

Treatment of Idiopathic Guttate Hypomelanosis with CO₂ and Er:YAG Fractional Laser

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Idiopathic guttate hypomelanosis (IGH) is an acquired disorder presenting with small hypopigmented macules that occur chiefly on sun exposed regions of the skin. Treatments for IGH include corticosteroid, either topical or intralesional, topical retinoid, topical calcineurin inhibitors and surgical techniques. A 40-year-old Korean female patient presented with hypopigmented and depigmented macules with discrete circumscribed borders on her lower legs for several years. She was diagnosed with IGH and treated with carbon dioxide (CO₂) fractional laser (FL) on the lesion of the right popliteal fossa and Erbium-doped Yttrium Aluminium Garnet (Er:YAG) FL on the lesion of the right thigh. After four sessions of treatments at 4-week intervals, she had achieved good cosmetic results without side effects or complications. Clinical assessment showed similar outcomes of two IGH lesions treated with Er:YAG FL and CO₂ FL. Accordingly, we suggest that FL could be considered as a therapeutic option for treatment of IGH.

Key words

CO₂ Fractional laser; Er:YAG Fractional laser; Idiopathic guttate hypomelanosis

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INTRODUCTION

Idiopathic guttate hypomelanosis (IGH) is a common acquired leukodermic dermatosis characterized by multiple round to oval, hypopigmented or porcelain white macules.¹ The lesions are usually observed on the exposed areas of the upper and lower extremities.¹ The etiology and pathogenesis of IGH is unknown, however, genetic factors, sun exposure, trauma and autoimmunity have been suggested as contributing factors.² Although it is asymptomatic, affected individuals may seek medical attention due to aesthetic motivation. Treatment modalities include cryotherapy, superficial dermabrasion, topical retinoids, intralesional corticosteroids or topical tacrolimus with variable success rate.³⁻⁵ Recently, there are a few reported cases treated with carbon dioxide (CO₂) fractional laser (FL) showing improving results.⁴ Herein, we describe a case of IGH treated with either CO₂

FL or Er:YAG FL and compare clinical efficacy of laser treatments.

CASE REPORT

A 40-year-old female patient presented with small, achromic macules measuring 0.2-0.3 cm on her lower extremities for several years (Fig. 1A, B). She had no subjective symptom but complained of cosmetic problems and she had not received any treatment for IGH before. After initial evaluation, we tried CO₂ FL and Er:YAG FL on her thigh and lower leg respectively, and compared the efficacy of them.

After obtaining written informed consent, she underwent four sessions of laser treatments at 4-week intervals. Topical lidocaine/prilocaine cream (EMLA[®] cream; Astra Pharmaceutical Products Inc., Westborough, MA) was applied as a local anesthesia one hour prior to laser

