Journal of Population Therapeutics & Clinical Pharmacology

RESEARCH ARTICLE
DOI: 10.53555/jptcp.v31i2.4361

HISTOMORPHOLOGICAL CHARACTERISATION OF NON-SPECIFIC DERMATITIS ON SKIN BIOPSIES ANALYSED IN A TERTIARY CARE CENTRE.

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Abstract:
Histopathologic examination of skin biopsies is very crucial in the clinical dermatology. A need for pattern categorization of non-specific dermatitis is an important step in the algorithmic approach of inflammatory dermatosis. Histopathological diagnosis is based on clinical correlation but many times there is discordance between morphological findings and clinical diagnosis leading to descriptive reporting. Such reporting is often of little help to the dermatologist. Hence there is a need to look into these non-specific morphological groups so that a criteria/ algorithm could be developed to give a definitive diagnosis. A one year retrospective study was done in department of pathology, school of medical science and research. A total of 62 cases H&E slides were examined by two pathologist and the categories which were non-specific were labelled as study group. The study group included 32 cases were reclassified into predominant inflammatory reaction pattern i.e spongiotic, interface, psoriasiform, lichenoid to reclassify this group. Out of the total 62 skin biopsies, 32 (52%) cases were non-specific and the most common histopathological features with non-specific dermatitis cases were mild degree of spongiosis (44%), compact orthokeratosis (37.5%), acanthosis (56.3%), dermal interface vacuolisation (47%) and most common distribution of dermal infiltrate were superficial (66%). Most common pattern of dermatitis was spongiotic (65.6%) followed by lichenoid pattern (15.6%).
Morphological categorisation of non-specific dermatitis under spongiotic, interface, psoriasiform or lichenoid according to the pattern of distribution is much more informative than giving a purely

descriptive reporting. A clinicopathological correlation becomes much easier and relevant for the dermatologist.

Keywords - Dermatopathology, dermatosis, spongiotic, interface, dermatitis

Introduction

Histopathological diagnosis of all skin biopsies is very crucial in the clinical dermatology practice.[1] Dermatopathology is a complex branch and too often histopathologists feel overwhelmed with the complexity of varied morphology of inflammatory disorders. Many times there is discordance between morphological findings and a clinical diagnosis or clinical impression leading to failure of a conclusive diagnosis.[2] At other times the morphological findings are so varied and overlapping with different clinical entities that a definite diagnosis becomes really difficult. It is essential for clinical management and inspite of this large number of cases are given descriptive or non-specific diagnosis. Most of the times "mixed" histopathologic reaction patterns like spongiotic-interface or or say psoriasiform-lichenoid) pose an interpretative challenge requiring careful clinicopathologic correlation. Such reporting is often of little help to the dermatologist. Dermatologists with huge clinico-pathologic exposure to diagnosis and management of dermatitis can help guide the histopathologist to the recognition of specific clue findings in the biopsy that can point towards a specific direction. There is a need for categorization of non-specific dermatitis biopsies into predominant reaction patterns in the algorithmic diagnostic approach of inflammatory dermatosis[3]

Material and methods

Our study was done for a period of one year from September 2021 to August 2022 in the Department of Pathology in a School of Medical Sciences and Research, Uttar Pradesh after taking approval from institutional ethical committee. All the well preserved skin punch biopsies received in our histopathology section were registered for the study. The punch biopsies in 10% neutral buffered formalin were processed routinely and stained with Haematoxylin and Eosin stain. Special stains i.e Ziehl Nielsen stain (for Acid Fast Bacilli), Fite faraco stain for lepra bacilli and Periodic acid schiff (PAS) stain were applied wherever Required following the standard protocol.[4] A Total of 62 cases H&E slides were examined by two independent pathologist and microscopic findings were correlated with the clinical diagnosis.

