International Surgery Journal
Akshatha AP et al. Int Surg J. 2022 Sep;9(9):1603-1606
http://www.ijsurgery.com
pISSN 2349-3305 | eISSN 2349-2902

DOI: https://dx.doi.org/10.18203/2349-2902.isj20222238

Original Research Article

Study of efficacy of skin grafting in healing lower extremity ulcers in a rural tertiary care hospital

Akshatha A. P.[1], Ambikavathy Mohan[2]*, Kailashnath B. S.[1]

[1]MVJMC and RH, Hoskote, Bengaluru, Karnataka, India
[2]Department of General Surgery, MVJMC and RH, Hoskote, Bengaluru, Karnataka, India

Received: 15 November 2021
Revised: 06 December 2021
Accepted: 30 December 2021

***Correspondence:**
Dr. Ambikavathy Mohan,
E-mail: ambikaashri67@gmail.com

ABSTRACT

Background: Ulcers are discontinuity of skin/mucous membrane. Chronic ulcers are caused by skin loss that takes long to heal. Skin grafting helps tissue regeneration, hastens healing process. Skin grafts are classified as Split-thickness skin grafts and full-thickness skin grafts. STSG consist of epidermis and some layers of dermis. FTSG consists of epidermis, dermis, and subcutaneous tissue.
Methods: This retrospective and prospective study was conducted on 80 patients diagnosed with healing ulcers of the lower extremity admitted and treated at MVJMC and RH from January 2021-August 2021. Inclusion criteria were patients >18 years, both sexes. Exclusion criteria were patients who were having malignant/TB ulcers and children.
Results: Data was analysed using SPSS-21. In our study, healing ulcers were seen in 80 patients, of which 48 (60%) males and 32 (40%) females. 4 (5%) patients had venous ulcers, 5 (6.25%) varicose ulcers, 10 (12.5%) post burn ulcers, 22 (27.5%) traumatic ulcers, 6 (7.5%) amputated stump and 33 (41.25%) diabetic foot ulcers. STSG 70 (87.5%) and FTSG 10 (12.5%). The uptake was 70-80% in 11 (13.75%), 80-90% in 20 (25%), 90-99% in 24 (30%) and 100% in 25 (31.25%). Complications observed 4 (5%) infections, 5 (6.25%) no graft uptake and 77 (88.75%) had no complications.
Conclusions: Although FTSG can be offered in some cases, STGS is the gold standard in terms of efficacy for healing ulcers. Outcome of the graft depends not only on type of graft also on quality of recipient bed. Skin grafting improves the quality of life in reducing pain.

Keywords: Split thickness skin grafting, Full thickness skin grafting, Healing ulcers

INTRODUCTION

Skin grafting is one of the most used techniques in plastic-reconstructive surgery and dermatology.[1] More than 3000 years ago, the earliest use of skin grafting took place in India, where skin grafts from the gluteal region were harvested to reconstruct noses.[2] In 1823, Buenger, a German physician, documented the first successful skin graft, transferring skin from buttock to the nos.[3] Skin grafting offers an important therapeutic option in the treatment of chronic leg ulcers (CLUs), which generally include vascular ulcers, such as chronic venous/varicose leg ulcers (CVLUs) and arterial leg ulcers (ALUs), diabetic ulcers (DUs), traumatic ulcers and healing amputation stumps.[4,5] CLUs affect 1% of the adult population in Western countries and are associated with decreased quality of life, representing an important economic problem because of their recurrent nature and long-term care with subsequent large socio-economic costs. These ulcers may resist medical treatment and require skin grafting for healing.[6,7]

Skin grafts are classified according to the thickness of the graft, geometry and source. According to the thickness of the grafts are split-thickness skin grafts (STSGs) and full-thickness skin grafts (FTSGs).[8]

Split-thickness skin grafts consist of epidermis and some layers of dermis. In the context of STSGs, different types of skin grafts can be identified: thin STSG (0.2 mm), middle STSG (0.4 mm) and thick STSG (0.6 mm). Full-thickness skin grafts are composed of epidermis, dermis and various layers of subcutaneous tissue. The amount of dermis has a central role in determining mechanical, functional, aesthetical properties and trophism of the graft, neovascularisation and revascularisation takes at least 5 days.[9,10]

Objective

The objective of this study was to determine the efficacy of skin grafting and complications.

METHODS

This prospective/observational study was conducted in department of general surgery at MVJMC and RH between January 2021 to August 2021. Ethical approval was taken from the institution.

Eighty cases of healing ulcers were admitted and treated accordingly. Inclusion criteria were patients >18 years, both sexes. Exclusion criteria were paediatrics, and patients with malignant and tubercular ulcers. Written informed consent was taken from the patients who agreed to participate in the study.

