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ANALYSIS OF EFFICACY OF INTRAOPERATIVE TRIAMCINOLONE ACETONIDE INJECTION WHEN COMBINED WITH SURGICAL EXCISION IN PREVENTING RECURRENCE OF KELOID

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ABSTRACT

Objectives

1. Primary objective of the study is to determine recurrence rate of keloid among patients who underwent surgical excision along with intraoperative administration of triamcinolone acetonide injection along wound margin.
2. Secondary objective is to assess various demographic factors involved in recurrence and subjective improvement in symptoms.

Materials and Methods: Study was a Retrospective Descriptive Study and conducted among patients in whom surgical excision was combined with intraoperative triamcinolone acetonide injection for treatment for keloid. Data collected from records available in the department and interviewing patients over phone for symptoms and signs at the site of excised lesion. Recurrence and no recurrence were determined based on information provided by patient during interview.

Results: In our study, 8/12(66.7%) patients had no recurrence and 4/12(33.3%) had recurrence when surgical excision was combined with intraoperative injection of triamcinolone acetonide. A curious finding, due to unknown reason, was that 5 out of 6 **females** (83%) with earlobe keloid had no recurrence, and remaining one had recurrence, but about 50% size compared to initial size, whereas only1 out of 3 male (33%) patients with keloid on ear had no recurrence. All patients had no itching or pain at the site after minimum 1 year of the procedure. All patients had no wound complications due to inclusion of steroid injection.

Conclusion: Combining intraoperative triamcinolone acetonide injection along with surgical excision is an effective, easy, and cost-effective method in reducing keloid recurrence.

KEYWORDS: Keloid, surgical excision, intraoperative triamcinolone, recurrence.

INTRODUCTION

Hypertrophic and Keloid scars are grouped together as fibroproliferative scars that are characterised by excessive deposition of collagen. Keloid scars are unique to humans, and are abnormal, irregular, thickened, raised, firm to hard fibrous proliferative lesions that occur at the site of a skin injury due to trauma, surgery, blisters, vaccination, or body piercing. The term ‘cheloid’, meaning ‘crab claw’ was coined from Greek by Alibert in 1806.[1] The most common sites are the ear lobes, shoulders, upper back and chest, but keloids can occur anywhere. Spontaneous keloids though rare, can also occur. The major clinical features that help to distinguish keloids from hypertrophic scars are that keloid continue to grow beyond the margins of the original wound, without a quiescent or regressive period, whereas Hypertrophic scars usually cease to grow within 4 months of injury and limited to original wound margin.[1]

When a keloid is associated with a skin incision or injury, the scar tissue continues to grow for a time after closure of the original wound, becoming larger and more

visible until it reaches a final size. Keloid enlargement can be predicted in areas that have an erythematous border. In addition to the swelling patients are also troubled by pain, itch, or symptoms due to infection.

Postulates regarding pathogenesis of Keloid scars, include

1. Altered growth factor theory (increased expression of TGF-beta and PDGF).[7]
2. Collagen turn over hypothesis (disorganized wavier and thicker collagenous mass, with increase in Type I to III ratio).[9]
3. Tension Hypothesis (tension on scar causing misalignment of oriented collagen fibres).[1]
4. Neurogenic Inflammation Hypothesis (stimulation of mechanosensitive nociceptors in skin leading to release of neuropeptides and cytokines like TGF-beta and NGF).[8]
5. Genetic Immune Dysfunction (genetic predisposition links keloid formation to a particular HLA subtype).[7]
6. Sebum Reaction Hypothesis (injury in a pilosebaceous unit triggers T cell mediated immune response, stimulating mast cells and collagen production).[7]

Scar management can be categorized into invasive and noninvasive modalities. Noninvasive therapies such as intralesional corticosteroids, X-ray irradiation, pressure dressing, silicone gel sheets, cryotherapy etc. are reported to be effective in the treatment of keloids in some cases. Surgical Excision alone has very high recurrence rate.[14] It is usually combined with other modalities like intra lesional triamcinolone acetonide injection, brachytherapy, pressure garments, silicone gel sheet etc.

