International Journal of Biology and Pharmacy Research Updates

Journal homepage: https://orionjournals.com/ijbpru/

(CASE REPORT)

The use of acellular dermal matrix in the closure of anterior leg ulceration with exposed tibialis anterior tendon caused by compression dressing

Giaampietro Bertasi [1,*] and Mariana Peroni [2]

[1] *Department of Biotechnology, University of Padua, Italy.*
[2] *U.O. Geriatry - Diabetology, Santa Maria del Carmine Hospital, Rovereto, Italy.*

International Journal of Biology and Pharmacy Research Updates, 2022, 02(01), 001–005

Publication history: Received on 16 June 2022; revised on 20 July 2022; accepted on 22 July 2022

Article DOI: https://doi.org/10.53430/ijbpru.2022.2.1.0029

Abstract

The extracellular matrix (ECM) plays an integral role in wound healing. It provides both structure and growth factors that allow for the organised cell proliferation. Large or complex tissue defects may compromise host ECM, creating an environment that is unfavourable for the recovery of anatomical function and appearance. Bioscaffolds derived from the extracellular matrix (ECM) of decellularized tissues can naturally mimic the complex extracellular microenvironment through the retention of compositional, biomechanical, and structural properties specific to the native ECM. Increasingly, studies have investigated the use of ECM-derived scaffolds as instructive substrates.

Keywords: Wound Healing; Diabetes; Chronic Wounds; Skin Substitutes; Skin Dressings; Matrices; ADM; p-Toluensulfonic acid; Biofilm

1. Introduction

The most frequently reported with medical compression therapy-associated adverse events include skin irritation/lesion, discomfort and pain. Compression can be responsible for adverse effects, sometimes severe, requiring treatment change or withdrawal. Tight bandages can also result in vascular compromise, which can lead to local hypothermia and swelling of the limb and toes due to venous stasis; if left unattended, this can also result in necrosis. [1][2]

2. Case

Patient: 49/Female with KHO DMT2, presented with a sloughy ulcer with purulent discharge on the lateral aspect of the right foot, with OM of the 5th MT Head. She was being treated elsewhere.

Compression dressing applied resulting in anterior leg ulceration with exposed Tibialis Anterior tendon.

Prognosis was below the knee amputation. (Fig. 1)

The ulceration has been treated with Advanced Decellulazied Dermis (Dermacell AWM)* (*Dermacell AWM is a technologically advanced Acellular Dermal Matrix that is used to treat diabetic foot ulcers, chronic non-healing wounds, and supplemental tissue support. (Fig. 3) after deep WBP and biofilm treatment with p-toluensulfonic acid (C-DEB)** ***C-DEB is p-toluensulfonic acid, a dehydrating agent.* [3][4][5][6][7][8][9][10][11][12][13][14]

* Corresponding author: Giaampietro Bertasi
Department of Biotechnology, University of Padua, Italy.

Figure 1 Anterior leg ulceration with exposed Tibialis Anterior tendon

2.1. Treatment

Debridment. Systemic antibiotic therapy. 5 weeks VAC and p-toluensulphonic acid (Fig. 2)

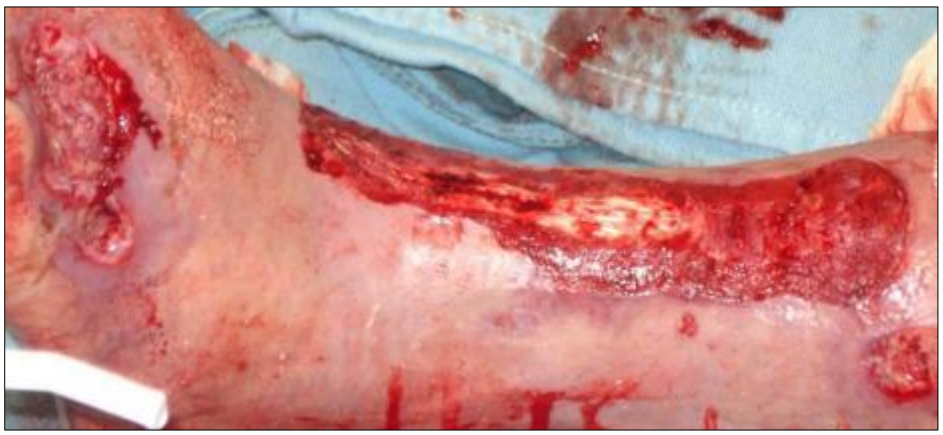

Figure2 Ulcer after WBP

At week 5 grafted with Advanced Decellularized Dermis (Dermacell AWM)*.

