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Candida lusitaniae: Frequency of Recovery, Colonization, Infection, and Amphotericin B Resistance

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Candida lusitaniae **recovered from 58 specimens from 13 patients represented less than 1% of the yeasts isolated over a 15-month period. The majority of isolates were recovered from respiratory tract, stool, and urine specimens. Of the 13 patients, 1 had a documented infection associated with septicema. Urine isolates from that patient developed resistance to amphotericin B during therapy.**

Candida lusitaniae van Uden et do Carmo-Sousa was originally isolated from the gastrointestinal tracts of warm-blooded animals (8). Recently, this organism has been shown to cause opportunistic infections in humans. Three cases of septicemia involving *C. lusitanae* have been previously described, two in immunocompromised patients during granulocytopenia (5 [strains originally reported to be variants of *C. tropicalis*], 6) and one following an episode of a perforated appendix and peritonitis (6). Interestingly, in two of the three cases the blood isolates were resistant in vitro to amphotericin B (Amp-B); one was resistant before the initiation of Amp-B therapy (3), and the other developed resistance during therapy (6). In the third case (5), the blood isolates were susceptible, but isolates recovered from urine after the initiation of therapy showed the development of resistance to Amp-B. One diabetes mellitus patient with a urinary tract infection responded to local bladder instillation of Amp-B, and the isolates did not develop resistance to Amp-B (1).

Little information is available on the association of this yeast species with human colonization or disease, other than these few cases of infections. *C. lusitaniae* isolates have occasionally been submitted to the Centers for Disease Control, Atlanta, Ga., for identification (7). This study was conducted to determine the frequency of recovery, the frequency of colonization, the body sites of colonization, the frequency of Amp-B resistance, and the clinical significance of *C. lusitaniae*.

All yeasts recovered from clinical specimens at The Johns Hopkins Hospital, Baltimore, Md., over a 15-month period between February 1983 and April 1984 were analyzed. Yeasts were identified by the examination of germ tube production in human serum at 37°C, carbohydrate fermentation reactions (glucose, sucrose, maltose, galactose, trehalose, and cellobiose), urease activity, and morphology on cornmeal agar with caffeic acid. When identification was not attained or when a yeast which fermented cellobiose was encountered, an API 20C yeast strip (Analytab Products, Plainview, N.Y.) was used. *C. lusitaniae* was characterized as being a germ tube-negative yeast with short hyphae and with blastoconidia on cornmeal agar, negative for urease production, capable of fermenting glucose, galactose, trehalose, and cellobiose, and appropriately identified with the API 20C system.

All isolates identified as *C. lusitaniae* were tested for their in vitro susceptibility to Amp-B. The MICs were determined by an agar dilution procedure (5). An isolate for which the MIC of Amp-B was ≥2.0 μg was defined as being resistant.

All patients with cultures positive for *C. lusitaniae* were reviewed for evidence of infection. Infection was defined as positive tissue cultures and histopathology or three or more positive blood cultures within 72 h associated with clinical evidence of a compatible infectious disease.

Over the 15-month study, more than 9,000 yeast isolates were recovered. The relative incidence of *C. lusitaniae* is shown in Table 1. This species represented less than 1% of the yeasts recovered, or ca. 2% of the yeasts which were not *C. albicans*. The recovery of this species by body site and number of patients is shown in Table 2. The organism was recovered from 13 different patients, most frequently from respiratory tract (throat, sputum, bronchium or trachea), stool, and urine specimens. One patient had blood cultures and a vascular catheter tip culture positive for *C. lusitaniae*.

This patient was the only one of the 13 individuals with cultures positive for *C. lusitaniae* who had documented evidence of infection. The patient was a young girl receiving cytotoxic therapy for acute leukemia. During granulocytopenia her respiratory tract became colonized with *C. lusitaniae*. Eight blood cultures and one vascular catheter tip culture became positive over a 1-week period while she was febrile, and Amp-B therapy was begun. Subsequently, over the next 9 days, urine cultures became positive. The final two isolates recovered from urine specimens from this child after the initiation of Amp-B therapy were resistant to Amp-B in vitro, with MICs of 10 to 20 μg/ml. The remaining 56 isolates, including 4 urine isolates recovered from a second highly immunocompromised patient, were susceptible to Amp-B in vitro, with MICs of <2.0 μg/ml.

C. lusitaniae was found as a part of the mycoflora of the upper-respiratory, gastrointestinal, and urinary tracts of hospitalized patients. This yeast species was recovered from both the skin and vagina of only one patient; these may not

TABLE 1. Relative recovery of *C. lusitaniae* over 15 months

Yeast	No. of isolates (%)[a]
Total	9,105
C. albicans	6,629 (68.4)
Other than *C. albicans*	2,876 (31.6)
C. lusitaniae	58 (0.64)

[a] Percentage of the total number of yeast isolates recovered.

TABLE 2. Recovery of *C. lusitaniae* by body site and number of patients

Body site	No. of:	
	Isolates (n = 58)	Patients (n = 13)[a]
Respiratory tract	24	9
Stools	8	5
Urine	15	3
Blood	8	1
Vascular catheter tip	1	1
Skin	1	1
Vagina	1	1

[a] The total number of patients exceeds 13 because some patients had positive cultures from multiple body sites.

be accurate data, as skin and vaginal cultures represent an extremely small percentage of fungal cultures submitted to The Johns Hopkins Hospital. Whether these colonization patterns would be comparable in normal, healthy individuals is unknown. Overall, this species was recovered relatively infrequently, representing less than 1% of the total yeast isolates identified. This rate of recovery was much lower than that of *C. albicans*, *C. tropicalis*, *C. parapsilosis*, *C. glabrata* (*Torulopsis glabrata*), and *Saccharomyces cerevisiae* at The Johns Hopkins Hospital (2).

It appears that *C. lusitaniae* is similar to other yeast species in its ability to colonize individuals and cause opportunistic infections in compromised patients. This species does seem to differ from other medically important yeasts in the development of resistance to Amp-B in vivo.

Is *C. lusitaniae* an emerging new pathogen? This question is difficult to answer because this species can be confused with isolates of *C. parapsilosis*, *C. tropicalis*, and other yeasts (4, 7). My laboratory misidentified an Amp-B-resistant yeast as *C. tropicalis* in 1979 before changing identification methods (5). The addition of cellobiose fermentation for detecting a positive reaction or the use of the API 20C yeast strip permits accurate identification of this species. As yeast identification procedures expand, this species will probably be recognized more frequently than it has been in the past.

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