



Original Article

Clinical and Histopathological Study in Vitiligo Patients

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Abstract

Background: Vitiligo, also called leukoderma, is either an acquired or familial, but highly complex pigmentation disorder in which melanocytes, the principle pigment-producing cells in humans, are destroyed. Affecting 0.5%-1% of population worldwide, vitiligo can be a highly disfiguring disorder that is characterized by the development of smooth and porcelain-white patches of skin devoid of protective melanin pigmentation.

Methods: This was an cross-sectional study during a period from 2017 to 2018 including 52 clinically diagnosed vitiligo patients. Patient were clinically evaluated and a proper history was taken including patient's age, sex, site, duration, family history, area of community, itching, associated endocrine disorder, associated skin disorder, and clinically examined for the morphological distribution, pattern, and border of the lesion, and looked for signs such as erythema, koebner phenomenon, leukotrichia.

Results: More than one third of patients were between 20-30 years of age (38.5%). More than half of patients were females (57.7%). The duration of disease was 12-60 months (Sub acute phase/Intermediate lesion) among more than half of patients (57.7%). Vitiligo vulgaris clinical diagnosis was among more than half of patients (55.8%) followed by Generalised & Segmental (17.3%) and Acrofacial vitiligo (9.6%). Diabetes mellitus was among 11.5% patients and Thyroid disorder was in 7.7% patients. On histological aspect Hypomelanosis and Monodermal cells infiltrate was among majority of patients 86.5% and 76.9% respectively followed by Suprabasal vacuolization was 53.8%.

Conclusion: This study indicates the correlation of various pathological alterations with clinical features of vitiligo patients.

Keywords: Vitiligo, Clinical, Histopathological.

Introduction

Vitiligo is the most common depigmentation disorder where the selective destruction of functioning melanocytes causes depigmentation of the skin, hair and mucosal surfaces (Picardo and Taiieb, 2010)¹. It affects approximately 0.5% to 1% of the population, with an average age of onset at about 24 years, its prevalence appears to be equal between men and women and there is no difference in the rate of occurrence according to skin type or race (Alikhan et al, 2011)². Several etiological factors have been suggested for which the most compelling evidence involves a combination of environmental, genetic and immunological factors interacting to contribute to autoimmune melanocyte destruction (Spritz, 2006)³.

In 1991, Cui et al showed that the depigmented skin of vitiligo patients carries residual melanocytes that can be preserved in hair follicles for a long time. These melanocytes are able to act as a reservoir for the repopulation of pigment cells with normal function during disease treatment (Cui et al, 1991)⁴.

According to some authors, epidermal melanocytes are absent in depigmented skin (Abdel-Naser et al, 1994)⁵. According to others, melanocytes and melanin are found in the area of depigmentation even in longstanding vitiligo lesions. Such ambiguous results may to some extent be due to differences in markers and research methods (Tobin et al, 2000)⁶.

Immunohistochemical research on various melanocytic antigen expression in the skin provides important information about melanocyte status in vitiligo lesions. Several different markers have been suggested for melanocyte identification, but none of them show absolute specificity and sensitivity (Pretti et al, 2010)⁷. Melan-A antigen is mostly expressed in melanocytes of the skin and the retina. (Ordóñez, 2014)⁸.

The present study was planned to study clinical and pathological alterations both in vitiligo patients.

Material and Methods

This was an observational, cross-sectional study during a period from 2017 to 2018 including 52 clinically diagnosed vitiligo patients presented with hypopigmented lesion attending OPD of Skin & V.D, Department were undertaken for histopathological analysis obtained from skin biopsy.

Patients with partially treated/under treatment patients and poor tissue processing were excluded from the study. The study was approved from the Ethical Committee of the Institute and consent was taken from each participant before including in the study.

Methods

Patient were clinically evaluated and a proper history was taken including patient's age, sex, site, duration, family history, area of community, itching, associated endocrine disorder, associated skin disorder, and clinically examined for the morphological distribution, pattern, and border of the lesion, and looked for signs such as erythema, koebner phenomenon, leukotrichia.

Processing of specimen

Skin biopsy was fixed in 10% buffered formalin solution, and processed, and embedded in paraffin. Paraffin blocks were cut into 4- to 5-micron sections on a microtome and placed on glass slides.

