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Corresponding Author: Dr. Mariam Jesudas, Email: mariamj1997@gmail.com

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PERILESIONAL SKIN IN PSORIASIS

Semeena N K¹, Elizabeth K Paul², K R Ravi³, Mariam Jesudas⁴, Shimmy Paulose⁵. Sheeba Varghese⁶

¹Associate Professor, Department of Dermatology, Al Azhar Medical College, Idukki, Kerala, India.

²Consultant Dermatologist, Indira Gandhi Cooperative Hospital, Ernakulam, Kerala, India.

³Assistant Professor, Department of Anaesthesia, Al Azhar Medical College, Idukki, Kerala, India. ⁴Junior Resident, Salvation Army Hospital, Ernakulam, Kerala, India.

⁵Assistant Professor, Department of Paediatrics, Al Azhar Medical College, Idukki, Kerala, India. ⁶Professor, Department of Physiology, Royal Dental College, Palakkad, Kerala, India.

Abstract

Background: Psoriasis is defined as common, genetically determined, inflammatory and proliferative disease of the skin. The characteristic lesion consists of chronic, sharply demarcated dull red scaly plaques, particularly on the extensor prominences and in the scalp. Materials and Methods: All consecutive patients of plaque type of psoriasis with more than 50% body involvement who were not on any treatment for 2 weeks prior to their visit were included. Psoriatic Area and Severity Index (PASI) score was calculated for all patients. PASI score included redness, thickness, scaliness and extent of the lesions. Using these parameters scalp, upper limb, trunk and lower limb lesions were assessed and totalled. The association of psoriasis like arthropathy and nail changes were also noted. Auspit'z sign, Koebner's phenomenon and 'halo of Woronoff' were looked for in all patients. Skin biopsies were done from A) plaque like lesion and B) perlesional normal skin. Result: During the one year period of study 21850 patients attended dermatology outpatient department, out of which 21% had psoriasis. Out of 50 patients 15 (30%) were in the age group of 31-40 years. 94% of patients showed seborrhoeic psoriatic lesions on the scalp and 74% had guttate lesions. PASI score ranged from 17.4 to 22.4 in 38% of patients. The patients who were in the minimum PASI group had very little erythema and scaling. Perilesional biopsy showed only perivascular upper dermal lymphocytic infiltrate. Conclusion: Out of 50 patients only 33 patients (66%) showed classical histopathological features of psoriasis. Perilesional biopsy showed only perivascular upper dermal lymphocytic infiltrate which carries a limited significance as it did not differ from control biopsies.

INTRODUCTION

Psoriasis is defined as common, genetically determined, inflammatory and proliferative disease of the skin. The characteristic lesion consists of chronic, sharply demarcated dull red scaly plaques, particularly on the extensor prominences and in the scalp.^[1]

Prevalence of psoriasis in Western Europe and Scandinavia is between 3 to 15%.^[2] There is a low incidence of psoriasis in oriental people. Females develop psoriasis earlier than males.^[3] There are two peaks for the age of onset, one at 16-22 yrs and the other at 57-60 years4. Patients with family history of psoriasis tend to have earlier age of onset.^[4-7] In India there are no well planned studies to detect the prevalence of this disease.

Psoriasis is also a polygenic and multifactorial disease. Multifactorial implies that the cause of the disease is due to the effect of several genes.^[8,9] There is a definite relationship of the HLA-system to psoriasis, which includes HLA-B13, B17, B37, according to various studies.^[10,11]

Several factors are implicated in the exacerbation of psoriasis. They include trauma, infection (acute guttate psoriasis), endocrine factors,^[4] sunlight, metabolic factors, drugs like lithium, betablockers, antimalarials sudden and withdrawal of corticosteroids apart from psychogenic factors.^[8] Confirmation of diagnosis of psoriasis lies on histopathology. Histopathological examination of the lesional skin shows characteristic features like hyperkeratosis. presence of Munro 'micro abscessess', parakeratosis, absence of granular layer, acanthosis and spongiform pustules of kogoj. The

dermal changes include dilated and tortuous capillaries and 30 club shaped rete ridges.^[12]

The histopathological changes of perilesional skin in psoriatic patients have been investigated by a number of dermatologists.^[13-15] The following changes were observed in the perilesional skin.

