

CLINICAL, LABORATORY AND RADIOLOGICAL PROFILE OF RE-TREATMENT TUBERCULOSISAnkit Jain¹, Suma K. R²¹Postgraduate Student, Department of General Medicine, Sri Siddhartha Medical College and Hospital, Tumkur, Karnataka.²Professor, Department of General Medicine, Sri Siddhartha Medical College and Hospital, Tumkur, Karnataka.**ABSTRACT****BACKGROUND**

Re-treatment tuberculosis has emerged as a major threat to global TB control efforts in recent years. Facilities for its diagnosis and treatment are limited in many high-burden countries including India. Screening and identification of re-treatment tuberculosis patients is very important, as they are the main source of transmission of MDR-tuberculosis to others who may need prolonged treatment with costly second line drugs. Inappropriate and inadequate treatment of re-treatment tuberculosis patient leads to the emergence of multi-drug resistance.

This study aims at finding the clinical, laboratory and radiological profile of re-treatment tuberculosis as well as the risk factors associated with them to help in early diagnosis and treatment of these groups of patients.

MATERIALS AND METHODS

This is a descriptive study. The present study includes 22 patients categorised as re-treatment tuberculosis according to RNTCP guidelines and undergoing treatment under RNTCP were taken in the study at Sri Siddhartha Medical College, Tumkur, Karnataka from 1st January 2016 to 31st August 2017. Patients were subjected to clinical examination, laboratory and radiological investigations.

RESULTS

Total of 22 patients were included in the study. Male: Female ratio for re-treatment tuberculosis was 4.5: 1. Most of the patients of re-treatment tuberculosis belonged to the age group of > 51 years 10 (45.4%). Among re-treatment patients, 50% were failures, 31.8% defaulter and 18.1% relapse. Most common clinical presentation in re-treatment tuberculosis (90.9%) was pulmonary tuberculosis and 81.8% were sputum positive. 95.4% patients had cough, 81.8% had breathlessness and 63.6% had fever. Most common clinical sign on general physical examination in this study was 10 (45.4%) pallor, followed by 5 (22.7%) icterus, 4 (18.8%) lymphadenopathy and 4 (18.8%) cyanosis. Most common radiological finding on chest x-ray in re-treatment tuberculosis was infiltration 9 (40.9%), followed by cavity 6 (27.2%), and fibrosis 3 (13.6%). Many of the cases had comorbid conditions like 45.4% Anaemia, 36.3% Malnutrition, 13.6% Alcoholic, 13.6% CKD, 18.1% DM and 4.5% HIV.

CONCLUSION

Re-treatment TB patients are emerging challenges to TB controls as they present with more severe disease and are more likely to have co-morbid conditions like DM, HIV, CKD, ALD and malnutrition. This study brought out the relationship between them. This study also shows that pulmonary TB is the most common site and many patients have sputum 3+ on microscopy. These patients need prolonged treatment with more number of drugs, thereby leading to more adverse reactions.

KEYWORDS

Re-treatment TB, MDR-TB, CBNAAT etc.

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BACKGROUND

Tuberculosis or TB, which is caused by bacteria *Mycobacterium tuberculosis* complex, is one of the oldest diseases known to affect humans and a major cause of death worldwide. This disease most often affects the lungs, although other organs are involved in upto one-third cases. Transmission usually takes place through the airborne spread of droplet nuclei produced by patients with infectious pulmonary tuberculosis.¹

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Corresponding Author:

Ankit Jain,

Room No. 20, PG Boys Hostel (Jeevika),

Sri Siddhartha Medical College and Hospital,

Tumkur, Karnataka.

