

Prospective Study of Cartridge Based Nucleic Acid Amplification Test (Cbnaat) In HIV Infected Sputum Negative Pulmonary Tuberculosis In Teritiary Care Hospital.

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Abstract:

INTRODUCTION: Diagnosis of pulmonary tuberculosis in sputum negative HIV infected patients. It is fact that 50% -60% patients of pulmonary tuberculosis are sputum negative microscopically.smear microscopy is easiest ,commonest and widely employed tool for confirmatory diagnosis of tuberculosis,but it has low sensitivity and specificity.sputum culture for mycobacterium tuberculosis bacteria can increase the diagnostic yield by 20-40%,but it take long duration of 2-8 weeks when solid media are used or 10-14 days when radiometric system in liquid media are used.Delayed diagnosis causes increased rate of disease transmission in the community.the role of newly introduced cartridge based nucleic acid amplification test (CBNAAT) in the community. The role of newly introduced cartridge based nucleic acid amplification test (CBNAAT) in the revised national control programme (RNTCP) is highly promising with a high yield of bacteriological diagnosis in HIV infected sputum negative pulmonary tuberculosis patients with detection of rifampicin resistance within 2 hours only.

AIM AND OBJECTIVES-The current study is to find out efficacy of CBNAAT in diagnosis of HIV infected sputum negative pulmonary tuberculosis patients .The detection of rifampicin resistance also done in those patients.

MATERIAL AND METHODS: sputum samples of 200 sputum negative pulmonary tuberculosis patients were sent to district CBNAAT centre .The CBNAAT result were analysed.

RESULTS: Mycobacterium tuberculosis was detected in sixty two patients (62%) .Not a single case was detected as resistant to rifampicin .

CONCLUSION: CBNAAT helps in increased case detection rate in less time in HIV infected sputum negative pulmonary tuberculosis patients .

Key Words: CBNAAT , RNTCP, pulmonary tuberculosis, mycobacterium tubercu losis, HIV .

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I. Introduction

Acquired immunodeficiency syndrome is caused by Human immune deficiency virus (HIV) which progressively impairs cellular immunity. HIV is transmitted by sexual contact , by exposure to blood and blood products or infants of HIV infected mothers .(who may infected in utero ,prenatally or via breast feeding).world major route is heterosexual.tuberculosis is an age old disease .in 1882,Sir Robert Koch discovered mycobacterium tuberculosis (MTB) as the causative agent for the disease.According to the global tuberculosis report 2014 of world health organisation (WHO),tuberculosis (TB) remains one of the most dangerous communicable disease.the disease usually affects the lungs know as pulmonary tuberculosis (PTB)and spreads by droplet aerosol transmission from infected patient to healthy person.early diagnosis is imperative for early patient management and successful patient outcomes in order to prevent the further spread of diseases.but even today ,the diagnosis of TB remain alusive.the symptoms of pulmonary tuberculosis are cough , fever ,hemoptysis ,weight loss are non specific and these may occur in any chronic lung infection .chest x ray is also highly diversified for diagnosis of pulmonary TB . till today ,no biochemical or serological test is valid and acceptable for diagnosis of pulmonary TB.in this manner,the microscopic demonstration of mycobacterium tuberculosis bacilli in sputum samples is the only method for confirmatory diagnosis of PTB.Sputum

microscopy is accepted world wide as the first line test and it is a rapid method (few minutes).as well as cost effective (free under RNTCP) .however ,it is less sensitive and only 50 to 60% of new cases of PTB can be diagnosed.^{1,2} Sputum culture has a higher diagnostic yield, but it is an expensive ,more time consuming ,(2-4 weeks),test that is done at few reference laboratories³.Smear negative pulmonary tuberculosis (SNPT)constitutes nearly half of the PTB patients .Ten to twenty percent of TB transmission in the community are attributable to SNPT patients⁴ .So, early diagnosis and treatment of SNPT patients is essential to reduce the global burden of TB. The WHO policy guidance on the use of CBNAAT was issued in December 2010. The recommendations were that it should be used as the initial diagnostic test in individuals at risk of having MDR-TB or HIV associated TB (strong recommendations) .in 2013 ,the use of CBNAAT recommendation was extended as Xpert MTB /RIF may be used rather than conventional microscopy and culture as the initial diagnostic test in all adults suspected of having TB (conditional recommendation) acknowledging resource implications ,high-quality evidence.⁵ In our institution District tuberculosis centre ,this test was implicated in for detection of mycobacterium tuberculosis in new smear negative pulmonary TB patients .So, an institutional based study was imperative to know about the efficacy of CBNAAT in diagnosis of PTB in such patients.

