

<https://doi.org/10.48047/AFJBS.6.14.2024.4777-4796>



African Journal of Biological Sciences

Journal homepage: <http://www.afjbs.com>



Research Paper

Open Access

Identification of *Candida* species in Patients with Pulmonary Tuberculosis Treated at a Tertiary Care Hospital

Dr.Amit Kumar¹, Dr Shilpi Gupta², Manish chauhan³, Dr Trupti Bajapai⁴

Assistant professor Department of Microbiolog , Sri Aurobindo Medical College & PG Institute 1 (ORCHID ID: 0009000773459380)

Assistant professor Department of Microbiolog , Sri Aurobindo Medical College & PG Institute 2 (ORCHID ID: 0009000720598408)

Tutor Department of Microbiolog , Sri Aurobindo Medical College & PG Institute 3

Assistant professor Department of Microbiolog , Sri Aurobindo Medical College & PG Institute 4

Volume 6, Issue 14, Aug 2024

Received: 09 June 2024

Accepted: 19 July 2024

Published: 15 Aug 2024

doi: [10.48047/AFJBS.6.14.2024.4797-4800](https://doi.org/10.48047/AFJBS.6.14.2024.4797-4800)

Abstract:

Background: In patients suffering from bronchopulmonary disorders, *Candida* species are becoming more and more recognized as potentially harmful fungi. Studying the various *Candida* spp. and its significance in pulmonary tuberculosis patients has become more important in recent years due to the synergistic growth-promoting interaction of *Candida* and *Mycobacterium tuberculosis*.

Material and methods: Sputum samples from one hundred patients with proven pulmonary tuberculosis were randomly collected and used in this investigation. All of the samples were prepared for KOH mount and gram stain, which are used to identify budding yeast cells and gram-positive budding yeast with pseudohyphae, respectively. Afterwards samples were inoculated on Sabouraud's dextrose agar, gram staining was performed after a colony developed. The colony was then subcultured on Chrome agar, and the final identification was carried out using the VITEK - 2 automated method.

Result: A total of 100 sputum samples diagnosed with pulmonary tuberculosis , 33 samples were positive for *Candida* species of which *Candida albicans* , *Candida tropicalis* , *Candida krusei* , *Candida parapsilosis* , *Candida guilliermondii* and *Candida kefyr* were 17, 9, 3, 1, 1 and 2 respectively.

Key words : MTB (*Mycobacterium tuberculosis*) , TB(Tuberculosis), KOH mount (potassium hydroxide mount)

Introduction

Mycobacterium tuberculosis (MTB) is the infectious agent responsible for tuberculosis (TB), of which pulmonary tuberculosis is the most prevalent kind. Research on secondary fungal infections in pulmonary tuberculosis patients is crucial because in recent times, the prevalence of fungal infection in patients with pulmonary tuberculosis and other immunocompromised patients has been steadily rising, resulting in high rates of morbidity and mortality.^[1-2]

Numerous studies have demonstrated that the increased activity and virulence of tuberculosis makes the progression of pulmonary tuberculosis more harmful when it is linked to an invasive fungal infection.^[3]

Every year, concurrent fungal infections affect up to a million individuals who have recovered from tuberculosis; these infections are sometimes misinterpreted as recurrent TB.^[4]

3–84% of sputum specimens include *Candida* species, depending on the population being studied and the methods used to isolate the fungus. Reports state that 15–32% of patients with pulmonary tuberculosis also co-infect with *Candida*.^[5]

In certain nations, between 15% and 32% of tuberculosis patients also have a co-infection with *Candida* sp., while up to 80% of tuberculosis patients also have an HIV infection.^[6]

Any species of *Candida* can cause the fungal infection known as candidiasis. Other than the mouth and vagina, it can spread to other parts of the body, and depending on where it infects, it may cause fever and other symptoms..^[7]

Material and methods: The goal of the current investigation was to identify the *Candida* species that infected pulmonary tuberculosis patients. This study was conducted in a tertiary care hospital, from 12.7.2023 to 7.12.23. This study comprised sputum samples from 100 patients with confirmed pulmonary tuberculosis that were randomly collected. All samples were processed for KOH mount (for detection of budding yeast with pseudohyphae), gram stain (for detection of gram positive budding yeast with pseudohyphae). Then samples were inoculated on Sabouraud's dextrose agar, once colony appeared, gram stain was done, followed by subculture of colony on chrome agar and final identification was done by VITEK -2 automated method by using identification card YSO8 procured from Biomarix.

