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Clinical and dermoscopic assessment of patients with hypopigmented skin lesions - a cross -sectional study

Hipopigmente deri lezyonları olan hastaların klinik ve dermoskopik değerlendirmesi - kesitsel bir çalışma

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Abstract

Background and Design: Hypopigmentation refers to any form of decreased pigmentation and depigmentation. The study aims to evaluate the use of a dermatoscope in diagnosing cases of hypopigmented skin lesions.
Materials and Methods: A total of 123 patients with hypopigmented skin lesions attending the dermatology outpatient department of a tertiary hospital were selected for the study. Dermoscopy was performed using DermLite-DL4 dermatoscope on hypopigmented lesions.
Results: In vitiligo, a white glow on a white background with absent or reduced pigment network was characteristic. The characteristic pattern in Tinea versicolor was hypopigmented macules with a decreased pigment network against a brownish-white background and double-edged scales that furrowed in the skin lines. Idiopathic guttate hypomelanosis displayed a reduced pigment network with white structureless areas. Ill-defined margins with uniformly reduced pigment networks against a brownish-white background with minimal white scales were characteristic of pityriasis alba. Follicular plugs, telangiectasias, rosette appearance, and peppered arrangement of grey-blue and brown globules are specific for lichen sclerosus ET atrophicus. Nevus depigmentosus showed a reduced reticular pigment network and feathery margins. Progressive macular hypomelanosis showed abrownish-white background, reticular pigment network, and minimal white scales in the skin lines. Ring scales and reticular pigment network were characteristic of polymorphous light eruption. Hypopigmented patches of leprosy showed a distorted light brown pigment network with a brownish-white background with minimal white scales, reduced eccrine and follicular openings, short broken hairs, v-shaped hairs, and pigtail hairs. Post-inflammatory hypopigmentation showed hypopigmented macules with decreased pigment network, white glow, perifollicular pigmentation, and peppered arrangement of grey-blue and brown globules. Chemical leukoderma is characterized by hypopigmented macules with blotchy erythema and grey granular dots. Hypopigmented lesions of systemic sclerosis revealed white homogeneous areas with perifollicular pigmentation.
Conclusion: This study showed hypopigmented skin lesions might exhibit characteristic and specific dermoscopic features. When correlated with history and clinical examination, dermoscopy aids in diagnosing hypopigmented lesions and obviating the need for biopsy.
Keywords: Dermoscopy, hypopigmented lesions, pigment network, margins

Öz

Amaç: Hipopigmentasyon, herhangi bir azalmış pigmentasyon ve depigmentasyon formunu ifade eder. Bu çalışma, hipopigmentli deri lezyonlarının tanısında dermoskop kullanımını değerlendirmeyi amaçlamaktadır.
Gereç ve Yöntem: Çalışma için üçüncü basamak bir hastanenin dermatoloji bölümünün ayaktan hasta birimine başvuran hipopigmente deri lezyonları olan toplam 123 hasta seçildi. Ayrıntılı öykü ve klinik muayeneden sonra, hipopigmente lezyonlarda DermLite DL4 dermatoskop kullanılarak dermoskopi yapıldı.
Bulgular: Vitiligo'da, beyaz bir arka plan üzerindeki beyaz bir parlama ve azalmış ya da kaybolmuş pigment ağı karakteristiktir. Tinea versikolorda karakteristik desen, kahverengi-beyaz arka plana karşı azalmış pigment ağı ile birlikte hipopigmente maküller ve deri çizgilerinde oluşan çift kenarlı skuamlardır. İdiyopatik guttat hipomelanoz, azalmış pigment ağına sahip beyaz yapısız alanlar ile karakterizedir. Pityriasis albanın karakteristik özellikleri, belirsiz sınırlara sahip, kahverengi-beyaz bir arka plana karşı uniform olarak azalmış pigment ağı ve minimal