On the basis of specific histopathological findings, the entities were divided into six broad groups: 1) Lichenoid/interface 2) Psoriasiform 3) Spongiotic 4) Vesiculobullous 5) Granulomatous and 6) Vasculopathic. The categories which were non-specific or overlapping were labelled as our study group. The histopathological parameters were matched with the clinical diagnosis made by the dermatologist and clinicopathologic consistency was evaluated.

Results

Our study was a retrospective evaluation of 62 cases, which were received in histopathology section of School of medical sciences and research, Sharda university, Uttar Pradesh over a period of one year (September 2021-August 2022). Out of the total 62 skin biopsies, 32 (52%) cases were non-specific.**(Table 1)** Spectrum of histopathological changes in epidermis and dermis were analysed and the most common histopathological features associated with non-specific dermatitis observed were mild degree of spongiosis (44%) **(Table 2)**, compact orthokeratosis (37.5%) followed by basket weave orthokeratosis **(Table 3)** with acanthosis present (56.3%),**(Table 4)** granular layer unremarkable in 69% cases, dermal interface vacuolisation in 47% and most common distribution of dermal infiltrate were superficial (66%) with 63% cases showing lymphocytic infiltrate **(Table 5)** revealing most commonly perivascular pattern (63%) followed by lympho-histiocytic.**(Table 6)** Most common predominant pattern of dermatitis was spongiotic (65.6%) followed by lichenoid pattern (15.6%).**(Figures 1-8).**

Tables & Figures:

Table 1- Spectrum of reaction pattern in inflammatory dermatitis

Broad Category	Total	Percentage	Sub category	No. of cases	Percentage
Lichenoid/Interface	9	14.5	Lichen Planus	2	3.2
			Lichen Planus Pigmentosus	2	3.2
			Verruca Plana	2	3.2
			DLE	1	1.6
			Lichen Sclerosus Et Atrophicus	1	1.6
			Polymorphous Drug Reaction	1	1.6
Psoriasiform	5	8.1	Psoriasiform Drug Eruption	2	3.2
			Erythroderma	1	1.6
			Psoriasis Vulgaris	1	1.6
			Pityriasis Lichenoid Chronicus	1	1.6
Spongiotic	2	3.2	Allergic contact dermatitis	1	1.6
			Seborrheic dermatitis	1	1.6
Vesiculobullous	2	3.2	Angiokeratoma	1	1.6
			Leucocytoclastic Vasculitis	1	1.6
Granulomatous	7	11.3	Borderline Tuberculoid Leprosy	3	4.8
			Borderline Lepramoid Leprosy	2	3.2
			Granuloma Annulare	1	1.6
			Lupus Vulgaris	1	1.6
Vasculopathic	5	8.1	Bullous Impetigo	1	1.6
			Dermatitis Herpetiformis	1	1.6
			Pemphigus Vulgaris	1	1.6
			Varicella	1	1.6
			Toxic Epidermal Necrolysis	1	1.6
Non- specific	32	51.6	Non-Specific Dermatitis	32	51.6
Total	62	100	Grand Total	62	100.0

Table 2: Degree of spongiosis in non-specific dermatitis cases

Spongiosis	Count Total	Percentage
Mild	14	43.7
Moderate	7	21.8
Not Present	11	34.3
Grand Total	32	100.0

Table 3: Pattern of keratosis in non-specific dermatitis cases

Keratosis	Count Total	Percentage
Atrophic	2	6.3
Basket-Weave Orthokeratosis	8	25.0
Compact Orthokeratosis	12	37.4
Parakeratosis	2	6.3
Unremarkable	8	25.0
Grand Total	32	100

Table 4: Pattern of acanthosis in non-specific dermatitis cases

Acanthosis	Count Total	Percentage
Nil	13	40.6
Patch	1	3.1
Present	18	56.3
Grand Total	32	100

Table 5: Pattern of predominant inflammatory cells infiltrate in non-specific dermatitis cases

Composition	Count Total	Percentage
Eosinophils	1	3.1
Lymphocytes	20	62.5
Lympho-Histiocytic	7	21.9
Neutrophils	4	12.5
Grand Total	32	100

