STUDY OF ACQUIRED FACIAL HYPERPIGMENTATION

Kunjumani Sobhanakumari[1], Celine Machiyanickal Issac[2], Anitha Ananthavally[3]

[1]Professor, Department of DVL, Government T. D. Medical College, Alappuzha.
[2]Assistant Professor, Department of DVL, Government Medical College, Kottayam.
[3]Consultant Dermatologist, Department of DVL, Government Hospital, Chengannur.

ABSTRACT

BACKGROUND

Facial hypermelanosis is a clinical feature of a diverse group of disorders most commonly in middle-aged females who are exposed to sunlight. There is a considerable overlap in clinical features among the clinical entities of facial hypermelanosis. Aetiology in most of facial melanosis is unknown, but some factors like UV radiation in melasma and exposure to allergens in Riehl's melanosis could be implicated. Histopathology is an accurate diagnostic tool. The benefit of histopathology is not only to confirm diagnosis, but also to exclude related disorders. Among the hyperpigmented conditions, melasma, Riehl's melanosis, Acanthosis Nigricans (AN) and Lichen Planus Pigmentosus (LPP) are the common causes of facial hypermelanosis - most common being melasma.

MATERIALS AND METHODS

This is a descriptive cross-sectional study of hundred consenting patients who attended the outpatient wing of Dermatology Department of Government Medical College, Kottayam. They were included only after getting the written informed consent.

RESULTS

Maximum number of patients were in the 5th decade. 65% were females. Homemakers/housewives constituted the main study group (34%).55% of patients had duration of pigmentation between 1 to 5 years. Among these, melasma and acanthosis nigricans had the longest duration of disease. 69% of patients were symptomatic. Most common clinical diagnosis was melasma (45) followed by acanthosis nigricans (17), Riehl's melanosis (15) and lichen planus pigmentosus (14). One case each of exogenous ochronosis and Addison's disease and remaining were post inflammatory. Histopathologically, 63% of patients had histological features suggestive of melasma, which evolved as the most common cause of facial melanosis, next common being acanthosis nigricans and Riehl's melanosis.

CONCLUSION

Clinical and histopathological examination is must to confirm the definite diagnosis of facial hyper-pigmentation. Skin is said to be the window to systemic diseases. So some of the pigmentation is diagnostic clue for the underlined systemic disorder or disease.

KEYWORDS

Acquired Facial Melanosis, Precipitating Factors, Histopathology.

HOW TO CITE THIS ARTICLE: Sobhanakumari K, Issac CM, Ananthavally A. Study of acquired facial hyperpigmentation. J. Evid. Based Med. Healthc. 2017; 4(34), 2026-2031. DOI: 10.18410/jebmh/2017/395

BACKGROUND

Acquired Facial Hyperpigmentation

There is great diversity in the colour of human skin across the globe. Acquired pigmentary disorders commonly affect Asians particularly Indians. Hyperpigmentation causes disfiguring lesions, which can significantly affect a person's psychological and social wellbeing contributing to lower productivity, social functioning and self-esteem especially the facial hyperpigmentation.[1] Hyperpigmentation is abnormal darkening of the skin, which typically results from increased melanin.[1] This may occur in the epidermis, dermis or mixed depending on the site of abnormality. Epidermal hyperpigmentation is due to increased melanin production by existing melanocyte or proliferation of active melanocytes (melanocyte hyperpigmentation). Melanophages, endogenous substances and exogenous chemicals are responsible for dermal hyperpigmentation.[2] Not only the dermatological diseases, but systemic disorders also produce facial hyperpigmentation. Correct diagnosis is essential for the effective management of hyperpigmentation. Examination of skin biopsy often serves as complementary or confirmative tool for diagnosis. As skin is said to be the window to systemic diseases, some of these cutaneous pigmentary disorders provide useful clues for the diagnosis of underlying internal diseases and in many instances may serve as disease severity marker or prognostic indicator. There are a few studies about the

Financial or Other, Competing Interest: None.
Submission 06-04-2017, Peer Review 10-04-2017,
Acceptance 24-04-2017, Published 25-04-2017.
Corresponding Author:
Dr. Kunjumani Sobhanakumari,
Professor, Department of DVL,
Government T. D. Medical College, Alappuzha.
E-mail: yemyessadeep@gmail.com
DOI: 10.18410/jebmh/2017/395

aetiopathogenesis of facial pigmentation. Diagnosing disease with exact aetiology, finding out the precipitating factors and providing the proper treatment are much useful for patients with this distressing problem.

