



COMPARATIVE STUDY OF OUTCOMES OF SPLIT SKIN GRAFT AFTER HARVESTING WITH TUMESCENT AND NON TUMESCENT TECHNIQUE

General Surgery

Dr. Rahim Samir	3rd year Postgraduate, Department of General Surgery, Aarupadai Veedu Medical College, Vinayaka Mission Research Foundation (Deemed to be University), Pondicherry.
Dr. S. Madhivanan	HOD, Department of General Surgery, Aarupadai Veedu Medical College, Vinayaka Mission Research Foundation (Deemed to be University), Pondicherry.
Dr. Ravichandran	Professor, Department of General Surgery, Aarupadai Veedu Medical College, Vinayaka Mission Research Foundation (Deemed to be University), Pondicherry.
Dr. Ilango Sp	Associate professor, Department of General Surgery, Aarupadai Veedu Medical College, Vinayaka Mission Research Foundation (Deemed to be University), Pondicherry.
Dr. N. Aadil	3rd year Postgraduate, Department of General Surgery, Aarupadai Veedu Medical College, Vinayaka Mission Research Foundation (Deemed to be University), Pondicherry.

ABSTRACT

Introduction: Tumescent technique has been practiced for over twenty years especially in liposuction. This study aims to compare the graft take in recipient site intumescent and non-tumescent harvesting on 5th day and to compare the donor site healing on 10th day and dynamics of reepithelialisation on donor site on 15th day. **Material & Method:** A non-randomized controlled study was conducted among patients attending the OPD&IPD of general surgery department, AVMC, between November 2020 to November 2022. Both male and female patients with age group above 18 years and less than 65 years with no comorbid conditions with haemoglobin at minimum 10gm% were included. These patients were broadly divided into two groups of 42 patients each by consecutive sampling technique. Blood haemoglobin, blood sugar and urea, serum protein and creatinine, blood group, wound swab for culture and sensitivity were done and entered in data collection proforma. The tumescent local solution is prepared in the operating room, immediately before surgery. Graft donor site will be prepared. Tumescent local anesthesia taken in a 10 ml syringe connected to Klein needle using three way cannula and was injected intra dermally and sub-dermally over the donor site and graft harvested. And non-tumescent technique of graft harvesting was done to different subsets of patients like Group 1 and Group 2 at the donor site. Patients were observed and followed up to monitor their progress. Data were collected, analyzed and tabulated using SPSS Ver.20. **Result:** In present study of 84 patients with split skin graft in the wards and outpatient department were included. The superiority of the tumescent approach was demonstrated at the donor site. Results from both treatments were similar three weeks later. As a result of lignocaine's bacteriostatic qualities, which kept the area around the graft clean, the tumescent method generated better outcomes, and we hypothesise that there may have been less hematoma/seroma formation on the grafted spot. **Conclusion:** According to the findings of the following study, tumescent graft harvesting provides superior take outcomes and donor site healing than non-tumescent graft harvesting. After three weeks, the effects of both approaches were found to be equivalent. Therefore, with the exception of the difficulties, the tumescent approach is thought to be preferable.

KEYWORDS

I. INTRODUCTION

II. After cellulitis, necrotizing fasciitis, burns, and trauma-related wound debridement with healthy granulation tissue, ulcers may form. These ulcers are treated using split thickness skin grafts derived from healthy skin, recipient site and anatomical place, preferably the thigh (ulcer).

III. The outcome of a skin graft depends on three factors: the donor site, the recipient bed, and the patient's general health. Graft nutrition intake, recipient bed vascular ingrowth, and postoperative immobility all affect graft absorption.

The development of seroma/hematomas, graft shearing, an unclean or insufficiently vascularized bed, concurrent illnesses, and smoking are all potential graft take-down inhibitors. In structures, graft take is lowered. Bone, cartilage, and tendon are examples of tissues having reduced blood flow. A vascular, pus-free, and streptococcal-infection-free wound bed is ideal. In this study, we assess the usage of lignocaine and adrenaline and investigate how they affect graft uptake during tumescent surgery. When harvesting a transplant to minimize blood loss and enhance graft take, a solution containing a vasoconstrictor and a local anaesthetic is injected sub-dermally. Crystalloid, a local anaesthetic, a vasoconstrictor like adrenaline, and sodium bicarbonate are all components of tumescent local anaesthesia (TLA).

IV. The donor location is hydrated with crystalloid to provide a plane for the transplant harvest. The antibacterial properties of local anaesthetics enhance recipient acceptance and prevent graft infection. Although the tumescent approach has progressed throughout time, graft harvesting rarely uses it. This investigation examines how well tumescent application affects graft absorption and donor site healing.

II. MATERIAL AND METHODS

Non-randomized controlled study was carried out in the Department of General Surgery, Aarupadai Veedu Medical College and Hospital, Puducherry. This is a comparative study in which 84 patients were studied in two groups after obtaining written informed consent.

Patients with age group above 18 years and below 65 years, all donor sites of split skin graft, Patients with haemoglobin minimum at 10gm%, TBSA <30% are included in the study. Patients with diabetes mellitus, Hypoproteinemia, Anemia & donor sites after harvesting of thin split skin were excluded from study.

Complete history, laboratory investigations, examination was obtained and entered in data collection proforma. 42 patients are treated by tumescent technique of harvesting and 42 patients by non-tumescent technique of harvesting of split skin graft. Patient shifted to the post-operative ward. Comparison of graft take on day 5, healing of donor site on day 10, re-epithelialisation of donor site wounds after 15 days was done. Data analysis was done by SPSS Ver.20.

