ejpmr, 2021,8(2), 470-474

SJIF Impact Factor 6.222

EUROPEAN JOURNAL OF PHARMACEUTICAL AND MEDICAL RESEARCH

www.ejpmr.com

Research Article

ISSN 2394-3211

EJPMR

PREVALENCE OF CANDIDA CO-INFECTION IN PULMONARY TUBERCULOSIS

[1]*Dr. Vidya Shetty, Ph.D, [2]Dr. Unnati Padalia, Ph.D, [3]Dr. Sapna Malik M.D., [4]Dr. Jyothirlatha Bangera, M.D.

[1]Associate Professor, Department of Microbiology, K. J. Somaiya Medical College, Hospital and Research Centre, Mumbai.

[2]Prof and HOD, Department of Microbiology, K. J. Somaiya College of Science and Commerce, Mumbai.

[3]Professor, Department of Microbiology, K. J. Somaiya Medical College, Hospital and Research Centre, Mumbai.

[4]Prof and HOD, Department of Microbiology, K. J. Somaiya Medical College, Hospital and Research Centre, Mumbai.

***Corresponding Author: Dr. Vidya Shetty**

Associate Professor, Department of Microbiology, K. J. Somaiya Medical College, Hospital and Research Centre, Mumbai.

Article Received on 11/12/2020 **Article Revised on 01/01/2021** **Article Accepted on 21/01/2021**

ABSTRACT

Introduction: In recent years, fungal infections are on the rise due to various predisposing factors such as long term administration of antibiotics, use of steroids, pulmonary tuberculosis, immunosuppressive drugs and HIV infection. When host resistance is lowered, these opportunistic fungi become fatal. *Candida albicans* was the most important pathogen, but in recent times there is an increase in non-albicans *Candida* species. **Aims and Objectives:** Our aim was to find out the prevalence of *Candida* co-infection among pulmonary tuberculosis and to identify various species of non-albicans *Candida*. **Material and Methods:** A total of 192 smear positive pulmonary tuberculosis patients were included in the study. Only those samples which showed pus cells with budding yeast cells and pseudohyphae in gram stain were cultured in Sabouraud dextrose agar. The *Candida* grown was identified and speciated by various tests. **Results:** Out of 192 patients,91 samples were positive for *Candida* species.49 were *C.albicans*, 28 were *C.tropicalis*, four each of *C.parapsilosis* and *C.krusei*, three *C.glabarata*, two of *C.dubliniensis* and a single strain of *C.kefyr*. In this study we found a shifting pattern of epidemiology of *Candida* species from commensal to emerging pathogen. **Conclusion:** Therefore, screening of tuberculosis patients for *Candida* infection should be routinely practiced. The prevalence with non-albicans *Candida* species is increasing and may be associated with inadequate response to antitubercular drugs.

KEYWORDS: Pulmonary tuberculosis; Non-albicans *Candida;* prevalence.

INTRODUCTION

Candida albicans has emerged as a potentially pathogenic fungus rather than innocous mucosal commensal in patients with bronchopulmonary diseases. Pulmonary tuberculosis is one among the most common disease in developing countries. *Candida* species infection has always seemed to be associated with secondary infections in tuberculosis.[1]

Candida species have been one of the co-infection challenges facing the patients suffering from pulmonary tuberculosis. Patients with tuberculosis are immunocompromised and susceptible to fungal and lungs mycotic infections.[2] The increase in the incidence of *Candida* species over the past two decades is significant and non-albicans species continue to replace *C. albicans* at most clinical sites. The occurrence of pulmonary tuberculosis co-infection cases with *Candida albicans* is about 15% - 32%.[3] While *Candida albicans* is considered as primary agent of these diseases. Other species like *Candida dubliniensis*, *Candida tropicalis*, *Candida parapsilosis* etc. has also been shown to produce severe systemic infection.[4]

Hence we aimed to determine the incidence of *Candida* coinfection among tuberculosis patients. The synergistic growth promoting association of *Candida* and *Mycobacterium tuberculosis* has raised increased concern for studying the various *Candida* species and its significance in pulmonary tuberculosis patients during current years.[1] There is increased concern with studying altered mycotic respiratory flora and its significance in pulmonary tuberculosis patients in current years due to this change in trends. Hence we aimed to determine the incidence of *Candida* coinfection among tuberculosis patients

MATERIAL AND METHODS

Out of the total 400 patients with suspected tuberculosis, 192 sputum samples were found to be positive for acid fast bacilli by Ziehl Neelsen staining. All tuberculosis positive samples were subjected to standard mycological study. Gram stain was done and samples were inoculated on Sabouraud dextrose agar. Of the 192 samples, 91 showed budding yeast cells and pseudohyphae along with pus cells and heavy growth was considered to have *Candida* coinfection.

