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Research Article

Helix Advancement Flap Reconstruction Combined with Intralesional Triamcinolone Acetonide and 5-Fluorouracil for Auricular Keloids: A Prospective Pilot Study

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Abstract

Background: Auricular keloids remain difficult to manage because of high recurrence rates and cosmetic deformity. Combination approaches using surgery and adjuvant intralesional therapy may improve outcomes.

Objective: To evaluate the efficacy and safety of auricular keloid excision with helix advancement flap reconstruction combined with intralesional Triamcinolone Acetonide (TAC) and 5-Fluorouracil (5-FU).

Methods: A prospective pilot study was conducted involving 15 auricular keloids from 11 patients treated at a tertiary dermatology center. Patients underwent extralesional keloid excision with helix advancement flap reconstruction followed by serial intralesional TAC/5-FU injections every two weeks for 3 months. Outcomes included recurrence rate at 6 months, scar quality using the Patient and Observer Scar Assessment Scale (POSAS), complication rates and patient satisfaction.

Results: Recurrence occurred in 2 of 15 lesions (13.3%) at 6 months. Significant improvement in patient-reported POSAS parameters was observed, including pain, pruritus, color, stiffness and thickness ($p<0.05$). Observer-assessed pliability significantly improved at 6 months ($p=0.0313$). Pain, erythema, tenderness and pruritus progressively decreased over time. The most common late complications were telangiectasia and hyperpigmentation. Most patients reported satisfaction with treatment outcomes.

Conclusion: Combined auricular keloid excision using helix advancement flap reconstruction with adjuvant TAC/5-FU therapy demonstrated low short-term recurrence rates and favorable cosmetic outcomes. Larger controlled studies with longer follow-up are recommended.

Keywords: Auricular Keloids; Triamcinolone Acetonide; Patient and Observer Scar Assessment Scale

Introduction

Keloids are benign fibroproliferative disorders characterized by excessive collagen deposition extending beyond the original wound margins. Auricular keloids are particularly challenging due to their high recurrence rates, cosmetic implications and psychological burden on affected individuals. Ear piercing remains one of the most common etiologic factors associated with auricular keloid formation.

Numerous treatment modalities have been proposed, including surgical excision, intralesional corticosteroids, 5-fluorouracil (5-FU), pressure therapy, cryotherapy, laser therapy, silicone gel sheeting and radiation therapy. However, no single modality has consistently demonstrated universally acceptable long-term outcomes.

Surgical excision alone is associated with recurrence rates as high as 45–100%. Consequently, multimodal approaches have become increasingly favored. Helix advancement flap reconstruction offers the advantage of reducing wound tension while preserving auricular contour and minimizing cosmetic deformity. Intralesional TAC and 5-FU combination therapy has also demonstrated synergistic effects through suppression of fibroblast proliferation and collagen synthesis.

Despite these advances, there remain limited studies evaluating the combined use of helix advancement flap reconstruction with adjuvant TAC/5-FU therapy in auricular keloids. This study aimed to evaluate the clinical outcomes of this combined approach.

Methodology

This prospective pilot study was conducted at the Department of Dermatology, Jose R. Reyes Memorial Medical Center, Manila, Philippines. Patients aged 18–65 years with clinically diagnosed auricular keloids were recruited. Eligible participants underwent extralesional keloid excision followed by helix advancement flap reconstruction under tumescent anesthesia. Helix advancement flap reconstruction is a tension-reducing auricular repair technique commonly utilized following excision of helical rim defects. After complete extralesional keloid excision extending to healthy tissue, adjacent helical rim tissue is mobilized either unilaterally or bilaterally along the helical margin. Cartilage approximation and advancement allow closure of the defect while preserving the natural contour of the auricle and minimizing skin tension, a known contributing factor to keloid recurrence. In selected cases, V-Y advancement of the helical root may be performed to gain additional tissue length and facilitate closure. Two weeks postoperatively, patients received serial intralesional injections of a 1:1 mixture of TAC and 5-FU every two weeks for three months. Primary outcome was recurrence at 6 months post-treatment. Secondary outcomes included scar quality assessed using the POSAS, complication rates and patient satisfaction.

