Comparison of Fractional CO₂ Laser, Verapamil, and Triamcinolone for the Treatment of Keloid

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Objective: Scar biology is a territory less understood. The search for ideal treatment of keloid continues. The aim of this study was to compare the role of CO₂ laser, triamcinolone (TAC), and verapamil in the treatment of keloid.

Approach: A randomized parallel-group study was conducted in which 60 patients were randomly allocated to three groups from May 2017 to April 2018. First group received fractional CO₂ laser therapy, second group received triamcinolone, and third group received intralesional verapamil. Outcomes were evaluated using Vancouver scar scale score at 3 weekly intervals for 6 months.

Results: There was a reduction in scar height, vascularity, and pliability in all the three groups. However, pigmentation was not completely resolved by any of the three modalities. The response was fastest in case of triamcinolone followed by verapamil and laser, which was statistically significant. There was reduction in pain and pruritus in all the three groups and lesser injection site pain with verapamil. There was some amount of charring with CO₂ laser.

Innovation: Our study provides evidence that TAC has the fastest response in treating keloids when compared to other modalities. Scar pigmentation is the parameter that is not completely resolved by TAC, verapamil, or CO₂ laser.

Conclusion: The study revealed that fractional CO₂ laser and verapamil are as efficient as triamcinolone acetate (TAC) for treating keloids, except it takes longer for laser and verapamil to act compared to TAC. Verapamil can be used as an alternative treatment modality that is cost-effective with minimal adverse effects.

Keywords: keloid, CO₂ laser, verapamil, triamcinolone, comparison

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INTRODUCTION

IN A WORLD EMPHASIZING physical appearance more and more every-day, a scar is something people want to do away with, to the greatest extent possible. It leaves a mark on the body as well as the psyche. Despite a plethora of treatment modalities available, none guarantees a cure. A keloid is produced due to aberrant benign fibroproliferative growth because of overexpression of cytokines and growth factors.^{1,2} Glucocorticoids have been applied for the treatment of keloids and hypertrophic scars since

1960 as the first-line drugs. However, it has side effects like atrophy, telangiectasia, and hypopigmentation. Pain is associated with its intralesional injection.^{3,4}

The advent of fractional photothermolysis in scar treatment is a quantum leap in the domain of scar rehabilitation. According to the Consensus report, ablative fractional laser deserves a prominent role in future paradigm for scar treatment.⁵ Several case reports were found containing promising results with the use of CO₂ laser in the treatment of hy-

pertrophic scar and keloid. In 1992, Lee first reported the use of calcium channel blocker verapamil for treating keloids.⁶

We embarked upon this randomized study to compare the three regimens (*i.e.*, CO₂ laser, triamcinolone, and verapamil) in terms of objective outcomes by Vancouver scar scale (VSS) score and adverse effects in the treatment of keloids.⁷ A short review and results of the study follow.

CLINICAL PROBLEM ADDRESSED

There are multiple options available for treating keloids and hypertrophic scar but none guarantees cure beyond doubt. The aim of this study is to investigate superiority of one modality over another in terms of scar treatment and adverse effects.

METHODOLOGY

A prospective study was conducted in the department of Burns and Plastic surgery of SMS Hospital, Jaipur, between May 2017 and April 2018. This was a single-blind, randomized parallel-group study. All the patients eligible for the study were selected from the outpatient clinic and randomized according to the Chit-in-Box method. The study protocol was approved by the institutional Screening Committee and Ethics Committee. Informed consent was obtained from all the participants.

Inclusion criteria were all patients aged more than 12 years and less than 50 years of age with keloids of size 0.5 cm to 5 cm in greatest dimension and of >6-month and <2-year duration. Females who were pregnant or were planning pregnancy were excluded. Patients who had received previous treatment for the same keloid in the past 12 months were excluded. Baseline blood investigations, including complete blood count, and renal and liver function tests, were carried out before inclusion in the study.