Patient's data was documented as per the preforma which included the demography, presenting chief complains, with history of presenting illness, past history, personal history and family history and local examination findings. X-ray of the ulcer region to rule out osteomyelitis, Routine blood investigations such as CBC, RFT, LFT, FBS, HIV, HbsAg, culture sensitivity of the discharge from the ulcer were done.

Patients were subjected to split thickness or full thickness skin grafts according to the diagnosis. Split-thickness/Full thickness skin grafts was harvested using humby's knife and meshed to expand, increases the surface area and make the graft to adhere to ulcer bed. The descriptive statistical analysis was done using SPSS-21.

Investigations

Routine blood investigations, COVID test, culture sensitivity of the discharge, X-ray of the part, fasting blood sugar, HIV and HBs Ag test. The data was analyzed using SPSS-21.

Operative procedure

All the patients underwent skin grafting under spinal anaesthesia. Graft was harvested from the thigh, gluteal region and leg using Humby's knife, graft preparation was done by meshing, placed on the ulcer bed and fixed with skin staples and dressed with sterile dressings. The graft site was re-inspected on the 3rd-5th post-operative day and uptake documented as 70-80%, 80-90%, 90%-100%. Patients were followed up at an interval of 1-2 months.

RESULTS

At MVJ Medical College and Research Hospital, 80 patients with healing ulcers were studied, of which 48 (60%) were males and 32 (40%) were females.

7 (8.75%) patients had venous ulcers, 2 (2.5%) varicose ulcers, 4 (5%) post burn ulcers, 22 (27.5%) traumatic ulcers, 22 (27.5%) were healing pressure ulcers and 23 (28.75%) diabetic foot ulcers. Skin grafting was performed-split thickness skin grafting 70 (87.5%) and full thickness skin grafting 10 (12.5%). The outcome of skin grafting was 70-80% graft uptake in 11 (13.75%), 80-90% in 20 (25%), 90-99% in 24 (30%) and 100% graft uptake in 25 (31.25%).

Complications post graft were observed in 4 (5%) acquired infection post graft, 5 (6.25%) no graft uptake and 77 patients (88.75%) had no complication.

Table 1: Showing gender distribution of patients with healing ulcer.

Gender	N	%
Male	48	60
Female	32	40
Total	80	100

Table 2: Showing duration of healing ulcer.

Duration (days)	N	%
0-3	2	2.5
4-7	38	47.5
8-11	30	37.5
12-15	10	12.5
Total	80	100

Table 3: Showing causes of ulcer.

Causes	N	%
Venous ulcer	4	5
Traumatic ulcer	22	27.5
Post burns ulcer	10	12.5
Diabetic foot ulcer	33	41.25
Varicose ulcers	5	6.25
Amputated stump	6	7.5
Total	80	100

Table 4: Showing types of graft performed.

Types of graft	N	%
STSG	70	87.5
FTSG	10	12.5
Total	80	100

Table 5: Showing graft outcomes.

Outcomes	N	%
70-80%	11	13.75
80-90%	20	25
90-100%	24	30
100%	25	31.25
Total	80	100

Table 6: Showing complications post graft.

Complications	N	%
Infections	4	5
No graft uptake	5	6.25
None	71	88.75
Total	80	100

DISCUSSION

Skin grafting as a treatment of chronic leg ulcers has been evolved from a long time. Conventional split-skin grafting is a useful and effective technique for healing ulcers. Chronic leg ulcers affect 1% of the adult population and are associated with decreased quality of life, representing an important economic problem because of their recurrent nature and long-term care with subsequent large socioeconomic costs. These ulcers fail to heal by medical treatment and require skin grafting for healing.[1,2] Skin grafts are classified according to the thickness of the graft, geometry and source. According to the thickness, the grafts are split-thickness skin grafts (STSGs) and full-thickness skin grafts (FTSGs). Split-thickness skin grafts consist of epidermis and some layers of dermis. In the context of STSGs, different types of skin grafts can be identified: thin STSG (0.2 mm), middle STSG (0.4 mm) and thick STSG (0.6 mm). Full-thickness skin grafts are composed of epidermis, dermis and various layers of subcutaneous tissue. The amount of dermis has a central role in determining mechanical, functional, aesthetic properties and trophism of the graft. Neovascularisation and revascularisation takes at least 5 days.[3-5] Split-thickness skin grafts can be harvested by power-driven dermatome, and free-hand dermatome and Humby's knife. A free-hand dermatome offers a quick method of harvesting a skin graft that does not depend on electricity or pneumatic power, the motorized dermatome has largely replaced the free-hand dermatome for large split-thickness harvests, because of its simplicity and reliability. Infiltration of the subcutaneous tissue with saline and lubrication with Vaseline ointment, Lignocaine jelly makes it easier to harvest the skin. Split-thickness skin grafts can be meshed to expand, increases the surface area and allows the graft to adhere better to ulcer bed. Meshed grafts leaves an aesthetically less attractive scar, and the possibility of causing more contraction of the wound.[6-8]

