Evaluation of Epidermal Reaction Pattern and Assessment of Histopathological Findings of Various Skin Disorders

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ABSTRACT

Introduction: Skin biopsy with histopathologic study may be indicated for any doubt in clinical judgment, be it diagnostic or therapeutic. The present study was undertaken to study histopathological changes in epidermis and epidermal reaction pattern of various skin disorders.

Material and Methods: The present study was carried out over 250 patients with various skin lesions The clinical findings of patients were noted and histopathology reports were than thoroughly evaluated to reach a confirmative diagnosis and thus epidermal pattern were studied. Each biopsy was subjected to systemic and critical interpretative assessment in sequence of epidermal changes or vacuolar changes etc.

Results: Among the disease restricted to the superficial cutaneous units, psoriasiform lesions (n=28, 31.8%) were most common, and lichenoid lesions were the second most common lesions (n=21, 23.8%). Among psoriasiform lesions, psoriasis was the most common lesion in the presenting group (n=26/28). Among lichenoid lesions lichen planus was the most common entity found (n=17/21). Most common epidermal pattern in basal cell carcinoma were peripheral pallisading of basal cells, asymmetric proliferation of epidermis into dermis, and acanthosis.Most common epidermal pattern in squamous cell carcinoma were irregular proliferation of epidermis into dermis and irregular acanthosis.

Conclusion: Histopathology of skin biopsies is an important and mandatory method in the investigation of various skin diseases and together evaluation of clinical correlation microscopical appearance provide diagnostic information.

Keywords: Biopsy, Dermatology, Epidermis, Skin lesions

INTRODUCTION

Skin diseases differ in their appearance according to the pathogenesis of the disease as diseases in which there is an overproduction of epidermal cells or a disorganization of their differentiation often show scaling. Simple benign hyperplasia (overgrowth) of the epidermis such as is commonly seen in infantile eczema often appears as lichenification, a term used to describe a thickening of the epidermis in which the normal surface markings of the skin are greatly exaggerated. Chronic benign or malignant proliferative dermatoses involving the epidermis often have a rough warty surface caused by overproduction by the epidermal cells of keratin.[1]

Skin biopsy with histopathologic study may be indicated for any doubt in clinical judgment, be it diagnostic or therapeutic. The histopathologic report not only clarifies or confirms diagnosis and helps in clinical or surgical management, but it can also be a determinant factor in the medical-patient relationship, with psychological impact on both parties, enhancing the physician certainty about clinical diagnosis and the patient's trust in the management.[2] The present study was undertaken to study histopathological changes in epidermis and epidermal reaction pattern of various skin disorders.

MATERIAL AND METHODS

The present study (prospective) was carried out in Department of Pathology, at tertiary care hospital over 250 patients during the period from January 2014 to November 2015. Various skin lesions that comes in the histopathology section from Department of Dermatology, Government hospital in the form of biopsy material were studied and evaluated. Patients with relevant history and presenting features visiting dermatology outpatients/indoor patients were scrutinized for appropriate skin biopsies. These histopathology reports were than thoroughly evaluated to reach a confirmative diagnosis and thus epidermal pattern were studied. The clinical findings of patients were noted, and after an informed consent biopsy was taken from lesion along with surrounding normal areas. In this process, biopsy site was cleaned and painted with antiseptic solution and adequate amount of material with normal skin was taken by a punch biopsy instrument. The specimen was preserved in 10% formalin subsequently dehydration, clearing, embedding in paraffin wax were carried out. Blocks were made, sections of 3micromtr thickness were cut and stained with Harris Haematoxylin and Eosin stain

Light microscopy technique was used for the diagnosis. Each biopsy was subjected to systemic and critical interpretative assessment in sequence of epidermal changes or vacuolar changes etc.

Department of Dermatology, Government hospital has contributed for the completion of this study by providing relevant patient information and clinical support.

STATISTICAL ANALYSIS

Microsoft excel 2007 was uses to make tables. Descriptive statistics were used to infer results.

RESULTS

After dividing the skin diseases, on the basis of their histopathological characteristics into four strata, the following

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findings were noted (table-1).

DISEASE STRATIFICATION

Diseases Confined To Superficial Cutaneous Lesion: Among 11 cases of eczematous lesions, eczema was seen in 4 cases and 2 cases showed disseminated eczema, 2 cases of atopic dermatitis and one each of hypertrophic eczema, palmoplantar eczema and chronic actinic dermatitis. Among 28 psoriasiform lesions, 26 were of psoriasis and one each of pityriasisrosea and psoriatic erythroderma. Among 21 cases of lichenoid infiltration, 17 cases were of lichen planus, 2 of hypertrophic lichen planus and one each of hyperplastic lichen planus and lichen planopilaris. Among 6 cases of atrophic epidermis 3 were each of DLE and SLE. Among 11 cases of irregular epidermis, 10 cases were of pseudoepitheliomatous hyperplasia (Figure-1) and one each of actinic keratosis and keratoacanthoma as shown in table-2.