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beyaz skuamlar içerir. Foliküler tıkaçlar, telanjiektaziler, rozet görünümü ve gri-mavi ve kahverengi globüllerin serpilmiş düzeni liken sklerozus et atrofikus için özgüldür. Nevus depigmentosus, azaltılmış retiküler pigment ağı ve tüy gibi kenarlara sahiptir. İlerleyici maküler hipomelanoz, kahverengi-beyaz arka plan, retiküler pigment ağı ve deri çizgilerinde minimal beyaz skuamlar içerir. Halka skuamları ve retiküler pigment ağı, polimorf ışığa duyarlı döküntünün karakteristik özellikleridir. Leprada hipopigmente yamalar, minimal beyaz skuamlar, azaltılmış ekrin ve foliküler açıklıklar, kısa kırık kıllar, v şekilli kıllar, pigtail kıllar ile kahverengimsi beyaz bir arka plana sahip çarpık açık kahverengi pigment ağı gösterdi. İnflamasyon sonrası hipopigmentasyon, azalmış pigment ağına sahip hipopigmente maküller, beyaz parıltı, perifoliküler pigmentasyon ve gri-mavi ve kahverengi globüllerin serpilmiş düzenini gösterir. Kimyasal lökoderma, lekeli eritem ve gri granüler noktalarla karakterize edilen hipopigmente maküllerle kendini gösterir. Sistemik sklerozun hipopigmente lezyonlarında, perifoliküler pigmentasyona sahip beyaz homojen alanlar görüldü.
Sonuç: Bu çalışma hipopigmente deri lezyonlarının karakteristik ve spesifik dermoskopik özellikler gösterebileceğini göstermiştir. Dermoskopi, öykü ve klinik muayene ile uyumlu olduğunda, hipopigmente lezyonların teşhisine ve biyopsi ihtiyacının ortadan kaldırılmasına yardımcı olur.
Anahtar Kelimeler: Dermoskopi, hipopigmente lezyonlar, pigment ağı, kenar boşlukları

Introduction

Hypopigmented skin lesions are the most frequently encountered skin problems in dermatology clinics. Hypopigmented cutaneous disorders can be due to various disturbances in the pigmentary system like defects in the number or function of the melanocytes, decreased melanization of melanosomes, or decrease of the transfer process from melanocytes to keratinocytes[1]. Commonly seen hypopigmented macular diseases are vitiligo, pityriasis alba, pityriasis versicolor, idiopathic guttate hypomelanosis (IGH), nevus depigmentosus, extragenital lichen sclerosus[2]. Hypopigmented disorders carry a significant psychological burden on the patients due to the stigma associated with conditions like vitiligo and leprosy. Dermatoscope is a safe and rapid diagnostic tool that when combined with clinical examination aids in the management of dermatological disorders[3]. Its use is well documented in the diagnosis of skin tumors, pigmentary melanocytic lesions, scalp/hair diseases[4], nail fold abnormalities[5] and inflammatory dermatoses[3,6]. This study aimed to assess the clinical and dermoscopic profile in patients with hypopigmented skin lesions. Due to a lack of studies on the dermoscopic profile of hypopigmented skin lesions in India, we undertook this study. In this study, we tried to find out the dermoscopic findings of various hypopigmented disorders and correlate or refute with available literature reports.

Materials and Methods

This was a cross-sectional observational study done on 123 patients with hypopigmented skin lesions attending the dermato-venereology outpatient department of a tertiary hospital in south India during the period from January 2019 to June 2020. Sampling is done by simple random sampling. The approval of the Vydehi Institute of Medical Sciences and Research Center Ethics Committee was received (approval number: ECR/747/Inst/KA/2015, date: 09.11.2018). Informed consent was taken from the patients. The inclusion criteria were being patients with hypopigmented skin lesions who were willing to give informed written consent. The exclusion criteria were being patients who had treatment for hypopigmented lesions in the past 3 months. A detailed history was taken and a dermatological examination was done. Histopathological examination was done in doubtful cases. Woods light examination was done for all cases. Potassium hydroxide examination was done for scaling lesions. A dermoscopic examination of all cases was done using a hand-held dermatoscope (DermLite-DL4) 10X magnification with polarized and non-polarized light. An Iphone camera was used to take images which were coded and stored. A dermoscopic examination was done blindly by two dermatologists.

Statistical analysis

Data was entered into an MS Excel data sheet and was analyzed using IBM SPSS 22 version software. Categorical data was represented in the form of frequencies and proportions. Continuous data were represented as mean and standard deviations. Various dermoscopic features we tried to observe in this study are pigmentary network changes, scales, perifollicular and perilesional pigmentation, the color of the lesion, borders and specific changes like leukotrichia and telangiectasia.

