



## CLINICOPATHOLOGICAL CORRELATION OF INFECTIOUS SKIN DERMATOSES

Piyush Deshpande and M.N Karandikar

Department of Pathology, Bharati Vidyapeeth Deemed University Medical College and Hospital.

### ARTICLE INFO

#### Article History:

Received 19<sup>th</sup> September, 2016  
Received in revised form 8<sup>th</sup>  
October, 2016  
Accepted 4<sup>th</sup> November, 2016  
Published online 28<sup>th</sup> December, 2016

#### Key words:

Dermatopathology, Clinicopathologic  
Correlation, Biopsy, Leprosy,  
Infectious

### ABSTRACT

**Introduction:** Skin disease is one of the most common human illnesses. It pervades all cultures, occurs at all ages, and affects between 30% and 70% of individuals, with even higher rates in at risk subpopulations.

**Aim:** To study the histopathological findings of infectious skin lesions and their clinical correlation.

#### Objectives:

1. To determine the pattern of the histopathological lesions of infectious dermatoses with respect to age and sex.
2. To determine the incidence of different infectious skin lesions undergoing punch biopsy.
3. To correlate the clinical diagnosis of the cases with the histopathological diagnosis.

**Material and methods:** This study includes retrospective study of the infectious skin lesions in the past three years (Aug 2010 to July 2013) and prospective study of the following two years. 51 cases of infectious skin lesions have been included in this study.

**Observations and results:** The observations and results of the present study include age and sex distribution, site of the lesion, clinical features, histopathological features and their clinicopathologic correlation.

**Conclusion:** Skin lesions are present in limitless variations and in many instances may not easily be identified by even the most experienced dermatologist. But a thorough history and examination should at least help us to place our findings into categories, and help us discern a likely etiology.<sup>2</sup>

Copyright © 2016 Piyush Deshpande. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

## INTRODUCTION

Skin disease is one of the most common human illnesses. It pervades all cultures, occurs at all ages, and affects between 30% and 70% of individuals, with even higher rates at risk subpopulations. Its detrimental effects on health range from physical incapacity to death. The International Classification of Disease, ten classifications of human disease list more than 1,000 skin or skin-related illnesses, a pattern dominated by a few conditions accounting for most of the skin disease burden. Yet despite this profound impact, skin disease continues to receive relatively little attention in the national or global health debate.<sup>1</sup>

Among the many aspects of the physical examination, the diagnosis of skin disorders requires a unique approach. It demands the diagnostician's ability not only to observe and interpret but also to use new language – the language of the dermatologist. The purpose of this study is to perform a thorough dermatologic history and examination and to be able to recognize dermatologic conditions and attain definitive diagnosis. Numerous disease states may be manifested in the skin. Skin pathology can be divided into two categories: Abnormal findings may represent a disease process limited exclusively to skin, or they may reflect a systemic illness.<sup>2</sup>

## AIM

To study the histopathological findings of infectious skin lesions and their clinical correlation.

## OBJECTIVES

1. To determine the pattern of the histopathological lesions of infectious dermatoses with respect to age and sex.
2. To determine the incidence of different infectious skin lesions undergoing punch biopsy.
3. To correlate the clinical diagnosis of the cases with the histopathological diagnosis.

## MATERIAL AND METHODS

This study includes retrospective study of the infectious skin lesions in the past three years (Aug 2010 to July 2013) and prospective study of the following two years. 51 cases of infectious skin lesions have been included in this study.

### Selection of subjects

#### Inclusion criteria

All patients undergoing skin biopsy at Bharati Hospital and Research Centre irrespective of age, sex and diagnosis.

**Exclusion criteria**

1. Adequate sample is not received.
2. Informed written consent could not be obtained from the patient.

**Methodology of study**

A detailed medical history of each patient was obtained. Complete clinical examination of the skin was performed along with complete systemic examination. A punch biopsy, incisional or excisional biopsy in case of infectious skin lesions was performed. The skin biopsies were sent in 10% buffered formalin to the histopathology section. The sample was kept for a minimum 2 hours in 10% buffered formalin for proper fixation. Gross examination of tissue was done. Subsequently dehydration, clearing, embedding in paraffin wax were carried out. Paraffin blocks were made, sections of 3 to 4 µm thickness were cut and stained with Harris Haematoxylin and Eosin stain and were observed microscopically. Special stains were used whenever the need was felt. The result of the test was entered to the proforma and an excel sheet was used for analysis along with history and examination findings. Informed written consent was taken from patients.

