Histopathological study of epidermal& dermal changes in lesional&perilesional biopsies of psoriasis cases at a tertiary center- An Original Research

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ABSTRACT

Background: Psoriasisis a chronic disease of the skin of unknown etiology that is characterised bychronic relapsing nature and variable clinical features. Since histopathological study gives the exact diagnosis of psoriasis & can differentiate it from other histological mimics, present study was aimed to study histopathological features of epidermal and dermal changes in lesionaland perilesional biopsies of psoriasis cases at a tertiary center.**Materials and Methods:**Present study was single-center, prospective, observational study, conducted in patients with clinical features of psoriasis, not received treatment for the past, skin biopsies were taken from both lesional& perilesional areas of psoriatic patients, H & E staining was done. **Results:**Among 52 cases, majority of patients were from the age group 31-40 years (40.3 %), and maleto female patient ratio was 2.7:1.Clinically, common features were macules/papules/plaques (100 %), moderate-severe itching (80.7%), nail involvement (61.5 %), nail pitting (40.3%), subungual hyperkeratosis (17.3%), nail discolouration (3.84%), Koebner phenomenon (23%), Auspitz sign (75%). Among 8 cases of early lesions, common features observed were parakeratosis (100%) mild to moderate acanthosis (100%), dilated capillaries and perivascular cellular infiltrate (100%), thinning of supra papillary plate (50%), Munro micro abscess (50%), spongiosis (37.5%).41 specimens of late lesions were studied of which 90% showed parakeratosis of which 53.6% had uniform and 36.5% had patchy para keratosis. 100% of patients showed Acanthosis of which 75.6% showed marked acanthosis, 24.4% showed mild-moderate acanthosis. Perilesional changes observed were dermal edema & dilated dermal capillaries in papillary dermis (53%), dermal perivascular mononuclear infiltrates (42%), intermittent/patchy parakeratosis (11%), mild acanthosis (17%), irregularly elongated rete ridges (7%) & diminished granular layer (5%). Munro micro abscess & supra-papillary thinning was not seen in any perilesional biopsy.**Conclusion:**Histopathological evaluation is necessary for confirming the diagnosis of psoriasis and for differentiating it from other histologic mimics. Also, the Perilesional findings of the present study support the etiology of psoriasis.

Keywords: Histopathologicalevaluation, psoriasis,lesional, perilesionalbiopsies, Munro micro abscess, Spongiform pustule of kogoj.

DOI Number: 10.48047/nq.2022.20.19.NQ99093 **NeuroQuantology2022;20(19): 1017-1029**

INTRODUCTION

Psoriasis is a chronic disease of the skin of unknown etiology that is characterised by chronic relapsing nature and variable clinical features. The cutaneous lesions are usually so distinct that a clinical diagnosis is easy to make. The lesions are classified as erythro-squamous which indicates that both the vasculature (erythematic) as well as epidermis (increased scale formation) is involved. Genetic and environmental factors greatly influence the clinical development of psoriasis.[1,2]

Skin biopsies are easily taken and studied as early as possible. Since histopathological study gives the exact diagnosis of psoriasis & can differentiate it

from other histological mimics, it is helpful for the dermatologists and patients to start the treatment soon without any delay which further helps in the improvement of the quality of life of patients.

On histopathology, epidermal features like regular acanthosis, elongated rete ridges, supra-papillary thinning, hypogranulosis, munro-micro abscess, spongiosis & spongiform pustule of kogoj are seen.[3,4]Of all the features, only the spongiform pustule of kogoj and Munro micro abscesses are truly diagnostic of psoriasis and in their absence, diagnosis can rarely be made with certainty on histologic basis.

Though perilesional skin appears normal, it may show features of psoriasis in both epidermis & dermis with varying degrees when compared to lesional areas.[5] Therefore, biopsies are taken from perilesional areas also.

By studying perilesional histopathological changes& comparing them with lesional changes, an inference can be drawn about the etiological cause of psoriasis.[6]Present studywas aimed to study histopathologicalfeatures of epidermal & dermal changes in lesional& perilesional biopsies of psoriasis cases at a tertiary center.

MATERIAL AND METHODS

Present study was a single-center, prospective, observational study, conducted in department of pathology, at MGM Hospital (Kakatiya medical college)Warangal, Telangana, India. Study duration was of 2 years (August 2017 to August 2019). Study approval was obtained from institutional ethical committee.

Inclusion criteria

- Patients with clinical features of psoriasis, not received treatment for the past, willing to participate in present study

Exclusion criteria

- Patient receiving immune-suppressive drugs.
- Patients who did not give consent for biopsy.