Figure 3 Graft in situ and non-adherent medication

Figure 4 7 days post-op

Figure 5 6 weeks post-op post-op: the escars fell at week seven

Figure 7 9 week post-op

Figure 8 12 weeks pos-op

3. Conclusion

Uneventful post-operative course and complete healing at 12 weeks post-op. (Fig. 8). Dermacell AWM has shown efficacy as an adjunct in lower limb ulcers treatment and has been shown to improve the aesthetic properties of skin. Dermavell AWM is particularly useful when treating exposed tendons and bones that may be unsuitable for skin graft coverage. [7][15]

Compliance with ethical standards

Acknowledgments

We thank Lifenet Health, Virginia Beach, Virginia, USA, for providing Decellularized Dermal Matrix (Dermacell) and DAPA srl, Verona Italy for providing C-DEB.

Disclosure of conflict of interest

The Authors declare that there is no actual or potential conflict of interest in relation to this case study.

Statement of informed consent

Informed consent was obtained from the participant included in the study.

References

[1] A Andriessen, J Apelqvist, G Mosti, H Partsch, C Gonska, M Abel: Compression therapy for venous leg ulcers: risk factors for adverse events and complications, contraindications - a review of present guidelines. J Eur Acad Dermatol Venereol. Sep 2017; 31(9): 1562-1568.

[2] S Raju: Skin necrosis as a complication of compression in the treatment of venous disease and in prevention of venous thromboembolism. Phlebolynphology. 2008; 15(1): 2

[3] Moore MA, Samsell B, Wallis G,Triplett, S, Chen S, Linthurst Jones A, Xiaofei Qin: Decellularization of human dermisusing non-denaturing anionic detergent and endonuclease: a review. Cell Tissue Bank. 2015; 16: 249–259.

[4] Samsell B, Softic D, Xiaofei Qin, McLean J, Sohoni P, Gonzales K, Moore MA. Preservation of allograft bone using a glycerol solution: a compilation of original preclinical research. Biomaterials Research. 2019; 23: 5.

[5] Mariana Peroni, Renzo Girardello, Ornella Pancheri, Stefano Bonvini and Giampietro Bertasi: Hard-to-heal wounds: A new biofilm treatment with a novel desiccant. Magna Scientia Advanced Biology and Pharmacy. 2021; 3(1): 058–063.

[6] Schultz GS, Sibbald RG, Falanga V, Ayello EA, Dowsett C, Harding K, Romanelli M, Stacey MC, Teot L, Vanscheidt, W. Wound bed preparation: a systematic approach to wound management. Wound Repair Re*gen*. 2003; 11: S1–S28.

[7] M Dussoyer, A Michopoulou, P Rousselle. Decellularized Scaffolds for Skin Repair and Regeneration. Appl. Sci. 2020, 10, 3435; doi:10.3390/app10103435

[8] Yoursry Abdalaziz and Giampietro Bertasi Treatment of diabetic foot ulcer with human acellulardermal matrix (ADM) *Wound Care Manage.* 2018; 1(1): 1 of 2.

[9] Dumville JC, Deshpande S, O'Meara S and Speak K. Foam dressings for healing diabetic foot ulcers. Cochrane Database Syst Rev. 2011 Sep 7;(9):CD009111. doi: 10.1002/14651858.CD009111.pub2

[10] S Mazzei, A Sindoni, F Famà, G Bertasi, Nimfa, J Buizo, Mohab. A Shafei Use of human acellular dermal matrix for wound healing in a patient with necrotizing fasciitis, after failure ofautologous dermal / epidermal skin graft: A case report *Glob Surg.* 2019; 5: 1-3.

[11] Walters J, Cazzell S, Pham H, Vayser D, Reyzelman A. Healing rates in a multicenter assessment of a sterile, room temperature, acellular dermal matrix versus conventional care wound management and an active comparator in the treatment of full-thickness diabetic foot ulcers. ePlasty. 2016; 16: e10.

[12] Vijay Kr Kakkar and Giampietro Bertasi: Non-healing ulcer on great toe treated with ADM. Magna Scientia Advanced Biology and Pharmacy. 2022; 5(2): 009–011.

[13] Sanjay Sharma and Giampietro Bertasi: An advanced decellularized dermis intended for soft tissue repair: A new surgical approach for DFU. Magna Scientia Advanced Biology and Pharmacy. 2022; 6(1): 012–015.

[14] Vangelis G Alexiou, Stylianos G. Koutsias and Bertasi Giampietro: The use of Dermacell® Allograft in a diabetic patient with critical limb ischemia. Magna Scientia Advanced Biology and Pharmacy. 2022; 6(1): 033–035.

[15] Helgeson MD, Potter BK, Evans KN, et al. Bioartificial dermal substitute: a preliminary report on its use for the managementof complex combat-related soft tissue wounds. J Orthop Trauma. 2007; 21: 394–399.