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A Rare Case of Saprochaete Capitata Fungemia in an Uncontrolled Diabetic Patient

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Abstract

Saprochaete capitata (formerly known as Geotrichum capitatum) is a ubiquitous fungus found in soil, water, air, plants and dairy products. It colonizes the skin, and bronchial and intestinal tract of healthy people producing serious opportunistic infections in immunocompromised patients with mainly haematological malignancies, especially in those with acute leukaemias and more rarely in patients with other non-hematological diseases such as diabetes, neuralgia, organ transplantation and inflammations. Since 1960s its presence is being increasingly recognized in these group of patients. The clinical spectrum of S. capitata disseminated infections is very similar to that produced by Candida, being easily misinterpreted. The diagnosis of invasive S. capitate disease is challenging and relies primarily on the isolation of the fungi from blood or tissue samples. The associated high mortality and low susceptibility to fluconazole and echinocandins of S. capitata require the acknowledgement of this emergent infection so that it can be properly treated. Source control and recovery of the immune system are crucial for successful therapy. In this report, we described a case of invasive fungal infection caused by S. capitata in a poorly controlled diabetes with asthmatic patient.

Keywords: Saprochaete capitate; Procalcitonin; Serum lactate; Blood culture

Case Report

A 50 years old male, nonsmoker presented to emergency department with 4 days history of high grade fever, cough, left sided chest pain with severe shortness of breath in acute respiratory distress. Patient was a known case of Diabetes for last 10 years on irregular treatment with known asthmatic for last 4 years on as and when needed salbutamol inhaler. He was in acute respiratory distress. His vital signs were: oxygen saturations of 88% on room air, temperature of 37.8, heart rate of 130 beats/ min, respiratory rate of 26/min with blood pressure of 136/80 mmHg. On examination of Respiratory System - there were course crepitations at left lower chest with bilaterall expiartory ronchi. Other systemic examinations were unremarkable. Initial investigations in ER are suggestive of: ABG: PO2-63.7/ PCO2-29.1/Ph- 7.35/SaO2- 90.1, WBC- 19000, with Neutrophilia, CRP-348, RBS- 23.43 mmol/L, HBA1C- 14.3. Creatinine- 1.54, Sodium- Low , Urine- Glu 4+, Protein- 2+, Ketone bodies- 1+, Serum Lactate- 4.97, Procalcitonin- 37(very high). CXR- showed diffuse hazy opacity in left lower zone / reterocardiac area including costophrenic angle? Consolidation. There is focal patchy opacity in right lower zone. The patient was admitted in ICU as a case of sepsis due to acute severe pneumonia with respiratory failure/ acute asthma exacerbation/ uncontrolled Diabetes with hyperglycemia and ketosis with dehydration. The septic profile like serum Lactate, procalcitonin, blood culture, sputum culture & urine culture was sent before starting antibiotics. Patient was put on Oxygen inhalation, started IV insulin, Bronchodilator nebulizations and broad spectrum antibiotics. Even though patient was on dual IV broad spectrum antibiotics, he was having intermittent spikes of temperature with persisting left sided chest pain & hypoxia, so CT chest was done after stabilizing the patient and the report showed Bilateral lower lobe necrotizing pneumonias with cavitatory changes and left hydro-pneumothorax with collapse of underlying lung. So intercostal tube was inserted and connected to underwater seal

drainage system. Intercostal tube was removed after expansion of left lung with almost complete drainage of fluid from left side. Initial Blood culture report showed Group-A Streptococcus growth, but Sputum & urine showed no growth. In view of persisting symptoms with worsening of radiological findings, IV antibiotics were revised & put on Inj Meropenem/ Inj Vancomycin along with other supportive care.

