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PATHOGENETIC CORRECTION OF GENITOURINARY SYNDROME OF MENOPAUSE: THE ROLE OF LASER TECHNOLOGIES AND LOCAL HORMONAL THERAPY

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Abstract: The study evaluates the efficacy of combining fractional CO2 laser with local estriol for Genitourinary Syndrome of Menopause (GSM). 60 postmenopausal women were divided into two groups: Group A (local estriol only) and Group B (CO2 laser+estriol). Results showed that Group B achieved a 45% increase in the epithelial maturation index compared to 28% in Group A. Combined therapy significantly improves vaginal health and reduces symptoms of atrophy.
Keywords: *GSM, CO2 laser, estriol, menopause, vulvovaginal atrophy.*

Introduction

Genitourinary Syndrome of Menopause (GSM) affects up to 70% of postmenopausal women. Unlike vasomotor symptoms, GSM manifestations (vulvovaginal atrophy, dysuria, dyspareunia) do not resolve over time but tend to progress, severely impacting quality of life. While local hormonal therapy (LHT) remains the "gold standard", it has limitations regarding long-term compliance and contraindications. Laser technologies (CO2 and Er: YAG) represent a promising non-pharmacological method for tissue regeneration.

The objective of this study was to evaluate the clinical efficacy and safety of pathogenetic treatment of genitourinary syndrome of menopause (GSM) using a combined approach that integrates fractional CO_2 laser therapy with local estriol administration.

Methodology

The study included 60 patients (mean age 54.2=3.8 years) with verified GSM.

Group A (n=30): LHT only (estriol 0.5 mg suppositories, 2 times/week)

Group B (n=30): Combined treatment (3 sessions of CO2 laser at 4-5-week intervals + maintenance LHT).

Assessment Methods:

1. Vaginal Health Index (VHI) by G. Bachmann (1 to 5 scale).
2. Visual Analog Scale (VAS) for pain and dryness assessment.
3. Cytological examination (Epithelial Maturation Index – MI).

Results And Discussion

After 6 months of therapy, improvements in all assessed parameters were observed in both groups; however, the magnitude of these changes differed depending on the treatment modality.

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Table 1
Dynamics of VHI and VAS scores (after 6 months)

Parameter	Group A (LHT)	Group B (CO2 + LHT)	p-value
VHI (points)	3.8 ± 0.4	4.6±0.3	<0.05
Dryness (VAS, 0-10)	2.4 ± 0.5	1.1 ± 0.3	<0.01
Dyspareunia (VAS, 0-10)	3.1 ± 0.6	1.4 ± 0.4	<0.01

The Vaginal Health Index (VHI) score was significantly higher in Group B (CO_2 + LHT) compared to Group A (LHT), amounting to 4.6 ± 0.3 versus 3.8 ± 0.4 points, respectively ($p < 0.05$), indicating a more pronounced restoration of vaginal mucosal condition in the combined therapy group. The severity of vaginal dryness, assessed using the Visual Analog Scale (VAS), was significantly lower in Group B (1.1 ± 0.3) compared to Group A (2.4 ± 0.5) ($p < 0.01$), reflecting a greater reduction in symptoms with the combined approach. Similarly, dyspareunia scores were significantly reduced in Group B (1.4 ± 0.4) compared to Group A (3.1 ± 0.6) ($p < 0.01$), suggesting superior efficacy of CO_2 + LHT in alleviating pain during intercourse. Overall, the combination therapy (CO_2 + LHT) demonstrated greater clinical effectiveness than LHT alone across all evaluated parameters.

