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Pathology

Analysis of CBNAAT Sensitivity in Diagnosing Tubercular Lymphadenitis in Correlation with FNAC in A Tertiary Care Center

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Abstract **Original Research Article**

Background: The diagnosis of extra pulmonary TB (EPTB) like tubercular lymphadenitis is challenging due to the paucibacillary nature of the disease. Recently, WHO recommends Gene Xpert/ CBNAAT to diagnose the patient suspected EPTB. The aims and objectives of this study to detect the sensitivity of CBNAAT over FNAC to diagnose a TB lymph node. ***Material and Method:*** This is a descriptive observational study carried out over a period of 12 months (July 2018 to June 2019) in Dept. of Pathology, CNMCH, Kolkata. All cases suspecting TB lymphadenitis between the age group of <1yr to 60yrs were included in the study. FNAC was done and material sent for Leishman Giemsa stain, ZN stain, HE and CBNAAT. ***Result:*** Total no. of cases 289. Majority of aspirates are from cervical lymph node- 94.1% (272/289). Total cytomorphological positive 50.5% cases out of total 289 cases, that is 88.48% out of total true TB cases and CBNAAT positive 94%.CBNAAT has detected more than 11.5% (19) cases which were not detected by FNAC. ***Conclusion:*** FNAC still remains the cheapest test to diagnose Lymph node TB. In cases with Granulomatous Lymphadenitis and purulent Aspirate, CBNAAT has an important role in diagnosing Lymph Node TB over FNAC.

Keywords: CBNAAT, FNAC, Lymph node TB, ZN stain.

INTRODUCTION

India is the home of the world's largest tuberculosis (TB) burden accounting 21% incidence globally. All though pulmonary involvement is most common; it can potentially affect any organ of the body. Infection by Mycobacterium Tuberculosis affecting outside the lung parenchyma called extra pulmonary TB (EPTB) accounting 10-15% of total TB cases [1-5]. As bacillary load in EPTB like Lymph Node TB is very low [8], diagnosis is still remains challenging [6]. Cytology and conventional smear microscopy is helpful for initial diagnosis. FNAC is a simple and rapid diagnostic test but conventional microscopy lacks sensitivity [7]. Mycobacteriological culture testing is not always available and results may take 4 to 8 weeks or more [9]. In Dec' 2010 WHO endorsed CBNAAT/ Gene Xpert for TB laboratories. CBNAAT was adopted in INDIA by RNTCP in 2012.

Cartridge Based Nucleic Acid Amplification Test (CBNAAT)-It is a closed system 2 nd generation real time polymerase chain reaction requires 2 hours only and minimal technical expertise to diagnose TB. In 2014 WHO recommend CBNAAT for EPTB cases to diagnose MTB [4]. The aim and objective of this study to calculate the incidence of LNTB in tertiary care center and comparing FNAC findings with CBNAAT sensitivity.

Fig-1: CBNAAT laboratory at CNMCH, Kolkata

MATERIAL AND METHODS

It is an observational study done in the Dept. of Pathology, CNMCH, Kolkata over a period of 12 months (July'2018 to June'2019). Sample size is 289. Inclusion criteria are all clinically suspected LNTB cases. Exclusion criteria are already diagnosed and follow-up cases of TB. Analysis of cytomorphological positivity in FNAC versus CBNAAT sensitivity has been done.

Procedure

Proper written consent has been taken from all cases before starting procedure. 23 or 25 gauge needle and 10ml syringe is used. Relevant clinical features and gross specimen appearance (caseous, purulent, blood mixed) was recorded at the time of specimen collection.

Specimen sent for LG, HE, ZN staining. Evaluation for specimen adequacy and examined for epithelioid cells with or without necrosis. The remaining aspirate was added with CBNAAT buffer and collected in falcon tube and incubated at room temperature. Shake properly and kept for 20 minutes. 2ml sample is taken by Pasteur pipette and transferred to Xpert cartridge. Then cartridge is loaded into Xpert machine.

