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Case Report

Melasma and Hypopigmentation After Q Switched Laser Treated with Intradermal Injections of Aminoacids and Low Weight Hyaluronic Acid (Sunekos Performa)

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Abstract

Melasma is a common skin condition characterized by symmetrical dark patches, appearing as light to dark brown spots on the face, usually on the forehead and cheek areas, which negatively affect the patient's quality of life. Many laser treatments have been developed to address melasma, with Low Fluence Q-Switched Nd: YAG laser (LFQSNY) being widely used. Some treatment plans recommend a session every 15 days, while others suggest a session every 28 days, but there is currently no agreed-upon frequency for treatment sessions. The LFQSNY appears to be an effective and safe option for treating melasma, though there have been occasional reports of mottled hypopigmentation, which may be linked to the accumulation of high laser energy. Kligman's formula stands as the gold standard for topical treatment of melasma, but its side effects, such as ochronosis from long-term use and irritation, have led many doctors to discontinue its use. We are describing a 48 year old female with Melasma who was treated in another Clinic with LFQSNY laser (10 sessions, one session every 21 days) and topical Kligmans formula nightly. The patient referred that after the 10th session she noticed white round patches in the treated area and and worsening of the melasma, after the physical examination the diagnosis was Melasma and Laser Hypopigmentation, therefore we decided to treat her with intradermal amino acids and low weight hyaluronic acid once a week for 2 weeks and then every 14 days for another 2 sessions, we also prescribed topical formulas. After 3 sessions of the Intradermal Injections and the topical creams the melasma and Hipopigmentation started its resolution. In order to measure the results of the Melasma we used Modified MASI Score as well as Visia (Candfield, USA) equipment for Before and after pictures to measure the response of the Hypopigmentation. The Modified MASI score was initially 9 before treatment, and after completing four sessions and applying the topical formulas, the score decreased to 3.6.

Keywords

Melasma, Laser, Hypopigmentation, Ochronosis

1. Introduction

Melasma is a common condition characterized by acquired, symmetrical dark pigmentation that appears as light to dark brown spots on the face, typically on the forehead and cheek areas, adversely affecting a patient’s quality of life. Initially, melasma was classified based on the location of melanosomes into epidermal, dermal, and mixed types. However, in vivo

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reflectance confocal microscopy has shown that melanophages have a heterogeneous distribution, indicating that all melasma might be "mixed." Additionally, the dermis often displays signs of solar elastosis and increased blood vessel presence. Consequently, melasma is now considered to be the result of a complex interplay among epidermal melanocytes, keratinocytes, dermal fibroblasts, and vascular endothelial cells, with hormonal, genetic factors, and exposure to ultraviolet radiation (UVR) influencing its variability, dynamic nature, and persistent nature [2-4].

Women with Fitzpatrick skin types III–V residing in regions with high levels of ultraviolet (UV) light are often impacted by melasma. In some parts of the world, like Southeast Asia or Latin America, up to 30% of the population is affected. [3]. The pathogenesis of melasma is complex and involves various factors, including inflammation, reactive oxygen species, UV radiation, genetic factors, and hormones. Additionally, abnormal blood vessel proliferation and the activation of endothelial cells may play a significant role. Numerous treatments for melasma have developed over time, and it is now recognized that effective treatment should address multiple factors across various cell types, including melanocytes, endothelial cells, senescent fibroblasts, keratinocytes, mast cells, and sebocytes. Additionally, emphasis has grown on addressing the pronounced vascular component in melasma. This is due to the elevated production of proangiogenic factors like vascular endothelial growth factor (VEGF), which leads to the proliferation of dermal blood vessels. Various treatment approaches have focused on addressing hyperactive melanocytes, melanosome transfer to keratinocytes, impaired skin barrier, and mast cells. [5] Recently, the role of the vascular component in melasma has been recognized as significant, making it a critical target for this pigmentation disorder. Consequently, addressing the vascular component may lead to improved long-term outcomes, particularly through the use of laser treatments targeting the blood vessels associated with melasma [6]. A variety of laser and light therapies have been evaluated in clinical trials for their efficacy and side effects in treating melasma. The five main types include Intense Pulsed Light (IPL), Q-switched lasers, picosecond lasers, non-ablative fractional resurfacing lasers, and ablative fractional resurfacing lasers. [1-13]. These treatments can be very effective, yet they often require significant recovery time and may cause inconvenience due to the downtime involved. Traditional treatments often lead to inconsistent results, unexpected side effects related to pigmentation, and high recurrence rates, relapses are common following treatment, and researchers continue to explore solutions that could offer a more lasting and successful treatment for this challenging skin pigmentation condition [13].

