Cosmetic Concerns in Melasma, Part 1: Pathogenesis and Clinical Considerations

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Melasma is a chronic acquired skin condition, characterized by irregular brown or hyperpigmented patches that commonly occur symmetrically on the forehead, cheeks, and nose. The pathogenesis of melasma, although not fully elucidated, is believed to be multifactorial. Exposure to UV light and heat, hormonal changes, and genetic factors are thought to play interconnected roles in the development of the disease. Although all skin types are susceptible to melasma, patients with darker skin phototypes are more commonly afflicted. Melasma also can impact a patient's overall quality of life (QOL) and can be distressing for both patients and physicians because the disease often is refractory to treatment. As a result, treatment methods must address clinical outcomes as well as the patient's psychological health and QOL. In part 1 of this series, we review the pathogenesis, clinical aspects, and psychological/emotional impact of melasma.

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Melasma is a common hyperpigmentation disorder that preferentially affects females. Clinically, melasma presents as circumscribed hypermelanosis with characteristic hyperpigmented patches that are symmetrical and most frequently occur on the face but also can occur on other areas, such as the extensor arms. Melasma can slowly develop and has been associated with exposure to UV light and heat, hormonal changes, and underlying genetic factors.[1] In the United States, melasma affects approximately 5 to 6 million individuals, with an estimated incidence of 5% to 10% in females. It is more common among Hispanic, Asian, African American, and Middle Eastern populations and tends to persist longer in patients with darker skin phototypes.[2] Melasma especially is a prevalent concern among the Latino population. Sanchez et al[3] reported that melasma constitutes 8.2% of diagnoses made in Latino patients who present to private dermatology practices.

Melasma can present a range of cosmetic concerns for affected patients. The clinical course can be recalcitrant to therapy and therefore distressing for both the patient and the dermatologist. Cosmetic concerns associated with melasma include mottled pigmentation and areas of hyperpigmentation as well as an overall uneven skin tone. Part 1 of this series focuses on the pathogenesis, clinical aspects, and psychological/emotional impact of melasma; an individualized stepwise approach to treatment will be discussed in part 2.

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ETIOLOGY AND PATHOGENESIS

The pathogenesis of melasma, although not fully elucidated, is thought to involve exposure to UV radiation or another exacerbating factor, which, in combination with hyperfunctional melanocytes, results in increased melanin production.[4] Although UV radiation is thought to play the main role, the visible light spectrum also contributes,[5] which is supported by the disease's predilection for sun-exposed areas and its tendency to improve during the winter months.

Other documented causative/exacerbating factors include pregnancy, oral contraceptives, elevated levels of hormones (eg, estrogen, progesterone), phenytoin anticonvulsants, and phototoxic medications, as well as increased expression of c-kit ligand and stem cell factor. Pérez et al[6] reported that fertile women who develop melasma without history of pregnancy or use of oral contraceptives also may present with mild ovarian dysfunction that is consistent with polycystic ovary syndrome.

In melasma-affected skin, melanocytes are highly dendritic, exhibit rapid DNA synthesis upon UV sun exposure, and multiply rapidly.[7] On histologic examination, melanin deposition is seen in all layers of the epidermis as well as an increased number of dermal melanophages. Ortonne et al[8] conducted a survey of 9 clinics worldwide. Of the 324 women who completed surveys, 48% had a family history of melasma, with 97% being a first-degree relative. Additionally, 42% of participants reported onset of melasma following pregnancy, with 29% noting onset before pregnancy and 26% during pregnancy. In participants who reported onset of melasma during pregnancy, the risk was associated with spending more time outdoors.[8]

Melasma as a Component of Photoaging

Melasma can be considered part of the photoaging process. Facial melasma induced by solar UV exposure and visible light is common in East Asian populations; it can be considered a form of actinic dyspigmentation and therefore a contributor to photoaging.[9] Sun exposure also was the most frequently indentified trigger or aggravator of the disorder in a study of 197 Tunisian patients with melasma.[10]

