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Original Research Article

Tuberculosis: an experience at government chest disease hospital

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ABSTRACT

Background: This retrospective study was carried out to find the incidence, clinical profiles and treatment outcome of pulmonary and extrapulmonary tuberculosis patients attending the only Chest Disease Hospital in Srinagar.
Methods: A retrospective analysis of 613 patients having EPTB and PTB was undertaken from the chest disease hospital of Government Medical College Srinagar. Demographic characteristics, clinical features and treatment outcome were obtained from medical case records of all patients visiting the hospital for a period of two years from May 2016-May 2018.
Results: The study comprised of 613 patients, out of which 365% were having pulmonary TB while 35% were having extrapulmonary TB. Majority of patients (44.5%) in TB group were in age group 10-30 while majority of patients (42%) in EPTB group were in age group 51-70. Males were seen more commonly affected. Majority (90%) of patients in EPTB group had pleural effusion. Majority of patients (71%) were smear positive by ZN staining in PTB group. Majority (90%) of PTB patients in smear negative group were BAL negative. In PTB group 8% were treatment failure while in EPTB group 2% were treatment failure. MDR was seen in 4.2% of total tuberculosis patient while XDR was seen in 0.32% of total patients. Out of treatment failure in PTB group MDR was seen in 64% followed by monoresistance to INH in 30% and XDR in 6%. In EPTB group MDR was seen in 100% of treatment failure. All patients with XDR died. Among the MDR patients majority are on treatment while 12% died, another 12% defaulter while 12% completed treatment.
Conclusions: Among evaluated tuberculosis patients, maximum had PTB. Pleural tuberculosis was the most common presentation of EPTB. The study shows male preponderance in both groups. Treatment response was excellent with failure rate of 8% in PTB and 2% in EPTB. Most common cause of failure was MDR. XDR was seen in two patients and both of them died.

Keywords: BAL, Extra pulmonary TB (EPTB), Failure, MDR, Pulmonary TB (PTB), XDR, ZN staining

INTRODUCTION

Tuberculosis (TB) is one of the most important global health problems. India accounts for one fourth of global TB burden i.e. 2.2million out of 9.2million new cases annually.[1] In India, more than 40% of population is infected (prevalence of infection) with *Mycobacterium tuberculosis*.[1]

India has the highest burden of both TB and MDR TB. It is also estimated 2.2lakhs people die due to TB annually.[1] Based on subnational DR surveys carried out in three

states of India, 3% among new cases and 12-17% among previously treated TB cases have MDR TB.[1]

Tuberculosis is primarily the disease affecting the lungs (pulmonary tuberculosis; PTB) but it may have various manifestations and can affect many sites such as lymph nodes, central nervous system, bones, and gastrointestinal tract which is known as extrapulmonary tuberculosis (EPTB).[2,3]

EPTB is a significant health problem in both developing and developed countries and prevalence of disease in India accounts for 8.3% to 13.1%.[4,5]

The acceptable methods for microbiological diagnosis of TB are sputum smear microscopy for AFB; culture; rapid molecular diagnostic testing including LPA and Nucleic Acid Amplification Test (NAAT) Xpert MTB/Rif testing using Gene Xpert system.[1]

Diagnosis of EPTB is based on FNAC/HPE, CB NAAT, culture-positive specimen from the extra pulmonary site or strong clinical suspicion.[1]

MDR is a microbiological diagnosis defined as resistance to at least isoniazid and rifampicin. It has become a significant public health problem worldwide and an obstacle to the effective global control of TB.[1]

XDR is an MDR TB case whose biological specimen is additionally resistant to flouroquinolones (oxifloxacin, levofloxacin, moxifloxacin) and at least one of the three injectable second line drugs amikacin, kanamycin, capreomycin.

In smear positive and presumptive MDR TB (as per PMDT guidelines) a CBNAAT will be performed to rule out rifampicin resistance before initiation of treatment where patients will be categorized as microbiologically confirmed Drug Sensitive (DST) TB or rifampicin resistance TB.[1]

Sparse literature is available regarding the relative contributions of extrapulmonary disease to the total number of tuberculosis cases from India as reliable epidemiological data are lacking.[6]

This study is aimed at presenting our data of TB, highlighting the demographic profile, microbiological characteristics and treatment outcome of TB patients attending the only tertiary care hospital meant for chest diseases in Kashmir.

