



Characteristics of Candidemia in a Coccidioidomycosis Endemic Region: The impact of Increased Azole Use in the Selection of Candida species

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Background

- The incidence of invasive candidiasis secondary to non-*Candida albicans* species is on the rise¹.
- In Arizona, azoles are used as treatment and as prophylaxis for coccidioidomycosis among immunosuppressed populations².
- We intended to describe the characteristics and outcomes of non-*C. albicans* candidemia in our region.

Methods

- We conducted a multicenter study in Arizona evaluating adult patients ≥ 18 years old with candidemia from October 1, 2017 to January 1, 2020.
- Patient demographics, medical history, procedures, antifungal use, and laboratory data were collected.
- Our institutional review board approved our study.
- Descriptive statistics were implemented, using Stata 16.1.

Results

- Over the study period, there were 145 patients with 151 candidemia episodes.
- For the patient-per-episode, the median age was 51 (IQR 37-62), 45% were female, and 86.1% were White.
- 10% had a history of transplantation (40% HSCT and 60% SOT). 22.5% had a history of cancer.
- 15% underwent abdominal surgery 3 months prior to having candidemia.
- 71% had a central venous catheter, of which 82% were removed around the time of diagnosis.

Results (cont.)

- 78% had another systemic infection concomitant with the episode of candidemia.
- 81 (54%) had an ophthalmic examination and 4 (5%) had endophthalmitis.
- 101 underwent echocardiography, of which 12 were found to have infective endocarditis (9/12 had bacteremia during that time).
- Only 5 (3.3%) had a documented history of coccidioidomycosis.
- 37 (24.5%) received azole therapy 3 months prior to presentation.

Table 1. Patients characteristics

| | General | Transplant* | P-value |
|-------------------------------|----------------|-------------|---------|
| Candidemia Episodes | 136 | 15 | - |
| Non- <i>C. albicans</i> | 57/136 (42%) | 12/15 (80%) | 0.1 |
| Age (IQR) | 51 (24-83) | 59 (37-61) | 1 |
| Female | 63/136 (46%) | 5/15 (33%) | 0.34 |
| White | 116/136 (85%) | 14/15 (93%) | 0.9 |
| LOS** (IQR) | 15.5 (10-22) | 40 (15-67) | 0.001 |
| History of Coccidioidomycosis | 4/136 (2.9%) | 1/15 (6.6%) | 0.4 |
| History of Cancer | 29/136 (21%) | 5/15 (33%) | 0.33 |
| Prior-azole Therapy | 24/136 (17.6%) | 13/15 (87%) | <0.001 |
| Death or Hospice Discharge | 45/136 (33%) | 7/15 (47%) | 0.3 |

*Transplant: Solid organ and bone marrow transplant recipients. **LOS: Length of stay in days.

- 60% of the candidemia episodes were due to non-*Candida albicans* species (Table 2).
- Of those who previously received antifungal therapy 27/37 had non-*C. albicans* spp. [11/13 transplant, and 9/11 cancer patients].
- 83% of *C. glabrata* had MIC >2 mcg/ml.
- The majority (71%) of the patients-per-episode initially received an echinocandin without significant statistical differences in the mortality outcome.

- Of all admissions per episode, 4.6% were discharged to hospice, and 29.8% died. ICU admission was associated with higher mortality (56.6% vs. 16.7%, P=<0.001).
- ID consultation was associated with lower mortality (27% versus 63%, P=0.004), and was associated with 97% of all central catheter removal events.
- In the central catheter removal group, a lower mortality was observed [61% to 20% (P=<0.001)].

Table 2. Candida species per transplant

| Organism | Transplantation | | Total |
|-----------------------------|-----------------|-----------|------------|
| | No | Yes | |
| <i>Candida albicans</i> | 57 | 3 | 60 |
| <i>Candida dubliniensis</i> | 12 | 2 | 14 |
| <i>Candida glabrata</i> | 43 | 5 | 48 |
| <i>Candida kefyr</i> | 1 | 0 | 1 |
| <i>Candida krusei</i> | 4 | 4 | 8 |
| <i>Candida lipolytica</i> | 1 | 0 | 1 |
| <i>Candida lusitanae</i> | 2 | 1 | 3 |
| <i>Candida parapsilosis</i> | 8 | 0 | 8 |
| <i>Candida tropicalis</i> | 8 | 0 | 8 |
| Total | 136 | 15 | 151 |

Conclusion

- Our study found higher rates of non-*Candida albicans* spp. candidemia among transplant patients; however, the difference was not statistically significant.
- Prior azole use resulted in a significant increase in the risk of non-*Candida albicans* spp. candidemia.
- Removal of central catheters and ID consultations were associated with a reduction in mortality.
- In Coccidioidomycosis endemic regions, the risk of non-*Candida albicans* infections is likely but larger studies need to be conducted.

References

- Wispflinghoff H, Ebberts J, Geurtz L, et al: Nosocomial bloodstream infections due to *Candida* spp. in the USA: species distribution, clinical features and antifungal susceptibilities. *International journal of antimicrobial agents*. 2014;43(1).
- Burr JE, Kusne S, Carey EJ, Hellman RL: The prevention of recrudescence coccidioidomycosis after solid organ transplantation. *Transplantation*. 2007;83(9):1182-1187.