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Efficacy and Safety of Triamcinolone Injection in Keloid

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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Original Research Article

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ABSTRACT

Background: A keloid scar is characterised by the production of type III (early) or type I (late) collagen. The goal of this study was to see how effective intralesional triamcinolone acetonide was in treating Keloids from a clinical and microscopic standpoint.
Methods: This prospective study included 40 patients diagnosed clinically and histologically with Keloid. Patients were given intralesional injection of triamcinolone (40mg / ml) and each 1 cm2 of keloid was injected by 0.3 ml of the solution for one session monthly for five subsequent sessions. Patients were subjected to full history taking, clinical examination [general and dermatological], digital photography of the lesions and tissue punch biopsies.
Results: Before treatment: Normal pigmentation occurred in 36(90.0%) and hyper pigmentation occurred in 4(10.0%). After treatment: Normal pigmentation occurred in 32(80.0%), hyper and hypo pigmentation occurred in 4(10.0%). Colour, itching, pliability and surface area were insignificantly different before and after treatment.
Conclusions: The triamcinolone injection was to be promising and long lasting for the suppression of symptoms related to keloids and hypertrophic scars.

Keywords: Efficacy; safety; triamcinolone; keloid.

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1. INTRODUCTION

Wound healing can result in a normal scar or a hypertrophic scar, each of which has three separate phases (inflammation, proliferation, and remodelling [1]). Platelet degranulation and activation of the complement and clotting cascades generate a fibrin clot for hemostasis, which serves as a scaffold for wound repair, shortly after wounding. The immature scar enters the last maturation phase after the incision is closed, during which abundant extracellular matrix is destroyed and immature type III collagen is transformed into mature type I collagen [2].

Fresh scars are typically crimson, itchy, and slightly raised, eventually fading to flat, frequently depigmented scars with no additional symptoms after a few months [3].

Keloid is a type of scar with formation of either type III (early) or type I (late) collagen. It is a result of an overgrowth of granulation tissue (collagen type III) at the site of a healed skin injury which is then slowly replaced by collagen type I. Keloids are firm, rubbery lesions or often shiny fibrous and vary from single nodules to multiple linear plaques and can vary from pink to the color of the person's skin or red to dark brown in color. A keloid scar is harmless and not contagious, although it can cause extreme itching, pain, and textural changes. In severe situations, it can impair skin movement, limiting limb movement if it affects joints [4].

Keloid also called benign fibro-proliferative scars as it grows beyond the confines of original wound and invade surrounding skin. It does not regress and tend to reoccur after excision [5].

The frequency of occurrence is 15 times higher in highly pigmented people. African descendant people have increased risk of keloid occurrence [1].

Keloids represent a therapeutic challenge. There is no universally accepted treatment resulting in permanent ablation of these scars [6]. Because of the high recurrence rate, a variety of treatments have been developed, including compression therapy, intralesional corticosteroid injections, 5-fluorouracil, methotrexate, bleomycin, radiation, cryosurgery, laser therapy, tamoxifen, and tacrolimus [7].

The aim of this work was to evaluate clinically and microscopely efficacy of intralesional triamcinolone acetonide in treatment of Keloids.

2. PATIENTS AND METHODS

This prospective study was conducted at the Dermatology and Venereology Department in Tanta University Hospitals during the period between January 2018 till January 2019. The study was carried out on 40 patients who were diagnosed clinically and histologically as Keloid since at least 7 months duration and measuring more than 1 cm in size and had stopped treatment at least 3 months before enrolment in the study.

Patients who received treatment of keloid in the last 3 months before enrolment in the study, with kidney disease, liver disease, ischemic heart disease, neurological disease, endocrine disease, malignancy or any other systemic disease and pregnant or lactating women or those planning for pregnancy were excluded.

Patients were given intralesional injection of triamcinolone (40mg / ml) and each 1 cm^2 of keloid was injected by 0.3 ml of the solution for one session monthly for five subsequent sessions.

2.1 All Patients Were be Subjected to the Following

Full history taking from the patient or his/her relatives [This is include age, sex and medical history including diabetes mellitus and hypertension], Clinical examination [General and dermatological], Examination the skin lesion [Onset, course, duration, morphology as regard site, size, surface, tenderness, itching and distribution of the lesions], Digital photography of the lesions will be taken before and after each injection at the end of treatment, Tissue punch biopsies from the lesional skin before and after therapy will be obtained and processed . Five μm sections will be stained by haematoxylin and eosin (H and E) stain to be examined by light microscope. Morphometric analysis will be carried out to compare the microscopic results before and after therapy.

