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Spectrum of Non Neoplastic Skin Diseases: A Histopathology Based Clinicopathological Correlation Study at a Tertiary Health Care Centre

Preeti Bajaj[1], Sharad Ashok Waghachaure[2]*, and Archana Ukey[3]

[1]Professor & Head, Department of Pathology, Dr. VasantraoPawar Medical College Hospital & Research Centre, Nashik - 422003, Maharashtra, India; dr.prbajaj@gmail.com
[2]3rd year Resident, Department of Pathology, Dr. Vasantrao Pawar Medical College Hospital & Research Centre, Nashik - 422003, Maharashtra, India; sharad.waghachaure26@gmail.com
[3]Associate Professor, Department of Pathology, Dr. Vasantrao Pawar Medical College Hospital & Research Centre, Nashik - 422003, Maharashtra, India; archu12241@gmail.com

Abstract

Introduction: Skin biopsy probably is the most important ancillary aid to confirm clinical diagnosis. The interpretation of many skin biopsies requires the identification and integration of two different morphological features – the tissue reaction pattern and the pattern of inflammation. **Aim:** To correlate histopathological diagnosis with clinical diagnosis in various non neoplastic skin lesions. **Materials and Methods:** The present study was a prospective and observational type of study. A total number of 197 participants were included after satisfying the eligibility criteria with due permission from Department of Dermatology. Only those patients who had given valid informed consent were included in the study. **Results:** Out of 197 biopsies studied, histopathological diagnosis in 167 biopsies (84.8%) was consistent with clinical diagnosis, while in 30 biopsies (15.2%) histopathological diagnosis was not consistent with clinical diagnosis. **Conclusion:** Out of 197 cases (M=111, F=86) biopsies studied, histopathological diagnosis was consistent with clinical diagnosis in 167 biopsies (84.8%), while in 30 biopsies (15.2%) the histopathological diagnosis was not consistent with clinical diagnosis. The skin biopsy remains the gold standard for diagnosis which can be supported with other techniques to confirm the diagnosis. This emphasizes the significance of histopathology in diagnosing non neoplastic skin disorders.

Keywords: Histopathology, Clinicopathological Correlation, Non Neoplastic Skin Lesions

1. Introduction

In recent years, there has been an increasing awareness towards the normal skin appearance, texture and also about the skin related diseases, as it affects social, working and sexual relationship. The pattern of skin diseases varies from one country to another due to different environmental factors and different lifestyles. Studies from developing countries conducted over a period of years in past have reported high prevalence of skin disorders, the spectrum of which has been highly variable[1].

The clinical presentation of skin diseases is restricted to only few changes, like hyperpigmentation, hypopigmentation, macules, papules, nodules, pustules and few others, the spectrum of histopathology of skin disorder varies widely[2]. Each clinical presentation is common to different histopathological picture and thus definitely requires histopathology for their confirmation. Separation of each of these becomes important because the treatment and prognosis tends to be disease specific[3]. Human skin consists of a stratified, cellular epidermis and an underlying dermis of connective tissue[4].

The science and art of dermatopathology was started in early 19th century Europe with the writings of pioneers like Simon, Von Baerensprung, Unna and Gans. Julius Rosenbaum (1807-1874) picked up Gilbert Breschet's suggestion of microscopic studies of skin lesion and first spoke of dermatopathologists[5]. Tradition of dermatologists writing about histopathological aspect of skin disease was carried on by researchers like F. Pinkus, A. Civatte, J. Darier,

*Author for Correspondence

H. Montgomery, H. Pinkus, W. Lever and more recently R.K. Winkelmann, E. Wilson Jones and A.B. Ackermann[6]. In the last century, major contributions to the discipline were made by British dermatopathologists[6,7].

D'costa F Grace *et al*[8,9] conducted a histopathology based clinicopathological correlation study in pediatric age group and found positive correlation in 56.07% cases, in their study histopathology gave the diagnosis in 26.16% while they found 17.75% nonconclusive cases. Hudavdelingen *et al*[10] conducted a similar study in non neoplastic skin biopsies and found correlation in 57.5% cases, in 20.5% cases histopathology offered the final diagnosis and in the rest 22% cases no diagnosis could be made.