Many graft fixation techniques are used such as reverse tie-over fixation, use of fibrin glue and dermabond, and negative pressure dressing without tie-over dressing and skin staples. In our study,we used skin staples.Sterile dressing was applied and limb immobilized with splint. Post operatively, graft was inspected on the 3rd-5th day. The most common complications with skin grafts were skin pigmentation and skin graft contraction and rejection. Hydroquinone cream is useful for treating transient pigmentation.[9,10] At MVJ Medical College and Research Hospital, 80 patients with healing ulcers were studied, of which 48 (60%) were males and 32 (40%) were females (Table 1). 7 (8.75%) patients had venous ulcers, 2 (2.5%) varicose ulcers, 4 (5%) post burn ulcers, 22 (27.5%) traumatic ulcers, 22 (27.5%) were healing pressure ulcers and 23 (28.75%) diabetic foot ulcers (Table 3). Skin grafting was performed-Split thickness skin grafting 70 (87.5%) and full thickness skin grafting 10 (12.5%) (Table 4). The outcome of skin grafting was 70-80% graft uptake in 11 (13.75%), 80-90% in 20 (25%), 90-99% in 24 (30%) and 100% graft uptake in 25 (31.25%) (Table 5). Complications such as infection were observed in 4 (5%), 5 (6.25%) did not take up the graft, 77 patients (88.75%) had no complications (Table 6). Although FTSG can be offered in some cases, STGS is the gold standard in terms of efficacy for healing ulcers. Outcome of the graft depends not only on type of graft also on quality of recipient bed. Skin grafting improves the quality of life in reducing pain.

Limitation

Small sample size was the limitation of the study.

CONCLUSION

Although FTSG can be offered in some cases, STGS is the gold standard in terms of efficacy for healing ulcers. Outcome of the graft depends not only on type of graft also on quality of recipient bed. Skin grafting improves the quality of life in reducing pain.

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

REFERENCES

1. Cornwall JV, Doré CJ, Lewis JD. Leg ulcers: epidemiology and aetiology. Br J Surg. 1986;73(9):693-6.
2. Poskitt KR, James AH, Lloyd-Davies ER, Walton J, McCollum C. Pinch skin grafting or porcine dermis in venous ulcers: a randomised clinical trial. Br Med J (Clin Res Ed). 1987;294(6573):674-6.
3. Blair SD, Wright DD, Backhouse CM, Riddle E, McCollum CN. Sustained compression and healing of chronic venous ulcers. BMJ. 1988;297(6657):1159-61.
4. Kanapathy M, Smith OJ, Hachach-Haram N, Bystrzonowski N, Mosahebi A, et al. Protocol for a

systematic review of the efficacy of epidermal grafting for wound healing. Syst Rev. 2016;5:92.
5. Jo LJ, Mus HB, Fish J. Skin grafts. UTMJ. 2009;86: 61-4.
6. Rose JF, Giovinco N, Mills JL, Najafi B, Pappalardo J, Armstrong DG. Split-thickness skin grafting the high-risk diabetic foot. J Vasc Surg. 2014;59(6):1657-63.
7. Wood MK, Davies DM. Use of split-skin grafting in the treatment of chronic leg ulcers. Ann R Coll Surg Engl. 1995;77(3):222-3.
8. Serra R, Amato B, Butrico L, Barbetta A, Caridi G, Massara M, et al. Study on the efficacy of surgery of the superficial venous system and of compression therapy at early stages of chronic venous disease for the prevention of chronic venous ulceration. Int Wound J. 2016;13(6):1385-8.
9. Ramos JV, Schmidt M, Wu SC. Epidermal skin grafts for the treatment of chronic lower extremity ulcers. Podiatry Manag. 2013, 32:95-104.
10. Haram N, Bystrzonowski N, Kanapathy M, Edmondson SJ, Twyman L, et al. The use of epidermal grafting for the management of acute wounds in the outpatient setting. J Plast Reconstr Aesthet Surg. 2015;68(9):1317-8.
11. Sanniec K, Nguyen T, Asten S, Fontaine J, Lavery LA. Split-Thickness Skin Grafts to the Foot and Ankle of Diabetic Patients. J Am Podiatr Med Assoc. 2017;107(5):365-8.
12. McCartan B, Dinh T. The use of split-thickness skin grafts on diabetic foot ulcerations: a literature review. Plast Surg Int. 2012;2012:715273.
13. Mohan A, Raruva S, Srinivasan K. Predictive risk factors for lower limb amputations in patients with diabetic foot ulcer in correlation with Wagner's grading. Predictive risk factors for lower limb amputations in patients with diabetic foot ulcer in correlation with Wagner's grading. Int Surg J. 2021;8(12):3576-82.

Cite this article as: Akshatha AP, Ambikavathy Mohan, Kailashnath BS. Study of efficacy of skin grafting in healing lower extremity ulcers in a rural tertiary care hospital. Int Surg J 2022;9:1603-6.