Study was explained to patients in local language & written consent was taken for participation & study. Relevant clinical findings were recorded. Skin punch biopsies were taken under aseptic precautions and local anaesthesia and specimens were transported in formalin. Skin biopsies were taken from both lesional& perilesional areas of psoriatic patients, H & E staining was done as per standard procedure& histopathological findings of both lesional& perilesional biopsies were recorded.

Data was collected and compiled using Microsoft Excel, analysed using SPSS 23.0 version. Statistical analysis was done using descriptive statistics.

RESULTS

The incidence of psoriasis in our hospital was 1.2%. Among 52 cases, majority of patients were from the age group 31-40 years (40.3 %), mean age of the patients was 33.3 years. Male to female patient ratio in this study was 2.7:1. Majority of the lesions were noted in lower extremities in 32.6% of cases, followed by upper extremity in 23% of cases, trunk in 19.2%, scalp in 19.2% cases, palms & soles in 5.7% cases.

Out of 52 patients, 18 patients (34.6%) had no influence of season on their progression of disease. 29 patients (55.7%) had exacerbation of the disease in winter, 5 patients (9.6%) had exacerbation during summer.

Table 1- **GENERAL CHARACTERISTICS**

Characteristics	No. of patients	Percentage
Age groups (in years)		
11-20	2	3.85%
21-30	8	15.38%
31-40	21	40.38%
41-50	18	34.62%
51-60	3	5.77%
Mean age (mean±SD)	33.3	64.04%
Gender		
Male	38	73.08%
Female	14	26.92%
Sites of involvement		
Scalp	10	19.23%
Upper extremity	12	23.08%
Lower extremity	17	32.69%
Palms & soles	3	5.77%
Trunk	10	19.23%
Seasonal variation		
exacerbation in winter	29	55.77%
exacerbation in summer	5	9.62%
No influence	18	34.62%

Majority of the patients in the present study showed chronic plaque type of psoriasis.The lesions were of guttate variety in 9 cases and erythematous sheets studded with pustules in 2 cases. In the remaining 41 cases, lesions were of plaque type with hyperkeratotic silvery scales on erythematous base of which 2 cases showed palmoplantar involvement, 1 case showed involvement >90% body surface.

Table 2 - **TYPES OF PSORIASIS**

Psoriatic lesion type	No. of patients	Percentage
Plaque type	38	73.08%
Guttate	9	17.31%
Palmoplantar	2	3.85%
Pustular	2	3.85%
Psoriatic erythroderma	1	1.92%

Clinically, common features were macules/papules/plaques (100 %) followed by moderate-severe itching (80.7%), nail involvement (61.5 %), nail pitting (40.3%), subungual hyperkeratosis (17.3%), nail discolouration (3.84%), Koebner phenomenon (23%), Auspitz sign (75%), pustules (3.85%).
None of the cases included in the present study showed either mucous membrane or joint involvement.

Table 3: **CLINICAL SPECTRUM**

Clinical feature	No. of patients	Percentage
Macules/papules/plaques	52	100.00%
Erythematous, silvery scales	49	94.23%
Itching	42	80.77%
Auspitz sign	39	75.00%
Nail changes	32	61.54%
Winter exacerbation	29	55.77%
Koebner phenomenon	12	23.08%
Pustules	2	3.85%

For the purpose of analysis, the lesions were divided into two major types, early lesions (macules/papules without scaling or mild scaling of < 30 days duration), late lesions (lesions of >30 daysduration with bright red erythema, several layers of silvery scales and positive Auspitz sign).

Generalized and localized Pustular psoriasis (lesions with sterile pustules), Psoriatic erythroderma (diffuse erythema & scaling involving > 90% body surface).

Among 8 cases of early lesions, common features observed were parakeratosis (100%) mild to moderate acanthosis (100%), dilated capillaries and perivascular cellular infiltrate (100%), thinning of supra papillary plate (50%), Munro micro abscess (50%), spongiosis (37.5%).

