ORIGINAL ARTICLE

Study of Bacteriological Profile of Secondary Infection in Active Pulmonary Tuberculosis Cases

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ABSTRACT

Tuberculosis (TB) is a potentially serious infectious disease. Infections began increasing in 1985, partly because of the emergence of HIV. India is the highest TB burden country with World Health Organisation (WHO) statistics for 2017 giving an estimated incidence figure of 2.2 million cases of TB for India out of a global incidence of 9.6 million cases. Secondary bacterial infection is one of the most important complications in patients with pulmonary tuberculosis. So it becomes important to study about secondary infection associated with tuberculosis. In our study we tried to isolate Bacterial pathogens causing secondary Bacterial infection in patients suffering with active pulmonary tuberculosis in duration of 3yearsw.e.f August 2015 to July 2019. The total number of 50 positive sputum samples examined for secondary infection where Klebsiella is the most common pathogen isolated which constitute around 24%, while Staphylococcus aureusconstitute the least with just 1%.

Keywords: Tuberculosis, secondary infection, Antibiotics.

INTRODUCTION

Tuberculosis (TB) is a potentially serious infectious disease that mainly affects our lungs. Once rare in developed countries, tuberculosis infections began increasing in 1985, partly because of the emergence of HIV. India has approximately two to three million people infected with Tuberculosis. India is the highest TB burden country with World Health Organisation (WHO) statistics for 2017 giving an estimated incidence figure of 2.2 million cases of TB for India out of a global incidence of 9.6 million cases[1]. Tuberculosis is the biggest health issue that lies around India, but what makes it worse is the newly and recently discovered global phenomenon of DR-TB-Drug-Resistant TB started off with MDR-TB, and moved on to XDR-TB[2].

Along with drug resistance, Secondary bacterial infections also become the most important complications in patients with pulmonary tuberculosis[3]. The major reason is the inhibition of human defence forces during the course of active tuberculosis**.** In another study, T lymphocyte deficiency in patients with infiltrative pulmonary tuberculosis was observed**.** Another reason for lowering of immune system of tuberculosis patients might be the hormonal changes such as inhibited pituitary function, higher adrenal activity, elevated cortisol level, altered thyroid function and increased pancreas functional activity during the initial period of tuberculosis. It has also been observed that the alveolar lining material of patient with active pulmonary tuberculosis has less bactericidal activity against bacterial infection[4]**.** After isolation we have studied about drug sensitivity of these pathogens by disc diffusion method.

MATERIALS AND METHODS

The study was conducted at the Department of Pulmonary Medicine, C.U. Shah medical college & Hospital, Surendranagar, Gujarat from August 2015 to July 2019.Patients admitted in Department of Pulmonary Medicine, C.U. Shah medical college & Hospital, Surendranagar for their tuberculosis treatment are the subject of the study. On the basis of the clinical finding and physician's recommendation patients having some complication like non-subsiding fever, cough, Stomach pain, muscle pain, Chest pain in spite of taking antituberculosis drugs were selected as subject of the study.

Isolates were identified by standard microbiological procedures (Gram staining, colonial morphology, slide and tube coagulase test, motility, biochemical tests). Reference strain of gram positive cocci Staphylococcus aureus ATCC 35556, gram negative bacilli Pseudomonas aeruginosa ATCC were used as control[5]. After proper identification we have studied

about the drug sensitivity pattern of the identified micro-organisms by disc diffusion method based on Clinical Laboratory Standards Institute (CLSI, formerly National Committee for Clinical Laboratory Standards (NCCLS), 2004. Mueller-Hinton agar (himedia) was inoculated with a suspension prepared from identified micro-organisms. The zone size was measured after 24 hours and interpreted as per approved CLSI guideline[6,7].

RESULT AND DISCUSSION

Total 50 numbers of sputum samples from T.B. patient with secondary infection were collected. The organisms isolated from the sputum sample and identified where Klebsiella (48%) is major pathogen followed by Pseudomonas(28%), Enterococcus (8%),Acinetobactor (6%), Escherichia coli and Coagulase negative Staphylococcus aureus (4% each), here we found Staphylococcus aureus as least found micro-organism which is 2%.The secondary bacterial infection in pulmonary tuberculosis were found in 37 male patients and 13 female patients.