E-mail: ankit_jainratlam@yahoo.in

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Overall, a relatively small proportion (5 - 15%) of the estimated 1.7 billion people infected with *M. tuberculosis* will develop TB disease during their lifetime. However, the probability of developing TB disease is much higher among people infected with HIV and also higher among people affected by risk factors such as undernutrition, diabetes, smoking and alcohol consumption.²

TB is the ninth leading cause of death worldwide and the leading cause from a single infectious agent, ranking above HIV/ AIDS. An estimated 10.4 million people fell ill with TB in 2016: 90% were adults, 65% were males and 10% were people living with HIV. In 2016, 6.3 million new cases of TB were reported (up from 6.1 million in 2015), equivalent to 61% of the estimated incidence of 10.4 million.²

In 2016, 39% of the 3.6 million new bacteriologically confirmed and previously treated TB cases notified globally were reported to have been tested for resistance to rifampicin, up from 31% in 2015. Coverage was 33% for new TB patients and 60% for previously treated TB patients.²

Globally in 2016, an estimated 4.1% (95% confidence interval [CI]: 2.8 - 5.3%) of new cases and 19% (95% CI: 9.8 - 27%) of previously treated cases had MDR/RR-TB.²

India accounts for one-fourth of the global TB burden. In 2015, an estimated 28 lakh cases occurred, and 4.8 lakh people died due to TB. India bears second highest number of estimated HIV associated TB in the world. An estimated 1.1 lakh HIV associated TB occurred in 2015 and 37,000 estimated number of patients died among them.³

Total of 68,462 cases were notified in 2016 in the state of Karnataka, out of which 59,732 (87%) were from public sector and 8,730 (13%) were from private sector. Out of 59,732 TB patients notified from public sector, 49,814 (83%) patients were of pulmonary tuberculosis and 9,918 (17%) patients of extrapulmonary tuberculosis. Out of these cases, 47,145 (79%) were new cases and 12,587 (21%) were previously treated cases.³

The primary aim of the tuberculosis (TB) control programmes across the world is to reduce mortality and morbidity due to TB by interrupting the chain of TB transmission. Re-treatment cases (TB patients who have been previously treated with anti-TB drugs for at least a month), are a challenge to this primary aim of the TB control programmes. These patients comprise of relapse, treatment after failure, treatment after default and re-treatment other cases. Re-treatment cases emerge mostly as a result of inadequate and improper treatment of the new-TB cases. When compared to new cases, re-treatment cases require longer and more complicated treatment, are more likely to harbour and transmit drug-resistant TB, and are likely to have poor treatment outcomes including increased risk of death.⁴

There is utmost need to study the re-treatment tuberculosis patients, as inappropriate treatment can lead to patients remaining infectious and becoming a potential source of multi-drug resistance.

As the criteria for diagnosis of re-treatment patients has been simplified and CBNAAT machines have been made widely available, there has been a recent surge in the cases of re-treatment tuberculosis. So this study is undertaken to note the typical clinical, radiological and laboratory characteristics including the risk factors of re-treatment tuberculosis patients so as to help in its early detection and treatment.

Aims and Objectives

Aim of the study is to study the clinical, laboratory and radiological profile of re-treatment tuberculosis patients. An objective of the study is to study the clinical, laboratory and radiological profile as well as associated conditions and risk factors in patients with re-treatment tuberculosis.

MATERIALS AND METHODS

This is a descriptive study. The present study includes 22 patients categorised as re-treatment tuberculosis according to RNTCP guidelines and undergoing treatment under RNTCP were taken in the study at Sri Siddhartha Medical College Tumkur, Karnataka from 1st January 2016 to 31st August 2017. Detailed history regarding the illness was recorded. A thorough physical examination of all system was carried out. Appropriate laboratory and radiological investigation details

were recorded. All patients were assigned categories as per RNTCP. Informed consent of all patients was taken in our study.

Inclusion Criteria

All patients aged > 18 years who are diagnosed to have re-treatment tuberculosis according to RNTCP guidelines.

Exclusion Criteria

- Extrapulmonary tuberculosis patients undergoing treatment under CAT-1 of RNTCP.
- All patients were diagnosed to have MDR tuberculosis.

Statistical Method

The data obtained from the patients with regard to clinical, radiographic and laboratory investigations was presented in tabulated forms. The numbers were expressed in percentages.

