

**Original article:**

## Mast cells in leprosy

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### ABSTRACT:

Mast cells have received little attention in leprosy recently, but evidence linking them with the development of delayed hypersensitivity reactions' raises the possibility that they might be of some importance in leprosy lesions. The study included total 102 skin biopsies. The tissues were fixed in 10% formalin, processed by routine paraffin embedding technique. The section was stained with freshly prepared Toluidine blue stain. The Toluidine blue stained sections were evaluated for qualitative and quantitative aspects of mast cells. Mast cells were counted per field at 100x magnification. The area selected included DEJ, perivascular, periadenexal, and areas of cellular infiltrate. Mast cells were categorised as granulated and degranulated. Mast cell density, distribution and morphology may be useful in identifying various leprosy lesions, understanding their evolution and modify treatment protocols.

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### INTRODUCTION:

The skin lesions of leprosy contain many if not all of the cell types which occur in normal skin, in addition to those which migrate into the lesions from peripheral blood as part of the granulomatous process. The contribution of cells normally present in the dermis to granuloma formation and progression is uncertain.<sup>2</sup>Mast cells have received little attention in leprosy recently, but evidence linking them with the development of delayed hypersensitivity reactions' raises the possibility that they might be of some importance in leprosy lesions.<sup>2</sup>Mast cells are heterogeneous with respect to their morphology, biochemistry, and function. The differences between them appear to depend on the tissue and species from which they are derived, so that is not possible to apply the results of studies of mast cell distribution or function in one site or animal to another with any certainty.<sup>2</sup>Mast cells are found in tissues throughout body, particularly in proximity to surfaces that interface with the external environment. They are found at all levels

of dermis, where they are grouped around blood vessels, nerves and appendages. Increase in mast cell number have been reported in various cutaneous diseases.<sup>1</sup>

Mast cells are dynamic cells playing central role in allergic inflammation, protective immune response and other inflammatory responses. They are found in all levels of skin including dermis, around blood vessels, nerves, appendages, at dermoepidermal junction (DEJ) and also in subcutaneous tissue. Variations in morphologic, biochemical and/or functional characteristics of mast cells from different anatomical sites have been reported raising the possibility that mast cells of different phenotypes may have different functions in health and disease. In the present study, we attempt to evaluate mast cell infiltration with respect to morphology, distribution and quantity in non neoplastic skin lesions using simple histologic techniques.<sup>1</sup>

**OBJECTIVES:**

- To calculate mast cell count in skin biopsies
- To study the role of mast cells in health and disease.

**MATERIALS AND METHODS:**

The study included total 102 skin biopsies. The tissues were fixed in 10% formalin, processed by routine paraffin embedding technique. The section was stained with freshly prepared Toluidine blue stain. The Toluidine blue stained sections were evaluated for qualitative and quantitative aspects of

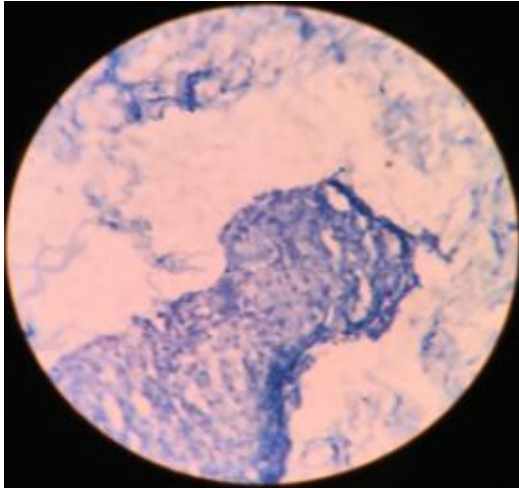
mast cells. Mast cells were counted per field at 100x magnification. The area selected included DEJ, perivascular, periadenexal, and areas of cellular infiltrate. The result of the study are expressed as the mean mast cell count per mm<sup>2</sup>.

