



## Surgery

## SPLIT THICKNESS SKIN GRAFT SURVIVAL IN DIABETIC AND NON-DIABETIC WOUND MANAGEMENT

**Dr.Ramarao Peddi** Professor, Dr.PSIMS & RF, Vijayawada, India.

**Dr.Lukka Mounika\*** Post Graduate Student of General Surgery, Dr.PSIMS & RF, Vijayawada, India.  
\*Corresponding Author

**Dr.Hemanth Jalayya Tellakula** Post Graduate Student of General Surgery, Dr.PSIMS & RF, Vijayawada, India.

**ABSTRACT** **Introduction:** Split skin grafting is a widely used surgical procedure for the treatment of ulcers. Graft survival depends on various factors like vascularity, wound infection, etc. Diabetes is associated with microvascular damage leading to endothelial dysfunction, neuropathy, wound infection, which collectively affects graft survival. **Aim:** To compare the amount of graft uptake, the postoperative complications, and survival of split thickness skin graft in diabetic wound management when compared with non-diabetics. **Materials and Methods:** In this prospective non-randomized comparative study, 30 patients with ulcers were included of which 15 were diabetic, and 15 were non-diabetic. Split skin grafting was done as a part of their wound management. The two groups were compared in terms of the amount of graft uptake, post-operative wound infection, re-ulceration, revisional surgery, donor site infection. **Results:** Average wound surface area in diabetic group is 42.31 cm<sup>2</sup> and average graft uptake is 23.67 cm<sup>2</sup>, in non-diabetic group average wound surface area is 78.06 cm<sup>2</sup> and average graft uptake is 64.06 cm<sup>2</sup>. Diabetics have significantly less graft uptake when compared with non-diabetics (p<0.001). out of 15 patients in diabetic group 3(19.3%) underwent revisional surgery, out of 15 patients in non-diabetic group 1(3.85%) patients underwent revisional surgery (p value is <0.05) which is statistically significant. 1(5.8%) out of 15 patients in diabetic group developed re-ulceration, 1(1.9%) out of 15 in non-diabetic group developed re-ulceration (p >0.3, not significant). 4(25%) out of 15 in diabetic group developed post operative graft infection, 2(13.5%) out of 15 in non-diabetic group developed graft infection (p > 0.1, not significant). None of the patients in the study developed donor site infection. **Conclusion:** Diabetes is associated with poor graft survival and high post operative complication rates in patients undergoing split skin grafting.

**KEYWORDS :** skin grafting, diabetics, split-skin graft,

## INTRODUCTION

Skin grafting is a process of reconstructing a defect in the skin. Split skin grafting is a widely used surgical procedure for the treatment of ulcers which involves transfer of epidermis and part of dermis from donor area to recipient area. Uptake of STSG takes place in three phases namely imbibition, revascularization and Organization. Graft will securely adhere to the recipient bed by 10 to 14 days. Sensations return to the graft over time, pain is the 1st sensation to return within 4 to 5 weeks after grafting.

Graft survival depends various factors like vascularity, wound infection etc. Graft survival in diabetes is affected by endothelial dysfunction, neuropathy, wound infection. Endothelial dysfunction leads to micro vascular disruption that is preferably seen in kidneys, eyes and extremities. Neuropathy is another significant problem because the patients cannot appreciate pain and most of the times not aware of severity of their wound. All these factors collectively influence the graft survival in diabetics who undergo skin grafting. Hence this study has been taken up to identify the survival of split thickness skin graft in Diabetics and non diabetics.

Total of 30 patients were included in this prospective study. All the patients were treated with split thickness skin graft. They were divided into two groups, Diabetic group (15 patients) and Non-diabetic group (15 patients). Initial assessment of the wound was done in all the patients with Fasting blood sugar levels (FBS), Postprandial blood sugar levels (PPBS) and HbA1c levels apart from the routine clinical evaluation. All the patients underwent thorough debridement of the ulcer initially. All the patients were treated with antibiotics and correction of hematological parameters like anemia.

## INCLUSION CRITERIA:

1. Patients above 18 yrs of age, undergoing SSG were included in this study.
2. Ulcers with healthy granulation tissue with no bacterial growth or scanty growth on culture were included in this study.
3. Patients who were diagnosed with diabetes & on medication, and patients who were diagnosed recently with fasting sugar of >126 mg/dl or random blood sugar of >200mg/dl were included in the diabetic group

## EXCLUSION CRITERIA:

1. Patients with age less than 18 yrs
2. Patients with peripheral arterial disease, retroviral disease, Malignancies, Tuberculosis which hinders wound healing were excluded from the study.

