Use of Irradiated Human Skin Allograft for Temporary Coverage in Staged Surgical Excisions of Lentigo Maligna Melanoma

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Introduction

Lentigo maligna (LM), the most common subtype of melanoma in situ (MIS), represents 79-83% of MIS cases.[1] Patients with LM or other subtypes of MIS have a greater risk of developing invasive lentigo maligna melanoma (LMM).[2] Radiation therapy, topical imiquimod, and 5-fluorouracil are all treatment options.[3] However, surgical excision remains the most effect treatment.[4-9] Wide local excision, Mohs micrographic surgery (MMS), and staged surgical excision (SSE) are all reasonable options. The use of SSE with permanent histologic sections ensures high cure rates, but this technique leaves an open wound that requires effective, temporary coverage while specimens are evaluated prior to final reconstruction. The objective was to review our experience with irradiated human skin allograft (IHSA) following SSE of LM and LMM.

Dimensions (cm)	Area (cm^2)	Cost ($)
1.5x2	3	80
2.5x3	7.5	120
4x4.5	18	200
7x8	56	350
6x12	72	350

Table 2: Available sizes and costs of GammaGraft™

Methods

A retrospective analysis was performed at a single institution from 2008 to 2020. Patients with a pathology-confirmed diagnosis of LM or LMM, who underwent SSE followed by placement of GammaGraft® IHSA were included. All procedures conformed to the National Comprehensive Cancer Network (NCCN) guidelines (Table 1). Wound infection, location of malignancy, post-operative pain, and cost were reviewed.

GammaGraft® (Promethean LifeSciences, Inc., Pittsburgh, PA) is an irradiated, sterile human allograft containing both dermis and epidermis.

Tumor Thickness	Recommended Margins
In situ	0.5-1.0 cm
≤1.0 mm	1.0 cm
>1.0-2 mm	1-2 cm
>2.0-4 mm	2.0 cm

*Table 1: NCCN Guidelines Version 2.2021

Results

- From 2008 to 2014, seventy-eight (n=78) patients were included, (46 males and 32 females).
- The average time from initial surgery to final reconstruction was 16.9 days.
- IHSA placement occurred on numerous regions, including the cheek, nose, forehead, scalp, trunk, extremity, neck, and ear.
- Final reconstructive options included complex closures, local flaps, full and split-thickness skin grafts, secondary intention healing, and primary closure.
- Pathology results revealed MIS or LM in 45/78 cases (58%) and invasive LMM in 33/78 cases (42%).
- Average wound size of 34 cm^2.
- Only 3 wound infections and 1 hematoma reported.
- From 2014 to 2020, 107 patients were added to the original study (n=178 from 2008-2020). Only one infection was reported (1/107 patients).
- Data from 2014 to 2020 is currently being analyzed.

Figure 1. (A) Initial application of the IHSA. (B) The appearance of the wound 2 weeks post-operatively. (C) Removal of the dried allograft. (D) Healthy wound bed under the allograft.

Conclusion

- SSE with permanent section histologic confirmation for LM and LMM provides recurrence rates of 0-5%,[10-11] as compared to rates of 8-20% following standard wide local excision with 5 mm margins.[12]
- SSE provides the option for multiple-stage resections, thus minimizing the margins necessary during the first resection to 5 mm.
- IHSA avoids the need for expensive, daily dressing changes.
- IHSA optimizes cosmesis and improves recurrence rates.
- IHSA is a practical and affordable option (Table 2).
- Offers low rates of wound infections and complications while awaiting tumor-free margins from pathology.
- Efficient, biological protection provided by the IHSA.

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