Grossing

The skin punch biopsy or the incisional biopsy were presented intoto and was carefully section to include the epidermis. Sections of 4-5 μ thickness were cut and stained with Haematoxylin & Eosin

Statistical analysis

Statistical analysis of data was performed using statistical package for social science software (SPSS) version 17.0

Results

More than one third of patients were between 20-30 years of age (38.5%). The mean age of patients

was 29.50±15.94. More than half of patients were females (57.7%). The duration of disease was 12-60 months (Sub acute phase/Intermediate lesion) among more than half of patients (57.7%). More than half of patients belonged to urban areas (69.2%) (Table-1).

Vitiligo vulgaris clinical diagnosis was among more than half of patients (55.8%) followed by Generalised & Segmental (17.3%) and Acrofacial (9.6%). The most common affected site was lower limb (75%). The second most common affected site was upper limb (34.6%) followed by involvement of trunk (32.7%). Regular border was present among about in one third of patients (32.7%). Pattern of distribution was symmetrical present among more than one third of patients (46.2%). Itching was present in more than one third of patients (48.1%). Erythema was present in one third of patients (30.8%). Koebner phenomenon was present in more than one third of patients (40.4%). Leukotrichia was present in one third of patients (34.6%). Atopic dermatitis was among 11.5% patients and Alopecia areata was in 7.6 % patients. Diabetes mellitus was among 11.5% patients and Thyroid disorder was in 7.7% patients (Table-2).

Melanocytes at basal were absent among majority 86.5% of patients (H&E section). Hyperkeratosis was among 88.5% and Thinned epidermis was among 63.5% patients and Suprabasal vacuolization was among 53.8%. Mononuclear cells infiltrate was among majority of patients (76.9%) followed by Perivascular inflammation (71.2%), Sweat gland degeneration & Dermal nerve degeneration (21.2%) and Lichenoid inflammation (19.2%) (Table-3).

Table-1: General characteristics of Vitiligo patients

General characteristics	No. of patients	
	No. (n=52)	%
Age in years		
<20	12	23.1
20-30	20	38.5
31-40	7	13.5
>40	13	25.0
Mean±SD	29.50±15.94	

Gender		
Male	22	42.3
Female	30	57.7
Duration of disease in months		
<12 (Early lesion)	7	13.5
12-60 (Intermediate lesion)	30	57.7
>60 (Long-standing lesion)	15	28.8
Family history		
Present	24	46.2
Absent	28	53.8
Place of residence		
Rural	16	30.8
Urban	36	69.2

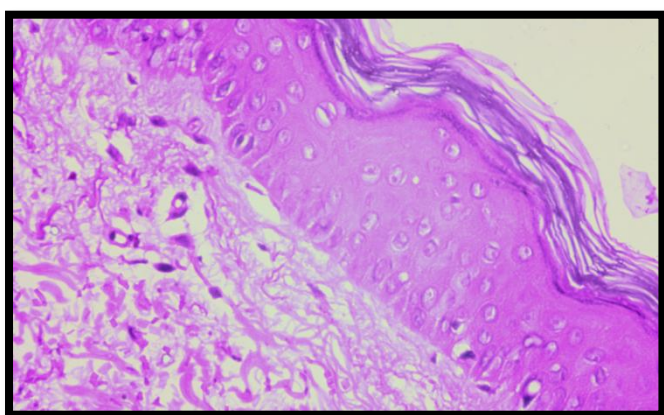
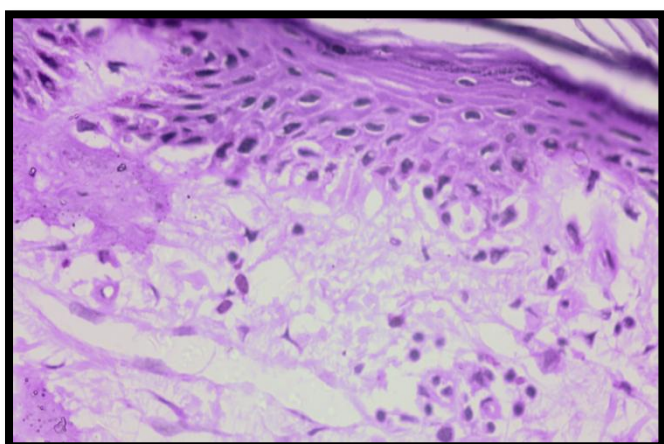
Table-2: Clinical characteristics of Vitiligo patients