Table 6: Perivascular inflammation in non-specific dermatitis cases

Perivascular	Count Total	Percentage
Not Present	12	37.5
Present	20	62.5
Grand Total	32	100.0

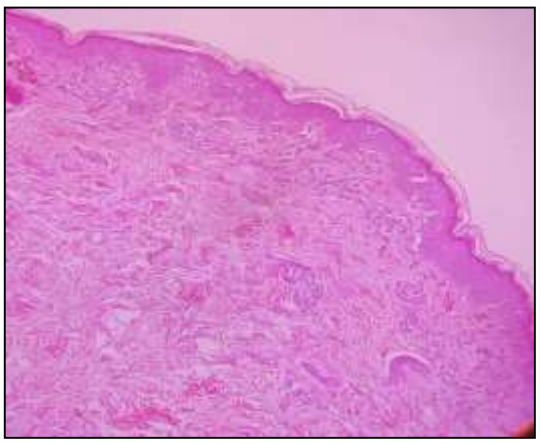


Figure 2

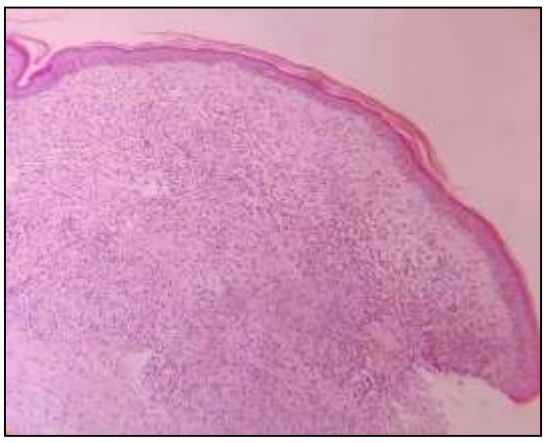
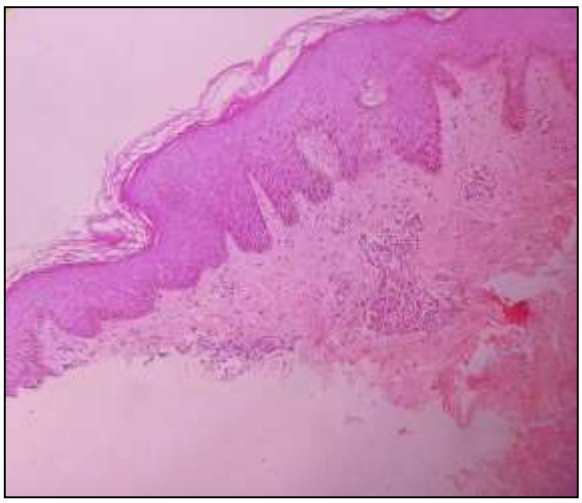


Figure 1



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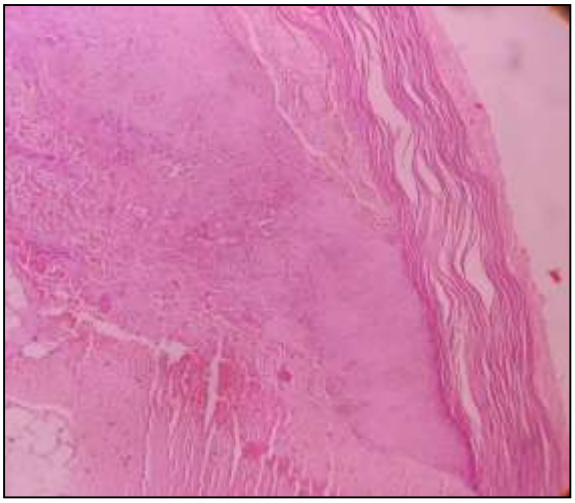