Categorical data was described in form of number and percentage. The Chi-Square test was used to find the association between risk factor and the outcome variable. P value less than 0.05 was considered as statistically significant.

III. Statistical analysis

Data analysis was done by SPSS Ver.20. Categorical data was described in the form of number and percentage. The Chi-Square test was used to find the association between risk factor and the outcome variables. P value less than 0.05 was considered as statistical significance.

IV. RESULTS

In present study, total of 84 patients fulfilling inclusion criteria were included.

Table 1. Comparison of outcomes in tumescent and non-tumescent technique

	Tumescence (n=42)		Non-tumescence (n=42)		P-value
	Mean	SD	Mean	SD	
day5takesite	96.9	3.484	96.16	4.66	0.429
day10donorsite	98.45	2.58	97.38	3.17	0.093

Paired t-test shows that, there was a statistically significance mean difference between 5 days and 10 days in tumescence and there was no statistically significance difference in the non-tumescence.

Table 2. Comparison of complication in both techniques

complications	Technique		Total	p-value
	Tumescence	Non-tumescence		
ITCHING	2 (4.76%)	3 (7.14%)	5 (5.95%)	0.991
NIL	40 (95.23%)	39 (92.85%)	79 (94.05%)	
Total	42	42	84	

Among 5 itching participants, 3 (7.14%) were non-tumescence.

V. DISCUSSION AND CONCLUSION

Split thickness skin transplant technique is used to treat burns, necrotizing fasciitis wounds, and ulcers or raw areas that develop as a result of trauma. To minimise blood loss during graft harvesting, STSG harvesting can be carried out under tumescent anaesthesia. This method also results in earlier and better graft absorption at the recipient site. However, tumescent anaesthesia for STSG is not commonly used. The goal of this study is to demonstrate improved and quicker graft absorption at the recipient site and improved healing at the donor site. The chosen patients ranged in age from 18 to 65, were free of concomitant diseases, had clean wounds that were ready for grafting. By performing both procedures on the same patient and taking one transplant under tumescent anaesthesia and the other without it, the other confounding variables were reduced.

The commonest site of raw area was more on left foot, right foot and right leg. Out of 45 left thigh graft harvested site, 25 (55.60%) were tumescence and 20 (44.40%) were non-tumescence. In the right thigh, among 39 participants, 22 (56.40%) were non-tumescence and 17 (43.60%) were tumescence.

This demonstrated the fact that tumescent method provided higher rates of skin graft take-up. Nonetheless, we want to emphasise that on day 5, the grafts were relatively monitored.

The superiority of the tumescent approach was demonstrated at the donor site. Results from both treatments were similar three weeks later. As a result of lignocaine's bacteriostatic qualities, which kept the area around the graft clean, the tumescent method generated better outcomes, and we hypothesise that there may have been less hematoma/seroma formation on the grafted spot.

According to the findings of the following study, tumescent graft harvesting provides superior take outcomes and donor site healing than non-tumescent graft harvesting. After three weeks, the effects of both approaches were found to be equivalent.

Therefore, with the exception of the difficulties, the tumescent approach is thought to be preferable.

VI. REFERENCES

1. Lee S. S, Tsai C. C, Lai C. S., and Lin S. D., "An easy method for preparation of postage stamp autografts," Burns, 2000 vol. 26, no. 8, pp. 741-749.
2. Harashina.T and Iso.R., "The treatment of leukoderma after burns by a combination of dermabrasion and "chip" skin grafting," British Journal of Plastic Surgery, 1985, vol. 38, no. 3, pp.301-305.
3. Ragnell A., "The secondary contracting tendency of free skin grafts," British Journal of Plastic Surgery, vol. 5, no. 1, pp. 6-24, 952.
4. Ratner D: Skin grafting. From here to there. Dermatol Clin 1998, 16(1):75.
5. Hauben DJ, Baruchin A, Mahler D.: On the history of the free skin graft. Ann Plast Surg 1982;9:242.
6. McGregor AD, McGregor IA..Fundamental techniques of plastic surgery and their surgical applications. 10th edition. London: Churchill Livingstone,2000.
7. Peer LA: Transplantation of Tissues, 1955. Vol 2. Baltimore, Williams & Wilkins.
8. Birch J, Branemark PI: The vascularization of a free fullthickness skin graft. I. A vital microscopic study. Scand J Plast Reconstr Surg 1969;3:1.
9. Tucker GT, Mather LE: Properties, absorption, and disposition of local anesthetic agents, Neural Blockade in Clinical Anesthesia and Management of Pain, 2nd edition. Edited by

- Cousins MJ, Bridenbaugh PO. Philadelphia: Lippincott Williams & Wilkins, 1988, pp. 47-110
10. Rao RB, Ely SF, Hoffmann RS: Deaths related to liposuction. N Engl J Med 1999; 340:1471-5
11. Bergfeld D, Sommer B, Sattler G: Infiltration technique, Tumescent Local Anesthesia. Edited by Hanke CW, Sommer B, Sattler G. New York, Springer, 2019, pp 55-60
12. Ramirez OM, Galdino G: Does tumescent infiltration have a deleterious effect on undermine skin flaps? Plast Reconstr Surg 1999; 104:2269-72
13. M.K.Rajendran. Tumescent non-tumescent technique for split thickness skin graft harvesting. International Surgery Journal. 2018 Dec;5(12):4026-4030.
14. Ramesh Koujalagi, V.M.Uppin, Rajesh Pawar, Vaibhav Avinash Patil. Tumescent versus non-tumescent technique in skin graft healing: a cross-sectional study. International Surgery Journal. 2018 May;5(5):1822-1825.