- 1. Slight epidermal hyperplasia.
- 2. Punctiform spongiotic areas are seen with involvement of stratum basale.
- 3. Around the subpapillary blood vessels mild inflammatory reaction with increase in number of macrophages, mast cells and lymphocytes.^[13-15]

The present study has been carried out in the department of dermatology venereology and leprosy (DVL), Al Azhar Medical College, Kerala during the period 2020-2021. This study is aimed at to observe the histopathological changes in perilesional skin of psoriasis and to evaluate its significance. **Objective**

- 1. To highlight the histopathological changes of perilesional skin in psoriatic individuals.
- 2. To compare the perilesional skin of psoriatic patient with normal control.

MATERIALS AND METHODS

This study included dermatology out patients at Al Azhar Medical College during July 2020 to June 2021.

Inclusion Criteria

All consecutive patients of plaque type of psoriasis with more than 50% of body involvement were included in the study. Non-psoriatic patients were taken as controls.

Exclusion Criteria

All other types of psoriasis except plaque type were excluded from the study.

Methodology

- 1. All consecutive patients of plaque type of psoriasis with more than 50% body involvement who were not on any treatment for 2 weeks prior to their visit were included.
- 2. The demographic factor, clinical features, area of involvement were entered in a proforma.

The proforma included name of the patient, age, sex, complete postal address, occupation and income. In addition to the duration of illness, number of episodes per year, complications, family history and treatment history were also noted. A general assessment of the of the patient was done including pulse and blood pressure. Systemic examination was done routinely. All patients were examined to exclude tonsillitis, pulmonary tuberculosis and intercurrent infections. Investigations were carried out screen for diabetes, HIV and syphilis.

A detailed examination of the skin lesions included the types of lesions like papules, plaques, annular, guttate, and site like palmoplantar etc. Psoriatic Area and Severity Index (PASI) score was calculated for all patients. PASI score included redness, thickness, scaliness and extent of the lesions. Using these parameters scalp, upper limb, trunk and lower limb lesions were assessed and totalled. The association of psoriasis like arthropathy and nail changes were also noted. Auspit'z sign, Koebner's phenomenon and 'halo of Woronoff' were looked for in all patients.

Skin biopsies were done from A) plaque like lesion and B) perlesional normal skin. The biopsy site was cleaned with alcohol. 2cc of 2% lignocaine solution was injected intradermally at the site. An elliptical incision was made measuring 1cm in length and a depth to include subcutaneous fat. Wound was closed with sutures. The biopsy material was transported to the laboratory in 10% formalin solution. Similar biopsy was done from the perilesional skin and appropriately marked as A&B. Periodic skin biopsies were done from normal individuals who were included as controls for comparison. The results were correlated to find out the changes in the perilesional skin and a comparison was made with controls.

RESULTS

Incidence

Out of the total number of 21850 patients who attended the outpatient department of DVL at Al Azhar Medical College during the study period there were 472 cases of psoriasis. This accounted for 2.1% of all dermatological patients.

Table: Incidence of psoriasis	
Total number of patients attended dermatology	21850
department	
Total number of psoriasis vulgaris patients	472
Incidence of psoriasis vulgaris	21%



The age distribution was shown in [Figure 1]. This showed that the maximum number of patients belonged to the age group of 31-40 years. The oldest patient was 60 years and the youngest was 5 years old.



Out of 50 psoriatic patients, 41 were males and 9 were females. Out of the 41 males, there was one male child. The male female ratio was 4.5:1 showing a male preponderance.



In majority of the patients the duration of the disease recorded was less than 5 years. (Fig. 3) The maximum duration of the disease encountered was 20 years in a 50 year old male patient and the minimum was one month in a 5 year old male child.



29 out of 50 patients had 2 episodes of the disease in the past and only one patient had 4 episodes. 18 patients had only 1 previous episode The other 2 patients had 3 episodes.



3 types of complications were looked for namely psoriatic arthropathy, exfoliative psoriasis and pustular psoriasis.

Out of 50 patients 8 patients (16%) had psoriatic arthropathy inaddition, and another & patients (16%) had exfoliative psoriasis. Pustularpsoriasis was not encountered in our study patients.

Family History

Out of 50 patients only 2 patients (4%) had family history of psoriasis.



The following treatments were taken by our patients during the previous episodes. Out of 50 patients 39 patients used emollients along with other medications. 17 patients used topical corticosteroids along with emollients. 15 patients used coal tar. 13 patients used methotrexate. 5 patients were on PUVA sol therapy. 3 patients were on oral corticosteroids. 15 patients resorted to native treatment. However none of the previous treatments had any outcome on relapses.



