Original Research Paper

Volume - 12 | Issue - 01 | January - 2022 | PRINT ISSN No. 2249 - 555X | DOI : 10.36106/ijar

Pathology

DIAGNOSTIC UTILITY OF KI 67 IMMUNOSTAINING IN DIFFERENTIATION OF PSORIASIS VS OTHER PSORIASIFORM DERMATITIS

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ABSTRACT **Background:** Psoriasis is a prototype of psoriasiform tissue pattern and needs to be differentiated from other psoriasiform dermatoses (PD) both clinically and histopathologically.

Aim: To study the morphology of psoriasis and other psoriasiform conditions and to study the expression of Ki67 to distinguish psoriasis from the other psoriasiform dermatitis lesions.

Methods: A study was performed on paraffin blocks of 28 psoriasis and 22 psoriasiform dermatitis patients between 2018 and 2020. The selected formalin fixed paraffin embedded tissues from each biopsy specimen were cut into 3-5 µm section and were stained with hematoxylin and eosin. Primary antihuman antibodies against ki67 were applied.

Results: Out of 50 patients, 62% were men and in the age group of 21-40 years. Mean staining of Ki 67 was higher in psoriasis than other psoriasiform dermatitis.

Conclusion: The present study showed the expression of Ki67 biomarker higher in psoriasis as compared to the other psoriasiform dermatitis lesions.

KEYWORDS : Immunohistochemistry; Psoriasis; Psoriasiform Dermatitis, Ki67

INTRODUCTION

Psoriasis is a common, chronic, inflammatory proliferative condition of the skin, associated with systemic manifestations in many organ systems. The pathological abnormalities in psoriasis include hyperproliferation of the epidermis, a marked dermal and epidermal inflammatory infiltrate, increased angiogenesis within the dermis and abnormal cutaneous neuronal/neurotransmitter organization. The term 'Psoriasiform' implies that the lesion either clinically or histopathologicaly mimics psoriasis. This group includes psoriasis, seborrheic dermatitis, pityriasis rubra pilaris, allergic dermatitis, atopic dermatitis, nummular dermatitis, lichen simplex chronicus, prurigo nodularis, pityriasis rosea, inflammatory linear verrucous epidermal nevus and mycosis fungoides.[1,2]

The presence of evenly elongated, thin rete ridges with equally long dermal papillae can imply only one condition i.e., psoriasis. All other diseases exhibit an uneven psoriasiform pattern, i.e., rete ridges are of uneven lengths and thickness with thick supra-papillary plates. One should also observe at this juncture, the depth (superficial or both superficial and deep) and pattern of the dermal infiltrate i.e., perivascular, lichenoid or nodular. A clinical diagnosis is confirmed on histopathology.

Ki-67 monoclonal antibody (mAb) has been suggested to react only with proliferating cells. In order to study epidermal proliferating cells, immunohistological (IHC) staining was performed with Ki-67.

The present study was aimed to attempt evaluation of 50 skin biopsies of clinically diagnosed cases of psoriasis and psoriasiform dermatitis using H& E and IHC expression of Ki 67 to help the clinicians decide optimal management approach for the patient.

MATERIALS AND METHODS

Patients

The present study was approved from the institutional thesis and ethics committee. The patients were selected from documented reports of pathology in which first clinical diagnosis and biopsy proven diagnosis were same as psoriasis or one of the psoriasiform dermatoses.

In the present study, 28 paraffin blocks of psoriasis and 22 blocks of psoriasiform dermatitis were collected from the Department of Pathology, Government Medical College, Amritsar.

Specific diagnoses were identified in all the cases clubbed under PD, but due to small number of entries, statistical analysis mandated considering all of them under the umbrella of one term.

Immunohistochemical And Histopathologic Analysis

The selected formalin fixed paraffin embedded tissues from each biopsy specimen were cut into 3-5 µm sections, mounted on glass slides. Slides were stained with hematoxylin and eosin. The clinical and histopathological diagnoses were made by a dermatologist and a pathologist and was followed by immunohistochemistry application.