MATERIALS AND METHODS

This descriptive cross-sectional study was conducted in the outpatient wing of Department of Dermatology, Government Medical College, Kottayam. Those who were willing to take part in the study were included after getting informed written consent. Data was entered using proforma. Detailed clinical history regarding the age, duration of the illness, occupation, exposure to sun light, use of drugs, cosmetics, medicated soaps, fairness creams, medicated oil, hair dye and turmeric or red sandalwood, details of alcohol consumption and family history of similar and systemic illness were obtained. General and systemic examination was also done. Relevant investigations were carried out to rule out associated illness when required. Skin biopsy was done from the face in all cases. Data was entered in to MS Excel and analysed using SPSS statistical software. Agreement between clinical and histopathological diagnosis by finding out the value of Kappa coefficient. Value of Kappa is the mean of agreement. Level of significance is 0.001.

RESULTS

This is a descriptive cross-sectional study of 100 consenting patients. The youngest patient was a 13-year-old female and the oldest was a 76-year-old male. The maximum number of patients were in the 5th decade (Figure 1).

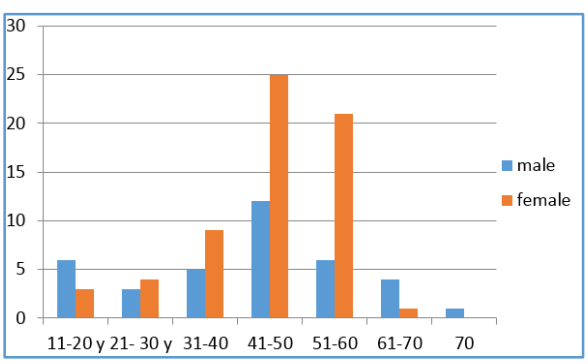

Figure 1. Age Distribution

There were 65 females and 35 males. Of the total of 100 patients, 34% were homemakers/housewives that were the main study group. Manual labourers with outdoor activities comprised the second largest group. Others (28%) were electricians, fishermen, coir workers, field workers, military personal and tailor. In this study, the duration of hypermelanosis ranged from 1 month to 20 years. 55% of patients had duration of pigmentation between 1 to 5 years. Among these, melasma and acanthosis nigricans had the longest duration of disease. 69% of patients were symptomatic. Symptoms were burning sensation, itching or both especially on sun exposure. 84% had history of exacerbation on sun exposure. The role of sunlight as an aggravating factor in many conditions especially melasma (69.09%) and Riehl's melanosis were noted in our study. History of cosmetic use was noted in 88% of study population. These include fairness cream, sandalwood powders, kumkum, bindi and herbal lighting agents like lime extract, leafy preparations and turmeric paste.

In our study, medicated oil use was noticed in 48% cases. Most commonly used medicated oil in our study was herbal oils made of henna or shoe flower. Use of psoralen-containing oils for scaling of scalp and itching is a common practice here.25% had the habit of using hair dye. Most common colour of facial melanosis in our study was brown (49%), which indicated an epidermal pigmentation, followed by black (41%). Morphology of pigmentation was macular, plaque or both (Table 1).

Morphology			
Types	**Males**	**Females**	**Total**
Macular	28	59	87
Plaque	6	6	12
Both	1	0	1
Total	**35**	**65**	**100**

Table 1. Morphology of Pigmentation

Pattern of Presentation

Four patterns of pigmentation were observed in our study of which the commonest was diffuse constituting 71%. Homogenous or uniform was the next common (25%). Patchy and speckled pattern were noticed in 2% each.

Clinical Diagnosis			
Clinical Diagnosis	**Males**	**Females**	**Total**
Melasma	11	34	45
LPP	3	11	14
Acanthosis nigricans	13	4	17
Riehl's melanosis	14	1	15
Erythema Dyschromicum Perstans(EDP)	0	2	2
Postinflammatory pigmentation(PIH)	1	3	4
Exogenous ochronosis	1	0	1
Others	1	1	2
Total	**44**	**56**	**100**

Table 2. Clinical Diagnosis

Clinically, there were light to dark brown patches with irregular borders. Three clinical patterns of melasma are recognised clinically. They are centofacial, malar and mandibular patterns. In our study, the commonest site involved was centrofacial area followed by malar (Table 2).

