

Original Research Article

CONVENTIONAL SCOOPING VS. SERIAL TANGENTIAL EXCISION OF ULCER AND SPLIT SKIN GRAFTING: A COMPARATIVE STUDY

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ABSTRACT

Background: Chronic wounds are a result of traumatic injuries like burns or even constitute poor wound healing due to underlying conditions like diabetes, venous insufficiency, poor nutritional status, etc. Medical conditions like Diabetes Mellitus, arterial insufficiency, venous disease, lymph oedema, steroid use, connective tissue disease and radiation injury those inhibit wound healing. In general, they have a fibrotic margin and a bed of granulation tissue which may include areas of slough. In most of the patients with chronic granulating wounds split skin grafting is the preferred option for coverage of the wounds. Some surgeons favoured application of skin graft on the granulation tissue after scraping with scoop. The choice of debridement technique significantly influences healing outcomes and graft take. This study compares the efficacy of conventional scooping versus serial tangential excision of ulcers followed by split skin grafting (SSG). We aim to assess wound bed preparation, graft take rates, healing times, and postoperative complications.

Materials and Methods: A prospective comparative study. A total of 52 patients with chronic ulcer requiring STG were included in the study. The study was conducted for a period of 18 months. They were divided into two group, Group A and Group B. Group A patients were prepared for STG using conventional scooping and Group B patients were prepared for STG using serial tangential excision with humby's knife. Outcome measured in terms of time taken to prepare bed, percentage of graft uptake, infection rate, hospital stay, numbers of dressing required.

Results: 52 patients were divided into group A and group B. Group B patients were prepared for STG using serial tangential excision using humby's knife. Group B patient required less time for bed preparation, had no infection, higher percetange of graft uptake and less hospital stay.

Conclusion: Serial tangential excision of raw area is better method before split thickness grafting than conventional scooping of chronic ulcer.

Keywords: Scooping, tangential excision, ulcer, granulation tissue, splitthickness skin grafting, raw area.

INTRODUCTION

Chronic wounds are moreover painful, debilitating and majorly impairing the quality of life of the affected individuals. Chronic wounds are a result of traumatic injuries like burns or even constitute poor wound healing due to underlying conditions like diabetes, venous insufficiency, poor nutritional status, etc.^[1] There are numbers of patients with chronic wound coming to our hospitals, most of them belongs to lower socioeconomic class. Often, they present late with grossly infected wound and a considerable amount of time has to be spent in preparing these patients in respect of improving the general health and wound management. Medical conditions like Diabetes Mellitus, arterial insufficiency, venous disease, lymph oedema, steroid use, connective tissue disease and radiation injury those inhibit wound healing. In general, they have a fibrotic margin and a bed of granulation tissue which may include areas of slough.^[2] Patients with chronic wounds suffer from significant amount of pain with multiple tedious procedures and hospital stays. The main aim of managing the chronic wounds by split-thickness skin grafting is to find the best possible way to reduce post-op care and morbidity, which grossly include the hospital stay with improved percentage of graft uptake and decreased number of post-op dressings required. In most of the patients with chronic granulating wounds split skin grafting is the preferred option for coverage of the wounds.^[3] Some surgeons favoured application of skin graft on the granulation tissue after scraping with scoop.^[3,4] This technique is conventionally used by them. We use a newer technique that is usually used in burn-patients. In this technique first necrotic and Escher of burnt skin is tangentially excised using a knife until fresh punctuate bleeding. Then the area is a covered with split thickness graft. The granulation tissue is excised in layers by serial tangential excision using a knife. The superficial layer is believed to contain the superficial colonizing bacteria. Deep layer is believed almost identical with bed area from where the skin graft has been taken (donor site). And today, the better take up survival and wide spread use with positive amount of success makes split thickness skin graft boon towards management of chronic wounds especially in a country like India where it allows patient from all social background to gain its accessibility. The split thickness skin grafting is most commonly performed for chronic non healing wound to close the wound defect. And with this, the purpose of skin grafting has changed from improving rate of survival to improving the quality of life. Chronic ulcers require effective debridement to promote granulation and epithelialization. Conventional scooping involves curettage or sharp debridement to remove necrotic tissue. In contrast, serial tangential excision utilizes a dermatome or blade for precise removal of non-viable tissue in layers. This study evaluates the comparative effectiveness of these techniques in preparing ulcers for STG.[5-7]

MATERIALS AND METHODS

Study Design: A prospective comparative study **Patients:** 52 patients with chronic ulcers requiring STG.

