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Original Research Article

Dermoscopic assessment of melasma at a tertiary care centre in South India: A cross sectional study

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Abstract

Introduction: Melasma also referred to as chloasma or the mask of pregnancy is characterized by symmetrical brownish or brownish black macules and patches. Dermoscopy is increasingly used for the diagnosis of pigmentary disorders like melasma. The colour of the melanin in dermoscopy depends on quantity or density and location of the pigment which helps in classifying the condition.
Aim: To assess the dermoscopic features in different types of melasma.
Materials and Methods: This was a year-long cross-sectional study conducted among 100 patients with melasma. All dermoscopic findings were studied using handheld pocket dermoscope (Dermlite DL4 3GEN).
Results: The mean age of study population was 44.12± 8.1 years. In our study, 95% were women and 5 % were men. Centrofacial melasma (51%) was the most common morphological pattern observed, followed by malar (44%) and mandibular (5%). Epidermal type of melasma was commonly found to be associated with Fitzpatrick skin type IV (63.3%). On dermoscopic evaluation, 59% had epidermal melasma, followed by 35% with dermal melasma, and 6% had mixed pattern. The colour of the lesion noted on dermoscopy was dark brown (51%) followed by light brown (47%) and blue (2%). Dermoscopy showed majority of the patients having reticuloglobular pattern(68%), followed by perifollicular brownblack globules (57%), unpatterned patchy brownblack pigment (32%), granular(33%), and telangiectasia (22%). Telangiectasia was most commonly seen in centrofacial type.
Conclusion: Dermoscopy can be a valuable tool in differentiating melasma from other facial melanoses. Dermoscopy also aid in classifying the melasma subtypes, which further helps in deciding the appropriate treatment for patients.

Keywords: Dermoscopy, Melasma, Pattern, Pigment, Reticuloglobular, Telangiectasia

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1. Introduction

Melasma is an acquired hypermelanosis of skin that is due to dysfunction in melanogenesis occurring symmetrically over sun-exposed areas.[1] The other designations are mask of pregnancy, liver spots, and uterine chloasma.[2] Etiological factors include genetic influences, ultraviolet radiation, pregnancy, hormonal therapies, hypothyroidism, cosmetics, phototoxic drugs, and antiepileptic medications.[3] It is characterized by irregular serrated patches with geographic borders, which occur exclusively on the face and occasionally over the neck and forearm.[4] Melasma is classified based on involved sites as centro-facial, malar, and mandibular. Based on the depth of melanin accumulation, it is classified as epidermal, dermal, and mixed type.[4]

Dermoscopy is a non-invasive tool that is used to visualize the subtle clinical patterns of skin, which are not usually visible to the naked eye.[5] It is used to differentiate melanocytic lesions from non-melanocytic lesions and also can be used to identify whether melasma is of epidermal, dermal, or intermediate type.[6] The most common dermoscopic pattern observed in melasma includes reticuloglobular pattern, arcuate pattern, honeycomb pattern,

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and perifollicular brown-black granules.[7] The present study was undertaken to study the clinicodemographic profile and to assess the various dermoscopic features seen in different types of melasma.

2. Materials and Methods

This was a hospital-based, cross-sectional observational study conducted among 100 newly diagnosed cases of melasma who visited our Dermatology outpatient department over a period of one year from January 2023 to January 2024. The study was approved by the institutional ethics committee. Inclusion criteria were all patients ≥ 18 years presenting with melasma and those willing to participate in the study. Patients with systemic lupus erythematosus and other facial dermatosis, coexistent other facial melanosis, those with a history of previous treatment in the past 3 months, and all clinically doubtful cases were excluded.

Baseline demographic data such as age, sex, socioeconomic status, occupation, literacy level, family history, age of onset, duration of the disease, and relevant clinical details were recorded in a predesigned proforma, and all patients were further subjected to dermoscopic examination using a handheld pocket dermoscope (Dermlite DL4, 3 gen., USA). A dermoscope was placed over the surface of the lesion without applying any contact medium, and the lesion was observed in polarized mode at 10x magnification. Dermoscopic pictures were taken using a high-resolution mobile phone camera attached to the dermoscope (iPhone X, Apple Inc., USA).

The final analysis of data was performed using SPSS version 27.0. Descriptive statistics such as mean, median, minimum, maximum, and percentages were calculated to describe the demographic data. All demographic data, clinical data, and dermoscopic patterns were compared and analyzed using the Pearson's Chi-square test. P value < 0.05 was considered statistically significant.

