

ASSESSMENT OF EFFICACY OF FRACTIONAL CO<sub>2</sub> LASER WITH INTRALESIONAL  
GLUCANTIME VERSUS INTRALESIONAL GLUCANTIME ALONE FOR TREATMENT  
OF CUTANEOUS LEISHMANIASIS

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## ABSTRACT

**Background:** Leishmaniasis is considered a significant health issue in Syria, with increasing incidence rates. Although spontaneous healing is possible, post-healing scars affect patients' quality of life. Due to the lack of response in some cases to antimonial compounds, alternative therapies have been explored, provided they are effective, safe, affordable, and accessible. **Objective:** To compare the efficacy of intralesional injection of Glucantime alone versus combination with fractional CO<sub>2</sub> laser in treating cutaneous leishmaniasis lesions, and to evaluate side effects and correlation with age, gender, and disease duration. **Materials and Methods:** Forty patients were randomly divided into two groups: one treated with intralesional Glucantime twice weekly, the other received the same plus fractional CO<sub>2</sub> laser therapy (parameters: 25 J, dot cycle 5, pixel pitch 1 mm, 1 pass) twice with two-week intervals. side effects monitored. Data analyzed with SPSS v26. **Results:** Complete healing was observed in 72.4% of lesions, partial improvement in 18.8%, no improvement in 8.6%. The combination group had significantly higher cure rates ( $p=0.001$ ). No correlation between improvement and age, gender, or disease duration. Side effects were mild and comparable between groups. **Conclusion:** Combination therapy of fractional CO<sub>2</sub> laser with intralesional Glucantime is more effective than Glucantime alone with good safety profile.

**KEYWORD:-** Leishmaniasis, Glucantime, Fractional CO<sub>2</sub> Laser.

## INTRODUCTION

Leishmaniasis is a parasitic disease caused by protozoa of the genus *Leishmania*, transmitted by sandflies.<sup>[1]</sup> It is a global health problem, particularly in endemic areas like Syria.<sup>[2,3]</sup> Cutaneous leishmaniasis (CL) manifests as skin lesions that may heal spontaneously but often leave disfiguring scars.<sup>[4,5]</sup> Traditional treatment includes antimonial compounds such as meglumine antimoniate (Glucantime).<sup>[6]</sup> However, treatment failure and resistance have encouraged the exploration of adjunctive therapies, including laser therapy.<sup>[7]</sup> Fractional CO<sub>2</sub> laser is a promising modality that may enhance drug delivery and lesion healing by inducing dermal remodeling.<sup>[8,9]</sup> This study aims to evaluate the efficacy and safety of combining fractional CO<sub>2</sub> laser with intralesional Glucantime compared to Glucantime alone in treating CL.

## Objectives

To compare the therapeutic efficacy and safety of intralesional Glucantime alone versus combined with fractional CO<sub>2</sub> laser in cutaneous leishmaniasis lesions and assess the impact of age, gender, and disease duration on treatment outcomes.

## MATERIALS AND METHODS

Forty patients with clinically and microscopically confirmed CL, attending the Dermatology Clinic at Al-Latakia University Hospital during 2023–2024, were enrolled after informed consent. Inclusion criteria were: age above 5 years, lesion diameter  $\leq 4$  cm,  $\leq 4$  lesions, and disease duration  $\leq 12$  weeks. Exclusion criteria included prior systemic or topical treatment for CL, pregnancy, lactation, immunosuppression, and lesions on nose/ear less than 2 cm from eyelid or on joints.

## Patients were randomly assigned to two groups

Group 1: Intralesional Glucantime twice weekly until complete healing or max 8 weeks.

Group 2: Intralesional Glucantime as above plus fractional CO<sub>2</sub> laser (25 J, dot cycle 5, pixel pitch 1 mm, 1 pass), applied twice with two-week intervals.

Patients were monitored periodically for clinical response, side effect.

Improvement was categorized as:

Complete: full healing, negative smear microscopy.

Partial: 25–75% lesion size reduction.

No improvement: less than 25% reduction or no change.

### Statistical analysis

The chi-square or Fisher exact test was used to study the relationships between categorical variables. The Independent T student test was employed to compare the mean differences between the two groups. All variables were tested using univariate regression, and the statistically significant variables were then entered into a multivariate analysis equation. Results were considered significant if the p-value was less than 5%. IBM SPSS Statistics software was used to compute the statistical parameters and analyze the results.

