Comparative study between CBNAAT and acid-fast bacilli culture in extra pulmonary tuberculosis

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ABSTRACT

Introduction: Mycobacterium Tuberculosis is a complex organism in which lungs are the main portal of infection. Tuberculosis affecting organs other than lungs called as extrapulmonary tuberculosis. Tuberculous lymphadenitis is the most common form of Extrapulmonary Tuberculosis contributing to 35 percent of Extrapulmonary Tuberculosis cases. CBNAAT is a cartridge based nucleic acid amplification test which detects the presence of Mycobacterium Tuberculosis as well as Rifampicin resistance.

Materials and Methodology: Samples were collected from the appropriate extrapulmonary sites which included Lymph Node aspirate, Pleural fluid, Ascitic fluid, Abscess, Cerebrospinal Fluid. The samples were sent for AFB smear, CBNAAT and AFB culture. The data was analyzed and results were compared.

Results: This cross-sectional study was conducted in a sample size of 89 patients attending the outpatient department in a tertiary care center in the Department of Respiratory Medicine at Santosh Hospital, Ghaziabad who were clinically suspected cases of Extra Pulmonary Tuberculosis. MTB was detected in CBNAAT in 33(37%) cases giving a Yield of 37% with RIF resistance in 2(2.2%) cases and MTB was detected in 53(59.5%) giving it a yield of 59.5% with RIF resistance in 2.

Conclusion: There was statistically significant weak agreement seen between CBNAAT finding and AFB culture finding (Kappa value = 0.48; p value <0.01).

Keywords
MTB, EPTB, CBNAAT, AFB Culture, Rifampicin Resistance.

Imprint

1284 | Cardiometry | Issue 25. December 2022
As per WHO, EPTB should be diagnosed on the basis of culture positive specimen or caseating granuloma on biopsy or strong clinical evidence consistent with active Extrapulmonary Tuberculosis. 9

MATERIALS AND METHODOLOGY
STUDY DESIGN: Cross Sectional Study
PLACE OF STUDY: Department of Respiratory Medicine, Santosh Hospital, Ghaziabad, (U.P)
STUDY POPULATION: Clinically suspected cases of extrapulmonary tuberculosis both inpatient and outpatient were enrolled in the study after their consent. The samples included Lymph node aspirate, Pleural fluid, Ascitic fluid, Cerebrospinal fluid and Abscess
DURATION OF STUDY: One year study
SAMPLE SIZE: sample size is 89.
INCLUSION CRITERION:
1. All adult patients (>18 years) suspected of Extrapulmonary tuberculosis which includes Superficial Lymphadenitis, Pleural effusion, Abdominal Kochs, Cerebrospinal Fluid and Abscess
2. All genders.
3. All new as well as retreatment EPTB cases.
EXCLUSION CRITERION:
1. Extrapulmonary samples contaminated with blood, stool, blood
2. Pleural effusion due to Chronic Renal Failure and Cardiac Failure

It is a Cross sectional study conducted at Santosh Hospital, Ghaziabad where all the clinically suspected cases of Extrapulmonary tuberculosis were taken in the study.

Samples were collected from the appropriate extrapulmonary sites which included Lymph Node aspirate, Pleural fluid, Ascitic fluid, Abscess, Cerebrospinal fluid

The samples were sent for AFB smear, CBNAAT and AFB culture.

The data was analyzed and results were compared.

OBSERVATIONS & RESULTS
As observed from the above Table 12 and Fig 12, out of 89 cases, MTB was not detected in CBNAAT in 56(62.9%) cases and MTB was detected in CBNAAT in 33(37%) cases giving a Yield of 37% with Rif resistance in 2(2.2%) cases.

<table>
<thead>
<tr>
<th>CBNAAT</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not detected</td>
<td>56</td>
<td>62.9</td>
</tr>
<tr>
<td>Detected with rifampicin sensitivity</td>
<td>31</td>
<td>34.8</td>
</tr>
<tr>
<td>Detected with rifampicin resistance</td>
<td>2</td>
<td>2.2</td>
</tr>
</tbody>
</table>

As shown in the above Table 13 and Fig 13, out of 89 cases, MTB was not detected in 36(40.4%) in AFB culture and MTB was detected in 53(59.5%) giving it a yield of 59.5% in which 2(2.2%) were detected to have MDR.