Etiology was classified into infection, burn, trauma, and surgery. Patients were randomly allocated to three groups. The first group received CO₂ laser, second group received triamcinolone acetonide (TAC), and the third group received verapamil intralesionally after every 3 weeks for 24 weeks or till scar flattening occurred, whichever was earlier. Injections were given on an outpatient basis with an insulin syringe. VSS was originally designed by Sullivan *et al.*⁸ to assess burn scars, which has since been extended to include other scars as well. In addition to digital photography, VSS is a valuable instrument in the clinical evaluation and follow-up of scars.⁷ For VSS, keloid height was measured with calipers; 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 till scar flattening occurred (VSS <2). A maximum of 2 mL of triamcinolone (40 mg/mL) and 2 mL of verapamil (2.5 mg/mL) was injected. Fractional CO₂ laser was delivered with a spot density of 25 spots/cm² and energy of 30–50 millijoules level. Scars were evaluated at each stage by taking serial photographic records and objective measurements by VSS. Assessment was done by a resident doctor who was not part of the treating team. Mean values of the score were recorded. Adverse effects were also noted.

Statistical analysis

Comparative analysis among the three groups was done using scatter plots to determine the correlation in the treatment groups. Proportions were compared between the groups using chi square test and ANOVA was used for evaluating difference in means of groups. Statistical analysis was carried out with SPSS software for Windows Version 23.0 (Armonk, NY). A *p*-value of <0.05 was considered to be significant.

RESULTS

The youngest patient in the study was 12 years old and the oldest was 48 years old. There were 31 females and 29 males in the study. Trauma was the most common etiology (*n* = 18) followed closely by infection (*n* = 17), burn (*n* = 15), and surgery (*n* = 10). The most commonly involved region was presternal area (*n* = 24), followed by trunk (*n* = 14), extremities (*n* = 13), and face (*n* = 9). The baseline characteristics of the population were comparable in all the three groups. (Table 1). Mean preinjection VSS scores for all the treatment groups are presented in Tables 2 and 3.

There was a reduction in height, vascularity, pliability, and pigmentation at every successive assessment in all three groups and that was maintained till the final evaluation as shown in Figure 1. Pigmentation of scar was the parameter that did not resolve in any of the treatment groups. The rate of improvement in scar characteristics can be seen in the scatter plots (Fig. 2). On using the scatter plots to determine the correlation among treatments in the three groups, the faster rate of improvement in scar was seen in triamcinolone; however, the difference in rate of pigmentation with all the three agents was not statistically significant. Pain and pruritus were relieved in all the three groups after two to three settings of treatment.

Table 1. Baseline characteristics of the population

	Laser (N = 20) n (%)	TAC (N = 20) n (%)	Verapamil (N = 20) n (%)	p-Value LS
Mean age	32.65 (9.74)	30.45 (9.33)	29.45 (8.24)	0.529
values number				
Females	11 (55)	9 (45)	11 (55)	0.76
Males	9 (45)	11 (55)	9 (45)	
Etiology				
Burn	6 (30)	5 (25)	4 (20)	0.76
Infection	6 (30)	6 (30)	5 (25)	0.92
Surgery	3 (15)	3 (15)	4 (20)	0.88
Trauma	5 (25)	6 (30)	7 (35)	0.78
Region				
Extremity	5 (25)	4 (20)	4 (20)	0.91
Face	4 (20)	2 (10)	3 (15)	0.67
Trunk	4 (20)	6 (30)	4 (20)	0.68
Presternal	7 (35)	8 (40)	9 (45)	0.812

All *p*-values were greater than 0.05 (no statistically significant difference).
LS, level of significance; TAC, triamcinolone acetonide.

Minor adverse effects were seen in triamcinolone and laser groups. Verapamil group did not show any adverse effect. Charring was seen in laser group, while pain at the time of injection was observed in the triamcinolone group as shown in Table 4.

