

Pressure Injury Reconstruction Utilizing an Ovine Forestomach Matrix Graft

Abigail Chaffin, MD, FACS, CWSP, FAPWCA

Chief – Division of Plastic Surgery, Tulane University, New Orleans, LA, USA

INTRODUCTION

The burden of pressure injuries (PI) remains a substantial problem with over 1 in 10 adults patients admitted to hospitals affected with PIs [1]. As of 2011 it was estimated that the cost of treating a stage 4 PI and its related complications was \$129,248. Additionally, the average 6 month post operative healing rate for a stage 4 PI is 31-34% and the post operative complication rate after flap reconstruction is reported to be 58.7%. Herein we present the use of an ovine forestomach matrix (OFM) graft in PI reconstruction. OFM is an intact extracellular matrix graft that has demonstrated an ability to modulate tissue proteases [3], promote angiogenesis [4] and is resilient in contaminated wounds [5-7]. The authors hypothesize that the addition of OFM would decrease post-operative complications and healing times seen in PI reconstruction.

METHODS

This is a single center retrospective case series analyzing 6 cases (n=6) in which OFM was utilized as part of PI reconstruction. After surgical reconstruction patients were followed up until wound closure.

RESULTS

Five males and one female patient all presented with Stage 4 PI's. All patients underwent a flap surgical reconstruction with the use of OFM as an implant. All flap reconstruction patients had healed surgical incisions with no significant postoperative complications. There was one mild postoperative dehiscence that healed by 5 weeks.

CONCLUSION

OFM may assist in the accelerated healing of PIs following surgical reconstruction and lower the complication rate when used as part of flap closure. Further studies are needed to expand on this pilot experience.

REFERENCES AND DISCLOSURES

[1] Li, Z., F. Lin, L. Thalib and W. Chaboyer (2020). "Global prevalence and incidence of pressure injuries in hospitalised adult patients: A systematic review and meta-analysis." *Int J Nurs Stud* 105: 103546. [2] Bamba, R., J. J. Madden, A. N. Hoffman, J. S. Kim, W. P. Thayer, L. B. Nanney and M. E. Spear (2017). "Flap Reconstruction for Pressure Ulcers: An Outcomes Analysis." *Plast Reconstr Surg Glob Open* 5(1): e1187. [3] Negron, L., S. Lun and B. C. H. May (2012). "Ovine forestomach matrix biomaterial is a broad spectrum inhibitor of matrix metalloproteinases and neutrophil elastase." *Int Wound J* 11(4): 392-397. [4] Irvine, S. M., J. Cayzer, E. M. Todd, S. Lun, E. W. Floden, L. Negron, S. G. Dempsey, A. Alexander, S. P. Gunningham, C. Knight, P. F. Davis, B. R. Ward and B. C. H. May (2011). "Ovine Forestomach Matrix (OFM) Stimulates Angiogenesis In Vitro and In Vivo." *SAWC*, Dallas, Texas, USA. [5] Chaffin, A. E. and M. C. Buckley (2020). "Extracellular matrix graft for the surgical management of Hurley stage III hidradenitis suppurativa: a pilot case series." *J Wound Care* 29(11): 624-630. [6] Chaffin, A. E., S. G. Dowling, M. S. Kosyk and B. A. Bosque (2021). "Surgical reconstruction of pilonidal sinus disease with concomitant extracellular matrix graft placement: a case series." *J Wound Care*. [7] Desvigne, M. N., K. Bauer, K. Holifield, K. Day, D. Gilmore and A. L. Wardman (2020). "Case Report: Surgical Closure of Chronic Soft Tissue Defects Using Extracellular Matrix Graft Augmented Tissue Flaps." *Frontiers in Surgery* 7(173).

Sex/Age	Comorbidities	History	Defect Measurement	Outcomes
M, 51	Paraplegic	<ul style="list-style-type: none"> Recurrence of left ischial and trochanteric PI Prior gluteal flap for sacral ulcer, VY hamstring flap for left ischial ulcer Stage 4 ischial and trochanteric PI with underlying osteomyelitis 	~20 x 30 cm	<ul style="list-style-type: none"> Fully healed at 6 weeks No recurrence, last follow-up week 18 No complications
M, 66	ESRD	<ul style="list-style-type: none"> Stage IV sacral decubitus PI after prolonged ICU stay for gallstone pancreatitis 	~10 x 10 x 5 cm	<ul style="list-style-type: none"> Fully healed at 5 weeks No recurrence at week 18 No complications
M, 24	Paraplegic after GSW	<ul style="list-style-type: none"> Stage IV bilateral ischial PI Prior history of E. coli and Strep infections with underlying ischial tuberosity osteomyelitis suspected on MRI 	~8 x 9 x 5 cm (bilateral)	<ul style="list-style-type: none"> Fully healed at 5 weeks Drain pulled out accidentally week 1; small seroma left side No recurrence, last follow-up week 16 No complications
F, 49	Obesity	<ul style="list-style-type: none"> COVID resulting in prolonged ICU stay in 2021 Stage IV PI from ICU stay, underwent debridements and wound care for 1 year with no significant progress MRI demonstrated concerning sign of osteomyelitis in the coccygeal and distal sacrum 	~8 x 7 x 7 cm	<ul style="list-style-type: none"> Fully healed at 5 weeks Remained healed at 16 months No complications
M, 25	Paraplegic after MVA	<ul style="list-style-type: none"> Recurrent stage IV sacral decubitus PI and a new stage IV left ischial PI with significant osteomyelitis extending from ischium to posterior column of the acetabulum Patient has had previous V-Y advancement flap 3 years prior to sacral PI 	~15 x 15 x 8 cm	<ul style="list-style-type: none"> Fully healed at 5 weeks No recurrence, last follow-up week 8 No complications
M, 56	DM Previous smoker	<ul style="list-style-type: none"> Burned bilateral buttocks and thighs in 2017 in a roofing accident STSG failed leading to stage IV PI Initial attempt at reconstruction at outside center dehiscence and now has recurrent stage IV PI with osteomyelitis of ischium 	~ 15 x 10 x 6 cm	<ul style="list-style-type: none"> Fully healed at 4 weeks No recurrence, last follow-up week 6 No complications

Case Example: 25-year-old male with recurrent Stage IV PI and concurrent osteomyelitis.