There was statistically significant weak agreement seen between CBNAAT finding and AFB culture finding (Kappa value = 0.48; p value <0.01).
TABLE 2

Yield of AFB culture in study subjects (n=89)

<table>
<thead>
<tr>
<th>AFB culture</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not detected</td>
<td>36</td>
<td>40.4</td>
</tr>
<tr>
<td>Detected with no MDR</td>
<td>51</td>
<td>57.3</td>
</tr>
<tr>
<td>Detected with MDR</td>
<td>2</td>
<td>2.2</td>
</tr>
</tbody>
</table>

Figure 2

DISCUSSION

This cross-sectional study was conducted in a sample size of 89 patients attending the outpatient department in a tertiary care center in the Department of Respiratory Medicine at Santosh Hospital, Ghaziabad who were clinically suspected cases of Extra Pulmonary Tuberculosis.

The study was conducted to know the yield of CBNAAT in Extra Pulmonary Tuberculosis in the locality and to compare it with AFB culture sensitivity taking it as the Gold Standard in the diagnosis of Tuberculosis. Study conducted by Singh KG et al had a diagnostic yield of 77.9% in CBNAAT in tubercular peripheral lymphadenopathy.1

Study conducted by Shamma Shetye et al had maximum diagnostic yield of CBNAAT in pus and aspirates where 48.38% were MTB positive with Rifampicin resistance and 49.74% were MTB positive with Rifampicin sensitive.10

E. Tortoli et al conducted a study in which the overall sensitivity and specificity of Xpert in Extrapulmonary Tuberculosis was 70% and 97.3%.6

TABLE 3

Association of AFB culture and CBNAAT finding (n=89)

<table>
<thead>
<tr>
<th>CBNAAT</th>
<th>Not detected</th>
<th>Detected without MDR</th>
<th>Detected with MDR</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not detected</td>
<td>33</td>
<td>22</td>
<td>0</td>
<td>55</td>
</tr>
<tr>
<td>Detected with rifampicin sensitivity</td>
<td>3</td>
<td>29</td>
<td>0</td>
<td>32</td>
</tr>
<tr>
<td>Detected with rifampicin resistance</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>36</td>
<td>51</td>
<td>2</td>
<td>89</td>
</tr>
</tbody>
</table>

Kappa value = 0.48; p value <0.01
In a study conducted by Yadav.K and Veena.M, yield of CBNAAT was 23.8% in which maximum cases of MTB positives were found in the FNAC that is 52.2%.

In our study, MTB was not detected in CBNAAT in 56(62.9%) cases and MTB was detected in CBNAAT in 33(37%) cases giving a Yield of 37% with RIF resistance in 2(2.2%) cases and MTB was not detected in 36(40.4%) in AFB culture and MTB was detected in 53(59.5%) giving it a yield of 59.5%.There was statistically significant weak agreement seen between CBNAAT finding and AFB culture finding (Kappa value = 0.48; p value <0.01).

The current study was conducted in the Department of Respiratory Medicine, Santosh Hospital to study the yield of CBNAAT in EPTB and to compare the diagnostic efficacy of CBNAAT with AFB culture in all the forms of EPTB.

Out of 89 subjects included in the study who were EPTB suspects, all the extrapulmonary samples from the respective Extrapulmonary sites were subjected to CBNAAT and AFB culture, out of which 33 came out to be CBNAAT positive giving it an yield of 37% and 53 came out to be AFB culture positive giving AFB culture an yield of 59.5%.

The findings of the present study are imperative owing to widespread impact of tuberculosis on the society.11-13 In future the newer developments in genetic or tissue engineering are sought to bring developments in this field.14,15 Nevertheless the findings of the study are to be interpreted with caution keeping in mind the limitations of the study and the strength of evidence.16

**CONCLUSION**

Yield of AFB culture (59.5%) in clinically suspected cases of EPTB is greater than Yield of CBNAAT is (37%) in clinically suspected cases of EPTB. There was statistically significant agreement seen between CBNAAT finding and AFB culture finding.

**CONFLICT OF INTREST:**

None declared

**References**