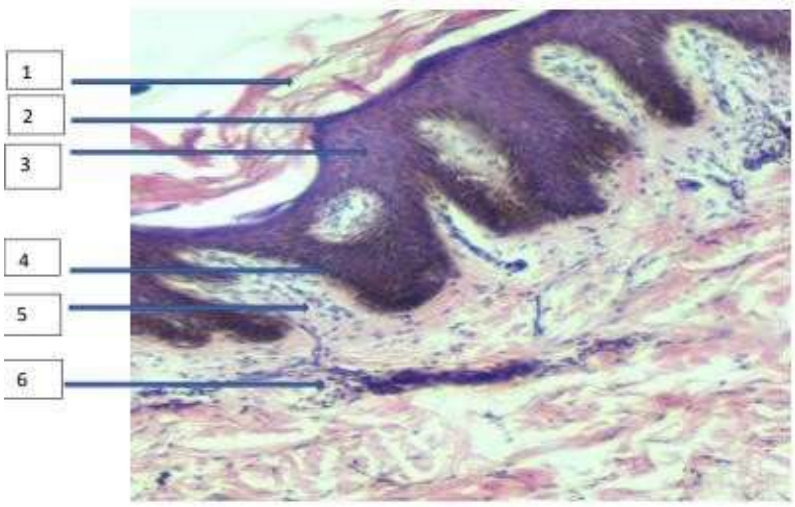


Figure 1: NORMAL HISTOLOGY OF SKIN

1.Stratum corneum (horny layer)
2.Stratum granulosum
3. Stratum spinosum
4.Stratum basale
5. Papillary dermis
6. Reticular dermis

Skin consists of two distinct regions, superficial epidermis, comprising of stratum corneum, stratum granulosum, stratum spinosum, stratum basaleand deep dermis which is subdivided into papillary dermis and reticular dermis

eISSN 1303-5150

CLINICALPICTURES

Figure 2: PLAQUE PSORIASIS WITH SILVERY SCALES

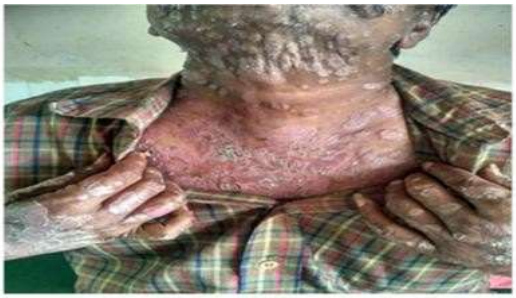


Figure 3: PLAQUE PSORIASIS WITH SILVERY SCALES

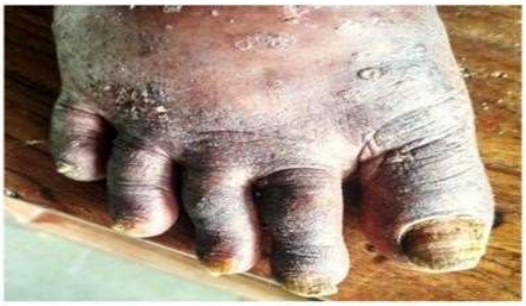


Figure4: NAIL CHANGES

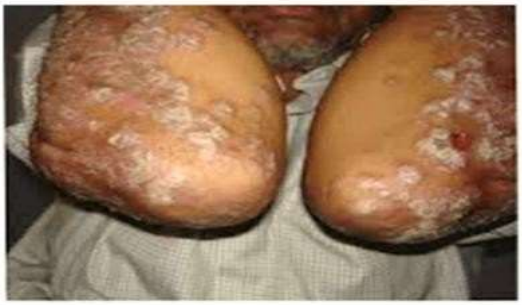


Figure5: PUSTULAR PSORISIS

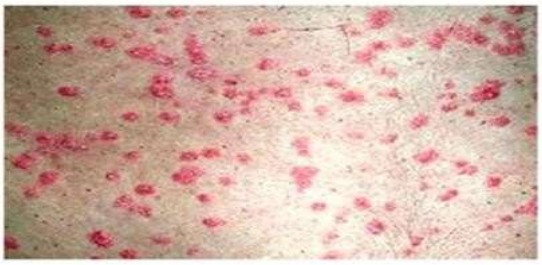


Figure 6-GUTTATE PSORIASIS.

Table 4:Histopathological features of early lesions

Histopathology features	**Number of cases**	**Percentage**
Patchy Parakeratosis	08	100%
Dilated dermal capillaries & perivascular infiltrates	08	100%
Acanthosis		
Mild	06	75%
Moderate	02	25%
Thinning of supra papillary plate	04	50%
Thinning of stratum granulosum	04	50%
Munro micro abscess	04	50%
Spongiosis	03	37.5%

Out of 41 specimens of late lesions that were studied, 90% showed parakeratosis of which 53.6% had uniform and 36.5% had patchy para keratosis. 100% of patients showed Acanthosis of which 75.6% showed marked acanthosis, 24.4% showed mild-moderate acanthosis. Other histopathological changes were dilated dermal capillaries and perivascular cellular infiltrates (100%), thinning of supra papillary plates (51.2%), thinning of stratum granulosum (73.1%), Munro Micro abscess (68.2%) & spongiosis (17%).

