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Original Article

Histopathological Spectrum of Non-Neoplastic Lesions of Skin in a Tertiary Care Hospital of South Gujarat

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ABSTRACT

Background: Non-neoplastic skin lesions constitute a major proportion of dermatological disorders encountered in routine clinical practice, particularly in developing countries. Due to overlapping clinical features, accurate diagnosis based solely on clinical examination is often difficult, making histopathological evaluation essential.

Aim: To study the histopathological spectrum of non-neoplastic skin lesions in a tertiary care hospital of South Gujarat and to assess the diagnostic utility of punch biopsy.

Materials and Methods: This descriptive study was conducted in the Department of Pathology over a one-year period from January 2024 to December 2024. A total of 140 skin punch biopsy specimens were received, of which 110 cases diagnosed as non-neoplastic skin lesions were included in the study. Detailed clinical data were recorded. All specimens were processed routinely and examined using hematoxylin and eosin staining, with special stains applied where indicated. Histopathological findings were correlated with clinical features.

Results: The age of patients ranged from 12 to 97 years, with the highest number of cases observed in the 21–30-year age group. Male predominance was noted. Borderline leprosy was the most common histopathological diagnosis, followed by lepromatous leprosy and lichen planus. Infectious and inflammatory dermatoses were more frequent in younger age groups, while autoimmune and connective tissue disorders were seen predominantly in older patients.

Conclusion: Non-neoplastic skin lesions exhibit wide histopathological diversity with significant clinicopathological overlap. Histopathological examination of punch biopsy specimens remains the gold standard for accurate diagnosis, classification, and effective management, particularly in regions where infectious dermatoses remain endemic.

Keywords*: Non-neoplastic skin lesions; Histopathology; Punch biopsy; Leprosy; Clinicopathological correlation; Dermatopathology; Tertiary care hospital.*

INTRODUCTION

The skin is the largest organ of the human body and serves as a vital protective barrier against physical, chemical, and biological agents. [(1)] Due to its constant exposure to the external environment, the skin is susceptible to a wide variety of disorders. Skin diseases constitute a significant public health problem, particularly in developing countries, and contribute substantially to morbidity and impairment in quality of life. Non-neoplastic skin lesions form a major proportion of dermatological conditions encountered in routine clinical practice. These lesions encompass a broad spectrum of disorders, including inflammatory, infectious, granulomatous, pigmentary, and connective tissue diseases. [(2)] Clinically, they may present as macules, papules, plaques, nodules, vesicles, or pustules. Owing to the overlap in clinical presentation among many of these conditions, accurate diagnosis based solely on clinical examination is often challenging. Histopathological examination remains the gold standard for the diagnosis of non-neoplastic skin lesions[(3)].

Skin biopsy provides valuable information regarding epidermal, dermal, and subcutaneous involvement and helps in distinguishing clinically similar lesions. Among the various biopsy techniques, punch biopsy is the most commonly employed method as it is simple, minimally invasive, cost-effective, and provides an adequate full-thickness sample of skin for histopathological evaluation. Clinicopathological correlation plays a pivotal role in arriving at a definitive diagnosis, as histopathological findings must be interpreted in conjunction with clinical features. Early and accurate diagnosis through histopathological evaluation not only aids in appropriate disease classification but also facilitates timely initiation of treatment, thereby reducing complications and improving patient outcomes.The present study was undertaken to evaluate the histopathological spectrum of non-neoplastic skin lesions in a tertiary care hospital and to highlight the diagnostic utility of punch biopsy with clinicopathological correlation.

AIM AND OBJECTIVES

Aim

To study the histopathological spectrum of non-neoplastic skin lesions in a tertiary care hospital of South Gujarat.

Objectives

- To analyze the histopathological patterns of various non-neoplastic skin lesions.
- To study the age- and sex-wise distribution of non-neoplastic skin lesions.
- To assess the utility of punch biopsy in the diagnosis of non-neoplastic skin disorders.

