

PATHOPHYSIOLOGICAL CHANGES IN MORPHOLOGY OF LYMPHNODES ON FNAC IN SUSPECTED CASES OF TUBERCULOSIS

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Abstract

Background: To study the pathophysiological changes in the cytomorphology of lymphnodes (LN) in the patients suspected of tuberculosis (TB). **Materials and Methods:** The present study was a prospective study conducted in the Cytology section of Department of Pathology, Christian Medical College and Hospital, Ludhiana. The study included 121 lymph node aspirates from the patients with clinical suspicion of tuberculosis for a period of 1 ½ years and was carried out in both in- and out-patients who underwent Fine needle aspiration Cytology (FNAC) on lymph nodes and their pathophysiological changes in cytomorphology were observed. **Result:** Lymphadenopathy was the commonest symptom (100%) which was present in all patients. The pathophysiological changes in cytomorphology of LNs were studied and constituted non-specific inflammatory pathology in 17(14%) cases, reactive hyperplasia in 33 (27.3%) cases and granulomatous inflammation with/without necrosis in 41(33.9%) cases. Smears showing abundant necrosis without epithelioid granulomas constituted of 30 (24.8%) cases. **Conclusion:** The most common pathophysiological change in the morphology with associated AFB positivity was necrosis without epithelioid cell granulomas which comprised 20 out of 30 (66.6%) cases showing patients decreased immunity and extensive necrosis of LN due to TB bacilli.

INTRODUCTION

Tuberculosis (TB) is the leading cause of death from a single infectious agent known as Mycobacterium tuberculosis (MTB). It is a well-known disease and globally poses major public health challenge. Geographically, India accounts for 28 per cent of the overall global TB burden out of the six high-burden countries from south-east Asia region which is highest TB infection globally.^[1] The most common extrapulmonary tuberculosis manifestation is tuberculosis lymphadenitis (TBL) accounting for 70% cases and most commonly affects peripheral and cervical lymph nodes. There are multiple steps in pathophysiology of TB bacilli which include aerosolization, macrophage phagocytosis, phagolysosome blockage and replication, T helper type 1 (TH1) response, granuloma formation, clinical manifestations, and transmission.^[2,3] The Mycobacterium tuberculosis bacteria (Mtb) from the lungs, is taken up by macrophages and is transported to lymph nodes and lead to granuloma formation.

Hence T-cells activate and generate adaptive immune responses by cytokine production and other effector mechanism activation for microbial killing.^[4] Lymph nodes are sites of immune system but also serve as niches of MTB growth and persistence. These enlarge, cause granulomatous inflammation and distorts the normal architecture of the lymph node which is vital to its function.^[5] Lymphadenitis is the most common extrapulmonary manifestation of tuberculosis. It remains both diagnostic and therapeutic challenge because it mimics other pathologic processes. FNAC and PCR are helpful in obtaining an early diagnosis.^[6] The lymph node in TB usually causes a painful swelling of one or more lymph nodes. Most often, the disease is localized to the anterior or posterior cervical chains (70-90%) or supra clavicular. It is often bilateral and non-contiguous lymph nodes can be involved.^[7] Mycobacterial culture is the reference method for detection of tubercle bacilli, but it is time consuming and requires specialized safety procedures.^[8] Microscopy of Ziehl-Neelsen (ZN) stained smears

plays a key role in the diagnosis and monitoring the treatment of tuberculosis.^[3,9,10] It's major disadvantage is low sensitivity ranging from 9 to 46%.^[6]

The study was carried out in both in- and out-patients who underwent FNAC on lymph nodes which were clinically suspicious of tuberculosis. The aim of the study was to compare the pathophysiological changes in morphology of lymph nodes of patients suspected of tuberculosis.

MATERIALS AND METHODS

Study Design: This prospective study was conducted in Cytology section of Department of Pathology, Christian Medical College, Ludhiana, for FNAC of lymph nodes with clinical suspicion of TB over a time period of 1 ½ years. The samples from indoor as well as outdoor patients, from all age groups, who underwent FNAC of lymph nodes with clinical suspicion of TB were included while the cases diagnosed as malignancy on routine cytology were excluded. Demographic details, history and clinical examination was done as per the protocol. After preparing the patient for aspiration of the lesion, FNAC was performed and four smears were prepared as per routine with May Grünwald and Giemsa stain (MGG), Hematoxylin and Eosin (H&E) stain and one smear was stained with conventional Ziehl-Neelsen stain. The smears were studied to look for pathophysiological changes in morphology of Lymph nodes in cases suspected of tuberculosis.

Statistical Analysis: The spectrum was calculated by averages and proportions.

RESULTS

The youngest patient was 13 months old while the eldest was 80 years with a mean age of 32.6 years with female: male ratio of 1.01:1. Of the 121 lymph nodes, cervical lymphadenopathy (LAP) was most common with 60 (49.5%) cases followed by supraclavicular LNs in 18 (14.8%), submandibular in

10 (8.3%) and infraclavicular LN in 7 (5.7%) of the cases.

Ten (8.3%) and 5 (4.1%) patients presented with axillary and inguinal lymphadenopathy respectively. Intrabdominal (1/121), para aortic (1/121) and mesenteric regions (1/121) constituted a total of 2.5% cases.

Lymphadenopathy was the commonest symptom (100%) which was present in all patients followed by evening rise of temperature (60.3%), loss of weight (52%), loss of appetite (50.4%) and cough (28%).