DISCUSSION

Earliest mention of disfiguring scars or keloid appeared in Egypt in Smith Papyrus, dated ~2000 B.C. In 1800, Dermatologist named Baron Jean Louis Alibert introduced the term cheloide or keloid, which means crab's claw in Greek.⁹ Cosmetic disfigurement leads to physical and psychosocial embarrassment. Wound healing has three phases: inflammatory, proliferative, and remodeling.¹⁰ Inflammatory phase leads to recruitment of inflammatory cells and formation of hemostatic plugs. The second phase involves relocation of fibroblasts and inward migration of keratinocytes into the wound margin. The third and last phase is the most important phase of scar remodeling responsible for the different types of scar. A balance of collagen production and degradation marks this phase.

Table 2. Baseline scores of outcome parameters

ID	Laser Mean ± SD (VSS Score Values)	TAC Mean ± SD (VSS Score Values)	Verapamil Mean ± SD (VSS Score Values)	p-Value LS
Height	1.95 ± 0.759	1.75 ± 0.639	2.05 ± 0.60	0.361
Vascularity	2.05 ± 0.686	1.65 ± 0.489	1.95 ± 0.68	0.12
Pigment	1.6 ± 0.503	1.7 ± 0.47	1.65 ± 0.48	0.811
Pliability	1.85 ± 0.671	1.9 ± 0.641	2.1 ± 0.64	0.443

Data reported as Mean ± SD.

All *p*-values were greater than 0.05 (no statistically significant difference).
VSS, Vancouver scar scale.

With better understanding of pathophysiology of hypertrophic scars and keloids, newer possibilities of treatment are emerging with verapamil, lasers, antimitotic drugs like 5 FU or bleomycin, interferon α 2b, and even botox.¹¹ There have been a myriad of options available for treatment of keloids. Modalities like 5 FU have been used alone and in combination with triamcinolone as shown by the senior author in a previous study; however, it is fraught with complications.¹² Other treatments like scar massage and use of silicone are just supportive physical therapies and their role in treating keloids has not been established, although they may be added as an adjunct. We embarked upon this study to find an alternative modality that was equally efficacious and had minimal side effects.

Early reports suggest that fractional laser resurfacing is associated with consistent and significant functional and cosmetic improvement.¹³ Fractional photothermolysis amplifies the effect of treatment and minimizes the recovery period by creating thousands of minute areas on the skin surface and transmitting thermal injury to facilitate heat shock protein formation around the skin dermis, thus reforming collagen.^{14,15} Fractional CO₂ laser at 10,600 nm has a role in scar remodeling without noticeable side effects.

According to the consensus meeting, it was decided that fractional laser was more effective for scar improvement than Pulsed dye laser or Q switched laser. Inflammatory and erythematous scars encountered early are most amenable to treatment with pulsed dye laser.^{16–18} Ablative fractional lasers typically produce greatest improvement for hypertrophic scars and scars of less than 2-year duration. The penetration of scar is between 400 and 1,000 μm into the dermis; deeper dermis fibrotic components remain untreated. Targeting tissue water may lead to thermally induced destruction of blood vessels and thus improvement of erythema. It releases TGFβ and bFGF, thus causing scar contraction.^{19,20}

Application of CO₂ laser showed a drop in VSS score on all the parameters after every session of treatment, although the time taken was longer in comparison to triamcinolone and verapamil. Further focused research studies are required to characterize the scar, as has been shown in many studies that CO₂ laser is more efficacious if used early.

Intralesional triamcinolone is the first-line drug for aberrant scars as it inhibits the fibroblast growth factor and enhances collagen breakdown. It causes a significant reduction in the levels of alpha-1-antitrypsin and alpha-2-macroglobulin, which

Table 3. Mean preinjection Vancouver scar scale scores*Mean ± SD Pre-injection VSS Scores*