Candida species were identified upto species level by various tests such as gramstain morphology, germ tube formation, Cornmeal agar with Tween 80 for demonstration of Chlamydospores, blastospores and pseudohyphae, sugar assimilation tests and growth on *Candida* Chrom agar.[4,5]

Growth and Colonial characteristics on chromagar Candida & corn meal-Tween 80 agar

***Candida* Species**	**Colony Characteristics on Chrom Agar**	**Colony characters on Corn meal agar with Tween 80**
Candida albicans	Apple green colonies	Chlamydospores present, abundant pseudohyphae, and true hyphae, clusters of blastospores
C.dubliniensis	Dark green colonies	Occasional triplets or pairs of chlamydospores on the ends of hyphae
C.famata	White to light pink	Pseudohyphae not present
C.glabarata	White to large glossy pale pink to violet colonies	Pseudohyphae not present
C.guillermondii	Small pink to purple colonies	Pseudohyphae with cluster of blastospores
C.kefyr	Pink colonies	Pseudohyphae with elongate blastoconidia
C.krusei	Large flat spreading pale pink colonies with matt surfaces	Branched pseudo mycelium with clusters and chains of blastospores
C.lipolytica	White to cream colour colonies	Branched pseudo mycelium with clusters and chains of blastospores and true hyphae
C.lusitaniae	Pink grey purple colonies	Branched pseudohyphae
C.parapsilosis	White to pale pink colonies	clusters of blastospores, occasionally giant cells
C.rugosa	Blue green with white border colonies	Pseudohyphae with elongate blastoconidia
C.tropicalis	dull blue to purple with pale pink edges colonies	Abundant Pseudohyphae with blastoconidia

RESULTS

Of the 192 patients with pulmonary tuberculosis, *Candida* coinfection was seen in 91 patients. *C.albicans* was the most common isolate followed by *C.tropicalis*. Of the 91 patients, 53 were males and 38 females. Co infection was seen maximum in the age group of 31-50.

Table 1: Age and sexwise distribution of *Candida* species among tuberculosis patients.

Age	**Male**	**Female**
1-20	2	3
21-30	6	8
31-40	22	14
41-50	14	08
51-60	05	05
61-70	03	-
71-80	01	-
Total	53	38

Table 2: Speciation of *candida.*

***Candida* species**	**Number of *candida* species (%)**
C.albicans	49(53.84)
C.tropicalis	28(30.76)
C.krusei	4(4.39)
C.parapsilosis	4(4.39)
C.glabarata	3(3.29)
C.dubliniensis	2(2.19)
C.kefyr	1(1.09)
Total	91(100)