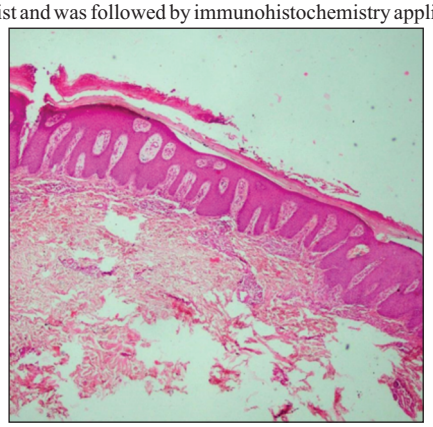

Figure 1: Photomicrograph Showing Psoriasis (H& E, 100X)

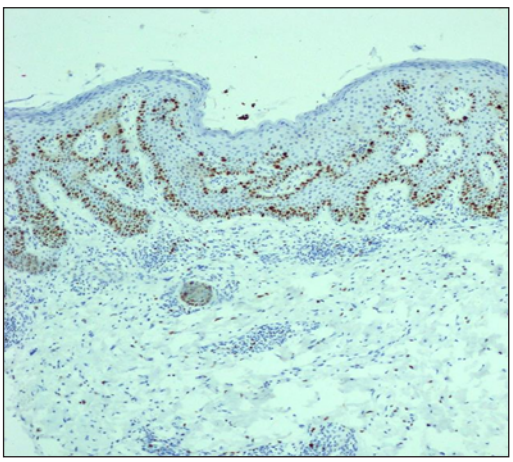

Figure 2: Photomicrograph Showing Immunoreactivity For KI 67 IN PSORIASIS IHC, 400X)

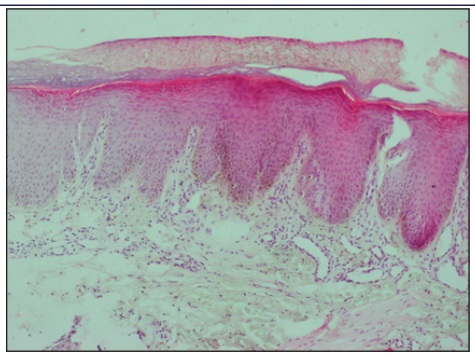

Figure 3: Photomicrograph Showing Lichen Simplex Chronicus (H&E, 400X)

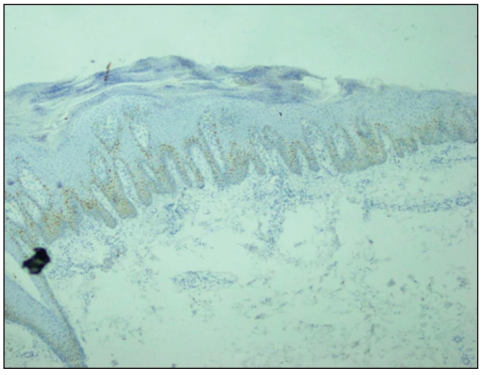

Figure 4: Photomicrograph Showing Immunoreactivity For KI67 IN LSC (IHC ,100X)

Statistical Analysis

Data analysis was done and graphs were plotted using Microsoft Excel software 2010. A p-value <0.05 was considered statistically significant.

RESULTS

Baseline Variables

50 cutaneous paraffin blocks of psoriasis and other psoriasiform dermatitis were analysed. Out of these patients, 62% were men.

Table 1: Age & Gender Wise Distribution

Age group (years)	No. Of Cases	Psoriasis		Psoriasiform Dermatitis	
		M	F	M	F
<=20	5	-	3 (60%)	-	2 (40%)
21-40	20	7 (35%)	4 (20%)	3 (15%)	6 (30%)
41-60	21	12 (57%)	-	5	6 (30%)
61-80	4	2 (50%)	-	2 (50%)	-
Total	50	21 (42%)	7 (14%)	10 (20%)	12 (24%)

Immunohistochemistry Staining Of Ki 67

A positive Ki 67 staining seen as brown stained nuclei of epidermal cells was observed in each sample and was subjected to a scoring system. The positive/negative staining results were found to be different between psoriasis and psoriasiform dermatitis specimens which came out to be statistically significant. (p=0.036) A higher quantitative score was observed in Psoriasis in comparison to the PD group.