CLINICAL FEATURES

Facial melasma is divided into 3 clinical patterns.[11] The centrofacial pattern is the most common manifestation and is seen in about two-thirds of patients. The malar pattern, the second most common, occurs in approximately 20% of patients. The mandibular pattern is the third most common and is seen in approximately 16% of patients.[11]

Melasma also is classified into 4 subtypes using Wood lamp examination to assess where the pigment is concentrated; the 4 subtypes include epidermal, dermal, mixed (epidermal and dermal), and intermediate.[12] Lesions composed of epidermal pigment are found to be accentuated on Wood lamp illumination, and those that are composed mainly of dermal pigmentation become less conspicuous, or blend in, on the same examination. The mixed variant has a combination of both epidermal and dermal pigment and therefore may show some accentuation with Wood lamp fluorescence. The intermediate variant of melasma is mainly seen in patients with Fitzpatrick skin type VI.[12]

Factors that contribute to the severity of melasma include the surface area affected, intensity of pigmentation relative to the surrounding skin, homogeneity of the lesions, and the presence of 3 or more shade differences.[13] The melasma area and severity index (MASI) is an instrument used to evaluate the severity of melasma. The score is calculated by assessing 4 facial areas (forehead, right malar region, left malar region, and chin) that correspond to 30%, 30%, 30%, and 10% of the total area (A) of the face involved, respectively. Other elements of the index are darkness (D) and homogeneity (H). The MASI score is calculated as follows: $D + H \cdot A$; scores range from 0 to 48.[14] In 2009, Pandya et al[15] performed a study to determine the reliability and validity of MASI. They found that the MASI was reliable within and between raters. It also was validated compared with the melasma severity scale, mexameter scores, and area measurements. The authors concluded that homogeneity was the most difficult component to reliably assess and recommended that it be removed from the MASI score because its absence would not alter reliability or validity measures.[15] Balkrishnan et al[16] reported the results of a trial of treatment with a triple-combination formulation, which demonstrated improvements in patient MASI scores. These improvements also correlated with improvements in patients' quality of life (QOL) measures, such as feeling less self-conscious, less embarrassed, and less likely to limit social or leisure activities because of the appearance of the skin.

QUALITY OF LIFE

Arenas[17] conducted a survey of Mexican women and reported that approximately 66% of participants developed melasma during pregnancy, and one-third of these women had persistent pigmentation. Melasma can be particularly distressing to patients and has been shown to impact a patient's QOL.[18] Particularly in the Latino population, melasma is associated with poor health and nutrition.[19] These factors can negatively impact a patient's QOL; treatment improves cosmetic concerns and impacts

psychological and emotional aspects of the patient's overall well-being.

The melasma QOL (MELASQOL) survey is an instrument that was developed to identify impairments to a patient's life caused by melasma.[20] It is a 10-question survey that asks patients to rate each item on a Likert scale of 1 (not bothered at all) to 7 (bothered all the time). The MELASQOL survey is scored from 0 to 70, with a higher score reflecting worsened health-related QOL. Balkrishnan et al[20] reported that the aspects most affected by melasma were social life, recreation, leisure, and emotional well-being. Subsequently, Dominguez et al[21] adapted a Spanish-language MELASQOL to specifically target Latina women. The items from the MELASQOL were adapted, translated, and internally validated to be used in Spanish-speaking communities. The authors reported physical health, emotional well-being, social life, and money matters as domains most affected by melasma. Participants who were less educated, received prior treatments, and had extended periods of melasma scored higher on the Spanish-language MELASQOL, reflecting a worsened QOL for those patients.[21] The MELASQOL scale has been adapted and validated for other ethnicities and nationalities, including Brazilian Portuguese,[18] French,[22] and Turkish,[23] which substantiates how melasma can impact QOL and cosmetic concerns for all patients irrespective of race or phototype.

CONCLUSION

Understanding the etiology and pathogenesis of melasma will help physicians establish a treatment approach that is directed toward the patient's needs. Because melasma can negatively impact a patient's QOL, treatment to improve cosmetic concerns also can impact the patient's emotional well-being.

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