Many skin diseases can be diagnosed by a simple clinical examination, but sometimes relatively simple diagnostic procedures are required for additional valuable information towards reaching final diagnosis[11]. Skin biopsy probably is the most important ancillary aid to confirm clinical diagnosis. The interpretation of many skin biopsies requires the identification and integration of two different morphological features - the tissue reaction pattern and the pattern of inflammation[9]. The four dimensions of the biopsy namely length, breadth, depth and time in relation to each other are required to be studied and correlated by a pathologist and clinician to arrive at a definitive diagnosis[12].

The skin lesions among the patients can be classified into various categories according to the morphology of lesion and can be confirmed by skin biopsy[13]. Integrated approach of dermatologist and pathologist is required to get clinical correlation and to arrive at a definitive diagnosis. This study mainly includes histopathological evaluation of various nonneoplastic skin lesions and their clinicopathological correlations followed by the study of age and sex incidence in various nonneoplastic skin lesions.

2. Aims and Objectives

1. To study the histopathology of various non-neoplastic skin lesions of all the study participants.
2. To correlate histopathological diagnosis with clinical diagnosis.

3. Materials and Methods

a) Study design:- Observational Study.
b) Study setting:- Department of Pathology and Department of Dermatology Medical College, Hospital and Research Centre.
c) Duration of the study:- August 2016 to December 2018.

3.1 Eligibility Criteria

a) Inclusion criteria

1. Clinically diagnosed cases of non-neoplastic skin disorders.
2. All biopsies that showed definitive signs of any particular pathology.

b) Exclusion criteria

1. Patients not giving consent for biopsy.
2. Inadequate skin biopsies.
3. Cases with Neoplastic skin lesion/histology.

3.2 Technique of Skin Biopsy

It included Excision biopsy, Incision biopsy, Punch biopsy and Shave biopsy.

Processing of the tissue:
Overnight schedule for tissue processing[14]

- 10% Formalin: 1 hr
- 10% Formalin: 1hr
- 50% Alcohol: 1hr
- 70% Alcohol: 1hr
- 95% Alcohol: 1hr
- 95% Alcohol: 40 min
- 100% Alcohol: 1 hr
- 100% Alcohol: 40 min
- Xylene: 1 hr
- Xylene: 30 min
- Paraffin wax: 30 min
- Paraffin wax: 30 min
- Paraffin wax: 30 min
- Paraffin wax: 30 min

3.3 Tissue Processing

Paraffin embedding and block making, Trimming, Sectioning and Hematoxylin and Eosin Staining.

- Sections were dewaxed in 2 jars of Xylene, each for 15 min.
- Xylene was removed by keeping slides in 2 jars of absolute alcohol, each for 2 mins.
- In 70% alcohol for 5 min
- Rinsed in water
- Sections stained in Harris Hematoxylin for 7-10 mins.
- It was followed by washing in running water till the sections turned blue.
- Sections differentiated in 1% acid alcohol solution for 3-5 sec.

- Washed with tap water for 5 mins.
- Treatment done with increasing grades of alcohol
  - In 50% alcohol for 2 mins
  - In 70% alcohol for 2 mins
  - In 90% alcohol for 2 mins.
- Counterstained with 2% Eosin Y for 1 min.
- Dehydrated with absolute alcohol 3 times each for 2 mins.
- Clearing was done by 3 changes in Xylene each for 10 mins
- Mounted in DPX

Tissue Processing:

Paraffin embedding and block making, Trimming, Sectioning and H & E Staining done.

4. Results

In this present study we received a total of 223 skin biopsies with clinical history and clinical diagnosis.

In our study, in 168 cases, histopathological diagnosis was consistent with clinical diagnosis (including one neoplastic case), in 32 cases, histopathological diagnosis was not consistent with clinical diagnosis (including two neoplastic cases) and 23 cases were inconclusive [includes inadequate biopsies (14) and biopsies with non specific pathology (9)] (Table. 1).

Table 1. Clinicopathological correlation

Clinicopathological Correlation	Frequency	Percent
Present	168	75.34%
Absent	32	14.35%
Inconclusive	23	10.31%
Total	223	100%

Out of these, 197 biopsies were included in this study and 26 were excluded according to inclusion and exclusion criteria. This is shown as follows (Table 2).

Table 2. Biopsies not included in the study

Number of biopsies (Total 26)	Reason
14	Inadequate biopsies
09	No definitive signs of particular pathology
03	Neoplastic histology

Out of 197 biopsies studied, histopathological diagnosis in 167 biopsies (84.8%) was consistent with clinical diagnosis, while in 30 biopsies (15.2%) histopathological diagnosis was not consistent with clinical diagnosis (Table 3).