Intralesional Corticosteroid therapy has remained the preferred treatment for fibroproliferative scars since 1960s.[18] The most commonly injected corticosteroid is Triamcinolone acetonide, available as 10 and 40 mg/ml vials, administered most commonly into the papillary dermis with maximum dose of 80mg in a single sitting. The procedure may be repeated every 4 to 6 weeks until the desired effect is obtained.[10] Though the exact mechanism is not known, steroids potentiate collagen degradation by enabling collagenase to remain active.[12] Corticosteroids act by suppression of inflammatory process in the site of keloids by impairing fibroblast growth and increasing collagen degradation. Corticosteroids also have an anti-inflammatory effect that reduces vascular permeability, inhibits the production of chemical intermediates that mediate inflammation, itch and pain. Also, triamcinolone inhibits vascular endothelial growth factor and transforming growth factor TGF beta 1 and induce scar regression.[15,16]

Though the size of the keloid may decrease with nonsurgical treatment alone in some larger lesions, the results may not be satisfactory. Surgical excision alone has shown varying degrees of recurrence, up to 45 to 100%[13,14] and it reduced to <10% when combined with radiation.[5] Recurrence rate could also be reduced by postoperative steroid injections without causing inadvertent changes like skin pigmentation, wound dehiscence, chronic dermatitis, or neoplastic changes.[18] When surgical excision with intra-operative local injection of triamcinolone acetonide, followed by repeat injection of the same drug at weekly intervals for 2-5 weeks depending on the symptomatic relief, and then monthly injections for 4-6 months, no recurrence was noted in 91.9%of patients.[17] Perioperative nonsurgical therapies should be combined to prevent the inevitable recurrence after surgical excision.[6]

This study was done to assess the outcome in a group of patients in whom surgical excision was combined with intraoperative Triamcinolone acetonide(40mg/ml), which was very easy, cost effective and required minimum number of hospital visits compared to radiotherapy, pressure application, silicone gel sheet and post-operative triamcinolone injection. The procedure was done at a tertiary care hospital during a period of Jan 2019 to March 2020, after obtaining approval from Institutional Review Board.

Keloid was treated in the following manner. Keloid was excised intra lesionally leaving a small margin of 1 to 2 mm, under local anesthesia. Wound was closed using 4.0/3.0 Poliglicaprone suture material, depending on the site. 1ml of the 'Triamcinolone acetonide' injection (40mg/ml) was given sub dermally along wound margin after closure of the wound. Patients were asked to come for review at 2 weeks interval till 1 month and thereafter if there were any symptoms like itching, early swelling etc. (Figure 1, 2).

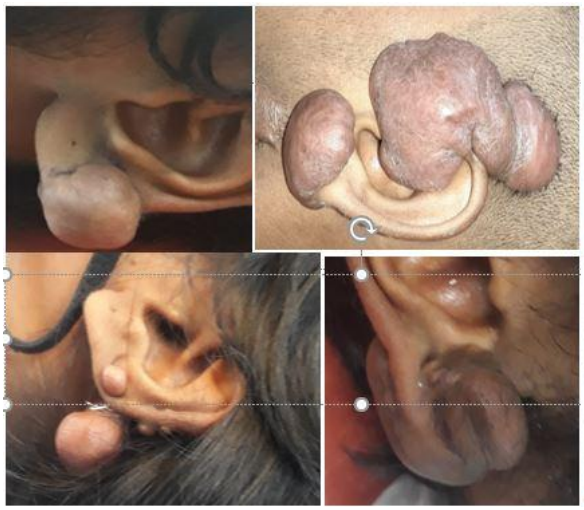

Figure 1: Pre Operateive Images

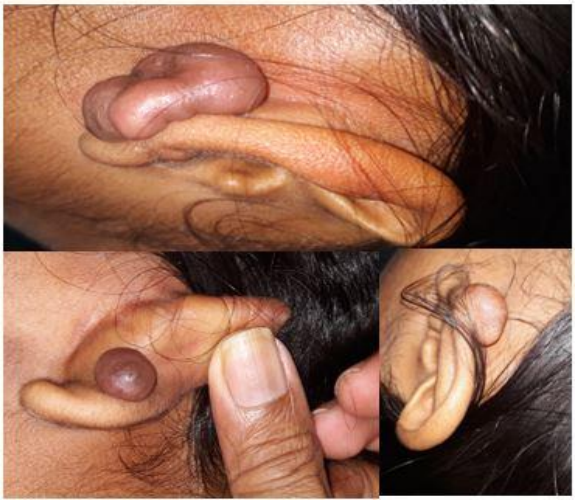

Figure 2: Preoperative Images

MATERIALS AND METHODS

A Retrospective Descriptive study was done among patients who underwent Surgical excision along with intra operative triamcinolone acetonide injection, without any exclusion criteria as only young patients without any co morbidities were given intraoperative triamcinolone injection. Data collected from records in the department, which included copy of OP ticket and Surgery Register, and by interviewing patients for symptoms and signs of keloid at the site of excision, at the time of the study. Data from 12 patients who underwent surgery for Keloid between Jan 2019 and March 2020 was collected. Study was conducted during April and May 2021. Patients were interviewed either directly or over phone. Of the 13 surgeries done for Keloid during the period, data could be collected from 12 patients, and we could not contact one patient. Each patient's basic information such as Name, Age, Sex, Occupation, Family History, Antecedent cause, Symptoms, Site and size of lesion, Surgery details, details of follow up visits, present status of recurrence if any, were recorded.