Southwick et al., (2007) had studied that Isolation of secondary bacterial infection from the pulmonary tuberculosis patients from the new cases and failure of tuberculosis treatment.The antimicrobial susceptibility to the isolated secondary bacterial infection in pulmonary tuberculosis in the new and failed treated cases[8].

Table1: List of Isolated Micro-organisms from Sputum Sample

Name of Isolated organism	Isolate	Percentage
Klebsiella	24	48%
Pseudomonas	14	28%
Enterococcus	4	8%
Acinetobactor	3	6%
Escherichia. Coli	2	4%
Coagulasenegative staphylococcus aureus	2	4%
Staphylococcus aureus	1	2%

Table 2:Antibiotic Susceptibility profile of isolate

Antibiotic used against Isolated Micro-organism	Susceptible	Resistance
Klebsiella		
Ampicillin		R(all isolate)
Ceftazidime	S	R(3 isolate)
Cefipime	S	R(3 isolate)
Levofloxacin	S	R(1 isolate)
Ciprofloxacin	S	
Piperacillin-tazobactam	S	R(1 isolate)
Cefoperazone-sulbactam	S	R(3 isolate)
Meropenem	S	
Imipenem	S	
Colistin	S	
Pseudomonas		
Amikacin	S	
Gentamicin	S	
Ceftazidime	S	
Cefipime	S	R(1 isolate)
Piperacillin-tazobactam	S	
Ciprofloxacin	S	
Levofloxacin	S	R(1 isolate)
Imipenem	S	
Enterococcus		
Colistin	S	
Ampicillin	S	
Vancomycin	S	
Linezolid	S	
Ciprofloxacin	S	
Doxycycline	S	R(2 isolate)
Tetracycline	S	R(1 isolate)
Acinetobactor		
Teicoplanin	S	
Amikacin	S	
Tobramycin	S	
Cefoperazone-sulbactam	S	
Meropenem	S	
Imipenem	S	
Colistin	S	
Escherichia. Coli		
Tigecycline	S	
Amikacin	S	
Ceftriaxone		R(all isolate)
Cefuroxime		R(all isolate)
Cefipime		R(all isolate)
Ceftazidime		R(all isolate)
Ciprofloxacin		R(all isolate)
Gentamicin	S	
Piperacillin-tazobactam	S	
Imipenem	S	
Coagulase negative staphylococcus aureus		
Colistin	S	
Cefoperazone		R(all isolate)
Cefuroxime		R(all isolate)
Cefpirome		R(all isolate)
Co-trimoxazole	S	
Vancomycin	S	
Staphylococcus aureus		
Linezolid	S	
Cefoxitin	S	R(1 isolate)
Cefuroxime	S	R(2 isolate)
Cefixime	S	R(2 isolate)
Co-trimoxazole	S	
Erythromycin		R(all isolate)
Penicillin	S	
Linezolid	S	
Vancomycin	S	

Table3: Demographic data of secondary infection in active pulmonary tuberculosis cases.

Demographic data of secondary infection in active pulmonary tuberculosis cases	Patients (N=50)
Sex	
Male	37
Female	13
Age	
<30 years	6
30-45 years	16
45 years	19
>60years	9

M. Nagatak et al., (2014), had studied that the causative microorganism of the secondary infections in patients with tuberculosis sequel were essentially similar in those with other lower respiratory tract infection. i.e. Chronic bronchitis, bronchiectasis, diffuse panbonchiolitis, chronic pulmonary emphysema, etc[9].

Jasmer et al., (2002) in a study titled "Clinical practice. Latent tuberculosis infection" found that Pseudomonas aeruginosa was the major pathogenic bacteria responsible for the chronic respiratory failure and/or fatal outcome in the post –tuberculosis patients[10].

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