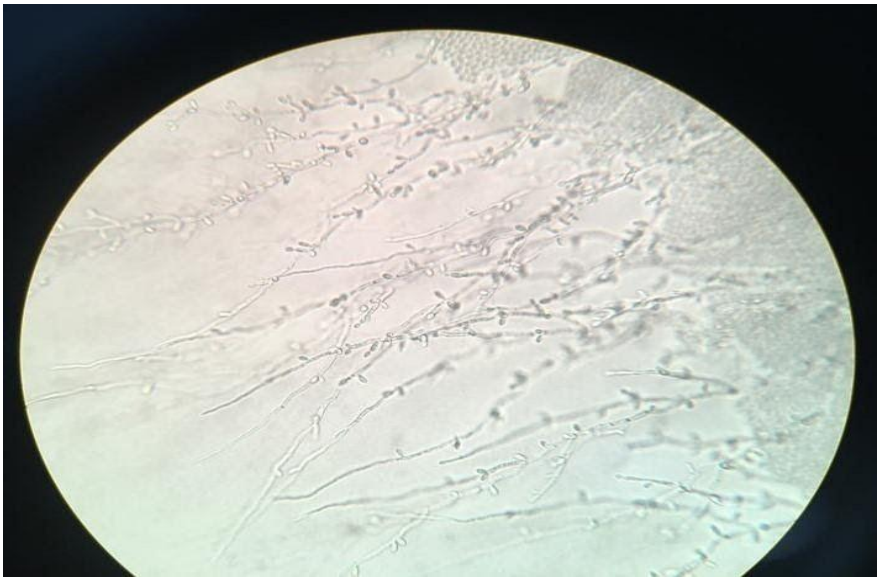
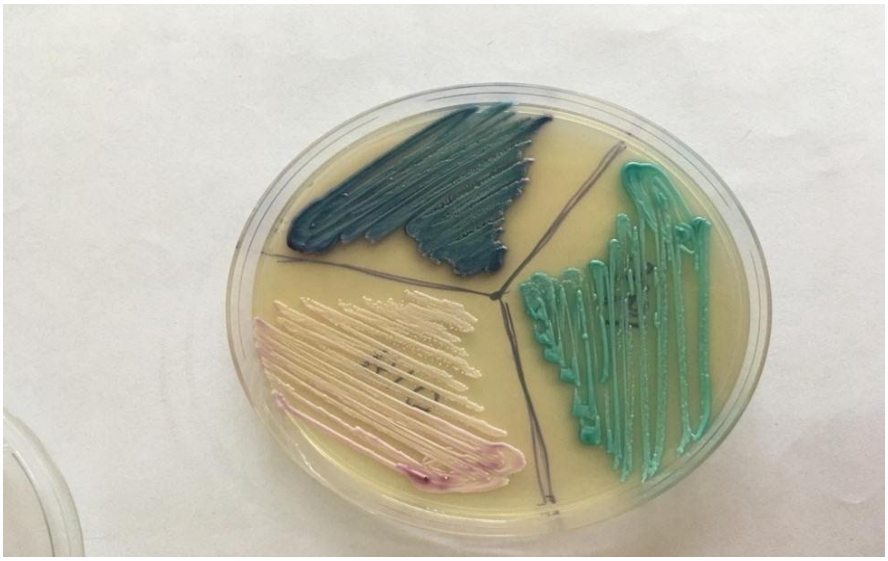
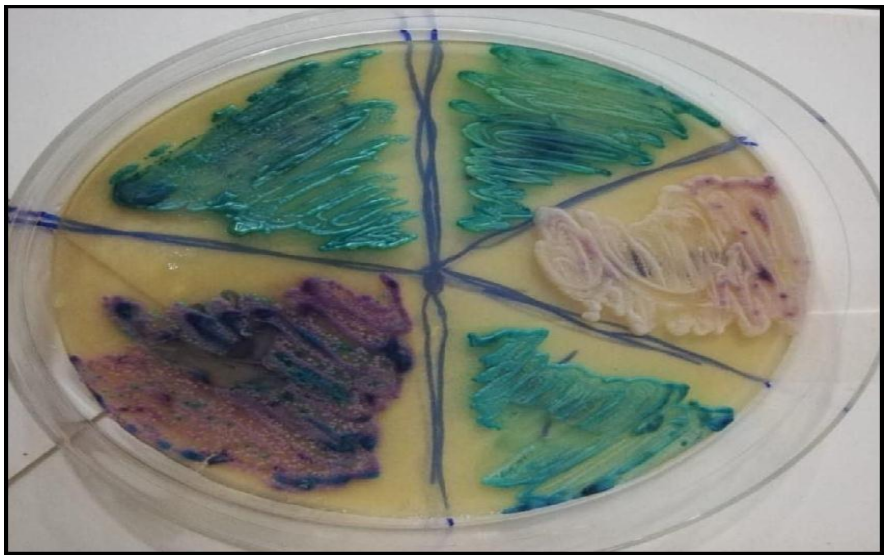


Figure 1: Dalmau technique *(C.tropicalis).*



Bluish green –*C.tropicalis,* **Green-*C.albicans,*** **White to pink-*C.parapsilosis***



Light green—*C.albicans,* pink to purple –*C.glabarata,* white to pink to purple—*C.guillerbondii*

Figure 2: Different species of *candida* on chromagar.

DISCUSSION

Tuberculosis is well recognized for its wide range of clinical spectrum, chronicity and sequlae. Respiratory fungal infections are one of the emerging conditions complicating pulmonary tuberculosis. Weak immune status, destruction of lung tissues and lesions formed due to tuberculosis are the predisposing factors for fungal infections. Even after successful recovery from tuberculosis, prolonged treatment with antibiotics and corticosteroids makes the patients very much prone to opportunistic infections.[6] Though several authors have documented *Candida* species as the most common fungal agent isolated from sputum of pulmonary tuberculosis patients, its significance has always been a matter of controversy due to the fact that up to 32.5% healthy people carry *Candida* in their throat. This can contaminate the sputum sample during collection.[7] Although *Candida* infections in pulmonary tuberculosis is not well recognized, in few cases it was shown to be associated with chronic secondary infections responsible for cough, expectoration, dyspnea, anemia and fever which may prove fatal in severe cases.[8]

In the present study, the candidal prevalence was more in males as compared to females and maximum age group was 31-50. The increased prevalence in males can be attributed to their increased exposure to external environment and habit of using some additive substance.[9] In our study, *C. albicans* was the commonest species causing secondary infection; other non-albicans *Candida* species were also associated with secondary infection. The non-albicans *Candida* isolated were C. *tropicalis* (30.76%), *C.krusei* (4.39%), *C. parapsilosis* (4.39%), *C. glabrata* (3.29%), *C. dubliniensis* (2.19%) and *C.kefyr* (1.09%).Other authors reported 50% of *C. albicans*, 20% of *C. tropicalis*, 20% of *C. glabrata*, 6.7% of *C. parapsilosis.*[10] This study showed increasing incidence of non-albicans *Candida* infection.