VSS parameter	0 Weeks	3 Weeks	6 Weeks	9 Weeks	12 Weeks	15 Weeks	18 Weeks	21 Weeks	24 Weeks
Height									
Laser	1.95 ± 0.76	1.95 ± 0.76	1.8 ± 0.61	1.8 ± 0.62	1.6 ± 0.5	1.2 ± 0.52	0.75 ± 0.55	0.25 ± 0.44	0.25 ± 0.44
TAC	1.75 ± 0.64	1.7 ± 0.73	1.55 ± 0.69	1.55 ± 0.6	0.7 ± 0.47	0.6 ± 0.5	0.25 ± 0.44	0 ± 0	0 ± 0
Verapamil	2.05 ± 0.6	2.05 ± 0.6	1.85 ± 0.67	1.6 ± 0.6	1.3 ± 0.47	1.05 ± 0.22	0.55 ± 0.51	0.1 ± 0.31	0.05 ± 0.22
p-value LS	0.361NS	0.276NS	0.311NS	0.392NS	<0.001S	<0.001S	0.01S	0.046S	0.019
Pigmentation									
Laser	1.6 ± 0.50	1.55 ± 0.51	1.55 ± 0.51	1.4 ± 0.5	1.2 ± 0.41	1.1 ± 0.31	0.9 ± 0.31	0.85 ± 0.37	0.8 ± 0.41
TAC	1.7 ± 0.47	2 ± 0	2 ± 0	2 ± 0	2 ± 0	1.45 ± 0.51	1.15 ± 0.37	1 ± 0	0.8 ± 0.41
Verapamil	1.65 ± 0.49	1.65 ± 0.49	1.65 ± 0.49	1.65 ± 0.49	1.6 ± 0.5	1.6 ± 0.5	0.8 ± 0.41	0.7 ± 0.47	0.55 ± 0.51
p-value LS	0.811NS	0.002S	0.002S	<0.001S	<0.001S	0.003S	0.011S	0.028S	0.133
Vascularity									
Laser	2.05 ± 0.69	2.05 ± 0.69	2 ± 0.65	1.5 ± 0.51	1.3 ± 0.47	0.8 ± 0.52	0.53 ± 0.51	0.45 ± 0.51	0.45 ± 0.51
TAC	1.65 ± 0.49	1.65 ± 0.49	1.45 ± 0.51	1.15 ± 0.37	0.6 ± 0.6	0.25 ± 0.44	0	0	0
Verapamil	1.95 ± 0.69	1.95 ± 0.69	1.95 ± 0.69	1.4 ± 0.5	1.2 ± 0.41	0.65 ± 0.49	0.25 ± 0.44	0.1 ± 0.31	0.1 ± 0.31
p-value LS	0.12NS	0.12NS	0.012S	0.058NS	<0.001S	0.002	<0.001S	<0.001S	<0.001
Pliability									
Laser	1.85 ± 0.67	1.85 ± 0.67	1.75 ± 0.55	1.7 ± 0.47	1.35 ± 0.49	1.05 ± 0.22	0.95 ± 0.22	0.9 ± 0.31	0.9 ± 0.31
TAC	1.9 ± 0.64	1.85 ± 0.59	1.8 ± 0.52	1.2 ± 0.41	0.95 ± 0.39	0.55 ± 0.51	0.05 ± 0.22	0	0
Verapamil	2.1 ± 0.64	2.1 ± 0.64	2.05 ± 0.6	1.5 ± 0.51	1.25 ± 0.44	0.95 ± 0.39	0.5 ± 0.51	0.05 ± 0.22	0
p-value LS	0.443	0.361	0.202	0.005	0.017	<0.001S	<0.001S	<0.001S	<0.001

Figure 1. (a). Hypertrophic scar before CO₂ laser therapy. **(b)** Photograph after four settings of laser therapy. **(c)** Preinjection photograph of verapamil. **(d)** After four sessions of verapamil.

Figure 2. Figure showing scatter plots for comparing the scar parameters in terms of height, vascularity, pigmentation, and pliability in the three treatment groups. y-axis represents the VSS score and x-axis represents the time duration in weeks. TAC, triamcinolone acetonide; VSS, Vancouver scar scale.

tend to be greater in keloidal tissue and are natural inhibitors of collagenase in human skin.²¹ The International Advisory Panel on Scar Management has recommended the use of intralesional steroid injections as the first-line therapy for the treatment of keloid and hypertrophic scars.²²

A varying dose of 10–40 mg/mL has been described in literature, necessary to be effective. We chose a dose of 40 mg/mL for our study. The most frequent adverse effects linked to TAC are telangiectasia, skin atrophy, and altered pigmentation, which are unacceptable to most patients.