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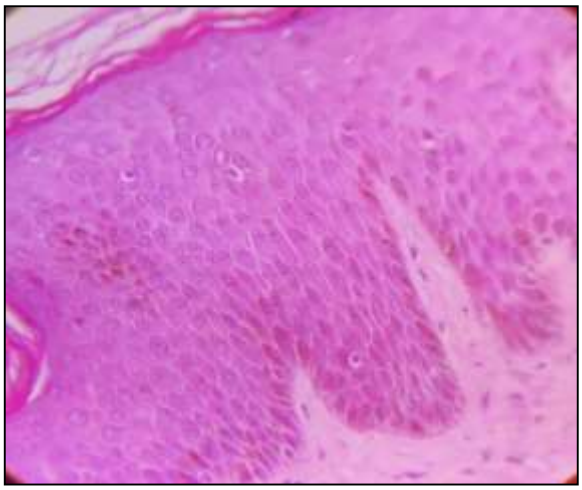

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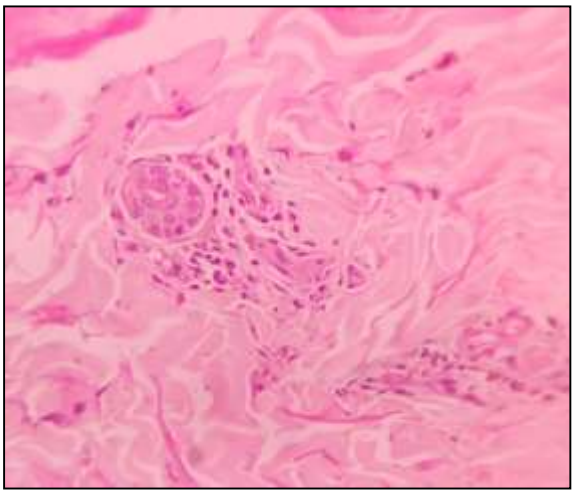

Figure 6

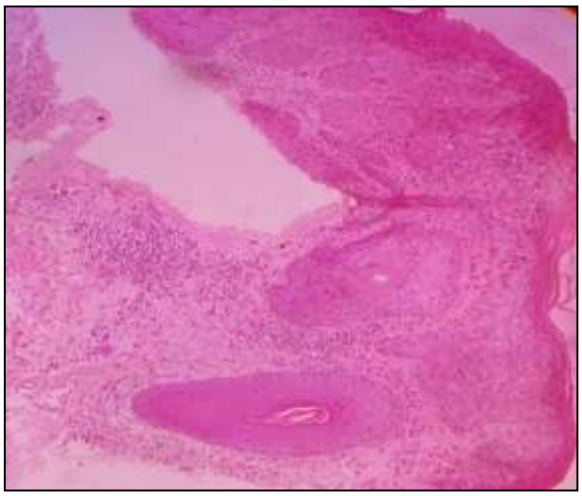

Figure 7

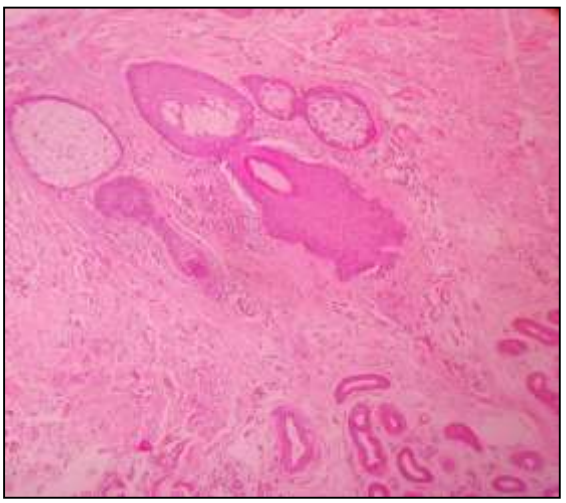

Figure 8

Figure 1-8: Photomicrographs from variable histomorphology of non specific dermatitis.(1) mild dermo-epidermal lymphocytic infiltrate with basal layer vacuolisation (2) orthokeratosis with superficial and deep dermal infiltrate (3) acanthosis with perivascular infiltrate (4) basket-weave orthokeratosis with pigment incontinence (5) mild spongiosis with acanthosis (6) periadnexal infiltrate (7) lichenoid infiltrate (8) periadnexal lymphocytic infiltrate (H&E stained slides)