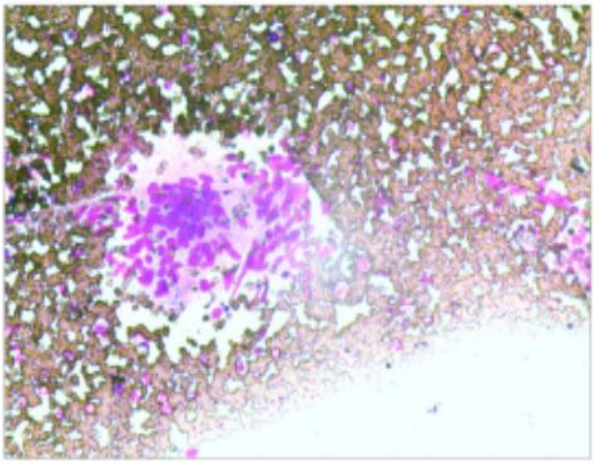

Fig-2: Epitheliod cells forming granuloma in LG staining

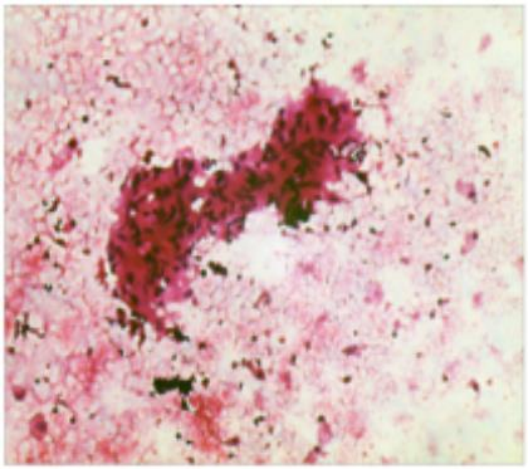

Fig-3: Epitheliod cells forming granuloma in H & E staining

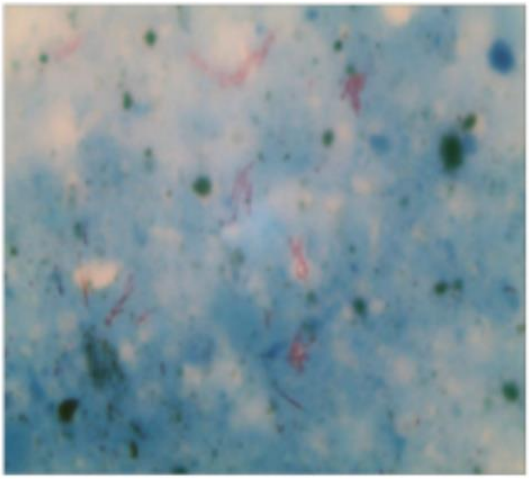

Fig-4: Acid fast bacilli in 2N staining

Result of CBNAAT was declared within two hours as Detected or Not Detected. Statistical calculation has been done by using SPSS software [3].

RESULT

All 289 cases were subjected to FNAC and CBNAAT. Cytomorphological features with ZN stain positive consistent with TB were 50.5% cases out of total 289 cases and 88.48% out of total true TB cases. CBNAAT positive cases were 94% out of total true TB cases.

Majority of the cases are between 11 -30 years and female preponderance (Table-1); in this study CBNAAT also shows the same result (Table-2).

Table-1: Age and sex distribution of total cases (n=289)

Age group	No of Cases	Male	Female
2 months-10	35	27	8
11-20	**76**	**25**	**51**
21-30	**85**	**37**	**48**
31-40	51	23	28
41-50	26	18	8
51-60	16	10	6
Total	289	140(48%)	**149(51%)**

Table-2: Age and sex wise distribution of CBNAAT positive cases (n=289)

Age group	No of cases	Total	Male	Female
2 months -10	35	5	4	1
11-20	**76**	**43**	**12**	**31**
21-30	**85**	**58**	**24**	**34**
31-40	51	35	19	16
41-50	26	9	7	2
51-60	16	5	4	1
Total	289	155	70(24%)	**85(29.4%)**

Table-3: Site wise distribution of total cases along with CBNAAT positivity

Site	Total	%	CBNAAT positive
Cervical region	**272**	**94.1**	**151/272(55.5%)**
Axillary region	6	2.07	1/6(16.6%)
Inguinal region	4	1.38	2/4
Chest wall	1	0.35	1/1
Leg	2	0.7	
Forearm	2	0.7	
Nape of neck	2	0.7	
Total	289		155