Table 5: **Histopathological features of late lesions**

Histopathology features	Number of patients	Percentage
Parakeratosis		
Uniform	22	53.6%
Patchy	15	36.5 %
Acanthosis		
mild-moderate	10	24.4%
Marked	31	75.6%
Thinning of supra papillary plate	21	51.2 %
Thinning of stratum granulosum	30	73.1%
Munro micro abscess	28	68.2%
Spongiosis	07	17%
Dilated dermal capillaries & perivascular infiltrates	41	100%

Perilesional changes observed were dermal edema &dilated dermal capillaries in papillary dermis (53%), dermal perivascular mononuclear infiltrates (42%), intermittent/patchy parakeratosis (11%), mild acanthosis (17%), irregularly elongated rete ridges (7%) & diminished granular layer (5%). Munro micro abscess & supra-papillary thinning was not seen in any perilesional biopsy.

H & E OF HISTOPATHOLOGY OF EARLY LESIONS

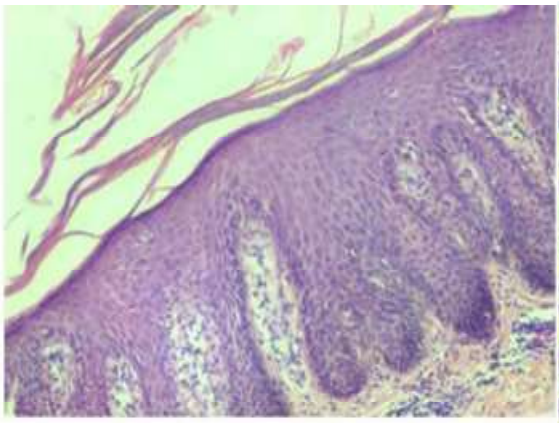


Figure 7: Mild Hyperkeratosis, acanthosis, regular elongated rete ridges, supra papillary thinning, hypogranulosis(10x)

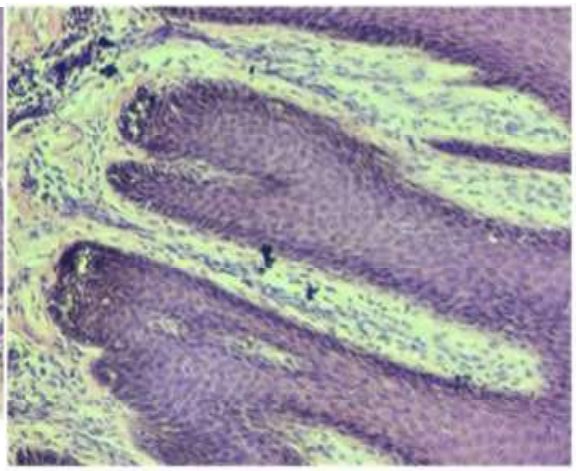


Figure 8: H & E showing elongated, club shaped rete ridges(40x)

H & E OF HISTOPATHOLOGY OF LATE LESIONS

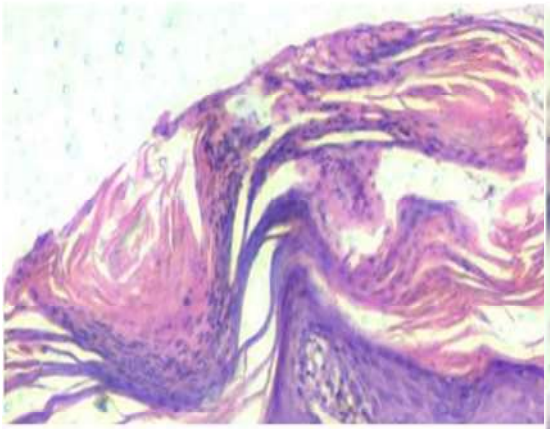
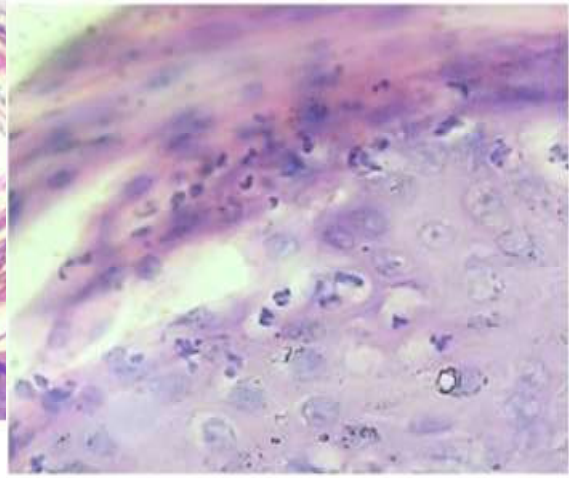


Figure 9: Extensive Hyperkeratosis, parakeratosis & Munro micro abscess (10X)