Repeat investigations from ICU

Routine lab reports showed: still leucocytosis with neutrophilia & high CRP. Renal & liver functions were normal, except very low serum albumin & total protein. Contrast CT chest was repeated showing bilateral necrotic consolidations with B/L pleural collection. Repeat Blood & sputum culture were sent along with sputum for AFB x 3 smears to r/o pulmonary tuberculosis. ESR was within normal limit, Mantoux test was 2 mm and all the three sputum samples were negative for AFB. Patient developed moderate pleural effusion on right side, so ultrasound guided pleural aspiration was done & around 400cc of fluid was aspirated and sent for analysis. Pleural fluid report showed mixed lymphocytic and neutrophilic exudative effusion with no bacterial growth and negative for AFB. Fluid cytology showed mixed inflammatory pattern with lymphocyte predominance. No evidence of malignancy in the smears studied. Repeat blood culture was negative, whereas Sputum culture showed heavy growth of Saprochaete capitate, a rare fungal pathogen. Injection Voriconazol was started for fungal growth and Injection Human Albumin for hypoalbuminemia. After treating with antifungal agent and correction of albumin level, the patient gradually improved clinically, became afebrile, maintaining oxygen saturation at room air and his laboratory parameters normalizes. His blood sugar was well controlled with long acting insulin. The patient was discharged on oral Voriconazole with other supportive measures.

So a final diagnosis was made as sepsis due to acute severe Streptococcal necrotizing pneumonia complicated with invasive Saprochaete Capitata Fungemia, Uncontrolled Type-2 Diabetes with hyperglycemia and hypoalbuminemia.

Discussion

Invasive fungal infections (IFIs) constitute a major cause of mortality and morbidity especially in severely immunocompromised patients. These infections are being increasingly recognized worldwide, partly due to advancements in diagnostic testing, implementation of aggressive chemotherapeutic protocols and use of antifungal prophylaxis in immunocompromised patients. In one report, the incidence of IFIs increased from 23.2 cases / 100,000 patients in 2008 to 31.8 cases / 100,000 patients in 2015 [1]. To date, Aspergillus, Candida, Cryptococcus and Pneumocystis remain the most predominant fungal pathogens affecting immunocompromised patients [2]; however, over the past decade, we witnessed the emergence of less common fungal species as causative agents for life-threatening IFIs such as Saprochaetes and Trichosporon spp [3]. These fungal organisms can cause blood stream infections as well as invasive and disseminated multiorgan disease. Patients with Saprochaete Capitata septicaemia can present similarly to those with other invasive fungal infections. In patients with resistant fever and underlying immunosuppression, fungal infection should be kept in mind, and early initiation of appropriate antifungal treatment must be overviewed. All fungal infections occur as a result of colonization of the respiratory, urogenital or gastrointestinal tract systemic infection as a common finding. S. capitata can be found in the normal microbial flora of the human digestive and respiratory tracts [4,5], such that discrimination between colonization and infection is difficult. However, in many studies, it has been proven that the isolation of these yeasts from superficial sites is significantly correlated with the development of invasive infection. The probable portal of entry is the respiratory and gastrointestinal system or skin and nosocomial transmission which has been suggested in a number of cases. Disseminated disease is common with Saprochaetes especially in severely immunosuppressed patients. In contrast to disseminated candidiasis, the involvement of lungs is common in invasive infections caused by S. capitate [6]. Patients often present with an acute febrile illness, which could be the only initial manifestation, or could be accompanied by various other symptoms depending on the sites of disease involvement. Symptoms usually progress rapidly to multi-organ failure, shock and death in the majority of patients despite adequate antifungal therapy [4]. Mortality approaches 60–80%; however, rapid molecular identification and prompt initiation of appropriate antifungal therapy have been shown to decrease the numbers of disease-related deaths [3-9]. Patients with pulmonary disease present with shortness of breath and cough which could be productive of purulent or bloody sputum. Most common radiographic findings include diffuse bilateral infiltrates, ground glass opacities, pleural effusion and parenchymal nodules. The isolation of this microorganism from sputum or bronchoalveolar lavage in neutropenic patients with well documented pneumonia, and in the absence of other pathogens, is indicative of probable pulmonary geotrichosis.