Results

A total of 123 patients with hypopigmented lesions were included in the study. Out of 123 patients, 55.3% were females and 44.7% were males. Most of the patients were asymptomatic (Table 1). Vitiligo was seen in 34 patients (27.64%) followed by tinea versicolor in 26 patients (21.1%). Other conditions are listed in Table 2. The duration of the lesions was less than 6 months in 40.7% of the subjects whereas it is more than 6 months in 59.3% of subjects. 27.65% of the subjects had

Table 1. Demographic details and symptoms

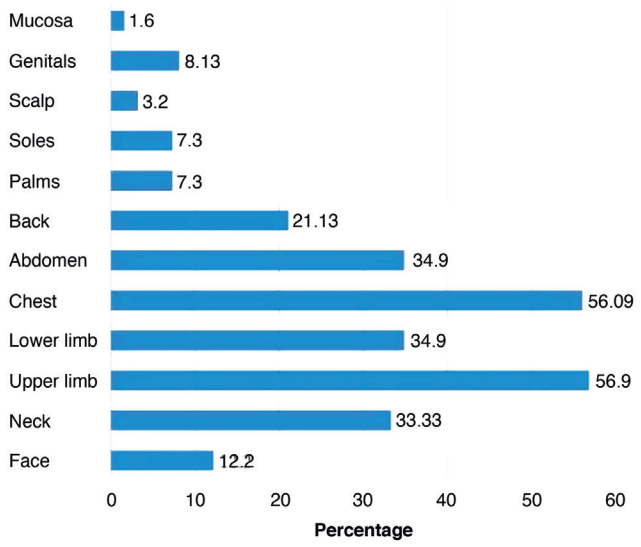
Age group	Frequency	Percentage
18-35 years	82	66.7%
36-55 years	31	25.2%
>55 years	10	8.1%
Sex		
Male	55	44.7%
Female	68	55.3%
Duration of lesions		
≤6 months	50	40.7%
>6 months	73	59.3%
Number of lesions		
Single	34	27.65%
Multiple	89	72.35%
Symptoms		
Itching	16	13%
Burning	0	0%
Decreased sensation	2	1.6%
Pain	0	0%
Body surface area involvement		
<10 %	91	74%
11-30%	20	16.3%
>30 %	12	9.8%

a single lesion while 72.3% had multiple lesions. The most common site involved is the chest and upper limb (56.09%) (Graph 1).

Thirty four cases were diagnosed as vitiligo, out of 34 cases 70.58% were under the age of 35 years. 50% were males. Vitiligo vulgaris was the most common type of vitiligo observed in our study. 82.35% of the patients had vitiligo for more than 6 months duration. Woods lamp examination of the lesions showed bright blue-white fluorescence. On dermoscopy of the lesions, borders were nebuloid (50%), amoeboid (35.29%), trichrome (29.41%) and petaloid (11.76%). The pigment network was absent in 11 patients (32.35%), reduced in 11 patients (32.35%), and reversed in 9 patients (26.47%). Diffuse white glow was noted in 23 patients (67.64%), perilesional pigmentation was seen in 4 patients (11.76%), and perifollicular pigmentation was seen in 6 patients (17.64%) (Figure 1). Satellite bodies were seen in 10 patients (29.41%) and micro Koebner's phenomenon was seen in 7 patients (20.59%). Comet tail appearance is seen in 11 patients (32.35%).

Table 2. Distribution of subjects according to clinical diagnosis

Clinical diagnosis	Frequency	Percent
Vitiligo	34	27.6
Tinea versicolor	26	21.1
Idiopathic guttate hypomelanosis	12	9.7
Pityriasis alba	10	8.1
Lichen sclerosus et atrophicus	6	4.9
Nevus depigmentosus	6	4.9
Postinflammatory hypopigmentation	6	4.9
Progressive macular hypomelanosis	9	7.3
Polymorphous light eruption	6	4.9
Contact leukoderma	4	3.3
Scleroderma	2	1.6
Hansen's disease	2	1.6
Total	123	100.0



Graph 1. Graph showing the frequency distribution of sites involved

A total of 26 patients with tinea versicolor were studied 57.7% were in the 18-55 years age groups. 69.2% of patients were females. 80.7% of the patients had lesions less than 6 months. Woods lamp examination showed yellow to orange fluorescence. On dermoscopy, diffuse hypopigmented macules were seen with a decreased pigment network. Well-defined borders were seen in 70% of cases. Characteristics observed on dermoscopy were the presence of white scales within the lesions and double-edged scales in the furrows (Figure 2). The hair inside the macule had a normal color but had perifollicular scales.

Twelve patients included in the study were diagnosed with IGH. Approximately 80% belonged to the 18-35 years age group and 70% were males. The duration of the lesions was more than 6 months. On dermatoscopy, multiple shiny white macules were seen with well to ill-defined borders. Borders were amoeboid (50%), feathery (50%), petaloid (40%), and nebuloid (10%) (Figure 3). Residual pigment network within the lesions and coalescing of macules rendered a cloudy sky pattern.

