

Wound Complications and Limb Salvage Following Orthopedic Surgery Using a Full Thickness Lyophilized Amnion Chorion Membrane (LCAM)*

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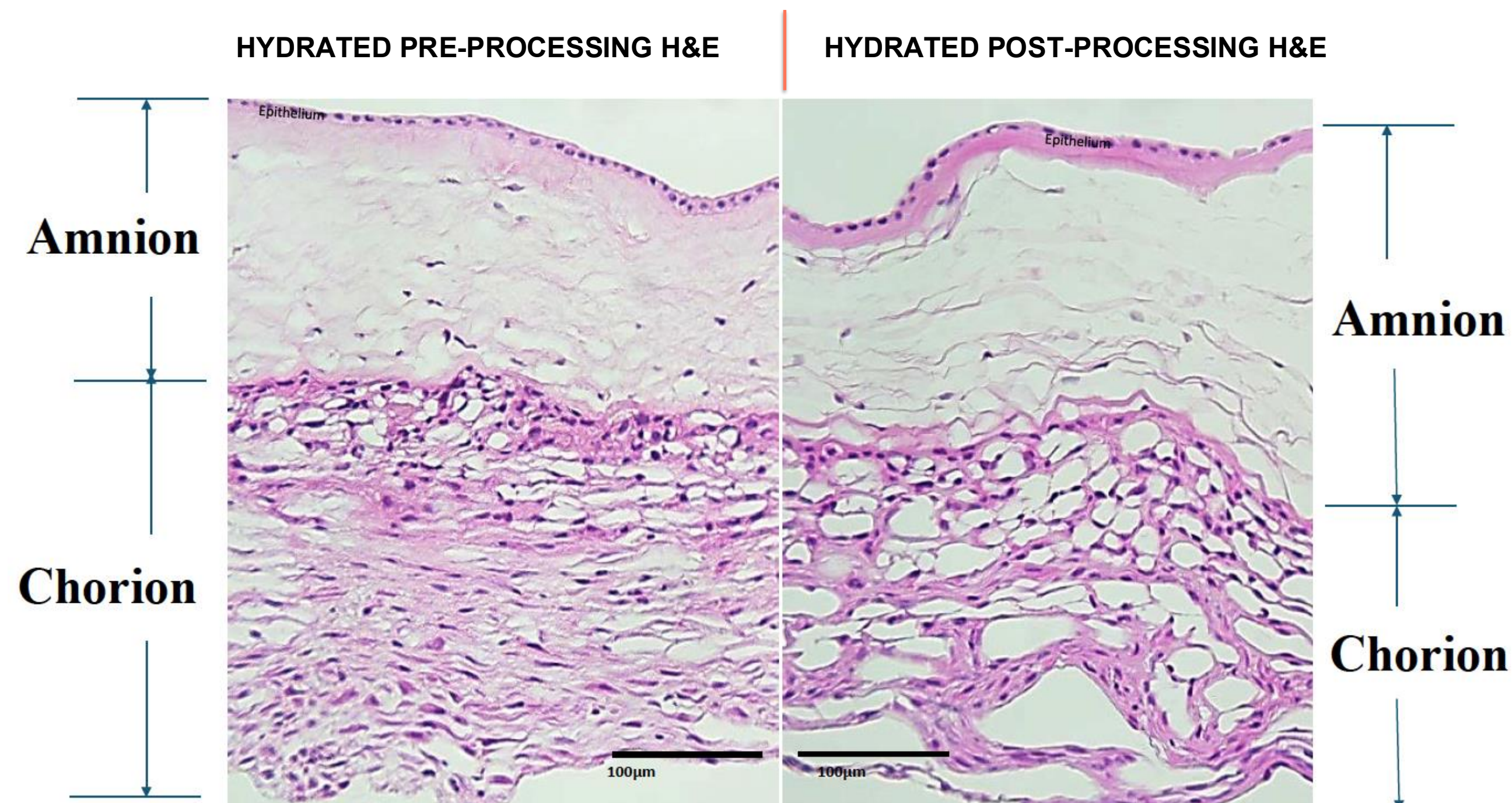
Introduction and Background

- Post-operative wound complications following instrumented orthopedic procedures, though relatively uncommon, can result in significant morbidity and may progress to limb loss, particularly in elderly patients with multiple comorbidities.
- Biologic adjuncts such as full thickness lyophilized amnion-chorion membranes (LCAM) have gained attention for their ability to modulate inflammation, enhance granulation, and support closure in complex surgical wounds.
- This case describes limb salvage in an 82-year-old male with extensive cardiovascular, metabolic, and renal disease who developed deep infection and wound dehiscence after sequential hip and tibial fracture repair.

Clinical Mechanism & Rationale

- In deep surgical wounds complicated by infection, dehiscence, or impaired physiology LCAM provides thicker multilayer allograft, incorporating amnion, intermediate layers, and chorion.
- Lyophilization (freeze-drying) is designed to preserve structural integrity of the placental membrane with approximate 500 µm thickness (Figure 1).¹

Figure 1. Pre- and Post-Lyophilization H&E



- Experimental analysis has shown that LCAM has significantly higher protein retention compared to dehydrated amnion-chorion, which can result in losses of approximately 50% of growth factors and cytokines present in the native tissue.^{1,2}
- Proteomic analysis has identified over 350 regulatory proteins within lyophilized amniotic membranes, including chemokines, adhesion molecules, and cytokines involved in tissue repair.³

Methods

- The patient initially presented with a left intertrochanteric hip fracture and was treated with open cephalomedullary nail fixation.
- Six months later, a second high-impact fall caused a comminuted left tibial fracture, surgically fixed with intramedullary nailing.
- Patient returned with surgical wound dehiscence and deep infection along the tibial incision (Figure 2).

Figure 2. Baseline Surgical Wound Dehiscence



- Operative debridement, irrigation, and removal of the intramedullary nail were performed, followed by application of negative pressure wound therapy (NPWT).
- Biweekly LCAM applications were started in an outpatient setting and wound area, drainage, granulation quality, and infection status were assessed at each visit (Figure 3).

Figure 3. Routine Surgical Wound Assessment



Results

- Use of LCAM produced progressive granulation and steady wound contraction of the tibial defect.
- Full closure occurred approximately three months after initiating LCAM therapy. (Figure 4)
- No recurrence of infection was documented at the tibial site following introduction of LCAM. Limb amputation, previously considered due to the severity of the complication, was ultimately avoided.

Figure 4. Final Visits to Complete Closure



Conclusions

- LCAM used in combination with NPWT enabled successful limb preservation after post-operative wound infection and surgical wound dehiscence.
- Further investigation is warranted to define optimal application intervals, combined use with NPWT, and comparative effectiveness relative to LCAM or other amnion-based products.

References

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Declaration of Interests

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