Clinical characteristics	No. of patients	
	No. (n=52)	%
Clinical diagnosis		
Acrofacial	5	9.6
Generalised	9	17.3
Segmental	9	17.3
Vulgaris	29	55.8
Affected site		
Head & Neck	10	19.2
Lower limb	39	75.0
Upper limb	18	34.6
Palm/sole	13	25.0
Trunk	17	32.7
Genital	6	11.5
Others	5	9.6
Border		
Regular	17	32.7
Irregular	35	67.3
Symmetrical/asymmetrical		
Symmetrical	24	46.2
Asymmetrical	28	53.8
Itching		
Present	25	48.1
Absent	27	51.9
Erythema		
Present	16	30.8
Absent	36	69.2
Koebner phenomenon		
Present	21	40.4
Absent	31	59.6
Leukotrichia		
Present	18	34.6
Absent	34	65.4
Associated Cutaneous disorders		
Atopic dermatitis	6	11.5
Alopecia areata	4	7.6
None	42	80.8
Associated endocrine disorder		
Diabetes mellitus	6	11.5
Pernicious anemia	3	5.8
Thyroid disorder	4	7.7
None	39	75.0

Table-3: Distribution of patient with Histological changes

Histological changes* (H&E section)	No. of patients	
	No. (n=52)	%
Epidermal changes		
Melanocytes at basal	7	13.5
Supra basal vacuolization	28	53.8
Hyperkeratosis	46	88.5
Thinned epidermis	33	63.5
Dermal changes		
Perivascular inflammation	37	71.2
Mononuclear cells infiltrate	40	76.9
Lichenoid inflammation	10	19.2
Sweat gland degeneration	11	21.2
Dermal nerve degeneration	11	21.2

*Multiple response

**Figure-1:** Shows absence of basal melanocytes on (H&E stain, 40X magnification)**Suprabasal vacuolization on H&E section (40X)**

Discussion

In our study, more than one third of patients were between 20-30 years of age (38.5%) followed by 31-40years (13.5%), >40 years (25%), and <20

years (23.1%). The mean age of patients was 29.50 ± 15.94 . In this study, more than half of patients were females (57.7%). In a study (Singh et al, 2011)⁹, the mean age of vitiligo patients was 33.23 ± 16.67 . 78.5% cases had age of onset around the age of 40 years while 21.5% had age of onset after the 40 years of age out of 200 cases, 118 (59.0%) were females while rest 82 (41.0%) were males. The finding of this study in regard to age was in agreement with other studies also (Rajpal, 2008; Arycan, 2008)^{10,11}.

Predominance of females was observed in our study and this was in accordance with the study of Kovacs (1998)¹²; Al-Mutairi & Sharma (2006)¹³; Shajil et al (2006)¹⁴ and Nunes & Esser (2011)¹⁵. This may be attributed to the fact that parents are probably more concerned when confronted with a daughter instead of a son with vitiligo and therefore more likely to consult a doctor (Jaishankar, 1992)¹⁶.

In our study, the duration of disease was 12-60 months (Intermediate lesion/Sub-acute phase) among more than half of patients (57.7%) followed by >60months (Long-standing lesion/Chronic phase) (28.8%) and <12 months (Early lesion/Acute phase) (13.5%). In the study by Singh et al (2011)⁹, 40% cases had 1-5 years (12-60 months) duration of disease. More than half of the patients belonged to urban community (69.2%). Rajpal et al (2008)¹⁰ observed that 64.0% patients were from urban areas.

In our study, the most common affected site was lower limb (75%). The second most common affected site was upper limb (34.6%) followed by trunk (32.7%) involvement. This can be substantiated by the study of Al-Mutairi & Sharma (2006)¹³; Chanda et al (1996)¹⁷; Martis et al (2002)¹⁸ and Reghu et al (2011)¹⁹. Contrary to this Handa and Dogra (2003)²⁰ reported face, trunk and legs in descending order of frequency. Singh et al (2011)⁹ found that 44% patients showed lower limb as a site of onset of vitiligo followed by trunk/face (18.5%) and upper limb (45%) while frequency of genital and scalp as site of onset was 2% & 2.5% respectively.

In our study, Vitiligo vulgaris morphological type was among more than half of patients (55.8%) followed by Generalised & Segmental (17.3%) and Acrofacial vitiligo (9.6%). Singh et al (2011)⁹ found that Vitiligo vulgaris, Segmental and Acrofacial were in 54.8%, 14.5% and 21.5% respectively. The lower percentage of Acrofacial in this study than Singh et al (2011)⁹ might be due to different environmental conditions in the studies. Similarly, Kovacs (1998)¹²; Handa & Kaur (1999)²¹ reported vulgaris to be most common type.