RESULT: A total of 100 sputum samples diagnosed with pulmonary tuberculosis, 33 samples were positive for *Candida* species of which *Candida albicans*, *Candida tropicalis*, *Candida krusei*, *Candida parapsilosis*, *Candida guilliermondii* and *Candida kefyr* were 17, 9, 3, 1, 1 and 2 respectively. Among the gender of patients male and female were 18 and 15 respectively. Among the various age group of < 18, 19-45 and 46-60 years number of *Candida* isolates were 6, 17 and 10 respectively. In comparison with

identification of candida species between CHROM agar and VITEK-2, as per CHROM agar candida albicans , candida tropicalis , candida krusei and candida parapsilosis were 17, 9, 3, 4 respectively , result of vitek-2 and CHROM agar was similar for candida albicans , candida tropicalis and krusei but CHROM agar unable to differentiate between Candida parapsilosis ,Candida guilliermondii and Candida kefyr. As per vitek result Candida albicans , Candida tropicalish , Candida krusei , Candida parapsilosis , Candida guilliermondii and Candida kefyr were 17, 9, 3,1 ,1 and 2 respectively.

DISCUSSION: In present study 33 % pulmonary tuberculosis patients co-infected with candida species. This is in concordance with the study conducted by Amala, S.E and Ndukwu et al where prevalence of candida species co-infection in pulmonary tuberculosis was 32% and 26 % respectively.^[8-9] In our study Candida albicans (51.51%) were predominant species isolated from pulmonary tuberculosis followed by , Candida tropicalish , Candida krusei , Candida parapsilosis , Candida guilliermondii and Candida kefyr were 27.27%, 9.09% ,3% ,3% and 6% respectively that was similar to study done by Sharma et al.who reported *Candida albicans*, *Candida guilliermondii*, *Candida tropicalis*, *Candida parapsilosis*, *Candida kefyr* and *Candida krusei* were 43%, 0 , 22%, 5.4% , 4% respectively.^[10]

CONCLUSION: mortality and morbidity associated with fungal infection In patients with pulmonary tuberculosis is increasing since few decades so Candida infection in patients with pulmonary tuberculosis never be underestimated.

References

1. Chen XH, Gao YC, Zhang Y, Tan ZH, Yu YS, Zang GQ, Tuberculosis infection might increase the risk of invasive candidiasis in an immunocompetent patient. *Rev Inst Med Trop Sao Paulo*. 2015; 57(3): 273–5.
2. Fridkin SK. The changing face of fungal infections in health care settings. *Clin Infect Dis*. 2005; 41(10): 1455–60.
3. Greer AE, Geomets HN. The coexistence of Pathogenic fungus in certain chronic pulmonary diseases with special reference to pulmonary tuberculosis. *Dis Chest*. 1943; 9:212.
4. [Coexistence of opportunistic mycosis and mycobacterium tuberculosis in patients attending the Central Tuberculosis Reference Laboratory of Ghaemshahr city, Iran](#) *Int.J. Mycobacteriology*(2015)
5. B. Ozcelik, S. Citak, S. Cesur, F. Icli, U. Abbasoglu In vitro susceptibility of *Candida* species isolated from cancer patient to some antifungal agents .*Drug Metabol. Drug Interact.*, 20 (2004), pp. 101-108
6. Mitchell, L.S. and Jeffrey, U.S. (1990) Evolution of the Protists and Protistan Parasites from the Perspective of Molecular Systematic. *International Journal for Parasitology*, 29, 11-20.
7. Chen, X.H., Gao, Y.C., Zhang, Y., Tang, Z.H., Yu, Y. and Zang, G.O. (2015) Tuberculosis Infection Might Increase the Risk of Invasive Candidiasis in an Immune Competent Patient. *The Revista do Instituto de Medicina Tropical de São Paulo*, 57, 273-275.
8. Amala, S.E., Hanson, A. and Wokem G.N. (2020) *Candida* Co-Infection with Mycobacterium tuberculosis in Tuberculosis Patients and Antifungal Susceptibility of the Isolates. *Journal of Tuberculosis Research*, 8, 53-65.
9. Ndukwu, C.B., Mbakwem-Aniebo, C. and Frank-Peterside, N. (2016) Prevalence of *Candida* Co-Infection among Patients with Pulmonary Tuberculosis in Emuoha, Rivers State, Nigeria. *Journal of Pharmacy and Biological Sciences*, 11, 60-63.
10. Sharma et al. 2017 Sharma Y, Chumber SK, Kaur M. Studying the prevalence, species distribution, and detection of in vitro production of phospholipase from *Candida* isolated from cases of invasive candidiasis. *J Global Infect Dis* 2017;9:8-11