Treatment of Hyperpigmentation in Darker Skins

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Introduction

Darker skin or skin of colour means higher Fitzpatrick skin types in a wide range of racial and ethnic groups referring to persons from African, Asian, Native American, Middle Eastern and Hispanic backgrounds. Darker skin types are characterized by higher content of melanin, higher eumelanin to pheomelanin ratio. This is an advantage for protection against ultraviolet (UV) radiation, however it also makes darker skin more vulnerable to postinflammatory dyspigmentation [1,2].

Pigmentary disorders, especially hyperpigmentation is one of the most common complaints in darker skin, and the management is often challenging. A recent review by Cestari et. al listed most common acquired hyperpigmentations in darker skin including melasma, Post Inflammatory Hyperpigmentation (PIH), acanthosis nigricans, phytodermatosis, dermatores papulosa nigra, erythema dyschromicum perstans, periorbital hyperpigmentation, flagellate dermatosis, confluent and reticulated papillomatosis of Gougerot and Carteaud, cervical poikiloderma and primary cutaneous amyloidosis [3]. This presentation will particularly focus on the treatment options of melasma and PIH in darker skin.

Treatment options in Melasma and PIH in Darker Skin

Before the treatment, one should identify and treat any underlying dermatosis or contributing factors. Moreover, the treatment should have rational goals. One should also keep in mind the options with multi-therapy approach. Sun protection should be central with sunscreens and physical barriers, such as hats and clothing which will reduce sun exposure [4].

For melasma, current treatments available remain unsatisfactory. Topical combination therapies are more effective. Triple Combination (TC) including hydroquinone, retinoids and steroids is most effective with clear adverse effects such as erythema and peeling. Chemical peels, especially superficial ones, are generally effective. Laser and light therapies have mixed with an increased risk of irritation and PIH [5].

For PIH, firstly one should aim to treat underlying disorders. It often takes many months. Topical therapy is typically effective for epidermal PIH. Chemical peels and lasers may help in recalcitrant hyperpigmentation. All treatments should be used with great caution to prevent irritation and worsening of PIH [4].

Topical treatments

A list of skin lightening agents are listed in Table 1 [2]. The largest group in those agents is tyrosinase inhibitors, and the most well-known agent is hydroquinone which is often considered as “topical gold standard” in the melasma and hyperpigmentation treatments [4]. However, in last decade concerning the safety reasons about hydroquinone such as ochronosis or theoretical risk of malignancy, many newer agents are in the market [6]. Beside those newers, fixed TC including hydroquinone 4%, tretinoin 0.05%, flucinolon acetonide 0.01% is shown as the therapy with highest evidence – still little controlled studies - in Latin guide of melasma or recent reviews. If there is an irritation or allergy to one of compounds of this TC, one may use it as dual combinations. In Latin guide for treatment of melasma, second line therapies are TC plus peels or microdermabrasion, and lastly lasers and light sources [4,7].

Table 1: Skin lightening agents [2].

| Mechanism of action                  | Compound                      |
|-------------------------------------|-------------------------------|
| Tyrosinase inhibition               | Arbutin                       |
| Azelaic acid                        |                               |
| DeoxyArbutin                        |                               |
| Hydroquinone                        |                               |
| Liquorice extract                   |                               |
| Mequinol                            |                               |
| N-Acetylgulcosamine                 |                               |
| N-Acetyl-4-S-cysteamínolphenol      |                               |
| Reduction in melanosome transfer    | Niacinamide                   |
| Retinoids                           |                               |
| Soybean trypsin inhibitor           |                               |
| Interaction with copper             | Ascorbic acid                 |
| Kojic acid                          |                               |
| Stimulation of keratinocyte turn    | Glycolic acid                 |
| Retinoids                           |                               |
| Inhibition of melanosome maturation | Arbutin                       |
| DeoxyArbutin                        |                               |
| Inhibition of protease-activated    | Soybean trypsin inhibitor     |
| receptor-2                          |                               |
| Oxidation and break down of melanin | Lignin peroxidase             |

Hydroquinone is an older depigmenting cream which is effective in 2%-5% formulations. The most well-known adverse effects are irritation, contact allergy, exogenous ochronosis. It is sold with prescription in many countries. It is also a component of famous Kligman’s Formula: Hydroquinone 5%, tretinoin 0.1%, dexamethasone 0.1% [8].

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Lasers and light sources

Lasers are the last options for the recalcitrant cases of melasma and PIH with great caution. Many reports have pointed out that the safest and efficient laser for melasma and PIH in darker skin was q-switched Nd:YAG laser with its longer wavelength (1064 nm). Q-switched Ruby laser with 694 nm is not recommended in darker skin. Intense pulse light (IPL) has mixed results [19].

Some reports have shown that low fluence q-switched Nd:YAG laser with 1064 nm was beneficial for melasma and PIH in darker skin. A study by Cho et al. [20] from Korea has reported high patient satisfaction (50-100% improvement) in 18 of 25 patient with five sessions q-switched Nd:YAG laser with 2-week interval. The fluence was between 2.0-3.5 j/cm². Another study with the same laser by Choi [21] et al. has showed that the mean MASI scores were significantly decreased after five sessions with 1-week interval. The fluence was also 2.0-3.5 j/cm². However, a study by Wattanakrai has reported only temporary improvement with 5 sessions q-switched Nd:YAG laser with 1-week interval. The fluence was between 3.0-3.8 j/cm². Four of 22 patients had rebound hyperpigmentation, and all patients had recurrence of melasma [22].

In a recent study by Chung et al., they compared the efficacy of pulse-in-pulse IPL (PIP-IPL) and the combination of IPL and q-switched Nd:YAG laser. After 6 months, they found same efficacy on melanin index for both therapy, and concluded that PIP-IPL might be a safe and promising treatment for melasma in darker skin [23].

In terms of fractional lasers, in a study by Wanithphakdee deecha et al., they concluded that fractional photothermolysis laser 1410 nm was safe and temporary effective, but long term follow up was still needed. They suggested that only 5% coverage should be used to minimize risks [24]. In a case report by Katz et al., fractional photothermolysis laser 1550 nm had been shown to be effective in a recalcitrant PIH with 3 sessions with 4-week interval [25]. Another case report from Turkey by Oram et al showed that fractional CO² laser was beneficial for a recalcitrant PIH with two sessions [26].

Conclusion

The management of pigmentary disorders in darker skin is often challenging. Melasma and PIH are the most common problems in skin of colour. Firstly, one should identify and treat any underlying and/or contributing factors and have rational treatment goals. Sun protection is essential, and multi-therapy approach is needed in most cases. In most cases, especially superficial ones, first-line therapy is topicals with TC or newers. Second-line therapy is chemical peels with topicals. Lasers and light therapies should be used with special attention for the type of it, skin type and fluence. Low fluence q-switched Nd:YAG laser with 1064 nm has been reported with more benefits.

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