Table 3. Clinicohistopathological correlation

Clinicohistopathological Correlation	Frequency	Percent
Present	167	84.8%
Absent	30	15.2%
Total	197	100%

In this study out of 197 cases, there were 111 males and 86 females.

The ratio of male: female was 1.29: 1 (Table 4).

The present study includes minimum age of 4 years (female) and maximum of 80 years (male). The most common age group observed was 21-30 years followed by 31-40 and 41-50 years (Table 4).

Table 4. Age wise distribution of cases

Age Group (Years)	Male		Female		Total	Percent
	No.	%	No.	%		
1-10	1	0.9%	6	7%	7	3.6 %
11-20	14	12.6%	6	7%	20	10.2%
21-30	30	27%	16	18.6%	46	23.4%
31-40	21	19%	17	19.8%	38	19.2%
41-50	14	12.6%	16	18.6%	30	15.2%
51-60	19	17.1%	12	13.9%	31	15.7%
61-70	7	6.3%	10	11.6%	17	8.6%
71-80	5	4.5%	3	3.5%	8	4.1%
Total	111	100%	86	100%	197	100 %

The skin diseases have various types of lesions which are macule, papule, pustules, vesicles etc. In our study we found maximum skin lesions as plaques (67) followed by papules (31), patch (29), macule (25), vesicles (18) (Table 5).

It was found that the most common non neoplastic skin disorder diagnosed on biopsy was Leprosy (36.04%) followed by Pemphigus Vulgaris (8.12%) and Psoriasis (8.12%) (Figure 1-3).

Table 5. Distribution of cases according to the type of skin lesion

Type of lesion	Frequency	Percent
Macule	25	12.7 %
Patch	29	14.7%
Papule	31	15.7%
Plaque	67	34.1%
Nodule	8	4.1%
Vesicle	18	9.1%
Pustule	1	0.5%
Crust	4	2.0%
Scale	7	3.6%
Ulcer	1	0.5%
Erosion	3	1.5%
Targetoid lesion	1	0.5%
Exfoliation	1	0.5%
Verrucous lesion	1	0.5%
Total	197	100%

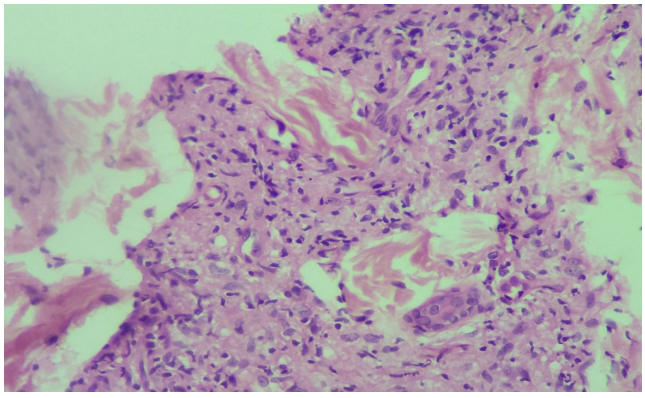

Figure 1. **Histoid Leprosy:** Shows periadnexal spindle shaped histiocytes (400x).

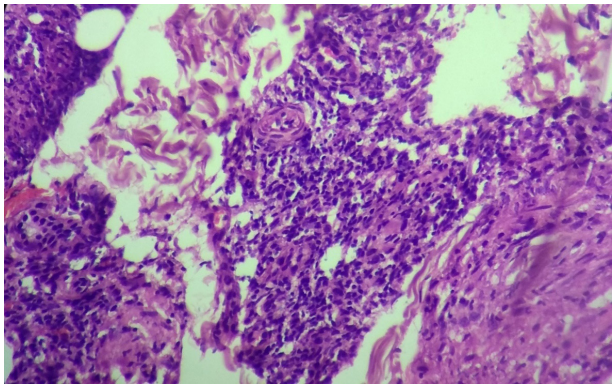

Figure 2. **Tuberculoid Leprosy:** Shows epithelioid cell granuloma surrounded by dense lymphocytic infiltrate (400x).

