

Effects of Cryopreserved Amniotic Membrane Allograft on Total Ankle Arthroplasty Wound Healing

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Introduction/Purpose: Despite improvements in newer-generation total ankle arthroplasty (TAA) implants, relatively high wound-healing complication rates continue to be reported with the anterior ankle incision. Only 66% heal without wound-healing complications, 25% have minor complications requiring local care and/or oral antibiotics, and 9% experience major complications requiring reoperation (Raikin et al., 2010). Recently, multiple regenerative adjuncts have been investigated to reduce postoperative complications by enhancing local healing factors and reducing risk of infection. The relatively novel use of adjunctive therapy utilizing cryopreserved amniotic membrane modulate wound healing by down-regulating inflammation and scar formation (Hanselman et al., 2015). The purpose of our study is to determine whether the local application of cryopreserved amniotic membrane wound allograft may enhance soft tissue wound healing of the TAA anterior ankle incision.

Methods: Patients with symptomatic ankle arthritis who failed conservative management underwent TAA by two senior foot and ankle surgeons at single tertiary hospital. Both senior surgeons were present and involved in all surgeries, and all patients underwent the same procedure as indicated by their pathology, postoperative regimen, and rehabilitation protocol. At skin closure, patients were either allocated to the treatment or control group strictly by the designated primary attending. The skin closure of the treatment group was performed in standard fashion with local application of cryopreserved amniotic membrane to the extensor retinacular layer and no allograft was used for the control group. Demographics, sagittal and coronal correction, and patient comorbidity information was collected. The primary outcome was time to skin healing as determined by suture removal and surgical site skin apposition without evidence of granulation tissue or eschar. Secondary outcomes were skin dehiscence, local wound care, and use of antibiotics.

Results: Local application of amniotic membrane allograft significantly decreased overall time to skin healing (40 days to 28.5 days, $p=0.0377$). There were no reoperations for wound complications in either group. However, there was a trend in decreased dehiscence (13% to 6%, $p=0.29$) and antibiotic prescription (23% to 9%, $p=0.09$). There was no significant difference in treatment versus control group with respect to body mass index, sagittal or coronal correction, sex, history of smoking, prior arthrodesis, or primary or revision. There was a significantly higher percentage of patients with history of diabetes who received amniotic membrane than those who did not receive the adjunct therapy (20% versus 2%, $p=0.01$).

Conclusion: Regenerative technology using local application of cryopreserved amniotic membrane allograft may enhance TAA outcomes by decreasing time to healing. Although there was a trend in decreased dehiscence and antibiotic usage, larger randomized controlled trials are necessary to determine whether local application of cryopreserved amniotic membrane allograft may enhance soft tissue wound healing and ultimately reduce the incidence of devastating soft tissue complications.