**OBSERVATIONS AND RESULTS**

The observations and results of the present study include age and sex distribution, site of the lesion, clinical features, histopathological features and their clinicopathologic correlation. The adequacy criteria used for the biopsies was the presence of: epidermis, dermis and subcutaneous tissue or part of it in the tissue submitted. The cases where definitive diagnosis could not be offered were excluded from further analysis.

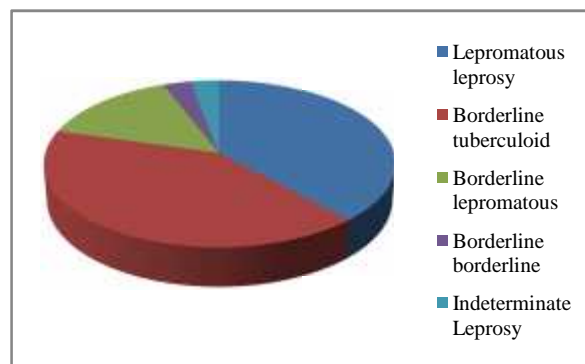
**Table 1** Distribution of infectious dermatoses in our study

Diagnosis	No. of cases	Percentage
Leprosy	45	88.23
Atypical mycobacterial tuberculosis	1	1.96
Pityriasis versicolor	1	1.96
Molluscum contagiosum	1	1.96
Verruca vulgaris	1	1.96
Condyloma acuminatum	1	1.96
Scrub typhus	1	1.96
<b>Total</b>	<b>51</b>	<b>100</b>

51 cases of infectious skin lesions were biopsied, of which Leprosy was the commonest of all infectious skin lesions, comprising 88.23% of cases while there was one case each of the other infections as shown in the table. Since leprosy was the commonest diagnosis, the cases were further typed using Ridley and Jopling classification of leprosy. The histopathological findings in these cases were analyzed. Analysis was also done depending on age, sex, site, commonest clinical feature and clinicopathologic correlation of the type of leprosy.

**Leprosy**

Leprosy was the commonest of all infectious skin lesions, comprising 88.23% of cases while there was one case each of the other infections as shown in the table. Since leprosy was the commonest diagnosis, the cases were further typed using Ridley and Jopling classification of leprosy. The histopathological findings in these cases were analyzed.



**Table 2** Pie diagram depicting distribution of types of leprosy Maximum number of cases belonged to BT leprosy followed by LL type

Analysis was also done depending on age, sex, site, commonest clinical feature and clinicopathologic correlation of type of leprosy.

**Table 3** Distribution of lesions of Leprosy into their histological subtypes and their observations

Type of leprosy	TT	BT	BL	LL
<b>Age (yrs)</b>				
1 – 10	-	-	-	-
11 – 20	-	1	1	-
21 – 30	-	4	-	-
31 – 40	2	2	-	4
41 – 50	4	3	3	5
51 – 60	4	3	1	3
61 – 70	1	2	-	1
<b>Sex</b>				
Male	6	8	4	5
Female	5	7	1	8
<b>Site</b>				
LE	4	5	2	6
UE	5	6	3	4
H	1	-	-	-
C	-	1	-	-
Ab	-	1	-	-
F	-	-	-	1
G	1	2	-	2
<b>Clinical presentation</b>	11 cases - hypopigmented plaques/papules	All cases - dry plaques and papules	All cases - asymmetric macules	9 cases - macules and papules; 3 cases - infiltrating nodules
<b>Histopathological presentation</b>	Atrophic epidermis, compact granuloma with epithelioid cells and neurovascular lymphocytic infiltrate. Inconsistent feature – Langhan giant cells	Atrophic epidermis and formation of granulomas	Atrophic epidermis, foamy macrophages and sparse/no lymphocytic infiltrate	Atrophic epidermis, Grenz zone of normal collagen and foamy macrophages
<b>Clinicopathologic correlation</b>				
Agreement	9 (81.81%)	12 (75%)	3 (60%)	9 (69.23%)
Disagreement	2 (18.18%)	3 (25%)	2 (40%)	4 (30.77%)
<b>Total no of cases (in percentage)</b>	11 (24.44%)	15 (33.33%)	5 (11.11%)	13 (28.89%)

Indeterminate leprosy - One case of Indeterminate leprosy presented with hypopigmented macules on the lower extremity in a 28 year old female patient. Histopathology showed atrophic epidermis with lymphocytes invading into lower epidermis and perineural, periadnexal and perivascular

lymphocytic infiltrate. AFB stain was positive. There was clinicopathological disagreement in this case. Clinical diagnosis was borderline tuberculoid leprosy.

