Original Article

DOI: 10.7860/JCDR/2023/64322.18680

Dermatology Section

Clinicodermoscopic Study of Idiopathic Guttate Hypomelanosis at a Tertiary Care Hospital in Central India

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ABSTRACT

Introduction: Depigmented skin lesions are commonly encountered in day-to-day practice and can cause significant social stigma. They are challenging to diagnose clinically and histopathologically. Idiopathic Guttate Hypomelanosis (IGH), a pigmentary condition commonly affecting older individuals, can lead to cosmetic deformity and have a significant psychological impact. Dermoscopic evaluation offers a quick and easy way to resolve diagnostic confusion and prevent unnecessary biopsies.

Aim: To study the clinical and dermoscopic features of IGH.

Materials and Methods: This cross-sectional observational study was conducted in the Department of Dermatology, Venereology, and Leprosy at Chirayu Medical College and Hospital, Bhopal, Madhya Pradesh, India from July 2021 to June 2022. A total of 180 patients with IGH lesions underwent a detailed clinical history, dermatological and systemic examinations, followed by dermoscopic examination. The collected data were statistically analysed using Statistical Package for Social Sciences (SPSS) version 20.0, and the results were tabulated in terms of distribution, frequency, and mean±Standard Deviation (±SD).

Results: Among the 180 patients, the most affected age group was 51-60 years. A total of 108 (60%) were females and 72 (40%) were males. The most common site of involvement was the distal part of the lower extremity in 152 (84.4%) cases, followed by the distal part of the upper extremity in 115 (63.8%) cases. A total of 46 (25.5%) patients had a history of excessive sun exposure. Additionally, 21 (11.6%) patients had other associated features of photoaging, such as xerosis, solar lentigo, seborrhoeic keratosis, freckles, and actinic keratosis. The most common dermoscopic pattern observed was amoeboid in 103 (57.2%) patients, followed by feathery in 41 (22.7%), petaloid in 23 (12.7%), nebuloid in 13 (7.2%), and a combination of patterns in six percent of patients.

Conclusion: The IGH was more common in females and older age groups, with the distal parts of the lower extremity being the most frequently involved site. Excessive sun exposure was a common risk factor for IGH, and several patients may have associated signs of photoaging. The most common dermoscopic pattern observed was amoeboid. Therefore, clinical dermoscopic examination can be helpful in identifying IGH and differentiating it from other depigmented lesions.

Keywords: Acquired leukoderma, Geriatric patient, Leukopathy, Lower extremity, Photoaging, Senile degeneration

INTRODUCTION

The IGH, also known as Disseminate Lenticular Leukoderma, was first described by Costa OG [1] in 1951 as "symmetric progressive leukopathy of the extremities." The term was coined by Cummings KI and Cottel WI [2]. It is a benign acquired leukoderma with an unknown aetiopathogenesis. However, several factors have been proposed as possible triggers, including senile degeneration, sunlight exposure, microtrauma, and genetics. The lesions are discrete round to oval porcelain-white macules, measuring 3-5 mm, commonly found on the extremities of older individuals. These macules exhibit reduced amounts of melanin and a decreased number of melanocytes. Once present, these lesions do not grow, although the number of lesions may increase [3]. While it has been hypothesised to be Ultraviolet (UV)-induced, controversy exists. IGH is a common skin condition seen in day-to-day practice and causes significant cosmetic concern for patients, especially females [4]. It affects all ethnic groups, but individuals with darker skin tend to notice it more. Caucasians, particularly those with brown eyes and hair, are more likely to experience IGH [5]. In India, its incidence is approximately 20% in individuals below 30 years of age and rises to 80% in patients older than 70 years [6].