Lesions had undergone objective evaluation using Vancouver Scar Scale (VSS). For VSS, keloid height was measured by centimetre scale, pliability was assessed by palpation, vascularity was assessed by visual inspection and pigmentation was scored after blanching and comparing it with the surrounding skin. Blanching was achieved using a piece of clear plastic sheet. Three blinded dermatologist evaluation by

comparing photos before and after treatment of the four group. Histopathological examination to tissue punch biopsies from the lesional skin before and after the therapy.

Light microscopic examination and morphometric analysis were carried by a histologist to compare the results from keloid before and after the therapy.

2.2 Statistical Analysis

Statistical analysis was done by SPSS v26 (IBM Inc., Chicago, IL, USA). Quantitative variables were presented as mean and standard deviation (SD). Qualitative variables were presented as frequency and percentage (%).

3. RESULTS

Demographic data, duration and size of lesion of the studied patients [Table 1].

Burn occurred and surgical wound occurred in 16(40.0%), spontaneous occurred in 8(20.0%), accidental trauma and recurrence after surgical removal didn't occurred in triamcinolone group. Previous treatment as topical steroid represented 20(50.0%), IL steroid and surgery represented 4(10.0%) and no previous treatment were 12(30.0%).Site behind ear, back, nuchal area and face were 4(10.0%), lower limb, upper limb and chest were 8(20.0%) Table 2.

Thickness before treatment ranged from 5.0 – 10.0 mm with mean value of 6.20 ± 2.10 mm and thickness after treatment ranged from 2.0 – 10.0 mm with mean value of 4.70 ± 2.45 mm. Vancouver before ranged from 5.0 – 10.0 with mean value of 4.30 ± 1.34 and after ranged from 3.0 – 7.0 with mean value of 4.30 ± 1.34 Table 3.

Before treatment: Normal pigmentation occurred in 36(90.0%) and hyper pigmentation occurred in 4(10.0%). After treatment: Normal pigmentation occurred in 32(80.0%), hyper and hypo pigmentation occurred in 4(10.0%). Color, itching, pliability and surface area were insignificantly different before and after treatment Table 4.

Table 1. Demographic data, duration and skin type of the studied patients

	Triamcinolone group (n = 40)
	N (%)
Sex	
Male	24(60.0)
Female	16(40.0)
Age (years)	
Min. – Max.	5.0 – 60.0
Mean ± SD.	27.90 ± 17.70
Median (IQR)	28.50 (13.0 – 38.0)
Duration	
Min – Max	7.0 – 36.0
Mean **±** SD	17.40 ± 9.44
Median (IQR)	15.0 (9.0 – 24.0)
Skin type	
III	36(90.0%)
IV	4(10.0%)
Size (cm)	
Min. – Max.	2.0 – 10.0
Mean ± SD.	3.90 ± 2.44
Median (IQR)	3.0 (2.50 – 5.0)

Table 2. Cause, previous treatment and site

Cause	Triamcinolone group (n = 40)
	N (%)
Accidental Trauma	0(0.0)
Recurrence after Surgical removal	0(0.0)
Burn	16(40.0)
Spontaneous	8(20.0)
Surgical	16(40.0)
Wound	
Previous treatment	
No	12(30.0)
Topical steroid	20(50.0)
Surgery and IL	0(0.0)
IL steroid	4(10.0)
Surgery	4(10.0)
Site	
Behind ear	4(10.0)
Back	4(10.0)
Lower limb	8(20.0)
Upper limb	8(20.0)
Nuchal area	4(10.0)
Face	4(10.0)
Chest	8(20.0)
Neck	0(0.0)

Table 3. Thickness and Vancouver

		Triamcinolone group (n = 40)
Thickness (mm)	Before	(n = 40)
	Min. – Max.	5.0 – 10.0
	Mean ± SD.	6.20 ± 2.10
	Median (IQR)	5.0 (5.0 – 7.0)
	After	(n = 40)
	Min. – Max.	2.0 – 10.0
	Mean ± SD.	4.70 ± 2.45
	Median (IQR)	4.0 (3.0 – 5.0)
Vancouver	Before	(n = 40)
	Min. – Max.	5.0 – 10.0
	Mean ± SD.	6.70 ± 1.64
	Median (IQR)	6.0 (6.0 – 7.0)
	After	(n = 40)
	Min. – Max.	3.0 – 7.0
	Mean ± SD.	4.30 ± 1.34
	Median (IQR)	4.0 (3.0 – 5.0)