**MC quantification**

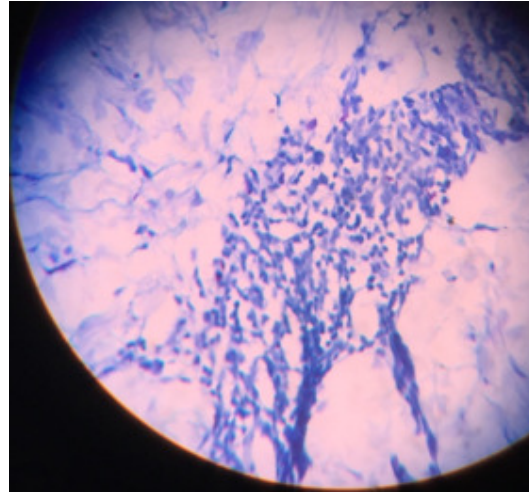
- Mast cell counts were expressed as cells per mm.<sup>2</sup>
- Diameter of field of vision under 40 x is 0.4 mm.
- Area of one field of vision = 0.1256 mm<sup>2</sup>

**RESULTS:**

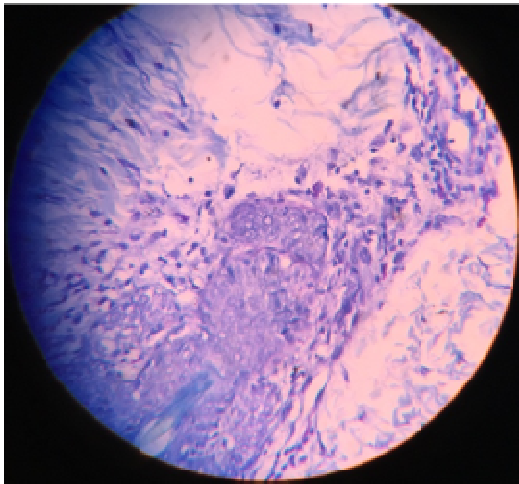
- The total number of cases studied were 102.
- Out of which 63 were Borderline tuberculoid leprosy
- 14 were Borderline lepromatous leprosy
- 14 were Lepromatous leprosy
- 7 were Borderline borderline leprosy
- 4 were Tuberculoid leprosy
- 1-2 mast cells / 0.1256 mm<sup>2</sup> were observed in Tuberculoid leprosy
- 2-3 mast cells/ 0.1256 mm<sup>2</sup> were observed in Borderline tuberculoid leprosy
- 3-4 mast cells/0.1256 mm<sup>2</sup> were observed in Borderline borderline leprosy
- 5-6 mast cells /0.1256mm<sup>2</sup> were observed in Borderline lepromatous leprosy
- 6-7 mast cells /0.1256mm<sup>2</sup> were observed in Lepromatous leprosy
- Highest mean mast cell count was observed in Lepromatous leprosy (0.5)
- Mean mast cell count observed in Borderline borderline is (0.428)
- Mean mast cell count observed in Borderline lepromatous leprosy is (.3571)
- Mean mast cell count observed in Borderline tuberculoid leprosy is (0.0317)
- Mean mast cell count observed in Tuberculoid leprosy is (0.25)
- The age range of the patients studied was 20 – 65 years .
- Patients studied were both males and females.