Discussion

Though the commonest, inflammatory dermatitis comprise a wide, complex variety of clinical disorders and it becomes very important to recognise the microanatomy of the skin to understand the variable histological patterns of inflammatory skin diseases. The skin as we know is divided into four anatomical compartments from the histopathological perspective [5]

1. First compartment comprise the epidermis, papillary dermis and superficial vascular plexus.
2. Second compartment consists of the reticular dermis and the deep vascular plexus.
3. Third compartment consists of the pilo-sebaceous units, the eccrine glands, the apocrine glands.
4. Fourth compartment constitutes the subcutaneous tissue.

A compartmental approach to derive to a reaction pattern is a key to diagnosis of inflammatory dermatosis however there are certain limitations to this approach eg the size of the skin biopsy sent should be adequate and must represent all the four compartments. Punch biopsies lesser than 2 mm is considered too small to include all compartments and almost always likely to be inadequate to demonstrate a specific pattern. Skin biopsy of 4mm is ideal for the histological evaluation of most inflammatory dermatitis.[6]

In present study, emphasis is encouraged on for the use of standard terminologies while Describing various inflammatory conditions along with consideration of predominant tissue reaction patterns and hence categorization of inflammatory dermatoses. It is also very necessary to emphasize on the fact that for certain pattern of inflammation there can be innumerable different entities encompassed within that inflammatory reaction pattern.[7]

Practical approach to superficial inflammatory dermatoses involve the first unit of the skin.[8] Superficial perivascular inflammatory infiltrate is the most common pattern of reaction.[9] Inflammatory dermatoses that involve the first compartment of the skin are divided mainly into three categories: (1) non-vesiculobullous (based on the presence or absence of epidermal changes non-vesiculobullous are divided into two categories and when epidermal changes are present, they are further subclassified into spongiotic dermatitis, interface dermatitis, lichenoid and psoriasiform dermatitis) (2) pustular dermatoses, and (3) vesiculo-bullous lesions.[10]

Inflammatory dermatoses should be grouped according to six specific patterns or say major tissue reactive patterns approach to classify primarily based on depth of involvement from epidermis, papillary dermis and superficial vascular plexus encompassing the vesiculobullous lesions, pustular dermatosis and non vesiculobullous, non-pustular with or without epidermal changes.[11] These classically have a predominant superficial perivascular inflammatory infiltrate, and can be classified by type of inflammatory cell infiltrate most common being lymphocytic, lymphoeosinophilic , lymphoplasmacytic, lymphohistiocytic and neutrophilic. Non-vesiculobullous, non-pustular lesions showing epidermal changes i.e spongiotic dermatitis are characterized by intercellular edema.[12] In our study, perivascular pattern of inflammation was most commonly seen with presominantly lymphocytic type of cell infiltrate. Interface dermatitis are sub-categorised into interface dermatitis with vacuolar change and interface dermatitis with lichenoid inflammation. Psoriasiform dermatitis reveal classical regular epidermal hyperplasia, elongation of the rete ridges, hyperkeratosis and parakeratosis. Also there is superficial perivascular inflammatory infiltrate revealing epidermal thinning of overlying the tips of suprapapillary plates and dilated, tortuous blood vessels within the papillae.[13]

Conclusion

The histolopathology of skin inflammatory disorders can be lot confusing, even for the most experienced pathologist probably because the immune system within the skin has limited ways in which it responds to any antigenic stimulus, and many inflammatory diseases do not show characteristic histological features. This study revealed that in a non-specific category clubbing them

under various forms dermatitis spongiotic, interface, psoriasiform or lichenoid according to the pattern of distribution is much more informative than giving a purely descriptive reporting. A clinico-pathological correlation becomes much easier and relevant the dermatologist can re-examine the patient according to the classification or may be in a position to reclassify or diagnose the case for proper treatment and management.