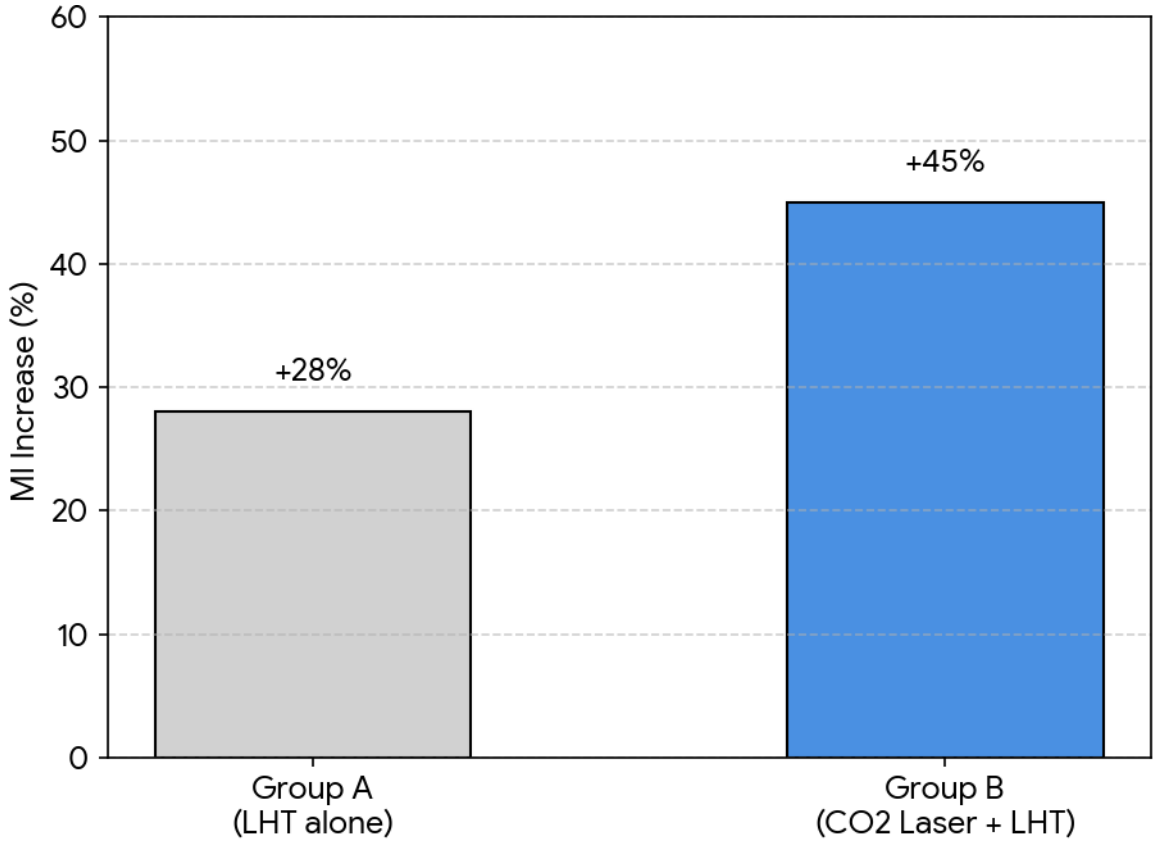

Fig. 1. Epithelial Maturation Index (MI) Growth after 6 Months

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Dopplerographic assessment of microcirculation revealed a marked improvement in mucosal blood flow in both groups after treatment; however, the effect was substantially more pronounced in Group B. In this group, mucosal perfusion increased by approximately 35% compared to baseline values, indicating a significant enhancement of local hemodynamics.

This improvement can be primarily attributed to the biological effects of CO_2 laser therapy, which stimulates neoangiogenesis and promotes vascular remodeling. Laser-induced controlled thermal воздействия trigger the release of growth factors (including VEGF), activation of fibroblasts, and subsequent formation of new capillary networks within the vaginal mucosa. As a result, tissue oxygenation and nutrient delivery are improved, contributing to enhanced regenerative processes.

In contrast, while Group A (LHT) also demonstrated positive changes in microcirculatory parameters, these improvements were less pronounced, suggesting that hormonal therapy alone has a more limited effect on vascularization compared to the combined approach.

Laser exposure creates controlled thermal “micro-defects”, activating fibroblasts and the synthesis of type I and III collagen. LHT provides the necessary estrogenic background for epithelial proliferation. The combination of these methods yields a synergistic effect.

Conclusions

The combined use of fractional CO_2 laser therapy and local hormonal treatment (LHT) demonstrates superior efficacy compared to estrogen monotherapy, providing faster symptom relief and a more sustained therapeutic effect. The CO_2 laser technique is safe and contributes to long-term restoration of vaginal wall structure and function. Overall, pathogenetic management of genitourinary syndrome of menopause (GSM) should be comprehensive and individualized, taking into account patient-specific clinical features and therapeutic needs.

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