Disease With Localised Superficial Epidermal Proliferation: In this disease category; among 33 patients of papillomatous lesion category, 27 patients were of verruca vulgaris, 3 of verruca plana and 2 of molluscumcontagiosum and one was having condylomaaccuminata. Four patients were having seborrheic keratosis with histopathological feature of irregularly thickened epidermis. Among 55 patients showing epidermal proliferation into dermis, 27 patients had basal cell carcinoma (Figure-2), 25 had squamous cell carcinoma (Figure-3)and three were having verrucous carcinoma. Two patients showed elongated rete ridges with diagnosis of lentigosimplex andnaevus and the one was having thinning of epidermis in form of porokeratosis as shown in table-3.

Diseases With Vesiculobullous Lesions: All 7 patients having subcorneal blisters were diagnosed to have pemphigus foliaceous. Of two patients having intraspinous blisters, one each hadDarier's disease and herpes simplex. Among 12 patients having suprabasal blisters, 11 had pemphigus vulgaris (Figure-3) and one is having Grover's disease (Figure-4). Five patients with subepidermal blisters on histopathology showed bullous pemphigoidas illustrated in table-4.

MISCELLANEOUS

Among this category 33 patients had leprosy, two were having keratopilaris. One each was diagnosed with lupus vulgaris, fibrokeratoma,Kyrel's disease, sebaceous carcinoma, prurigo simplex, erythema multiforme.

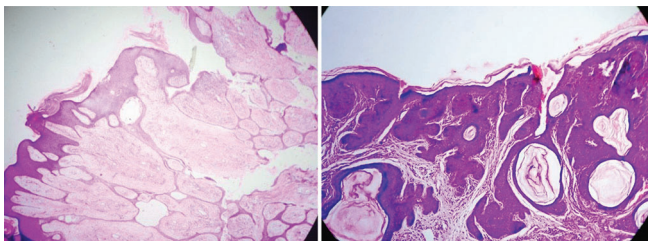


Figure-1: Photomicrograph of pseudoepitheliomatous hyperplasia (H and E stain 4x view); **Figure-2:** Photomicrograph of keratotic basal cell carcinoma (H and E stain 10 x view)

Histopathological classification	Number of patients (out of 250 patients)	Percentage (out of 250 patients)
Superficial Cutaneous Units	88	35.2%
Localized Superficial Epidermal Proliferations	95	38%
Vesiculobullous lesions	26	10.4%
Miscellaneous	41	16.4%
Total	250	100%

Table-1: Histopathological Findings

Sr no.	Histopathological Characteristic	Disease Subtype	Number of Patients	Total
1	Spongiotic Changes	Acute spongiotic dermatitis	1	10
		Sub-Acute spongiotic dermatitis	4	
		Chronic spongiotic dermatitis	5	
2	Eczematous Lesions	Eczema	4	11
		Disseminated eczema	2	
		Hypertrophic eczema	1	
		Palmoplantar eczema	1	
		Chronic actinic dermatitis	1	
		Atopic dermatitis	2	
3	Psoriasiform Lesions	Psoriasis	26	28
		Pityriasisrosea	1	
		Psoriatic erythroderma	1	
4	Lichenoid Infiltration	Lichen planus	17	21
		Hypertrophic LP	2	
		Hyperplastic LP	1	
		Lichen planopilaris	1	
5	Atrophic Epidermis	DLE	3	6
		SLE	3	
6	Irregular Epidermis	Pseudoepitheliomatous hyperplasia	10	12
		Actinic keratosis	1	
		Keratoacanthoma	1	
Total				88

Table–2: Disease confined to superficial cutaneous lesion:

Epidermal patterns

(1) Epidermal changes in psoriasis

Most common histopathologic findings in psoriasis seen in present study were acanthosis(84.6%), hyperkeratosis(76.9%), parakeratosis(69.2%) and psoriasiform hyperplasia(69.2%). Micromunroabscess(7.6%) was seen in few cases as illustrated in table-6.