RESULTS

Age	Males	Females	Re-treatment (n=22)	(%)
<40	3	0	3	13.6
41-50	7	2	9	40.9
>51	8	2	10	45.4

Table 1. Distribution by Age in Re-treatment Tuberculosis

Types	Males	Females	Total (n=22)	(%)
Failure	9	2	11	50%
Defaulter	7	0	7	31.8%
Relapse	2	2	4	18.1%

Table 2. Types of Re-treatment Tuberculosis

Site of TB	Re-treatment TB (n=22)	Percentage
Pulmonary TB	20	90.9%
Extrapulmonary TB	2	9%

Table 3. Site of Tuberculosis observed in Re-treatment Tuberculosis

Grading of Sputum	Re-treatment TB (n=22)	(%)
Absent	4	18.1
1+	0	0
2+	9	40.9
3+	9	40.9

Table 4. Sputum Analysis observed in Re-treatment Tuberculosis

Symptoms	Present in Re-treatment TB (n=22)	Percentage (%)
Cough	21	95.4
Breathlessness	18	81.8
Fever	14	63.6
Chest pain	5	22.7
Pain abdomen	1	4.5
Seizures	1	4.5
Low backache	1	4.5
Discharging wound	1	4.5

Table 5. Symptoms observed in Re-treatment Tuberculosis

Signs	Present in Re-treatment TB (n=22)	(%)
Pallor	10	45.4
Icterus	5	22.7
Lymphadenopathy	4	18.8
Cyanosis	4	18.8
Gibbus	1	4.5
Tenderness lumbar spine	1	4.5

Table 6. Signs observed in Re-treatment Tuberculosis

Laboratory Parameter	Present in Re-treatment TB (n=22)	(%)
1. Haemoglobin(gm/dL)		
a. < 10	6	27.2
b. 10.1 - 12	8	36.3
c. > 12	7	31.8
2. Total count (cells/cumm)		
a. < 4000	1	4.5
b. 4000 - 11000	7	31.8
c. > 11000	14	63.6
3. RBS (mg/dL)		
a. < 110	9	40.9
b. 110 - 140	6	27.2
c. > 140	7	31.8
4. ESR		
a. < 40	15	68.1
b. 40 - 60	6	27.2
c. > 60	1	4.5
5. Blood Urea (mg/dL)		
a. < 30	11	50
b. 30 - 50	10	45.4
c. > 50	1	4.5
6. Serum Creatinine (mg/dL)		
a. < 1.4	19	86.3
b. > 1.4	3	13.6
7. HIV positive	1	4.5

Table 7. Laboratory Tests observed in Re-treatment Tuberculosis

Investigation	Features	Present in Re-treatment TB (n=22)	Percentage (%)
X-Ray Features	Normal	1	4.5
	Infiltration		
	a. Unilateral	8	36.3
	b. Bilateral	1	4.5
	Collapse	1	4.5
	Fibrosis	3	13.6
	Cavity		
	a. Unilateral	4	18.1
	b. Bilateral	2	9
	Pleural Effusion	0	0
USG	Abscess	1	4.5
MRI	Pott's spine	1	4.5

Table 8. Radiological Features observed in Re-treatment Tuberculosis

DISCUSSION

This study was done to know the clinical, laboratory and radiological profile as well as the associated risk factors of re-treatment patients who were diagnosed and registered under RNTCP Department at Sri Siddhartha Medical College Hospital and Research Centre, Tumkur, Karnataka.

Among total 22 cases of re-treatment registered during the study period, 18 (81.8%) were males and 4 (18.1%) were females. In this study male-to-female ratio of re-treatment TB is 4.5: 1, which shows a male predominance similar to other studies like Srinath Sharath et al⁵ in Andhra Pradesh, which shows 67% male patients and Sandeep Naveen et al⁶ at Chandigarh shows 63.9% males with male: female ratio of 1.8: 1, while Ugra Srinath et al⁷ shows 80% male predominance.

Above data is different from other studies in showing a female predominance like Hanoock, Henry et al⁸ at Malawi which shows 60% females in their study.

