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Case Report

Internal Medicine Section

Pulmonary Candidiasis in an Immunocompetent Patient

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ABSTRACT

Clinically, fungi infections of the respiratory system are uncommon. The pathogen culture and the clinical characteristics are frequently used in the clinical diagnosis of fungi. Two different patterns of invasive pulmonary candidiasis have been described: primary candida bronchopneumonia and secondary pulmonary disease arising from haematogenous dissemination or rarely primary bronchopneumonia. Primary candida bronchopneumonia is limited largely to immunocompromised patients and is thought to occur by aspiration of candida into the upper respiratory tract. This is a case of a 55-year-old male who presented with the chief complaint of dyspnoea on exertion, intermittent fever, and cough associated with expectoration of 1-month duration. The fever was moderate grade and intermittent without chills, rigours or night sweats. Respiratory system examination revealed bilateral scattered course crackles in both lung fields. Chest X-ray revealed heterogeneous opacities in bilateral upper lobes and hyperinflation of the lung. Biopsy specimens from para hilar (centrilobular nodules) were obtained and stained with Haematoxylin and Eosin (H&E), periodic acid Schiff, and Gram stain. Clusters of pseudohyphae and budding yeasts were detected in the nodules, indicating candida infection. Sputum microscopy confirmed pulmonary candidiasis. The patient's bronchoscopy was done and bronchoalveolar lavage was sent for investigations and the growth of candidiasis came positive.

Keywords: Aspiration, Cough, Dyspnoea on exertion, Fungal infections, Intermittent fever

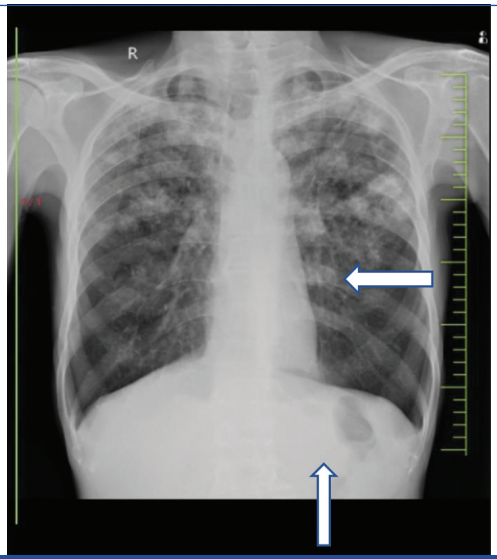
CASE REPORT

A 55-year-old male presented to the Department of Medicine in the tertiary hospital care with the chief complaint of dyspnoea on exertion, intermittent fever, and cough associated with expectoration of 1-month duration. There was no history of any hospital admission, chronic obstructive airway diseases, haemoptysis, rhinorrhoea, paroxysmal nocturnal dyspnoea, or orthopnoea. The fever was moderate grade and intermittent without chills, rigours, or night sweats. He was a former smoker who had quit smoking ten years earlier and used to smoke one pack a year. He also denied having alcohol and illicit drug use. There was no history of weight loss and no history of other co-morbid illness.

General examination revealed a body temperature of 36.6°C, oxygen saturation of 99% in room air, blood pressure of 136/76 mmHg, pulse rate of 84/min, and respiratory rate of 22/min. Respiratory system examination revealed bilateral scattered course crackles in both lung fields. Routine investigations are tabulated in [Table/Fig-1]. Chest X-ray revealed heterogeneous opacities in bilateral upper lobes and hyperinflation of lungs [Table/Fig-2]. High-Resolution Computed Tomography (HRCT) revealed multiple centrilobular nodules with linear branching giving tree in bud appearance diffusely involving along with patchy areas of consolidation in bilateral lung fields relatively sparing bilateral lower lobes [Table/Fig-3]. Cardiovascular and per abdomen examinations were normal.