2) Epidermal changes in lichen planus

All the cases showed orthokeratosis(100%). Wedge shaped hypergranulosis was seen in 88.2% cases. Irregular acanthosis was seen in 94.1% of cases. Max Joseph spaces or small areas of artifactual separation was apparent in 23% of cases as illustrated in table-7

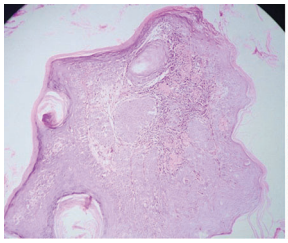
(3) Epidermal changes in Pemphigus

Tomb stone appearance is seen in 81.8% of cases. Hyperkeratosis seen in 27.2 % of cases, while 90.9% of cases showed acanthosis and acanthocytes was observed in 81.8% of cases as illustrated in table-8.

Epidermal changes in Pemphigus foliaceous: Acanthosis and acanthocytes were seen in all the cases of pemphigus foliaceous while dyskeratosis seen in 85.7% of cases as illustrated in table-8.

Epidermal changes in Basal cell carcinoma: All the cases of Basal cell carcinoma showed peripheral pallisading of basal cell layer, while 96.2% cases showed asymmetric proliferation of epidermis into dermis. Acanthosis was seen in 81.4% and atrophic epidermis accounted to less than 20% of cases as shown in table-9.

Epidermal changes in Squamous cell carcinoma: Almost all the cases of squamous cell carcinoma showed irregularly acanthosis while parakeratosis finding was observed in 80% cases (table-9).



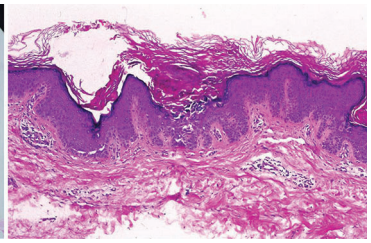


Figure-3: Photomicrograph of squamous cell carcinoma (H and E stain, 10x\ view); **Figure-4:** Photomicrograph of grover's disease (H and E stain 10x view

DISCUSSION

After dividing the skin diseases, on the basis of their histopathological characteristics into four strata, the following findings were noted. Going with the individualized histopathological characteristics, among the disease restricted to the superficial cutaneous units, psoriasiform lesions (n=28, 31.8%) were most common, and lichenoid lesions were the second most common lesions (n=21, 23.8%). Among psoriasiform lesions, psoriasis was the most common lesion in the presenting group (n=26/28). Among lichenoid lesions lichen planus was the most common entity found (n=17/21). Present study was compared with study conducted by Asokan et al[3], and by Bedi et al[4], and it showed concordance with these studies in terms of psoriasis being the most common lesion among psoriasiform lesions. Similar findings of epidermal pattern were seen in a study commenced out by Karumbaiah KP et al[5] in which majority of the lesions showed hyperkeratosis, parakeratosis, acanthosis while hypogranulosis and Munro micro abscess accounted to less than 30%of the cases.

Sr No.	Histopathological Characteristic	Disease Subtype	Number of Patients	Total
1	Papillomatous Lesions	Verruca vulgaris	27	33
		Verruca plana	3	
		Molluscumcontagiosum	2	
		Condylomaaccuminata	1	
2	Irregularly Thickened Epidermis	Seborrheic keratosis	4	4
3	Epidermal Proliferation In To Dermis	Squamous cell carcinoma	25	55
		Basal cell carcinoma	27	
		Verrucous carcinoma	3	
4	Elongated Rete Ridges	Naevus	1	2
		Lentigo simplex	1	
5	Thinning Of Epidermis	Porokeratosis	1	1
Total				95

Table–3: Disease with localised superficial epidermal proliferation

Sr no.	Histopathological Characteristic	Disease Subtype	Number of Patients	Total
1	Subcorneal Blisters	Pemphigus foliaceous	7	7
2	Intraspinous Blisters	Darier's disease	1	2
		Herpes simplex	1	
3	Suprabasal Blisters	Pemphigus vulgaris	11	12
		Grover's disease	1	
4	Subepidermal Blisters	Bullous pemphigoid	5	5
Total				26

Table–4: Disease with vesiculobullous lesions

Most of the characteristic histopathologic features of Lichen planus were seen with regularity in the present study. Most commonly seen findings were orthokeratosis irregular acanthosis, wedge shaped hypergranulosis. These changes account for more than 90% of the cases. Max Joseph space is the least frequent finding present in only 30% of the cases. Present study was in concordance with study conducted byIreddy SG et al[6] regarding most common age presentation of lichen. The results of the present study also correlates with the findings of Parihar A et al.[7]