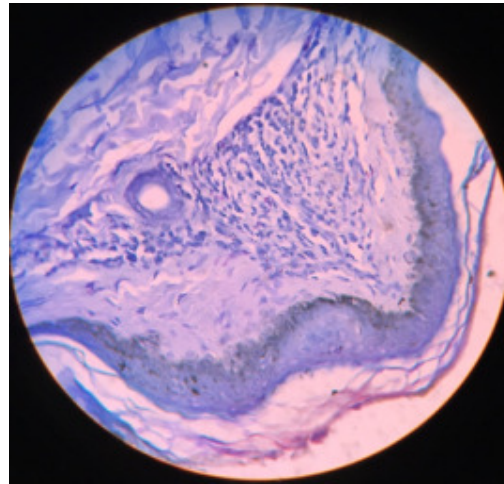
**1-2 mast cells in TT**



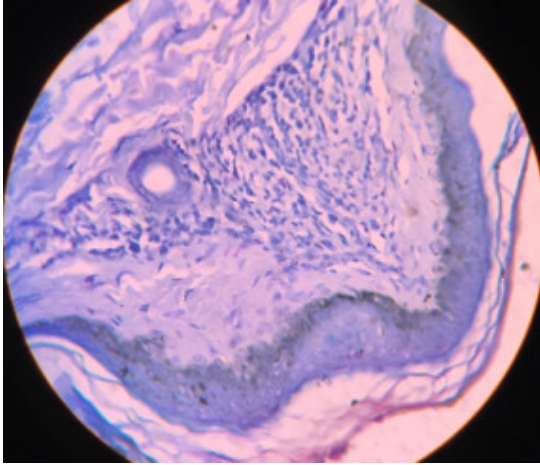
**2-3 mast cells in BT**



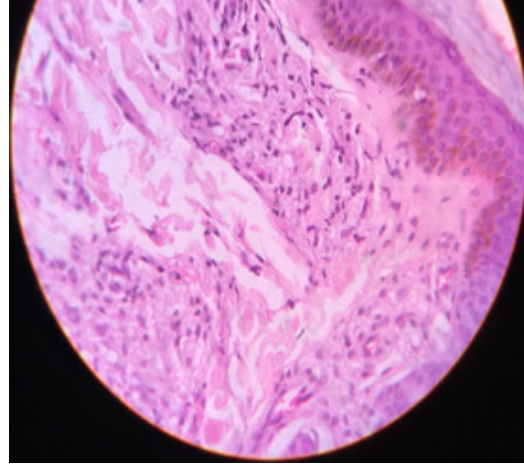
**3-4 mast cells in BB**



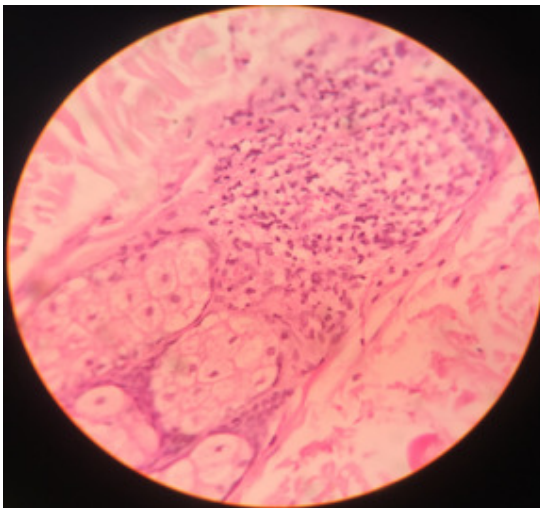
**5-6 mast cells in BL**



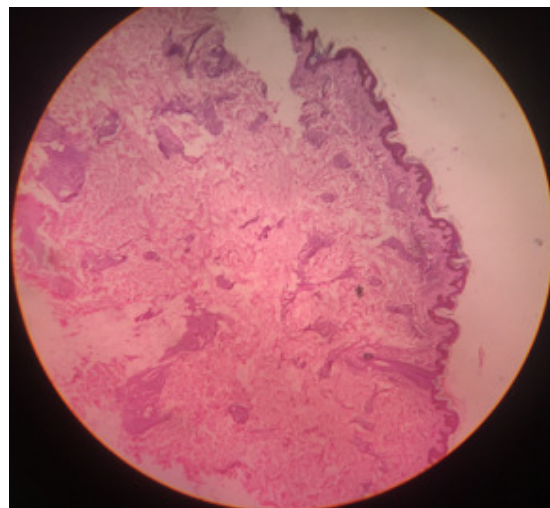
**6-7 mast cells in LL**



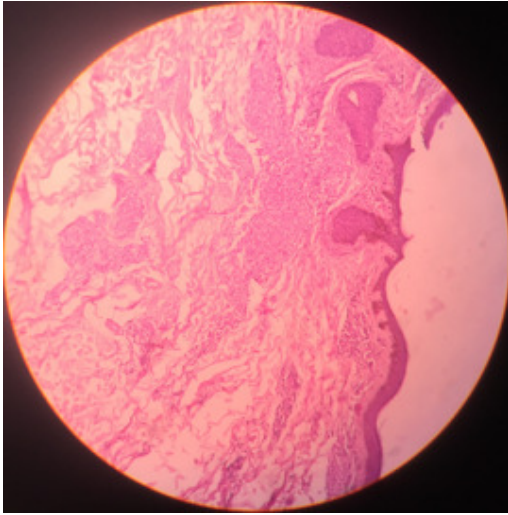
**Mast cell in H&E**



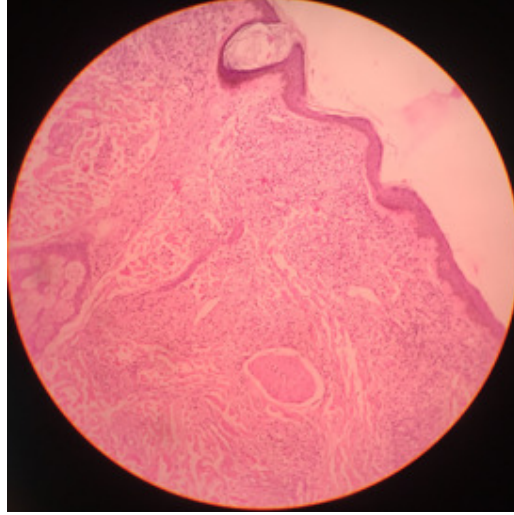
**Borderline tuberculoid leprosy  
Lymphocytic aggregates around sebaceous glands**