Table 4. Adverse effects

	Co ₂ Laser	TAC	Verapamil
Pain at injection site	2/20	8/20	0
Telangiectasia	0	2/20	0
Skin atrophy	0	1/20	0
Charring	3/20	0	0

Verapamil depolymerizes actin filaments to modify fibroblast morphology with a consequent increased secretion of procollagenase. In another study, verapamil was found to inhibit interleukin-6 and vascular endothelial growth factor production in primary culture of keloid fibroblast. Boggio *et al.* confirmed that verapamil is involved in the process of wound healing. Fifty micrometer of verapamil was an excellent scar modulator.²³ Both triamcinolone and verapamil could attain a VSS (first described by Sullivan) score of zero, but it was fast in case of triamcinolone (18 weeks), while it took longer for verapamil (24 weeks), except in case of pigmentation where none could achieve a score of zero.^{24–26}

The treatment interval of 3 weeks was kept arbitrarily in accordance with previous studies. However, no correlation of interval with outcome has been found.

All the previous studies could not be compared due to lack of standard criteria. We tried to make

our study more objective by using VSS score for comparing the outcome. However, being observer dependent, it is prone to error.

Each of the modality had its own advantage and treatment needs to be individualized according to the scar characteristics. Although time is the constraint with laser and verapamil in comparison to triamcinolone, they are free from adverse effects. Early scars should be subjected to fractional laser therapy. Verapamil is a cost-effective alternative, which can be used in place of triamcinolone.²⁷

Limitation of the study is its short follow-up, where exact estimation of recurrence cannot be made and that is the main disadvantage seen with CO₂ laser therapy. The dose and response of fractional laser in different types of scar need to be evaluated in future. Longer prospective studies are required to elucidate the same.

CONCLUSION

The study revealed that fractional CO₂ laser and verapamil are an efficient and safe therapeutic modality for treating keloid, but it takes longer to act in comparison to TAC. More research and prospective clinical studies regarding dose and response of laser in different types of scar are required. Verapamil can be used as an alternative treatment modality as it is more cost-effective and devoid of any adverse effects.

INNOVATION

The treatment of keloid has been a matter of debate till now. TAC continues to be the gold standard. Our study provides evidence that TAC has the fastest response in treating keloids when compared to other modalities. Scar pigmentation is

KEY FINDINGS

- TAC, verapamil, and CO₂ laser are all effective in keloid.
- CO₂ laser is an efficient and safe option in treating early scars (<2-year duration).
- Verapamil is as efficacious as TAC with lesser adverse effects and being more cost-effective.
- However, both verapamil and CO₂ laser take longer to act in comparison to TAC.

the parameter that is not completely resolved by TAC, verapamil, or CO₂ laser.

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REFERENCES

1. Reish RG, Eriksson E. Scar treatments: preclinical and clinical studies. *J Am Coll Surg* 2008;206:719–730.
2. Mari W, Alsabri SG, Tabal N, Younes S, Sherif A, Simman R. Novel insights on understanding of keloid scar: article review. *J Am Coll Clin Wound Spec* 2016;7:1–7.
3. Huang C, Murphy GF, Akaishi S, Ogawa R. Keloids and hypertrophic scars: update and future directions. *Plast Reconstr Surg Glob Open* 2013;1:e25.
4. Gauglitz GG. Management of keloids and hypertrophic scars: current and emerging options. *Clin Cosmet Investig Dermatol* 2013;6:103–114.
5. Anderson RR, Donelan MB, Hivnor C. Laser treatment of traumatic scars with an emphasis on ablative fractional laser resurfacing consensus report. *JAMA Dermatol* 2014;150:187–193.
6. Berman B, Maderal A, Raephe B. Keloids and hypertrophic scars, pathophysiology, classification, and treatment. *Dermatol Surg* 2017;43 Suppl 1:S3–S18.
7. Brusselaers N, Pirayesh A, Hoeksema H, Verbelen J, Blot S, Monstrey S. Burn scar assessment: a systematic review of different scar scales. *J Surg Res* 2010;164:e115–e123.
8. Sullivan T, Smith J, Kermode J, McIver E, Courtemanche DJ. Rating the burn scar. *J Burn Care Rehabil* 1990;11:256–260.

