A Comparison of Tarsal Tunnel Incision Site Healing With and Without Amniotic Allograft

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STATEMENT OF PURPOSE

Postoperative complications of any surgery include, but are not limited to: scar formation, skin closure, and wound dehiscence. The aim of this study was to assess the incidence of surgical wound healing complications in the tarsal tunnel region with and without amniotic membrane application applied to the subcutaneous tissue prior to skin closure after surgical decompression of the tarsal tunnel.

METHODOLOGY/PROCEDURE

A retrospective review of medical records was performed on patients who underwent tarsal tunnel releases from March 2017 to February 2019. Seventy patients' charts were included in this study and assessed. All procedures were performed at Bethesda Memorial Hospital in Boynton Beach, Florida by four surgeons. Exclusion criteria included diabetics with a glycohemoglobin of >7.5%, current tobacco users, and history of keloid formation. Medical records, operative reports and postoperative documentation were reviewed from the time of the surgery through the most recent follow-up visit. Thirty-six of the patients received one application of amniotic membrane during subcutaneous incision closure prior to skin closure for tarsal tunnel decompression surgery intra-operatively. In contrast, thirty-four patients who also underwent tarsal tunnel decompression did not have amniotic membrane application prior to closure. The postoperative course and treatments were noted and assessed including: incision healing, time to suture removal, and complications.

LITERATURE REVIEW

The use of human amniotic membrane to facilitate wound healing has been well documented since the early 1900s, however there are limited studies documenting the results and usage. The underlying mechanism of action of the amniotic graft resides in the rich biological construction of the amnion and chorion membranes, which include layers of basement membranes and a variety of intrinsic factors. Human amniotic membrane has been well established in the setting of chronic wounds and has been noted to aid in pain and sensitivity reduction. One study by Sheikh et al included chronic wounds that were otherwise intractable to several advanced wound therapies, including other skin substitutes, topical agents, hyperbaric oxygen treatment, NPT and multiple debridements. In this study, healing was observed in a variety of wounds with one to three applications of the dehydrated amniotic membrane material.[2]

LITERATURE REVIEW

Dehydrated human amniotic membrane allografts aid in scar reduction, as demonstrated in a retrospective study that reviewed the use of amnion-based allograft membrane to prevent postoperative scarring between the tendon, peritendonous structures, and overlying skin. Patients were evaluated at an average of 1.7 years post-surgery. Of the 14 patients, 86% were clear of scarring around the surgical site and 93% were scar tissue-free at the tendon-repair site. Of the patients with signs of scar tissue, the effects were reported as "mild" or "moderate".[1]

In another study, human acellular amniotic membrane was applied following the surgical excision of skin lesions on the lower 1/3 of the nose. The amniotic membrane was found to accelerate the disappearance of scarring and pain after surgery. In addition, when compared with the values of the control group, the implantation was found to noticeably accelerate the formation and detachment of scabs postoperatively. After surgery, when the diameter of the lesion exceeded 5 mm, the amniotic membrane was found to enhance the wound healing significantly when compared with the results of the control group.[3]

RESULTS

From the total cohort of 70 patients, there were 36 patients with application of the amniotic graft and 34 patients without the amniotic graft. The average age of patients in the amniotic group was 49.94 years, while the average age of the non-amniotic application group was 52.79 years. Out of the 36 patients with amniotic allograft, 3 complications (8.33%) were documented, while the 34 patients who did not receive the amniotic membrane graft saw 19 complications (55.88%). Complications included wound dehiscence, infection, hypertrophic scarring, and hypersensitivity to scar. In the amniotic allograft group the only complication seen was hypertrophic scarring, no dehiscences or serious complications were noted. In the group which did not receive the amnio, the complications include hypertrophic scarring (10 patients), dehiscence (3 patients), hypersensitivity to the area (5 patients), and infection (1 patient). The time until postoperative suture removal for the group which received the amniotic membrane was 15.2 days and the non-amniotic membrane group was 15.53 days.

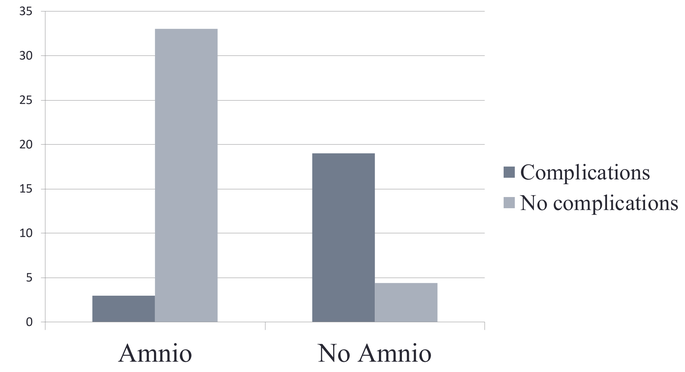

Figure 1: Comparison of complication rates with amnio application versus no amnio application

DISCUSSION & CONCLUSION

This retrospective study was conducted to assess the use of amniotic membrane graft in subcutaneous tissue layer prior to dermal closure to optimize healing. A high percentage of patients with application of the amniotic graft placed subcutaneously prior to skin closure healed with less complications than without the application of the allograft.

The results of this study are limited by the retrospective nature of the review. There is limited research involving closure of surgical wounds using amniotic membrane, however promising outcomes have been demonstrated in various studies. Our study was aimed to evaluate the use of human amniotic allograft application upon closure of surgical incision and its potential to prevent surgical wound healing complications, such as wound dehiscence and hypertrophic scar formation. The application of an amniotic membrane graft is a promising option for assisted incisional healing in the tarsal tunnel region. This has considerable potential for the application of other lower extremity sites in incision healing.

REFERENCES

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