METHODS

The present study is a retrospective analysis of patients of Tuberculosis attending Government Chest disease hospital affiliated to Government Medical College Srinagar.

A total of 613 patients having EPTB and PTB attending outdoor patient's department and indoor patient's department of hospital were enrolled. Data was collected by analysis of treatment cards of patients enrolled for DOTS in two year from May 2016 to May 2018.

All registered MDR TB cases were treated with appropriate dosage of drugs as per sensitivity panel. Type of TB, microbiological characteristics and treatment outcome were noted.

Inclusion criteria

Confirmed cases of PTB and EPTB diagnosed on the basis of clinical features, sputum microscopy, chest radiography, BAL analysis, CBNAAT, FNAC/HPE and response to ATT.

Exclusion criteria

Patients having other disorders such as COPD, asthma, lung cancer and ILD (intestinal lung disease) were excluded from the study.

Those patients who were treatment failure were subjected to CBNAAT, LPA and conventional culture sensitivity to diagnose MDR/XDR.

RESULTS

The study compromised of 613 patients, out of which 397 (65%) were having pulmonary TB while 216 (35%) were having extrapulmonary TB (EPTB) (Table 1).

Table 1: Age and sex distribution.

Age groups	PTB (397) (65%)				EPTB (216) (35%)			
	Male	Female	Total	Percentage	Male	Female	Total	Percentage
10-30	90	87	177	44.5	35	26	61	28
31-50	50	40	90	23	25	21	46	21
51-70	58	42	100	25	47	43	90	42
71-90	16	14	30	7.5	10	9	19	9
Total	214	183	397		117	99	216	
	54%	36%			54%	46%		

Majority of patients (44.5%) in TB group were in age group 10-30 followed by age group 51-70 years while majority of patients (42%) in EPTB group were in age group 51-70 years followed by age group 10-30 years (Table 1). Males in both PTB and EPTB groups were 54% while females were 36% (Table 1).

Majority (90%) of patients in EPTB group had pleural effusion followed by lymph node TB in 8%. Majority of patients (71%) were smear positive by ZN staining in PTB group while 29% were smear negative (Table 2).

Table 2: Types of TB and distribution.

Type of TB		No of patients and percentage			
		Male	Female	Total	Percentage
Pulmonary (397)		214	183	397	
Extra pulmonary (216)	Lymph nodes	10	7	17	8
	Abdominal	2	0	2	1
	Genitourinary	1	0	1	0.5
	Potts Spine	1	0	1	0.5
	Pleural Effusion	103	92	195	90
	Total	117	99		

Majority (90%) of PTB patients in smear negative group were BAL negative while 10% were BAL positive by ZN staining (Table 3).

Table 3: Smear status of PTB (397).

Smear status	No	Percentage
Smear positive by ZN staining	281	71
Smear negative by ZN Staining	116	
BAL positive by ZN	12	29
BAL negative by ZN	104	

In PTB group 8% were treatment failure while in EPTB group 2% were treatment failure. MDR was seen in 4.2% of total tuberculosis patient while XDR was seen in 0.32% of total patients (Table 4).

Out of treatment failure in PTB group MDR was seen in 64% followed by monoresistance to INH in 30% and XDR in 6%. In EPTB group MDR was seen in 100% of treatment failure (Table 4).

All patients with XDR died while patients with monoresistance are still on treatment. Among the MDR patients majority are on treatment while 12% died, another 12% defaulter while 12% completed treatment (Table 4).

Table 4: Treatment outcome.

Pulmonary TB (397)		Extra pulmonary TB (216)	Treatment	Outcome
Cured	364 (92%)	211 (98%)		
Treatment failure	33 (8%)	5 (2%)		
	MDR 21 (64%)	5 (100%)	Treatment Completed	3
			On treatment	16
			Defaulter	3
			Died	3
			Transfer out	1
	XDR 2 (6%)	0	Both died	
	Resistant to INH 10 (30%)	0	On treatment	

DISCUSSION

This study was aimed to find the demographic characteristics and distribution of tuberculosis patients attending chest disease hospital with special emphasis on microbiology and treatment outcome.

