**Blastoschizomyces capitatus** pneumonia in a patient with untreated chronic lymphocytic leukemia

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**ABSTRACT**

Several cases have been reported of *B. capitatus* infections in immunocompromised patients. Acute leukemia is the main predisposing factor. Chronic lymphocytic leukemia (CLL) is not usually associated with opportunistic infections. We report a case of pulmonary infection by *B. capitatus* in a patient with untreated chronic lymphocytic leukemia. Although the patient had a complete recovery, we believe that this report will alert clinicians to consider *B. capitatus* as possible cause of severe pneumonia in untreated CLL.

1. Introduction

Invasive fungal infections are increasingly important as causes of morbidity and mortality especially in immunocompromised patients. *Saprochaete capitata*, (Teleomorph: *Magnusomyces capitatus*, previously named *Geotrichum capitatum*, *Trichosporon capitatum* or *Blastoschizomyces capitatus*) [1] is a cosmopolitan and ubiquitous fungus, widespread in nature, that can be found in the normal microbial flora colonizing humans. It rarely causes invasive human infections, usually in immunocompromised individuals [2]. Lung infection can develop as an opportunistic infection in patients with haematological malignancies, severe neutropenia, cytotoxic chemotherapy, and corticosteroids use [3]. However, it can occur also, in very rare case-reports, in immunocompetent patients without chronic underlying lung disease [4,5]. We report a case of pulmonary infection by *B. capitatus* in a patient with untreated chronic lymphocytic leukemia (CLL). All previous reported events of *B. capitatus* pneumonias in patients with CLL occurred in subjects who were previously treated for CLL. In fact, untreated CLL is not usually associated with opportunistic infections.

2. Case

A 86-year-old male patient presented to our Department of Pneumology with fever (39°C), general sickness, breathlessness and productive cough (day 0). Although treated at home with cephalosporins (ceftriaxone) and paracetamol, he did not respond to drugs. Patient had a history of chronic lymphocytic leukemia, in follow up and not treated, diagnosed in 2006; renal failure of undefined origin; and abdominal aortic aneurysm with surgical repair. Admission laboratory studies showed Hb 9,1 g/dl, total leucocyte count 6800/µl with differential leucocyte count (DLC) P 55,4 (polimorph) L 37,5 M 6,7 E 0,3 B 0,1 and platelets 81 × 103/µl (normal range: 150–400 × 103 µl). The level of serum urea was 133 mg/dl (normal range: 17–43 mg/dl), and creatinine level was 4,6 mg/dl (normal range: 0,7-1,2 mg/dl). Elevated inflammatory markers, such as C-reactive protein 164,5 mg/l (normal range 0-5 mg/l) and erythrocyte sedimentation rate 51 mm (normal range 0-20 mm) were present. Results of liver function tests, and coagulation studies all were normal. Electrolyte levels were within the reference range. At physical examination, his respiratory rate was 28/ min, blood pressure 130/80 mmHg, heart rate 85/min and arterial oxygen saturation was 89% on room air; and increased to 92% on 96% oxygen via a face mask. Rales were present in one third of the lung field bilaterally. Additionally, his blood gas results were pH 7,46; PaO2 64 mmHg; PaCO2 25 mmHg; HCO3- 20,9 mmol/l; BE -5,1 mmol/l; and SaO2 93% on room air. A chest radiograph showed consolidation in the right lower lobe (Fig. 1) (day +1). Chest CT scan (Fig. 2) revealed areas of ground-glass attenuation with (alveolar) consolidation in posterior segment of the upper left lobe, in the middle lobe and lower lobes; bilateral pleural effusion; and scattered micronodules could be observed; ectasia of the thoracic aorta; Infrathoracic mediastinal thyroid goiter (day + 3).

Abdominal ultrasound showed an increased liver volume with steatosis, enlarged spleen, and kidneys had normal size, with some cysts. Additionally laboratory tests were done; blood and urine cultures...
were negative. Viral and bacterial investigations including Cytomegalovirus, echovirus, coxsackie, legionella, *Mycoplasma pneumoniae* showed negative results. The biomarker 1,3-β-D-glucan, performed by means of Fungitell kit (Associates of Cape Cod Inc., Falmouth, Massachusetts), was positive (91 pg/mL) (day +4). The patient had been given piperacillin with tazobactam intravenous 4.5 g every 8 h daily; sulfamethoxazole and trimethoprim oral 160/800 mg twice daily. He was also treated with immunoglobulin intravenous and erythropoietin. A sputum sample was send for the research of *Pneumocystis* DNA, for direct microscopic examination and fungal culture in Sabouraud's dextrose agar medium supplemented with chloramphenicol and gentamicin (day +5). The RIDA®GENE *Pneumocystis jiroveci* real-time PCR assay (R-Biopharm, Darmstadt, Germany) was used for the qualitative detection of *Pneumocystis jirovecii* DNA. PCR was performed on the CFX96™ (Bio-Rad) and DNA was extracted by using the EZ1 DNA tissue kit (Qiagen) and following the manufacturer's instructions. Direct microscopic examination with 15% potassium hydroxide (KOH) showed numerous thin, septate, hyaline hyphae while *Pneumocystis* DNA was negative (day +5). After 72 h of incubation at 32 °C growth of numerous cream colored colonies was seen (Fig. 3).