3. Results

Among 100 patients studied, 95% were females and 5% were males. The mean age of patients was 44.12±8.11 years, with the age range from a minimum of 18 years to a maximum of 70 years. The most common age group affected was 41-50 years (42%). 86% of patients observed gradual onset of melasma, while 14% complained of sudden onset. There was no history of any preceding drug intake. The key aggravating factors were sun exposure (43%), followed by cosmetics use (32%), commonly fairness creams, and stress (33%), including menstrual flare. 59% of affected patients had Fitzpatrick skin type IV. Epidermal type of melasma was commonly found to be associated with Fitzpatrick skin type IV (63.3%). Demographic data of all patients was summarized in **Table 1**.

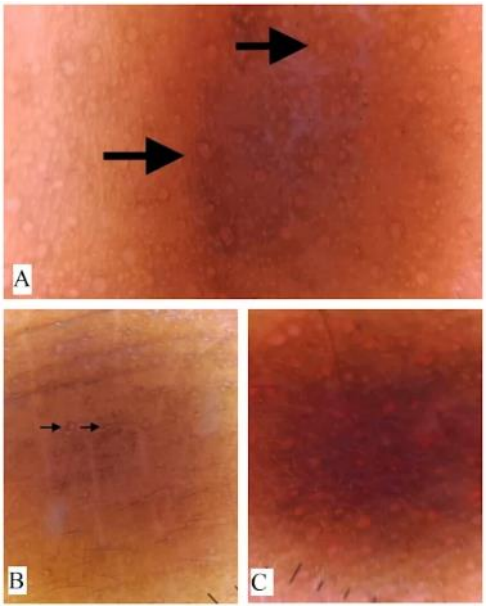

Figure 1: Dermoscopy of centrofacial melisma (×10x) Showing reticuloglobular pigment; **A**: Perifollicular brown globules; **B**: Unpatterned patchy brown black pigment **C**.

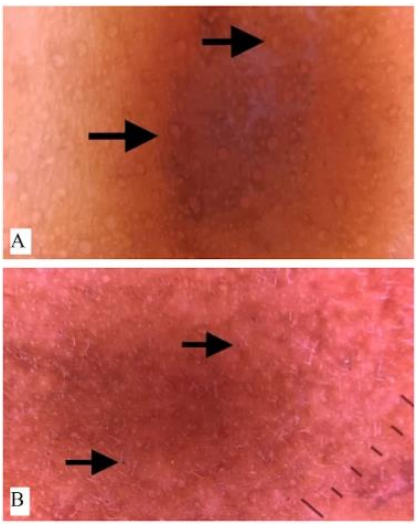

Figure 2: Dermoscopy of malar melisma (×10x) showing reticuloglobular pigment; **A:** Granular dots **B**.

Centrofacial melasma (51%) was the most common morphological pattern observed, followed by malar (44%) and mandibular (5%). The colour of the lesion noted on dermoscopy was dark brown (51%), followed by light brown (47%) and blue (2%). The most common type of melasma seen on dermoscopy was epidermal (59%), followed by dermal (35%) and mixed (6%) types.

The most common dermoscopic pattern observed was the reticuloglobular pattern (68%), followed by perifollicular brown-black globules (57%), unpatterned patchy brown pigment (38%), granular (33%), and telangiectasia (22%). Among all the dermoscopic patterns, reticuloglobular pattern (66.7%) and granular pattern (36.4%) were predominantly seen in the malar type, while the reticuloglobular pattern

(70%) and unpatterned patchy brown pigment (37.3%) were more observed in the centrofacial type. (**Figure 1A-C**) (**Figure 2A&B**) (**Table 2**) With respect to the depth of melanin deposition, reticuloglobular pattern (71.4%) and perifollicular brown-black globules (60%) were more often observed in dermal melasma, whereas telangiectasia (23.7%) and granular dots (33.9%) were more seen in epidermal melasma. Unpatterned patchy brown-black pigment was noted in all cases of mixed melasma (100%). However, all these dermoscopic features showed no statistically significant association among the subtypes. (**Table 3**)

Table 1: Demographic profile of all patients

Variable	**Category**	**N**
Age (Years)	18-30	3
	31-40	32
	41-50	42
	51-60	19
	61-70	4
Mean age (Years)		44.12±8.11
Age of onset(Years)	18-30	4
	31-40	35
	41-50	42
	>50	19
Mean age of onset (Years)		42.59±8.17
Gender	Male	5
	Female	95
Residence	Rural	43
	Urban	57
Duration of melasma	<1year	19
	1-2 years	68
	2-3years	12
	3-4 years	1
Socioeconomic status	Upper Middle	26
	Upper Lower	24
	Lower Middle	50
Fitzpatrick skin type	III	11
	IV	59
	V	30