FNAC was done on all the patients with clinical suspicion of TB. The pathophysiological changes in cytomorphology of LNs were studied and constituted non-specific inflammatory pathology in 17(14%) cases, reactive hyperplasia in 33 (27.3%) cases [Figure 1] and granulomatous inflammation with/without necrosis in 41(33.9%) cases [Figure 2]. Smears showing abundant necrosis without epithelioid granulomas constituted of 30 (24.8%) cases [Figure 3, Table 1].

All the 121 lymph node aspirates were subjected to conventional ZN staining [Figure 4].

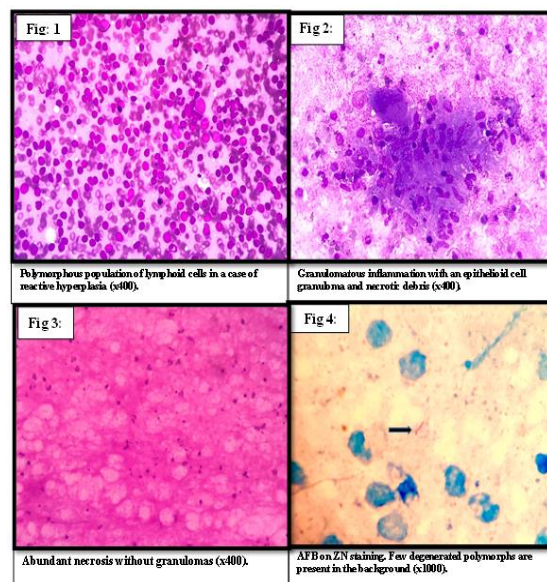


Table 1: Various cytomorphological patterns and AFB positive cases by conventional ZN stain.

Comparison of various cytomorphological patterns and conventional ZN method (n=121)			
Diagnosis		Number of cases	Positive by conventional ZN staining %
Non specific inflammation		17	11.7
Reactive lymphadenitis		33	24.2
Granulomatous inflammation	with extensive necrosis	30	40
	with minimal necrosis	11	18.1
Necrosis without epithelioid cell granulomas		30	66.6
Total		121	36.6

Table 2: Different cytomorphological categories observed in lymph node aspirates with clinical suspicion of tuberculosis in various studies.

Study	Total cases	Non specific /Suppurative inflammation	Reactive lymphadenitis	Granulomatous inflammation with/ or without necrosis	Extensive Necrosis with no granulomas
Bhardwaj et Al, ^[11] (2015)	125	14 (11%)	-	88 (70.4%)	23 (18.4%)
Patel et al, ^[12] (2013)	115	28 (24.3%)	19 (16.5%)	68 (59.1%)	-

Dwivedi and Mathur, ^[13] (2013)	200	55 (27.5%)	41 (20.5%)	104 (52%)	-
Present study	121	17 (14%)	33 (27.2%)	41 (33.9%)	30 (24.7%)

Table 3: Smear positivity for AFB on ZN stain in various studies.

	ZN stain
Bhardwaj et al. ^[11] (2015)	22.4% (28/125)
Patel et al. ^[12] (2013)	27.8% (32/115)
Dwivedi and Mathur, ^[13] (2013)	35.5% (71/200)
Present study	36.3% (44/121)

DISCUSSION

The present study was carried out to compare the various pathophysiological changes in cytomorphology of lymphnodes in patients suspected of TB and included 121 lymph node aspirates.

In our study, the patients showed a wide age group ranging from 13 months to 80 years with the mean age being 32.6 years. Most of the patients (26.4%) belonged to the third decade which was in concordance with studies done by Bhardwaj et al, Patel et al.^[11,12]

Cervical lymph nodes formed the majority (49.5%) in our study followed by eighteen (14.8%) from supraclavicular region, 10 (8.2%) cases each from axillary region and submandibular region, 7 (5.7%) from infraclavicular region, 5 (4.13%) cases were from inguinal region and 1 each from para aortic, mesenteric and intraabdominal lymph nodes. Eight (6.6%) cases presented with lymphadenopathy at more than one site. Comparable results were seen by Bhardwaj et al, Patel et al.^[11,12]

In the present study, cytomorphologically diagnosed categories included non-specific inflammation, reactive lymphadenitis, granulomatous inflammation with/ or without necrosis and necrosis without epithelioid granulomas; of these granulomatous inflammation with/or without necrosis formed the majority (33.9%). Studies showing different cytomorphological categories in lymph node aspirates with clinical suspicion of tuberculosis is shown in the [Table 2].

The smear positivity for AFB in our study by ZN staining was 36.3%.

Various studies done by Bhardwaj et al,^[11] Patel et al,^[12] and Dwivedi and Mathur,^[13] is shown in [Table 3].

These findings were comparable to our study and is shown in the [Table 3].

CONCLUSION

The present study suggested that the cervical group of lymphnodes were the most commonly involved with 60 (49.5%) cases followed by supraclavicular region in 18 (14.8%), submandibular in 10 (8.3%) and infraclavicular region in 7 (5.7%) of the cases. The most common pathophysiological change in

cytomorphology of LN with associated AFB positivity was necrosis without epithelioid cell granulomas which comprised 20 out of 30 (66.6%) cases showing patients decreased immunity and extensive necrosis of LN due to TB bacilli.

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