



PREVALENCE OF MYCOBACTERIUM TUBERCULOSIS STRAINS AND RIFAMPICIN MONO-RESISTANCE IN NEWLY DIAGNOSED CASES FROM EAST MAHARASHTRA REGION.

Microbiology

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ABSTRACT

Introduction: Tuberculosis (TB) is one of the major causes of morbidity and mortality worldwide. Also MDR-TB and HIV-TB co-infection are major hurdles in achieving aim and objective of national tuberculosis programme.

Material and method: this retrospective study included 1364 suspected patients from April 2016 to March 2017 from registered RNTCP patients. The samples were subjected to Xpert MTB/RIF Assay. Data was tabulated and analyzed using spss 16.

Results: out of total 1364 suspected TB cases, 155 (11.36%) were detected with mycobacterium tuberculosis, whereas 1209 (88.64%) were negative for tuberculosis. Out of 155 tuberculosis patients, 64 (41.29%) were HIV positive, 59 (38.06%) had extra-pulmonary TB, 8 (5.16%) were children and 24 (15.48%) were other clinically tested. 64 (7.56%) patients have HIV-TB co-infection. Out of total 155 confirmed TB cases, 7 (4.516%) patients had rifampicin resistance

Conclusion: Prevalence of mycobacterium tuberculosis and rifampicin resistance is found to be high suggesting need of awareness about the condition and its spread.

KEYWORDS:

M.tuberculosis, rifampicin resistance, HIV-TB co-infection, MDR-TB

INTRODUCTION

Tuberculosis (TB) remains one of the world's most deadly but reassuringly curable infectious diseases if properly treated¹. India is the highest TB burden country accounting for one-fourth of the global incidence and it is 17th among 22 high TB burden countries in the terms of TB incidence rate².

The World Health Organization (WHO) recently published data estimating that 0.4 million new (incident) TB cases worldwide, while People living with HIV accounted for 1.2 million (11%) of all new TB cases³. In 2015, there were an estimated 480 000 new cases of multidrug-resistant TB (MDR-TB) and an additional 100 000 people with rifampicin-resistant TB (RR-TB) who were also newly eligible for MDR-TB treatment. There were an estimated 1.4 million TB deaths, and an additional 0.4 million deaths resulting from TB disease among people living with HIV. The World Health Organization (WHO) estimates that 3.9% of all new TB cases had MDR-TB or rifampicin-resistant TB (RR-TB) in 2015⁴; in comparison to 21% of TB patients with a history of prior treatment.

TB is an important cause of morbidity and mortality in children worldwide. About 1 million cases of paediatric TB are estimated to occur worldwide every year. The proportion of paediatric TB cases registered under RNTCP has been constant in the past five years and for 2013, 63919 new TB cases were notified accounting for 5% of all cases⁵.

Anti-tuberculosis (TB) drug resistance is a major public health problem that threatens progress made in TB care and control worldwide. Drug resistance arises due to improper and irrational use of anti-tubercular drugs (ATDs) in chemotherapy of drug-susceptible TB patients. The major cause of anti-TB drug resistance development is due to infrequent and irregular consumption of anti-TB medication. Infection may occur due to direct transmission from an infected individual or it could be due to inadequate or inconsistent treatment⁶.

The rapid spread of MDR TB is due to lack of adequate knowledge about disease in the community, various risk factors associated with the disease and increase in number of HIV infection. The World Health Organization (WHO) recommends that drug susceptibility testing (DST) and culture be performed for all patients with suspected or known tuberculosis (TB)⁷.

Molecular assays such as GeneXpert are changing the landscape of the diagnosis and management of drug resistant TB and may prove to be a cost-effective solution to this problem in a variety of settings⁸⁻¹⁰.

The present study is done 1) to diagnose Mycobacterium infection in

clinically suspected cases of tuberculosis. 2) to find out HIV-TB co-infection rate. 3) to find prevalence of Rifampicin mono-resistance in newly diagnosed cases in Chandrapur TB hospital.

METHODOLOGY

A retrospective study was conducted over a period of 1 year (From April 2016 to March 2017) on 1364 suspected tuberculosis patients. Permission of Institutional ethics committee has been taken.

Collection of sample: Sputum samples from registered RNTCP patients were subjected to Xpert MTB/ RIF Assay. After proper instruction to the patient, two sputum samples were collected per patients. The Ziehl-Nelson smear finding was provided by the RNTCP-DOTS regional centre.

Data was obtained from the RNTCP filled requisition form. Data is divided in paediatric tuberculosis, extra-pulmonary TB, HIV-TB co-infection and other clinically tested. Data is tabulated and analyzed in spss 16.0

RESULTS

Table 1 show that in the present study, total 1364 patients were suspected as having tuberculosis. Out of these, 847, 99, 285 and 133 were HIV Positive, children, extra-pulmonary and clinically tested respectively.

Table 2 illustrates that of the total 1364 suspected patients, 155 (11.36%) were detected with mycobacterium tuberculosis, interpreting prevalence of TB as 11.36% whereas 1209 (88.64%) were negative for tuberculosis. Out of 155 tuberculosis patients, 64 (41.29%) were HIV positive, 59 (38.06%) had extra-pulmonary TB, 8 (5.16%) were children and 24 (15.48%) were other clinically tested.