Laboratory parameter	Patients value	Reference value
Haemoglobin	9.7 g/dL	11-14 g/dL
Total Leucocyte Count (TLC)	7400 cell/mm^3	4000-11000 cell/mm^3
Platelet count	2.5 lac/mm^3	1.5-4 lac/mm^3
Haematocrit	27.2%	30-34%
Serum creatinine	1.4 mg/dL	<1.5 mg/dL
Urea	18 mg/dL	7-20 mg/dL
Sodium	139 mmol/L	130-145 mmol/L
Potassium	4.1 mmol/L	3.5-5.1 mmol/L
Serum bilirubin	1.0 mg/dL	0.3-1.2 mg/dL
Aspartate Aminotransferase (AST)	45 IU/L	10-45 IU/L
Alanine Aminotransferase (ALT)	50 IU/L	10-45 IU/L
HIV (ELISA Method) negative	Negative	-

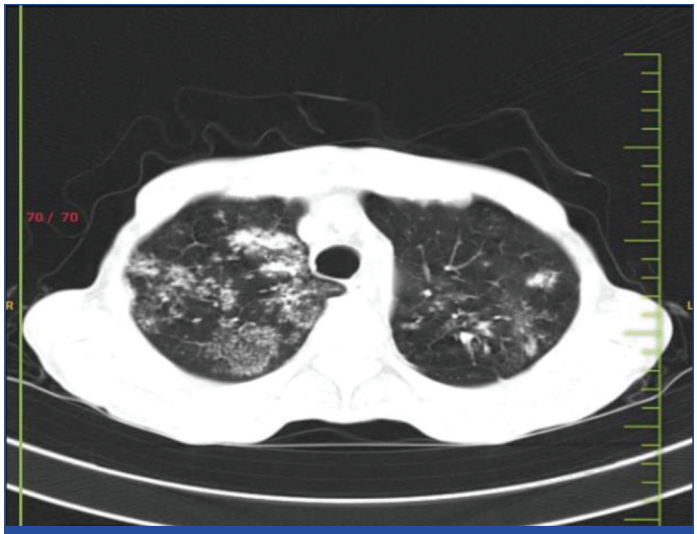
[Table/Fig-1]: All routine investigations.



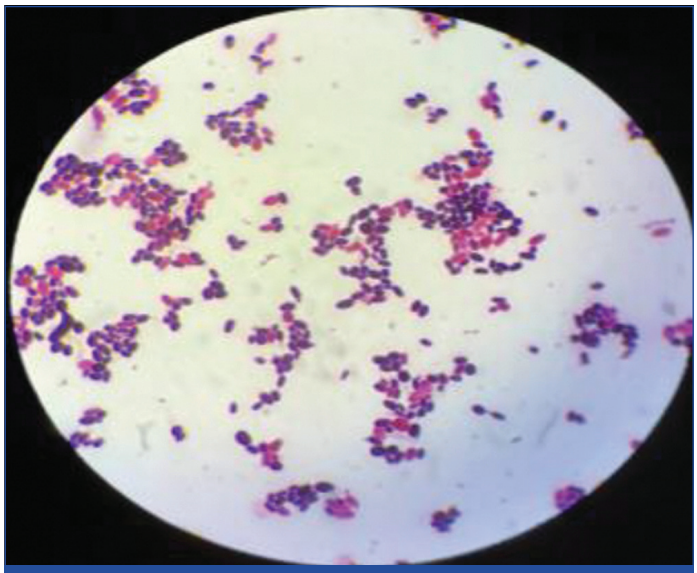
[Table/Fig-2]: Chest X-ray showing heterogeneous opacities in bilateral upper lobes (white arrows) and hyperinflation of lungs.

Sputum was induced with 3% normal saline nebulisation and early morning sputum was sent for 3 consecutive days for Acid-Fast Bacilli (AFB) which was negative and Cartridge Based Nucleic Acid Amplification Test (CBNAAT) was also negative. Gram staining of sputum revealed gram-positive budding yeast cell without pseudo hyphae indicating candida species growth [Table/Fig-4].