Pityriasis alba was present in 10 patients. The duration of the disease was less than 6 months and equally distributed among both males

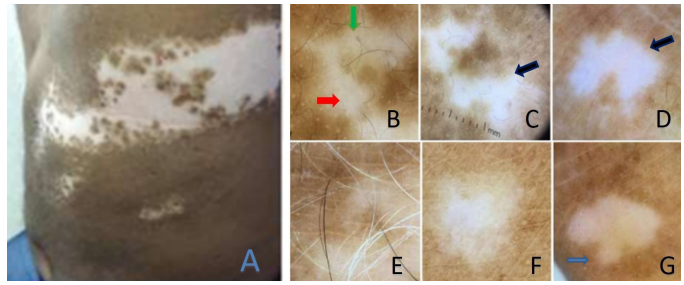


Figure 1. Vitiligo: **(A)** Clinical image showing a depigmented patch of vitiligo over the abdomen. Dermoscopy of vitiligo: **(B)** Depigmented patch with loss of pigment network. Green arrow showing perifollicular pigmentation, **(C, D)** White glow on a white background, **(E)** Leucotrichia, **(F)** Trichrome pattern, **(G)** Amoeboid borders

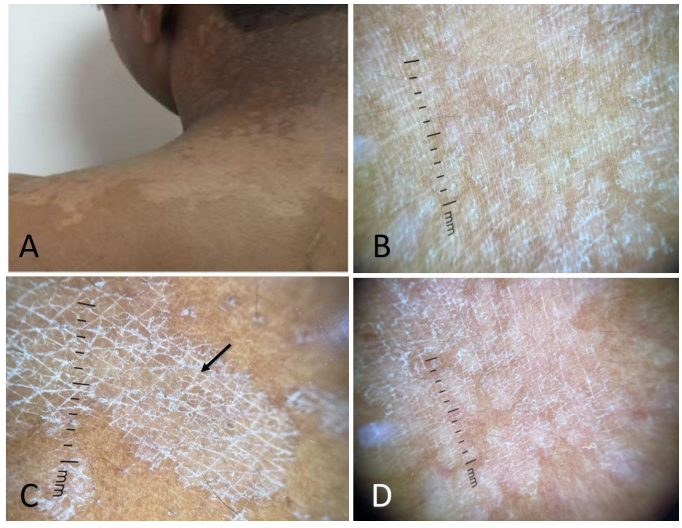


Figure 2. (A) Clinical image of Pityriasis versicolor, **(B-D)** Dermoscopy showing hypopigmented macules with decreased light brown pigment network. **(C)** Arrow showing double-edged scales localized to the skin furrows

and females. On dermoscopy hypopigmented macules with ill-defined margins with no clear demarcation from the surrounding area seen. Minimal white scales were observed (Figure 4).

Six patients were diagnosed with extragenital lichen sclerosus et atrophicus. All the patients were females. Duration of the disease was more than 6 months (average 1 to 2 years). Approximately 83.3% belonged to the 18 to 35 years age group, while 16.7% belong to the 35-55 years age group. All the patients presented with well-defined hypopigmented lesions with raised borders associated with symptoms of itching. Three patients had genital disease also. On dermoscopy, white structureless areas were seen in all the lesions. A pinkish white background was seen in 66.7% of the patients. Follicular plugs and telangiectasias were noted in all the lesions (Figure 5). Rosette appearance and peppered arrangement of grey-blue and brown globules were observed in 83.7% of cases.

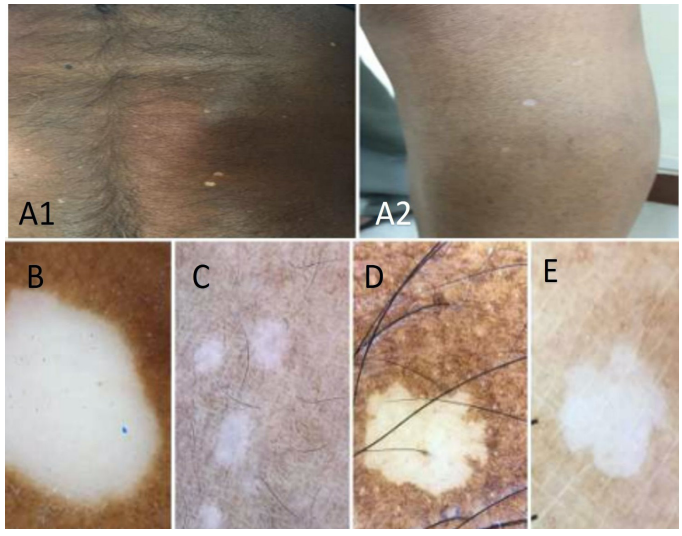


Figure 3. (A1, A2) Clinical image of idiopathic guttate hypomelanosis, dermoscopic features: **(B, C)** Nebuloid pattern with indistinct borders. **(D)** Amoeboid patches, **(E)** Petaloid borders