MATERIALS AND METHODS

This descriptive study was conducted in the Department of Pathology of a tertiary care hospital over a period of one year, from January 2024 to December 2024. Skin punch biopsy specimens received from the Department of Dermatology during the study period were included. A total of 140 skin punch biopsy specimens were received, out of which 110 cases were diagnosed as non-neoplastic skin lesions and included in the study. Clinical details including age, sex, site of lesion, nature of lesion, duration of lesion, and provisional clinical diagnosis were recorded. Patients of all age groups with clinically suspected non-neoplastic skin lesions were included. Inadequately preserved specimens and cases diagnosed as neoplastic skin lesions were excluded from the study. All biopsy specimens were fixed in 10% neutral buffered formalin. During gross examination, the tissue was submitted in toto and processed using an automated tissue processor. Paraffin-embedded tissue blocks were prepared, and sections of 4–5 µm thickness were cut using a rotary microtome. The sections were routinely stained with hematoxylin and eosin. Special stains such as Ziehl–Neelsen, Fite–Faraco, Gomori's methenamine silver, and Periodic acid–Schiff were employed wherever indicated. Histopathological diagnosis of each case was made in correlation with clinical findings. The various non-neoplastic skin lesions were classified based on histopathological features and further analyzed with respect to age and sex distribution.

RESULTS

Total 140 punch biopsies of skin were received in pathology department in tertiary care hospital from January 2024 to December 2024, out of them, 110 punch biopsies were diagnosed as non-neoplastic lesions of skin. Commonest non-neoplastic lesions along with their age and gender wise distribution were analyzed as follows.

- **Table:1-Age wise distribution of Non-neoplastic lesions of skin. (n=110)**

Age group (years)	cases	Percentage
10-20	29	26.3%
21-30	41	37.2%
31-40	12	10.9%
41-50	10	9.0%
51-60	08	7.2%
61-70	05	4.5%
71-80	03	2.7%
81-90	00	00
91-100	02	1.8%
Total	110	100%

The age of patients in the present study ranged from 12 to 97 years. Non-neoplastic skin lesions were most commonly observed in the 21–30 years age group, accounting for 37.2% of cases, followed by the 10–20 years age group (26.3%). The least number of cases were noted in patients above 80 years of age.

- **Table:2-Gender wise distribution of Non-neoplastic lesions of skin. (n=110)**

Gender	case	Percentage
Male	**68**	**61.8%**
Female	**42**	**38.1%**
Total	**110**	**100%**

Non-neoplastic skin lesions were more commonly observed in males (61.8%) compared to females (38.2%), as shown in Table 2.

- **Table:3- Gender wise distribution of histopathological spectrum of Non-neoplastic lesions of skin .(n=110)**

Histopathological Diagnosis	Male	Female
Borderline Leprosy	**16(23.5%)**	**07(16.6%)**
Lepromatous Leprosy	**11(16.1%)**	**04(9.5%)**
Tuberculoid Leprosy	**07(10.2%)**	**04(9.5%)**
Lichenoid Interface	**04(5.8%)**	**03(7.1%)**
Lichen Planus	**09(13.2%)**	**03(7.1%)**
Psoriasis	**04(5.8%)**	**01(2.3%)**
Psoriasis Vulgaris	**04(5.8%)**	**03(7.1%)**
Granuloma Annulare	**03(4.4%)**	**01(2.3%)**
ENL*	**02(2.9%)**	**04(9.5%)**
Pemphigus Foliaceus	**02(2.9%)**	**02(4.7%)**
TEN*	**01(1.4%)**	**02(4.7%)**
Morphea	**00**	**06(14.2%)**
Spongiotic dermatitis	**02(2.9%)**	**01(2.3%)**
Vascular Interface Dermatitis	**03(4.4%)**	**00**
Polymorphea light eruption	**00**	**01(2.3%)**
Total (110 cases)	**68 cases**	**42 cases**

***ENL:Erythema Nodosum Leprosum ,*TEN:Toxic Epidermal Necrolysis**

Table 3 depicts the gender-wise distribution of the histopathological spectrum of non-neoplastic skin lesions. Borderline leprosy was the most common diagnosis in both males and females. In males, borderline leprosy was followed by lepromatous leprosy and lichen planus, whereas in females, borderline leprosy was followed by morphea.