Source of support: Self
Conflict of interest- None, declared by all authors

Declarations:
Funding- Not applicable

Conflicts of interest/Competing interests- Not applicable

Code availability (software application or custom code)-Not applicable

Authors' contributions –
Dr. Monal and **Dr. Kangana** was responsible for the literature search and drafting of manuscript along with reviewing, editing and interpretation of slides. **Dr. Neema Tiwari** and **Dr. Sarandeep Singh Puri** was involved in drafting of manuscript. **Dr. Jyoti** was responsible for interpretation of slides. **Dr. Mandal** was responsible for diagnosing, editing and the final approval of the draft.

References-

1. Elder DE, Elenitsas R, et al. Outline of cutaneous pathology. Chapter 5. In: David E. Elder, ed. Lever's Histopathology of the Skin, 10th ed. New Delhi: Wolters Kluwer/Lippincott Williams and Wilkins, 2009; pp.83-114.
2. Crowson A. Superficial and Deep Perivascular Dermatitis. In: Barnhill RL, Crowson A, Margo CM, Piepkorn MW, Kutzner H, Desman GT. Eds. Barnhill's Dermatopathology, 4e. McGraw Hill; 2020.
3. Mehregan AH. Evolution of a Dermatopathologist-A 35-year Experience. The Gulf Journal of Dermatology 1994;1:2:1-10.
4. Gayti B. Morris, Elisabeth J. Ridgway, S. Kim Suvarna. Traditional stains and modern techniques for demonstrating microorganisms in histology. Editor(s): S. Kim Suvarna, Christopher Layton, John D. Bancroft. Bancroft's Theory and Practice of Histological Techniques (Eighth Edition). Elsevier, 2019. Pages 254-79.
5. Kaler AK, Parthiban R. An approach to the diagnosis of superficial inflammatory dermatosis. Hum Physiol 2013;62:17617-622.
6. Alsaad KO, Ghazarian D. My Approach to Superficial Inflammatory Dermatoses. J Clin Pathol 2005;58:1233–1241. DOI: 10.1136/ jcp.2005.027151.
7. Billings, S.D. Common and critical inflammatory dermatoses every pathologist should know. Mod Pathol 33 (Suppl 1), 107–117 (2020). https://doi.org/10.1038/s41379-019-0400-z.
8. Elston DM, Stratman EJ, Miller SJ. Skin biopsy: Biopsy issues in specific diseases. J Am Acad Dermatol 2016;74(1):1-16.
9. Sina B, Kao GF, Deng AC, Gaspari AA. Skin biopsy for inflammatory and common neoplastic skin diseases: Optimum time, best location and preferred techniques – A critical review. J Cutan Pathol 2009;36(5):505-10.
10. Ram-Wolff C, Martin-Garcia N, Bensussan A, Bagot M, Ortonne N. Histopathologic diagnosis of lymphomatous versus inflammatory erythroderma: a morphologic and phenotypic study on 47 skin biopsies. Am J Dermatopathol. 2010 Dec;32(8):755-63. doi: 10.1097/DAD.0b013e3 181cfbfbf. PMID: 20559121; PMCID: PMC3298112.

11. Hedge VK, Khadilkar UN. A clinicopathological study of interfacedermatitis. Indian J Pathol Bacteriol 2014;57:386-89.
12. Raghuveer C, Shvanand DR, et al. A clinic-histopathological study of psoriaris. Int J Sci Stud 2015;3:176-79.
13. Kaler AK, Parthiban R. An approach to the diagnosis of superficial inflammatory dermatosis. Hum Physiol 2013;62:17617-622.