### RESULTS

Demographic and clinical characteristics of study groups

Total patients: 40

Glucantime-only group: 20 patients

Combination therapy group (Glucantime + fractional CO<sub>2</sub> laser): 20 patients

Gender distribution:

Males: 13 in each group (total 26)

Females: 7 in each group (total 14)

Mean age:

Glucantime-only group: 26.3 ± 8.3 years

Combination therapy group: 27.05 ± 11.1 years

Number of lesions:

Total lesions: 69

Lesions per patient: 1–4 (mean 1.73 ± 0.7)

Mean lesion size:

Glucantime-only group: 2.25 ± 0.55 cm

Combination therapy group: 2.6 ± 0.68 cm

Mean duration of disease:

Glucantime-only group: 7.3 ± 2.9 weeks

Combination therapy group: 6.5 ± 3.38 weeks

**Table 1: Distribution of lesions by healing rate.**

Improvement	Combined Treatment Group (n)	Topical Injection Group (n)	P value
Complete Improvement	37	13	0.001
Partial Improvement	4	9	0.026
No Improvement	1	5	0.041
Total	42	27	69

By comparing the complete improvement rate, we found that 37 out of 42 patients (88%) in the combined treatment group had complete improvement versus 13 out of 27 patients (48%) in the topical injection group. Statistical analysis using Fisher's exact test showed a

significant difference ( $p=0.001$ ). The odds ratio was 8.5 with a 95% confidence interval, meaning the chance of complete improvement was 8.5 times higher in the combined treatment group compared to the topical injection group.

**Table 2: Distribution of patients by side effects.**

Side Effect	Combined Treatment Group (n)	Topical Injection Group (n)	P value
Pain	20	20	0.186
Swelling	18	19	
Redness	19	17	
Secondary infection	3	4	
Burning	3	0	
Itching	1	0	

**Table 8: Shows the distribution of patients by side effects.**

**Table 3: Distribution of patients by lesion site.**

Lesion site	Combined Treatment Group (n)	Topical Injection Group (n)	Total	P value
Upper Limb	7	5	12	0.351
Lower Limb	3	4	7	
Upper + Lower Limb	3	3	6	
Face	2	2	4	
Face + Upper Limb	2	2	4	
Face + Lower Limb	1	0	1	
Trunk	2	0	2	
Trunk + Upper Limb	0	2	2	
Trunk + Lower Limb	0	2	2	
Total	20	20	40	

Complete healing was observed in 72.4% of all treated lesions, partial improvement in 18.8%, and no

improvement in 8.6%. The combination group showed significantly higher complete cure rates. Side effects

were mild and included pain, erythema, edema, and transient burns in the laser group. No statistically significant difference in adverse events between groups was found. No association was found between response rate and age, gender, or duration of infection.

## DISCUSSION

Our findings demonstrate that fractional CO<sub>2</sub> laser combined with intralesional Glucantime significantly improves treatment outcomes in CL compared to Glucantime alone, consistent with prior studies.<sup>[11,12]</sup> The laser may enhance drug penetration and stimulate dermal repair, explaining the higher cure rates. Side effects were mild and manageable, confirming the safety of this approach.

No significant association was found between treatment response and patient age, gender, or disease duration, suggesting broad applicability. Similar observations were reported by Nilforoushzadeh *et al.*<sup>[11]</sup> and Iraj *et al.*<sup>[12]</sup> Some studies found laser alone less effective, supporting the benefit of combination therapy.<sup>[12]</sup>

## CONCLUSION

Combination therapy of fractional CO<sub>2</sub> laser with intralesional Glucantime is a safe and more effective modality than Glucantime alone for cutaneous leishmaniasis. This approach offers a promising alternative in treatment-resistant cases and may improve patient outcomes and cosmetic results.

## REFERENCES

1. Marie C, Petri WA Jr. Extraintestinal Protozoa. In: Porter RE, ed. *The Merck Manual of Diagnosis and Therapy*. Rahway, NJ: Merck & Co Inc, 2022.
2. WHO. Leishmaniasis Fact Sheet. World Health Organization, 2023. Available at: <https://www.who.int/news-room/fact-sheets/detail/leishmaniasis>
3. CDC. About Leishmaniasis. US Centers for Disease Control and Prevention, 2024. Available at: <https://www.cdc.gov/leishmaniasis/about/index.html>
4. Stark CG, Vidyashankar C. Leishmaniasis. Medscape, 2024.
5. Boelaert M, Sundar S. Leishmaniasis. In: *Manson's Tropical Infectious Diseases*, 2014; 23: 631–651.e4.
6. PAHO. Manual of Procedures for Leishmaniasis Surveillance and Control in the Americas, 2019.
7. WHO. Status of endemicity of cutaneous leishmaniasis. <https://apps.who.int/gho/data>
8. McIlwee BE, Weis SE, Hosler GA. Incidence of endemic human cutaneous leishmaniasis in the United States. *JAMA Dermatol*, 2018; 154(9): 1032–1039.
9. Asilian A, Iraj F, Hedaiti HR, Siadat AH, Enshaieh S. Carbon dioxide laser treatment of cutaneous leishmaniasis. *Dermatol Online J*, 2006; 12(2): 3.
10. Slaoui W, Chiheb S, Benchikhi H. Efficacy of pulsed-dye laser on residual red lesions of cutaneous leishmaniasis. *Ann Dermatol Venereol*, 2015; 142(1): 17–20.
11. Nilforoushzadeh MA, Naeeni FF, Sattar N, Haftbaradaran E, Jaffary F, Askari G. The effect of intralesional meglumine antimoniate versus a combination therapy in cutaneous leishmaniasis lesions. *J Res Med Sci*, 2012; 17.
12. Iraj F, *et al.* Combination therapy of intralesional antimony and laser in cutaneous leishmaniasis.