Papules and plaques were seen in all 50 patients. 47 patients (94%) showed seborrhoeic lesions in addition, and guttate lesions were seen in 37 patients (74%). Annular and palmoplantar lesions were seen in 5 patients each. None of the patients had pustular, gyrate, rupiod, eczematous, and infective lesions.

Psoriasis Area Severity Index (PASI) Score



The maximum PASI score was calculated as 34.4 and the minimum was 7.2. Out of 50 patients, 19 patients (38%) were in the range of 17.4-22.4. Only 3 patients were within the range of 32.7-37.7.



Key to [Figure 9]

- 1. Small joint involvement
- 2. Large joint involvement
- 3. Ankylosing spondylitis
- 4. Rheumatoid arthribis
- 5. Multilating type

Out of 50 psoriatic patients only 5 patients (10%) had involvement of large joints and 3 (6%) had involvement of small joints. Rheumatoid arthritis type involvement were seen in another 3 patients (6%). None of the patients had ankylosing spondylitic type or mutilating type arthritis.

Nail Involvement

Out of 50 psoriatic patients 27 patients (54%) showed multiple pitting on the nails and 6 of them (12%) showed subungual hyperkeratosis in addition.

9 patients (18%) had only brownish discolouration. Onycholysis was not observed in this study population.

Koebner's phenomenon was present and Auspitz's sign was elicited in all patients (100%). Lesional skin- Histopathology



Key to [Figure 10] A=Classical psoriasis

B=Suggestive of psoriasis

C=Non specific

Out of 50 psoriatic patients 33 patients (66%) showed classical psoriatic features in histopathology. 2 patients (4%) showed features suggestive of psoriasis. In 15 patients (30%) the histopathology was non specific.

Perilesional Skin - Histopathology

All 50 biopsies from the perilesional skin showed few perivascular lymphocytic infiltrate only. There was no evidence of epidermal changes from the perilesional skin in any patient.

Table 1: Lesional skin biopsy Vs perilesional skin biopsy						
Lesional		Total	Perilesional		Total	
А	33	66%	A1	-	-	
В	2	4%	B1	50	100%	
С	15	30%	-	-	-	
Total	50	100%	Total	50	100%	

Key to [Table 1]. Lesional A-Classical psoriasis B-Suggestive of psoriasis C-Non-specific

Perilesional

A1 = Large no. of lymphocytes B1= Few lymphocytes

Table 2: Clinical picture versus Lesional skin biopsy Lesional.					
Clinical Picture	Α	В	С	Total	
13.00	20	1	5	26(52%)	
14.00	5	1	7	13(26%)	
15.00	2			2(4%)	
16.00	4		3	7(14%)	
17.00	2			2(4%0	
Total	33	2	15	50(100%)	

Key to [Table 2] A-Classical psoriasis B=Suggestive of Psoriasis C-Non Specific

1=Papule 13=1, 2, 5, 10 2=Plaque 14=1, 2, 10 4 = Annular 15=1,2,5

5 =Guttale 16=1, 2, 4, 5, 10

10 = Seborrhic 17=1, 5, 10

Features corresponding to numbers 3, 6, 7, 8 and 9 (ie. 3 = pustular, 6-gyrate, 7=rupioid, 8 = eczematous, 9 = infective) were not noticed.

From [Table 2] the following interpretations were made.

33 cases (66%) showed classical histopathological features of psoriasis from lesional skin and 20 of them showed a combination of papules, plaques guttate and seborrhoeic lesions clinically. 2 cases (4%) which showed histopathological features suggestive of psoriasis had shown papules and plaques clinically without seborrhoeic lesions.

Of the 15 cases (30%) which showed non specific changes histopathologically 12 cases had shown papules, plaques, guttate and seborrhoeic lesions, clinically.