Table 2: Association between clinical types and dermoscopic patterns of melasma

Clinical types (%)	**Dermoscopic patterns of Melasma**					**P value**
	Reticuloglobular N(%)	**Perifollicular N(%)**	**Telangiectasia N(%)**	**Granular N(%)**	**Unpatterned patchy brown black pigment N(%)**	
Centrofacial (51%)	34 (66.7%)	30 (58.8%)	11 (21.6%)	15 (29.4%)	19 (37.3%)	0.949
Malar (44%)	31 (70.5%)	25 (56.8%)	9 (20.5%)	16 (36.4%)	11 (25%)	
Mandibular (5%)	3 (60%)	2 (40%)	2 (40%)	2 (40%)	2 (40%)	

Table 3: Dermoscopic findings in different types of melasma based on depth

Type of melisma (%)	**Dermoscopic patterns of Melasma**					**P value**
	Reticuloglobular N(%)	**Perifollicular N(%)**	**Telangiectasia N(%)**	**Granular N(%)**	**Unpatterned patchy brown black pigment N(%)**	
Epidermal (59%)	40(67.8%)	34(57.6%)	14(23.7%)	20(33.9%)	20(33.9%)	0.978
Dermal (35%)	25(71.4%)	21(60%)	7(20%)	11(31.4%)	12(34.3%)	
Mixed (6%)	3(50%)	2(33.3%)	1(16.7%)	2(33.3%)	6(100%)	

Table 4: Dermoscopic types of melasma in various studies

S.No	Researcher	Place & year of study	Dermoscopic types
1	Our study	Tamil Nadu, 2023	Epidermal (59%) Dermal (35%) Mixed (6%)
2	Nanjundaswamy et al[5]	Karnataka, 2017	Epidermal (46%) Dermal (18%) Mixed (36%)
3	Talmer et al[19]	Portugal,2009	Epidermal (40%) Dermal (22.5%) Mixed (37.5%)
4	Manjunath et al[25]	Karnataka, 2015	Epidermal (43.3%) Dermal (20%) Mixed (36.6%)
5	Manjunath et al[23]	Karnataka,2016	Epidermal (36%) Dermal (46%) Mixed (18%)

Table 5: Comparison of dermoscopic patterns of melasma with similar studies conducted elsewhere

S.No	Researcher	Place and year of study	Dermoscopic pattern
1	Our study	Tamil Nadu,2023	Reticuloglobular pigment – 68(68%) Perifollicular globules – 57(57%) Telangiectasia – 22(22%) Granular dots – 33(33%) Unpatterned patchy pigment – 32(23%)
2	Neema S et al[24]	West Bengal,2017	Reticuloglobular pigment – 83(83%) Perifollicular globules – 60(60%) Telangiectasia – 33(33%) Granular dots – 28(28%) Unpatterned patchy pigment – 17(17%)
3	Sreenath S et al[8]	New Delhi,2022	Reticuloglobular pigment – 55(55%) Perifollicular globules – 15(15%) Telangiectasia -38(38%) Irregular network – 30(30%)
4	Manjunath et al[23]	Karnataka,,2016	Regular pigment network – 18(36%) Irregular network – 23(46%) Both regular and irregular network – 9(18%)
5	Yalamanchili et al[11]	Karnataka,2014	Reticuloglobular network – 95% Perifollicular pattern – 97% Patchy-62.4% Diffuse-37.6%

4. Discussion

Melasma is an acquired hyperpigmentary disorder commonly affecting middle-aged females. Morphologically, melasma has been classified into three subtypes—centrofacial, malar, and mandibular. Centrofacial melasma involves the forehead, cheeks, upper lip, and chin, whereas malar type involves the cheeks and nose, and mandibular type affects only the rami of the mandible. Dermoscopy can be used for both diagnosis and prognosis of the patient with pigmented facial skin lesions. The colour of the lesions in dermoscopy indicates the depth of melanin accumulation and thus helps in classifying the type of melasma. The melanin present in the stratum corneum appears as black, whereas in the dermoepidermal junction it appears as brown, and in the dermis it appears as blue or gray. This also helps in understanding therapeutic implications, as dermal melasma responds poorly to conventional treatment.