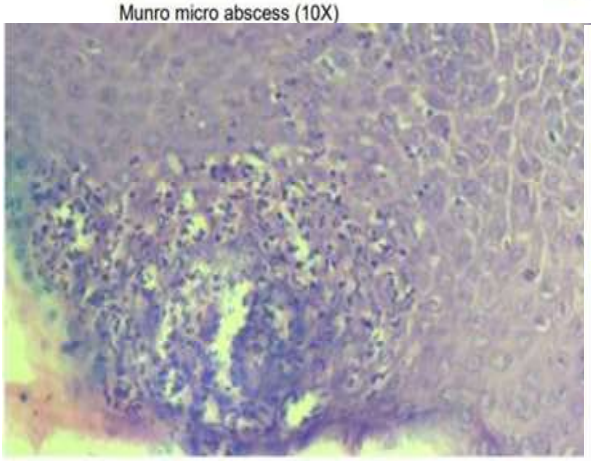


Figure 11: H & E showing Munro micro abscess (10x)

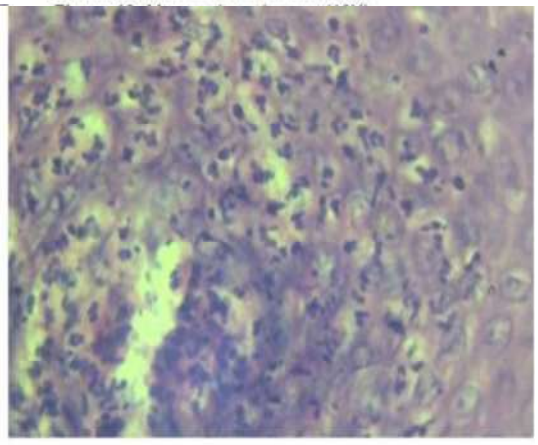


Figure 12: H & E showing Munro micro abscess (40x)

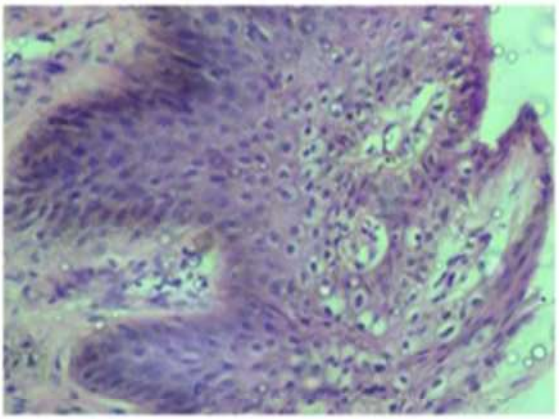


Figure 13: H & E of spongiosis(40x)

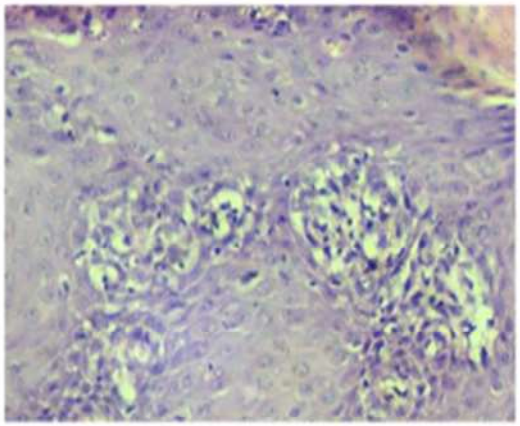


Figure 14: H & E of spongiform pustule of kogoj (40x)

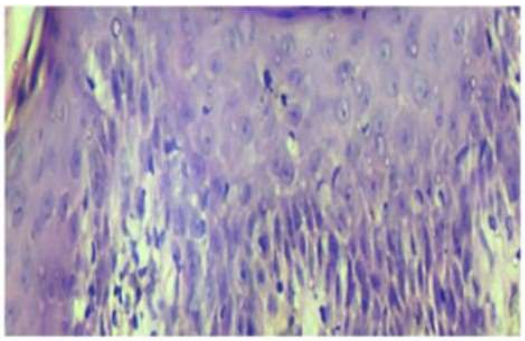


Figure 15: H & E showing mitosis (40x)

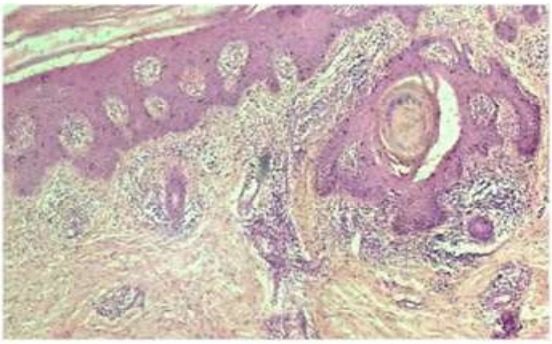


Figure 16: H & E showing Hyper & parakeratosis, moderate acanthosis, dilated dermal capillaries & perivascular infiltrates(10X