Table 3: PASI VS Lesional skin biopsy					
	Α	В	С	Total	
7.20			1	1(2%)	
9.00	1		2	3(6%)	
9.60	2		1	3(6%)	
10.20	1			1(2%)	
10.80			2	2(4%)	
12.60	1			1(2%)	
12.80	1			1(2%)	
13.20	5			5(10%)	
14.40			1	1(2%)	
15.00			1	1(2%)	
16.20	4		1	5(10%)	
16.80	1			1(2%)	
17.40		1		1(2%)	
18.00	2	1	2	5(10%)	
18.60	4		1	5(10%)	
19.00	1			1(2%)	
19.80	1			1(2%)	
20.40	1			1(2%)	
20.60	1			1(2%)	
21.60	3		1	4(8%)	
23.40	1			1(2%)	
24.00	1			1(2%)	
27.00	1			1(2%)	
28.00			1	1(2%)	
28.70			1	1(2%)	
33.40	1			1(2%)	
Total	33 (66%)	2(4%)	15(30%)	50(100%)	

Key to [Table 3].

A= Classical psoriasis B=Suggestive of psoriasis C=Non-specific

Of the 33 cases with classical histopathological features of psoriasis one case had a PASI score of 9 and 5 cases had a score of 13.2. The maximum PASI was 34.4 in one case. The 2 cases which showed histopathological features suggestive of psoriasis had a PASI score 17.4 and 18 respectively. Among 15 cases which showed nonspecific changes histopathologically the PASI ranged from 7.2 to 28.7.

Table 4: Complication 1: Psoriatic arthropathy Vs Lesional skin Lesional					
Α	В	С	Total		
30	2	10	42 (84%)		
3		5	8(16%)		
33	2	15	50 (100%)		

Nil

Complication1: Arthropathy Total

Key to [Table 4].

A=Classical Psoriasis B =Suggestive of Psoriasis C = Non- Specific histopathology

Out of 50 psoriatic patients only 8 patients had psoriatic arthropathy, of these 8 patients (16%), 3 showed classical psoriasis in histopathology and 5 patients had shown non-specific changes.

Table 5: Complication II: Exfoliative Psoriasis Vs Lesional skin Lesional				
Α	В	С	Total	
29	2	11	42 (84%)	
4		4	8(16%)	
33	2	15	50 (100%)	

Complication II: Nil Exfoliative Total

Key to [Table 5].

A =Classical Psoriasis B=Suggestive of Psoriasis C = Non-specific histopathology

Out of 50 psoriatic patients. 8 patients had exfoliative psoriasis. Four of these 8 patients showed classical histopathological features of psoriasis and the other four had shown nonspecific changes only.

Table 6: Lesional Skin Vs Duration						
Duration in months		Α	В	С	Total	
1.00	≤=12	11		6	17 (34%)	
2.00	13-60	14	2	3	19(38%)	
3.00	61-120	6		5	11 (22%)	
4.00	>120	2		1	3(6%)	
	Total	33	2	15	50(100%)	

Key to [Table 6].

A= Classical psoriasis B = Suggestive of psoriasis C = Non-specific histopathology.

Of the 33 cases with classical psoriatic in histopathology, 14 cases had the duration ranging from 13-60 months. Only 2 cases had the duration for greater than 120 months. Similarly out of 15 cases which showed non specific histopathological picture 6 had the duration of the disease for less than 12 months, one for more than 120 months and the rest varied in between.

Perilesional skin Vs Controls

50 biopsies from perilesional skin was compared with 10 biopsies taken from controls. It was found that there were no epidermal changes in the control biopsies and the dermis only showed mild upper dermal parivasuclar lymphocytic infiltrate. The amount of infiltrate did not differ from the perilesional skin biopsies.

DISCUSSION

During the one year period of study 21850 patients attended dermatology out patient department, out of which 21% had psoriasis. Almost similar incidence was reported earlier from various parts of our country.[16,17]

Out of 50 patients 15 (30%) were in the age group of 31-40 years. Metha TK reported a maximum incidence in the age group of 31-50 years.^[16] Clinical profile of psoriasis in North India showed the maximum onset before the age of 30 years.^[18]

The male: female ratio was 4.5:1 in our study. This correlated with the earlier Indian studies.[16-18] The increased incidence in males was probably due to more number of male patients attending the out patient's department.

The duration of the disease ranged from one month to 20 years.

16% of the psoriatic patients in the study group had psoriatic anthropathy in addition, and another 16% presented with exfoliative psoriasis. This was in comparison with earlier work done by Bedi.^[18]

Family history was present only in 2 patients (4%). Even though psoriasis can run in families, this was detected in 2% and 7.4% in earlier studies.^[16,17]

94% of patients showed seborrhoeic psoriatic lesions on the scalp and 74% had guttate lesions. This clinical pattern also correlated with earlier Indian studies.^[16-18]

PASI score ranged from 17.4 to 22.4 in 38% of patients. As PASI score was not calculated in anyone of the earlier studies on psoriasis from India it is difficult to comment on this. However our attempt had shown that the maximum PASI as 34.4 and the minimum as 7.2. The patients who were in the minimum PASI group had very little erythema and scaling.