S. capitata is a non-fermentative, non-encapsulated, urease-negative ascomycetous yeast. Microbiological diagnosis of infection with this yeast is relatively easy because there is no need for different special media. For primary cultures on Sabouraud agar, 24 h usually were sufficient for incubation; fungal growth was clearly visible after 24 h of incubation and somewhat more evident by 48 h, however, cultures may require incubation for up to 5 days. Macroscopically, S. capitata form yeast-like, farinose, dry cottony colonies with frosted glass appearance on the plate

(Figure 1-5) [3-10]. Microscopically, they form true fragmented hyphae, pseudo-hyphae, arthroconidia, annelloconidia and blastoconidia [3-12].

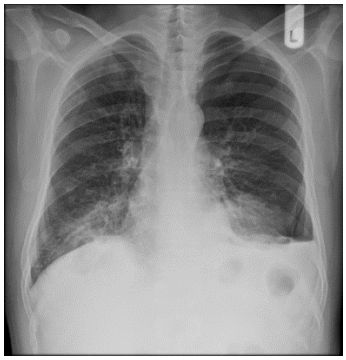

Figure 1: *CXR on admission.*

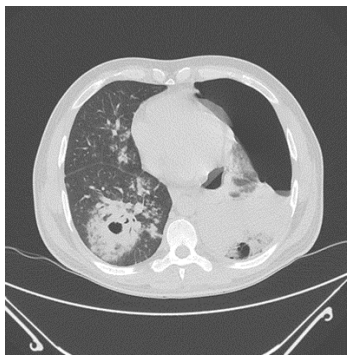

Figure 2: *HRCT chest – Lung window.*

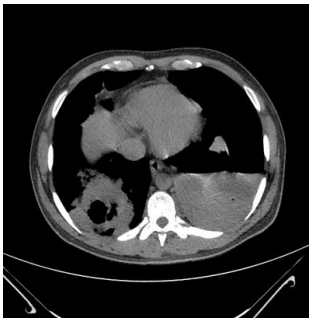

Figure 3: *HRCT chest –Mediastinal window.*

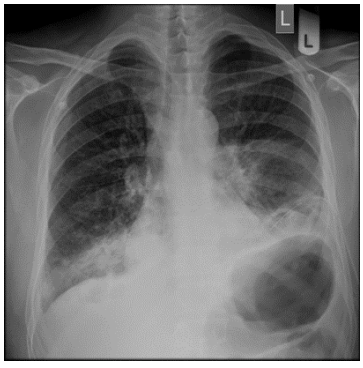

Figure 4: *CXR post intercostal tube removal.*

Figure 5: *Dry cottony colonies with frosted glass appearance of Saprochaete spp. on (a) blood agar and (b) chocolate agar, respectively.*

But, the final identification is well confirmed by a reliable method such as Vitek-2 system, with very high probability. To date, there is no established therapeutic regimen for the treatment of invasive S. capitata infections, largely due to the rarity and challenging diagnosis of these organisms and lack of in vitro standardized antifungal susceptibility [3]. Based on in vitro susceptibility results from numerous case reports and case series, these organisms appear to be intrinsically resistant to echinocandins and highly resistant to fluconazole [3,4]. However, there is a considerable degree of consensus that S. capitata shows adequate susceptibility to polyenes such as amphotericin B and azoles such as voriconazole, posaconazole and itraconazole[13-15]. Clinically and radiologically our patient responded well to Intravenous followed by Oral Voriconazole.

Conclusions

A wide array of host and environmental factors may contribute to the increased risk for infection with Saprochaetes; however, definite associations are yet to be evaluated. The physicians should vigilantly monitor the emergence of such rare pathogens in severely immunocompromised population. Prophylactic and empirical antifungal protocols should be updated constantly to reflect the changing local epidemiology of invasive fungal infections.

Additional Information

Author contributions

AKA, PT, SKO and RD have contributed equally in writing and reviewing of the manuscript. AKA is the article guarantor.

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Conflicts of Interest

The authors declare no conflict of interest. Patient consent for publication not required.

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