Study Period: The study was conducted for a period of 18 months

Inclusion Criteria

- Patients with age between 6 to 80 years
- Patients with chronic wound following trauma, infection and burns etc

Exclusion Criteria

- Patients with age less than 5 years and more than 60 years
- Patients with coagulopathy and filarial ulcers.

Grouping: Patients were divided into two groups

- Sampling size: 52 (26 in each group)
- (sample size calculated considering effect size of skin graft taken is 1.124 from previous study using G*power software)
- Effect size = 1.124
- Level of confidence (α) = 95% Power = 90%
- $\eta = 52$ (26 in each group)
- Group A: Conventional scooping with STG (n=26)
- Group B: Serial tangential excision with STG (n=26)

Procedure:

- Group A conventional scooping: Curettage performed until healthy bleeding tissue was observed, followed by STG.
- Group B serial tangential excision: Layer-bylayer excision using a humby's knife to achieve a uniform wound bed before STG.
- Preoperative preparation: (same in both the group)

All the routine investigation like complete blood count, renal and liver function test, ECG, chest x-ray done and associated comorbidities like anaemia, jaundice, diabetes, hypertension, respiratory disorders were controlled respectively before surgery.

Preparation of the parts of adjacent limb and donor site was done. Povidone-iodine scrub given to the recipient and donor site night before the STSG operation. Liquid paraffin gauze dressing done at donor site night before STSG operation. Standard intravenous Antibiotics given 1hr before the operation.

- Written and informed consent for operation and operating method was taken.
- Operative method same for both group:

After preparation of wound bed and applying liquid paraffin to donor area, using Humby's knife or Dermatome and ensuring the thickness for graft and appropriate size blade, skin graft harvesting done. After that harvested skin graft expansion done using Mesher. After that harvested skin graft placed at recipient site and fixed with skin staplers. Povidoneiodine ointment and liquid paraffin gauze dressing was kept at both recipient site and donor site.

Outcomes Measured:

- Time taken for wound bed preparation
- Percentage of graft take at Day 5 and Day 14
- Infection rates
- Healing time
- Hospital stays
- Number of post op dressing required

RESULTS

Total 52 patients were included in our study based on inclusion and exclusion criteria. They were divided equally into two groups; group A and group B. Majority patients were between 20-40 years of age.

Table 1: Age Distribution			
Age (years)	Group A	Group B	
06-20	09 (34.61%)	10 (38.46%)	
20-40	11 (42.30%)	11 (42.30%)	
40-60	05 (19.23%)	05 (19.23%)	
60-80	01 (03.84%)	00	
Total	26	26	

In our study majority patients were male. Total 15 out of 26 patients were male in group A and 18 out of 26 were male in group B. Whereas total 11 out 26 patients were female in group A and 08 out of 26 patients were female.

Table 2: Sex Distribution		
Gender	Group A	Group B
Male	15	18
Female	11	08
Total	26	26

Table 3: Associated conditions		
Conditions	Group A	Group B
Hypertension	02 (07.69%)	03 (11.53%)
Necrotizing Fasciitis	18 (69.23%)	15 (57.69%)
Diabetes mellitus	06 (23.07%)	08 (30.76%)

In our study, majority of patients having necrotizing fasciitis as associated condition. In group A, 02 patients were having hypertension, 18 were having

necrotizing fasciitis and 06 patients were having diabetes mellitus.

Hospital Stay	Group A	Group B
08-10	08	18
11-13	03	07
14-17	10	01
18-20	04	00
>20	01	00
Total	26	26

In our study, we observed that there was significant difference in hospital stay between group A and group B patients. In group B, majority of patients had to stay in hospital for 8-10 days. Whereas in group A, it was between 14-17 days. P value <0.05.

Table 5: Post op dressing		
Post op dressing (numbers)	Group A	Group B
0-1	00	18
2-3	19	07
4-5	06	01
>6	01	00
Total	26	26

There were less numbers of dressing required in group B patients in comparison to group A patients. Group A patients required more numbers of dressing due to frequent soakage. Thus, required longer hospital stay for group A patients compared to group B patients.