In this study 10 (45.4%) cases belonged to the age group of > 51 years, which highlights the socio-economic burden of re-treatment tuberculosis on the society. Similar study by Srinath Sharath et al⁵ in Andhra Pradesh shows 88% patients were in the age group of 15 - 64 years. Sandeep Naveen et al⁶ at Chandigarh conducted a study, which shows the mean ages of males and females were 38.79 ± 14.4 and 30.84 ± 15.85 years respectively, while Ugra Srinath et al⁷ conducted a study which shows that the median age was 38 years.

Most common clinical presentation in our study was 21 (95.4%) cough followed by 18 (81.8%) breathlessness and 14 (63.6%) fever similar to Abinash Kaushik et al⁹ in west Bengal showing cough (92.1%) and fever (84.2%) followed by weight loss, anorexia and haemoptysis.

Most of the re-treatment tuberculosis patients in our study had 81.8% sputum smear positivity similar to Ugra Srinath et al⁷ study, which shows 79.4% were sputum smear-positive.

In our study 11 (50%) were re-treatment failure, 7 (31.8%) defaulters and 4 (18.1%) were relapse cases, while studies like Srinath, Sharath et al⁵ in Andhra Pradesh showed 78% were relapses, 73% were treatment after default and 59% were failure cases, while study by Karma, Luna et al¹⁰ in Sikkim shows relapse cases were 63.8%, failure cases were 20.8% and treatment after default cases were 15.2%.

The most common x-ray feature in our study was 9 (40.9%) infiltration followed by 6 (27.2%) cavitary lesions (4 unilateral and 2 bilateral). The study done by Abinash Kaushik et al⁹ in West Bengal shows most common x-ray feature as cavitary lesions, which accounted for 60.8% of the cases.

Co-morbid Conditions	Present Study	Abinash Kaushik et al ⁹	Kelly Ouafae et al ¹¹
HIV	4.5%	2.6%	1%
Alcoholic	13.6%	30.2%	2%
CKD	13.6%		
DM	18.1%	9.2%	
Anaemia	45.4%		
Malnutrition	36.3%		

Table 9. Comparison of Co-morbid Conditions associated with Tuberculosis

The above study shows the demographic characteristics of patients like age and gender distribution are similar to those in other study. The clinical characteristics also shows that most patients present with pulmonary tuberculosis in re-treatment tuberculosis cases and most of them turn out to be sputum positive and thereby are highly infectious. This study also shows that these patients have more extensive disease radiologically and also many of them have other co-morbid

conditions like DM, HIV, CKD, ALD, anaemia and malnutrition, etc. which makes them more prone to relapses or reactivation of tuberculosis. These patients also need more number of drugs and for prolonged period, which may lead to more number of adverse drug reactions and also are more likely to discontinue treatment. This study also shows that most of the cases in re-treatment tuberculosis were failure cases, thereby strengthening the fact that incomplete and inadequate treatment are the main cause of emergence of MDR-TB.

The introduction of daily regimen will probably reduce the number of failure TB cases and also with the more availability of CBNAAT machines aid in early identification and treatment of MDR-TB cases and with the help of NIKSHAY these TB cases are better monitored until the end of treatment.

CONCLUSION

Re-treatment tuberculosis patients are emerging challenges to TB controls as they present with more severe disease and are more likely to have co-morbid conditions like DM, HIV, CKD, ALD and malnutrition. This study brought out the relationship between them. They also need prolonged treatment with more number of drugs, thereby leading to more adverse reactions.

This study also shows that pulmonary TB is the most common site and many patients have sputum 3+ on microscopy. They form the important source of spread of infection to other individuals and also form source for MDR-TB which may worsen the existing situation if they are not diagnosed early and treated adequately.

The new change in regimen to daily treatment and also with the availability of more CBNAAT machines and use of NIKSHAY for monitoring of patient will be a big step towards early diagnosis and complete treatment of this group of patients.

Further studies need to be done to know the outcome of tuberculosis patients after starting of daily anti-tubercular treatment regimen and to know the impact of daily regimen in these group of patients under RNTCP.

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