Table 4. Clinical data, pliability and surface area of keloids

		Triamcinolone group (n = 40)
		N (%)
Pigmentation	Before	
	Normal	36(90.0)
	Hyper	4(10.0)
	After	
	Normal	32(80.0)
	Hyper	4(10.0)
	Hypo	4(10.0)
Color	Before	
	Normal	0(0.0)
	Pink	36(90.0)
	Purple	4(10.0)
	After	
	Normal	1(10.0)
	Pink	9(90.0)
	Purple	0(0.0)
	p_1	0.157
Itching	Before	
	Yes	36(90.0)
	After	
	Yes	36(90.0)
	p_1	1.000
Pliability	Before	
Firm		32(80.0)
Supple		0(0.0)
Yeilding		8(20.0)
After		
Normal		12(30.0)
Firm		0(0.0)
Supple		20(50.0)
Yeilding		8(20.0)
P		0.683
Surface area		Before treatment
Smooth		40(100.0)
Irregular		0(0.0)
after treatment		
Smooth		40(100.0)
Irregular		0(0.0)
$\chi 2$ (P value)		1
Other data		
Other cut		0(0.0)
General (NAD)		40(100.0)
Inves		0(0.0)

4. DISCUSSION

Keloids are among the most difficult benign growths on the human body for specialists to treat. If you have keloids, you should see a dermatologist if you have pain, pruritus, or a limitation of movement in your joints [8-10]. These skin lesions can be the source of discord in social and interpersonal relationships in some situations. As a result, it's critical that we identify treatments for these lesions that address both the symptoms and the actual lesions [11].

The most common anatomical sites of keloids in present study were upper limbs followed by head and neck then the back ,the chest (presternal area) and behind ear . Unlike , Mouhari et al. [12] noted that sternum, upper limb and head & neck

were the most common sites for keoids in dark skin patients. That could be attributed to the tendency of keloids to occur on highly mobile sites with high tension such as shoulders, neck, and presternum [1]. Also , Conversely, Bayat et al. [13] reported that ear was the most common site for keloids.

The most common causes of keloids in present study were burn (32.5%), post surgical wound (30%) then followed by spontaneous appearance of keloid (20%) , recurrence after surgical removal (15%) and accidental trauma (2.5%). Our result go with Annabi et al. [14] and Shaheen et al. [15] who reported that the most common cause of keloids differs according to conditions of study's society. They found that keloids could follow any form of skin injury, but burns were the most common **.** Bayat et al. [10] found that trauma was the most common cause of keloids [16].

Triamcinolone acetonide has long been the steroid of choice for treating hypertrophic scars and keloids with injections. Most of the clinical research in the scar arena suggests that intralesional corticosteroids, alone, or in the form of combination, provide the best relief of local symptoms as well as flattening of the scars themselves [17-21]. According to previous literature, the dosage of triamcinolone acetenoide for intralesional keloid injection has varied from 10 to 40 mg/mL, and the treatment is administrated at intervals of 4 to 6 weeks [22,23].

Actually, the monotherapeutic use of intralesional TAC in keloids treatment has been shown to be effective but it might induce more side effects in the form of hypopigmentation, mixed pigmentation, fat atrophy, telangiectasias, necrosis and ulcerations [4,23,24].

Our study has some limitations; it is a single centre study with a small sample size, some more studies are needed to be done to verify our findings.

5. CONCLUSION

The triamcinolone injection was to be promising and long lasting for the suppression of symptoms related to keloids and hypertrophic scars. This therapy is relatively affordable, readily available, and an effective therapeutic option that may be delivered in the consulting/treatment room as compared to various surgical procedures and other modalities.

CONSENT

An informed written consent was obtained from all cases before participating in the study, and after complete explanation of the advantages and disadvantages of the study.

