

COMPARATIVE STUDY OF WOOD'S LAMP AND DERMOSCOPIC FEATURES OF MELASMA

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ABSTRACT

INTRODUCTION

Melasma is an acquired hypermelanosis of sun exposed areas commonly seen in women, it can also occur in men. It presents as symmetrical hyperpigmented macules and patches commonly over the cheeks, nose, chin and forehead. Woods lamp is a useful device used to estimate the depth of melanin determined by light induced fluorescence. A dermoscope is a non-invasive diagnostic tool which enables a clear visualization of pigment distribution and color variation of melanin depending on its location within the skin.

OBJECTIVE

To classify melasma according to depth of melanin by dermoscopy and correlate woods lamp and dermoscopic findings.

MATERIAL AND METHODS

Analysis of concordance between woods lamp and dermoscopy in classification of melasma. 30 patients with facial melasma were examined using Woods lamp (Derma India) and Dermoscope (Dermlite DL3). On Woods lamp examination, melasma was considered epidermal when enhancement was noted, dermal when no enhancement was seen and mixed when few areas showed enhancement. On Dermoscopy, melasma was considered epidermal when regular pigment network with a brownish homogenous pigmentation was noted, dermal when irregular network with bluish grey pigmentation was noted and mixed when areas show both features.

RESULTS

The degree of concordance between the methods was considered good ($k < 0.56$) by statistical analysis.

CONCLUSION

Dermoscopy is more suitable for examination for melasma, since it allows visualization of pigmentary components in more objective way. It also helps to understand the prognosis and management.

KEYWORDS

Melasma, Wood's Lamp, Dermoscopy.

HOW TO CITE THIS ARTICLE: Manjunath KG, Kiran C, Sonakshi S et al. Comparative study of wood's lamp and dermoscopic features of melasma. J Evid Based Med Healthc 2015; 2(60), 9012-15. DOI: 10.18410/jebmh/2015/1279

INTRODUCTION: Melasma is an acquired hypermelanosis of sun exposed areas commonly seen in women, it can also occur in men. It presents as symmetrical hyperpigmented macules and patches commonly over the cheeks, nose, chin and forehead. Woods lamp is a useful device used to estimate the depth of melanin determined by light induced fluorescence. A dermoscope is a non-invasive diagnostic tool which enables a clear visualization of pigment distribution and color variation of melanin depending on its location within the skin.

Submission 18-12-2015, Peer Review 19-12-2015,

Acceptance 23-12-2015, Published 26-12-2015.

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DOI: 10.18410/jebmh/2015/1279

The study is justified due to the emotional impact and the high prevalence of hyperpigmentation. In this sense, we sought to evaluate the classification of melasma according to the depth of melanin pigment by dermoscopy, and correlate the dermoscopic findings to the Wood's lamp classification.

MATERIALS AND METHODS: A total of 30 patients with facial Melasma were included in this study selected by random sampling and the study period was for two months i.e.; June 2015 to August 2015. Study of the correlation between dermoscopy and Wood's lamp in the classification of melasma, using the Kappa coefficient (proportion of agreement when two observers individually classify a sample). All patients received instructions, read and signed informed consent, image consent, and the study was approved by the Ethics and Research Committee of Vydehi institute of medical sciences and research center, Bangalore.

The protocol included information about the patient's Identification, onset of dermatosis, familial history, and hormonal changes related to pregnancy and menopause, use of oral or topical medications, sun exposure, and classification by clinical examination, and data were stored in the form of questionnaires. Patients were evaluated by an experienced examiner through Wood's lamp (Derma India), with melasma classified as epidermal, dermal, or mixed, according to the fluorescent light. Dermoscopic examination was done using DermLite DL3 dermoscope. On Dermoscopy, melasma was considered epidermal when regular pigment network with a brownish homogenous pigmentation was noted, dermal when irregular network with bluish grey pigmentation was noted and mixed when areas show both features.

RESULTS: Among the evaluated patients, 18 were male and 12 female. Their ages ranged between 26 and 50 years.

On clinical examination, 16 patients had centrofacial and 14 malar melasma.

On Wood's lamp 13 patients showed complete enhancement hence classified as epidermal (Fig. 1-B), 14

patients had no enhancement hence classified as dermal (Fig. 2-B) and 3 patients showed few areas of enhancement and was classified as mixed melasma (Fig. 3-B).

On Dermoscopy, 13 patients showed Regular pigment network with a brownish homogeneous pigmentation hence classified as epidermal (Fig. 1-C), 6 patients showed Irregular network with bluish grey pigmentation hence classified as dermal (Fig. 2-C) and 11 patients showed features of Both epidermal and dermal and hence classifies as mixed melasma (Fig. 3-C).