The study compromised of 613 patients, out of which 397 (65%) were having pulmonary tuberculosis (PTB) while

216 (35%) were having extrapulmonary TB (EPTB). Different studies have found similar results. In the study by Mohammed T et al, 84.8% were having pulmonary TB and 15.2% were having extra pulmonary TB.[7] In a study by Pooja et al, (45.6%) had EPTB and at the Tuberculosis Clinic at the All India Institute of Medical Sciences, (AIIMS), New Delhi and the Sri Venkateswara Institute of Medical Sciences (SVIMS), Tirupati , patients with EPTB constituted 53% and 30.4% respectively during the period 1994-2002.[8,9] These high figures of EPTB could be due to high referral to our hospital of tuberculosis patients.

Majority (44.5%) of patients in our study in PTB group were in age group 10-30 years followed by age group 51-70 years. A similar finding was noted in a study by Lawrence et al, where 48% of pulmonary TB patient were in the age group 18-30 years.[10] Pooja et al, noted that 54% of patients in PTB were found in adolescent and early adult age group.[8] In contrast to our study, a higher prevalence of PTB has been observed in elderly than younger patients (16:1).[11]

Majority of patients (42%) in EPTB group were seen in elderly age group 51-70 years followed by age group 10-30 years.

In contrast to our study, Pooja et al, noted 58% of patients in EPTB ranged in adolescent and early adult age group.[8] Rock R et al, in midwestern US noted that 43% of the EPTB patients were in the age 15-24 years and in another study by Yassin MA et al highest number of EPTB patients were in the age 15-24 years (30.7%) followed by age group 25-34 (24.3%).[12,13] Another study by Arora VK et al, India also shows contrast findings 38% of the patients were in the age 15-24 years followed by 25% in age 25-34 years.[14]

Males in both PTB and EPTB groups out numbered females. Males were 54% while females were 36%. Similarly studies by Desai et al, Bhanvalikar et al, Pooja et al and Arora VK found the prevalence rates of pulmonary TB to be higher in males than females in India.[15,16,8,14]

In contrast to our study, in study by Pooja et al, and in recent Indian studies have noted greater affection of females in EPTB (63% vs 33% respectively).[8,11] The probable reason for male predominance is the tendency of our conservative society to pay attention more to males and bring them to tertiary care for treatment. The sites of EPTB may vary according to geographic location, population groups and a wide variety of host factors.[8]

Majority (90%) of our patients in EPTB group had pleural effusion followed by Lymph node TB in 8%. This finding is similar to study conducted by Pooja et al, where pleural tuberculosis was the most common presentation of EPTB in (54.7%) followed by lymph nodes (34.9%).[8] This finding is also similar to studies conducted by Prakash et al and Chander Vishav et al, where pleural effusion was most common followed by lymph node tuberculosis.[17,18] In contrast ,a study by Cherian JJ et al, the commonest site of EPTB was lymph node (34.4%).[19] Even though we excluded children from our study but lymph node TB is more common in children than pleura.[18]

Though culture is more sensitive than microscopy, in developing countries, diagnosis is primarily based on AFB microscopy owing to its simplicity, less cost and rapidity. It is highly specific for MTB, which appear as long, curved and beaded. The non-tuberculous mycobacteria (NTM) may appear as short, straight bacilli with no specific morphology.

Majority of patients (71%) were smear positive by ZN staining in PTB group while 29% were Smear negative. In contrast, a study by Mohammed T et al and Gadoev J et al, noted that among the pulmonary TB patients who were registered during the study period, the majority 64.7% and 53% respectively were smear-negative.[7,20] Saroj et al, in 2010 demonstrated 10.41% were found positive for AFB by ZN staining.[21] Ben et al, showed that out of 221 sputum samples, 10.85% samples were positive with Ziehl-Neelsen staining.[22] The case detection rate of mycobacterium by ZN staining in a study by Lawrence et al was 22%.[10]

ZN staining has a low sensitivity of 22-43% for a single smear. Maximum sensitivity has been found to be up to 60% under optimal conditions when compared with that of cultures.[23,24] The sensitivity is even lower in pediatric and human immunodeficiency virus (HIV)/AIDS patients who usually present a pauci-bacillary picture.[25,21]

Even though AFB stain of sputum is positive in up to 75% of adults with pulmonary TB, fewer than 20% of children with TB have a positive AFB smear of sputum or gastric aspirate.[21]