Molluscum contagiosum - A 5 year old male patient presented with multiple papules all over the body. The patient was not immunocompromised. Histopathologically the epidermis showed acanthosis and many epidermal cells contained large intracytoplasmic inclusion bodies (Molluscum bodies). Clinicopathologic correlation was positive.

Pityriasis versicolor - A 40 year old female presented with multiple light brown patches and scales on the trunk. Histopathologically the stratum corneum showed hyperkeratosis and contained numerous hyphae and spores of fungi. Clinicopathologic disagreement was observed. Clinical diagnosis was borderline tuberculoid leprosy with trophic ulcer.

Granulomatous lesion - A 25 year old female presented with ulcerated lesion on the lower extremity. Histopathologically there was presence of tuberculous granulomas with caseation necrosis. Clinicopathologic disagreement was noted. Clinical diagnosis was infected eczema.

Condyloma acuminatum - A 34 year old female presented with a warty lesion on the labia majora. Histopathologically the stratum malpighii showed papillomatosis and considerable acanthosis with elongation of rete ridges, there were areas in which the epithelial cells showed perinuclear vacuolation suggestive of koilocytic change. Clinicopathological correlation was positive.

Scrub typhus - A 6 year old male patient presented with eschar, fever and abdominal distention. Histopathologically two bits of tissue were studied, one bit showed normal epidermis, superficial dermal vessels with mild perivascular lymphocytic infiltrate, normal skin adnexae, but markedly thickened dermal collagen encroaching on the subcutis. The second bit shows hyperkeratosis, a few layers of epidermis in some parts of the biopsy. The dermis was totally destroyed & there was a dense polymorphonuclear infiltrate on a necrotic background. A few dermal collagen fibres were noted amidst this necrotic tissue. Clinicopathologic agreement was noted.

Verruca vulgaris - A single case of 55 year old female was seen which presented as single circumscribed firm papule on the lower extremity. Histopathological features were acanthosis, papillomatosis and hyperkeratosis. There was presence of broad elephantine rete ridges pointing radially inwards towards the centre. Deeper layers showed enlargement of nuclei with hyperchromatism. There was clinicopathological agreement.

**DISCUSSION**

Amongst the infectious group, lesions in this study were of leprosy, pityriasis versicolor, granulomatous dermatitis, atypical mycobacterial infection, verruca vulgaris, molluscum contagiosum, condyloma acuminatum and scrub typhus. Leprosy was the commonest of all infectious lesions, comprising of 88.23% cases. Since leprosy was the commonest diagnosis, the cases were further typed using Ridley and Jopling classification.

**Leprosy**

A total of 45 cases of leprosy were diagnosed in this study, of which 11 were tuberculoid leprosy (TT), 13 cases of

lepromatous leprosy (LL), 15 of borderline tuberculoid leprosy (BT), 5 of borderline lepromatous (BL) and 1 of indeterminate leprosy. Ridley and Jopling classification of leprosy divides leprosy into 5 subtypes (TT, BT, BB, BL, and LL). This has been widely adopted by histopathologists and leprologists.<sup>3</sup> Despite having such an accurate classification, leprosy cases show diversity between clinical and histopathological features.

**Table 4** Comparison of numerical distribution of cases of different types of leprosy

Type of leprosy	KL Shobha et al	Anuja sharma et al	Present study
	2015	2008	2015
Indeterminate	11 (11%)	54 (21.86%)	1 (2.22%)
TT	14 (14%)	20 (8.09%)	11 (24.44%)
BT	42 (42%)	87 (35.22%)	15 (33.33%)
BB	9 (9%)	45 (18.21%)	0 (0)
BL	10 (10%)	16 (6.48%)	5 (11.11%)
LL	14 (14%)	25 (10.12%)	13 (28.89%)
Total	100 (100%)	247 (100%)	45 (100%)