2. Case Report

A 48-year-old woman without history of allergies or immune disorders came to our Dermatology Department. She reported that she underwent 10 sessions of Low Fluence Q-switched (LFQSNY) Laser treatment along with Kligman's Formula at another laser center to treat her melasma. However, after the 10th session, she observed the development of white patches on the areas treated with the laser, and worsening of her melasma. (Figures 1, 2)

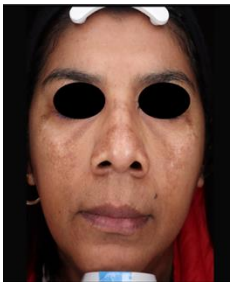

Figure 1. *Frontal view of 48 year old female patient with melasma and Hypopigmentation areas before treatment.*

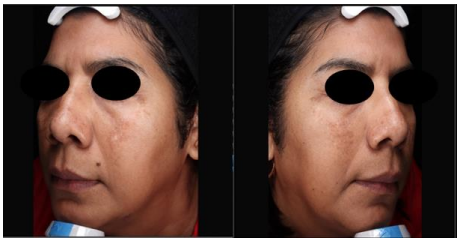

Figure 2. *Lateral Right and Left view of 48 year old female patient with melasma and Hypopigmentation areas before treatment.*

The patient mentioned that she received one laser treatment every 21 days and applied Kligman's Formula to the entire affected melasma area at night as her doctor recommended. She also stated that she avoided sun exposure following the laser sessions.

During the physical examination, white circular patches ranging from 1.5 mm to 3 mm in diameter were observed throughout the entire melasma area that had undergone laser treatment. The modified MASI (Melasma Area and Severity Index) score at the initial evaluation was 9. The patient reported no other clinical symptoms aside from the worsening of the melasma area following the treatment she had received.

After analyzing the patient we decided not to apply any laser device and to Initiate Intradermal Amino acids (Glycine, L-Proline, L-Lysine, L-Leucine, L-Valine, L- Alanine) and Low Weight Hyaluronic Acid (50 – 250 KD) (Sunekos Performa) every 7 days for the first 2 sessions and every 14 days for another 2 sessions. As Topical treatment we included a day cream containing Piruvic Acid 10%, tranexamic acid 3%, salicylic acid 2%, phytic acid 10%, Gluthatione 5% (Meline Ethnic Skin Day) and a night cream containing mandelic acid 10%, ascorbic acid 5%, arbutin 4%, melanostatina-5 5%, niacinamide 5%, magnesium sulphate 3%, tocopheril acetate 3%, cysteamine 0.5%, retinal 0.1%, (Meline Ethnic Skin Night) topical treatment was applied daily.

We evaluated the patient after 4 sessions of the intradermal Injections of Sunekos Performa and Topical treatment with Meline and the Modified MASI Score was 3.6 and the hypopigmentation areas were less visible. (Figures 3, 4, 5)