The IGH has been associated with the following three variations: solitary or multiple hypopigmented macules on a background of sun-damaged skin in sun-exposed areas; solitary ivory white, stellate, well-circumscribed, sclerotic macules related to sun exposure; and small well-circumscribed hypopigmented macules with a keratotic flat crust and a scalloped border [5]. Due to IGH's preference for sun-exposed locations, sunlight has been considered an important factor in its development. It has been observed that IGH can develop on the skin even after phototherapy (psoralen and UVA monotherapy or narrowband UVB) or co-exist with symptoms of photoaging, such as xerosis and lentigines, even in young people [7]. The sporadic incidence of IGH in children and photoprotected locations has raised questions about the significance of genetic factors. IGH has a positive correlation with human leukocyte antigen-DQ3 and a negative correlation with human leukocyte antigen-DR8, according to a study conducted on a subset of renal transplant patients. Additionally, individuals with a family history of IGH are more likely to experience this disorder [8]. It has also been proposed that oxidative stress plays a part in the development of IGH [9].

One of its close differentials is guttate vitiligo, which can potentially stigmatise individuals in the community [10]. Other differentials include Lichen sclerosus et atrophicus, Pityriasis versicolour, Leprosy, Pityriasis alba, Ash leaf macule, and various depigmented nevi. Sometimes, clinicians find it difficult to differentiate these hypopigmented lesions.

The clinical appearance of IGH is often nonspecific and can be confused with other hypopigmented skin lesions. Dermoscopy is a new emerging non-invasive tool that simplifies detection by visualising various patterns distinctive for specific conditions [11,12]. Thus, it has the potential to improve diagnostic precision. Therefore, the present study aimed to establish the clinical and dermoscopic presentations of IGH and distinguish it from other hypopigmented

lesions. Moreover, it is the first study from Central India to identify the dermoscopic features of IGH. The study findings will contribute to the existing knowledge of this condition and serve as a reference for future studies on IGH.

MATERIALS AND METHODS

This observational cross-sectional study was conducted in the Department of Dermatology, Venereology, and Leprosy at Chirayu Medical College and Hospital, Bhopal, Madhya Pradesh, India, from July 2021 to June 2022, after obtaining approval from the Institutional Ethical Committee (CMCH/EC/2021/29).

Sample size calculation: The sample size calculation was performed using WINPEPI [13] with a confidence interval of 95% and a maximum acceptable difference of 7% [14], resulting in a sample size of 180.

Inclusion criteria: All patients with clinically diagnosed lesions of IGH, regardless of age and gender, who were willing to provide written informed consent, were included in the study.

Exclusion criteria: Patients with co-existing hypopigmented lesions, chronic skin conditions, active infection around the lesions, severe illness or debilitation, and those who were currently receiving or had received prior treatment were excluded from the study.

Study Procedure

After obtaining written informed consent, all patients with IGH lesions underwent a detailed clinical history, dermatological and systemic examinations, and bedside tests. Demographic details, skin type, history of sun exposure, onset, duration, and progression of lesions, morphology of lesions, distribution of lesions, associated features of photoaging, and Wood's lamp examination were documented using a prestructured proforma. Dermoscopic examination was performed using the Dinolite Premier Digital Microscope AM4113ZT with polarised light, and findings were captured using the Dinocapture 2.0 software on a Lenovo IdeaPad 310 Laptop for analysis. Skin scrapings were examined using a 10% potassium hydroxide mount, and histopathological examination was performed as required. The relationship between the patient's age, duration of the skin lesion, and different dermoscopic patterns of IGH was analysed. Photographs were taken with the patient's consent, ensuring that their identity would not be revealed and confidentiality would be maintained at all levels.

STATISTICAL ANALYSIS

The collected data were tabulated and statistically analysed using SPSS version 20.0. The results were described in terms of distribution, frequency, and mean±Standard Deviation (±SD).

RESULTS

A total of 180 patients were enrolled, with age groups ranging from 31 to 90 years. The mean age was 57.82 years, and the most common age group was 51-60 years, with 75 (41.6%) cases, followed by 61-70 years, with 60 (33.3%) cases [Table/Fig-1]. Females were more commonly affected compared to males, with a male-to-female ratio of 2:3.