In the present study the upper and lower extremities were more affected which is contrary to the study done by Ponnighaus JM which shows majority of the lesions on face and back.<sup>4</sup>

In the present study most common age group affected was in the 5<sup>th</sup> decade (26.66%) in contrary to the study done by Anuja Sharma *et al* in which majority of the cases belong to the 3<sup>rd</sup> and 4<sup>th</sup> decade. In the study done by Mathur *et al*, a total 156 patients were studied, out of which 84 (53.8%) males and 72 (46.1%) females between 8 and 86 years of age. The majority of patients 33 (23.57%) were in the age group of 21-30 years and least affected age group was children below 10 years 1(0.007%). Overall coincidence of clinical and histopathological diagnosis of classification was seen in 115 cases (80.4%). Also in the study done by Anuja Sharma *et al*<sup>5</sup>, 86.66 % of males were affected, but in our study there was a slight male predilection (51.11%). Our study was in concordance with the study done by Mathur *et al*<sup>6</sup>, Suri Sushil Kumar *et al*<sup>7</sup> and S Goyal *et al* (53.8%)<sup>8</sup>.

**Table 5** Comparison of age, gender predilection and clinicopathologic correlation of leprosy cases (all types)

Study	Anuja S et al (2008)	Mathur et al (2009)	Suri Sushil Kumar et al (2012)	Present study (2015)
Peak age of detection	3 <sup>rd</sup> and 4 <sup>th</sup> decade	3 <sup>rd</sup> decade (23.57 %)	3 <sup>rd</sup> to 5 <sup>th</sup> decades (62 %)	5 <sup>th</sup> decade (26.66 %)
Gender predilection	Male (86.66 %)	Male (53.8 %)	Female (53.3%)	Male (51.11 %)
Clinicopathologic correlation	53.44 %	80.4 %	69.98 %	73.33 %

**Table 6** Comparison of clinicopathological agreement in different types of leprosy

Type of leprosy	Percentage of cases showing clinicopathologic correlation			
	KL shobha et al 2015(%)	Goyal S et al 2012(%)	Anuja sharma et al 2008 (%)	Present study (%)
LL	78.57	85.2	75.86	75
BL	70	37.5	58.82	60
BB	55.55	20	37.35	0
BT	64.28	33.33	53.01	85.71
TT	42.85	75	47.37	81.81
IL	81.81	100	100	0

Clinicopathological correlation was maximally observed in cases of LL in all studies while the present study shows maximum clinicopathologic correlation in cases of tuberculoid leprosy and borderline tuberculoid leprosy as compared to

other studies. Clinicopathologic agreement of borderline lepromatous leprosy cases in the present study is comparable with the study of Anuja Sharma *et al.*<sup>5</sup> There is a marked clinicopathologic disagreement in cases of borderline leprosy in different studies while in the present study clinical diagnosis of borderline leprosy was not provided in any case. The disparity between clinical and histological observations was anticipated because the parameters used for the histopathologic classification are well-defined, precise and also take into account the immunologic response of the tissue, while the clinical classification gives recognition only to the gross appearances of the lesions. Moreover, a sizable proportion of leprosy cases (BT+BB+BL) are in a continuously changing immunological spectrum and histological classification gives a better indication for any recent shift of a case position in the spectrum. In some early cases, clinical signs and symptoms may precede the presently known characteristic tissue changes, or vice versa. If a biopsy is taken at an early stage, there is likely to be discordance between the clinical and histopathologic observations. As disparity depends upon the lesion biopsied at the time of study, biopsy from the lesion which is morphologically suggestive of clinical diagnosis, serial biopsies from the same lesion, or from paired lesions, should be studied for a better clinicohistopathological correlation.

Biopsy has its limitations; it cannot provide definitive diagnosis, in cases like borderline and indeterminate types. There should be a close interaction between the pathologist and clinician for understanding the disease and for the benefit of the patient. Ridley and Jopling laid down precise criteria for histological typing of leprosy. However, results of different studies have not been uniform and there has been a noted disparity between clinical and histological diagnosis.

#### **Other infectious dermatitis**

In the present study one case each of Molluscum contagiosum, condyloma acuminatum, scrub typhus and verruca vulgaris were studied for which clinicopathological correlation was 100% whereas the other infectious lesions like pityriasis versicolor and atypical mycobacterial infection both showed 100% clinicopathological disagreement. The case of Molluscum contagiosum was seen in a 5 year old male. The case of Condyloma acuminatum was seen in a 34 year old female. These are in concordance with the peak age of incidence for Molluscum contagiosum and Condyloma acuminatum in the literature. As only a single case of the above lesions was found, the analysis with respect to age, sex, clinical features, clinicopathological correlation, histopathological features was not done.

