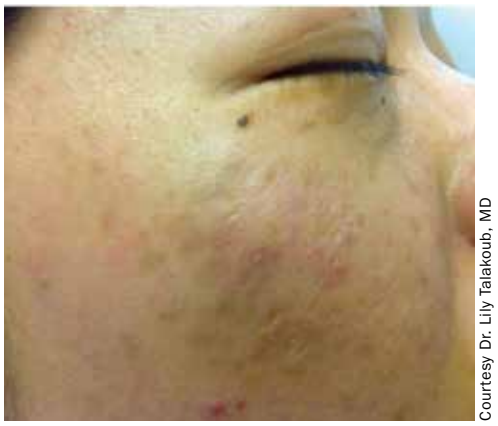
The hidden vascular component to melasma

BY LILY TALAKOUB, MD AND NAISSAN O. WESLEY, MD

So lets revisit this topic. We hate melasma. It is recalcitrant, resistant, and often recurs. But how many of us dermatologists look at melasma with a dermatoscope? A minority? And probably even fewer of us biopsy melasma. Are we missing the many, many cases of vascular or erythematotelangiectatic melasma and just treating melasma as a pigment problem instead of treating it as a vascular problem?



Courtesy Dr. Lily Talakoub, MD

This image shows the vascular component in melasma.

We know that melasma develops because of increased melanin production, not an increased number of melanocytes, but the underlying cause of increased melanogenesis is not fully understood. Several recent studies suggest that the increased vascularity in melasma skin is the underlying etiology. Understanding the way endogeneous and exogeneous stimuli such as sex hormones, oral contraceptives, ultraviolet irradiation, and visible light stimulate inflammation in the dermis, leading to the release of various mediators that stimulate angiogenesis and the activation of melanocytes, will help us improve the treatment of this relentless disease.

It's clear that UV exposure and visible light are the predominant triggers in the development of melasma. Recent studies looking at biopsies of lesional skin in melasma patients show similarity to solar-damaged skin. Solar elastosis has been shown to be secondary to the synthesis of alpha-melanocyte stimulating hormone (alpha-MSH) and adrenocorticotropic hormone (ACTH) derived from pro-opiomelanocortin (POMC) in keratinocytes. These peptides lead to proliferation of melanocytes, as well as increase in melanin synthesis via stimulation of tyrosinase activity and tyrosinase-related protein 1 (TRP-1).

Similarly, elevated estrogen and progesterone in pregnancy or with oral contraceptive use is known to stimulate melasma. Melanocytes express estrogen receptors and estradiol increases the level of TRP-2, which stimulates melanocytes to produce melanin. Recent literature has shown that the number of blood vessels, vessel size, and vessel density also are greater in lesional melasma skin than in perilesional skin. In addition, immunohistochemical staining has shown an increased level of factor VIIIa-related antigen in blood vessels in melasma skin, compared with perilesional normal skin.

Elevated vascular endothelial growth factor (VEGF) in keratinocytes also has been hypothesized to play a role in the elevated vascularization of melasma. Biopsies from affected skin also reveal increases in mast cells that release mediators – including histamine, VEGF, tumor necrosis factor–alpha, and interleukin-8 – which promote vascular proliferation. The evidence now points to these stimuli triggering angiogenesis, leading to release of mediators that cause melanocyte activation and melanin production.

Unfortunately, the treatment of vascular melasma is very difficult. Lasers such as the pulsed-dye laser that help skin vascularity can trigger worsening melanogenesis through dermal inflammation. The melanin cap overlying the melanocyte nucleus also can mask the underlying vascularity and make laser treatments more difficult. The isolated treatment of epidermal pigment also may be ineffective and transient.

By targeting the vessels in addition to the pigment, we will get improved clinical results and fewer relapses. We suggest that melasma be treated conservatively, not aggressively. It should be treated as an inflammatory process. Patients with melasma also have a slightly abnormal skin barrier, so we should be hesitant in using deep lasers, radio frequency, and aggressive chemical peels. Topical preparations – particularly triple-combination bleaching agents, retinoids, and nonhydroquinone skin lighteners – should be used sparingly and always in combination with treatments targeting skin vascularity. ■

References

J Dermatol Sci. 2007 May;46(2):111-6.

Exp Dermatol. 2005 Aug;14(8):625-33.

Clin Exp Dermatol. 2008;33(3):305-8.

J Eur Acad Dermatol Venereol. 2009 Nov;23(11):1254-62.

Ann Dermatol. 2010 Nov;22(4):373-8.

J Eur Acad Dermatol Venereol. 2013 Jan;27 Suppl 1:5-6.

Am J Clin Dermatol. 2013 Oct;14(5):359-76.

J Am Acad Dermatol. 2014 Feb;70(2):369-73.

Dr. Talakoub and Dr. Wesley are co-contributors to this column. Dr. Talakoub is in private practice in McLean, Va. Dr. Wesley practices dermatology in Beverly Hills, Calif. This month's column is by Dr. Talakoub. Write to them at dermnews@frontlinemedcom.com.