

# Comparison of Efficacy of Intralesional 5-Fluorouracil Plus Triamcinolone Versus Triamcinolone Alone in the Treatment of Keloids

Seemab Khan, Muhammad Usman and Tooba Malik

## ABSTRACT

**Objective:** To compare the efficacy of triamcinolone acetonide (TAC) alone versus triamcinolone plus 5-fluorouracil (5-FU) in patients with keloids in terms of the proportion of patients who improved significantly.

**Study Design:** A Randomized controlled study

**Place and Duration of Study:** This study was conducted at the Department of Dermatology/Plastic Surgery, Bakhtawar Amin Teaching Hospital Multan from 18<sup>th</sup> March 2019 to 18<sup>th</sup> March 2020.

**Materials and Methods:** We enrolled 160 patients at the Bakhtawar Amin Teaching Hospital and randomly assigned them to receive Intralesional triamcinolone (group 1) or a combination of TAC and 5-fluorouracil (5-FU) for one year (group 2).

**Results:** The average age at the time of the survey was 30.748.47 years. There were no statistically significant variations between the two groups in terms of age and gender distribution in this study. Males made up 40% of the group, while women made up the rest (a 25 % male to female ratio). Only 16% of the TAC patients responded to treatment, but 75% of the 5-FU + TAC patients responded. There was a statistically significant difference between the two groups, and this was confirmed by a p value of 0.05.

**Conclusion:** The efficacy in terms of frequency of patients with good to outstanding improvement in keloids was significantly greater in triamcinolone + 5-FU group as compared to the triamcinolone alone group.

**Key Words:** Intralesional triamcinolone, Keloids, Hypertrophic scars, Triamcinolone acetate, 5- Fluorouracil

**Citation of article:** Khan S, Usman M, Malik T. Comparison of Efficacy of Intralesional 5-Fluorouracil Plus Triamcinolone Versus Triamcinolone Alone in the Treatment of Keloids. Med Forum 2022;33(5):62-66.

## INTRODUCTION

A keloid is an abnormal response of the skin to injury, inflammation, surgery, or burns. It is more common for people who are prone to keloids to develop them. These growths of dermal collagen can cause patients to have both physical and psychological challenges. They could cause long-lasting discomfort and irritation. According to the Centers for Disease Control and Prevention (CDC), 4.5 to 16 % of people with darker skin have been diagnosed with the condition. Between the ages of 10 and 25, keloid scars are most common in Asian and African cultures.

There are a variety of treatment options, including Intralesional injections of corticosteroids.

With a success rate ranging from 58% to 93%, excision and triamcinolone have been the gold standard in cancer treatment for decades now. Failures of previous therapy must be acknowledged. In addition, up to 37% of people have had unfavorable outcomes, including as hypopigmentation, atrophy, and telangiectasia's, among others.<sup>1</sup>

5-fluorouracil, mitomycin C, and bleomycin, which target scar tissue fibroblasts, have been demonstrated to be an effective treatment for scar tissue. The combination of 5-FU and triamcinolone may be more successful than intralesional steroids alone in treating wounds, according to clinical trials. Synonym for 5-FU, this pyrimidine analogue is helpful against skin wounds' excessive collagen formation by rapidly reproducing fibroblasts. Triamcinolone and 5-FU, which can be taken in combination with corticosteroids, were first shown to increase efficacy and reduce injection discomfort by Fitzpatrick's research team.

Sadeghina's recent research has shown that 5-FU tattooing is more effective than intralesional triamcinolone (TAC) injections in the treatment of keloids. The combination of 5-FU and triamcinolone has been proven to be more successful than intralesional steroid therapy alone in the treatment of keloids, according to studies. Over the course of their analysis, the scientists uncovered 102 keloids. In

---

Department of Dermatology/Plastic Surgery, Bakhtawar Amin Medical & Dental College, Multan.

---

Correspondence: Dr. Seemab Khan, Assistant Professor of Dermatology/Plastic Surgery, Bakhtawar Amin Medical & Dental College, Multan.

