Novel Closure of a Severe Neonatal Scalp Injury Using Dehydrated Human Amnion/Chorion Allograft Matrix*

INTRODUCTION

The effective closure of complex wounds requires a healthy wound bed with adequate vasculature to support granulation and epithelialization. In this case study, the patient is a newborn 23-week extreme premature infant who suffered a severe scalp degloving injury at birth. After debridement of nonviable dermis, a large open wound extending to the periosteum and skull was present. Lacking any vascular support, the application of standard extracellular wound matrices would likely fail. The author sought to determine the application of dehydrated human amnion/ chorion allograft (dHACA) directly to the skull would support angiogenesis and create a healthy wound bed.

METHODS

Debridement of nonviable ischemic dermis resulted in a large open wound measuring 8 x 4 cm on the right posterior occiput. The wound bed was primarily periosteum covering the skull with only a small area of superficial subcutaneous tissue present. No visible vascularity was present. dHACA was applied directly over the skull and secured in place using a dialkylcarbamoyl chloride (DACC)-coated dressing. This was left in place for 2 weeks. Reassessment after two weeks revealed a pink viable wound bed. Thereafter, extracellular dermal matrix dressings were applied every three days. Complete wound closure was ultimately achieved.

RESULTS

The single application of dHACA supported angiogenesis and granulation tissue over the exposed skull. A healthy wound bed was created which allowed for final closure and epithelialization utilizing extracellular matrix dressings. Follow-up at one year of age revealed the scalp tissue to be healthy and intact.

DISCUSSION

This was the author's first experience utilizing dHACA in an extreme 23-week premature infant. The patient's extreme prematurity, the severity of the wound, and the unique aspect of the wound bed were challenges that routine wound dressings would have not overcome. In this case, the combination of dHACA followed by extracellular dermal matrix dressings acts as a protective covering to support wound closure.

*AmnioBand[®] Membrane (MTF Biologics, Edison, NJ)

Pediatric Wound Care & Laser Specialists RENE AMAYA, MD, FAAP, CWSP

CASE INFORMATION

Patient Information:

- Newborn 23-week premature infant male
- Comorbidities: E. coli Sepsis, Respiratory Distress Syndrome, Grade 4 Intraventricular Hemorrhage, Necrotizing Enterocolitis

Initial Examination/Wound History:

- Type: Severe traumatic scalp degloving injury.
- Location: Posterior right scalp.
- Initial injury took place at birth. Initial wound consult requested at 10 days of life 5/31/21.

 Preliminary management included debridement of nonviable/necrotic scalp tissue utilizing Active Leptospermum Honey (ALH) and sharp debridement. Dressings were reapplied daily with ALH gel and calcium alginate and secondary nonadherent foam/gauze. The open wound was treated with hypochlorous acid solution with every dressing change. After 11 days of combination autolytic and sharp debridement, on 6/10/21 all nonviable tissue was removed. The residual wound bed was free of necrotic scalp tissue exposing the skull and thin layer of periosteum and fascia. Minimal to no blood flow was present in the open wound. Wound size at this time measured 5.5 x 2.5 x 0.3cm. Application of human reticular acellular dermal matrix (HR-ADM) was considered as a treatment option to close the wound, but lacking sufficient blood supply and supportive subcutaneous tissue, it was felt that treatment would likely fail. The author sought to determine if the application of a human placental allograft directly to the skull would promote angiogenesis and create a healthy wound bed. If successful, the wound bed would thereafter be acceptable for a HR-ADM or other advanced wound dressing to promote closure and epithelialization.

Treatment:

- to secure all dressings in place.
- examination.

Outcome:

- three days. Only a single allograft was required.
- wound was left open to air.
- Partial hair growth has been observed. She is overall pleased with the progress seen.