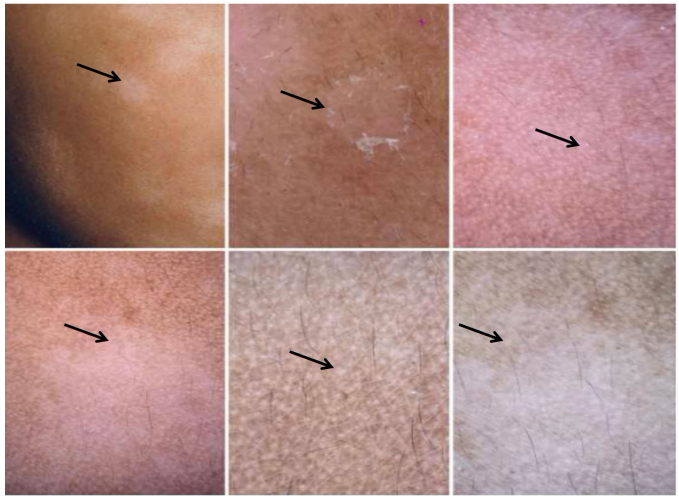


Figure 4. Pityriasis alba: Dermoscopy shows ill-demarcated white areas with minimal fine scales

Six patients were diagnosed with nevus depigmentosus. Nearly 66.7% were females while 33.3% were males. On dermoscopy, well-defined hypopigmented macules with feathery margins were noted. Decreased pigment network was seen in all cases. The brownish-white background was observed in 66.7% of the lesions.

Six patients were diagnosed with post-inflammatory hypopigmentation. The ratio of females was higher (66.7%) compared to males (33.3%). Patients had a history of thermal burns, trauma, or psoriasis. Dermoscopy showed hypopigmented macules with a decreased pigment network. White glow was seen in 33.3% of cases, perifollicular pigmentation in 33.3% of cases, peppered arrangement of grey-blue and brown globules in 16.7%, on pinkish-white background, and telangiectasia was noted in 1 patient. Minimal white scales were observed in one patient.

Progressive macular hypomelanosis was seen in 9 patients. Males were more affected (66.7%) than females (33.3%). Duration of the disease was more than 6 months in 55.6% of the patients. On dermoscopy, poorly defined hypopigmented macules with reduced pigment network (44.4%) were seen. Minimal white scales in the skin lines were seen in 77.7% of cases.

A total of 6 patients with polymorphous light eruption (PMLE) were studied. It is seen equally in males and females. On dermoscopy hypopigmented macules with white scales arranged in rings were seen against a brownish white background (Figure 6).

Two patients included in the study had hypopigmented patches of leprosy. They presented with well-defined patches with decreased sensation. The diagnoses were confirmed by histopathology. Dermoscopy showed hypopigmented macules with a distorted light

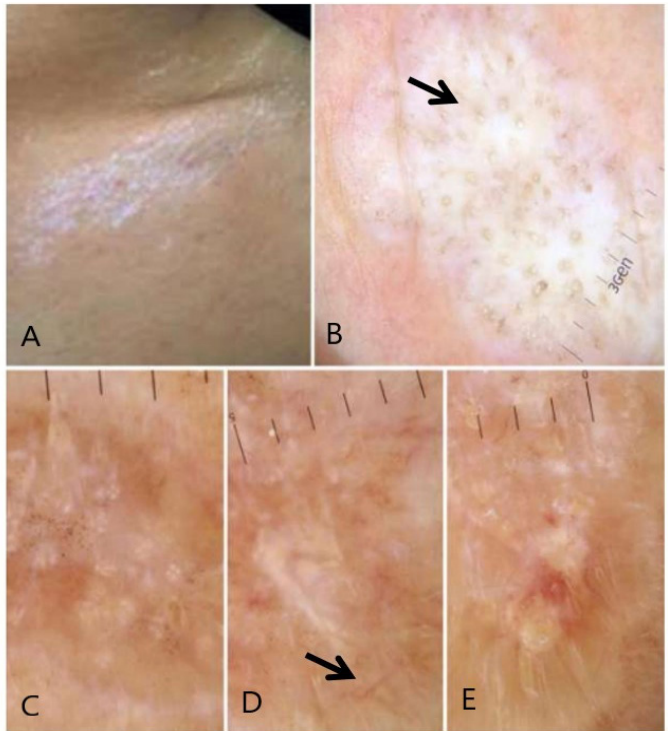


Figure 5. (A) Clinical image of lichen sclerosus et atrophicus. Dermoscopy of lichen sclerosus et atrophicus showing white structureless areas with follicular plugs [comedo-like openings **(B)**]. Note telangiectasis of different lengths **(C-E)**

brown pigment network with reduced eccrine and follicular openings, short broken hairs, v-shaped hairs, and pigtail hairs (Figure 7).