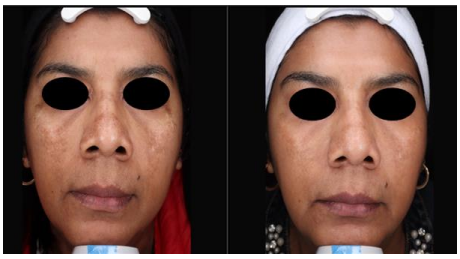

Figure 3. *Comparison between before and after picture (Frontal View).*

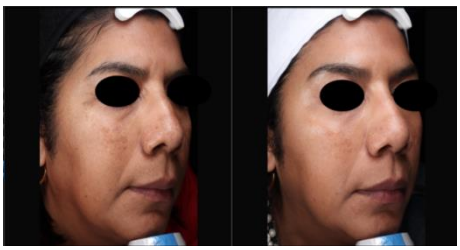

Figure 4. *Comparison between before and after picture (Lateral Left View).*

3. Discussion

Treatment of melasma is one of the most challenging fields to dermatologists. The results are inconsistent and unsatisfactory; recurrence and even worsening of the condition during or after treatment is not uncommon, as described in this case report. The classic standard treatment is the topical application of modified Kligman's triple combination (TC), consisting of hydroquinone (HQ) 4%, tretinoin 0.05%, and fluocinolone acetonide 0.01%. Laser treatment has been relatively contraindicated for melasma due to the risk of inducing inflammation and stimulating melanogenesis through unwanted photothermal effects, especially in darker skin [2-4]. The reason for such treatment resistance is not yet understood, but the complex pathogenesis of melasma might be involved. The low-fluence Q-switched Nd: YAG laser (LFQSNY), commonly referred to as 'laser toning (LT)', has been accepted as a new gold standard of melasma treatment in Asia, where there is high demand for treatment. This technique involves multiple sessions (usually around 10 sessions) of weekly or biweekly 1064 nm LFQSNY treatment with a low fluence (usually 1–3 J/cm^2), a collimated beam with a large spot size, and a frequency of 5–10 Hz. The endpoint of the procedure would be faint erythema. Laser Tonning is known to selectively destroy melanin in melanophores, whereas melanin-containing cells are left undamaged, resulting in safe depigmentation of melasma [8, 9].

Figure 5. *Comparison between before and after picture (Lateral Right View).*

In addition, one of the key advantages is that there is no downtime affecting patients' daily lives since the epidermis remains intact. Instead, rather marginal outcomes and questionable long-term results considering many treatment sessions of 1–2 week-intervals are drawbacks of LFQSNY in melasma to achieve and maintain better clinical results.

Although LFQSNY is a relatively safe treatment for melasma by the aforementioned mechanisms, adverse events occasionally occur. Among them, punctate leukoderma is the major concern since it lasts long without treatment. The incidence rate of punctate leukoderma is unknown. Although a larger portion of published studies have reported no or less incidence of puntctate leukoderma, there are a couple of literatures reporting approximately a 10% risk of punctate leukoderma from LFQSNY in East Asian patients with melasma. A retrospective analysis of a large number of 177 patients of melasma by Choi et al. demonstrated consistent findings that punctate leukoderma occurred in 21 out of 177 patients (11.9%) within 10 sessions of LFQSNY. Safely, a combination of LFQSNY with various other treatment modalities are commonly used in clinical practice [1-4].

Although the underlying mechanism is not understood, the histopathologic exam shows a preserved number of melanocytes even in the punctate leukoderma lesion compared to the adjacent normal skin, which signifies that melanocytes still survive, but are functionally downregulated [4]. Intervention to stimulate melanogenesis in melanocytes using focused, narrow-band ultraviolet B therapy has been used with some success. Although there are no statistical analyses, some authors have mentioned that hypopigmentation was generally sustained over 2–3 years, and spontaneous resolution was seen in only <10% of the patients after a 2-year follow-up. Another report estimated that punctate leukoderma resolved in half of cases after 2 years and 80% after 3–4 years from their clinical experience [7]. The risk factor of punctate leukoderma is known to be the excessive cumulative energy; the use of relatively high fluence, short treatment intervals, and too many sessions of total treatment [6, 7]. Therefore, caution is needed to avoid aggressive treatment and treatment should be discontinued as soon as possible upon the development of punctate leukoderma.

Mysore V, et al [8]. reported a case of hypopigmentation following LFQSNY treatment that was effectively addressed with ultraviolet B targeted phototherapy, leading to quick and satisfactory re-pigmentation. The key difference in our case is that the hypopigmentation areas were caused by the LFQSNY laser for treating a tattoo. In our case of melasma and hypopigmentation UVB could aid in treating the hypopigmented areas but it might exacerbate the melasma.

Baugh, Erica G. BA*; Anagu, Olive BS*; Kelly, Kristen M. MD*,† et Al, [9]. described cases of scars repigmentation using fractional laser with a topical prostaglandin analogue, although using this combinations seems to work for hypopigmentation we couldn't be able to apply it on our patient since her Melasma condition may get worse with the fractional laser causing the opposite, a Post Inflammatory Hyperpigmentation.

In our patient's case, our primary concern during the treatment was the potential worsening of her melasma, which led us to avoid using any laser devices. Instead, we opted for intradermal amino acids and topical depigmentation creams. This decision was considered after the study by Zhang X, Chen Y, Yang H, Ding H, and Cai P, among others, [10]. which explored plasma metabolomics and potential biomarkers in female melasma patients. The study indicated that melasma patients exhibited significant changes in 125 plasma metabolites, including those related to amino acids, lipids, and carbohydrates. Therefore, we believed that injecting amino acids could help the skin to recover and reduce the inflammatory component associated with our patient's melasma condition.

Abbreviations

UVR	Ultraviolet radiation
LFQSNY	Low Fluence Q-Switched Nd: YAG Laser
UV	Ultraviolet

Author Contributions

Kateryn Michelle Perez Willis is the sole author. The author read and approved the final manuscript.

Consent

Informed Consent has been signed by the patient.

Conflicts of Interest

The authors declare no conflicts of interest.

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