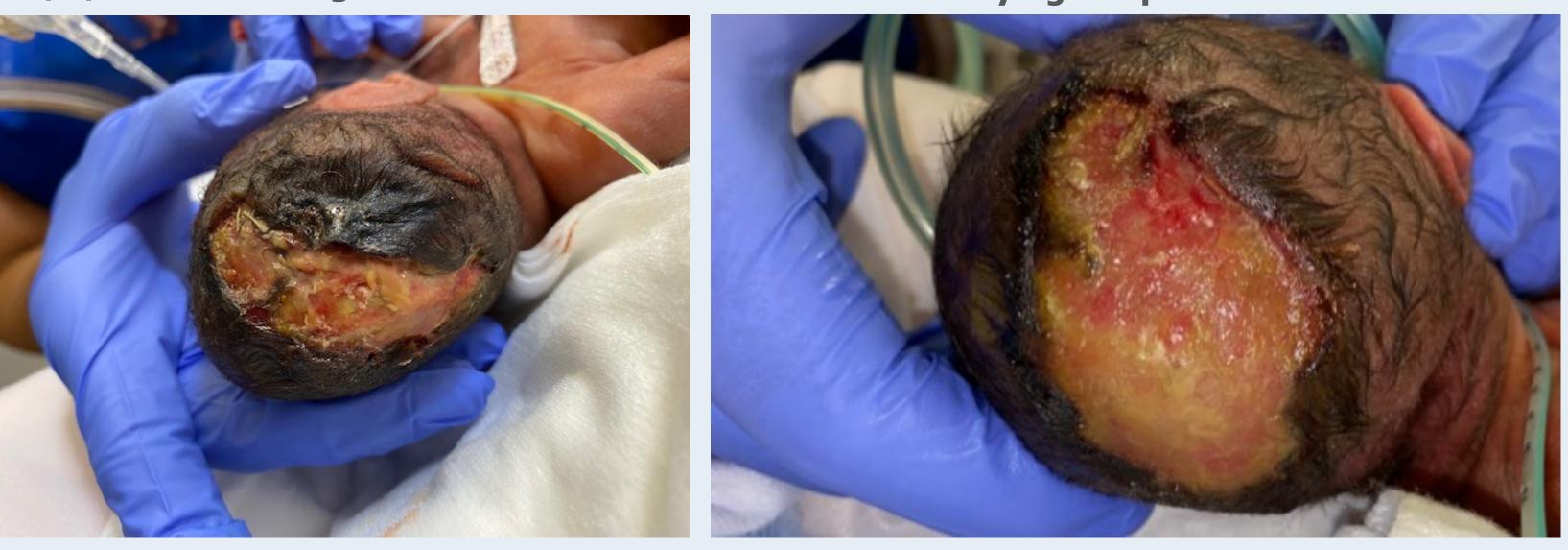
• On 6/11/21, the open wound was cleansed with hypochlorous acid solution. A 4 x 4cm piece of dHACA was applied directly onto the open wound bed. Dialkylcarbomoyl chloride (DACC)-coated mesh dressing was applied over the placental allograft to secure in place. The edges were secured with Steri-Strips. Vaseline gauze applied over the DACC-coated mesh dressing to provide moisture. Custom sized polymeric foam dressing was created and applied over the Vaseline gauze. Soft conforming gauze wrapped around the skull

• Every three days the secondary layer of dressings was gently removed to examine the surrounding tissue and evaluate for possible infection. The allograft and DACC-coated mesh dressing were not disturbed. The graft site was cleansed with hypochlorous acid solution. New secondary dressings were replaced with every

• On 6/24/21, thirteen days after the initial application of the allograft, the primary dressings were removed, and the wound examined. The site revealed active granulation tissue with vascular blood flow. The wound size had decreased to 4.5 x 2.3 x 0.2cm. Mild biofilm and slough were treated with ALH gel and the wound bed once again covered with DACC-coated mesh dressing and soft conforming gauze wrapped around the skull to secure all dressings in place. Once again, the open wound was cleansed with hypochlorous acid solution with every dressing change. Based on ongoing epithelialization and excellent granulation observed from the effects of the allograft and supporting wound dressings, this follow up procedure was repeated every

• On 8/25/21, the wound was 95% closed without any signs of complications, contractures, or infection. The

• At one year of age the mother reports her son is doing well and the scalp remains closed and skin healthy.



6/11/21 (Day 0): dHACA applied directly to the open wound



6/24/21 (Day 13): Active development of well-perfused granulation tissue



8/13/21 (Day 63)



6/4/21: Initial stages of debridement

6/10/21: No blood flow and minimal tissue overlying the periosteum

6/11/21 (Day 0): DACC-coated mesh dressing used to secure dHACA in place

7/8/21 (Day 27)



8/25/21 (Day 75) —Wound 95%



