Case Report

Lodderomyces elongisporus endocarditis in an intravenous drug user: a new entity in fungal endocarditis

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Lodderomyces elongisporus has been recently identified in the literature as an infrequent human bloodstream isolate, commonly mistaken for a non-albicans Candida. A case of Lodderomyces endocarditis in an intravenous drug user is described. To our knowledge, this report highlights the first documented case of Lodderomyces as a cause of endocarditis and summarizes the susceptibility patterns in the reported literature. All isolates reported so far have fluconazole MICs of \( \leq 0.25 \text{ mg mL}^{-1} \).

Case report

A 30-year-old male carpenter presented febrile to a hospital emergency department with associated recurrent swelling of his left forefoot. He had experienced a week of night sweats and rigors and no history of foot trauma. He had sought medical treatment in primary care for his foot symptoms in the preceding weeks prior to the commencement of the night sweats. The presumptive diagnosis had been a soft tissue injury and was treated symptomatically without improvement.

His past medical history included depression and claustrophobia. He was known to have a pre-existing cardiac murmur that had never been investigated. He was an intravenous heroin user, cigarette smoker and social drinker. He injected primarily via his left cubital fossa and occasionally the venous networks on the dorsal surfaces of his hands. He last admitted to intravenous drug use 8 weeks prior to presentation. His medications included oral quetiapine and he had no allergies.

Vital signs on admission were as follows: temperature 38.4 °C, pulse rate regular at 102 beats min\(^{-1}\), blood pressure of 102/74 and respiratory rate of 18 respirations min\(^{-1}\). Examination revealed an ejection systolic murmur and oedema localized to the left ankle region associated with full range of movement. There were no peripheral stigmata of endocarditis, neurological abnormalities or cardiac failure.

Three sets of blood cultures in addition to standard blood were taken from two different sites (BacT/ALERT; bio-Mérieux). The aerobic bottles of all sets flagged positive after approximately 40 h (range 37.6–43.8 h). Yeast was seen on microscopy. Preliminary identification was that of a non-albicans Candida after growth on Sabouraud Dextrose Agar, a negative germ tube test and subsequent isolation of blue/green colonies on CHROMagar Candida media (BD Diagnostics). The isolate was referred to a reference laboratory for definitive identification. A further two sets of blood cultures taken 2 days later also flagged positive prior to the commencement of antifungal agents. He was empirically commenced on caspofungin whilst awaiting further investigations and results. Blood cultures taken 48 h after therapy was commenced had no growth.

A transoesophageal echo was performed and demonstrated a bicuspid aortic valve with mild stenosis and aortic regurgitation. Bulky lesions up to 1 cm were attached to both leaflet margins. An MRI of his brain revealed right frontal and left parietal hyperintense lesions on the T2 weighted images consistent with presumed embolic lesions. A bone scan was consistent with multifocal osteomyelitis of the left foot.

The patient proceeded to cardiac surgery and received a 23 mm ATS mechanical aortic valve. Operative findings included large vegetations attached to the superior surface of the anterior aortic cusp and the ventricular surface of the posterior cusp. Histology demonstrated necrotic aortic valve leaflets and fibrinous vegetations with pseudohyphae. Yeast was isolated on Sabouraud Dextrose Agar from the valvular tissue after 31 h with further identification identical with the previous microbiology of the patient. The presumptive diagnosis was non-albicans Candida endocarditis. Two weeks of caspofungin was followed by 6 weeks of combination therapy with Ambisome and 5-flucytosine prior to and after his valve replacement, respectively. He was continued on oral voriconazole pending formal microbiological confirmation and sensitivity
testing of the isolate. Complexities of follow-up saw oral voriconazole continue despite his fluconazole MIC result as therapy for both his brain lesions and osteomyelitis. No surgery was performed for his osteomyelitis.

The final identification of the organism from both the initial blood cultures and valvular tissue was confirmed as *Lodderomyces elongisporus* via rRNA internal transcribed spacer region sequence analysis. The MICs were confirmed by the reference laboratory as follows: amphotericin 0.25 µg ml⁻¹, 5-flucytosine 0.06 µg ml⁻¹, fluconazole ≤0.125 µg ml⁻¹, itraconazole 0.06 µg ml⁻¹, ketoconazole ≤0.008 µg ml⁻¹, voriconazole ≤0.008 µg ml⁻¹, posaconazole 0.03 µg ml⁻¹ and caspofungin 0.03 µg ml⁻¹.