Total obese patients (BMI>30) in our study were 46%. 75% of cases in our study group with acanthosis nigricans were obese.

Melasma	63
LPP	7
Acanthosis nigricans	12
Riehl's melanosis	12
EDP	2
PIH	2
Exogenous ochronosis	1
Others	1
Total	**100**

Table 3. Histopathological Diagnosis

63% showed increase in epidermal melanin at all levels or increased pigmentation of basal layer or dermal melanin with or without mild perivascular lymphohistiocytic infiltration. These features were suggestive of melasma. (Table 3), (Figure 2).

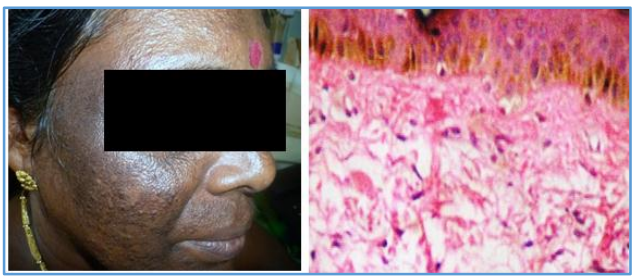

Figure 2. Melasma- Clinical and Histology

7% showed basal layer vacuolation, perivascular lymphocytic and variable band-like lichenoid lymphocytic infiltration abutting basal epidermis. Epidermis was normal, hyperkeratotic or atrophic. Late lesions showed melanophages in dermis. These features were suggestive of LPP.

12% showed epidermal atrophy, basal cell damage with liquefactive degeneration, perivascular or Lichenoid lymphocytic infiltration, numerous melanophages, basement membrane thickening and increasedbasal pigmentation. Features suggestive of Riehl's melanosis (Figure 3).

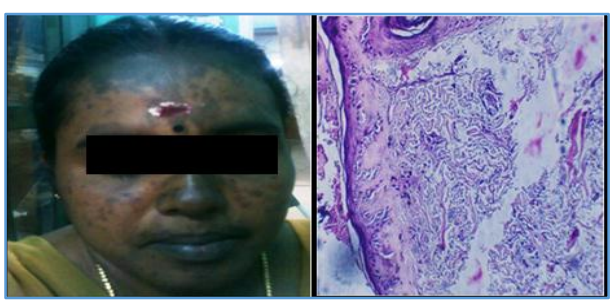

Figure 3. Riehl's Melanosis, Clinical and Histology

12% showed hyperkeratosis, papillomatosis, sparse perivascular lymphocytic infiltrate and some increase in basal pigmentation. One showed pseudohorn cyst. Features suggestive of acanthosis nigricans (Figure 4).

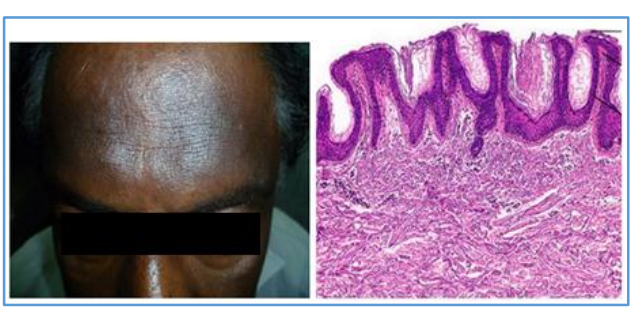

Figure 4. Acanthosis Nigricans, Clinical and Histology

2% showed increased basal pigmentation and upper dermal melanophages suggestive of PIH.

2% showed increased pigment in epidermis, macular degeneration of basal cells, pigment incontinence, melanophages and perivascular lymphohistiocytic infiltration suggestive of EDP.

The value of Kappa is a mean of agreement. Here, the kappa value was 0.535. According to this kappa value, there is moderate agreement between clinical and histopathological findings.

DISCUSSION

Acquired facial hyperpigmentation disorders are a heterogeneous group of disorders causing significant cosmetic disfigurement with subsequent emotional impact. This condition affects all races and is a common problem in India. There are several conditions, which causes facial melanosis. The common causes of facial hyperpigmentation include the following[3]

1. Melanotic hyperchromias (hyperpigmentation).

A. Hypermelanosis.
- Melasma.
- Lichen planus pigmentosus.
- Postinflammatory hyperpigmentation.
- Riehl's melanosis.
- Poikiloderma of Civatte.
- Berloque's dermatitis.
- Erythrosis pigmentosa peribuccalis of Brocq.
- Macular amyloidosis.
- Freckles (ephelides).
- Erythromelanosis follicularis facieiet colli.
- Periorbital melanosis and pigment demarcation line.
- Post chikungunya melanosis.
- Facial melanosis of systemic diseases.
  - Addison's disease.
  - Porphyria cutanea tarda.