Approximately more than 50% of the pulmonary tuberculosis is sputum smear-negative. The diagnosis and treatment of these patients relies on clinical symptoms, but 20% are asymptomatic.[26,27] Fiberopticbronchoscopy (FOB) can provide an early confirmative diagnosis in such patients. Despite the fact that it is expensive and aggressive, it is generally accepted as an important technique in the diagnosis of PTB and provides useful material for diagnosis. Among the bronchoscopic materials, bronchoalveolar lavage (BAL) is the best diagnostic material for the diagnosis of PTB. Diagnosis rate is up to 86.6% with less complication in experienced hands.[26]

Majority (90%) of patients in smear negative group were BAL negative while 10% were BAL positive by ZN staining. A bit higher percentage of BAL positive smear was noted in the study conducted on 56 sputum smear-negative patients by Yuksekol et al who found that BAL

smears were positive in 23%.[28] Nikbakhsh N et al, found that ZN staining of BAL samples was positive in (38%) patients and negative in 62%.[29]

Previous studies have reported that FOB and BAL play significant roles in diagnosis of PTB with a sensitivity of 80-93% and a specificity of 70-95%.[28] Shin et al, obtained 75.9%, 97.2%, 95.3% and 84.3% sensitivity, specificity, PPV and NPV of BAL, respectively.[30]

In PTB group 8% were treatment failure treatment failure. In one study by Akinola A et al, primary cure rate in pulmonary TB was 76.6%).[31] Muttath R et al, reported 100% cure rate in the patients with pulmonary TB on DOTS.[32] In EPTB group 2% were primary treatment failures.

MDR was seen in 4.2% of total Tuberculosis patient while XDR was seen in 0.32% of total patients. In contrast a higher percentage of MDR and XDR was seen in a study by Cui Hau Liu et al, who noted MDR in 20.2% and XDR in 1.4%.[33] MDR was seen in 100% of treatment failure in EPTB group.

Out of treatment failure in PTB group MDR was seen in 64% followed by Monoresistance to INH in 30% and XDR in 6%. Out of total MDR (26), treatment completed was in 3 (11.5%), on treatment 16 (61.5%), defaulter 3 (11.5%), died 3 (11.5%), transfer out 1 (3.8%).

Kefya et al, in their retrospective study assessed the treatment outcome of patients diagnosed with MDR TB and XDR TB and found out of 471 MDR patients 258 (57%) were cured, 16 (3%) completed treatment, 13 (3%) died, 60 (13%) experienced treatment failure and 126 (27%) were lost to follow up.[34] Out of 10 XDR TB patient in their study 3 (30%) completed treatment, 3 (30%) died and 4 (40%) were lost to follow up. Manoj et al, undertook a study to analyse the treatment outcome in pulmonary drug resistance TB, out of 194 patients of MDR, 48.4% were successfully treated and 22 (11.3%) failed on therapy, 39 (20.15%) died, 23 (11.8%) defaulted, 26 (13.4%) completed treatment, 13 (6.7%) were transferred out and in 1.5% stopped treatment due to ADRS.[35]

Leimane et al, in lativa reported a cure rate of 67.6% in MDR patients, a treatment completion rate of 1.6%, death rate of 5.6%, default 14.5% percent and a failure rate of 10.3% and 0.1% were still on treatment.[36]

All patients with XDR died while patients with mono resistance are still on treatment. Pragapati K et al, in a study on patients with XDR observed that 51.7% died, 9.82% were defaulters and 8.92% were treatment failures.[37] Mohammad R et al, in a study of outcome of XDR TB in Iran found that out of 7 cases, cure was achieved in 2, relapse in one, treatment failure in one and death in two. Outcome for one was unknown.[38]

CONCLUSION

This study was carried out to understand the clinical, epidemiological profile and treatment response of patients with pulmonary and extra-pulmonary tuberculosis presenting to our hospital.

Pulmonary tuberculosis was more common than extra pulmonary tuberculosis. Pleural tuberculosis was the most common presentation of EPTB. Pulmonary Tuberculosis affected the younger age group while extrapulmonary forms of tuberculosis, affected the elderly population. The study shows male preponderance among both EPTB and PTB cases. ZN staining of BAL of sputum negative patients was positive in only 10% of cases which is low as seen in other studies. Treatment failures were very low in our study and MDR was most common among failures. Mortality was 100% in XDR patients.

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