Prevalence of MDR-TB among New and Previously Treated Patients of Pulmonary Tuberculosis in DRTB Centre of Faridkot - A Retrospective Study

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ABSTRACT

Introduction: The emergence of Multi drug resistant tuberculosis in the world and in India as well is a major cause of worry in the control of tuberculosis. The spread of MDR TB is on the increase in the world in new and retreatment cases of patients suffering from tuberculosis. Non-compliance by the patients and inappropriate and irrational regimens prescribed addition of single drug in the failure cases by the physicians are the main causes for the emergence of drug resistance apart from the initial drug resistance in the new cases of pulmonary tuberculosis. Present study was conducted to determine the prevalence of drug resistant tuberculosis (DR-TB) among multi drug resistant tuberculosis (MDR-TB) suspects and to formulate the effective control measures to implement the DOTS treatment to prevent the emergence of MDR tuberculosis.

Material and Methods: A retrospective record based study was conducted among sputum positive MDR-TB suspect cases of Pulmonary TB which included those on category I or Category II between August 2012 to Nov 2015 admitted in GGS Medical College and Hospital, Faridkot. All new Cat I cases who were positive during their follow up and previously treated catII retreatment cases who were sputum smear positive in the beginning or during follow up were subjected to drug sensitivity tests either by LPA or CB-NAAT to detect resistance to Rifampicin alone or resistant to both Rifampicin and Isoniazid.

Results: A total Number 428 bacteriologically confimed patients of PTB who were either failure or relapse cases of Cat I and Cat II were subjected to CB-NAAT or LPA to determine the resistance to rifampicin and Isoniazid. 4 out of cases of cat I and 23 out of cases of Cat II were confirmed as having MDR TB. The overall drug resistance to RH was found be 6.3% and the drug resistance in Cat I and Cat II cases was determined as 1.9% and 10.3%.

Conclusion: Successful and stringent tuberculosis control measures such as early diagnosis, early initiation of treatment, rational prescriptions of antitubercular drugs in the right dosages for a prescribed period and compliance by the patient are a key to success to prevent drug susceptible TB to prevent the development of drug resistance TB.

Keywords: MDR TB, DST, DRTB, Drug Resistance, Cat I, Cat II

INTRODUCTION

Approximately 10.4 million people in the world are the victims of tuberculosis and 1.8 million people either suffering from tb alone or TB-HIV coexistence died in 2015.[1] India is harbouring 2.5 million tb cases ahead of the six leading nations in the world suffering from this disease.[2] The prevalence of MDR TB was estimated to be approximately 4.8 Lac (5%) in the world besides rifampicin resistant cases in 2013 and 2015. 3.9% of new and 21% of previously treated TB cases were estimated to have had rifampicin- or multidrug-resistant tuberculosis (MDR/RR-TB) in 2015 in the world. The incidence of MDR TB is 1-3% in new cases and in retreatment cases it is about 12-17% in India.[3-6] Isonized has a high level of 18% of initial drug resistance as compared to 2% of rifamicin.[7] This is the reason that any MDR TB Suspect who is resistant to rifampicin is presumed to be resistant to isoniazid also and is treated as an MDR case.[8,7]

Mismanagement of anti tubercular treatment, person to person transmission of the disease, non compliance and non adherence, inadequate and inappropriate regimen, premature cessation of anti tubercular treatment, use of single drug, addition of single drug to a failing or failed regimen are the common causes of the multidrug resistant tuberculosis.[9-13] The previous history of antitubercular treatment is an important marker of drug resistance[14] To prevent this emergence of drug resistant tuberculosis (MDR) and because the treatment of drug sensitive tuberculosis is far more cost effective than that of an MDR case, that is why the DOTS straraegy was devised under RNTCP guidelines.