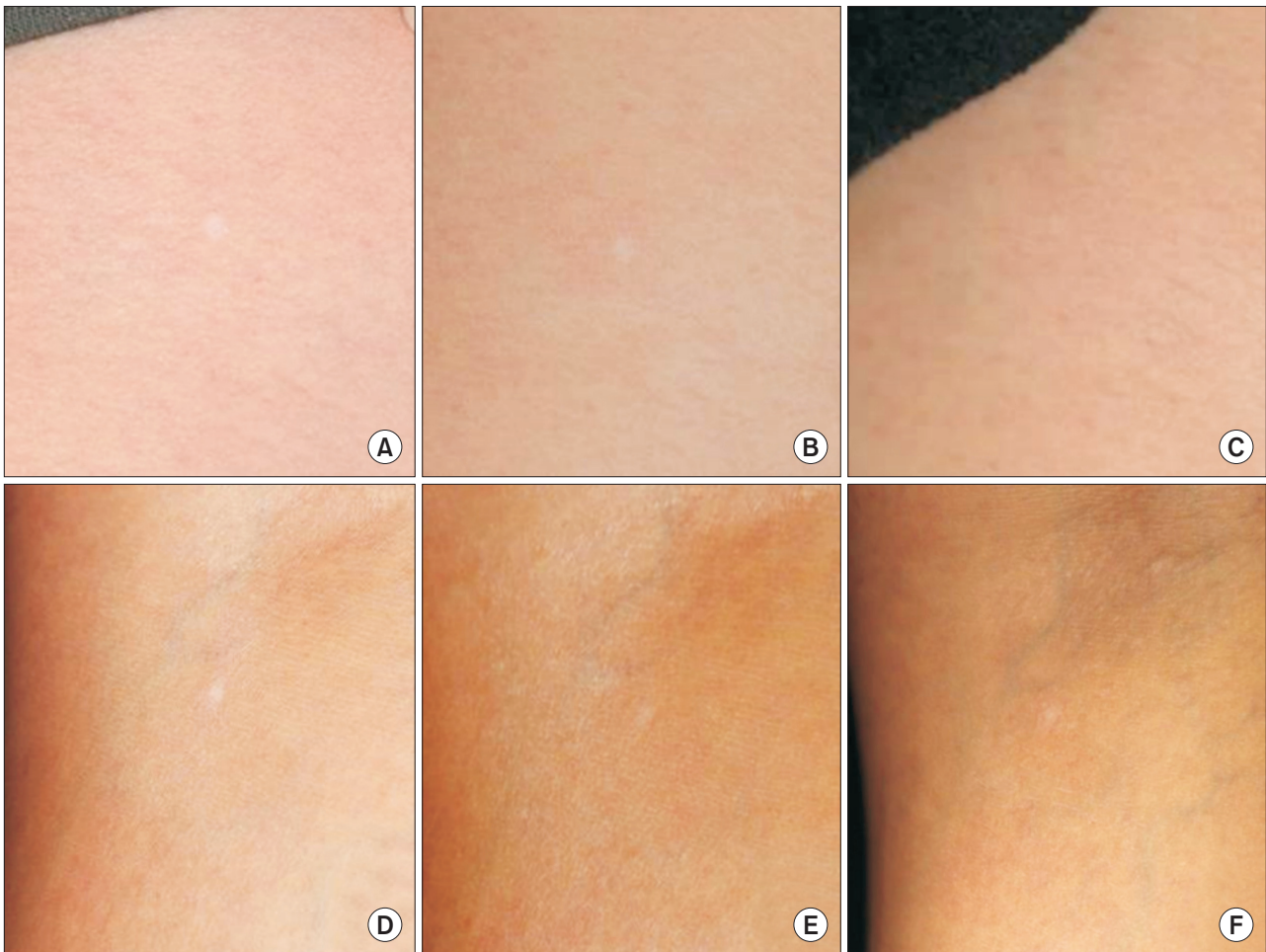


Fig. 1. Clinical photographs of patient. IGH lesions before treatment on the right medial thigh (A) and right popliteal fossa (D). After two sessions with CO₂ FL (B) and Er:YAG FL (E) and after four sessions with CO₂ FL (C) and Er:YAG FL (F).

therapy. Popliteal fossa of right knee was treated with 2,940 nm Er:YAG FL (Action, Lutronic Co., Ltd, Seoul, Korea) using a 12 × 12 mm fractional hand piece at a fluence of 14 mJ/cm², density of 2 spots/cm² in a single pass. Medial aspect of right thigh was treated with ablative 10,600 nm CO₂ FL (eCO2™, Lutronic Co., Ltd, Goyang, Korea) at a pulse energy of 30 mJ, a density of 100 spots/cm² in a single pass. The IGH lesions showed clinical improvement from the second session of treatments with Er:YAG FL and CO₂ FL (Fig. 1C, D) and gradual improvement was recorded after final treatments (Fig. 1E, F).

DISCUSSION

IGH was first described by Cummings and Cattel,⁶ presenting discrete porcelain white macules, measuring 2-5 mm in diameter. It may increase in size and numbers with age.⁷ The exact pathogenesis of IGH remains currently unknown. Kim et al.⁸ revealed that the epidermis in IGH lesions had a significantly reduced amount of melanin pigment and numbers of detectable melanocytes compared with peri-lesional normal skin. Also they found that the melanocytes from the skin lesions exhibited attenuated dendrite branching, dilatation of the endoplasmic reticulum and swelling of the mitochondria implying melanocyte degeneration.⁸ Therefore, underlying mechanism of hypopigmentation of IGH is believed to be both a reduction in number of melanocytes and the presence of dysfunctional ones.⁴

Because it is benign and asymptomatic, it does not require treatment.³ But, it causes aesthetic concerns with its predominance on the sun-exposed areas of the forearms and legs.³

Previous reports tried variable treatments and they showed variable success rates of achieving the patients' desired repigmentation.³⁻⁵ In our case, both CO₂ FL and Er:YAG FL yielded satisfactory improvement of IGH, and clinical improvement was similar to each other.

CO₂ FL and Er:YAG FL are widely accepted methods for skin rejuvenation.⁹ CO₂ FL targets water with an infrared beam at 10,600 nm, causing controlled abrasion of skin, and has been frequently used as a treatment for acne, pigmentation, scars, open pores and photo-aged skin.¹⁰ Er:YAG FL, at a wavelength of 2,940 nm, has a technical benefit because its wavelength is much closer to an absorption maximum of water (3,000 nm), thus allowing for higher precision yet superficial skin ablation.¹¹ We suppose that repigmentation following laser treatment

can be obtained by removal of dysfunctional melanocytes during ablation of the epidermis and various kinds of cytokines and growth factors stimulating melanogenesis during the wound healing process.

In this report, we described the case of IGH treated with CO₂ FL and Er:YAG FL separately, showing comparable results in both modalities. Thus, both CO₂ FL and Er:YAG FL can be considered effective treatment options for IGH patients. Large, controlled, prospective studies are needed to support our findings and to optimize FL parameters and treatment intervals.

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