Four patients had contact or chemical leukoderma. Females are more (75%) compared to males (25%). Dermoscopy showed hypopigmented macules with blotchy erythema, grey granular dots, and a decreased pigmentary network.

Two patients were diagnosed with systemic sclerosis. Dermoscopy showed diffuse hypopigmentation with a peri follicular circular pseudo reticular hypopigmentation with a perifollicular halo (Figure 8).

Discussion

The vast majority of hypopigmentation seen are neither contagious nor dangerous, but they are a cause of fear, anxiety, and uncertainty to the patients[7]. They cause significant cosmetic, psychological, economic, and societal stress posing a significant challenge[8]. Even if some of these conditions can not be cured, diagnosis and understanding of the disease may provide some relief.

Dermoscopy of normal skin reveals a typical reticular pigmentary pattern that corresponds to pigmentation along rete ridges with pale areas corresponding to papillary dermis[9].

In our study 12 different types of hypopigmentation disorders were observed. Among all hypopigmentary disorders, vitiligo was seen more commonly. In a study by Al-Refu[10] on dermoscopy of hypopigmented macular diseases vitiligo was commonly observed.

In our study both stable and unstable cases were included, and findings are consistent with other studies like Al-Refu[10] and Kumar

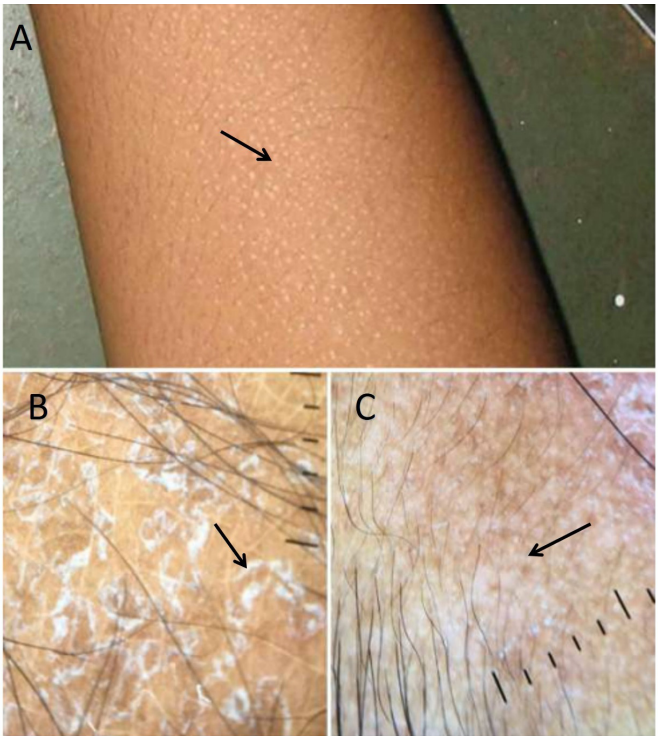


Figure 6. (A) Clinical image of PMLE. **(B, C)** Dermoscopy showing white scales arranged in the form of a ring of brownish white background

