

Testing the Limits of Fish Skin Xenograft for Large Mohs Surgery Defects

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Background

Mohs micrographic surgery is a tissue sparing technique used in the treatment of high-risk Basal Cell Carcinomas. Basal Cell Carcinomas are common, low-grade tumors that rarely metastasize but will continue to enlarge and become locally destructive.¹ For extremely large tumors removal and reconstruction becomes a great challenge.¹ Here we report a case of a Basal Cell Carcinoma on the shoulder of an 87-year-old female and the utility of using a combined purse string closure with fish skin xenograft after Mohs Micrographic Surgery.

Methods

Our patient was an 87-year-old female, who presented to the clinic with a large, ulcerated plaque with an erythematous border on the right anterior shoulder. The tumor was present for five years. Shave biopsy revealed an infiltrative basal cell carcinoma. The lesion was successfully treated with Mohs Micrographic Surgery. After clearing the lesion, she was left with a 15.5 cm x 11.5 cm defect. The defect size was reduced utilizing a purse string suture, followed by application of an omega-3 fish skin xenograft designed to expedite healing. This graft was applied over the subcutaneous fat, moistened with saline, layered with non-adherent padding and adhesive strips followed by gauze and stretch tape. The graft was removed and re-applied at 1-week intervals for a total of 7 weeks. After purse string closure and 7 applications of omega-3 fish skin xenograft, the patient's wound healed completely with preservation of function and an acceptable cosmetic outcome.

Results

Wound History: Patient presented with a large ulcerated, infiltrative Basal Cell Carcinoma on her right anterior shoulder. The lesion was present for five years. The tumor was entirely removed with Mohs Micrographic Surgery, which required two stages of excision. A standard linear repair was not ideal due to large diameter of defect.

Synthetic Graft Applications: 7 applications of omega-3 fish skin xenograft resulted in complete wound closure at 3 months. Skin matching improved, with acceptable cosmetic outcome.

Discussion

Omega-3 fish skin xenografts are FDA-approved for the treatment of chronic wounds.² It is an acellular dermal matrix from Atlantic cod with a uniquely preserved porous microstructure similar to human skin.² Advantages of using these grafts include their ability to decrease inflammatory cytokines, bacteria, and viruses, while increasing angiogenesis.² They are useful for large defects and help facilitate an environment for cell ingrowth and wound healing in the skin. The fish skin xenograft has been noted to be more affordable compared to acellular dermal matrices originating from other sources.

Conclusion

Use of an omega-3 fish skin xenograft has the potential for superior repair outcomes particularly when dealing with large wounds. Our patient was able to achieve a cosmetically acceptable outcome without impairment of the functional mobility of her shoulder. We would advocate for further use of synthetic grafts when advanced surgical closures are not appropriate.

References

1. Kim, John Y.S., et al. "Guidelines of Care for the Management of Basal Cell Carcinoma." *Journal of the American Academy of Dermatology*, vol. 78, no. 3, 2018, pp. 540-559.
2. Seth N, Chopra D, Lev-Tov H. "Fish Skin Grafts with Omega-3 for Treatment of Chronic Wounds: Exploring the Role of Omega-3 Fatty Acids in Wound Healing and A Review of Clinical Healing Outcomes." *Surg Technol Int*. 2022 May 19;40:38-46.



Day 0
Initial presentation for surgery
- 4 weeks post biopsy



Day 0
Wound size: 14.5 X 8.5 cm



Day 1
Patient returned for Stage II excision
Wound size: 15.5 X 11.5 cm



Day 1
1st application of fish skin graft



Day 8
2nd application of fish skin graft



Day 13
3rd application of fish skin graft



Day 20
4th application of fish skin graft



Day 27
5th application of fish skin graft



Day 34
6th application of fish skin graft



Day 40
7th application of fish skin graft



Day 62
Follow-up



8 Months post-surgery
Wound healed with
minimal functional deficit