

PREVALENCE OF POSITIVITY OF CBNAAT IN PULMONARY TUBERCULOSIS

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Abstract

Background: TB Is the ninth leading cause of death worldwide and the leading cause from a single infectious agent, ranking above HIV/AIDS. In 2016, there were an estimated 1.3 million TB deaths among HIV negative people (down from 1.7 million in 2000) and an additional 374 000 deaths among HIV-positive people.

Methods: This is a retrospective study conducted in the department of Pulmonary medicine. Early morning sputum sample was collected from the patients in a clean sterile container.

Results: Among the total 500 samples, 110 were detected tuberculosis positive by CBNAAT method and 390 were negative. And among 110 positive cases, 107 were Rifampicin sensitive and 3 were Rifampicin resistant

Conclusion: CBNAAT detects pulmonary TB with greater efficacy than sputum microscopy also helping in early diagnosis in less than 2 hours. It also detects rifampicin resistance with high specificity and can be used for screening for MDR-TB so that early therapy can be started thus decreasing the incidence of MDR-TB. WHO recommends CBNAAT for early diagnosis of pulmonary tuberculosis and detection of rifampicin resistance and retreatment cases, who are at risk of MDR-TB.

Keywords: CBNAAT, MDR, Pulmonary tuberculosis

Introduction

TB Is the ninth leading cause of death worldwide and the leading cause from a single infectious agent, ranking above HIV/AIDS. In 2016, there were an estimated 1.3 million TB deaths among HIV negative people (down from 1.7 million in 2000) and an additional 374 000 deaths among HIV-positive people.¹

Globally, the TB mortality rate is falling at about 3% per year. TB incidence is falling at about 2% per year; this needs to improve to 4-5% per year by 2020 to reach the first milestones of the End TB Strategy.²

The CBNAAT uses a cartridge containing all elements necessary for the reaction, including lyophilized reagents, liquid buffers and wash solutions. With observing aseptic technique, sample (2 ml mucuprulent) was collected in a falcon tube. The sample was loaded into cartridge and analyzed for presence of mycobacteria and rifampicin resistance in GX4 System (with 4 modules)³

Material and Methods

This was a retrospective record review of 322 newly diagnosed pulmonary TB patients who underwent sputum microscopy and CBNAAT as per RNTCP guidelines. All newly diagnosed patients higher than 12 years of age were include in the study. The number of patients being diagnosed as sputum positive or negative as well as those diagnosed as having Rifampicin resistant has been reported as percentage and proportions.

Early morning deep coughed sputum specimens in sterile containers were included in the study. Specimens were stored at 2-8 degree c in freezer till further processing and stored at 35 degree c for three days . CBNAAT is an automated, rapid cartridge based method for TB case detection and rifampicin resistance. It was launched in 2004, by cepheid and was partnered with FIND (Foundation for innovative new diagnostics).

Components

Modules- Thermal and Optical systems

Cartridge- Self contained disposable kit

Computer system- Software, barcode scanner

Parts of the machine

Plunger motor, plunger drive shaft, mother board, I core, Cartridge insertor, valve drive motor, ultrasonic horn.

CBNAAT

CBNAAT is a rapid cartridge based fully automated NAAT (Nucleic acid amplification test) for TB case detection and Rifampicin resistance testing suitable for use in disease endemic countries. It was launched in 2004 by Cepheid and was partnered with FIND (Foundation for Innovative New Diagnostics)

Observations

In this study in both male & female group, maximum patients were in age group 16-30 years. As age advanced, number of

patients decreased in both female and male groups. Females were affected relatively more in younger age group as compared to males and this difference was found to be statistically not significant.

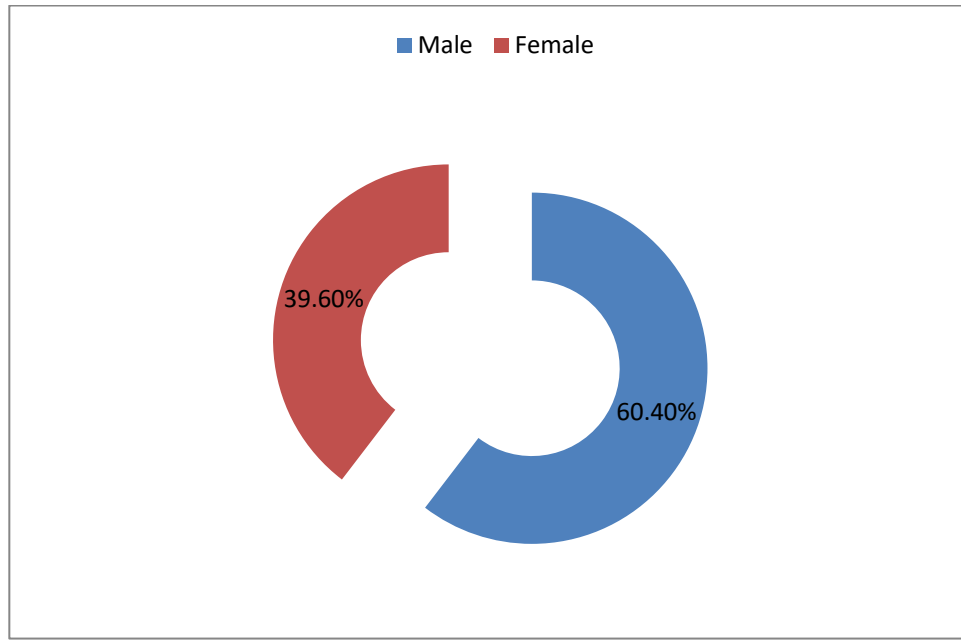


Table 1: Prevalence of positive case

Total sample taken	500
CBNAAT positive	110 case
Prevalence	22.00%
Rifampicin sensitive	107 case

Among the total 500 samples, 110 were detected tuberculosis positive by CBNAAT method and 390 were negative. And among 110 positive cases, 107 were Rifampicin sensitive and 3 were Rifampicin resistant.

Discussion

Early morning sputum samples were tested by CBNAAT method the positive have no specific age group and irrespective of sex. Sputum microscopy for AFB is simple economical and easy to do test for diagnosing pulmonary tuberculosis. However as it needs at least 10, 000 bacili per ml to give a positive result and being a highly subjective (operator dependent) test, its sensitivity has been shown to range from 20% to 60% under different conditions.³

CBNAAT on the other hand, not only detects tuberculosis positive cases, it also detects rifampicin resistance cases within 2 hours.

Past studies on drug resistance have shown that rifampicin resistance is seldom detected alone and 90% of rifampicin

resistance patients turn out to be MDR-TB, Hence CBNAAT can be a useful test for screening for MDR-TB. This is of particular reference to TB endemic area like India where there is high prevalence of MDR-TB of around 3% in new cases and 12-18% in old treated cases (and sputum microscopy is the only screening test used to diagnose tuberculosis). There are only few studies on CBNAAT from India.⁴

Conclusion

CBNAAT detects pulmonary TB with greater efficacy than sputum microscopy also helping in early diagnosis in less than 2 hours. It also detects rifampicin resistance with high specificity and can be used for screening for MDR-TB so that early therapy can be started thus decreasing the incidence of MDR-TB. WHO recommends CBNAAT for early diagnosis of pulmonary tuberculosis and detection of rifampicin resistance and retreatment cases, who are at risk of MDR-TB.

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