Data analysed in descriptive terms such as numbers, percentage and mean.

RESULTS

Twelve patients were followed up during the Study Period. Male- Female ratio was 1:1, with 6 females and 6 males. Their age ranged from 14 to 25 years, with 7(58%) of them being between 15 and 20 years. The mean age of the patients was 18.4 with a standard deviation of 2.8years.

Out of the 12 patients 11 were students while one was unoccupied. Seven (58%) of them had a family history of keloid. Eight (67%) of them developed the keloid after ear piercing for wearing an earring, while 3(25%) developed it after trauma and infection. In one patient (8%) the keloid developed spontaneously. Nine of them had ear keloids and other 3 had keloid on the temple, wrist and foot. While 2 of them had the keloid for less than 1 year, 2 of them had it for more than 2 years and less than 3 years and 8 of them had it for a minimum 3 years. The surface of the keloids in all the patients was smooth. While the smallest keloid was of the size 1x 1x 0.5 cm, the largest was 3x 3x 2 cm. None was infected. All the 12 patients had swelling and 4 of them had associated itching. Seven of them had a stable keloid. None had any significant illness in the past. None of them had any associated comorbidities.

All of them were surgically excised and Triamcinolone acetonide injection was given along with the procedure. All patients came for review at 2 weeks and sutures were removed then.

All patients who had itching prior to the procedure had no complaint of itching or pain 1 year after the procedure. No patient complained of pus discharge, wound dehiscence or delay in healing.

At the time of the study, minimum 1 year after the procedure, recurrence was as follows. 5 out of 6 females (83%) with earlobe keloid had no recurrence, and remaining one had recurrence, but about 50% size compared to initial size.1 out of 3 male (33%) patients with keloid on ear had no recurrence whereas 2 had recurrence. Altogether 6 patients out of 9 (67%) with ear lobe keloids did not have recurrence after 1 year and 3 patients (33%) had recurrence. In keloids located over sites other than ear lobe, only temple keloid recurred(33%) whereas keloid over wrist and dorsum of foot did not recur(67%). Altogether considering all sites, 8/12(67%) patients had no recurrence and 4/12(33%) had recurrence when surgical excision was combined with intraoperative injection of triamcinolone acetonide (Table 1).

Table 1: Demographic profile.

Age (years)	Gender	Family history	Site of lesion	Duration
Mean=18.4, SD =2.8	6{50%)	Yes -7(58%)	Ear lobe – 9(75%%)	Less than 1 year - 2(17%)
Range 14 to 25 years	6(50%)	NO -5(42%)	Other sites – 3(25%)	More than 1 year-10(83%)

Table 2: Results.

	Total	Earlobe (Females)	Earlobe (Males)	Other Sites (All Males)	Family History (Yes)	Family History (No)
No Recurrence	8(66.7%)	5(83.3%)	1(33.3%)	2(66.7%)	5(71.4%)	3(60%)
Recurrence	4(33.3%)	1(16.7%)	2(66.7%)	1(33.3%)	2(28.6%)	2(40%)

DISCUSSION

Keloids though benign, may severely affect the quality of life. Since keloids may continue to grow without quiescence, they can cause cosmetic handicap, and cause distortion and limit joint mobility. Though there is extensive knowledge regarding pathogenesis and histopathology of keloids, there is still no definitive cure for keloids. Surgery alone in Keloids has been associated with recurrence rate of 45-100%.[13,14] Our study shows that intraoperative corticosteroid injections yield good results.

Itching and pain at the site of keloids are common complaints reported by patients. These symptoms can heavily affect the quality of life of patients. The results of our study show that 100% of the cases had no itch or pain one year after surgery.

Intraoperative Corticosteroid injection when combined with surgical excision was effective for ear lobe keloids with a recurrence rate of 33% in the study group, compared to surgical excision alone.[13,14] However, the approach was more effective in ear lobe keloids in females, for unknown reasons, in whom the recurrence rate is only 16.7%. Our recurrence rate is more when compared to excision combined with postoperative corticosteroid injections in ear lobe keloids, but multiple (2 to 13) postoperative visits were required[18] when triamcinolone injection was given post operatively. Similarly excision followed by radiation[4,5] and cryotherapy[2] also yielded better results than ours but still radiation is more costly and not easily accessible, and required multiple visits. It is also possible to give post-operative triamcinolone injection or pressure devices or radiotherapy at early sign of recurrence following intraoperative injection, which we could not attempt due to circumstances which prevented frequent review of patients.

CONCLUSION

Intraoperative Triamcinolone Acetonide injection gave good results when combined with Surgical Excision for keloids and can be done routinely as it is very easy, cost effective, with no additional inconvenience to patient and without any wound complications.

FOOTNOTES

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