Fish Skin Xenografts Assisting with Split Thickness Skin Graft Harvest Site Management

Richard Bruno, DPM, FACFAS

Eastern Virginia Medical School

Statement of Purpose

The aim of this case series was to explore the usage of fish skin xenograft in the management of pain and healing of split thickness skin graft harvest sites.

Level of Study

Level IV, Case Study

Introduction

Complex lower extremity wounds require multiple treatment modalities based on the type of wound. For granular wounds, split thickness skin grafts are the gold standard with quick incorporation and high healing and success rates for re-epithelization. Kirsner has studied the success rate for split thickness skin grafting for venous leg ulcers to range between 50% to 75%. Post-operative pain to these split thickness skin graft harvest sites is often severe and the main drawback to an otherwise positive procedure.

Split thickness skin grafting has been proven to be reliable resource in healing diabetic wounds. Rose et al concluded there were no differences in split thickness skin grafting incorporation and success rates in patients with diabetes compared to patients without diabetes.

Initial application of split thickness skin graft

2

Methods

A retrospective case review of six patients who underwent harvest of split thickness skin grafting to assist in the management of complex lower extremity wounds was performed. All six patients had a past medical history of diabetes. Donor sites were treated with the application of fish skin xenografts. Seven total applications were performed with one patient receiving two harvest site treatments due to the site of the plantar deficit treated with split thickness skin grafting. All six patients received flaps procedures with the origination site treated with graft therapy until granulation tissue was ready to accept a split thickness skin graft. No patients received wound vacuum therapy. The split thickness skin graft sites were dressed with non-adherent bolster dressings. The fish skin xenograft site was dressed with non-adherent and Tegaderm in all cases. Each patient received a single application of the fish skin xenograft with no additional applications required. Patients were non-weight bearing due to the split thickness skin graft application. Patients were seen three times over 10 days for dressing changes and harvest site inspections. Re-application of the non-adherent and Tegaderm were performed.

Results

All six patients went on to heal their lower extremity wounds with the split thickness skin graft application. Mass incorporation of the split thickness skin grafting occurred within 7-14 days. Patients had an average donor site healing time of eight and a half days. Four of the grafts were fully incorporated by the fourth day and first post-operative visit while three of the grafts were fully incorporated by the seventh day on the second post-operative exam. The average hemoglobin A1c of patients in the study was 7.2%. Four patients expressed no pain to the donor site following fish skin xenograft application. Two patients graded their pain scores as 3/10 and 4/10 with subjective description of mild to moderate pain. Their pain was well managed with over the counter pain medication. There were no healing complications or instances of infection. Pigmentation of the split thickness skin graft harvest sites were noted to progress around

Initial fish skin xenograft application

4

Healed donor site

5

6

Discussion

Fish Skin Xenografts have shown the ability to assist with wound healing in complex wounds. There is not much literature on split thickness skin graft harvest site management. Most split thickness skin graft harvest sites are noted to have increased incident of pain in patients with healing of the donor site occurring around fourteen days.

For patients with complex wounds, Diabetes can make this even more complicated. Shibuya et al has studied the increased infection and wound complications rates in diabetic patients. For every 1% increase in the HbA1c, there is an increased odds of infection by a factor of 1.59 and wound complications by 1.25.

Walters et all studied the durability of plantar recipient sites of the foot with wound recurrence occurring in approximately 17% of patients versus 10% in patients with dorsal foot wounds. Additional studies show the success of split thickness skin grafting in high risk patients such as those with Diabetes Mellitus. Fish Skin Xenograft for donor sites provide an opportunity to healing these high risk patients faster than conventional management which can lower post procedure complications.

Fish skin xenografts are a viable option to assist with faster healing times and decrease subjective pain scoring to split thickness skin graft donor sites.

Split thickness skin graft incorporation

References

1. Split thickness skin grafting: A Primer for Orthopedic Surgeons. J Am Acad Orthopedic Surgery. 2021

2. Split thickness skin grafting for lower extremity ulcerations. Kirsner. Dermatological Surgery. 1997

3. Longterm Outcomes of Split Thickness Skin Grafting to the Plantar Foot. Walters et al. JFAS. 2020..

4. A Meta-Analysis of the Outcomes of Split Thickness Skin Graft on Diabetic Leg and Foot Ulcers. Yammine. Int J Low Extremity Wounds. 2019.

5. Split Thickness Skin Grafting. Braza. 2023.