Age group range (in years)	Frequency of patients with IGH
31-40	12 (6.6%)
41-50	20 (11.1%)
51-60	75 (41.6%)
61-70	60 (33.3%)
71-80	7 (3.8%)
81-90	6 (3.3%)

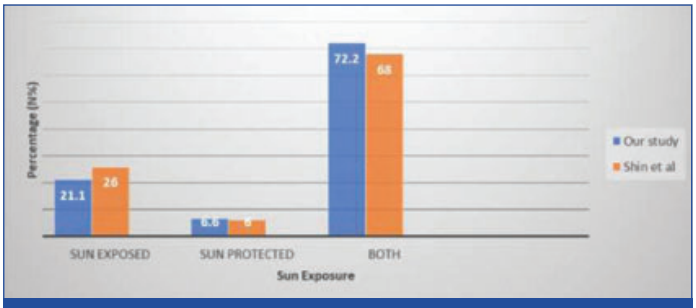
[Table/Fig-1]: Age-wise distribution of patients affected with Idiopathic Guttate Hypomelanosis (IGH).

The most common Fitzpatrick skin type found was type 4 in 126 (70%) patients, followed by type 5 and type 3 in 31 (17.2%) and 23 (12.7%) patients, respectively. A total of 46 patients (25.5%) had a history of excessive sun exposure. The most common site of involvement was the distal part of the lower extremity in 152 (84.4%) patients, followed by the distal part of the upper extremity in 115 (63.8%) patients [Table/Fig-2].

Site	Number of patients, n (%)
Lower limb (distal)	152 (84.44%)
Upper limb (distal)	115 (63.88%)
Upper limb (proximal)	38 (21.11%)
Trunk	32 (17.77%)
Lower limb (proximal)	13 (7.20%)

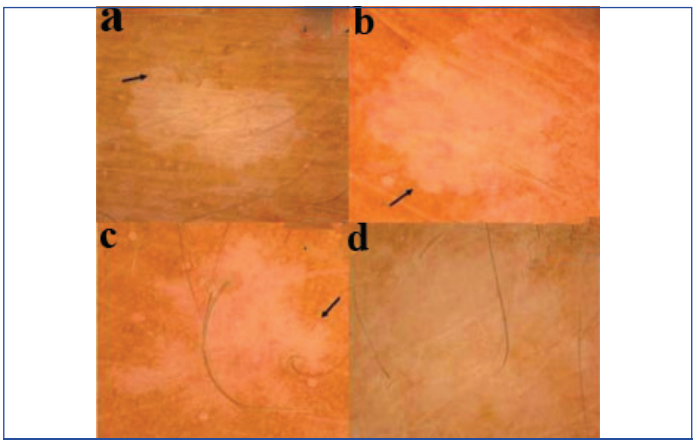
[Table/Fig-2]: Site-wise distribution of Idiopathic Guttate Hypomelanosis (IGH) lesions.

Overall, 130 patients (72.2%) had IGH lesions over both sun-exposed and sun-protected areas, 38 (21.1%) had lesions only over sun-exposed areas, and 12 (6.6%) had lesions only over sun-protected areas [Table/Fig-3]. A total of 21 patients (11.6%) had other features of photoaging, such as xerosis, solar lentigo, seborrhoeic keratosis, freckles, and actinic keratosis.

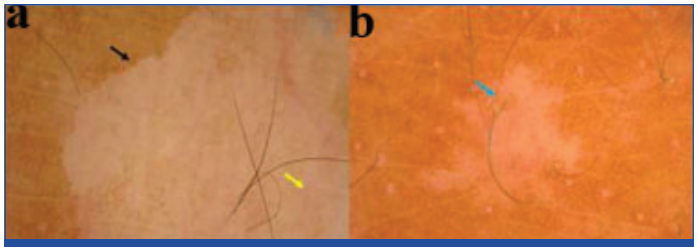


[Table/Fig-3]: Distribution of lesions based on sun exposure.