Majority of the patients in the present study belonged to 41-50 years of age group (42%). The mean age of patients was 44.12±8.11 years. This was in accordance with previous studies conducted by Sreenath et al,[8] Sevda onder et al,[9] and Jagannathan et al,[10] where the mean age was 38.15, 37.7±6.9, and 37.13 years, respectively. The mean age of onset was 42.59±8.17 years, which was slightly lesser when compared

with other studies by Yalamanchili et al[11] (37.13), Anderson et al (35.6±6.7),[12] and Sarkar R et al (34.57±10.5).[13]

The present study showed female (95%) preponderance for melasma, consistent with multiple previous studies suggesting a high female preponderance to the condition.[10,11,14-16] This infers that hormonal factors play a major role in the pathogenesis of melasma. Johnston et al[17] in their study showed that the depth of melanin pigment fluctuates in concurrence with the menstrual cycle.

In the current study, sunlight exposure (43%) was the key exacerbating factor in melasma. Pathak et al[18] reported that sunlight exacerbates melasma in all patients, which could be due to increased exposure to UV light leading to an increase in activity and number of the melanocytes. 53% of patients lived in an urban area, whereas 43% patients belonged to rural area.

In our study, majority of the patients had centrofacial pattern (51%), followed by malar (44%) and mandibular (5%) types, which was similar to the study by Sreenath et al.[8] However, various other studies reported malar type as the most common, followed by centrofacial and mandibular type.[10,11,19-21] This variation could be due to regional and environmental differences among the study population.

The colour on dermoscopy observed was dark brown (51%), followed by light brown (47%) and bluish gray (2%), consistent with Sreenath et al.[8] The test results showed that the majority of the patients with brown color was seen in the centrofacial and malar types of melasma. Bluish gray was observed in 2% of the patients, who were of the malar type. However, Sreenath et al.[8] noted predominantly brown color in malar (52.2%) and mandibular (57.1%) types and mixed color in the centrofacial (45.7%) type. Dermoscopic assessment showed the majority of patients with epidermal type (59%), followed by dermal (35%) and mixed type (6%), which was similar to the studies by Nanjundaswamy et al[5] and Talmer et al[22] However, they observed mixed type as the next common subtype, followed by dermal. In contrast, Manjunath et al[23] observed dermal type (46%) more common, followed by epidermal (36%) and mixed type (18%). (**Table 4**)

In the present study, the most common dermoscopic pattern observed was reticuloglobular pigment (68%), followed by perifollicular brown-black globules (57%), unpatterned patchy brown pigment (38%), granular (33%), and telangiectasia (22%). Reticuloglobular pattern was commonly seen in malar (70.5%) and centrofacial types (66.7%), consistent with the report by Sreenath et al[8] where it was seen in 58.6% of centrofacial and 52.2% of malar types. We noted telangiectasia in 22% of the patients, which was comparable again with the above-mentioned study, where 42.9% of patients showed telangiectasia in the centrofacial type. Telangiectasia can be a clue to rule out steroid abuse by the patients or may indicate concomitant erythemotelangiectatic rosacea.

Perifollicular globules (57%) were the second most common finding observed, similar to the study done by Neema S et al (60%).[24] However, perifollicular globules can be seen in normal individuals also, and it is not a significant finding for the diagnosis of melasma. Granular dots were observed in 33% of the patients, comparable to the study by Neema S et al (28%).[24] Granular dots denote the melanophages present in the dermis as a result of dermal incarceration of the pendulous melanocytes. Unpatterned patchy brown pigment was seen in 38% of the patients, which included all 6(100%) cases of mixed melasma, consistent with Neema et al (17%).[24] This was not described earlier, but those having a mixed type of melasma can have a superimposed pigment over a reticuloglobular network. The comparison of dermoscopic findings in melasma between the current study and other previous studies is shown in **Table 5**.

5. Limitations

The major limitations are the small sample size with a lack of histopathological correlation and a single-centered study design.

6. Conclusion

Dermoscopy reveals a specific pattern of well-defined and regular pigment network or reticuloglobular pattern in melasma, as opposed to the ill-defined pigment network seen in other facial melanoses. Other significant features of melasma, such as brown, black, or grey spots and globules, as well as telangiectasia, aid to distinguish it from other types of facial melanosis, alleviating the need for unwarranted biopsies. The most common dermoscopic pattern observed was the reticuloglobular pattern, followed by perifollicular brown-black globules, unpatterned patchy brown pigment, granular pattern, and telangiectasia. Reticuloglobular and granular patterns were commonly associated with the malar type, whereas reticuloglobular patterns and unpatterned patchy brown pigment were more often observed in the centrofacial type. Dermoscopic features observed were consistent with previous studies despite the ethnic, cultural, and geographic variations of our population. The colour on dermoscopy helps to classify melasma into epidermal, dermal, or mixed types, which provides insight on deciding the appropriate treatment for patients.

7. Source of Funding

None.

8. Conflict of Interest

None.

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