PMLE: Polymorphous light eruption

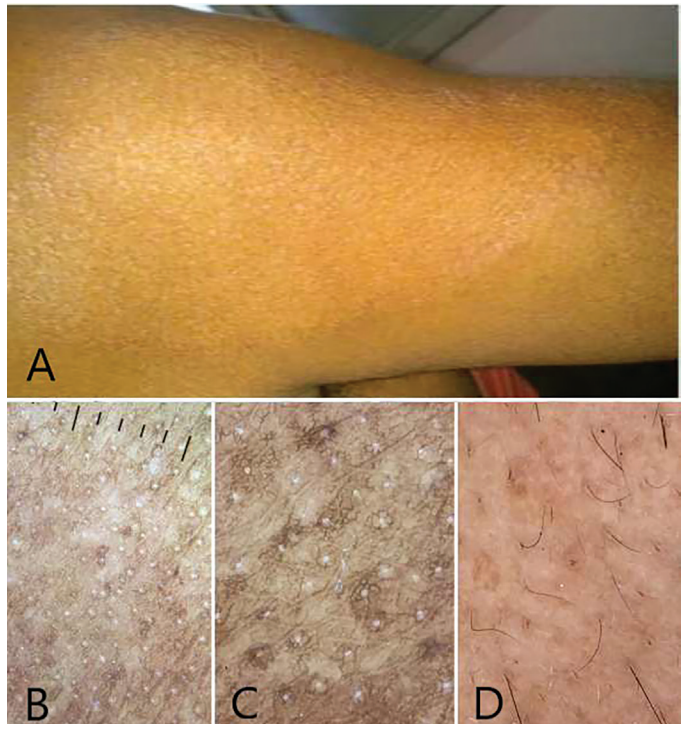


Figure 7. (A) Clinical image of Borderline Tuberculoid Hansen's disease, **(B-D)** Dermoscopy showing light brown pigment network with brownish white background, minimal white scales reduced eccrine and follicular openings, and short broken hairs

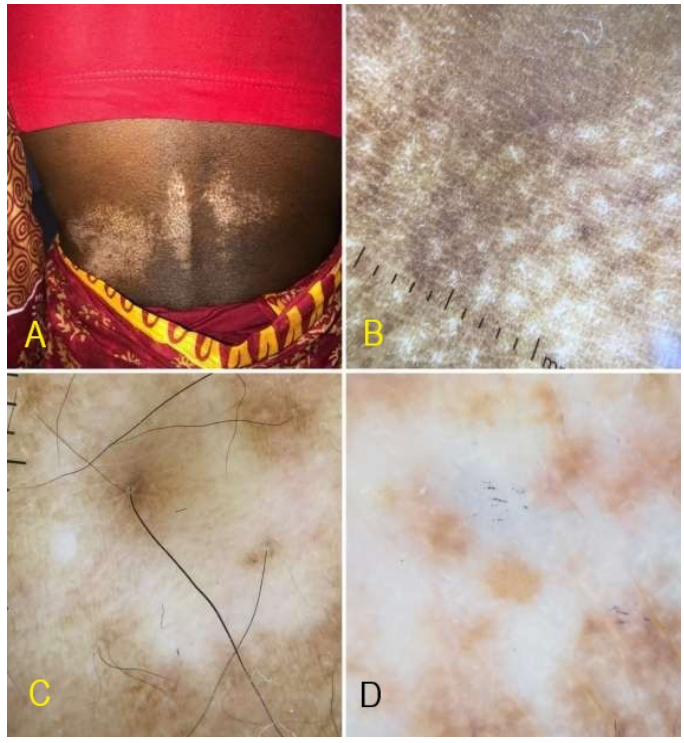


Figure 8. (A) Clinical image of depigmented macules of systemic sclerosis. **(B)** Dermoscopy showing depigmented macules with white glow, **(C)** perifollicular pigmentation, **(D)** absent pigmentary network

Jha et al.[11]. In this study, perifollicular pigmentation was present in 19.4% of vitiligo patients which shows they are in the early evolving stage of the disease. When early vitiligo lesion is compared to other hypopigmentary disorders the differentiating factor we observed is perifollicular pigmentation in a hypo/depigmented patch which is not seen in other conditions. Many studies have been done on dermoscopy of vitiligo. According to the literature, stable vitiligo is characterized by a sharp border, absent pigment network, and perilesional pigmentation. Unstable vitiligo is characterized by an ill-defined or trichrome border, reduced or reverse pigmentary network, perilesional and peri follicular depigmentation, satellite bodies, and starburst appearance. Chuh and Zawar[12] noted a pattern of depigmentation with residual reservoirs of perifollicular pigment signifying focally active or repigmenting vitiligo.

In Tinea versicolor, characteristic findings observed on dermoscopy were hypo-pigmented macules with white scales within the lesions and double-edged scales in the furrows which were on par with studies by Al-Refu[10], Kaur et al.[13] and Mathur et al.[14]. On dermoscopy, the characteristic differentiating point from other hypopigmented lesions is the presence of double-edged scales and scales that furrowed in the skin lines. This finding has been reported by Thomas and Malakar[15] and Ankad and Koti[16].