Table-4: Distribution of type of FNAC aspirates along with CBNAAT result (n=289)

Type of aspirate	Total	CBNAAT positive	CBNAAT negative
Purulent	**161(55%)**	**113(70.1%)**	**48**
Cheesy	12(4%)	5(41.6%)	7
Blood mixed	116(41%)	37(31.8%)	79
Total	289	155(53.6%)	134

Table-5: Comparison of cytomorphological diagnosis with CBNAAT (n=289)

Cytomorphological (FNAC) diagnosis	Total	CBNAAT + ve	Not correlated with FNAC CBNAAT
Granuloma with AFB positive cases	**146(50.5%)**	**136(93.1%)**	**10**
Abscess	49(17%)	**16**(32.6%)	**16**
Acute lymphadenitis	23(7.9%)	2(8.69%)	**2**
Acute sialadenitis	1	**1**	**1**
Squamous cell carcinoma/deposit	6		
Reactive lymphadenitis	53		
Hodgkin's lymphoma	1		
Neurofibroma	1		
Infected epidermal cyst	1		
Fungal infection	7		
Branchial cyst	1		
Total	289	**155**	**29**

DISCUSSION

The present study is hospital based prospective study on the diagnosis of TBLN by CBNAAT in comparison to FNAC. In the present study, we compared the age and sex wise distribution of CBNAAT positive cases with other studies where younger age groups were predominantly affected with LNTB in all the studies including present study and female's preponderance is seen which is correlated with other studies. In year 2006, Yassin *et al*., [2] in 'Ten year experience of the tuberculosis control program in the southern region of Ethiopia' showed that 15 to 24 years age group was more susceptible in respect of total CBNAAT positive cases that are 30.7 %. In year 2006, Arora VK *et al*., in 'Trends of extra pulmonary tuberculosis under RNTCP in South Delhi' showed that more CBNAAT positive cases were in the 15 to 24 years age group that is 38%. But in Mulualem *et al*., age group range were more 16 to 30 years that is 58%. In our study age group were 11 to 30 years that is 30.4%. In year 2017, Poojasing et al. showed that 69% of cases were female and Mulualem *et al*., showed that 76% cases were female, were CBNAAT positive. In present study female positive cases were 55% and males were 45% out of 155 total CBNAAT positive cases. We also compared the distribution of type of FNAC aspirate along with CBNAAT result which did not correlated with Mulualem study where caseous aspirates were 69% having CBNAAT positive but in our study 70.1% CBNAAT positive cases having purulent aspirates. The most common site of presentation in our study was cervical 94.1%, followed by axillary 2.07% and inguinal 1.38% which is concordant with Khajuria *et al*., [10] and Chand *et al*., [11] study. In present study CBNAAT sensitivity was 94% which is nearer to the others study like Sing KG *et al*., [12] where sensitivity is 91% and in Ligthelm *et al*., [13] sensitivity is 96.7% but cytomorphological sensitivity in present was 88.4%. In present study non correlated cases of CBNAAT with FNAC were 29. Out of which 19 cases were FNAC (negative) but CBNAAT (positive) and 10 cases were FNAC positive but CBNAAT negative, may be due to low bacillary load or Mycobacteria other than Tuberculosis (MOTT). So, it is noted that 19 suspected TB patients, were cytomorphologicaly negative for TB, who were surely benefited by the CBNAAT. Out of 289 cases true positive cases were 165(57.09%), within this Cytomorphologicaly positive cases were 146(88.4%) and CBNAAT positive cases were 155(94%). So cytomorphological sensitivity is 0.88 and CBNAAT sensitivity is 0.94 so it is noted that CBNAAT is more sensitive than FNAC.

CONCLUSION

Majority of aspirate from cervical LN. CBNAAT positive cases 94% but Cytomorphologicaly positive cases 88.48%.Younger age group and Females are more susceptible. Purulent aspirates having maximum CBNAAT positivity. Cervical lymph nodes are the predominant sites for EPTB. CBNAAT detected 19(11.5%) cases which were not detected by FNAC. Though FNAC is cost effective test but CBNAAT are more sensitive and require minimum time 2 hours only. So, combining with CBNAAT has an advantage of detection of FNAC missed cases and it can be integrated into routine diagnostic protocol.

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