Histopathologically, the findings of the viral lesions included in the study, i.e., Verruca vulgaris, Molluscum contagiosum and Condyloma acuminatum were consistent with the study done by V Sriram *et al.*<sup>9</sup> In the study done by V Sriram *et al.*, Verruca vulgaris and Condyloma acuminatum show hyperkeratosis, acanthosis, parakeratosis, papillomatosis and koilocytes. Koilocytes had an enlarged, hyperchromatic, irregular, raisinoid nucleus with perinuclear halo. The parakeratosis and papillomatosis were more pronounced in verruca vulgaris in comparison to condyloma acuminatum. The hallmark of molluscum contagiosum was intracytoplasmic viral inclusion bodies known as molluscum bodies. These molluscum bodies form initially in lower layers of stratum malpighii and as they increase in size they move towards the

surface. Similarly, histopathologically in Pityriasis versicolor, spores and hyphae in spaghetti and meat ball appearance in stratum corneum, and perivascular mononuclear infiltrate were seen, which were in concordance with RR Mittal *et al.*<sup>10</sup>

## **CONCLUSION**

Skin lesions are present in limitless variations and in many instances may not easily be identified by even the most experienced dermatologist. But a thorough history and examination should at least help us to place our findings into categories, and help us discern a likely etiology.

## **References**

1. Roderick J. Hay, Nicole E Johns, Hywel C Williams, Ian W Bolliger, Robert P Dellavalle, David J Margolis, Robin Marks, Luigi Naldi, Martin A Weinstock, Sarah K Wulf, Catherine Michaud, Christopher J.L. Murray and Mohsen Naghavi. The Global Burden Of Skin Disease In 2010: An Analysis Of The Prevalence And Impact Of Skin Conditions, *Journal Of Investigative Dermatology*.2014; 134, 1527–1534.
2. Peter Saitta, David E. Cohen, Darrell Rigel, Steven K. Grekin, and Ronald Brancaccio,. The Frequency of Self-Skin Examination and Full Body Skin Examination in Dermatologists. *J Clin Aesthet Dermatol*. 2011 Jun; 4(6): 20–24.
3. Gayathri, S. S., Alavandar, E., & Kumar, S. A. An analysis of skin appendageal tumors in south india. *Journal of Evolution of Medical and Dental Sciences*. 2012; 1(6):907-12.
4. Ponnighaus JM, Fine PE, Gruer PJ, Maine N. The anatomical distribution of single leprosy lesions in an African population, and its implications for the pathogenesis of leprosy. *Leprosy Review*. 1990; 61(3):242-250.
5. Anuja Sharma, Rajesh Kumar Sharma, K C Goswami, Subash Bardwaj. Clinico-Histopathological Correlation In Leprosy. 2008 ;(3) : 120 -123.
6. Mathur MC, R B K Ghimire, P Shrestha, S K Kedia. Clinicohistopathological Correlation In Leprosy. *Kathmandu University Medical Journal*. 2011; 9 (4) :248 -251.
7. Suri Sushilkumar K, Iyer Rekha R, Patel Darshana U, Bandil Supriya, Baxi Seema. Histopathology and Clinico-histopathological correlation in Hansen's disease. *Journal of Research in Medical and Dental Science*. 2014; 2 (1) : 32 – 38.
8. Sunita Goyal, Nilay Shah, F.R. Shah, N.R. Shah, C.K. Shah, J.M.Shah.Clinicopathological Correlation With Histomorphological Spectrum And Bacillary Index Of SKIN Biopsy In Leprosy. *Biennial Journal Of GAPM*; 2012.
9. V Sriram,S. Sowmya. Clinicopathological Study of Viral Skin Lesions: *International Journal Of Recent Trends In Science And Technology*. 2014; 13(2): 307-309.
10. R R Mittal, Paramjit Singh, D Prasad. Immunological Study Of Pityriasis Versicolor And Pityrosporum Folliculitis. *Indian J Dermatol Venerol Leprol*. 1992; 58(4) : 260-261.