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Cartridge-Based Nucleic Acid Amplification Test (Cbnaat) For Diagnosis Of Pulmonary Tuberculosis In Hiv: Results From Madurai District, Tamilnadu

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Abstract
Background: *Compared to sputum smear microscopy, which has limited utility among People Living with HIV(PLHIV) CBNAAT is able to detect more TB cases regardless of HIV status. Limited studies exist to study this in rural population.*
Methods: *The study objective was to assess the proportion of CBNAAT being positive for mycobacterium tuberculosis and there in rifamycin sensitivity among the HIV infected patients attending Tuberculosis clinic at a tertiary care hospital (receiving huge rural population), at Madurai, Tamilnadu. The Demographic, and CBNAAT results data of all HIV infected patients attending Pulmonology Out patient clinic at Government Rajaji Hospital, Madurai during the period between January 2017 to June 2017 were collected and analysed.*
Results: *Data on a total of 428 patients was obtained from the period of January 2017 to June 2017, who fit into the inclusion criteria. Out of this total, 64%(n=272) were males. Among the total 428 patients, 56 patients(13%) were detected positive for mycobacterium tuberculosis. Gastric juice and FOB did not yield any positive results for TB in all positive, among the M.TB detected patients, 55 were sensitive to Rifampicin and only one patient was reported as resistance to Rifampicin.*
Conclusion: *Fairly good proportion of M.TB detection is possible, when we use CBNAAT for detecting TB in HIV infected, even when the patients have with limited duration of respiratory symptoms*

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I. Introduction

The risk of developing tuberculosis (TB) is estimated to be between 26 and 31 times greater in people living with HIV than among those without HIV infection[1]. In 2014, there were 9.6 million new cases of TB, of which 1.2 million were among people living with HIV[1]. Diagnosing TB is a particular challenge among PLHIV who are more likely to have smear – negative pulmonary TB .This results in a delay in the detection of TB and in subsequent start of treatment. As a result, HIV-related TB deaths are a significant public health problem facing HIV-prevalent settings.

Compared to sputum smear microscopy, which has limited utility among PLHIV, Xpert MTB/RIF is able to detect more TB cases regardless of HIV status. For this reason, WHO recommends Xpert MTB/RIF as a primary diagnostic test for TB in PLHIV. As per RNTCP guidelines, CBNAAT is the preferred diagnostic technique for TB testing in PLHIV when compared to smear microscopy[2]. To assess the proportion of Xpert MTB/RIF that is Cartridge-based nucleic acid amplification test (CBNAAT) being positive for mycobacterium tuberculosis and there in rifamycin sensitivity among the HIV infected patients attending Tuberculosis clinic in rural population, we conducted a record review research from a retrospective data and we present the results of the study.

II. Methodology

The study objective was to assess the proportion of CBNAAT being positive for mycobacterium tuberculosis and there in rifamycin sensitivity among the HIV infected patients attending Tuberculosis clinic at a tertiary care hospital (receiving huge rural population), at Madurai, Tamilnadu.Study Design-Retrospective, descriptive analytical cohort study. Study Setting-The study was conducted at Pulmonology Out patient clinic at Government Rajaji Hospital, Madurai, Tamilnadu

Study population: All HIV infected individuals attending Pulmonology Out patient clinic at Government Rajaji Hospital, Madurai, irrespective of age, sex and duration of respiratory symptoms during the period between January 2017 to June 2017.

Inclusion Criteria: HIV infected individuals of all age, any sex, with respiratory symptoms

Exclusion criteria: Those he were severely, moribund were excluded from the study

Study procedure:

The Demographic, and CBNAAT results data of all HIV infected patients attending Pulmonology Out patient clinic at Government Rajaji Hospital, Madurai at the said period were collected. The specimens used for the CBNAAT test for pulmonary TB was sputum for adults and children above 8 years. For children unable to collect sputum, gastric lavage was extracted under aseptic precautions, and fibro-optic broncho-alveolar lavage when ever necessary was taken and sent for the Gene expert test to Microbiology Department of Madurai Medical College through RNTCP Cell, GRH. The results of the study was analysed using SPSS software version 20.00 Since the study involved retrospective review of records already collected, administrative approval was obtained from the Dean, Madurai Medical College.

III. Results

Data on a total of 428 patients was obtained from the period of January 2017 to June 2017, who fit into the inclusion criteria. Out of this total, 64%(n=272) were males. Median age (IQR) was 41(35,48). Basic demography details are presented in Table 1. Among the total 428 patients, 56 patients(13%) were detected positive for mycobacterium tuberculosis. Gastric juice and FOB did not yield any positive results for TB and all positive M.TB results were from sputum specimens only. Among the m.TB detected patients, 55 were sensitive to Rifampicin and only one patient was reported as resistance to Rifampicin (Table 2).

IV. Discussion

People living with HIV (PLHIV) have more than a 20-fold increased risk of TB compared to HIV-uninfected people. However detecting TB among HIV is still challenging. Our study showed using CBNAAT detected 13% of positive results for M.TB among HIV infected individuals. While some studies report higher proportion of detection[3], our study patients included HIV infected who had limited respiratory symptoms, as we included patients irrespective of duration of symptoms, that could lead to lower yield. A study [4]done at GGSM College, Faridkot a leading tertiary care centre of Malwa region of Punjab, India and Sputum samples received from 5 districts of Punjab (Bathinda, Faridkot, Moga, Kothpura, Ferozpur) including a total of 907 sputum samples of the patients with symptoms, showed that out of these 733 patients which were reported MTB positive and 19(2.5%) were reported positive for (HIV +TUBERCULOSIS). Of these 19 Co-infected cases 16 (84.21%) cases were sensitive to rifampicin (RiF) and 3(15.78%) cases were showing resistance to to rifampicin. Again in this study, high detection could be due to inclusion of patients with pronounced respiratory symptoms.

Another implications of the study is the feasibility of implementing the CBNAAT test being used in rural population. On reviewing the data, it is clear that there had been no reported difficulty in getting the results and the coordination between the departments and programmes had been much feasible. It is justified that the recent guidelines on TB management, both globally[5] as well as nationally[6] promotes CBNAAT for detecting TB in HIV. To conclude, fairly good proportion of m.TB detection is possible, when we use CBNAAT for detecting TB in HIV infected, even when the patients have with limited duration of respiratory symptoms.

Limitations

Since the data was collected from a shorter period of six months, it may be difficulty to generalise and concretely say based on the study findings

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Table 1. Demographic and basic details of HIV infected patients with respiratory symptoms attended pulmonology OP, GRH Madurai from January to June 2017 who were tested for CBNAAT

Variables	**n (%)**
Age (in yrs)	
Median (IQR)	41 (35, 48)
Age Group (in yrs)	
≤20	11 (2.6)
21 – 40	191 (44.9)
41 – 60	203 (47.8)
61 – 80	20 (4.7)
Sex	
Male	272 (63.6)
Female	156 (36.4)
SpecimenType	
FOB	2 (0.5)
Gastric Juice	2 (0.5)
Sputum	424 (99.0)
Total	428 (100.00)

Table 2: Results of detection on m.TB and Rifampicin sensitivity among the positives, for HIV infected patients with respiratory symptoms attended pulmonology OP, GRH Madurai from January to June 2017

Variables	**n (%)**
Result	
Negative	370 (86.4)
Positive	56 (13.1)
Indeterminate	2 (0.5)
DST	
Sensitive	55 (98.2)
Resistant	1 (1.8)

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