II. Material And Methods

This study was conducted by taking randomised samples of 200 sputum negative new pulmonary TB patients attending at Government medical college ,Anantapuramu.(both out patients and inpatients)in the department of Pulmonary medicine from May 2019 to August 2019 .A provisional diagnosis of PTB was made as per WHO criteria (cough for 2 weeks or more ,unexplained fever for 2 weeks or more , loss of appetite and body weight ,abnormal chest x ray),all of them were subjected to two samples of sputum smear microscopic examination at designated microscopic centre of this institute as per norms of revised national tuberculosis control program (RNTCP)and chest x ray . Patients with smear negative , with or with out x-ray signs of PTB were then subjected to CBNAAT test by sending sputum samples in falcon tubes to the district CBNAAT centre .The CBNAAT result was obtained in proper format as TB detected or not and resistance to rifampicin .The following are the inclusion and exclusion criteria for this study-

INCLUSION CRITERIA:

- Age –equal or more than 18 years ,both sexes ,new PTB suspects .
- Initial two sputm smear samples are negative for acid fast bacilli under fluorescent microscopy.
- Associated HIV infection (positive).

EXCLUSION CRITERIA;

- Patients with past history of tuberculosis or treated with a course of anti –tuberculosis drug therapy.
- Patients with co-morbidities of cardiovascular and renal diseases.

The institutional ethics committee (IEC) of Government medical college ,Anantapuramu had approved the conduct of this study.

III. Results

In this study ,68 patients were female and 132 patients were male .Age distribution is as summarized in table I.Radiological abnormality in chest x-ray and CBNAAT result is summarised in Table II and III.

Table I : Age distribution of patients

Age group(years)	Number (n)	Percentage(n%)
18-30	52	26
31-45	78	39
46-60	38	19
61 and above	32	16
Total	200	100

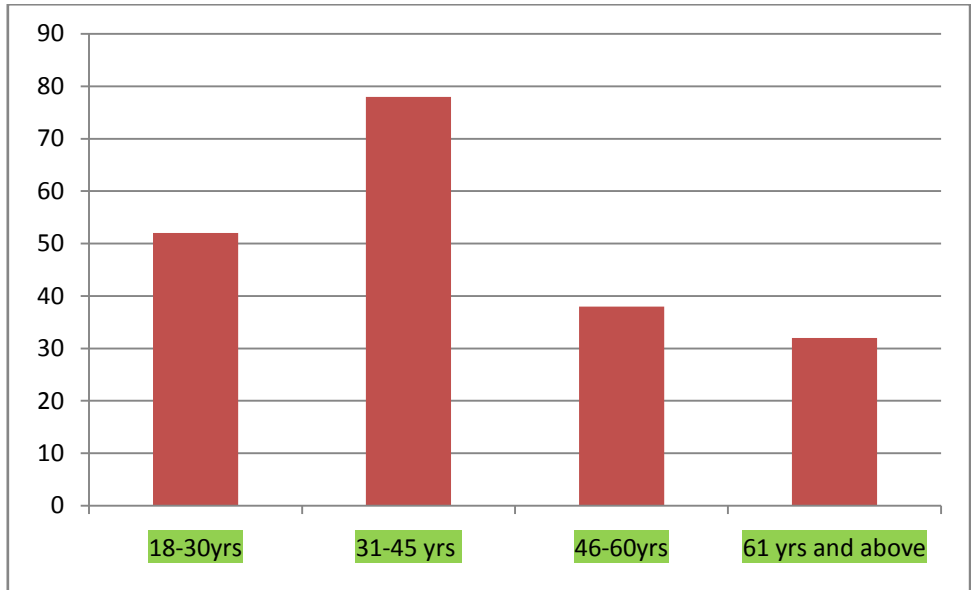
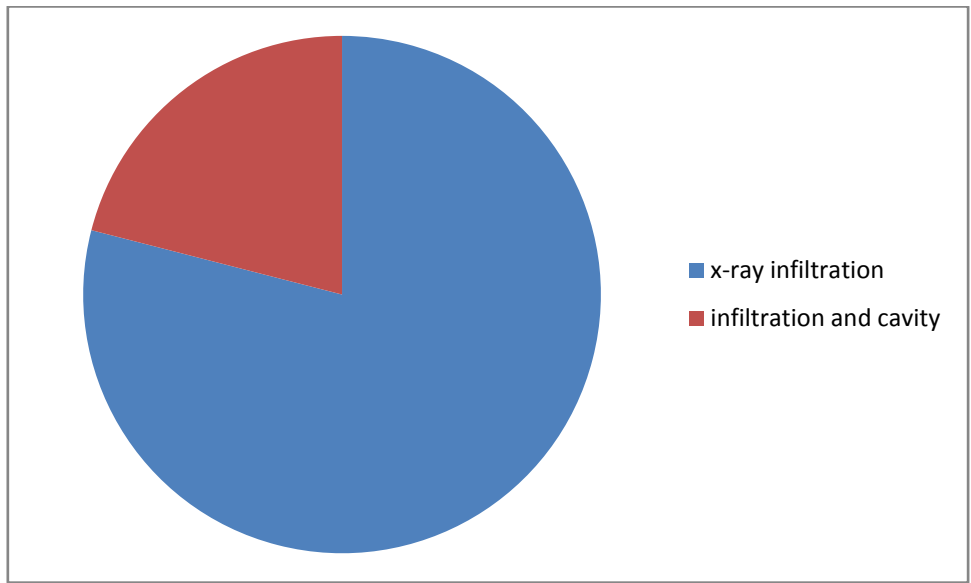