In this study, family history of disease was present among more than one third of patients (46.2%). Singh et al (2011)⁹ found family of disease among 28% patients. Handa & Kaur et al (1999)²¹ reported 11.5% family history while Al Mutairi & Sharma (2006)¹³ reported 18.9%. This is attributed to the role of genetic factors in the pathogenesis of vitiligo.

In our study, Koebner phenomenon was present in more than one third of patients (40.4%). Agarwal et al (2014)²² reported that Koebner phenomenon was present in 26.3%. In another study Van Geel et al (2012)²³, Koebner phenomenon was present 31.4% patients. Osman et al (2008)²⁴ found that Koebner sign was found to be present in 42 % of patients.

In our study, Leukotrichia was present in one third of patients (34.6%). In this study, Itching was present in more than one third of patients (48.1%). In the present study, Regular border was present in approximately one third of patients (32.7%). Erythema was present in one third of patients (30.8%) in this study.

In our study, pattern of distribution was symmetrical present in more than one third of patients (46.2%). Rajpal et al (2008)¹⁰ found that concurrent dermatological diseases were found in 12.17% of the patients with vitiligo. Osman et al (2008)²⁴ observed the bilaterally symmetrical pattern of distribution was the commonest pattern (in 85 %).

In our study, history of associated cutaneous disorders atopic dermatitis was among 11.5%

patients and alopecia areata was in 7.6% patients. Agarwal et al (2014)²² found that atopic dermatitis was in 4.9%.

In our study, history of associated endocrine disorders diabetes mellitus was among 11.5% patients and thyroid disorder was in 7.7% patients. Singh et al (2011)⁹ found that 12% patients were associated with thyroid disease followed by leukotrichosis (9.5%) and diabetes mellitus (3%). Gopal et al (2007)²⁵ and Arycan et al (2008)²⁶ reported 12% and 4.4% thyroid disease respectively. Huggins et al (2006)²⁷ reported 1-7% diabetes mellitus, Reghu et al (2011)²⁸ and Handa & Dogra (2003)²⁰ reported 6.3% & 11.5% leukotrichosis respectively.

In our study, Suprabasal vacuolization was among more than half 53.8% of 52 patients on histology. According to Leopold et al (2003)²⁹ reported increased number of epidermal vacuolization. Alikhan A et al (2011)² in a review of 74 vitiligo specimens, reported absence of pigment and suprabasal vacuolization which is similar to our study. In our study, Hyperkeratosis was among majority 88.5% of 52 patients on histology. Garcia-Romero et al (2012)³⁰ found on histology that in most patient's depigmented skin had increased hyperkeratosis, which is similar to our study.

In our study, Thinned epidermis was among more than half 63.5% patients. Alikhan A et al (2011)² reported Thinned epidermis in 53% in a review of 74 vitiligo specimens similar to our study. In our study, Perivascular inflammation was among majority (71.2%) of patients. According to Nagaral and Karibasappa (2017)³¹ observed dermis with mild perivascular lymphocytic infiltration and acanthosis along with mono nuclear cell infiltration in the upper dermis. Similar to our study, Alikhan A et al (2011)² reported perivascular inflammatory infiltrate in 30% of cases in a review of 74 vitiligo specimens.

In our study, Lichenoid inflammation was among more than one third of patients (19.2%). Attili and Attili (2013)³² found that focal lichenoid

inflammation of varying degrees around epidermal/adnexal melanocytes was identified as a common feature in evolving lesions of both SV (segmental vitiligo) (78%) and GV (Generalised vitiligo) (70%). According to Anisha B Patel et al (2013)³³ shows sometimes, lichenoid interface dermatitis may be an early evolving lesion of vitiligo.

In our study, Sweat gland & dermal nerve degeneration was present in (21.2%) of patients. Degeneration in both sweat gland & dermal nerve was present among 60% and 6.7% patients whom duration of disease was >60 months (Long-standing) and 12-60 months (Intermediate lesion) respectively. Alikhan A et al (2011)² observed degenerative changes in long-standing cases, dermal nerve degeneration in 78%. Gokhale and Mehta et al (1983)³⁴ demonstrated longstanding disease significant degenerative changes in dermal nerves and sweat glands. The dermal nerves in 41% of patients were completely degenerated and 38% showed some degree of degeneration similar finding were present with our study.

Conclusion

This study indicates the correlation of suspected cases of vitiligo with various pathological alterations turned out to be helpful parameters in making the right diagnosis.

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