MDR TB as defined resistance to H and and R two most powerful bactericidal drugs, is detected by using special molecular biology technique, Line Probe Assay (LPA) and Gene – Xpert. The results with LPA are available within 2-3 days. Gene–Xpert is a fully automated, rapid molecular biology test as it increases the case detection by nearly 30% and it detects the genetic mutations associated with resistance to rifampicin It also it detects the presence of Mycobacterium tuberculosis. Its cost is higher than conventional Microscopy but quite comparable to culture and drug susceptibility testing.[15-16] The results are available within 2-3 hours. WHO recommended that this first line diagnostic test in smear negative specimens because of the lack of accuracy of smear microscopy and also in MDR contacts, extrapulmonary and TB -HIV cases and gastric aspirates in Paeditric pulmonary TB suspects.[17] Present study was conducted to determine the prevalence of drug resistant tuberculosis (DR-TB) among multi drug resistant tuberculosis

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(MDR-TB) suspects and to formulate the effective control measures to implement the DOTS treatment and to prevent the emergence of MDR tuberculosis.

MATERIAL AND METHODS

The present study was conducted in Chest and TB Department of Guru Gobind Singh Medical College and Hospital, Faridkot Punjab which has a DR-TB centre catering to Faridkot, Bhatinda, Fazilka, Sri Mukatsar Sahib, Moga and Firozpur districts of Punjab.

All the sputum positive MDR suspects reporting during the study period formulated the study population. Retrospective record based study was conducted in August 2012 to November 2014.

Methodology

All the MDR suspects identified i.e., patients on Cat I who were positive during treatment (failure cases) or relapse cases or previously treated cases who were sputum smear positive at the time of diagnosis or positive during follow up sputum smear examination (failure cases) as well as CAT II relapse cases, defaulters and failures were identified from the line list of the cases available in the department. As per programme guidelines sputum of all these patients are sent for culture and drug susceptibility testing for first line drugs using Line Probe Assay (LPA) or cartridge based nucleic amplification test (CBNAAT). LPA detects resistance for Rifampicin (Rif) as well Isoniazid (INH) where as CBNAAT only detects Rif resistance. Any patient detected to be resistant to both Rif and INH or only Rif were labelled to be suffering MDR tuberculosis. All the patients suffering from MDR-TB were subjected to pre-treatment evaluation following which the treatment was initiated after admission to the ward associated with DR-TB centre. They were admitted for a period of seven days for monitoring of any side effects as well as counseling for compliance to the treatment initiated.

STATISTICAL ANALYSIS

The data was compiled and cleaned using excel and simple proportions were calculated where ever necessary.

RESULTS

Between the period of November 2012,428 patients treated with cat I and CAT II found positive either on treatment, failure or defaulters screened by LPA or CB -NATT, 27 patients in CAT II were confirmed to be MDR cases on C-DST (table-1). Out of them 14 were relapse cases, 2 (two) were failure cases, 4 were defaulters and 3 belonged to Others (table-2). Three patients who were MDR suspects subjected to LPA were sensitive to both the drugs RMP and INH. In Cat I patients 92 patients only three patients were resistant to RMP in 92 relapse cases and one out 20 failure cases were resistant to rifampicin in Cat I patients only 4 out of all 206 patients were found to be MDR confirmed cases. MDR suspects who were previously treated cases on Cat II treatment, twenty seven patients were found to be MDR confirmed cases (figure-1). Out of them 14 MDR patients belonged to relapse type of cases. Two cases were MDR confirmed from failure cases and 7and 3 were of Defaulters and

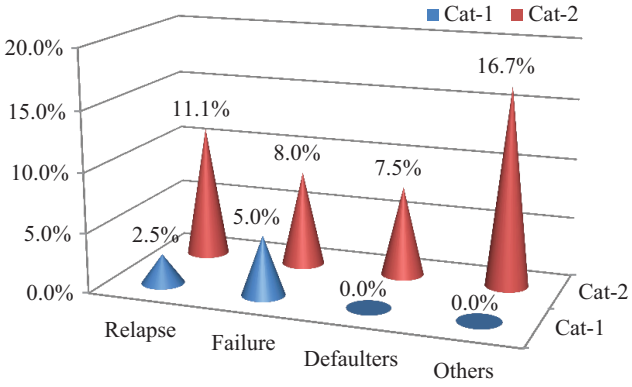

Figure-1: Distribution of types of cases in Cat I and Cat II

	Line probe assay (LPA)		CB-NAAT			
	Sputum samples sent for LPA	Positive Resistant to RH	Sputum Samples sent for C-NAAT	Positive by CB-NAAT	Total no of MDR confirmed case N	% of MDR cases
Cat I	00	00	206	4	4/206 1.94%	27/428 (6.30%)
Cat II	03	00	222	23	N23 23/222 10.36%	