Table 2: Showing Quantitative Scoring Of Ki 67

Quantity score of ki67	Psoriasis		Psoriasiform dermatitis	
	No. of cases	%age	No. of cases	%age
Score 0 (no staining)	0	0	0	0
Score 1 (1-10% +cells)	15	53.57	18	81.82
Score 2 (11-50% +cells)	13	46.43	04	18.18
Score 3 (51-80% +cells)	0	0	0	0
Score 4 (81-100% +cells)	0	0	0	0
Total	28	100.00	22	100.00

P=0.036

DISCUSSION

Psoriasis with its varied clinical features mimics many other skin lesions and as a prototype of psoriasiform dermatitis and needs distinction from the other entities to achieve complete resolution of the disease.

In the present study, an IHC marker Ki 67 was used in cutaneous specimens collected from patients with psoriasis and psoriasiform dermatitis, to determine the proliferation index in both the groups.

Psoriasis is characterized by epidermal hyperproliferation and expression of Ki67 is widely used to differentiate it from the normal skin and other skin lesions and also from the Psoriasiform Dermatitis lesions.

The literature suggests that monoclonal antibody Ki-67 reacts only with proliferating cells as it is a human nuclear cell proliferation-associated antigen that is expressed in all active parts of the cell cycle. [3] It is widely used marker to detect S, G2 and M phases of the cell cycle.[4] In present study, 78% (22 out of 28) of psoriatic patients showed moderate staining with Ki67 staining. On comparing the results of Psoriasis with PD, we found out that a larger proportion of psoriatic patients reported a higher quantitative score (Score of 2) in comparison with PD patients in which more patients (81.82%) had a lower quantitative score (Score of 1) and it was found to be statistically significant. (P value of 0.036)

Overexpression of Ki67 in the epidermis of psoriatic lesions was reported in the study by MM Amin et al which was significantly higher than the non-lesional skin (P≤0.001) which may be regarded as a major finding that points out epidermal hyperproliferation and that coincided with the observation by Jun-min, et al. [5] These authors observed that the over-expression of Ki-67 in psoriatic lesions suggested that there was an abnormality of cell cycle regulation of psoriatic keratinocytes. The abnormality might be related to the hyper-proliferation and abnormal differentiation of psoriatic keratinocytes, implying that it may be involved in the pathogenesis of psoriasis. The findings of this study were also in accordance with the observations that show Ki-67 staining as a notable indicator for psoriatic epidermis. [6,7]

While explaining the expression patterns, Caldwell CJ et al [9] in their study have shown that Ki-67 has proven to be of value as a marker of cell proliferation by recognizing the cell cycle-dependent expression of the Ki-67 non-histone nuclear antigen. Also, Ki 67 positive inflammatory cells are in the epidermis and Ki 67 negative dermal cells are in agreement with Nickoloff and Griffiths.

Another notable study done by Sezer et al [10] suggests that Ki-67 is a more sensitive marker in terms of the presence of a cut-off value of 75% for the suprabasal/total epidermal cell count ratio than non-psoriasis psoriasiform dermatoses(NPPD). The study compared the staining patterns of Ki67 in both the groups, and it was found that in Psoriasis group, Ki67 stained cells were also seen in suprabasal layers in comparison to the PD group in which positive Ki67 staining was more or less limited to the basal layer only. This important finding is corroborated by an another study done by Engin Sezer et al in which it was observed that suprabasal Ki67 counts were found to be higher in the Psoriasis group than in the PD group. The study also suggested that the most reliable distinction between the two entities is the cut-off value for suprabasal/total epidermal cell count ratio of 75%, which is higher in all psoriasis and lower in all NPPD cases which may be useful to the dermapathologists in differentiating the PD lesions from psoriasis.

CONCLUSION

Psoriasis is a hyperproliferative skin disorder with increased epidermal turnover compared with other psoriasiform dermatitis. The diagnosis of psoriasis and psoriasiform dermatitis is made mostly on morphology and aided by IHC. In studying the role of Ki-67 expression in differentiating psoriasis from PD lesions, a statistically significant difference was observed in the staining characteristics of Ki67 in Psoriasis when compared to PD lesions. A higher Ki67 quantity score was observed in psoriasis compared to the PD lesions and moreover there was increased suprabasal staining in psoriasis. We recommend that Ki67 should be used with other proliferation markers in psoriasis and psoriasis like lesions for a conclusive diagnosis and a better clinical outcome.

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