It is important to distinguish Lichen planus from other lichenoid dermatosis under microscope, as the treatment plan is different and they differ in prognosis also. A lichenoid xanthem triggered by a drug-induced reaction can mimic exanthematous Lichen planus. Lichen ruberanularis may resemble morphea or erythemasannulare, and Lichen ruberlinearis may show similar resemblance to striated nevus or Lichen striatus. These may be differentiated on the basis of the typical predilection sites and the patient's medical history.[8]

Among the diseases with histopathological characteristics of localized superficial epidermal proliferation (n=95), the pattern of epidermal proliferation into dermis (n=55, 57.8%) comprising of patients with squamous cell carcinoma (n=25/55, 45.45%), basal cell carcinoma (n=27/55, 49%) and verrucous carcinoma (n=3/55, 5.45%) was most common followed by papillomatous lesions (n=33, 34.7%) characteristics, of which verruca vulgaris was most common (n=27/33, 81.8%).

Among the patients with infiltrative histopathology, basal cell carcinoma (n=27/55, 49%) was slightly more common than the squamous cell carcinoma (n=25/55, 45.4%). Both diseases showed predilection for patients aged more than 40 years. Most common epidermal pattern in basal cell carcinoma were peripheral pallisading of basal cells, asymmetric proliferation of epidermis into dermis, and acanthosis. Most common epidermal pattern in squamous cell carcinoma were irregular proliferation of epidermis into dermis and irregular acanthosis.

Sr no	Infectious and Miscellaneous Disease	Number of Patients
1	Leprosy	33
2	Lupus Vulgaris	1
3	Keratopilaris	2
4	Fibrokeratoma	1
5	Kyrel's Disease	1
6	Sebaceous Carcinoma	1
7	Prurigo Simplex	1
8	Erythema Multiforme	1
Total		41

Table-5: Infectious and miscellaneous disease

Sr no	Histopathological Changes in Epidermis	No. of Cases (Out of 26)	Percentage (Out of 26)
1	Hyperkeratosis	20	76.9%
2	Parakeratosis	18	69.2%
3	Acanthosis	22	84.6%
4	Psoriasiform Hyperplasia	18	69.2%
5	Hypogranulosis	7	26.9%
6	Munromicro Abscess	2	7.6%

Table-6: Epidermal changes in psoriasis

Sr no	Histopathological Changes In Epidermis	No. of Cases (Out of 17)	Percentage (Out of 17)
1	Orthokeratosis	17	100%
2	Wedge shaped hypergranulosis	15	88.2%
3	Irregular acanthosis	16	94.1%
4	Max Joseph spaces	4	23%

Table-7: Epidermal changes in lichen planus

Epidermal changes in Pemphigus vulgaris			
Sr no	**Histopathological Changes In Epidermis**	**No. of Cases (out of 11)**	**Percentage (out of 11)**
1	Tombstone appearance	9	81.8%
2	Hyperkeratosis	3	27.2%
3	Acanthosis	10	90.9%
4	Acanthocytes	9	81.8%
Epidermal changes in Pemphigus foliaceous			
Sr no	**Histopathological Changes In Epidermis**	**No. of Cases (Out of 7)**	**Percentage (Out of 7)**
1	Acanthosis	7	100%
2	Dyskeratosis	6	85.7%
3	Acanthocytes	7	100%

Table-8: Epidermal changes in Pemphigus

Epidermal changes in Basal cell carcinoma			
Sr no	**Histopathological Changes In Epidermis**	**No. of Cases (N=27)**	**Percentage (N=27)**
1	Asymetric proliferation of epidermis into dermis	26	96.2%
2	Peripheral pallisading of basal layer	27	100%
3	Acanthosis	22	81.4%
4	Atrophic epidermis	5	18.5%
Epidermal changes in Squamous cell carcinoma			
Sr no	**Histopathological Changes In Epidermis**	**No. of Cases(N=25)**	**Percentage (N=25)**
1	Irregularly acanthosis	25	100%
2	Parakeratosis	20	80%

Table-9: Epidermal changes in Skin malignancy

The Vesiculobullous skin diseases comprise a group of eruptions of widely different etiology and prognosis, which sharea common characteristic, the formation of blister cavities with indifferent layers of the epidermis or beneath the epidermis.[9] Of the 26 patients with vesiculobullous lesion, 11 (42%) had pemphigus vulgaris; followed in number by pemhigusfoliaceous (n=7, 27%) and bullous pemphigoid (n=5, 19%). Pemphigus vulgaris was almost equally distributed among the age group 21-40 (n=3, 27%), 41-60 (n=4, 36%) and more than 60 years of age (n=3, 27%). While pemphigus foliaceous was more common in 41-60 years of age group (n=5, 71.43%). Bullous pemphigoid was more common in more than 60 years age group (n=3, 60%). The study showed concordance with study by Arya SR et al[10] regarding age distribution.