All lesions were between 2-6 mm in size, with the number of lesions varying from a few (1-5), many (6-30), to innumerable (>30) in 18 (10%), 93 (51.7%), and 69 (38.3%) patients, respectively. Lesions were stable in size but increased in number in 18 (10%) patients. The most common dermoscopic pattern observed was amoeboid in 103 (57.2%) patients, followed by feathery in 41 (22.7%), petaloid in 23 (12.7%), and nebuloid in 13 (7.2%) cases [Table/Fig-4a-d]. Six percent of patients had combination patterns. Perilesional and perifollicular pigmentation were found in 47 (26.1%) and 32 (17.7%) cases, respectively, while 14 (7.7%) cases showed linear vessels [Table/Fig-5a-b]. The age of the patient and the duration of the skin lesion with different patterns of IGH lesions have been depicted in [Table/Fig-6]. The feathery pattern was observed in smaller age groups (51.6±10.4 years) and with a longer duration of skin lesions (7.6±3.5 years), while nebuloid was seen in older age groups (54.2±12.3) and with a shorter duration of skin lesions (4.1±2.8 years).



[Table/Fig-4]: Dermoscopic patterns of IGH showing: (a) Amoeboid pattern; (b) Petalloid pattern; (c) Feathery pattern; (d) Nebuloid pattern.

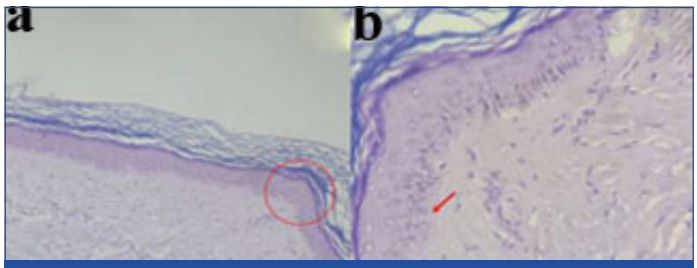


[Table/Fig-5]: Dermoscopy of IGH showing: (a) Perilesional pigmentation (black arrow) and Linear blood vessels (yellow arrow); (b) Perifollicular pigmentation.

Parametres	Amoeboid	Feathery	Petaloid	Nebuloid
Age (in years)				
Mean±SD	52.3±10.6	51.6±10.4	53.4±14.6	54.2±12.3
Min	36	33	38	54
Max	78	70	82	85
Range	42	37	44	31
Duration (in years)				
Mean±SD	6.8±4.2	7.6±3.5	5.3±4.7	4.1±2.8
Min	1	1	1	1
Max	16	20	18	10
Range	15	19	17	9

[Table/Fig-6]: Relation between age of the patient and duration of the skin lesion with different dermoscopic pattern of Idiopathic Guttate Hypomelanosis (IGH).

Twelve (6.66%) patients underwent a histopathological examination {Haematoxylin and Eosin (H&E)}, which showed a flat and atrophic epidermis with loss of rete and basket wave stratum corneum. There was decreased melanin in the basal layer, with melanin granules irregularly distributed within the hypomelanotic epidermis. Mild elastotic changes were seen in the upper dermis in lesions over exposed areas as a part of the photoaging process [Table/Fig-7].



[Table/Fig-7]: Histopathology of IGH showing: (a) Atrophic epidermis with loss of rete and basket wave stratum corneum, and mild elastotic changes in upper dermis (H&E 10X); (b) loss of melanin in basal layer (red arrow) (H&E 40X).

DISCUSSION

A total of 180 patients were enrolled, ranging in age from 31 to 90 years. The mean age was 57.82 years, with the most common age group being 51-60 years in 75 (41.6%) cases, followed by 61-70 years in 60 (33.3%) cases [Table/Fig-1]. Females were more commonly affected than males, with a male-to-female ratio of 2:3. The most common Fitzpatrick skin type found was type 4 in 126 (70%) patients, followed by type 5 and type 3 in 31 (17.2%) and 23 (12.7%) patients, respectively. A total of 46 patients (25.5%) had a history of excessive sun exposure. The most common site of involvement was the distal part of the lower extremity in 152 (84.4%) patients, followed by the distal part of the upper extremity in 115 (63.8%) patients [Table/Fig-2].

