e-ISSN: 0975-1556, p-ISSN:2820-2643

Available online on www.ijpcr.com

International Journal of Pharmaceutical and Clinical Research 2023; 15(8); 582-585

Original Research Article

Prevalence of Fungal Infections in MDR-TB Patients in Jodhpur (Western Rajasthan)

Khandelwal Dheeraj Kumar*[1], Kulshrestha Smita[2], Gupta Ritu[3]

[1]Assistant Professor, Department of Microbiology, Dr. SN Medical College, Jodhpur, Rajasthan
[2]Senior Professor, Department of Microbiology, Dr. SN Medical College, Jodhpur, Rajasthan
[3]Assistant Professor, Department of Biochemistry, Dr. SN Medical College, Jodhpur, Rajasthan

Received: 26-05-2023 / Revised: 24-06-2023 / Accepted: 25-07-2023
Corresponding author: Dr. Dheeraj Kumar Khandelwal
Conflict of interest: Nil

Abstract:

Introduction: Fungal infections are a leading cause of morbidity and mortality in immunocompromised patients especially in Tuberculosis patients. Early identification of these fungal infections can be the cornerstone in the treatment of MDR TB patients.

Aim of Study: To find out prevalence of associated fungal infections in MDR TB patient.

Material & Method: The study was conducted on 100 MDR-TB patients and the results were compared with 50 sputum samples collected from subjects other than tuberculosis patients. Microscopy and culture examination was done for each collected sample.

Discussion: Among 41 Candida positive in MDR-tuberculosis patients, the highest percentage was present for Candida albicans in both the group studied. Prevalence of non albicans Candida species (68.9%) was much higher than Candida albicans (31.71%) in MDR tuberculosis patients while a reverse relationship was observed in subjects other than tuberculosis.

Conclusion: Fungal infections are increasing day by day in MDR- tuberculosis patients. MDR-Tb patients are at high risk of acquiring non Candida albicans infections. So early detection of these fungal infections can help in increase survival rate, improve life style and can decrease the mortality rate in these patients.

Keywords: Immunocompramised, MDR-TB, Microscopy, Candida, Fungus.

Introduction

Fungal infections are very rapidly increasingly now a days and becoming a global health burden. These infections are associated with high morbidity and mortality rates along with severe consequences. Normally humans are relatively resistance to fungal infection but incidence of fungal infection increases in immunocompromised host. Near about 150 million severe cases of fungal infections occur annually worldwide and it results in 1.7 million deaths per year approximately.[1] The incidence of nearly all fungal infection has risen substantially. Opportunistic infection have increased in frequency as a consequence of intentional immunosuppression in organ and stem cell transplantation and other disorder, the liberal use of antibacterial agents and corticosteroid.[2] The coexistance among fungal pathogens and tuberculosis pulmonary is a clinical condition that generally occurs in immunosuppressive patients.[3] Chronic nature of tuberculosis along with prolonged chemotherapy with or without corticosteroids weaken patient's immune system leads to super infection of different type of fungus.

The infections caused by opportunistic fungi are included under new spectrum of fungal pathogens. Such fungi were earlier reported from various plants as pathogen but now they are known to cause diseases in human beings.

Now a day, awareness is increasing in treating medical persons and microbiologist, giving special attention towards opportunistic fungal infections in tuberculosis patients. So the present study was planned with an aim to find out the prevalence of fungal infections in multidrug resistance tuberculosis patients in Western Rajasthan.

Aims & Objectives: To find out prevalence of associated fungal infections in MDR TB patients.

Material & Methods

Study Design:

This study was a cross sectional study conducted in Department of Microbiology, Dr S. N. Medical College and Associated group of hospitals, Jodhpur (Rajasthan).

Sample Size:

The study was conducted on 100 sputum samples of Multi-Drug Resistance Pulmonary Tuberculosis (MDR-TB) patients of either sex with any age, received in TBC & DST Laboratory, KNC Hospital, Jodhpur. The results were compared with 50 sputum samples collected from subjects other than tuberculosis patients of either sex and of any age. The protocol was explained to every subject including in the study before enrolment and an informed consent was taken from them.

