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Intralesional Triamcinolone Acetonide in the treatment of keloids and hypertrophic scars

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Abstract

Introduction: Abnormal Hypertrophic scars and keloids are caused by persistent inflammation that increase collagen deposition. Many treatment options are available for keloids and hypertrophic scars, but none of them are totally effective. One of the most popular treatment options is triamcinolone acetonide. It is thought to decrease collagen deposition in keloid and hypertrophic scars by suppressing inflammation in wound scars.

Aim of the study: The work aimed to establish triamcinolone acetonide effects on pathological scars in a large number of patients, including its favorable impacts, as well as, its complications.

Subjects and methods: The current study recruited 80 patients with keloids and hypertrophic scars. We used intralesional Triamcinolone acetonide. Each patient took an injection once per month for three months. We used the Vancouver Scar Assessment Scale (VSS) to assess the results.

Results: The study showed clinical improvement in lesions with a high statistically significant difference in VSS. Some complications appeared in some patients, like hypopigmentation and atrophy.

Conclusion: The study revealed that Triamcinolone acetonide impacted the keloids and hypertrophic scars, but with complications in some patients. More studies needed to be done with different drugs in different combinations on pathological scars to make Triamcinolone safer than Triamcinolone alone.

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1. Introduction

Keloids and hypertrophic scars are pathological scars caused by excess collagen deposition in the dermis due to persistent inflammation [1].

Normally, wound healing occurs in a balanced and regulated process to form as invisible scars as possible. When this process becomes unbalanced, pathological scars, such as hypertrophic scars (HTS) and keloids can occur. Both scars are raised and firm because they are formed by fibrinogen that is overproduced by collagen during the healing process [2].

Excessive scar formation is divided into hypertrophic scars and keloids. Both types of scars are higher than the skin level, while hypertrophic scars do not extend beyond the original injury site, keloid scars usually extend beyond the edges of the original wound [3].

The prognosis of hypertrophic scarring is good when compared with keloids. They respond better to treatment and usually require a single treatment modality without recurrence. Unlike hypertrophic scars, keloids have a poor prognosis because they tend to have a genetic component, and patients at risk may have multiple keloids. Keloid scars will not go away spontaneously and will continue to grow for a year [4].

Keloids take 1 to 3 months to develop or as late as one year after injury or even spontaneously. On the other hand, Hypertrophic scar usually has a rapid growth phase of approximately six months, and then gradually regresses over a period of a few years until being flat scars with no further symptoms, but keloid typically persists for longer periods and do not regress spontaneously [3].

Keloid scars have a high recurrence rate after surgical resection and are more difficult to treat than hypertrophic scars. Therefore, adjuvant treatment is essential after surgery to help prevent a recurrence. As a family trend, all individuals can form keloids and hypertrophic scars, but keloids have more genetic predispositions than HTS [5].

Many treatment options for these pathological scars are available, but the results of them are really not complete. These treatments may be used alone or in combination. They include the most popular drug, triamcinolone acetonide [6].

Triamcinolone injection is the first line nowadays, but it has many drawbacks, including atrophy, hypopigmentation, and telangiectasia [7].

Corticosteroids have many mechanisms in treating keloids. They inhibit leukocyte functions and vasoconstrictor vessels, causing tissue hypoxia. They also inhibit cellular proliferation, decreasing collagen deposition. They increase collagenase that breaks collagen [8].

Steroids decrease transforming growth factor beta, Insulin-like growth factor one, and vascular endothelial growth factors [9].

2. Subjects and methods

2.1. Subjects

The current study included 80 patients from different age groups with keloids/hypertrophic scars.

Patients were selected from attendants of the Dermatology, STDs, and Andrology outpatient clinic, Fayoum university hospital. The diagnosis was performed on clinical basis. Patients were of both sexes and of different age groups. The lesion in all patients was either a keloid or hypertrophic scar.

Informed consent was taken from subjects enrolled in the study. The study was approved by the ethical committee of the faculty of medicine at Fayoum University.

Inclusion criteria

All patients with keloids/hypertrophic scars of age group (3-50 years) were included.

Exclusion criteria

Any patient with systematic or Dermatological diseases was excluded.

2.2. Study design

Baseline evaluation of lesion via Vancouver scar assessment scale (VSS) and after follow-up.

The therapy used was Triamcinolone Acetonide: 40mg/ml epirelifan vial (50% dilution). 1ml insulin syringe of solution contains a concentration of 20 mg/ml epirelifan.

Each patient received a session every month for three months. Three sessions one month apart. Each point of the lesion was injected with five units of solution with 1 cm spacing with a maximum of 1 ml of solution at each session.

Follow-up was done three months after the last session to detect the result, recurrence, and any complications.

VSS scores were measured before the start, after each month, and at follow-up.

2.3. Statistical analysis

Data were statistically described in terms of mean ± standard deviation (± SD), median and range, or frequencies (number of cases) and percentages when appropriate.

3. Results

The mean value of Vancouver score results at 0, 1, 2, and 3 months was 10.23±2.769 SD, 5.28±2.717 SD, 3.32±2.615 SD, 2.84±2.357 SD, respectively, and 2.62±1.831 SD at follow up (Table 1).

Table 1: Vancouver score results of Triamcinolone treated lesions.