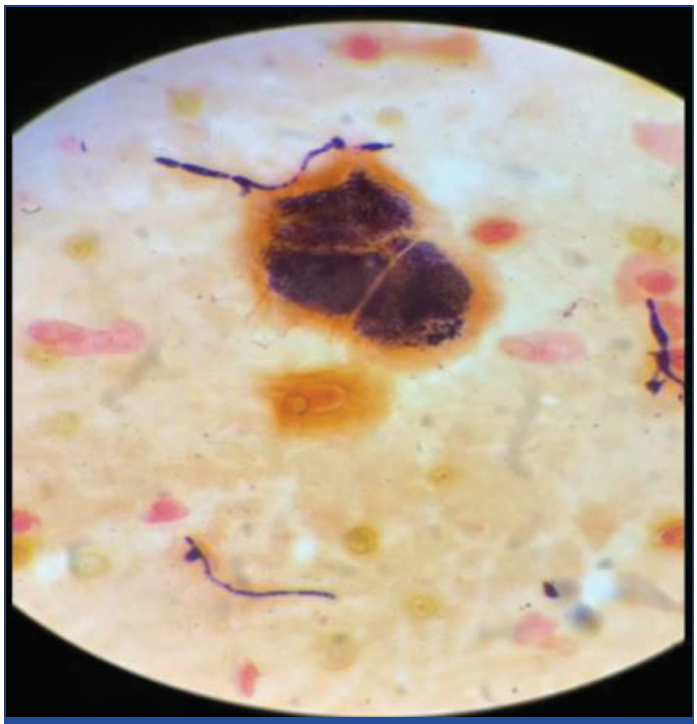
Biopsy specimens from para hilar (centrilobular nodules) of the upper lobe of the left side lung was obtained and stained with Haematoxylin and Eosin (H&E), periodic acid Schiff, and Gram stain. Clusters of pseudohyphae and budding yeasts were detected in the nodules, indicating candida infection [Table/Fig-5].



[Table/Fig-3]: HRCT thorax revealed multiple centrilobular nodules with linear branching giving tree in bud appearance diffusely involving along with patchy areas of consolidation in bilateral lung fields relatively sparing bilateral lower lobes.



[Table/Fig-4]: Gram-positive budding yeast cell without pseudo hyphae seen under oil immersion (100x) stained by gram stain.



[Table/Fig-5]: Smear showing budding yeasts with long pseudo hyphae, large epithelial cells, and pink-coloured pus cells.

The patient was started on systemic intravenous fluconazole for 3 weeks. As he responded well, the patient was discharged on the 3rd week on oral fluconazole for 3 weeks and was asked for a follow-up in OPD after 15 days. However, the patient did not report back.

DISCUSSION

All age groups can be impacted by candidiasis. Patients with immunosuppression were more likely to acquire candidiasis than immunocompetent people. The microflora of the human body contains opportunistic infections called Candida species [1]. Patients in Intensive Care Unit (ICUs) are more likely to get candida infections, which lengthen hospital stays and raise mortality rates [2]. The most significant issue when candida is formed, especially in cases originating from the respiratory tract, is either colonisation or invasive pulmonary candidiasis. Since candida is a component of the microflora, it must first be distinguished from colonisation in the tissue as a whole.

Over the past two decades, invasive, opportunistic mycoses have become more common in individuals with acquired immune deficiency syndrome, neoplastic disease, advanced age, immunosuppressive therapy, premature newborns, prolonged antibiotic use, late sepsis, and in patients undergoing blood and marrow transplantation and solid organ transplantation. Immune failure caused by Candida increases vulnerability to other respiratory infections in individuals at risk for developing serious fungal infections.

The prevalence of opportunistic mycotic infections rises over time as a result of an increase in immunosuppressive illnesses. The most frequent fungus linked to infections in immunocompromised people is still *Candida albicans*. An uncommon illness, pulmonary candidiasis, commonly affects people who are immunosuppressed [3].