- **Table:4-Histopathological spectrum of Non-neoplastic lesion of skin. (n=110)**

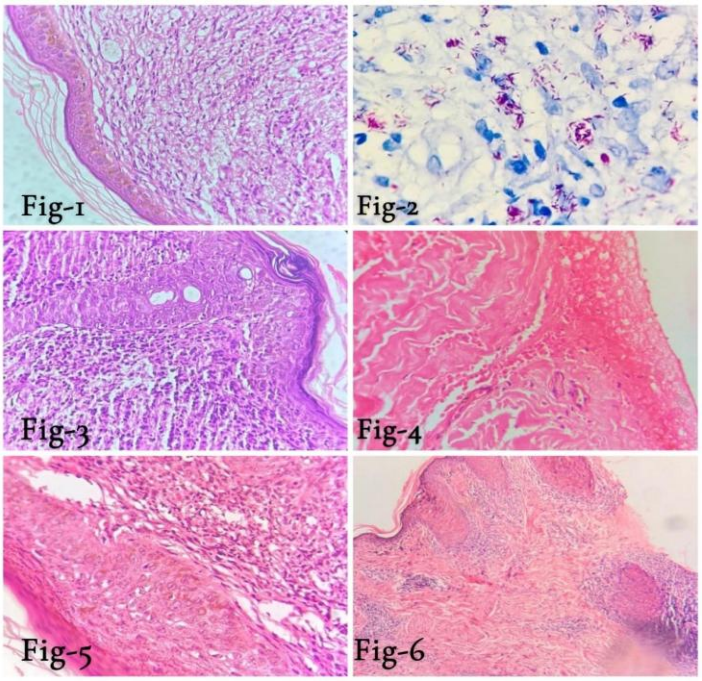
Histopathological Diagnosis	No. of Case	Percentage
Borderline Leprosy	**23**	**20.9%**
Lepromatous Leprosy	**15**	**14.5%**
Tuberculoid Leprosy	**11**	**10.0%**
Lichenoid Interface	**07**	**6.3%**
Lichen Planus	**12**	**10.9%**
Psoriasis	**05**	**4.5%**
Psoriasis Vulgaris	**07**	**6.3%**
Granuloma Annulare	**04**	**3.6%**
ENL*	**06**	**5.4%**
Pemphigus Foliaceus	**04**	**2.7%**
TEN*	**03**	**2.7%**
Morphea	**06**	**5.4%**
Spongiotic dermatitis	**03**	**2.7%**
Vascular Interface Dermatitis	**03**	**2.7%**
Polymorphea light eruption	**01**	**0.9%**
Total	**110**	**100%**

Table 4 shows the histopathological spectrum of non-neoplastic skin lesions. Borderline leprosy was the most common lesion (20.9%), followed by lepromatous leprosy (14.5%) and lichen planus (10.9%). Tuberculoid leprosy accounted for 10.0% of cases. Other lesions included lichenoid interface dermatitis, psoriasis, granuloma annulare, erythema nodosum leprosum, and connective tissue disorders in varying proportions.

- **Table: 5-Age group wise distribution of Non-neoplastic lesions of skin.(n=110)**

Histopathological Diagnosis	10-20 year	21-30 year	31-40 year	41-50 year	51-60 year	61-70 year	71-80 year	81-90 year	91-100 year	Total cases
Borderline Leprosy	06	13	02	01	00	01	00	00	00	23
Lepromatous Leprosy	03	06	01	01	01	01	00	00	02	15
Tuberculoid Leprosy	05	03	01	00	01	00	01	00	00	11
Lichenoid Interface	04	03	00	00	00	00	00	00	00	07
Lichen Planus	06	03	00	01	01	01	00	00	00	12
Psoriasis	01	02	01	01	00	00	00	00	00	05
Psoriasis Vulgaris	01	02	02	02	00	00	00	00	00	07
Granuloma Annulare	01	01	01	00	00	01	00	00	00	04
ENL	01	02	01	02	00	00	00	00	00	06
Pemphigus Foliaceus	00	00	01	00	02	00	01	00	00	04
TEN	01	00	00	00	01	01	00	00	00	03
Morphea	00	04	02	00	00	00	00	00	00	06
Spongiotic dermatitis	00	00	00	01	01	00	01	00	00	03
Vascular Interface Dermatitis	00	02	00	01	00	00	00	00	00	03
Polymorphea light eruption	00	00	00	00	01	00	00	00	00	01
	29	41	12	10	08	05	03	00	02	110