Data were analyzed using Stata MP version 17. Continuous variables were expressed as median and Interquartile Range (IQR), while categorical variables were presented as frequencies and percentages. Wilcoxon signed-rank test was used to compare POSAS scores between months 3 and 6. Statistical significance was set at $p<0.05$.

Results

Eleven patients with a total of 15 auricular keloids were included in the study. Median patient age was 22 years (IQR 18–33 years) and most participants were female. All keloids were secondary to ear piercing. At 6 months post-treatment, recurrence was observed in 2 of 15 lesions, corresponding to a recurrence rate of 13.3%. Significant improvements were noted in patient-reported POSAS domains, including pain, pruritus, color, stiffness and thickness. Observer-assessed pliability also significantly improved at 6 months. Pain, erythema, tenderness and pruritus progressively decreased over the follow-up period. The most common late adverse effects were telangiectasia and hyperpigmentation. No cases of ulceration, hypopigmentation or skin atrophy were observed. Most participants expressed satisfaction with the overall cosmetic outcome (Fig. 1).

Figure 1: Representative clinical outcomes following helix advancement flap reconstruction with adjuvant TAC/5-FU therapy.

The first case involves a 36-year-old female (Fig. 1) with a recurrent auricular keloid present for more than 3 years. The patient previously underwent multiple sessions of intralesional triamcinolone acetonide injections over a 2-year period with only

minimal improvement and rapid recurrence following treatment. Due to the persistent and recurrent nature of the lesion, the patient subsequently underwent extralesional keloid excision with helix advancement flap reconstruction followed by serial intralesional 5-fluorouracil (5-FU) and triamcinolone acetonide injections. The 6-month postoperative photograph demonstrates preservation of auricular contour with no clinically evident recurrence. The second case (Fig. 1) involves a 32-year-old female with a longstanding auricular keloid present for more than 5 years. The patient previously underwent two surgical excisions in addition to multiple sessions of intralesional triamcinolone acetonide injections over a 4-year period, with minimal sustained improvement and repeated recurrence. Given the refractory nature of the lesion, the patient underwent helix advancement flap reconstruction combined with adjuvant intralesional 5-FU and triamcinolone acetonide therapy. The postoperative image at 6 months demonstrates marked improvement in auricular contour and absence of significant recurrent keloid formation.

Discussion

This pilot study demonstrated favorable outcomes using a multimodal approach combining auricular keloid excision, helix advancement flap reconstruction and serial intralesional TAC/5-FU injections.

The observed recurrence rate of 13.3% compares favorably with previously reported recurrence rates following excision alone. The low recurrence rate may be attributed to the synergistic effects of tension redistribution achieved by the helix advancement flap and fibroblast suppression provided by TAC/5-FU therapy.

Improvement in patient-reported symptoms such as pain and pruritus suggests that the intervention not only improved cosmetic appearance but also enhanced symptom control and quality of life.

The most common late adverse effects were telangiectasia and hyperpigmentation, likely secondary to repeated corticosteroid injections. However, no severe adverse effects such as ulceration or tissue atrophy were noted.

Several limitations should be acknowledged. The study had a small sample size and lacked a control group. Additionally, multiple lesions from the same patient may have introduced within-subject correlation. Longer follow-up studies with larger cohorts are recommended.

Conclusion

Auricular keloid excision with helix advancement flap reconstruction combined with serial intralesional TAC/5-FU injections appears to be an effective multimodal approach associated with low short-term recurrence rates, improved scar quality and high patient satisfaction. Larger prospective controlled studies are warranted to validate these findings.

Conflict of Interest

The authors declared no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

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Data Availability Statement

The data supporting the findings of this study are available from the corresponding author upon reasonable request.

Ethical Statement

The study protocol was approved by the Institutional Review Board of Jose R. Reyes Memorial Medical Center. Written informed consent was obtained from all participants prior to enrollment.

Informed Consent Statement

Informed consent was obtained from all participants included in the study.

Authors' Contributions

All authors contributed equally to this paper.

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