There is no pathognomonic or radiological image associated with the presence of Candida in respiratory specimens, which may be the result of contamination. A confirmation of the organism in tissues is necessary for a conclusive diagnosis. Either dispersion from the upper airways or aspiration from those airways causes pulmonary invasion. Candidiasis typically manifests as colonisation rather than infection, and risk factor includes immunosuppression, neutropenia, haematologic malignancies, long-term antibiotic usage, late sepsis, and total parenteral feeding. On chest radiograph, bilateral bronchopulmonary infiltrates are a sign of pulmonary candidiasis, which can also manifest in one of four clinicopathologic ways: a) as a primary infection that is likely brought on by aspirating bacteria from the mouth; b) as part of a systemic haematogenous infection that involves multiple organs. The infection may eventually spread outside of the lung or it may remain localised; c) the organism may build up in the airways in conjunction with pulmonary illness; and d) it may occasionally take the form of a mycetoma.

C.Albicans, a mucous membrane found as a part of the regular normal microflora in the digestive tract, is the most prevalent species of this fungus (between 9% and 80%). Additionally, this fungus is common place in hospitals, whether it is in the air or on inert surfaces like floors, roofs, and food instead of being a harmless guest in patients' mucus who has bronchopulmonary disorders. *Candida albicans* has developed into a potentially dangerous fungus, which could aggravate the problems in these conditions. It was discovered that *C.albicans* (59%) predominated in cases of candida co-infection, followed by *C.tropicalis* (20%) and *C.glabatra* (20%) [4,5]. Pulmonary candidiasis is uncommon, although it has been linked to high mortality in immunocompromised or severely ill patients [6]. Multiple cavitary lesions associated with air-space consolidation have been reported as the most prevalent chest Computed Tomography (CT) findings of pulmonary candidiasis [7].

Sputum cultures become unreliable for diagnosis as the yeast colonises the upper airway, necessitating blood culture, body cavities, and/or sterile organ locations for definite identification. Pulmonary candidiasis can show as a solitary parenchymal lung nodule without recurring infections in patients with low immunoglobulin G levels [8]. Dermatitis, esophagitis, thrush, mediastinitis, vulvovaginal candidiasis, peritonitis, endocarditis, and septic arthritis, are all manifestations of candidiasis. Although nodular cavitary pneumonia is uncommon, it was detected in the index case.

In non neutropenic critically sick patients, a *Candida* score calculator helps to evaluate the chance of invasive candidiasis vs colonisation. In patients, severe sepsis (2 points), complete parenteral nutrition (1 point), the initial operation (1 point), and multifocal candida colonisation make up the candida score. These are the tell-tale signs of a candida infection. The index patient exhibited unifocal candida colonisation, which resulted in a score of 1. With a total score of 1, he had a 2.3% chance of developing invasive candidiasis without treatment [9].

Current diagnostics may mistake concurrent infections with several fungi for monomicrobial infections, with consequences for the use of antibiotics that may affect patient outcomes. One should determine the origin of mixed fungal infections by using molecular techniques on tissue samples. When applied to tissue samples, broad-range Polymerase Chain Reaction (PCR), sequence analysis, and Fluorescence Insitu Hybridisation (FISH) are a potent combination for determining the cause of mixed infections, including invasive fungal infections [10].

Echinocandins and azoles are the most popular antifungal medicines used to treat candida. Voriconazole is the major medication advised by the Infectious Diseases Society of America (IDSA) guidelines for treating invasive pulmonary aspergillosis, with amphotericin B, caspofungin, micafungin, and itraconazole as alternatives [11]. The following antifungal medications should be used to treat Candida: fluconazole, amphotericin B, echinocandin, voriconazole, or the combination of fluconazole and amphotericin B [12].

CONCLUSION(S)

To summarise, radiological findings such as ground-glass opacities, consolidation, miliary mottling, and microabscess cavities in such patients, pulmonary candidiasis should be considered. Although this CT result is assumed to be specific for pulmonary aspergillosis, it should also be considered in pulmonary candidiasis in individuals with risk factors. Hence, biopsy from centrilobular nodules was taken and suggestive of pulmonary candidiasis. We feel that our instance will aid in understanding and acknowledging this unusual condition's spectrum.

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