Table 5 depicts the age group–wise distribution of non-neoplastic skin lesions. The age range of patients was 10–100 years, with the highest number of cases observed in the 21–30 years age group (41 cases), followed by the 10–20 years age group (29 cases). Borderline leprosy was the most common lesion across most age groups, particularly in young adults. Infectious and inflammatory dermatoses predominated in the second and third decades of life, whereas autoimmune and connective tissue disorders were more frequently observed in middle-aged and elderly patients.



(Fig-1: H&E section(40X) showing lepromatous leprosy with diffuse foamy macrophages and a Grenz zone. Fig-2: Fite Faraco stain(100X) showing numerous acid-fast bacilli in lepromatous leprosy. Fig-3: H&E section (40X) of tuberculoid leprosy showing well-formed dermal granulomas. Fig-4: H&E section (40X) showing morphea with thickened, hyalinized collagen bundles. Fig-5: H&E section (40X)of ENL showing interface dermatitis with inflammatory infiltrate. Fig-6: H&E section (10X)of lichen planus showing saw-tooth rete ridges and band-like lymphocytes.)

DISCUSSION

The present study analyzed the histopathological spectrum of non-neoplastic skin lesions in punch biopsy specimens received at a tertiary care hospital. The 140 skin biopsies examined, 110 cases were diagnosed as non-neoplastic lesions, highlighting their significant burden in routine dermatopathology practice. The most commonly affected age group was 21–30 years, which is comparable with observations by Italiya et al. [4], Agrawal and Bhutani et al. [5], and Bezbaruah et

al. [6] Previous studies have shown that leprosy predominantly affects young adults, with the highest incidence reported in the 31–40-year age group by Bharadwaj et al. [7] and Adhikari et al. [8], followed by 30–39 years as observed by Isha Gupta et al. [9], and 20–29 years as reported by Moorthy et al. [10] However, other studies have reported higher prevalence in older age groups, indicating regional and demographic variation. A male predominance was observed (61.8%), consistent with most published studies, possibly due to increased occupational exposure and healthcare-seeking behavior among males.Borderline lepromatous leprosy was the most common histopathological diagnosis in present study, similar findings were reported by Patel et al. [11] and Moorthy et al. [10], whereas other authors documented epidermal cysts, spongiotic dermatitis, or borderline tuberculoid leprosy as the most frequent lesions. These variations may be attributed to geographic, environmental, and epidemiological differences.In both genders, borderline lepromatous leprosy was the predominant lesion. The high prevalence of leprosy across age groups emphasizes its continued public health relevance in this region. As non-neoplastic skin lesions often show overlapping clinical features, histopathological examination remains the gold standard for definitive diagnosis. Clinicopathological correlation is essential for accurate classification and appropriate management.

This study highlights leprosy as the most common non-neoplastic skin lesion across all age groups and both genders, reflecting its continued endemicity in the region. Owing to overlapping clinical features and subtle early lesions, clinical diagnosis alone is often inadequate. Histopathological examination remains crucial for definitive diagnosis and accurate classification according to the Ridley–Jopling system[5]. Therefore, a combined clinicopathological approach is essential for optimal patient management and effective disease control in tertiary care settings.

CONCLUSION

Non-neoplastic skin lesions exhibit marked histopathological heterogeneity with overlapping clinical features, limiting the reliability of clinical diagnosis alone. The present study confirms histopathology as the gold standard for accurate diagnosis and classification of these lesions. The predominance of leprosy highlights its continued endemicity and public health significance in the study region. Early skin biopsy with clinicopathological correlation is essential for timely diagnosis, appropriate therapeutic intervention, and prevention of disease-related morbidity, particularly in tertiary care settings.

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