Out of the total suspected HIV patients, 64 (7.56%) were confirmed with tuberculosis. Similarly, out of 285 suspected extra-pulmonary cases, 59 (20.70%) positive for tuberculosis. However 99 cases of suspected pediatric tuberculosis, 8 (8.08%) were confirmed for TB and 24 (18.05%) were confirmed with TB from 133 other suspected cases of clinical tests.

Table 3 shows that in the present study, out of total 155 confirmed TB cases, 7 (4.516%) patients had rifampicin resistance, suggesting prevalence of rifampicin resistance to be 4.156 %. Amongst these, 3 (42.86%) patients were TB with HIV, 1 (14.28%) was child and 3 (42.86%) were having extra-pulmonary TB.

DISCUSSION

In our study out of total 1364 suspected patients, 155 (11.36%) were

positive for tuberculosis. Amongst confirmed TB cases, 64 (41.29%) were having HIV co-infection, 59 (38.06%) had extra-pulmonary TB, 8 (5.16%) were children whereas 24 (15.48%) were tested positive clinically. Prevalence of rifampicin resistance was found to be 4.156%. Amongst these, 3 (42.86%) patients of TB with HIV and of extra-pulmonary TB had developed resistance.

The reported prevalence of tuberculosis and drug-resistant TB was found variable in different studies conducted across the world and in India. Cross sectional study by Wondemagegn Mulu et al¹¹ on rifampicin resistance pattern shows the prevalence of M. tuberculosis confirmed TB was 117 (23.2%) (95% CI 19.7–27%) which was higher than our study. The rate of MTB/HIV co-infection was 30 (16.6%). Of the 117 M. tuberculosis cases, 12 (10.3%) were resistant to rifampicin. Five rifampicin-resistant M. tuberculosis was noticed from all patients with MTB/HIV co-infection (17.9%). Rifampicin resistance was noticed in 6 pulmonary (9.5%) and 6 extra pulmonary tuberculosis cases (11.3%)

In a study by Surandra K. Sharma et al.¹² a total of 177 cases of sputum positive pulmonary tuberculosis were enrolled between 2008 and 2009 of which only two cases of MDR-TB were detected. Thus, the prevalence of MDR-TB among newly diagnosed pulmonary tuberculosis patients was 1.1 percent which is lower than our finding.

In a study conducted by Chakraborty Soma et al¹³, out of the 331 clinical samples (both pulmonary and extra pulmonary), 51(15.4%) were positive for Mycobacterium tuberculosis which is similar (11.36%) to our study and the prevalence of Rifampicin resistance to TB was 13.7% from all pulmonary samples and 8.69% from all extra-pulmonary samples.

Different studies from around India have reported a Rifampicin mono-resistance at around 9%^{14,15}.

A study in 2011-2012 by Surajit Lahiri et al¹⁶ reported a Rifampicin mono-resistance of 4.69% which is similar to our finding (4.516%).

Whereas another study by M. Giridhar Kumar et al.¹⁷ shows 0% Rifampicin resistance among MTB positive cases in 2010-2012 mainly from South India.

CONCLUSION

Tuberculosis has been a significant health hazard in India. In the study area, mycobacterium tuberculosis is prevalent along with load of TB-HIV co-infection. Prevalence of rifampicin resistance in new cases is increasing, suggesting infection with primary resistant strain of bacilli or contact with MDR cases. Hence, health workers must generate awareness and educate patient and family members about risk of acquiring primary MDR-TB to prevent its spread.

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Conflict of interest- None

MTB suspected patients	Frequency
TB with HIV	847 (62.10)
Paediatric tuberculosis	99 (7.26)
Extra-Pulmonary TB	285 (20.90)
Other clinically tested	133 (9.75)
TOTAL	1364 (100)

Table 1: Distribution of total MTB suspected patients

*Fig. in parenthesis represents percentage

Table 2: Distribution of total MTB Detected patients.

	MTB Positive	MTB Negative	Percentage
TB with HIV	64 (41.29)	783 (64.76)	847 (62.10)
Extra-Pulmonary TB	59 (38.06)	226 (18.68)	285 (20.89)
Paediatric tuberculosis	8 (5.16)	91 (7.53)	99 (7.26)
Other clinically tested	24 (15.48)	109 (9.02)	133 (9.75)
TOTAL	155 (100)	1209 (100)	1364 (100)

*Fig. in parenthesis represents percentage

Table 3: Prevalence of Rifampicin resistance in study population.

	Rifampicin Resistant	Rifampicin sensitive	Total
TB with HIV	3 (42.86%)	61(41.22)	64 (41.29)
Paediatric tuberculosis	1 (14.28%)	7 (4.73)	8 (8.08)
Extra-Pulmonary TB	3 (42.86%)	56 (37.84)	59 (38.06)
Other clinically tested	0 (00)	24 (16.22)	24 (18.05)
TOTAL	7 (100)	148 (100)	155 (100)

*Fig. in parenthesis represents percentage

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