All the patients underwent split thickness skin graft for the management of ulcer after following standard criteria. Results were compared between two groups in terms of amount of graft uptake, post operative graft infection, need of revisional surgery, and donor site infection. Amount of graft uptake was calculated by measuring surface area of the wound that was grafted and area of the graft that was taken up at 14th post operative day. Surface area was measured with standard manual method of transparent sheet, graph paper and scale. All the patients in the study were followed-up for 6 months.

## RESULTS

Total 30 patients were studied with 15 in each group. Average wound surface area in diabetic group is 42.31cm<sup>2</sup> and average graft uptake is 23.67cm<sup>2</sup>, in Non-diabetic group average wound surface area is 78.06cm<sup>2</sup> and average graft uptake is 64.06cm<sup>2</sup>. Compared with non-diabetics, diabetics have significantly less graft uptake (p<0.001). Out of 15 patients in diabetic group 3(19.3%) underwent revisional surgery, out of 15 patients in non diabetic group 1(3.85%) patients underwent revisional surgery (P value is <0.05) which is statistically significant. 1(5.8%) out of 15 patients in diabetic group developed re-ulceration, 1(1.9%) out of 15 in Non-diabetic developed re-ulceration (p>0.3,not significant). 4(25%) out of 15 in diabetic group developed post operative graft infection, 2 (13.5%) out of 15 in non diabetic group developed graft infection (p>0.1, not significant). None of the patients in the study developed donor site infection.

**Table – 1 Age And Sex Distribution Of The Patients**

| Age             | Non-diabetics |        | Diabetic      |        |
|-----------------|---------------|--------|---------------|--------|
|                 | Male          | Female | Male          | Female |
| 35-45           | 3             | 1      | 2             | 1      |
| 46-55           | 4             | 0      | 4             | 2      |
| 56-65           | 5             | 2      | 4             | 2      |
|                 | Diabetics     |        | Non-diabetics |        |
| Mean Age        | 52.8          |        | 39.94         |        |
| Graft Infection | 2             |        | 4             |        |

|                      |   |   |
|----------------------|---|---|
| Revision Surgery     | 1 | 3 |
| Re-ulceration        | 1 | 1 |
| Donor site infection | - | - |

### GOOD GRAFT UPTAKE IN NON-DIABETIC PATIENTS



### POST-OPERATIVE GRAFT INFECTION IN DIABETIC PATIENT



### DISCUSSION:

Diabetes mellitus is a condition characterized by hyperglycemia that is caused due to improper secretion of insulin or defective action of insulin on cells or both. Diabetes is the most common metabolic disorder with approximately 62 million cases in India. Diabetes leads to long term disease specific microangiopathy, this micro vascular dysfunction in diabetes will adversely affect the process of wound healing. Wound healing is impaired in diabetics due to micro vascular disease leading to tissue hypoxia, peripheral neuropathy and abnormal inflammatory and cellular pathways which predispose to infection in ulcers.

The micro vascular dysfunction leads to reduced blood flow to the tissue even though there might be no reduction in overall vascular density in patients suffering from diabetes.

Recent studies on diabetic animals revealed a reduction in VEGF which is known to promote angiogenesis and a topical application of VEGF improved healing. Split skin grafting is commonly employed surgical procedure in management of ulcers, which require angiogenesis for its survival.

As diabetic patients suffering with microangiopathy have poor angiogenesis, they are at risk for graft failure.

### CONCLUSION:

Diabetes is associated with poor graft survival and high postoperative complication rates in patients undergoing split skin grafting.

### REFERENCES:

1. Kaveeshwar SA , Cornwall J. The current state of diabetes mellitus in India. The Australasian medical journal. 2014, 7(1): 45-48. -ncbi.nlm.nih.gov
2. Rose JF, Giovinco N, Mills JL, Najafi B, Pappalardo J, Armstrong DG . Split-thickness skin grafting the highrisk diabetic foot. J Vasc Surg. 2014;59(6):1657-63.
3. Ramanujam CL, Han D, Fowler S, Kilpadi K, Zgonis T. Impact of diabetes and co-morbidities on split-thickness skin grafts for foot wounds. J Am Podiatr Med Assoc. 2013;103(3):223-32.
4. Christopherson K. The impact of diabetes on wound healing: implications of microcirculatory changes. Br J Community Nurs. 2003;8: S6-13.