

Ovine Forestomach Matrix is Efficacious in the Closure of Significant Post Surgical Undermining

Wahab N., MD; Lapucha M., MD; Chauhan, C., RN; Wahab Consulting & Research, Las Vegas, NV

INTRODUCTION

A classic tenet of surgery states, "dissect only along named structures" i.e. expose structures by dissecting through the loose, mostly avascular areolar tissue between fascial planes to minimize tissue trauma. Nevertheless, this manipulation does induce an inflammatory reaction that disrupts the normal function and interaction of adjacent tissue layers, giving rise to dead space and increased risk of post-operative complications, for example significant tissue undermining.

Ovine forestomach matrix (OFM) is a decellularized ECM containing basement membrane, structural proteins (e.g. collagen I, III, IV, elastin), and adhesion proteins (e.g. fibronectin, laminin) and growth factors (Lun *et al.* 2010). OFM acts as a biomimetic of tissue ECM to stimulate cellular activation and migration and orchestrates progression of natural wound healing (Irvine *et al.* 2011). OFM attempts to recreate the normal function and relationship of the disrupted tissue layers as described. This promotes wound healing, and prevention of larger tissue loss.

METHODS

An OFM graft[®] was used to address significant post surgical undermining in patients previously dissected along a surgical plane. The OFM graft was rehydrated in saline then placed between the freshly debrided adjacent tissue layers in the undermined area. NPWT was applied as the outer dressing using a bolster technique and was changed thrice weekly.

RESULTS AND DISCUSSION

All undermined defects rapidly granulated following placement of the OFM graft. OFM physically filled the tissue voids and vascularized as the graft integrated into the regenerating tissue. OFM is known to be anti-inflammatory (Street *et al.* 2015, Negron *et al.* 2012) suggesting its efficacy in addressing these non-healing defects between adjacent tissue planes may be via rebalancing the local inflammatory response.

CONCLUSION

This case series validates a novel technique of addressing post-surgical undermining. Based on the positive outcomes seen here, we postulate that OFM may prevent post-surgical complications in certain procedures if implanted at the time of surgery. Examples include open separation of components, delayed primary closure, and any procedure that involves extensive dissection along a tissue plane. It merits further study to elucidate its role in the prevention of post-surgical complications.

REFERENCES AND DISCLOSURES

Product was provided by Aroa Biosurgery Limited (New Zealand); [®] Myriad (Aroa Biosurgery Limited, New Zealand). Irvine, S. M., et al (2011). "Quantification of in vitro and in vivo angiogenesis stimulated by ovine forestomach matrix biomaterial." *Biomaterials* 32(27): 6351-6361. Lun, S., et al (2010). "A functional extracellular matrix biomaterial derived from ovine forestomach." *Biomaterials* 31(16): 4517-4529. Negron, L., et al (2014). "Ovine forestomach matrix biomaterial is a broad spectrum inhibitor of matrix metalloproteinases and neutrophil elastase." *Int Wound J* 11(4): 392-397. Street, M., et al (2015). "Augmentation with an ovine forestomach matrix scaffold improves biological outcomes of rotator cuff repair in a rat model." *J*

CASE 1: Pfannenstiel-Incision Abdominoplasty

57-Year-old female; pfannenstiel-incision abdominoplasty resulting in abdominal dehiscence and necrosis. Defect 14.0 x 8.0 x 3.5 cm; undermining 4.2 cm at the time of discharge. The undermining was resolved by 6 weeks after initial OFM graft placement and healed at 12 weeks.



CASE 2: Necrotizing Soft Tissue Infection

54-Year-old female; discharged with a wound of 9.3 x 21.0 x 4.2 cm to the medial left thigh; undermining 8.8 cm. The post-surgical undermining resolved by 10 weeks after initial graft placement and healed at 22 weeks.



CASE 3: Stage IV Ischial Pressure Ulcer

44-Year old male; paraplegic with persistent stage IV ischial pressure ulceration. Surgical debridement due to OM resulted in 12 cm undermining along the fascial plane at time of discharge. The undermining decreased 47% to 4.8 cm by 8 weeks.