Parameters	**At baseline**	**A month after the 1st session**	**A month after the 2nd session**	**A month after the 3rd session**	**Follow-up** (Three months after the last session)
Mean ±SD	10.23±2.769	5.28±2.717	3.32±2.615	2.84±2.357	2.62±1.831
N	80	80	74	64	74
Median	10 (5-16)	5 (0-11)	3 (0-10)	2 (0-10)	2 (0-8)

Regarding complications of Triamcinolone injection, after the first session, the lowest complication was tingling [(2.5%), two patients], hypopigmentation was [(7.5%), six patients] and the highest complication was pain [(10%), eight patients]. After the second session, the lowest complication was scaling

[(2.5%), two patients], and the highest complication was hypopigmentation [(12.5%), ten patients]. After the third session, the lowest complication was scaling [(2.5%), two patients], and the highest complication was hypopigmentation [(10%), eight patients]. After the final follow-up, only [(7.5%), six patients] had hypopigmentation, and no recurrence was recorded (Table 2).

Table 2: Complication results of Triamcinolone treated lesions.

Parameters	A month after the 1st session	A month after the 2nd session	A month after the 3rd session	Follow-up (Three months after the last session)
None	60 (75%)	58 (72.5%)	54 (67.5%)	68 (85%)
Tingling	2 (2.5%)	0	0	0
Pain	8 (10%)	6 (7.5%)	0	0
Bleeding	4 (5%)	0	0	0
Scaling	0	2 (2.5%)	2 (2.5%)	0
hypopigmentation	6 (7.5%)	10 (12.5%)	8 (10%)	6 (7.5%)
Total	80 (100%)	74 (95%)	64 (80%)	74 (92%)
Missing	0	6 (7.5%)	16 (20%)	6 (7.5%)

4. Discussion

Generally, wound healing takes place in a dynamic process of balancing to form the smallest possible visible scar. When this setting is out of balance, less-than-desirable scars appear, such as hypertrophic scars (HTS) and keloids. Both are raised, firm scars that form during the healing process due to excessive production of collagen fibrinogen and growth factors [2].

Hypertrophic scars and keloids appear in susceptible individuals due to some damage or irritation to the skin that is deep enough to affect the dermis and cause skin inflammation. Genetics, environmental factors, and increased wound pressure can also affect the development of keloids [10].

Despite the introduction of a wide variety of management protocols for hypertrophic scars, no definitive treatment has been established with optimal clinical results so far. Accepted treatment options for HTS include surgical excision of the scar with or without grafting, topical and intralesional corticosteroids injections, interferon therapy, bleomycin, silicone gel sheeting, laser therapy, and onion extract [11].

Eighty patients with keloids or hypertrophic scars participated in our study. Patients' age groups were between 3-50 years old. Fifty-six of them are females, and 24 are males.

Regarding symptoms of scars at baseline, 28 patients had no symptoms, 23 patients had pain,24 patients had itching, and five patients had tenderness.

The mean value for Vancouver score of injected lesions at 0,1,2,3,6 months was 10.23±2.769 SD, 5.28±2.717 SD, 3.32±2.615 SD, 2.84±2.357 SD, and 2.62±1.831 SD, respectively. A high statistically significant difference between the baseline and the result after each session of injection and between the baseline and the result three months after the third session.

That came in agreement with Sadighinia *et al.,* 2012, [12] and Abedini *et al.,* 2018, [13], who stated that Triamcinolone intralesional injection had improved keloid scar redness, itching, and height perfectly.

Corticosteroids have many mechanisms in treating keloids. They inhibit leukocyte functions and vasoconstrictor vessels, causing tissue hypoxia. They also inhibit cellular proliferation, decreasing collagen deposition. They increase collagenase that breaks collagen [9].

Regarding complications of Triamcinolone injection, After the first session, 2 (2.5%) patients had tingling, 8(10%) patients had pain, 4 (5%) patients had to bleed, and 6 (7.5%) patients had hypopigmentation. After the second session, 6 (7.5%) patients had pain, 2 (2.5%) had scales on the lesion, and 10 (12.5%) patients had hypopigmentation. After the third session, the lowest complication was scaling in 2 (2.5%) patients, and the highest complication was hypopigmentation in 8 (10%) patients. At the final follow-up, only 6 (7.5%) patients had hypopigmentation, and no recurrence was recorded.

That came in agreement with Syed *et al.,* 2013, [14] and Roques *et al.,* 2008, [15], who documented that corticosteroid injection in hypertrophic scars may cause hypopigmentation, telangiectasia, and even atrophy.

A high statistically significant difference was found in Triamcinolone treated lesions between baseline (0) and the final follow-up regarding vascularity (VAS), pigmentation (PIG) height (HIGH), and pliability (PLIAB) in the Vancouver scar scale.

As regards symptoms, we noticed that most of our patients who complained of pain (23 patients) and itching (24 patients) reported a significant improvement in pain and itching with Triamcinolone at the end of follow-up.

Conclusion

Our study revealed that Triamcinolone acetonide has a good effect on keloids and hypertrophic scars but with complications sometimes with some patients. Our study suggests that more studies needed to be done with different drugs in different combinations on pathological scars to make Triamcinolone safer than Triamcinolone alone.

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Ethical considerations

The study was approved by the ethical committee of the faculty of medicine at Fayoum University.

Patient consent

Informed consent was taken from subjects enrolled in the study.

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