Table-1: No of sputum samples of MDR Suspects sent for LPA and CB-NAAT

Type of category	Type of cases diagnosed as MDR				No of MDR Suspects Category wise 4/206	Total no of MDR suspects		Total no	
	Relapse	failure	defaulters	others		MDR Cases Category wise & %ge	MDR Suspects	MDR Cases	MDR %ge
CAT I (New)	3/122 2.5%	1/20 5%	0/49 0%	0/15 0%	206	4/206 1.94%	428	27	27/428 6.3%
CAT II (Previously treated)	14/126 11.1%	2/25 8%	4/53 7.5%	3/18 16.7%	222	23/222 10.03%			

Table-2: Types of Cat I and Cat II MDR Suspects and MDR cases

Others Category.

DISCUSSION

The most cost effective measure to treat the drug susceptible tb is by provision and implementation of good quality DOTS thereby preventing the spread of emergence of drug resistant tb. Rapid diagnosis and judicious treatment in a new case of tuberculosis is essential so as to prevent the further transmission of the disease. All follow up smear positive cases suspected to be drug resistant cases should be screened either by Line Probe Assay (LPA) or CB-NAAT molecular biological methods facilitating the rapid diagnosis of MDR-TB and its management minimizing the number of multi drug tuberculosis cases.

High-quality DOTS implementation, promoting the rational use of anti-TB drugs, and implementing infection control measures. WHO devised Programmatic Manangement of Drug Resistant TB (PMDT) guidelines to treat and control of DRTB.

This retrospective study was reviewed to assess the magnitude of drug resistant tb in MDR cases reporting to DRTB Centre of GGS medical college and hospital. Amonst 428 MDR suspects the prevalence of MDR TB patients was confirmed in 27 cases (6.3%).This observation is almost the same as the prevalence of DRTB depicted by the National figures of 5% in 2013.The DRTB was found to 1.9% in new and 10% in previously treated cases.[4,6] The presence of MDR TB in new patients on Cat I patients was low. Only 4 out of 202 cases (1.94%) were found to be MDR cases and this observation is almost similar to as reported by the TRC and NTI Banglore advocating that all newly diagnosed case of pulmonary tuberculosis may be treated with Cat I regimen without any fear of treatment failure or relapse cases.[4,5] the prevalence of MDR- TB was 3% to Rifamicin in new cases of pulmonary tb as concluded by Chandershekran et al.[18] in a study by Shanta et al 17% of cases of Cat I failure showed resistace to Rifamicin and isoniazid advocating the use of Cat II in cat I failure cases.[19] Prevalence of MDR-TB among previously treated patients has been observed to be higher in a study conducted at a referral tuberculosis hospital in Amargad, Gujrat.[20]

The magnitude of DRTB around 10% (23/222} in the retreatment cases on Cat II is to nearly similar to the level of 12% in the TRC and NTI study cases.[4,5] the proportion of MD R- TB in both type of cases new and previously treated cases 6.3% is similar to 5.7% as reported by Dutta et al.[21] It is lower than that in the study by Sharma et all which was as high as 20.04%.[22] It is the previously treated cases on Cat II who were most vunerable to multi drug resistance because of the previous exposure to the anti Tubercular drugs. In the study by Ghafoor et all, MDR-TB was noted in 66 (58.4%) patients. Amongst MDR patients, 20 (62.5%) were CAT I failure, 19 (76%) CAT II failure and 27 (48.2%) CAT II relapse cases.16 which were also similar to other studies.[23-25]

CONCLUSION

The most effective measure to treat the drug susceptible tb is the successful implementation of DOTS policy at the time of diagnosis as early as possible in a new case of tuberculosis so as to prevent the emergence of drug resistant tb and further transmission of the disease. All follow up smear positive cases suspected to be drug resistant cases should be screened either by Line Probe Assay or CB-NAAT molecular biological methods facilitating the rapid diagnosis of MDR-TB and its management minimizing the transmission of multi drug tuberculosis.

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