Most characteristic findings observed in Pemphigus vulgaris were acanthosis tomb stone appearance of keratinocytes and acanthocyteswhile least common finding was of hyperkeratosis. Findings of present study of Pemphigus foliaceous suggest slightly higher prevalence in females than males. This was in concordance with the findings of Deepti SP et al[11] and SR Arya et al.[10]

Among the miscellaneous category with histopathological finding of epidermal thinning, leprosy was the most common diagnosis made (n=33, 13.2%). It is distributed more commonly in the 21-40 years (n=15) and 41-60 years (n=13) of age group. Total 22 males and 11 females were affected by this disease.

Skin diseases often present a diagnostic dilemma and challenge for the pathologist. Knowledge of the clinical information, microanatomy of the skin, and the biological behaviour of various inflammatory dermatoses, in addition the use of a systematic approach during histological evaluation, are essential to narrow the differential diagnosis, thereby achieving the most accurate and appropriate diagnosis.[12]

CONCLUSION

In the present study, majority of the patients (n=95) showed histopathology characteristics of localized superficial epidermal proliferation accounting to 38% of total received biopsies. In the subunit of localized superficial epidermal proliferation majority (n=55/95) i.e. 57.8% patients showed epidermal proliferation into dermis suggestive of carcinomatous etiology, closely followed by papillomatous lesions (n=33/95 i.e. 34.7%). Most common epidermal pattern in basal cell carcinoma were peripheral pallisading of basal cells, asymmetric proliferation of epidermis into dermis, and acanthosis. Most common epidermal pattern in squamous cell carcinoma were irregular proliferation of epidermis into dermis and irregular acanthosis. Histopathology of skin biopsies is an important and mandatory method in the investigation of various skin diseases and together evaluation of clinical correlation microscopical appearance provide diagnostic information.

REFERENCES

1. Greaves MW. Skindisease Pathology. Available at: http://www.britannica.com/science/human-skin-disease
2. Werner B. Skin biopsy and its histopathologic analysis: Why? What for? How? Part I. An. Bras. Dermatol. 2009;84:391-95.
3. Asokan N, Prathap P, Ajithkumar K, Betsy A, Binesh VG. Pattern of Psoriasis in a tertiary care teaching hospital in South India. Indian J Dermatol. 2011;56:118-9.
4. Bedi TR. Psoriasis in North India. Geographical variations. Dermatologica. 1977;155;310-4.
5. Karumbaiah KP, Anjum A, Dangar K, Mallikarjun M, KariappaTM, Paramesh. Clinicopathological study of Psoriasis. Sch J App Med Sci. 2014;2(1C):298-302.
6. Ireddy SG, Udbalkar SG. Study of Lichen Planus and its different types and associated conditions. Advancejournals.org. 2014;1:1-11.
7. Parihar A, Parihar S, Sharma S, Bhattacharya SN,i Singh UR. Clinicopathologicalstudy of cutaneous lichen planus. Journal of Saudi Society of Dermatology and Dermatologic Surgery. 2015;19:21-26.
8. Kumar UM, Yelikar BR, Inamadar AC, Umesh S, Singhal A, Kushtagi AV. A Clinico-Pathological Study of Lichenoid Tissue Reactions-A Tertiary Care experience.Journal of Clinical and Diagnostic Research. 2013;7:312-6.
9. Laishram RS, Banerjee A, Punyabati P, Sharma CDL. Pattern of skin malignanciesin Manipur, India: A 5-year histopathological review. Journal of Pakistan Association of Dermatologists. 2010;20:128-32.
10. Sudhakar Rao KM, Ankad BS, Naidu V, Sampaghavi VV, Vinod, Aruna MS. A Clinical Study on Warts. Journal of Clinical and Diagnostic Research. 5:1582-4.
11. Murthy TK, Shivarudrappa AS, Biligi DS, Shubhashree MN. Histopathological Study of Vesiculobullous lesions of skin. Int J Biol Med Res. 2015;6:4966-72.
12. Arya SR, Valand A G, Krishna K. A clinico-pathological study of 70 cases of pemphigus. Indian J DermatolVenereolLeprol. 1999;65:168-71.
13. Deepti SP, Sulakshana MS, Manjunatha YA, Jayaprakash HT. A histomorphological study of bullous lesions of skin with special reference to immunofluorescence**.** Int J Curr Res Aca Rev. 2015;3:29-51.
14. Alsaad KO, Ghazarian D. My approach to superficial inflammatory dermatoses. Journal of Clinical Pathology. 2005;58:1233-41.

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