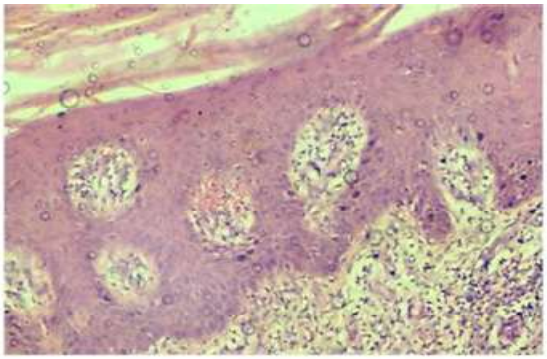


Figure 17: H & E showing Hyper & parakeratosis, moderate Acanthosis, dilated dermal capillaries & perivascular infiltrates (40x)

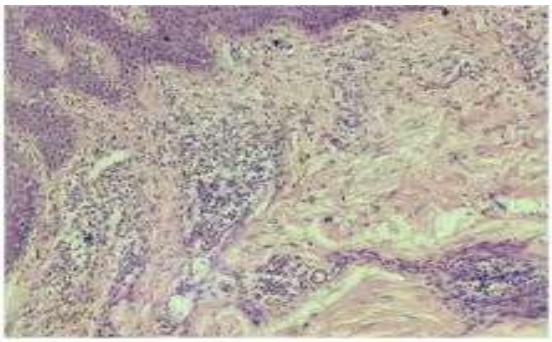


Figure 18

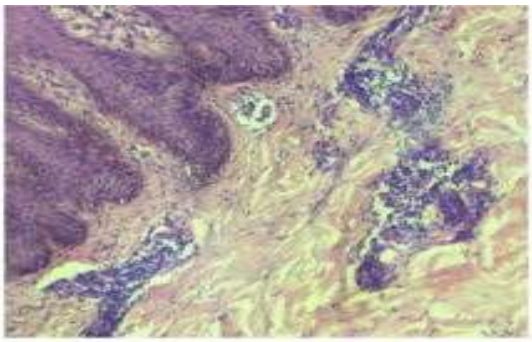


Figure 19

H & E showing dilated dermal capillaries & perivascular dermal infiltrates(10x)

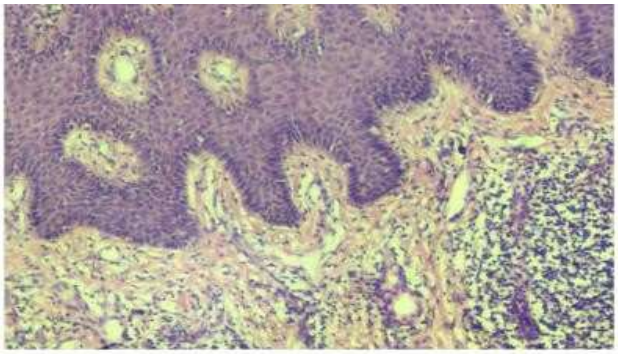


Figure 20: H & E showing dilated dermal capillaries & perivascular dermal infiltrates (40x)

Table 6: **Histopathological features of perilesional biopsies**

Histopathological features	**Number of patients**	**Percentage**
Dilated dermal capillaries	28	53.8%
Dermal perivascular infiltrates	22	42.3%
Acanthosis - Mild-moderate	09	17%
Parakeratosis – Patchy	06	11.5%
Irregularly elongated rete ridges	04	7.6%
Thinning of stratum granulosum	03	5.7%

H & E OF HISTOPATHOLOGY OF PERILESIONAL BIOPSIES

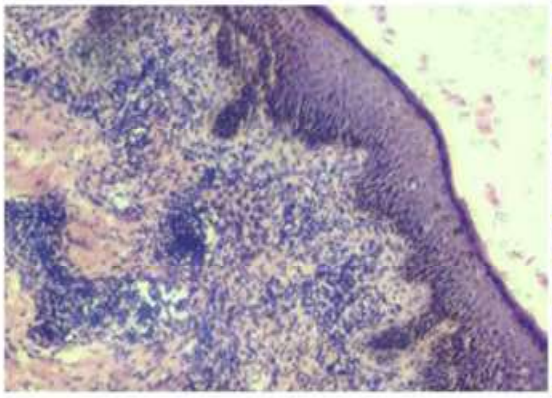


Figure 21: H & E showing no epidermal changes, prominent dermal changes with edema , dilated capillaries, perivascular heavy chronic inflammatory infiltrates(10x)