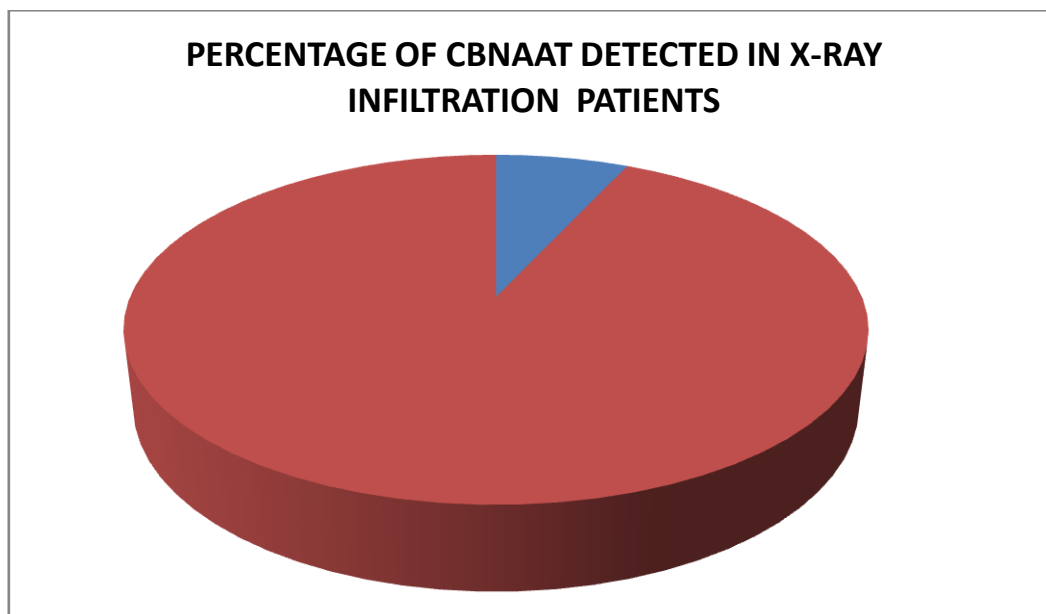
Table II: Chest -Xray abnormality suspicious PTB.

Infiltration abnormality	158
Infiltration and cavity	42
Total	200



CBNAAT Result :

X-ray lesion	No. of patients	No.of CBNAAT detected	percentage
Infiltration	158	34	21.51 %
Infiltration and cavity	42	28	66.6%
Total	200	62	88.1%



IV. Conclusions

India continues to have the highest number of tuberculosis cases in the world .global TB report 2017 released by world health organisation (W.H.O) estimated 10.4 million new TB cases world wide .⁶ seven countries accounted for most of the total burden with india having the maximum burden followed by Indonesia ,china,Pakistan ,Nigeria and south Africa (W.H.O 2016 report released in 2017).pulmonary TB constitutes maximum of all tuberculosis among which nearly about half are smear negative and those cases pose a challenge for bacteriological diagnosis .chest radiology with a clinical background is the main tool for diagnosis of sputum negative tuberculosis.sputum culture in SNPT patients can provides rapid diagnosis which is atime consuming process and can be done in a few available reference laboratories only .newly introduced rapid method of CBNAAT by W.H.O.is very helpful and a promising tool for early diagnosis and treatment of smear negative pulmonary tuberculosis patients with its role in detection of mycobacteria and rifampicin resistance within 2 hours only and that will definitely result in decreased TB transmission and global burden of tuberculosis .higher chance of mycobacterial detection by CBNAAT is among patients with a combined chest radiological abnormality of infiltration and cavitation .^{7,8,9} CBNAAT can also help in diagnosis of initial multi-drug resistant pulmonary tuberculosis.

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