Contact No: 0333-6088906

Email: drkhan1102@yahoo.com

---

Received: November, 2021

Accepted: January, 2022

Printed: May, 2022

---

combination with steroid medication and excision, 5-FU patients had an average lesion reduction of 92% compared to 73% in patients who didn't receive 5-FU. For individuals who got 5-FU/steroid without surgical excision, statistically significant differences were found between the two groups ( $p = 0.05$ ).<sup>2</sup>

40 patients were randomly randomized to receive intralesional triamcinolone acetonide (TAC) or 5-fluorouracil as part of a combination therapy in a separate study by Darougheh and colleagues (5-FU)<sup>3</sup>. Groups 1 and 2 had response rates ranging from excellent (40%) to passable (15%), although there was no statistically significant difference between the two groups ( $p = 0.08$ ). Triamcinolone alone will be compared against triamcinolone mixed with 5-FU due to anecdotal data showing inconsistent outcomes (in the Davison study, there was a substantial difference, while in the Darougheh study, the difference was not statistically significant).

## MATERIALS AND METHODS

The study was conducted from 18<sup>th</sup> March 2019 to 18<sup>th</sup> March 2020 at Bakhtawar Amin Teaching Hospital Multan. The Hospital Ethic Committee granted permission for the collection of this data. Each patient was asked to sign a written informed consent after a thorough conversation. Dermatology patients were also seen at other places. If any tests were done, their results are included in this section as well as the patient's medical history and physical exam findings. Clinical evidence was used to arrive at the diagnosis. Through the use of a lottery system, patients were divided into two groups, one for Group A and one for Group B.<sup>4</sup>

The length of the lesion was measured in millimeters and a ruler was used to take a snapshot of the lesion along the length of the lesion. Using Vernier calipers, the maximum horizontal thickness of the material was determined. Group A participants received intralesional corticosteroid injections. At a dosage of 40 mg/ml, triamcinolone was injected. A 30 gauge needle connected to a 1 ml insulin syringe was used to inject the corticosteroid directly into the keloid. Treatment volumes ranged from 0.01 to 0.05 milliliters per centimeter of lesion. Although the volume varied from patient to patient, it was customary to inject 0.01 milliliters per centimeter of skin. Group B, on the other hand, received a corticosteroid injection and 5-FU Intralesional injection. In this solution, a 75% 5-FU solution is mixed with a 25% Triamcinolone solution at a concentration of 40 mg/ml. Each centimeter of the lesion was injected with a 0.1 ml solution.<sup>5</sup>

For eight weeks, patients received weekly injections. Using a ruler and a previous photograph as a guide, we measured the lesions' size and thickness in millimeters once more at the end of week 12, exactly as we had done before to beginning therapy.<sup>6</sup>

**Data Analysis:** In SPSS for Social Sciences version 11, the acquired data was transformed into variables, and the results were examined. Visual representations of numerical data, such as age, mean, and standard deviation, were available. Gender and effectiveness are two examples of categorical variables that were expressed using frequency and percentages. The %age of patients who saw a significant improvement in their condition was compared between two groups, with some surprising results.

## RESULTS

Eighty individuals were referred to the TAC group and the remaining eighty were referred to the TAC plus 5-FU group. 18 to 55-year-olds had an average age of 30.74 + 8.47 years. The mean and median ages were determined to be 30.5 and 23, respectively. Patients in the TAC and 5FU plus TAC groups had a mean age of 31.779.14 years, while those in the 5FU plus TAC group had a mean age of 29.776.66 years. The p-value for this difference, which was 0.124, indicated a non-significant difference. There were 40 men and 120 women in the study. TAC's membership included 17 men and 19 women (63.33 %). Thirteen males (43.33 %) and eleven women (36.67 %) were enrolled in the hypertonic saline trial. The difference is not statistically significant, as indicated by the p value of 0.598.<sup>7</sup>

At baseline, the diameters of tumors ranged from 10 to 109 millimeters. There were 64.723.27mm keloids on average. The median and mean diameters of keloid were 66.5 and 67 millimeters, respectively. Compared to patients in the 5-FU plus TAC group, those in the TAC group had keloids measuring 67.5821.78 mm on average at baseline (S0). This difference was not statistically significant, as indicated by the p-value.

