The Healing Power of Nature

Fragmented Fish Skin Graft to Heal Large Soft Tissue Defects Due to Gas Gangrene

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INTRODUCTION

Soft tissue defects due to gas gangrene arise as a result of the rapid destruction of connective tissue. The infection progresses quickly, releasing toxins that lead to necrosis of the surrounding tissue and the formation of cavities within the affected muscles. The affected area appears erythematous, edematous, ecchymotic and releases a foul odor. [1]

Traditional treatment consists of immediate incision and drainage, administration of intravenous antibiotics, supportive medical care with staged serial debridements and negative pressure wound therapy (NPWT). [2] Dermal substitutes too have been incorporated in adjunct with traditional therapy to treat this pathology.

Fish Skin Graft* (FSG) has recently gained popularity for wound healing. Unlike most grafts, it can be applied upon itself in layers, and can be utilized to pack a wound up to the brim. This quality proves to be particularly useful to heal large soft tissue defects due to gas gangrene as such wounds are very irregularly shaped and often deep to muscle and bone. The objective of this study is to present how the fragmented FSG heals soft tissue defects due to gas gangrene with relative speed and efficiency.

METHODS

In both cases, after initial incision and drainage and resection of infected bone, antibiotics beads were applied into the wounds and intravenous antibiotics were administered. A staged debridement was then performed, after which fragmented FSG was fully packed into the wounds and NPWT was initiated. NPWT was continued until the wounds were superficial, after which collagenase ointment was applied twice a day.

RESULTS

A single application of FSG was necessary to heal the wounds. Significant granulation tissue over muscle/bone was noted after initial application that further grafting was not necessary. Complete healing of wounds was noted without any complications.

CONCLUSIONS

FSG is approximately 33% less expensive than other grafts in the market. [3] This makes it a very efficient, time conserving and cost-effective option for this pathology (and possibly others) as only one round of packing the wound cavities with fragmented FSG was necessary to achieve the necessary results in the presented cases. Comparative cross analyses are necessary to objectively assess and quantify the time and money saved using FSG versus alternate grafting modalities.

REFERENCES

1. Stevens DL, Bryant AE. Necrotizing Soft-Tissue Infections. N Engl J Med. 2017;377(23):2253-2265. doi:10.1056/NEJMra1600673.
2. Umeda D, et al. Clinical practice guidelines for the diagnosis and treatment of gas gangrene: 2020 revision. Jpn J Infect Dis. 2022;75(7):403-420. doi:10.7883/yoken.JJID.2022.13429
3. Winters C, Kirsner RS, Margolis DJ, Lantis JC. Cost Effectiveness of Fish Skin Grafts Versus Standard of Care on Wound Healing of Chronic Diabetic Foot Ulcers: A Retrospective Comparative Cohort Study. Wounds. 2020 Oct;32(10):283-290. PMID: 33370245.

CASE # 1

Patient History: 73 y/o female w/ PMHx of uncontrolled DM2, HTN, CAD consulted to podiatry service for severely malodorous wound with infection. Patient noted to be febrile, sweating profusely and running a high fever. CT scan revealed soft tissue emphysema going up to the flexor sheath.

6/31/23: Acute gas gangrene necessitating emergent I&D and partial 3rd ray resection

7/5/23: Clinically stable wound with intact Antibiotic beads

7/5/23: Debridement and Fragmented FSG application

7/22/23: s/p 2 weeks

7/29/23: s/p 3 weeks

8/15/23: s/p 5 weeks

8/29/23: s/p 7 weeks

9/19/23: s/p 10 weeks

9/26/23: s/p 11 weeks

10/10/23: s/p 13 weeks

10/17/23: s/p 14 weeks

10/24/23: s/p 15 weeks, NPWT DC'd today, now initiated collagenase ointment BID

10/31/23: s/p 16 weeks

11/14/23: s/p 18 weeks

12/12/23: s/p 22 weeks

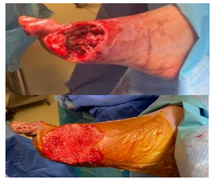
1/4/24: s/p 25 weeks

2/20/24: s/p 28 weeks

CASE # 2

Patient History: 66 y/o male with PMHx of uncontrolled DM2 (Hba1c:8.2), PVD, CAD, HTN and schizophrenia reported to the ED with a pungent smelling black toe. Patient is febrile and septic. Xrays were positive for soft tissue emphysema.

5/25/23:
Partial 1st ray resection and partial 2nd toe amputation



6/1/23:
Debridement and Fragmented FSG application

6/23/23:
s/p 3 weeks

8/10/23:
s/p 9 weeks

9/12/23:
s/p 13 weeks, healed