CASE REPORT

Community acquired fungemia caused by *Candida pulcherrima*: diagnostic contribution of MALDI-TOF mass spectrometry

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Abstract

**Background:** Community-onset candidemia constitute a distinct clinical entity the incidence of which is increasing. Contribution of *non-albicans Candida* species is rising.

**Case presentation:** We describe here the first reported case of community acquired fungemia due to *Candida pulcherrima*. Identification to the species level was performed by MALDI-TOF mass spectrometry. Treatment with fluconazole was successful.

**Conclusion:** This case confirms the pathogenic role of *C. pulcherrima* and the contribution of MALDI-TOF mass spectrometry for identification of rare *Candida* species.

**Keywords:** Fungemia, *Candida pulcherrima*, Mass spectrometry

Background

*Candida* is a major cause of morbidity and mortality in the healthcare setting [1]. Contribution of *non-albicans Candida* species to invasive infections is rising. Identification to the species level is essential for epidemiological investigations and optimal patient care [2]. *Candida pulcherrima* has been reported as a potential pathogen [3]. To our knowledge, we report here for the first time a case of community acquired fungemia due to *C. pulcherrima*.

Case presentation

Observation

A 48-year-old man was admitted to our hospital because of fever, dyspnea, and chest pain. The patient had a history of hepatitis C virus infection, opioid-use disorder treated with buprenorphine, chronic venous insufficiency, and severe chronic respiratory failure due to chronic obstructive pulmonary disease treated with long-term oxygen therapy and non-invasive ventilation at home. He was not admitted to the hospital and did not use any healthcare facilities in the last 12 month period. He reported recent use of cotton balls soaked in buprenorphine for injection in his venous ulcers.

On examination, the patient was noted to be short of breath with a respiratory rate of 24/min, and an oxygen saturation of 70 % on room air. The temperature was 39 °C, and the blood pressure 90/50 mmHg. There were scattered focal crackles in the right lung. The heart sounds were normal. Skin examination found chronic venous ulcers on both legs, no marks consistent with intravenous injection, no abscesses. Oral and dental health examination was normal. The remainder of the examination was normal. Arterial blood gas analysis revealed a PaO₂ of 154 mmHg, a PaCO₂ of 90 mmHg, a pH of 7.18 on 12 L/min of oxygen.

The patient was admitted to the intensive care unit and placed under non-invasive ventilation. Blood cultures were taken before intravenous cefotaxime and gentamicine were started. Laboratory results disclosed the following: hemoglobin, 12.0 g/dL; white blood cells, 5710/mm³; platelets, 94,000/mm³; creatinine, 13 mg/L; blood urea nitrogen, 0.49 g/L; C-reactive protein, 89 mg/L; aspartate aminotransferase, 37 units/L; alanine aminotransferase, 16 units/L; total bilirubin, 5 mg/L. HIV serologic test and hepatitis C
Discussion

We report a case of community-onset fungemia caused by C. pulcherrima occurring in an injection-drug user. Identification to the species level was performed by MALDI-TOF mass spectrometry.

Candida pulcherrima is part of the oral cavity flora in humans [4]. It might become an opportunistic pathogen [5]. Rare cases of fungemia have been reported. All previous cases of C. pulcherrima blood-stream infections have occurred in healthcare setting and were related to the use of indwelling catheter for parenteral nutrition [6–8]. We reported for the first time a case of C. pulcherrima causing community acquired fungemia. Community-onset candidemia constitute a distinct clinical entity the incidence of which is increasing [9]. Signs and symptoms of candidemia are non-specific leading to diagnostic delay. In our patient, diagnosis of fungemia was not initially suspected despite recent history of intravenous drug use and antifungal therapy was not included in the first empiric therapy regimen. Twenty-four hour after admission, blood cultures grew yeasts and use of MALDI-TOF mass spectrometry conducted to rapid diagnosis of C. pulcherrima blood-stream infection. Injection drug users are at increased risk for blood-stream fungal infections. Pathogenesis involves mycotic contamination of drug paraphernalia (e.g., used syringes) or contaminated drug solutions. Injected-buprenorphine users usually crush tablets in water or saliva and filter the solution through cotton-pad. Severe infectious complications have been reported following buprenorphine injections, including fungal systemic infection [10]. In our case, culturing of the patient’s injection drug apparatus and of the cotton ball could not be obtained.

Although reported cases of fungemia due to C. pulcherrima are few, identification of C. pulcherrima is difficult, and might lead to underestimation of its incidence and pathogenic role. Morphology and physiology of C. pulcherrima are very close to those of C. lusitaniae [11]. No phenotypic test can discriminate definitely between these two species. Molecular methods such as PCR are more reliable than conventional laboratory methods for identification of fungal pathogens. But these methods are not affordable in many laboratories.

Several investigators have demonstrated that MALDI-TOF mass spectrometry could accurately identify yeasts [12, 13]. This technique is based upon the acquisition by the desorption of specific proteins or glucans from fungal cells of unique mass spectrometric profiles (fingerprints).

Rapid recognition of candidemia and prompt initiation of appropriate antifungal therapy is a key determinant of outcome. For certain species, susceptibilities to antifungal agents can be predicted based on epidemiological susceptibility data. Concerning C. pulcherrima, available data are limited and reveal in vitro susceptibility to fluconazole [14, 15]. Clinical breakpoints have not yet been established for echinocandins, amphotericin B, and voriconazole by the Clinical and Laboratory Standards Institute (CLSI) Subcommittee on Antifungal Susceptibility Testing and the European Committee on Antimicrobial Susceptibility Testing (EUCAST) [16]. In our case, results of antifungal drug susceptibility testing were concordant with previously published data, and treatment with caspofungin, rapidly switched for fluconazole was successful.

Conclusions

This case confirms the pathogenic role of C. pulcherrima and illustrates the contribution of MALDI-TOF mass spectrometry for correct identification of rare Candida species. Prompt identification to the species level can
predict in vitro susceptibility and ensuring early appropriate therapy.

Consent
Written informed consent was obtained from the patient for publication of this case report.

Authors’ contributions
LD and AM conceived the case report. MP, PP collected the data. HM collected the data and participated in the design of the case report. ES drafted the manuscript. All authors read and approved the final manuscript.

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Competing interests
All authors declare that they have no competing interests.

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