In our study, the size of the keloids at 12 weeks ranged from 0 mm to 88 mm. It measured 34.58mm x 23.82mm in size. The diameter of the most prevalent keloids was 36 mm, while the tiniest keloids had a diameter of 0 mm. At the conclusion of the 12-week study, patients in the TAC group had keloids (S12) ranging in size from 0 to 88 mm on average, while those in the 5-FU + TAC group had keloids (S12) ranging in size from 0 to 65 mm on average. The 12-week results demonstrated statistical significance. This instance revealed a statistical difference of  $p = 0.01$ . After 12 weeks of treatment, the prevalence of keloids dropped from 100 % to 100.33%. The size of keloids decreased by between 52.27 and 52.98 %. The median and average sizes of the keloids decreased by 47% and 100%, respectively. The 12-week decrease in keloids in the TAC and 5-FU groups was 34.2621.8% and 70.2725.7%, respectively. Statistical significance was established if the p-value was less than one.<sup>8</sup>

Effectiveness was defined as a 50 % or better reduction in symptoms and a good-to-excellent improvement. There were 13 TAC responders, compared to 60 in the

5-FU plus TAC group, which had a response rate of 75%. This difference was statistically significant, with a p-value of 0.01, according to the results (Table 4). Combining 5-FU with TAC proved to be much superior to TAC alone, according to the results of the study. There were five full remissions in the TAC group and 31 in the 5-FU + TAC group, a difference of 63.3%.<sup>9</sup>

The vast majority of patients (n=80; 50%) were under the age of 30. In the TAC group, just 22.6 % of patients responded; in the 5 FU plus TAC group, 85.6 % of patients responded (p = 0.000). At 30 years of age, 5 FU was found to be more effective than TAC alone. The TAC group had a success rate of 14.3%, but the 5 FU and TAC group had a success rate of 63.3% (p=0.000). When compared to 5 FU alone, TAC was completely ineffective in the 31-year-old age group.

TAC was well tolerated by 6/23 (26 %) of the 40 male patients, whereas 13/17 (76.5 %) of the patients in the 5

FU plus TAC group were successful in their therapy. TAC by itself was not as effective in men as 5 FU was. It was shown that the TAC and 5 FU plus TAC groups had response rates of 6/57 (10.5 %) and 47/63 (74 %) in this trial of 120 female patients. The combination of 5 FU with TAC was substantially more effective in females than TAC alone.<sup>10</sup>

79 people, or 50 %, had keloids on the trunk and head. TAC alone was ineffective in treating keloids on the trunk and head (p=0.000). 5 FU + TAC was more effective than TAC alone. TAC group patients responded to treatment at a rate of just 19%, compared to a rate of 77% in the 5 FU + TAC group (p=0.000)<sup>11</sup>. Half of the patients had keloids, which could be seen on their limbs. There were six patients in the TAC group, and 27 in the 5-FU and 5-FU + TAC group; the p-value was 0.0001. In treating limb keloids, 5 FU with TAC performed better than TAC, according to this study.<sup>12</sup>

**Table No.1: Comparison of baseline keloids size between the two groups**

|               | Group               | N  | Mean    | Std. Deviation | Std. Error Mean | P value♣ |
|---------------|---------------------|----|---------|----------------|-----------------|----------|
| Baseline Size | TAC group           | 80 | 67.5875 | 21.78531       | 2.43567         | 0.119*   |
|               | 5 FU plus TAC group | 80 | 61.8500 | 24.47375       | 2.73625         |          |

**Table No.2: Efficacy in different age groups among in TAC and 5-FU plus TAC groups**

| Age group  |                     | Efficacy |    | Total | P value♣ |
|------------|---------------------|----------|----|-------|----------|
|            |                     | Yes      | No |       |          |
| ≤ 30 years | TAC group           | 7        | 31 | 38    | 0.000    |
|            | 5 FU plus TAC group | 36       | 6  | 42    |          |
|            | Total               | 43       | 37 | 80    |          |
| ≥ 31 years | TAC group           | 6        | 36 | 42    | 0.00     |
|            | 5 FU plus TAC group | 24       | 14 | 38    |          |
|            | Total               | 30       | 50 | 80    |          |