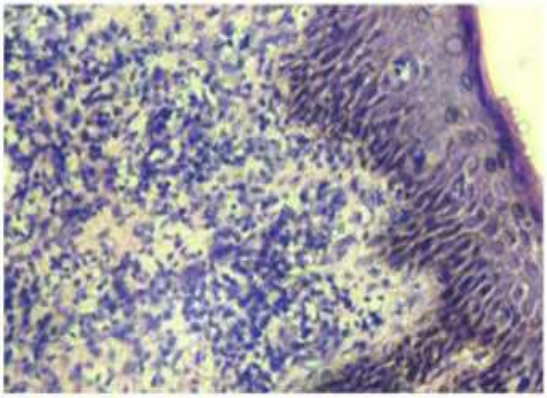


Figure.22: H & E showing no epidermal changes, prominent dermal changes with edema, dilated capillaries, perivascular heavy chronic inflammatory infiltrates(40x)

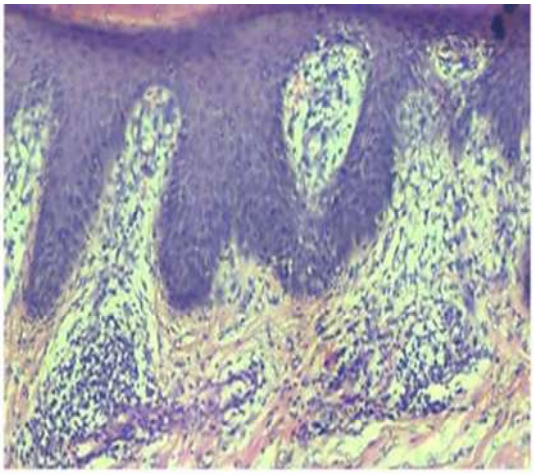


Figure.23 H & E showing prominent dermal changes, mild acanthosis(10x

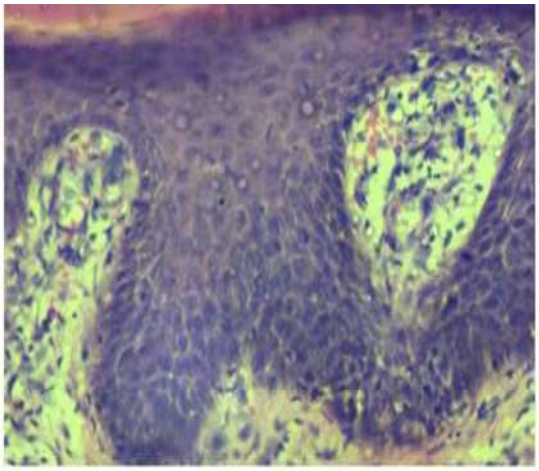


Figure.24: H & E showing prominent dermal changes, mild acanthosis(40x)

DISCUSSION

The skin has a limited number of reaction patterns with which it can respond to various pathological stimuli and clinically different lesions may show similar histologic patterns. There-fore to obtain the precise diagnosis of a skin biopsy, it should be accompanied by all relevant clinical details. The interpretation of skin biopsies requires the identification and integration of two different morphological features, the tissue reaction pattern and pattern of inflammation.

The incidence of psoriasis in our hospital was 1.2%, which is almost similar to observations made by Mehta et al.[7]Sardari Lai[8]&Okhandiar et al.[9] They observed an incidence of psoriasis as 1.5%, 1.25% and of 1.02 % respectively.

The patients with psoriasis are more likely to be stigmatized by societal biases, largely because of cosmetic reasons. Psoriasis has a greater impact upon the quality of life of adults in the 18 to 45 years age range, a life-stage when the individual is usually expected to be the most productive, both occupationally and socially.

In the present study majority of the patients (40.3%) belonged to the age group 31-40 years, followed by the age group 41-50 years (34.6%), Mehta et al.[7], Verma et al.[10] found the highest incidence in the age group of 21-30 years, whereas Sardar Lai[8] found highest number of patients in 11-20 years of age group.

eISSN 1303-5150

In the present study out of 52 patients there were 38 males and 14 females thus the male to female ratio was approximately 2.7:1. Similar findings were noted in the study ofFatani MI[11]&Bedi TR[12].Lower incidence in females as observed may be due to their being less attentive to health, and as psoriasis many a times occur primarily on the waist, buttocks andextensor aspect of extremities, without causing troublesome symptoms. Females would probably like to keep it hidden rather than seek medical advice. Women with psoriasis and psoriatic arthritis are markedly more likely to suffer than men from the emotional and psychological effects of the diseases.