Overall, 130 patients (72.2%) had IGH lesions over both sun-exposed and sun-protected areas, 38 (21.1%) had lesions only over sun-exposed areas, and 12 (6.6%) had lesions only over sun-protected areas [Table/Fig-3]. A total of 21 patients (11.6%) had other features of photoaging, such as xerosis, solar lentigo, seborrhoeic keratosis, freckles, and actinic keratosis. All lesions were between 2-6 mm in size, with the number of lesions varying from a few (1-5), many (6-30), to innumerable (>30) in 18 (10%), 93 (51.7%), and 69 (38.3%) patients, respectively. Lesions were stable in size but increased in number in 18 (10%) patients.

The most common dermoscopic pattern observed was amoeboid in 103 (57.2%) patients, followed by feathery in 41 (22.7%), petaloid in 23 (12.7%), and nebuloid in 13 (7.2%) cases [Table/Fig-4]. Six percent of patients had combination patterns. Perilesional and perifollicular pigmentation were found in 47 (26.1%) and 32 (17.7%) cases, respectively, while 14 (7.7%) cases showed linear vessels [Table/Fig-5]. The age of the patient and the duration of the skin lesion with different patterns of IGH lesions have been depicted in [Table/Fig-6]. The feathery pattern was observed in smaller age groups (51.6±10.4 years) and with a longer duration of skin lesions (7.6±3.5 years), while nebuloid was seen in older age groups (54.2±12.3 years) and with a shorter duration of skin lesions (4.1±2.8 years).

A total of 12 (6.66%) patients underwent histopathological examination, which showed a flat and atrophic epidermis with loss of rete and basket wave stratum corneum. There was decreased melanin in the basal layer, with irregularly distributed melanin granules within the hypomelanotic epidermis. Mild elastotic changes were seen in the upper dermis in lesions over exposed areas as part of the photoaging process [Table/Fig-7].

The IGH is primarily diagnosed clinically based on a patient's medical history and physical examination. Dermoscopy is a newer modality used nowadays to increase the diagnostic precision of clinicians. The present study was conducted on 180 patients, with 75 (41.6%) in the age group of 51-60 years being the most commonly affected. Females 108 (60%) outnumbered males 72 (40%). The distal part of the lower extremity 152 (84.4%) was the most involved site, followed by the distal part of the upper extremity 115 (63.8%). A total of 46 (25.5%) patients had a history of excessive sun exposure. Additionally, 21 (11.6%) patients had associated features of photoaging such as xerosis, solar lentigo, seborrhoeic keratosis, freckles, and actinic keratosis. The most common dermoscopic pattern observed was amoeboid 103 (57.2%), followed by feathery 41 (22.7%), petaloid 23 (12.7%), and nebuloid 13 (7.2%). Six percent of patients had combination patterns.

In the present study, older patients (above 50 years) were more commonly affected, reflecting that IGH is part of the normal aging process. Females were found to be affected more than males, possibly because females are more concerned about cosmetic disfigurement. This increasing prevalence with aging and female preponderance is consistent with other studies [7,11,15,16].

The most common site of involvement was the distal part of the lower extremity, followed by the distal part of the upper extremity, which is similar to the findings of other studies [7,11,15]. Some studies reported cases affecting the face and neck area, whereas the present study did not find many cases in those areas [7,15]. Additionally, 11.6% of IGH cases in the present study had associated features of photoaging, similar to the positive association found in other studies, especially in those with lesions over the face and neck area [7]. These findings suggest that UV light may play a role in the occurrence of IGH lesions.

In dermoscopy, IGH shows a diffuse white structureless area in the center with four different patterns in the periphery. The most common pattern is amoeboid (103, 57.2%), followed by feathery (41, 22.7%), petaloid (23, 12.7%), and nebuloid (13, 7.2%). The amoeboid pattern is characterised by the lesion extending peripherally into normal skin as pseudopods. The feathery pattern describes the extension of the border in a feather-like manner, while the petaloid pattern has well-defined flower petal-like borders. The nebuloid pattern is characterised by ill-defined borders. Similar to the present study, other studies reported amoeboid as the most common pattern and nebuloid as the least common [11,16]. The feathery pattern was more commonly seen in younger individuals, while the nebuloid pattern was more common in older individuals [11,16]. The nebuloid pattern is considered to be of recent onset, while older

IGH lesions demonstrate amoeboid, feathery, or petaloid patterns. Occasionally, perifollicular and perilesional pigmentation and linear vessels can be seen in the lesion. In the present study, 32 cases (17.7%) showed perifollicular pigmentation, 47 cases (26.1%) had perilesional pigmentation, and linear vessels were found in 14 cases (7.7%) [11]. Some authors have described two additional dermoscopic patterns in IGH: the cloudy sky-like pattern, characterised by multiple small irregular or polycyclic macules with both well and ill-defined edges, surrounded by a patchy hyperpigmented network, and the cloudy pattern, where roundish homogeneous whitish areas with well or ill-defined borders are noted [17,18].