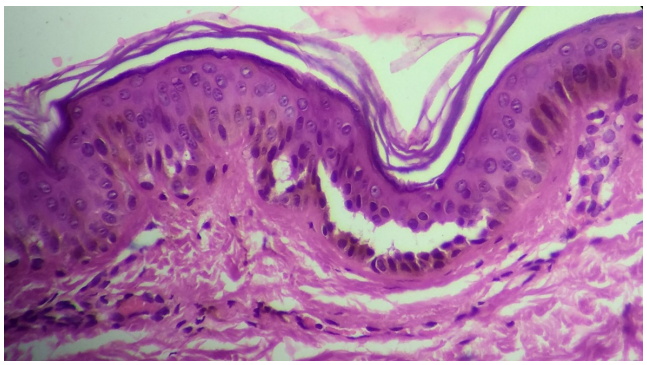

Figure 3. **Pemphigus Vulgaris:** Shows epidermal blister cavity with suprabasal cleavage giving row of tombstone appearance (400x).

5. Discussion

The present study included consecutive skin specimens received by the department of Pathology over a period of 2 years and 5 months. As far as the contribution of histopathology to the diagnosis was concerned, histopathology confirmed the diagnosis in 75.33% cases and it gave the diagnosis which was not suspected clinically in 21.4% and was non conclusive in 14.34% cases, combining both, histopathology was helpful in making a definitive diagnosis in 89.67% cases.

D'costa F Grace *et al*[8] conducted a similar study in pediatric age group and found positive correlation in 56.07% cases, in their study histopathology gave the diagnosis in 26.16% while theyfound 17.75% non conclusive cases.

Hudavdelingen *et al*[10] conducted a clinicopathological correlation study in non neoplastic skin biopsies and found

correlation in 57.5% cases, in 20.5% cases histopathology offered the final diagnosis and in the rest 22% cases no diagnosis could be made.

In our study the most common non neoplastic skin disorder diagnosed on biopsy was Leprosy (36.04%) followed by Pemphigus Vulgaris (8.12%) and Psoriasis (8.12%).

Out of 197 cases, majority were belonging to group V (n=70; 35.5%), followed by group III (n=58; 29.4%), group IV (n=38; 19.3%), group VIII (n=13; 6.6%), group II (n=7; 3.6%), group I (n=6; 3.1%), group VI (n=4; 2%) and one case with histopathological diagnosis (Tuberculoid leprosy with ENL) involving two groups; group V and group VIII.

In our study maximum number of cases belonged to 21-30 years age group followed by 31-40 years with males predominating both the groups, 65.21% and 55.26% respectively. Thus, most of the males involved in the study were in their 3rd and 4th decade of age.

A similar study conducted by Mamatha *et al*[15] in 2018 showed maximum number of cases in the age group of 51-60 years with female predominance in the respective group (52.4%). The study conducted by Grover *et al*[16] in 2016 observed highest number of cases in the age group of 11-20 years with male predominance (68.0%). A study conducted by Narang *et al*[12] in 2015 documented highest number of cases in the age group of 21-30 year, similar to our study.

Mamatha. K *et al*[15] conducted a similar study and found most of the cases were belonging to group V (154 cases), followed by group III (46 cases), group IV (27 cases), group VI (27 cases), group VII (16 cases), group II (12 cases) and group VIII (4 cases).

A study done by Felix Boon Bin Yap *et al*[17] in 2009 reported 92% of positive clinicohistopathological correlation and only 8% cases with negative correlation. Another study done by Canan Aslan et al[18] in 2010 reported 76.8% cases having positive correlation and 23.2% with absent correlation. This is in confirmation with our study. We also observed 84.8% cases with positive clinicopathological correlation and 15.2% with negative correlation.

In our study clinicopathological correlation was observed in 167 cases (84.8%) while in 30 cases (15.2%) the final diagnosis was different from clinical diagnosis.

Maximum clinicopathological correlation was seen in Group I cases followed by Group III cases, while maximum number of non-conclusive cases was from Group VI.

6. Conclusion

Out of 197 case (M=111, F=86) biopsies studied, histopathological diagnosis was consistent with clinical diagnosis in 167 biopsies (84.8%), while in 30 biopsies (15.2%) the histopathological diagnosis was not consistent with clinical diagnosis.

The skin biopsy remains the gold standard for diagnosis which can be supported with other techniques to confirm the diagnosis.

This emphasizes the significance of histopathology in diagnosing non neoplastic skin disorders

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