The results obtained from our study are similar to results obtained by Kali et al. where 50% of *C. albicans*, 20% of *C. tropicalis*, 20% of *C. glabrata*, *6.7%* of C. parapsilosis.[1] Lata et al,[12] documented *Candida tropicalis* (19.95%), *Candida glabrata* (16.54%), *Candida parapsilopsis* (13.14%). Jain et al.[13] reported *C. tropicalis* (9.1%). Baradkar et al,[14] detected *C. tropicalis* 3.25%, *Candida parapsilosis* 3.25%.

Candida albicans and *Candida tropicalis* are the most commonly isolated species 11 (34.4%), followed by *Candida parapsilosis* 7 (21.9%), *Candida dubliniensis* 2 (6.2%) and *Candida glabrata* 1 (3.1%) in the sputum samples collected from patients diagnosed with pulmonary tuberculosis.[15]

These variations in percentages are mainly attributed to differences in local prevalence of different species due to different environmental conditions, as well as to the various detection methods employed.

CONCLUSION

The secondary fungal infections are associated with the persistence of lung symptoms inspite of successful completion of antituberculous therapy. Hence adequate measures need to be taken for the early identification and treatment of these opportunistic infections. There is a need, therefore for mycological and bacteriological investigations of pulmonary tuberculosis patients for any secondary fungal or bacterial infections for better management of this high risk population. It is possible that the high relapse cases, treatment failures, resistance and high mortality associated with TB infection is partly attributed to coinfection with opportunistic fungal pathogens and drug resistant non TB bacteria.

REFERENCES

1. Kali A, Charles MVP, Joseph NM, Umadevi S, Kumar S, Easow JM. Prevalence of Candida co-infection in patients with pulmonary tuberculosis. AMJ, 2013; 6(8): 387-391.
2. Amiri MRJ, Siami R, Khaledi A Tuberculosis Status and Coinfection of Pulmonary Fungal Infections in Patients Referred to Reference Laboratory of Health Centers Ghaemshahr City during 2007-2017Ethiopian journal of health science, 2018; 6.
3. Smart Enoch Amala*, Asikiya Hanson, Gloria N. Wokem Candida Co-Infection with Mycobacterium tuberculosis in Tuberculosis Patients and Antifungal Susceptibility of the Isolates Journal of Tuberculosis Research, 2020; 8: 53-65.
4. Chander J A text book of Medical Mycology, Chapter, 2018; 7(4): 234-38.
5. Winn W, Allen S, Janda W, Koneman E, ProcopG, Schreskenberger P etal. Koneman's Color Atlas nad Textbook of Diagnostic Microbiology. Baltimore: Lippincott Williams and Wilkins. Chapter, Mycology, 2006; 21: 1216-21.
6. Jain S K, Agarwal R L, Pandey R C, Agarwal M. A Clinico-radiological survey of secondary mycoses in pulmonary tuberculosis. Ind J Med Sci, 1991; 45: 81-84.
7. Santiwongkarn P, Kachonboon S, Thanyasrisung P, Matangkasombut O. Prevalence of oral Candida carriage in Thai adolescents. J Investig Clin Dent, 2012; 3: 51-5.
8. Jawetz E, Mel Nick JL, and Addelberg EA. Review of Med Microbiology Lange medical publications 1976; 545: 5. Chander J et al A text book of medical microbiology, 3rd edition, Chapter, 2009; 7: 234-38.
9. Astekar M, Bhatiya PS, Sowmya GV. Prevalence andCharacterization of opportunistic candidal infections among patients with pulmonary tuberculosis. Journal Oral Maxillofac pathol, 2016; 20: 183-9.
10. Mathavi S, Shankar R, kavitha A, Sasikala, 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.

11. Pandalai, N. G. and Kurup, P. V. The occurrence of Candida species in the sputum of patients with bronchopulmonary diseases. Ind. J. Pathol. Bacteriol, 1962; 5: 75-79.
12. Latha R, Sasikala R, Muruganandam N, Venkatesh Babu R. Study on the shifting patterns of Non Candida albicans Candida in lower respiratory tract infections and evaluation of the CHROMagar in identification of the Candida species. J Microbiol Biotech Res, 2011; 1: 4-9.
13. Jain SK, Agarwal RL. Sharma DA, Agarwal M. Candida in pulmonary tuberculosis. J Postgrad Med. Jan, 1982; 28 (1): 24-9.
14. Baradkar VP, Mathur M, Wanjari K, Kumar S Candida in pulmonary tuberculosis. Bombay Hospital Journal, 2009; 51: 52-3.
15. Namratha W, Namdhihal, R Bharathi and A Divya. Prevalence of different species of Candida in sputum of tuberculosis. International Journal of Current Microbiology and Applied Sciences, 2018; 7(9): 3072-3075.