Guttate vitiligo can resemble IGH clinically and sometimes pose a diagnostic challenge for clinicians. Histopathological differentiation between the two conditions is also difficult. IGH shows basket wave hyperkeratosis, atrophic epidermis with loss of rete, and decreased basal layer pigmentation. In the present study, 12 patients (6.6%) underwent skin biopsy, which revealed atrophic epidermis with loss of rete and decreased melanin in the basal layer. Some lesions showed irregularly distributed melanin granules and focal skip areas with retained melanin. Lesions over sun-exposed areas showed elastotic changes in the upper dermis. Kim SK et al., found hyperkeratosis to be a more frequent histopathological finding compared to epidermal atrophy and flattened rete ridges. Epidermal atrophy was mainly seen in lesions over non sun-exposed areas compared to sun-exposed areas [15].

Vitiligo, on the other hand, shows lichenoid infiltration with focal areas of vacuolar change at the dermoepidermal junction and the absence of melanocytes. Joshi R reported that 80% of IGH lesions showed small areas of retained melanin in the basal layer alternating with large areas of melanin loss, which was labeled as a clue to differentiate IGH from vitiligo histopathologically [19].

Dermoscopy of guttate vitiligo reveals dense and glowing diffuse white areas with well to ill-defined borders, perifollicular and perilesional pigmentation in repigmenting lesions, and a reverse pigment network in evolving lesions. In contrast, IGH shows specific patterns at the periphery with occasional perifollicular and perilesional pigmentation. Other differentials to consider include nevus depigmentosus, Lichen Sclerosus Atrophicus (LSA), ash leaf macules, pityriasis versicolour, and pityriasis alba. In dermoscopy, nevus depigmentosus shows a faint pigment network throughout the lesion with serrated borders. LSA shows a whitish-pink background with follicular plugs. Ash leaf macules have a zone of total loss of the pigment network among areas of faint pigment network. Pityriasis versicolour and pityriasis alba present with fine scales, while leprosy demonstrates prominent skin furrows with reduced hairs and eccrine glands. Dermoscopy, being a non-invasive tool, can be useful for clinicians in differentiating these lesions.

Limitation(s)

The study was restricted to patients who visited a tertiary care hospital; therefore, it may not accurately reflect the prevalence or clinical presentation of IGH in the wider population. Additionally, the study has limitations in explaining the different demographic patterns of IGH in relation to the distribution of lesions, sun exposure, and histopathological findings.

CONCLUSION(S)

Dermoscopy is a recent non invasive diagnostic tool that magnifies subtle details of skin lesions and helps to study minute details that are not appreciated through the naked eye. In the case of depigmented lesions, where histopathology sometimes fails to differentiate the lesions, clinicodermoscopic study can be effective in diagnosing the conditions.

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PLAGIARISM CHECKING METHODS: [Jain H et al.]
- Plagiarism X-checker: Apr 01, 2023
- Manual Googling: Jun 15, 2023
- iThenticate Software: Sep 09, 2023 (8%)

ETYMOLOGY: Author Origin

EMENDATIONS: 8

AUTHOR DECLARATION:
- Financial or Other Competing Interests: None
- Was Ethics Committee Approval obtained for this study? Yes
- Was informed consent obtained from the subjects involved in the study? Yes
- For any images presented appropriate consent has been obtained from the subjects. Yes

Date of Submission: **Mar 28, 2023**
Date of Peer Review: **May 05, 2023**
Date of Acceptance: **Sep 11, 2023**
Date of Publishing: **Nov 01, 2023**