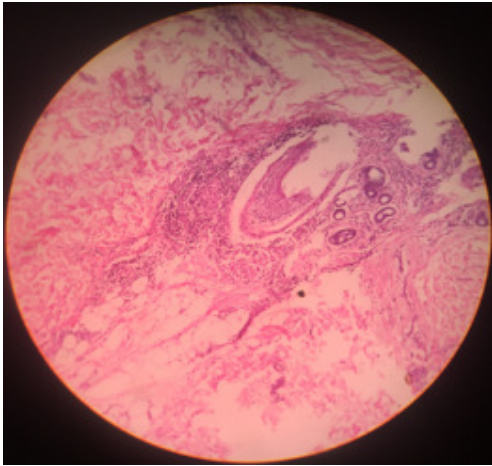
**Borderline tuberculoid leprosy  
Thinned out epidermis with lymphocytic aggregates around the adnexa**



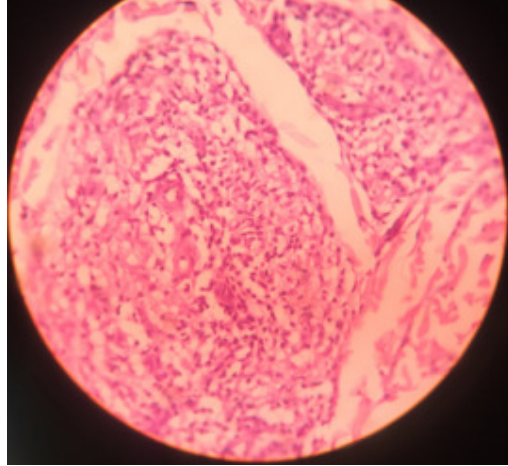
**Borderline tuberculoid leprosy**  
**Thinned out epidermis with granuloma**  
**around adnexa**



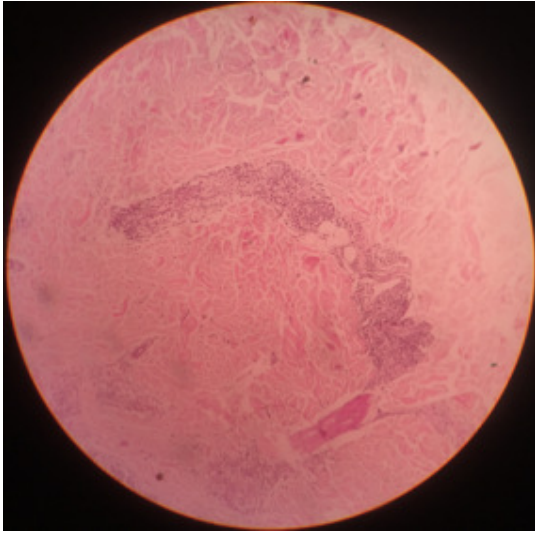
**Borderline lepromatous leprosy**  
**Thinned out epidermis with foamy**  
**macrophages and few lymphocytes around**  
**adnexa**