In the present study 34.6% had no influence of season on their disease. 55.7% had exacerbation of their disease in winter, 5 patients (9.6%) had exacerbation during summer. These findings were in concordance with that of Verma et al.[10]

Since psoriasis is a chronic condition that often waxes and wanes in severity, long-term management of the disease can be difficult. Understanding factors that can induce psoriatic exacerbations, flares, and rebounds can facilitate timely clinical intervention and reduce the risk of life-threatening flares from occurring in psoriatic patients.

The choice of therapy for treating exacerbations, flares, andrebounds should be based on the medical history of the patient, the severity of the disease.

Majority of patients in the present study showed chronic plaque type of psoriasis which was in concordance with studies of Griffith et al.[13] who observed Plaque type of psoriasis in about 85-90% of his cases. Bedi et al.[12] observed 90% of his cases showing chronic plaque type psoriasis.

On histopathological examination in early lesions, all cases showed patchy parakeratosis and mild to moderate Acanthosis, thinning of Suprapapillary plates&Munro microabscess which was in concurrence with the results of Sardari Lal[8].All the patients (100%) showed dermal capillary dilation and peri vascular lymphocytic infiltrate. This was in concordance with the results of Braun- Flaco et al.,[14] and Ragaz et al.[15]who noticed preponderance of dermal changes in early lesions.

Among late lesions. 41 patients were studied out of which 90% showed parakeratosis, 100% showed acanthosis, 51.2% showed thinning of supra papillary plate, 73.1% showed thinning or absence of stratum granulosum, 68.2% showed munro micro abscess which were almost in concordance with the results of Sardari Lai.[8] There is a disparity between the findings of our present study and recognized histopathological features of a well-developed lesion of psoriasis. Some specimens in our study showed absence of uniform parakeratosis, presence of normal stratum granulosum, and normal thickness of supra papillary plates.

Among 52 cases of perilesional biopsies, intermittent/patchy parakeratosis was seen in 6 (11%) patients, Mild acanthosis was seen in 9 (17%) patients, irregularly elongated rete ridges were seen in 4 (7%) patients, diminished granular layer seen in 3 (5%) patients, Munro micro abscess & supra papillary thinning were not seen in any perilesional biopsy. But dermal changes like dermal edema & dilated dermal capillaries in papillary dermis were seen in 28 (53%) patients, dermal perivascular mononuclear infiltrates were seen in 22 patients (42%)

Findings of perilesional biopsies in the present study were similar to the studies of Vivekanand et al.,[16] who observed only mild acanthotic change in 8 cases, intermittent parakeratosis in 12.5%, diminished granular layer in 10%, irregular elongation of rete ridges in 13 cases,dilated dermal capillaries in

papillary dermis in57.5%, dermal edema in 52.5%, and perivascular mononuclear infiltration in 32.5% cases of perilesional biopsies.

From the histopathological study of both lesional& perilesional biopsies of Psoriasis, it was observed that epidermal changes were more predominant and with increased intensity than dermal changes in lesional biopsies when compared with perilesional biopsies, whereas, dermal changes were more predominant & with increased intensity than epidermal changes in perilesional biopsies when compared withlesional biopsies, similar to the studies done by Gerald G. Krueger et al.[13], Vivekanand et al.[16]

Histopathological features of pustular and erythrodermic psoriasis were consistent with the clinical features.Perilesional biopsies showed only mild epidermal changes in only fewer patients when compared withlesional biopsies.Perilesional biopsies showed predominant dermal changes like dermal edema,dilated dermal capillaries and dermal perivascular mononuclear infiltrates,with increased intensity than lesional biopsies.

Histopathological evaluation is therefore necessary for confirming the diagnosis of psoriasis.Perilesional findingsof the present study also support the autoimmune theory of psoriasis as observed in recent studies.

Treatment depends upon age, sex, occupation, personality, general health, intelligence and resources as well as the type, extent, duration and natural history of disease. Treatment must always be appropriate to its severity and importance in that individual. Most stable discoid psoriasis should first be approached with topical therapy which disrupts the patient's routine as little as possible. Tar preparations and Vit D analogues are appropriate, but corticosteroids can be used for localized psoriasis. Advanced treatment measures are restricted to those patients, whose psoriasis is physically, socially, economically or emotionally disabling and in whom conventional and topical therapy has failed.[17]

CONCLUSION

Histopathological evaluation is necessary for confirming the diagnosis of Psoriasis because of its typical histological features & for differentiatingit from other histologic mimics. However, all histopathological features are not always found in all cases of psoriasis like in the present study, which might be due to the variations in the degree of activity of the lesions. Perilesional findings of the present study also support the autoimmune theory of psoriasis as aT-cell mediated inflammatory disorder with immune dysregulation, rather than a simple keratinocyte disorder.

Conflict of Interest: None to declare
Source of funding: Nil

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