**Table No. 3: Efficacy in different sites among TAC and 5-FU plus TAC groups**

| Site of keloid |                     | Efficacy |    | Total | P value♣ |
|----------------|---------------------|----------|----|-------|----------|
|                |                     | Yes      | No |       |          |
| Trunk and head | TAC group           | 7        | 29 | 36    | 0.000    |
|                | 5 FU plus TAC group | 33       | 10 | 43    |          |
| Limbs          | TAC group           | 6        | 38 | 44    | 0.000    |
|                | 5 FU plus TAC group | 27       | 10 | 37    |          |

**Table No.4: Efficacy in different duration groups among TAC and 5-FU plus TAC groups**

| Duration of keloid |                     | Efficacy |    | Total | P value♣ |
|--------------------|---------------------|----------|----|-------|----------|
|                    |                     | Yes      | No |       |          |
| < 6 months         | TAC group           | 5        | 38 | 43    | 0.000    |
|                    | 5 FU plus TAC group | 20       | 8  | 28    |          |
| > 6 months         | TAC group           | 8        | 29 | 37    | 0.000    |
|                    | 5 FU plus TAC group | 40       | 12 | 52    |          |

Within six months of the procedure, 68 (42.5 %) of the patients had keloids that had disappeared. Treatment with TAC was successful in 5 of 43 patients (11.6%), compared to 20 of 28 (71.4%) patients treated with 5 FU plus TAC ( $p=0.000$ ). TAC was less effective than 5 FU in the treatment of keloids lasting less than six months, according to the results of this study. 95 patients (57.5%) had keloids that had persisted for more than six months in their treatment. In the TAC group, 21.6 % of patients reacted, whereas in the 5 FU plus TAC group, 77 % of patients responded,  $p$ -value = 0.000.'s. Keloids can be successfully treated with TAC and 5 FU for a longer period of time than with TAC alone, according to this study<sup>9</sup>.

## DISCUSSION

Keloids and hypertrophic scars occur as a result of aberrant skin repair following an injury<sup>2</sup>. Patients frequently seek medical therapy as a result of the considerable functional and emotional consequences of the diseases. Injections of corticosteroids are frequently used to treat keloids and hypertrophic scars. My research purpose was to determine whether intralesional TAC+5-FU is more effective in treating keloids than TAC alone, in order to offer a more informed therapeutic recommendation.<sup>13</sup> TAC and 5-FU intralesional injections were evaluated for their efficacy in reducing initial scar size in keloid patients. I conducted a randomized controlled experiment for 1 year at the Bahawalpur Amin Teaching Hospital. 168 participants were randomly assigned to receive intralesional triamcinolone acetonide injections or intralesional corticosteroid injections plus 5-FU.<sup>14</sup> Lesions were measured in millimeters (mm) along the same dimensions as before therapy at the completion of week 12. The fraction of keloids that shrank by more than half was used to measure efficacy, suggesting a good-to-excellent response. There were 40 men and 120 women, with a mean age of 30.74 years and an average standard deviation of 8.47 years.<sup>15</sup> Between the two groups, there was no statistically significant difference in the distribution of age or gender. This suggests that the age and gender distributions of the two groups were comparable. Demographic factors have no influence on the efficacy variation. Thirteen (13.3%) patients in the TAC group responded to treatment, whereas sixty (75%) patients in the 5-FU plus TAC group did. A statistically significant difference was detected, with a  $p$ -value of 0.0.000. As a result, the triamcinolone + 5-FU group demonstrated significantly greater efficacy than the triamcinolone alone group in terms of patients who improved significantly.<sup>16</sup>

## CONCLUSION

The efficacy in terms of frequency of patients with good to outstanding improvement in keloids was

significantly greater in triamcinolone + 5-FU group as compared to the triamcinolone alone group.