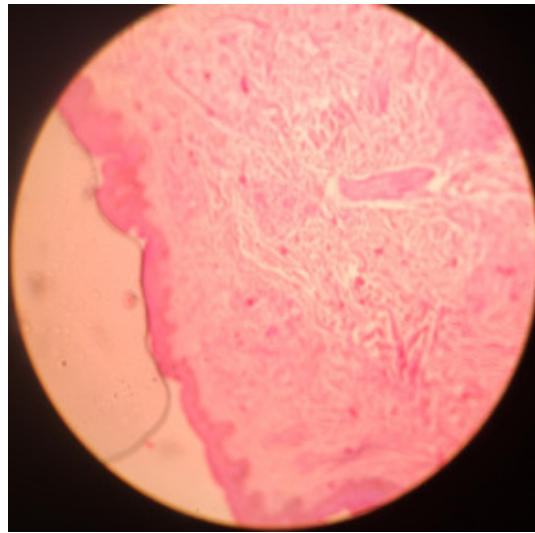
**Borderline tuberculoid leprosy**  
**Lymphocytic aggregates with giant cells**  
**around hair follicle**



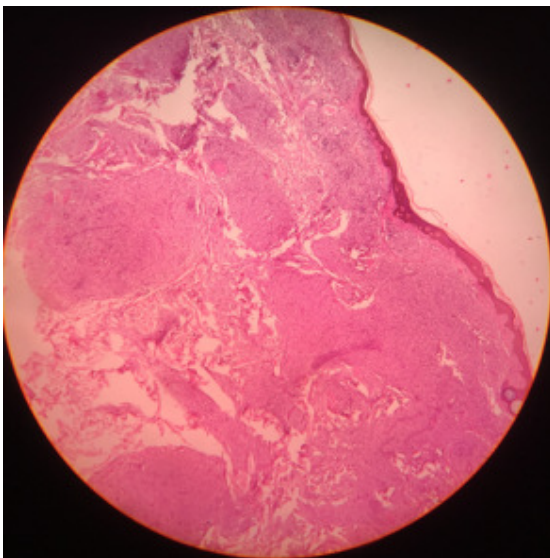
**Borderline lepromatous leprosy**  
**Sheets of foamy macrophages with few**  
**lymphocytes**



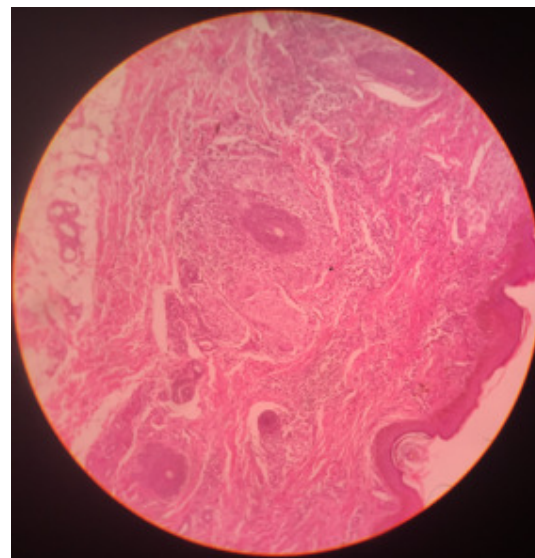
**Borderline borderline leprosy**  
**Lymphocytic aggregates and foamy macrophages**



**Borderline borderline leprosy**  
**Thinned out epidermis with**  
**Lymphohistiocytic aggregates and**  
**foamy macrophages around**  
**blood vessels and adnexa**



**Lepromatous leprosy**  
**Thinned out epidermis with grenz zone and**  
**diffuse sheet of foamy macrophages**



**Tuberculoid leprosy**  
**Granuloma with Langhans giant cell around**  
**hair follicle and eccrine glands**

**DISCUSSION:**

The total number of cases studied were 102. Highest mean mast cell count was observed in Lepromatous leprosy (0.5). The age range of the patients studied was 20 – 65 years. Patients studied were both males and females. In the present study, the mast cell density showed progressive increase over immunological spectrum of tuberculoid leprosy to lepromatous leprosy

**CONCLUSION:**

- The role of mast cells in health and disease is significant.
- Distinct alterations of mast cells are also noted in the various skin lesions. Mast cell density, distribution and morphology may be useful in identifying various skin lesions, understanding their evolution and modify treatment protocols.<sup>1</sup>

**REFERENCES:**

1. Joshi Meenakshyee M, Buch Archana C, Panicker N. K, Chandewale S.S Mast Cells in Non-neoplastic Skin Lesions Indian Medical Gazette - JANUARY 2013
2. Cree I A, Coghil G, Swanson Beck J Mast cells in leprosy skin lesions J Clin Pathol 1990;43:196-200