Mesenchymal Stem Cells and Regenerative Therapy with Bilateral Gracilis Flaps for Perineal Reconstruction of a Wound Infection in the Setting of Anal Squamous Cell Carcinoma: a CR

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Introduction

Perineal wounds in immunocompromised patients can often be difficult to treat. To date, there is no evidence of using mesenchymal stem cell (MSC) therapy in the perineal reconstruction of immunocompromised patients after multiple failed flaps. In this report, the authors describe the first application of MSC therapy for the treatment of a complex perineal wound site that was refractory to attempts with both vertical rectus abdominis myocutaneous (VRAM) flaps and myocutaneous gracilis flaps (MGFs) when treating squamous cell carcinoma of the anus in a patient with HIV.

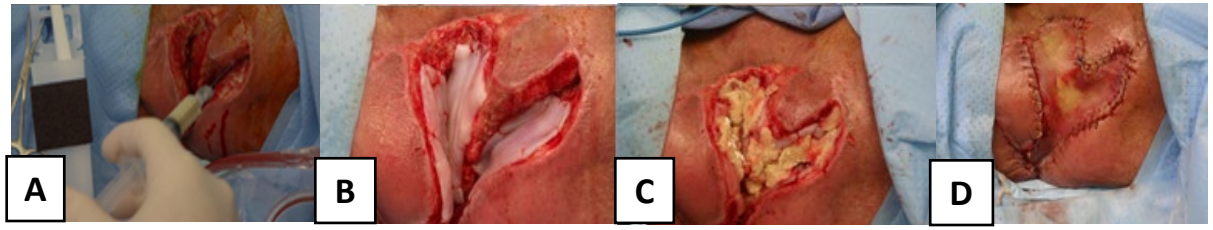
Methods

The patient gave informed written consent for the use of the data collected. The patient was a 60-year-old HIV positive male with squamous cell carcinoma (T1N0M0) of the anal margin. His HIV was poorly controlled with a last known CD-4 count of 44. He was status post an initial wide local excision of the disease while subsequently undergoing 5040 cGy radiotherapy in the anal canal and perianal area. He developed an infection postoperatively and was treated with both VRAM flaps and an MGF, which subsequently failed.

It was hypothesized that a lack of extra-cellular matrix (ECM) components hindered the normal process of inflammatory and immune response leading to the failure of the flaps. Therefore, the decision was made to apply MSC therapy and regenerative medicine for further reconstruction. The patient underwent 2 surgical procedures using MSC therapy and regenerative medicine products.

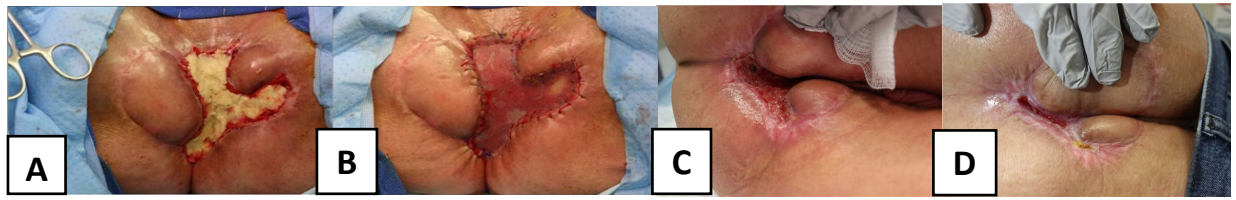
1st surgery: MSC therapy and regenerative medicine

The wound underwent 5 debridement procedures leading to a defect measuring 10 x 12 x 7 cm. A mixture of regenerative medicine products (incl. porcine urinary bladder matrix (UBM), human amnion/chorion allograft membrane) was injected into the wound (A). MSC grafts were sutured in place covering the exposed bed of gracilis muscle and perineal soft tissues (B). A mixture of regenerative medicine products (incl. human placental-based tissue matrix particulate, human umbilical cord-based particulate) was applied to the wound (C). Final coverage was completed by suturing the wound using porcine UBM (D). 9 days post-surgery, wound defect: 10 x 8 x 7 cm.



2nd surgery: regenerative medicine

24 Days following MSC placement, after debridement, fetal bovine acellular dermal matrix was sutured in place and a mixture of regenerative products (porcine UBM, Red One amniotic, human amnion/chorion allograft, human umbilical cord and human-derived acellular amnion) was injected into the wound (A). Final coverage was completed by suturing the wound using porcine UBM (B). Wound closure after 43 days (C). Wound healing after 79 days (D).



Results

After the application of the MSC therapy, the patient was followed up weekly with chemical irrigation of the wound. A mixture of regenerative products (incl. porcine UBM powder, Wound Balancing Matrices) was applied. At this time, the wound was reducing and only measured 5 cm long x 3 cm wide and 3 cm deep. Wound closure was observed 43 days and wound closure 79 days, after the 2nd surgical procedure. Upon further continued postoperative follow up, the patient was doing well clinically. He denied significant pain, drainage or symptoms of any systemic illness.

Discussion

This is the first case providing evidence that mesenchymal stem cell therapy, in combination with regenerative medicine, can be used to achieve good clinical outcomes in patients with squamous cell carcinoma of the anus that have undergone reconstructions in a disadvantageous field. We believe this method will be beneficial for surgeons in attempting to heal complex wounds in the setting of previously failed reconstruction in the perineum for squamous cell carcinoma of the anus. This method can also be applied to any other comorbidities that prove to complicate traditional perineal reconstruction.

Reference: Garcia et al. Advances in Skin & Wound Care. 2022. In press. **Trademarked Items:** Osiris umbilical cord mesenchymal stem cell grafts (Osiris Therapeutics, Columbia MD), PriMatrix® Dermal Repair Scaffold (Integra LifeSciences, Princeton NJ), MicroMatrix®, Cytal® Wound Matrix (ACell, Columbia MD), AmnioFill® , EpiFix® (MiMedx, Marietta, GA), PROMOGRAN PRISMA® Wound Balancing Matrices (3M, Saint Paul MN)