B. Hypermelanocytosis.
- Epidermal lentigines.
- Dermal - Nevus of Ota, Hori's naevus.

2. Non-melanotic hyperchromias.
- Exogenous deposits - exogenous ochronosis, drugs, heavy metals (Ag, Au).
- Endogenous deposits - alkaptonuric ochronosis.

3. Mixed melanotic and non-melanotic hyperchromia.
- Haemochromatosis.
- Drugs.

4. Epidermal and stratum corneum alterations.
- Acanthosis nigricans.

Many conditions causing pigmentary disorders were encountered in our outpatient department was not included in our study due to their reluctance in taking biopsy from the face because of fear of disfigurement.

Females present at an early age maybe due to greater cosmetic concern. The sex ratio showed a female:male ratio of 1.86:1 (65:35) in our study. In an article by Ana Perez et al, it has been quoted that facial melanosis is common in middle-aged women because of the relation to endogenous (hormones) and exogenous (use of cosmetics and perfumes and exposure to sunlight) factors along with cosmetic disability, which maybe the reason for more number of females seeking medical advice.[4] Female predominance in our study also agree with this study.

The largest group in our study constituted by homemakers/housewives (34%) who are involved in both indoor and outdoor activities, the next common group was manual labourers (11%) with mainly outdoor activity and thereby increased sun exposure. In a similar study by Hassan et al, housewives were the predominant group (22.59%).[5]

We observed 8 different types of acquired melanosis in this study group. They were melasma, Riehl's melanosis, AN, LPP, EDP, PIH, exogenous ochronosis andAddison's disease.

Melasma was the most common acquired facial hypermelanosis in our study consisting 63% of cases. 66.66% were females. Arun Acharand Hassan et al noted 19.87% and 19.4% of males respectively in their studies.[6,5]

The exact pathogenesis of melisma is unknown. Two groups of factors seem to operate- 1) Endogenous factors, most important is genetic predisposition and cutaneous vasculature and 2) Exogenous stimuli, which include sex hormones and ultraviolet irradiation.[7] The major aetiological factors implicated in the causation of melasma act in concert. Suzuki et al reported that UVR release interleukin-1, endothelin, inducible nitric oxide synthase, peptides like MSH and ACTH from keratinocytes. These stimulate melanocyte proliferation and melanin synthesis via stimulation of tyrosinase activity and tyrosinase-related protein-1 (TRP-1).[8,9] Complex cellular interactions and interplay of many cytokines and hormones contribute to the effect of UVR in pathogenesis of melasma. The involvement of keratinocytes, dermal fibroblasts and cutaneous vasculature are postulated recently.[10] Kang et al have reported a significant increase in expression of stem cell factor and C-kitfrom fibroblasts of melasma lesions.[11]The fibroblast derived cytokines stimulates the proliferation and melanogenesis of melanocytes.

About 69.09% of our patients with melasma described sunexposure as triggering factor, almost similar to previous study by Hassan et al (65.75%).[5] In 62%, there was a history of application of various cosmetic creams available over the counter. Use of fairness cream is very common in India, and in our study, it constituted 46%. Association of melasma with cosmetic products have also been reported by Achar.[6] The presence of photosensitising agents, bleaching agents and herbal preparations in these creams contribute to facial hyperpigmentation. Other cosmetic accessories like hair dye (80%), medicated oil (60.4%), turmeric and/red sandalwood paste (57.14%) use also was noted in our study. Study by Sanchez et al suggest that development of melasma may be triggered by ingredients in cosmetics.[12] Only 13% of our patients had the habit of using perfumes. Perfumes contain psoralens, which produces photo sensitisation and thereby hyperpigmentation. Since the number is small, a definite association cannot be made out. In our study, 6.3% of melasma patients were having hypothyroidism. Hassan et al noted thyroid dysfunction in 10.95% cases.[5] No other systemic illness was having a relevant association.