IGH is commonly seen in elderly patients and is characterized by hypopigmented or depigmented macules. IGH is usually a clinical diagnosis but when present at atypical sites dermoscopy comes of use. We observed four patterns in our study. Amoeboid and feathery patterns were noticed more in our study followed by nebuloid and petaloid. This may be due to the fact more lesions of IGH were of long-standing duration. Coalescing of hypopigmented macules with a background pigmentary network produced a cloudy sky pattern. In the literature, four patterns of IGH lesions were observed on dermoscopy. They are nebuloid, petaloid, feathery, and amoeboid[17,18].

Pityriasis alba is usually seen as dry, fine scaly pale patches on the face. We observed hypopigmented patches with ill-defined margins and fine scales. Similar findings were reported by Al-Refu[10] and Ankad and Koti[16]. In addition to the above findings, Al-Refu[10] observed erythematous changes within the patches which we did not find in our study.

Lichen sclerosus is a chronic inflammatory skin condition with sclerotic and atrophic lesions of the anogenital area and extra genital skin. In the early stages, diagnosis is clinical as it is difficult to diagnose by histopathology in the initial stages.

On dermoscopy of lichen sclerosus, we observed white structureless areas and comedo-like openings. Apart from this comma-shaped vessels, hairpin-like vessels, and dotted vessels are seen. In addition, blue-grey peppered dots and globules and white shiny streaks were also observed. White structureless areas correlate with epidermal atrophy whereas comedo-like openings represent follicular plugging. Similar findings were observed by Al-Refu[10], Jędrowiak et al.[19], Ankad and Beergouder[20] and Shim et al.[21].

Clinical criteria proposed by Coupe for Nevus depigmentosus are as follows: leucoderma present at birth or of early onset, no alteration in the distribution of leukoderma throughout life, no alteration in texture or change of sensation and absence of hyperpigmented border[22].On dermoscopy, we observed well-defined hypopigmented macules with feathery margins and a decreased pigment network against a brownish-white background. Findings were similar to Al-Refu[10], Malakar et al.[23] and Oiso and Kawada[24] noted serrated borders in their study.

PMLE is one of the most common photo dermatoses affecting sun-exposed areas. On dermoscopy of PMLE, we observed white-coloured circular scales arranged in the form of a ring on a light brown background. On histopathology, these ring scales correspond to the scale crust seen on the stratum corneum. Similar dermoscopic findings were observed in a case report on PMLE by Malakar and Mehta[25].

Leprosy is a chronic granulomatous disease caused by *Mycobacterium leprae*. Dermoscopic features of leprosy are characterized by reddish to violaceous structureless areas, telangiectatic vessels, follicular plugging, and reduced eccrine and follicular openings with minimal scales. It can be well differentiated from other depigmentary disorders due to the absence of skin appendages. Reddish to violaceous structureless areas correlate histopathologically to granulomatous changes. Very few studies have been done to evaluate the dermoscopic features in patients with leprosy[26].

Progressive macular hypomelanosis is characterized by numerous nummular hypopigmented macules that coalesce to form patches. It was first described in 1980 by Guillet et al.[27] on dermoscopy ill-defined whitish areas without scaling were observed on a brownish-white background. The pigmentary network was reduced. These findings were similar to the findings described in a symposium on progressive macular hypomelanosis by Ankad and Koti[16].

Post-inflammatory hypopigmentation is an acquired partial or total loss of skin pigmentation occurring after cutaneous inflammation. Errichetti et al noted the dermoscopy patterns of PIH resemble the original lesion[6]. In our study, we did not notice any dermoscopic signs similar to the original lesions.

Study Limitations

Chemical leukoderma is a hypopigmentation disorder resulting from contact dermatitis. On dermoscopy, we observed hypopigmented blotches on a brownish-white background with a decreased pigment network. However, in the literature, dermoscopy findings were blotchy erythema with decreased pigment network, linear irregular vessels, and gray granular dots[28].

Scleroderma is characterized by various cutaneous changes of which one is salt and pepper pigmentation. Dermoscopy of hypopigmented lesions reveals white homogenous areas with perifollicular pigmentation and Multiple regularly arranged brown dots around small white homogenous areas. Only a few case reports exist in the literature[29].

Conclusion

Dermoscopy is a non-invasive test, which can be used to confirm the diagnosis of hypopigmented skin lesions in correlation with history and clinical examination avoiding the need for a biopsy. Dermoscopy is also useful for assessing the activity and stability of diseases like vitiligo.

Ethics

Ethics Committee Approval: The approval of the Vydehi Institute of Medical Sciences and Research Center Ethics Committee was received (approval number: ECR/747/Inst/KA/2015, date: 09.11.2018).

Informed Consent: Informed consent was taken from the patients.

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