Of the 13 lesions considered as epidermal type by dermoscopic examination, the examination agreement under Wood's lamp was 12. Of the 6 considered dermal by dermoscopy, the agreement was 3 under Wood's lamp. And of the 11 considered mixed by dermoscopy, the agreement was 3 under Wood's lamp examination.

The Degree of Concordance between the methods was considered substantial ($K=0.565$, $p \text{ value} < 0.001$) by statistical analysis.



Fig. 1: Epidermal Melasma. A) Clinical. B) Examination under Wood's lamp. C) Dermoscopic examination

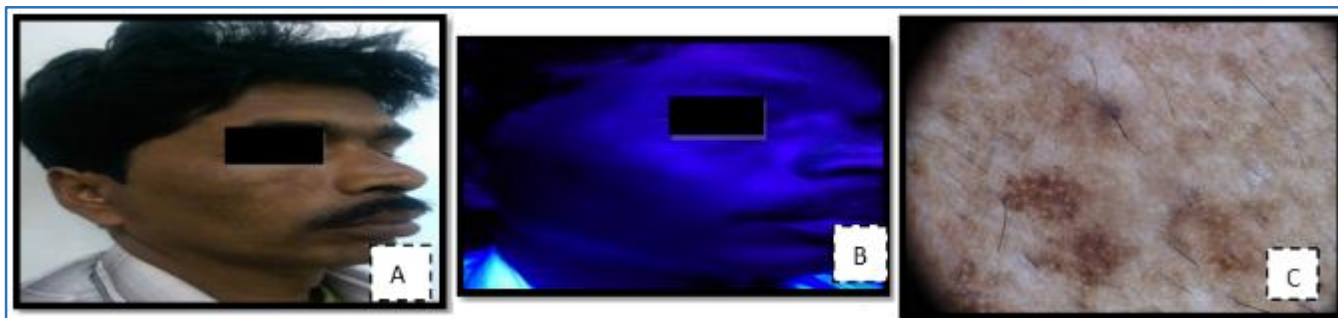


Fig. 2: Dermal Melasma. A) Clinical. B) Examination under Wood's lamp. C) Dermoscopic examination



Fig. 3: Mixed Melasma. A) Clinical. B) Examination under Wood's lamp. C) Dermoscopic examination.

DISCUSSION: Melasma is an acquired hypermelanosis of sun-exposed areas. It presents as symmetrical hyperpigmented macules and patches, which can be confluent or punctate. The cheeks, the upper lip, the chin, and the forehead are the most common locations, but it can occasionally occur in other sun-exposed locations. Though commonly seen in women, it can also occur in men. Multiple factors have been postulated to involve in the aetiology and pathogenesis of melasma including pregnancy, oral contraceptives, genetics, sun exposure, cosmetics and race. (1)

Melasma is much more common in women than in men. (1) It commonly occurs during pregnancy, has been associated with the use of oral contraceptives containing oestrogens and/or progestogens, certain drugs like hydantoin and with cosmetics. Sun exposure appears to be important for the development of melasma. There also appears to be a familial and racial predisposition. (2)

The prevalence of melasma varies between 1.5% and 33.3% depending on the population. Its prevalence in pregnancy is around 50-70%. (3) Melasma predominantly affects Fitzpatrick skin phototypes III and IV and often lasts for many years after pregnancy. (4) The incidence of melasma in pregnant ladies with white skin is reported to be more than 50% of the cases. However, in India it was found to be nearly 10%. (1)

Validated questionnaires in several populations have shown that even a small amount of melasma can cause significant emotional and psychological distress. Patients with lower levels of education or underlying psychiatric disorders may be at greater risk of emotional impairment. (4)

The hyperpigmented patches may range from single to multiple, usually symmetrical on the face and occasionally V-neck area. According to the distribution of lesions, three clinical patterns of melasma are recognized. The centrofacial pattern is the most common pattern and involves the forehead, cheeks, upper lip, nose, and chin. The malar pattern involves the cheeks and nose. The mandibular pattern involves the ramus of the mandible. (5)

In histopathology, the epidermal type is characterized by deposit of melanin pigment restricted to basal and suprabasal layers, occasionally extending on the epidermis until the stratum corneum; and the dermal type shows dermal pigmentation in the epidermis and the upper and middle dermis, mainly inside melanophages, often in perivascular deposition, and may also involve the deep dermis with minimal perivascular lymphocytic infiltrate in superficial dermis. (6)

Through Wood's lamp examination, the following types are described: epidermal—there is a colour accentuation as the light is absorbed by the excess of melanin in the basal or suprabasal regions; dermal—such accentuation is not noticeable; mixed—as the deposit of melanin occurs in both dermis and epidermis, increased staining is seen only in a few sites. Some even describe a fourth type that would be unnoticed in Wood's light, because it affects individuals of phototype V and VI. It is so named because the melanin in these patients is abundant and most of the light is absorbed

by this pigment. Only a small amount returns to the eyes, and the skin appears dark as a whole. (7,8,9)