Table 6: Percentage of graft uptake at 5th POD			
Skin graft uptake %	Group A	Group B	
95-100%	20	24	
90-95%	04	01	
80-90%	02	01	
<80%	00	00	
Total	26	26	

In our study, we observed that among total 26 patients in group B, 95-100% graft uptake in 24 patients out of 26(92.30%), 90-95% graft uptake in 01 patients, 80-90% graft uptake in 01 patient due to infection which resolved with antibiotics and dressing In group A patients, 20 patients out of 26 (76.92%) had graft uptake of 95-100%, 04 patients had graft uptake of 90-95%, 02 patients had graft uptake of 80-90% due to infection which resolved with antibiotics and dressing and no patients had graft uptake less than 80%. Percentage of Graft up take among both group patients on 5th Post op day: Group A - 92.30% Group B - 76.92%

Table 7: Wound bed preparation time		
Group A	Group B	
25 mins	18 mins	

In group A wound bed preparation time was 25 mins whereas in group B it was only 18 mins. Less time was taken for surgery among group B patients compared to group A patients.

DISCUSSION

This prospective, comparative study was aimed at assessing the surgical outcomes following serial tangential excision and conventional scooping in split thickness skin grafting. The patients admitted with chronic wound following burn, infection or trauma etc., were randomized for conventional technique (GROUP A) or serial tangential excision (GROUP B) on the odd-even basis. In the conventional scooping method (GROUP A) recipient raw area was scrapped using surgical scoop to remove excessive granulation tissue for graft placement. In the serial tangential excision method (GROUP B) granulation tissue at graft recipient area is excised using Humby's knife before graft placement. With regards to Post op hospital stay, around 57% patients operated with conventional scooping (GROUP A) required >13 days of hospital stay as compared to the serial tangential excision method (GROUP B) whereas 96% patients required ≤13-day of hospital stay. (P value < 0.05).[8]

In Kanpur study, around 85% patients operated with conventional scooping required >13 days of hospital stay as compared to the tangential excision method where most of the patients (98%) required \leq 13-day of hospital stay. The mean duration of post-op hospital stays reported in Kanpur study were 18.43 ± 4.21 days and 9.22 ± 1.33 days for conventional scooping and tangential excision method, respectively. While the mean duration of hospital stay was nearly similar for tangential excision in both the studies, the mean duration for conventional scooping group was lesser in our study. With regards to the primary outcome measure of graft uptake on 5th POD, around 92.30% patients with serial tangential excision method (GROUP B) showed 96% to 100% skin graft uptake as compared to only 76.92% patients with conventional scooping (GROUP A). Percentage of graft uptake by skin grafting techniques also found statistically significant difference between the two techniques (p<0.001). No patient showed <80% of take-rate. The results for serial tangential excision in our study are comparable to those with a Kanpur study where about 87% patients had skin graft uptake-rate of 96% to 100%. However, for conventional scooping group, Kanpur study had lower skin graft take-rate as compared to our study, as only 18% patients had a take-rate of 96% to 100%. In addition, few studies have also reported that serial tangential excision and grafting fairs better compared to even delayed excision and grafting. An army hospital from North India reported that skin graft take-rate and duration of hospital stay (lower) were much superior in the early excision group compared to delayed excision group. The study further reported that functional outcomes were better achieved with less need of secondary surgical procedures.^[9]

A study from Indonesia primarily studied the effect of early tangential excision v/s delayed excision on length of hospital stay for 42 patients with varied burn degrees. The study found that the duration of hospital stay was much shorter in early excision group (9.81 ± 6.41 days), as compared to the delayed excision group (15.80 ± 5.67 days). The findings for early excision hospital stay duration are also comparable with mean duration in our study reported for the tangential excision group.^[10-12]

Overall, our study found that the tangential excision method fairs better compared to the conventional scooping method on a number of outcome indicators, including skin graft take rate, number of postoperative dressing required and mean duration of hospital stay.

CONCLUSION

We all know that granulation tissue of wound is colonized with micro-organism, so when we try to remove that excessive granulation tissue using Humby's knife in serial tangential excision manner it actually converts chronic wound to acute secondary wound and it creates an identical smooth surface bed for graft harvesting. Thus, chances of graft uptake in split-thickness skin grafting increases and thus the patient require less no of post operative dressing and less no of hospital stay.

So, we can conclude after doing this study is that Serial tangential excision of raw area before Splitthickness skin grafting is better method than routinely done Conventional scooping before split- thickness skin grafting.

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