Nine months after cardiac surgery, including 7.5 months of oral voriconazole therapy, his frontal and parietal lesions had resolved on MRI with only small areas of gliosis remaining. He was systemically well with no forefoot symptoms, and his review 1 year after cessation of therapy remained the same with no recurrence of symptoms.

**Discussion**

*L. elongisporus*, named after Dr Jacomina Lodder, is a yeast first described in 1952 as *Saccharomyces elongisporus* (van der Walt, 1966). It has been isolated in nature from Californian citrus concentrates and the alimentary tract of flower-visiting beetles and other insects and was first described as a bloodstream isolate in 2008 (Li *et al.*, 2009; Lockhart *et al.*, 2008; Nguyen *et al.*, 2007). This organism was found after a small percentage of isolates confirmed by Vitek and API 20C (bioMérieux) as *Candida parapsilosis* gave unexpected CHROMagar results. These turquoise-coloured colonies were further characterized and identified as *L. elongisporus* by 26S rRNA gene sequencing (Lockhart *et al.*, 2008).

Recently, the *C. parapsilosis* complex has been divided into further species including *Candida metapsilosis* and *Candida orthopsilosis* on the basis of molecular testing (Tavanti *et al.*, 2005). Now, *L. elongisporus* needs to be additionally differentiated from the complex (Lin *et al.*, 1995; Tay *et al.*, 2009). Characteristically, *L. elongisporus* produces short pseudohyphae on cornmeal agar and produces single large round ascospores in *Saccharomyces* sporulation medium (Lockhart *et al.*, 2008).

To our knowledge, this is the first case of organ-specific disease, namely fungal endocarditis, due to this organism. Outbreaks of disseminated candidiasis in heroin users attributed to the use of lemons have been noted in the literature (Newton-John *et al.*, 1984). Although in our case the patient would not confirm the method of heroin preparation, the history of intravenous heroin use and the organism’s isolation in citrus in the literature raises the possibility of an epidemiological link for invasive *L. elongisporus* disease in our patient.

### Table 1. In vitro antifungal susceptibilities of *L. elongisporus* isolates described in the literature including the case report isolate (Cuenca-Estrella *et al.*, 2006; Tay *et al.*, 2009)

<table>
<thead>
<tr>
<th>Antifungal agent</th>
<th>MIC range (µg ml⁻¹)</th>
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</thead>
<tbody>
<tr>
<td>Amphotericin B</td>
<td>0.012–0.25</td>
</tr>
<tr>
<td>Caspofungin</td>
<td>0.015–0.03</td>
</tr>
<tr>
<td>Fluconazole</td>
<td>≤0.125–0.25</td>
</tr>
<tr>
<td>Ketoconazole</td>
<td>0.003–≤0.008</td>
</tr>
<tr>
<td>Itraconazole</td>
<td>0.047–0.06</td>
</tr>
<tr>
<td>Voriconazole</td>
<td>0.004–≤0.008</td>
</tr>
</tbody>
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The *in vitro* susceptibility patterns of our *L. elongisporus* isolate and those described in the literature are detailed in Table 1. These were tested by various methods including broth microdilution (Antifungal Susceptibility Testing Subcommittee of the European Committee on Antibiotic Susceptibility Testing for testing fermentative yeasts) and Etest (AB Biodisk) (Cuenca-Estrella *et al.*, 2006; Tay *et al.*, 2009). All isolates described so far have been fluconazole-sensitive (Lockhart *et al.*, 2008). This is not necessarily the case with other uncommonly identified non-*albicans Candida* species (Cuenca-Estrella *et al.*, 2006). Given the range of fluconazole susceptibility, early rationalization of antifungal use may be appropriate. However, the recognition of the laboratory characteristics of this organism and its formal differentiation from the non-*albicans Candida* group will aid in the description of its emerging pathological niche.

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**References**