Nail involvement was observed in addition to skin lesions in 54% and 8 of these patients (16%) also had psoriatic arthropathy. Bedi TR reported joint symptoms in 10% of the patients but frank arthritis was noted in 1.32% only.^[18]

Histopathological study of lesional skin revealed classical psoriatic features only in 66%. 15 patients (30%) revealed only nonspecific histopathology. A study conducted by Sardari Lal et.al concluded that well developed lesions of psoriasis did not show the characteristic histopathological features of psoriasis in all cases.^[19]

The microscopic features of psoriasis may show some variation depending on the age and the clinical form of lesions, their location and the influence of treatment.[20]

The earliest visible lesion reveals predominantly neutrophilic infiltrate which is seen perivascularly in the dermis and invasion by neutrophils of an oedematous epidermis.^[20] However even in those patients with nonspecific histopathology these changes were not observed by us. An analysis of the clinical lesions Vs lesional skin biopsy proved this statement as the nonspecific histopathological changes were observed even from the classical clinical lesions. It was found that the overall histopathological findings were not correlating in 30% of the study population and thus might not help in establishing the diagnosis with certainty.

Among the 15 cases which showed nonspecific features histopathologically the PASI score ranged from 7.2 to 28.7. Hence it was concluded that even with higher score of PASI the histopathology still could be nonspecific Similarly a comparison of

histopathology of lesional skin Vs PASI score was also inconclusive.

Nonspecific histopathology was seen in 5 patients with psoriatic arthropathy. Among the 8 patients with exfoliative psoriasis 50% only showed the classical histopathology. Similarly nonspecific histopathological features were also seen in 6 patients (12%) who had the duration of the disease for less than 12 months. Hence we could only conclude that the histopathology of lesional skin had no correlation with the duration, type of lesion, complications and PASI score.

The histopathology of the perilesional skin showed similar picture in all patients, which consisted of normal epidermis and mild to moderate perivascular lymphocytic infiltration. Surprisingly we did not notice the specific epidermal changes which was noticed by Braun -Falco. He observed in 1977 slight epidermal hyperplasia with psoriasiform pattern, modest hypergranulosis and a condensed stratum corneum. Similarly, mild to moderate dermal lymphocytic infiltrate which occurred in our patients was also not conclusive as such a picture was observed in controls also.

Our study also did not reveal increased number of macrophages and mast cells as observed by Brody.^[21,22] The earlier studies on perilesional skin did not reveal polymorphonuclear leucocytes, either in the dermis or in the epidermis. Our study confirmed the above finding.^[21,22]

The study done by Braverman and Ryan on microcirculation in psoriasis in the uninvolved skin revealed capillaries with excess endothelial gaps and hyperproliferation of endothelial cells.^[23,25] These changes were not observed by us from the study group.

Our attempts to know the pathological changes in the perilesional skin was carried out mainly to observe the early changes in perilesional skin and if possible to correlate with the clinical features. This would have helped us to project a possible pathogenesis. Interestingly the perilesional histopathology did not reveal the much expected features. We could not give importance to the only finding of mild to moderate perivascular upper dermal lymphocytic infiltrate.

Hence we hypothesize that the concept of pre psoriasis on a normal skin surrounding the lesion does not exist. This hypothesis also gets strengthened as there was no change in the perilesional skin when compared to normal controls. Further we could not type the lymphocytes. If we could do the lymphocytes marker and prove that the infiltrate is only of T lymphocytes much significance can be attached to that finding especially when compared to the perivascular lymphocytes from control patients.

Hence we recommend that our hypothesis may be rechecked by a proper selection criteria and by

doing T cell marker studies, which may throw more light in future in psoriasis.

CONCLUSION

- 1. Out of 50 patients only 33 patients (66%) showed classical histopathological features of psoriasis.
- 2. Perilesional biopsy showed only perivascular upper dermal lymphocytic infiltrate which carries a limited significance as it did not differ from control biopsies.
- 3. The concept of 'pre psoriasis' in a normal skin (perilesional) does not exist.

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