A traditional Wood lamp is a low-output mercury arc covered by a Wood filter (barium silicate and 9% nickel oxide), and emits wavelength 320–450nm (peak 365 nm). This was invented in 1903 by a Baltimore physicist; Robert W. Wood. Wood's lamp can be used to determine the depth of melanin in the skin. The variations in epidermal pigmentation become more apparent under Wood's light. For dermal pigmentation, this contrast is less pronounced. Based on Wood's light findings, Sanchez et al classified melasma into four subtypes: epidermal, dermal, mixed and Wood's light inapparent. (10) While a Wood lamp examination was previously thought to accurately predict epidermal versus dermal pigment deposition, recent studies have shown that dermal melanin deposition is common and may be under-recognized. (4)

Wood's lamp is the most widely used method of melasma classification. A study conducted by Ponzio et al. (1993) to assess the instrument validity to identify the pattern of melasma, aimed to determine the cases correctly classified in 61 patients, compared with the histopathological examination. The study showed low levels of sensitivity, specificity and accuracy of the examination under Wood's lamp in the three pathological types of melasma. The results obtained in this sample concluded that "classification of melasma by examining the skin under Wood's lamp has a low proportion of correct answers, since it proved to be moderately sensitive but with low specificity, resulting in accuracy of 46%, below the expectation". (11) Ultraviolet light from Wood's lamp penetrates predominantly in the stratum corneum and epidermis where melanin is distributed. The pigment depth will determine the fluorescence. The skin regions presenting an increase in epidermal melanin concentration will enhance their colour and become darker, in contrast to the normal surrounding skin. In contrast, the areas with decreased melanin concentrations will appear clearer and brighter. Thus, variations in epidermal pigmentation are more visible under a Wood's lamp, whereas dermal changes are much less evident or absent under the lamp compared to visible light. Less UV light reaches the dermis and this contributes much less to the fluorescence that returns to the eyes, i.e., dermal melanin does not affect the amount of light observed. Contrast between the affected and unaffected skin is considerably decreased or even unapparent compared to visible light. (12) Therefore, an established disadvantage is the fact that the technique will not be useful in individuals of skin type V and VI due to optical factors. Moreover, collagen and vascular changes, use of topical drugs and sunscreen can affect the test, resulting in unreliable results. (13,14,15) There are reports that the proposed therapies are effective mainly in the epidermal type, without good results for the dermal component. (16,17) Some of the patients were in treatment, however this fact should not be considered a bias because the study objective is to compare methods for melasma classification, which is basically to assess the capacity and location of melanin and correlate them with the same patient.

Dermatoscope: It is also known as Dermoscope, Skin surface microscope, Epiluminescence microscope and Episcope. It is a non-invasive, diagnostic tool which magnifies subtle clinical surface features of skin lesions as well as unveils some subsurface skin structures not normally visible even with a magnifying lens. Some dermatoscopic patterns are observed consistently with certain diseases and these then could be used for their diagnosis. Also, this office procedure may sometimes obviate the need for a skin biopsy for diagnosis and for follow-up. The facility of storage of images and the results being immediately available are added advantages.⁽¹⁸⁾

In short, a dermatoscope is functionally similar to a magnifying lens but with several add-on features of an inbuilt specialized illuminating system (visible light, polarized light, and ultraviolet sources), adjustable magnification, the ability to assess structures as deep as in the reticular dermis, and the ability to record digital images for future analysis and comparison.⁽¹⁸⁾

Dermoscopy of melasma: The dermatoscopic diagnosis of pigmented lesions is based on both global and local features; global features account for the pattern while the local features are responsible for minor changes. Reticular pattern is the global feature seen in all melasma lesions. Lesions of melasma show diffuse reticular pigmentation in various shades of brown sparing the follicles and sweat gland openings producing exaggerated pseudo network pattern with concave borders called the 'jelly sign'. This network is superimposed by dark brown or bluish-black hyperpigmented granules, globules and blotches predominantly in perifollicular areas but sparing the follicles.⁽¹⁸⁾

CONCLUSION: Dermoscopic examination helps in observing the pigment components, as well as their position on the skin layers. Hence allows objective classification of melasma which is less affected by such factors as the patient's skin phototype, vascular and collagen changes, or the use of topical products.

In the analysis of correlation between Dermoscopy and Wood's lamp in classification of Melasma, the results showed substantial discordance between the methods. Based on the principles of Dermoscopic examination, this method applicable, more appropriate and helpful for routine diagnosis, assessment and monitoring of patients with melasma.

Dermoscopy also allowed the observation of significant vascular component in many patients, which may be relevant in terms of future prospects for pathogenesis and therapeutic considerations.

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