9. Addison T. On the keloid of Alibert and on true keloid. *Med Chir Trans* 1854;37:27–47.
10. Singer AJ, Clark RA. Cutaneous wound healing. *N Engl J Med* 1999;341:738–746.
11. Gauglitz GG, Korting HC, Pavicic T, Ruzicka T, Jeschke MG. Hypertrophic scarring and keloids: pathomechanisms and current and emerging treatment strategies. *Mol Med* 2011;17:113–125.
12. 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*. 2017;6:393–400.
13. Ządkowski T, Nachulewicz P, Mazgaj M, et al. A new CO₂ laser technique for the treatment of pediatric hypertrophic burn scars an observational study. *Medicine* 2016;95:42.
14. Oh BH, Hwang YJ, Lee YW, Choe YB, Ahn KJ. Skin characteristics after fractional photothermolysis. *Ann Dermatol* 2011;23:448–454.
15. Hantash BM, Bedi VP, Kapadia B, et al. In vivo histological evaluation of a novel ablative fractional resurfacing device. *Lasers Surg Med* 2007;39:96–107.
16. Ru'aa Al Harithy, Pon K. Scar treatment with lasers: a review and update. *Curr Dermatol Rep* 2012;1:69–75.
17. McGoldrick RB, Theodorakopoulou E, Azzopardi EA, Murison M. Lasers and ancillary treatments for scar management Part 2: keloid, hypertrophic, pigmented and acne scars. *Scars Burn Heal* 2017; 3:1–16.
18. Nouri K, Vidulich K, Rivas MP. Lasers for scars: a review. *J Cosmet Dermatol* 2006;5:14–22.
19. Scramali L, Lomeo G, Nolfo C, Pompili G, et al. Treatment of hypertrophic scars and keloids with a fractional CO₂ laser: a personal experience. *J Cosmet Laser Ther* 2010;12:218–221.
20. Oh BH, Hwang YJ, Lee YW, Choe YB, Ahn KJ. Skin characteristics after fractional photothermolysis. *Ann Dermatol* 2011;23:448–454.
21. Hochman B, Locali RF, Matsuoka PK, et al. Intralesional triamcinolone acetonide for keloid treatment: a systematic review. *Aesthetic Plast Surg* 2008;32:705–709.
22. Mustoe TA, Cooter RD, Gold MH, et al. International advisory panel on scar management. International clinical recommendations on scar management. *Plast Reconstr Surg* 2002;110:560–571.
23. Boggio RF, Boggio LF, Galvão BL, Machado-Santelli GM. Topical verapamil as a scar modulator. *Aesthetic Plast Surg* 2014;38:968–975.
24. Shanthi FXM, Ernest K, Dhanraj P. Comparison of intralesional verapamil with intralesional triamcinolone in the treatment of hypertrophic scars and keloids. *Indian J Dermatol Venereol Leprol* 2008;74:343–348.
25. Li Z, Jin Z. Comparative effect and safety of verapamil in keloid and hypertrophic scar treatment: a meta analysis. *Ther Clin Risk Manag* 2016;12:1635–1641.
26. Danielsen PL, Rea SM, Wood FM. Verapamil is less effective than triamcinolone for prevention of keloid scar recurrence after excision in a randomized controlled trial. *Acta Derm Venereol* 2016;96:774–778.
27. Ahuja RB, Chatterjee P. Comparative efficacy of intralesional verapamil hydrochloride and triamcinolone acetonide in hypertrophic scars and keloids. *Burns*. 2014;40:583–588.

Abbreviations and Acronyms

LS = level of significance
TAC = triamcinolone acetonide
VSS = Vancouver scar scale