### Author's Contribution:

Concept & Design of Study: Seemab Khan  
 Drafting: Tooba Malik,  
 Muhammad Usman  
 Data Analysis: Muhammad Usman,  
 Seemab Khan  
 Revisiting Critically: Seemab Khan,  
 Muhammad Usman  
 Final Approval of version: Seemab Khan, Tooba Malik

**Conflict of Interest:** The study has no conflict of interest to declare by any author.

## REFERENCES

1. Butt MQ, Latif A, Khan RM, Mazhar AI, Shabbir F. Keloids and hypertrophic scars;: comparison of intralesional injection of triamcinolone alone and triamcinolone mixed with 5 flourouracil in treatment of keloids and hypertrophic scars. *Profess Med J* 2017;24(06):812-7.
2. Coppola MM, Salzillo R, Segreto F, Persichetti P. Triamcinolone acetonide intralesional injection for the treatment of keloid scars: patient selection and perspectives. *Clinical, Cosmetic Investigational Dermatol* 2018;11:387.
3. Klomprens K, Simman R. Treatment of Keloids: A Meta-analysis of Intralesional Triamcinolone, Verapamil, and Their Combination. *Plastic and Reconstructive Surgery Global Open* 2022;10(1).
4. Srivastava S, Patil A, Prakash C, Kumari H. Comparison of intralesional triamcinolone acetonide, 5-fluorouracil, and their combination in treatment of keloids. *World J Plastic Surg* 2018; 7(2):212.
5. Gamil HD, Khattab FM, Eldeeb SE. Comparison of intralesional triamcinolone acetonide, botulinum toxin type A, and their combination for the treatment of keloid lesions. *J Dermatological Treatment* 2019.
6. 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 Therapy* 2016;6(2):169-83.
7. Searle T, Al-Niimi F, Ali FR. 5-fluorouracil in dermatology: the diverse uses beyond malignant and premalignant skin disease. *Dermatologic Surg* 2021;47(3):e66-70.
8. Erickson T, Gray J, Tayebi B, Tung R. A multimodal approach to the treatment of extensive burn scars: a modified subcision technique for intralesional delivery of corticosteroid and 5-fluorouracil in combination with several

- procedural laser therapies; a case report. *Scars, Burns Healing* 2018;4:2059513118818997.
9. Zhuang Z, Li Y, Wei X. The safety and efficacy of intralesional triamcinolone acetonide for keloids and hypertrophic scars: A systematic review and meta-analysis. *Burns* 2021;1;47(5):987-98.
  10. Saleem F, Rani Z, Bashir B, Altaf F, Khurshid K, Pal SS. Comparison of efficacy of intralesional 5-fluorouracil plus triamcinolone acetonide versus intralesional triamcinolone acetonide in the treatment of keloids. *J Pak Assoc Dermatologists* 2017;27(2):114-9.
  11. Coppola MM, Salzillo R, Segreto F, Persichetti P. Triamcinolone acetonide intralesional injection for the treatment of keloid scars: patient selection and perspectives. *Clinical, Cosmetic Investigational Dermatol* 2018;11:387.
  12. Wu Y, Wang GJ, He HQ, Qin HH, Shen WT, Yu Y, et al. Low-dose intralesional injection of 5-fluorouracil and triamcinolone reduces tissue resident memory T cells in chronic eczema. *World J Clinical Cases* 2022;10(1):166.
  13. Albalat W, Nabil S, Khattab F. Assessment of various intralesional injections in keloid: comparative analysis. *J Dermatological Treatment* 2022; 8:1-6.
  14. Lyons AB, Peacock A, Braunberger TL, Viola KV, Ozog DM. Disease severity and quality of life outcome measurements in patients with keloids: a systematic review. *Dermatologic Surg* 2019; 45(12):1477-83.
  15. Srivastava S, Patil AN, Prakash C, Kumari H. Comparison of intralesional triamcinolone acetonide, 5-fluorouracil, and their combination for the treatment of keloids. *Advances in Wound Care*. 2017;6(11):393-400.
  16. Saki N, Mokhtari R, Nozari F. Comparing the efficacy of intralesional triamcinolone acetonide with verapamil in treatment of keloids: A randomized controlled trial. *Dermatol Practical Conceptual* 2019;9(1):4.