ETHICAL APPROVAL

The study was approved by the local ethical committee of Tanta University.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Gauglitz GG, Korting HC, Pavicic T, Ruzicka T, Jeschke MG. Hypertrophic scarring and keloids: pathomechanisms and current and emerging treatment strategies. Mol Med. 2011;17:113-25.
2. Slemp AE, Kirschner RE. Keloids and scars: a review of keloids and scars, their pathogenesis, risk factors, and management. Curr Opin Pediatr. 2006;18: 396-402.
3. Gauglitz GG, Pavicic T. [Emerging strategies for the prevention and therapy of excessive scars]. MMW Fortschr Med. 2012;154:55-8.
4. Alster TS, Tanzi EL. Hypertrophic scars and keloids: etiology and management. Am J Clin Dermatol. 2003;4:235-43.
5. Ogawa R. The most current algorithms for the treatment and prevention of hypertrophic scars and keloids. Plast Reconstr Surg. 2010;125:557-68.
6. Kontochristopoulos G, Stefanaki C, Panagiotopoulos A, Stefanaki K, Argyrakos T, Petridis A, et al. Intralesional 5-fluorouracil in the treatment of keloids: an open clinical and histopathologic study. J Am Acad Dermatol. 2005;52:474-9.
7. Prabhu A, Sreekar H, Powar R, Uppin V. A randomized controlled trial comparing the efficacy of intralesional 5-fluorouracil versus triamcinolone acetonide in the treatment of keloids. Journal of the Scientific Society. 2012;39:19.
8. Khan MA, Bashir MM, Khan FA. Intralesional triamcinolone alone and in combination with 5-fluorouracil for the treatment of keloid and hypertrophic scars. J Pak Med Assoc. 2014;64:1003-7.

9. Davison SP, Dayan JH, Clemens MW, Sonni S, Wang A, Crane A. Efficacy of intralesional 5-fluorouracil and triamcinolone in the treatment of keloids. Aesthet Surg J. 2009;29:40-6.
10. Aggarwal A, Ravikumar BC, Vinay KN, Raghukumar S, Yashovardhana D. A comparative study of various modalities in the treatment of keloids. International Journal of Dermatology. 2018;57:1192-200.
11. Hietanen KE, Järvinen TA, Huhtala H, Tolonen TT, Kuokkanen HO, Kaartinen IS. Treatment of keloid scars with intralesional triamcinolone and 5-fluorouracil injections - a randomized controlled trial. J Plast Reconstr Aesthet Surg. 2019;72:4-11.
12. Mouhari-Toure A, Saka B, Kombaté K, Akakpo S, Egbohou P, Tchangaï-Walla K, et al. Is There an Association between Keloids and Blood Groups? ISRN Dermatol. 2012;2012:750908.
13. Bayat A, Arscott G, Ollier WE, McGrouther DA, Ferguson MW. Keloid disease: clinical relevance of single versus multiple site scars. Br J Plast Surg. 2005;58:28-37.
14. Annabi N, Yue K, Tamayol A, Khademhosseini A. Elastic sealants for surgical applications. Eur J Pharm Biopharm. 2015;95:27-39.
15. Shaheen A, Khaddam J, Kesh F. Risk factors of keloids in Syrians. BMC Dermatol. 2016;16:13.
16. Mustoe TA, Cooter RD, Gold MH, Hobbs FD, Ramelet AA, Shakespeare PG, et al. International clinical recommendations on scar management. Plast Reconstr Surg. 2002;110:560-71.
17. Shah VV, Aldahan AS, Mlacker S, Alsaidan M, Samarkandy S, Nouri K. 5-Fluorouracil in the Treatment of Keloids and Hypertrophic Scars: A Comprehensive Review of the Literature. Dermatol Ther (Heidelb). 2016;6:169-83.
18. Fitzpatrick RE. Treatment of inflamed hypertrophic scars using intralesional 5-FU. Dermatol Surg. 1999;25:224-32.
19. Martín-Cartes J, Morales-Conde S, Suárez-Grau J, López-Bernal F, Bustos-Jiménez M, Cadet-Dussort H, et al. Use of hyaluronidase cream to prevent peritoneal adhesions in laparoscopic ventral hernia repair by means of intraperitoneal mesh fixation using spiral tacks. Surg Endosc. 2008;22:631-4.
20. Gupta S, Kalra A. Efficacy and safety of intralesional 5-fluorouracil in the treatment of keloids. Dermatology. 2002;204:130-2.
21. Elvira-Ioana B, Alexandra PA, Sabina B, Ioana C, Rares-Calin B, George J, et al. Hyaluronidase Efficacy In Treating Keloid Scars, A Case Report. Acta Medica Marisiensis. 2019;65.
22. Srivastava S, Patil AN, Prakash C, Kumari H. Comparison of Intralesional Triamcinolone Acetonide, 5-Fluorouracil, and Their Combination for the Treatment of Keloids. Adv Wound Care (New Rochelle). 2017;6:393-400.
23. Jones ME, McLane J, Adenegan R, Lee J, Ganzer CA. Advancing Keloid Treatment: A Novel Multimodal Approach to Ear Keloids. Dermatol Surg. 2017;43:1164-9.
24. Azzam EZ, Omar SS. Treatment of auricular keloids by triple combination therapy: Surgical excision, platelet-rich plasma, and cryosurgery. J Cosmet Dermatol. 2018;17:502-10.

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