Centofacial, malar and mandibular are the three patterns of melasma. Centofacial is the most common that involves the forehead, cheeks, upper lip, nose and chin. The malar involves the cheeks and nose and the mandibular involving the ramus of the mandible. In our study, centofacial area was most commonly involved (58%) and malar area alone was noted only in 7% of patients. Hassan et al noted centofacial involvement in 50.68%.[5]

Macular type of pigmentation was seen in all 63 patients with melasma in our study. The most common pattern was diffuse, seen in 45 patients. In Hassan et al study, only 14 out of 73 cases of melasma had diffuse pigmentation.[5] There was no relevant history of the use of oral contraceptive pills. A positive family history was observed in 70.5% in the present study, which is in concordance with an earlier reported study by Katsambas et al.[13]

Melasma can be differentiated into epidermal, dermal and mixed types. The diagnosis of melasma is usually made on clinical picture alone. But, there are many pigmentary disorders that clinically mimic melasma, so the distinction between them invariably requires a histopathological evaluation and subsequent clinical correlation.

Recent histopathology-based studies on melasma have found an increased epidermal melanin in almost all cases of melasma with or without an increase in dermal pigment and thus refuting the existence of pure dermal melasma.[14,15] Increased epidermal melanin is the key feature at all levels including stratum corneum, but is more pronounced in basal layers.[12,14,15] Melanin granules are seen as caps over keratinocytic nuclei.[6] Dermal melanin is variably present in melanophages or as free form in perivascular area in upper dermis.[14,15] Melanin is better appreciated by using Masson-Fontana stain. Epidermis shows mildly flattened rete ridges.[14] Mild perivascular lymphohistiocytic inflammation maybe seen in superficial dermis.[12,14,15]

Histopathologically, there were 63 cases of melasma in our study. Among 45 clinically-diagnosed melasma, 44 were confirmed histopathologically and the remaining one showed histological features of Riehl's melanosis. Rest of the cases with histopathological evidence of melasma were due to other causes.

Acanthosis nigricans and Riehl's melanosis were the second most common causes of facial melanosis constituting 12% each after pathological study. All patients with Riehl's melanosis in our study had history of cosmetic use in the form of whitening creams, medicated oil, hair dye, turmeric and red sandalwood paste. Riehl's melanosis is considered as a pigmented contact dermatitis to allergens present in cosmetics, fragrances and kumkum.[16,17] Pigmentation varies depending upon the causative agent. It presents as patches of brown, grey-brown or with red or blue hues on forehead, scalp, face and neck, which are usually preceded by mild erythema and pruritus. Henna application has been implicated in

some. Histopathology shows an interface dermatitis or perivascular lymphocytic infiltrate with basal cell vacuolisation.[18]

Facial lesions of AN involve cheeks, forehead and sulcus mentolabialis.[19] Histopathological features include hyperkeratosis papillomatosis seen as finger-like dermal projections covered by thin epidermis forming peaks and valleys. Occasionally, pseudohorn cyst are seen. 75% of acanthosis nigricans were obese in this study. Diabetes mellitus was seen in 33.33% of patients. In our study, out of 4 female patients with AN, 3 were having hirsutism. Findings of Riehl's melanosis were in concordance with Hassan etal study, whereas he noted only one case AN among 168 facial hyperpigmentation.

Lichen planus pigmentosus is a macular variant of lichen planus reported mostly from the Indian subcontinent and the Middle East.[20,21] It constituted 7% of patients in our study. Bhutani et al reported4.1% in their study.[20]In our study, the pigmentation varied between blue-black to slate grey and rarely brownish-black. The forehead, temple and bridge of nose were the commonest sites involved. 43% of our patients had an association of classical Lichen planus. Similar observations and associations were reported by Bhutanietal.[20] Aetiology for LPP is unknown. Photo distribution suggests that UV radiation may play a pathogenic role.[5] Kanwar et al examined 65 skin biopsies of LPP noticed basal cell vacuolisation in 78.5%, dermal melanophages in 63% and perivascular infiltrate in 81.5% of cases.[21]

EDP, PIH, exogenous ochronosis and Addisonian pigmentation was the other causes of pigmentation. Male patient with exogenous ochronosis had been using hydroquinone for the last 10 years. Histopathology was suggestive of exogenous ochronosis, but we were not able to demonstrate ochre bodies/banana bodies.

63% of patients in our study had histological features suggestive of melasma, which evolved as the most common cause of facial melanosis, next common being acanthosis nigricans and Riehl'smelanosis.