Identification of the yeast isolate was performed by conventional methods [1,6] including morphologic examination on corn meal Tween 80 agar. These colonies were identified as *Blastoschizomyces capitatus* by cornmeal agar medium with the addition of Tween-80, according to the Dalmau plate technique and by analysis of biochemical patterns by ID32C kit (bioMérieux, Marcy l’Étoile, France) [6] (day +10). Matrix-assisted laser desorption ionization time of flight mass spectrometry (MALDI-TOF MS) on a Microflex LT (Bruker Daltonics, Bremen, Germany) platform after ethanol-formic acid extraction identified the isolate as *Blastoschizomyces capitatus*. Susceptibility to fluconazole, itraconazole, voriconazole, posaconazole, flucytosine, caspofungin, anidulafungin, micafungin, amphotericin B, was evaluated by the Sensititre®YeastOne method. MIC values of 2 µg/mL for fluconazole, 0.12 µg/mL for itraconazole, 0.03 µg/mL for voriconazole, 0.25 µg/mL for posaconazole, 32 µg/mL for flucytosine, 8 µg/mL for caspofungin.

Fig. 1. Chest radiograph: consolidation in the right lower lobe (patchy right lower lobe infiltrate).

Fig. 2. Chest CT scan: areas of ground-glass attenuation with (alveolar) consolidation in posterior segment of the upper left lobe, in the middle lobe, and lower lobes; bilateral pleural effusion; limphadenopathy; and scattered micronodules could be observed. Ectasia of the thoracic aorta.
8 µg/mL for micafungin, 4 µg/mL for anidulafungin, 1 µg/mL for amphotericin B were obtained. Patient was put on itraconazole 100 mg/die orally (day +8). He responded well after 5 days. Before discharge Chest CT (Fig. 4) was performed and revealed a prominent reduction of ground glass opacities and consolidation in all involved lobes. Arterial blood gas levels in room air were as follows: pH 7.38; PO2 88 mmHg; PCO2 29 mmHg; HCO3-std 19.4 mmol/L; BE -7.1 mmol/L; SaO2 97%. The patient was discharged with improvement of dyspnea, oxygenation and radiological findings (day +16). He had to continue treatment for the next 30 days.

3. Discussion

_Blastoschizomyces capitatus_ is a rare, but emerging yeast mostly responsible for often lethal fungaemia in patients with profound neutropenia in the haematology setting [7,8]. Not much data is however available on pulmonary infection by _B. capitatus_ in an immunocompetent individual. Pulmonary mycosis in non-neutropenic patient affects two main populations: the solid organ transplanted patients and patients whose local defences are altered by chronic underlying lung pathology. We report a case of severe pneumonia in patient with CLL, diagnosed 9 yrs ago, on "Watch and Wait" (W&W) follow-up and not treated. _B. capitatus_ pneumonia in a CLL-patient on W&W follow-up is, to our knowledge, a rare event. In addition, the patient presented renal failure which is uncommon even in CLL. We don’t know if _B. capitatus_ caused renal failure in our case or this condition was pre-existent, but some case reports are described in literature. Treatment with itraconazole ameliorated also renal functionality and the

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**Fig. 3.** Direct examination of sputum sample with 10% KOH (A) (original magnification × 40), (B) growth on Sabouraud Dextrose Agar after 72 h at 32 °C.

**Fig. 4.** Chest CT scan after treatment with itraconazole. A prominent reduction of ground glass opacities and consolidation in all involved lobes were observed.
relationship between fungal infection and renal failure is real hypo-
thesis even not demonstrated. Although the patient had a complete re-
covery, we believe that this report will alert clinicians to consider B. capi-
tatus as possible cause of severe and even near-fatal pneumonia in
untreated CLL. Considering that B. capitatus is intrinsically resistant to
echinocandins [1], the use of definitive diagnostic procedures and the
rational application of antifungals is essential for appropriate man-
agement of these infections.

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Conflict of interest

There are none.

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