Ethical Clearance:

Ethical Clearance for this study was obtained from Institutional Ethical Clearance Committee, Dr. S. N. Medical College, Jodhpur.

Inclusion Criteria:

1. Patients of each sex with any age.
2. Patients of Multi-drug resistance Pulmonary Tuberculosis MDR-TB

Exclusion Criteria:

1. HIV positive Tuberculosis patients.
2. Tuberculosis patients on immunosuppressive drugs.
3. Patients suffering from autoimmune diseases
4. Patients who under gone for organ transplantation
5. Subjects who did not give consent.

Sample Collection: The sputum samples were collected from MDR-TB patients attending or admitted in Department of Respiratory Medicine and TB Clinics, and TB C&DST Lab, Dr. S. N. Medical College, Jodhpur. The samples were transported immediately, under normal conditions to Microbiology laboratory for culture and sensitivity test. The collected samples were processed as follows:

1. Direct Microscopy
a) Wet mount: KOH mount
b) ZN Staining
2. Inoculation and Culture
3. Identification by:
a) Macroscopic colony morphology
b) Microscopic morphology:
4. Gram staining,
5. Germ Tube Test
6. Growth on 0.1% Glucose Agar
7. India Ink Preparation
a) Biochemical Tests
8. Urease Test
9. Sugar Fermentation Test
10. Chromoganic Agar Culture

Result & Discussion: Among 100 patients of MDR-tuberculosis, 57 patients showed growth on SDA while no growth was seen in rest (43) of patients. For subjects other than tuberculosis, out of 50 cases, 15 cases showed growth on SDA.

The percentage of growth on SDA was 57% and 30% for MDR-tuberculosis and other than tuberculosis patients respectively. Out of 57 cases of MDR-tuberculosis patients, which showed growth on SDA, 41 (71.92%) were Candida species while 16 (28.1%) were observed as molds.

In subjects other than tuberculosis, it was observed that out of 15 cases, which showed growth on SDA, 14 (93.3%) were Candida while only 01 (6.7%) were molds. Thus it was observed that prevalence of Candida species was much higher than in molds in both the group studied.

Table 1:

S. No.	Group Studied	Subject Studied		
		Candida Sp.	Molds	Total
1	Tuberculosis Patients	41	16	57
2	Subjects other than Tuberculosis	14	1	15
	Total	**55**	**17**	**72**

Table 2: Prevalence of Candida Species among the Subjects Studied

S. No.	Candida	Study Group		
		Subjects other than Tuberculosis	Tuberculosis Patients	Total
1	Candida albicans	11	13	**24**
2	Candida tropicalis	2	9	**11**
3	Candida glabrata	1	9	**10**
4	Candida parapsillosis	0	5	**5**
5	Candida krusii	0	3	**3**
6	Candida guilliermondii	0	2	**2**
	Total	**14**	**41**	**55**

The prevalence of various Candida species is shown in above table. Among 41 Candida positive in MDR-tuberculosis patients, 13 (31.7%) were Candida albicans, 9 (21.95%) were Candida tropicalis, 9 (21.95%) were Candida glabrata, 5 (12.19%) were Candida parasilosis, 3 (7.31%) were

Candida krusii, and 2 (4.87%) were Candida guillermondii. Out of 14 cases of subjects other than tuberculosis, 11 (78.57%) were Candida albicans, 1 (7.14%) were Candida glabrata and 2 (14.28%) were Candida tropicalis. No other Candida species was observed in this group. Highest percentage was present for Candida albicans in both the group studied. Prevalence of various Candida species in MDR-TB patients was also observed by various scientists at various times in various countries. A reference study of them is here mentioned:

Table 3:

S. No.	Study	Prevalence of Candida Species					
		C. albicans	C. tropicalis	C. glabrata	C. parasilosis	C. krusii	C. guilliermondii
1	Njunda etal[4], 2012	21.81%	38.18%	-	3.63%	27.27%	5.45%
2	Kali A etal[5], 2013	50%	20%	20%	6.7%	3.3%	-
3	Mathavi S etal[6], 2014	66.7%	9.5%	4.8%	9.5%	9.5%	-
4	Mowna J etal[7], 2015	89.28%	7..14%	-	-	-	3.57%
5	Kavitha Y etal[8], 2017	60.98%	21.95%	7.31%	-	9.76%	-
6	**Present Study**	**31.7%**	**21.9%**	**21.9%**	**12.1%**	**7.3%**	**4.8%**

Summary & Conclusion:

Fungal pulmonary infections are increasing recently due to increased use of broad spectrum of antibiotics and steroids. Pulmonary tuberculosis is one of the most important health problems worldwide.

This problem becomes more complicated with the increase prevalence of multidrug resistant tuberculosis (MDR-TB). Many diseases have been reported to occur with tuberculosis making it more difficult to manage.

So keeping this in mind, the study was planned to evaluate the prevalence of pulmonary fungal infections in these patients. From this study it was concluded that:

A. Among 41 Candida positive in MDR-tuberculosis patients, the highest percentage was present for Candida albicans in both the group studied. In MDR- tuberculosis patients, six species of Candida were isolated namely Candida albicans, Candida glabrata, Candida guillermondii, Candida krusii, Candida parasilosis and Candida tropicalis. Only three species of Candida, Candida albicans, Candida tropicalis and Candida glabrata were present in subjects other than tuberculoisis.
B. Further, it was also observed from this study that prevalence of non albicans Candida species (68.9%) was much higher than Candida albicans (31.71%) in MDR tuberculosis patients while a reverse relationship was observed in subjects other than tuberculosis.

Thus it is concluded that, prevalence of fungal infections are increasing day by day in MDR-tuberculosis patients. As the sign and symptoms of fungal infections correlated with symptoms of MDR-tuberculosis, most of these infections are ignored and can further lead to complications. So it is suggested that routine screening of MDR-tuberculosis patients for fungal infections should be included in the panel of routine investigations as an adjunct in proper management of tuberculosis patients. It is also recommended that before starting any antifungal drug in these patients, antifungal sensitivity test should be done to prevent further serious complications and to decrease morbidity and mortality rate.

References

1. World Health Organization (WHO) global tuberculosis report 2012.
2. Kapil A. Ananthanarayan & Paniker's Textbook of Microbiology. 9th Edition. Universities Press. 2013.
3. Tille PM: Bailey & Scott's Diagnostic Microbiology 12th Edition. Elsevier.
4. Njunda AL, Ewang AA, F. Kamga LH, Nsagha DS, N.Assob JC, Ndah DA and Kwenti TE. Respiratory tract Aspergillosis in the sputum of patients suspected of tuberculosis in Fako Division – Cameroon. Journal of Microbiology Research. 2012; 2(4): 68-72.
5. Kali A, Charles MP, Noyal MJ, Sivaraman U, Kumar S and Easow JM. Prevalence of Candida co-infections in patients with pulmonary tuberculosis. Austral Med Journal. 2013;6(8): 387-91.

6. Mathavi S, Shankar R, Kavitha A, Sasikala G and Priyadharsini I. A study on prevalence of pulmonary candidiasis among tuberculosis patients and use of Chromagar in identification of Candida species. Journal of drug delivery and therapeutics. 2014;4(3): 118-121.
7. J Mowna, Dinesh Kaliyamoorthi. Mycological spectrum in Sputum samples of Pulmonary Tuberculosis Attending TB Clinic. International Journal of Multidisciplinary Research and Development, 2015;2(2): 487-490.
8. Kavitha Y, Moinuddin K, Anandi V and Nazeer H. Association of Candida and its antifungal susceptibility pattern in patients with pulmonary tuberculosis. International Journal of Medical Microbiology and tropical diseases. 2017;3(3): 126-128.