CONCLUSION

Facial pigmentation is distressing for both males and females of all age groups. Some of the conditions are over diagnosed and many are underdiagnosed, if we rely on clinical diagnosis alone. Treatment of these conditions are still challenging. So, it is important to have a comprehensive understanding and knowledge about the clinical and histopathological features of acquired facial melanosis.

ACKNOWLEDGEMENT

We are extremely thankful to Pathology Department, Government Medical College, Kottayam.

REFERENCES

[1] Cayce AK, Feldman RS, McMichael AJ**.** Hyperpigmentation: a review of common treatment options. J Drugs Dermatol 2004;3(6):668-673.

[2] Dhar S, Dutta P, Malakar R. Pigmentary disorders. In: Valia RG, Valia AR, eds. IADVL textbook of dermatology.3rd edn. Mumbai: Bhalani 2010:736-791.

[3] Lahiri K, Chatterjee M, Sarkar R. Pigmentary disorders: a comprehensive compendium. 1st edn. New Delhi: Jaypee Brothers Medical Publishers2014:288.

[4] Perez-Bernal A, Munoz-Perez MA, Camacho F. Management of facial hyperpigmentation. Am J Clin Dermatol 2000;1(5):261-268.

[5] Hassan I, Aleem S, Jabeen Y, et al. A clinico-epidemiological study of facial melanosis. Pigment Int J 2015;2(1):34-40.

[6] Achar A, Rathi SK. Melasma: a clinico-epidemiological study of 312 cases. Indian J Dermatol 2011;56(4):380-382.

[7] Goh CL, Dlova CN. Aretrospective study on the clinical presentation and treatment outcome of melasma in a tertiary dermatological referral center in Singapore Singapore Med J 1999;40(7):455-458.

[8] Suzuki I, Kator T, Motokawa T, et al. Increase of proopiomelanocortin mRNA prior to tyrosinase, tyrosinase-related protein 1, dopachrome tautormerase, Pmel-17/gp100, and P-protein mRNA in human skin after ultraviolet B irradiation. J Invest Dermatol 2002;118(1):73-78.

[9] Jo HY, Kim Ck, Suh IB, et al. Co-localization of inducible nitric oxide synthase and phosphorylated Akt in the lesional skins of patients with melasma. J Dermatol 2009;36(1):10-16.

[10] Kang HY, Ortonne JP. What should be considered in treatment of melasma. Ann Dermatol 2010;22(4):373-378.

[11] Kang HY, Hwang JS, Lee JY, et al. The dermal stem cell factor and C-kit are overexpressed in melasma. Br J Dermatol 2006;154(6):1094-1099.

[12] Sanchez NP, Pathak MA, Sato S, et al. Melasma: a clinical, light microscopic, ultrastructural and immunofluorescence study. J Am Acad Dermatol 1981;4(6):698-710.

[13] Katsambas A, Antoniou C. Melasma: classification and treatment. J Eur Acad Dermatol Venereol1995;4:217-223.

[14] Kang WH, Yoon KH, Lee ES, et al. Melasma: histopathological characteristics in 56 Korean patients. Br J Dermatol 2002;146(2):228-237.

[15] Grimes PE, Yamada N, Bhawan J. Light microscopic, immunohistochemical, and ultrastructural alterations in patients with melasma. Am J Dermatopathol 2005;27(2):96-101.

[16] Nakayama H, Harada R, Toda M. Pigmented cosmetic dermatitis. Int J Dermatol 1976;15(9):673-675.

[17] Nath AK, Thappa DM. Kumkum-induced dermatitis: an analysis of 46 cases. Clin Exp Dermatol 2007;32(4):385-387.

[18] Shenoi SD, Rao R. Pigmented contact dermatitis. Indian J Dermatol Venereol Leprol 2007;73(5):285-287.

[19] Barabash-Neila R, Freire L R, Zulueta-Dorado T, et al. Thickening of the skin on the forehead: a quiz. Acanthosisnigricans with forehead location. Acta Derm Venereol 2011;91(1):108-110.

[20] Bhutani LK, Bedi TR, Pandhi RK, et al. Lichen planus pigmentosus. Dermatologica 1974; 149(1):43-50.

[21] Kanwar AJ, Dogra S, Handa S, et al. A study of 124 Indian patients with lichen planus pigmentosus. Clin Exp Dermatol 2003;28(5):481-485.