6cm2 to 180cm2. Signs of local infection including purulent discharge, foul smell, and cellulitis of the adjacent area were present in 14 patients.

Vital parameters were stable in most of the patients at the point of surgery. Peripheral pulses were examined clinically and confirmed (if required) with Doppler ultrasonography.

Timeline

- **Day 0:** Initial presentation and clinical assessment
- **Day 1–5:** Optimization of comorbidities, wound cultures, antibiotics
- **Day 3–10:** Serial surgical debridement
- **Day 14–21:** Split-thickness skin grafting after granulation tissue presence
- **Postoperative Day 5:** First graft inspection
- **Week 2–6:** Follow-up for graft take and complications

Diagnostic Assessment

Baseline investigations complete blood count, serum electrolytes, renal function tests and glycemic assessment. Wound swabs cultures were taken before debridement which typically isolated Staphylococcus aureus and Pseudomonas aeruginosa. Radiological evaluation was carried out when there was suspicion of osteomyelitis.

Differential diagnosis was vasculitic ulcers, malignant ulcers and pressure sores, which were ruled out based on clinical and investigative findings.

Therapeutic Intervention

All patients underwent surgical debridement using regional or general anesthesia. Necrotic tissue was removed until punctate bleeding and margins of healthy tissue are achieved. STSG was obtained from the anterolateral thigh with a dermatome at a thickness of 0.012-0.015 inches.

The grafts were meshed, or applied as xenograft (sheet grafts) depending on the nature of the wounds, and held together with staples or sutures. Non-adherent dressings and compressive bandages were applied. Postoperative antibiotics were given dependent on culture sensitivity. Limb elevation and immobilisation were assured to encourage the adherence of the gird.

Follow-up and Outcomes

There were no complications that halted the implementation of the study. Patients were followed for a minimum of six weeks postoperatively. Complete graft take was found

to be 21 (70%) patients. Partial loss of the graft occurred in six patients, who were treated conservatively or with secondary grafting. Three patients had a total graft failure that required other reconstructive procedures.

Some of the postoperative complications were reported to be surgical site infection (n = 5 patients), hematoma or seroma formation (n = 4), delayed indication (n = 6), and donor site infection (n = 2). Functional outcomes were improved in most patients including satisfactory wound closure and ambulation.

DISCUSSION

Lower limb wound reconstruction still presents as an important challenge because of anatomical, physiological and patient-related factors. This case series confirms debridement followed by STSG is reliable in providing wound coverage in most cases with acceptable complication rates.

The observed complete rate of graft take, 70% is similar to previous published work especially in populations with a high prevalence of diabetes and vascular disease [6, 8]. Diabetes mellitus was the most common comorbidity and strongly associated with partial or complete loss of grafts, which is probably related to microvascular impairment and change in immune response [9].

Infection is a major reason for graft failure. Despite preoperative optimization and targeted antibiotic therapy, postoperative infection occurred in 16.7% of patients. Similar rates of these have been correlated in the literature with a focus on meticulous wound bed preparation and postoperative surveillance [10].

Hematoma and seroma formation, experienced in 13.3% of the cases, can mechanically break more adherence of the grafts. Careful hemostasis and adequate compression dressings are important prevention factor [11]. Donor-site morbidity was small and similar to reports from the existing literature [12].

Strengths of this study are standardized surgical technique and standardized follow-up. Limitations include relatively small sample size and the absence of long term functional outcome measures. In the future such studies with larger cohorts and with comparative reconstructive modalities are warranted.

Patient Perspective

Most patients reported satisfaction with wound healing and functional recovery. Patients with complications expressed concerns regarding prolonged hospital stay and need for additional procedures.

Informed Consent

Written informed consent was obtained from all patients for publication of this case series and accompanying clinical data. Patient confidentiality has been maintained.

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