

Successful Intact Fish Skin Graft (FSG) Reconstruction of A Complex Scalp Wound With Exposed Cranium Secondary to Gorlin Syndrome

Mark D Suski MD, FACS

Los Robles Center For Advanced Wound Healing Thousand Oaks CA
Institution, organization, establishment, foundation

INTRODUCTION

Gorlin syndrome or Nevoid Basal Cell Carcinoma syndrome is an autosomal dominant familial cancer syndrome which may cause hundreds of basal cells over a patient’s lifetime. It is characterized by a triad of manifestations to include multiple basal cell cancers, odontogenic keratocysts and skeletal deformities. Palmar and plantar skin pitting is also common. Prevalence is estimated at 1 per 40,000-60,000. The disease affects men and women equally. Patients can develop basal cell cancers as early as infancy with the median age being 20 years. It is caused by a mutation in patched 1 (PTCH), a tumor suppressor gene located on chromosome 9q. This gene encodes a transmembrane receptor protein that recognizes signaling proteins of the sonic hedgehog family. Activation of this mutated gene leads to tumorigenicity.^{1,2,3} This case report highlights the clinical efficacy of intact fish skin graft (FSG) in this unique subset of rare patients.

METHODS

A 70-year-old White female with Gorlin syndrome, initially diagnosed at age twenty, presented to our wound care center status post Moh’s excision of a large basal cell cancer of her midline scalp. The resultant wound measured 10 by 4 cm with exposed cranium anteriorly of 4 by 4 cm. She had failed outpatient conservative wound management by her dermatologist for greater than 6 weeks. Her past medical history was significant for non-insulin dependent diabetes mellitus, atrial fibrillation, hypertension and hyperlipidemia. She was being actively treated with vismodegib, a selective hedgehog pathway inhibitor. Her father, brother and niece have also been diagnosed with Gorlin syndrome. She has undergone greater than 50 basal cell excisions primarily involving her head and neck with extensive resultant periwound scarring.

RESULTS

The treatment plan consisted of operative bone burring and placement of both fragmented and intact FSG followed by one additional application of the intact FSG product 2 weeks later. Her exposed bone was fully granulated at 4 weeks postoperatively and she underwent successful staged split thickness skin graft reconstruction. Long term follow up has confirmed stable and pliable graft coverage.

CONCLUSIONS

FSG is FDA approved for treating most chronic and acute wounds. The product is an acellular dermal matrix sustainably harvested from Icelandic cod with a porous microstructure similar to human skin. Characteristics of the xenograft include bacterial resistance, cellular migration/proliferation, angiogenesis and inflammatory cytokine mitigation.⁴ To our knowledge this is the first case report of successful FSG reconstruction in a Gorlin syndrome patient.

CASE: RECONSTRUCTION OF A COMPLEX SCALP WOUND WITH EXPOSED CRANIUM

Patient History: A 70-year-old female with Gorlin syndrome, diagnosed at age 20, has a history of over 50 basal cell excisions primarily on her head and neck.

Wound History: She presented with a 10x4 cm wound on her scalp after Moh’s excision of a large basal cell cancer, with exposed cranium measuring 4x4 cm, and had failed conservative wound management for over 6 weeks.

Patient Outcomes: After treatment with intact fish skin graft (FSG), the wound granulated fully by 4 weeks, and she underwent successful staged skin graft reconstruction with stable and pliable graft coverage on long-term follow-up.



11/14/2024: Intraoperative Mohs defect with exposed bone



11/14/2024: Intraoperative particulate FSG placement



11/14/2024: Intraoperative sheet FSG placement



11/21/2024: FSG incorporating over exposed bone



11/27/2024: FSG incorporating over exposed bone



12/13/2024: Intraoperative granulation tissue at time of skin graft placement



12/13/2024: Intraoperative sheet FSG placement



12/30/2024: Healed graft at first post-operative visit



1/6/2025: Mature healed skin graft



1/20/2025: Mature healed skin graft

REFERENCES

1. Hasan A., Akintola D. An Update of Gorlin-Goltz Syndrome. Prim Dent J. 2018 Sep 01;7(3):38-41. [PubMed: 30428966]
2. Kosmidis C, Michael C, Mystakidou C, Theodorou V et al. An Easily Missed But Life- Threatening Diagnosis: A Case Report Of Gorlin Syndrome. Am J Case Report 2023; 24: e939117.
3. Gorlin R. Nevoid Basal Cell Carcinoma (Gorlin) Syndrome. Genetics In Medicine. 2004 Nov/Dec Vol 6 No 6:530-539.
4. Manusson s, Baldursson BT, Kjartansson H et al. Regenerative and Antibacterial properties of acellular fish skin and human amnion/chorion Membrane: Implications for tissue preservation in Combat Casualty Care. MilMed. 2017 Mar;182(S1):383-388. Doi: 10.7205/MILMED-D-16-00142 PMID: 28291503