Abstract

Each year, thousands of patients suffer from severe descubital ulcers, also known as pressure ulcers, or bed sores. The United States is home to millions of people at risk for this chronic condition, particularly those residing in long-term care facilities. The cost of care is substantial. Treatments can range in cost from $15,000 to $25,000 per year for a facility surgery, less than one-third of which is covered by insurance. In hospital settings, patients can remain in the hospital for weeks or months, sometimes until the skin is healed. Late-stage pressure sores present a unique challenge to physicians, in particular when they are deep, tunneling, and have tendon or bone involvement, as is the case for the two patients in this case study. As the time for consultation, both patients had wounds that were classified as Stage 4 with tissue loss and involvement of bone or tendon, according to the National Pressure Ulcer Advisory Panel (NPUAP). Upon inspection at the final examination, both wounds had contracted over 96%.

Methods and Materials

The allograft was applied in a private medical setting. For each application of Wharton’s jelly, 2ccs of CryoSTEM™ were administered via spray gun to the tissue circumference of the wound. Dr. Lavoro tracked the size of the wounds with the standard ruler method and a volumetric approach similar to the method by Berg (1990). The skin was cleaned and dried, and the patient was administered saline to fill the wound space and the volume required to fill the wound was recorded. The edges of the sors were traced with a pen in order to obtain an accurate measure of the surface area.

All methods were completed in compliance with the FDA and American Association of Tissue Banks (AATB) standards.

Results


Cesarean Section (through 2013). Nursing Standard, 23(45), 64. https://doi.org/10.7748/ns2009.07.23.45.64.c7115

Donation and Collection. 2018. Human umbilical cords were obtained from consenting mothers following full-term Cesarean Section. Each allograft was stored at -80 degrees Celsius until the SDU was transplanted.


The study was conducted in accordance with the Declaration of Helsinki, and approved by the Institutional Review Board of the Institute of Regenerative and Cell Therapy, Columbus, Ohio. Approval was obtained on December 2, 2022.

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\[\text{SEM micrographs of post-processed umbilical cord tissue samples. SEM}\]

Discussion

At the most recent examination in August, patient 1’s wound measured 1.30 cm x 0.45 cm x 1.00 cm. The most noticeable component of patient 1’s wound was the SDU located in the center of the wound. Upon initial examination in December, the wound measured 3.00 cm x 2.30 cm x 2.50 cm. Both had the total volume from the initial visit in January. For patient 2, there was a 95% decrease in surface and volume as a result of the presence of allograft. The average diameter of the SDU range from 0.30 cm to 0.80 cm, and the average diameter of the SDU range from 0.60 cm to 0.90 cm. These applications make it a suitable scaffold for the repair of structural tissue damage in the dermis.


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