211 Cases of *Candida* Osteomyelitis: 17 Case Reports and a Review of the Literature

Amy K. Slenker, MD†, Scott Keith, PhD‡, David A. Horn, MD†

†Division of Infectious Diseases, ‡Department of Pharmacology and Experimental Therapeutics

Thomas Jefferson University, Philadelphia, Pennsylvania

Background

•Invasive candidiasis (IC) is becoming more prevalent secondary to a growing population of immunosuppressed patients, invasive surgeries, and broad-spectrum antibiotics.

•Crude mortality rates for candidemia, the most common type of IC, are reported to be 30.6%[1].

•*Candida* osteomyelitis, another type of IC, is an uncommon infection and data are lacking regarding risk factors, diagnosis, and treatment.

Methods

•Patients (≥18 years old) treated in our institution (2000-2010) and the literature (1928-2010) were included if they had biopsy proven or imaging suggestive of osteomyelitis, and isolation of *Candida* from cultured bone or joint fluid.

Patient Characteristics

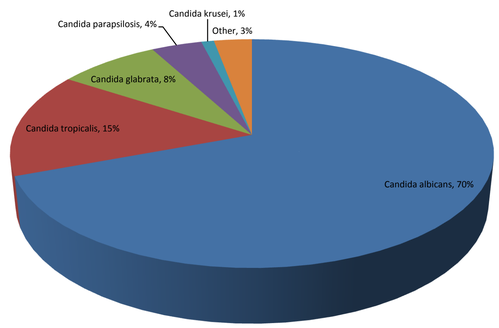
•Median age: 57± 21 years (range 18-90, mean 54 years)
•Male: 64% (134/209); female: 30% (62/209)
•Candidemia prior to diagnosis: 46% (60/130)
•The most common site of infection was vertebral (132/211, 63%), followed by the sternum (51/211, 24%).

Sites of Infection

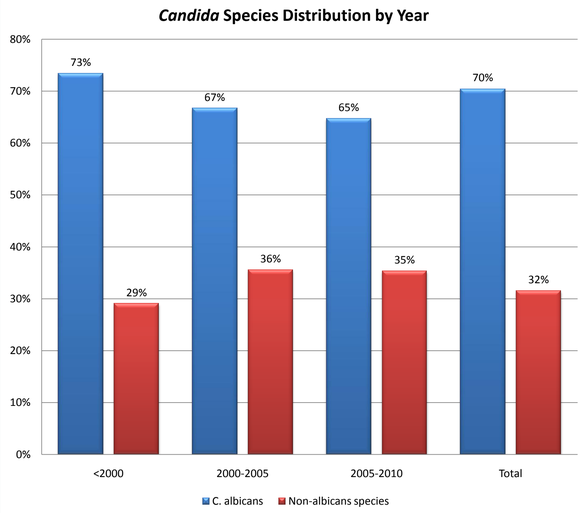
	Patients (n = 211)	Percentage (%)
Vertebrae	132	63
Sternum/Chest Wall	51	24
Femur	8	4
Facial bones	6	3
Foot/Ankle	6	3
Hips	6	3
Tibia/Fibula	5	2
Hand	4	2
Other	10	5

•16/211 (8%) of patients had multiple site of infection.

Candida Species



•*C. albicans* was the most common species in this case series.



•*C. albicans* was more common than non-*albicans* species, including reports from 2005-2010.
•In contrast, the literature indicates that *Candida* blood stream infections are currently predominantly non-*albicans* species[2].

Risk Factors

	Total (n = 206)	Percentage (%)
Prior surgery	118	57
Antibiotics	82	40
Central venous catheter (CVC)	39	19
Intravenous drug abuse (IVDA)	39	19
Immunosuppression	36	17
Diabetes mellitus	36	17
Malignancy	36	17
End-stage liver disease	25	12
Total parenteral nutrition (TPN)	25	12
Candida colonization/infection	21	10
Renal failure	20	9
Human immunodeficiency virus (HIV)	12	6
Transplant	12	6

•Risk factors for IC include: prior surgery, broad spectrum antibiotics, diabetes, renal failure, cancer, CVC, TPN, and immunosuppression[3-4].
•In addition, we identified the following comorbidities in our patients: liver disease, IVDA, and HIV.

Treatment

•The most common initial treatment regimens were amphotericin B (78/203, 38%) and fluconazole (50/203, 25%).
•Echinocandins were infrequently used (5/203, 2%).
•Combination therapy was used (37/203, 18%), most commonly with amphotericin B and flucytosine (28/203, 14%).
•Suppression therapy was employed in 104/201 (52%) of patients, most commonly with fluconazole (55/ 201, 27%).
•Fifty-nine percent (120/205) of patients underwent surgical debridement.
•Median length of treatment was 3 (±3.50) months.

Outcomes

•Therapy was reported to be successful in 90% (178/198) of patients.
•Median length of treatment was 3 (±3.50) months (mean 5.04 months), with 25% of people cured by 1.5 months and 75% cured by 6 months.
•For those cured, median length of treatment in patients was 3 ± 4.07 months (mean: 4.17 months) with 25% of people cured by 1.5 months and 75% cured by 5 months.
•Attributable mortality was 6% (11/200). Crude mortality was 12% (24/200).

Conclusions

•*C. albicans* was the most common species in this series.
•*C. albicans* is more prevalent than non-*albicans* species in this series, and this was maintained over time.
•Upon review of the data, we cannot draw any conclusions regarding *C. albicans* versus non-*albicans* and its relationship to cure (p = 0.113 by Fisher's test).
•There is a prolonged length of therapy for those patients considered cured. Median length of treatment was 3 (±3.50) months, with 25% of people cured by 1.5 months and 75% cured by 6 months.
•Attributable (6%) and crude mortality (12%) rates were much lower than those reported in the literature for candidemia, a type of invasive candidiasis.
•More studies are needed regarding antifungal therapy, surgical intervention, and length of therapy.

References

1. Zaoutis TE, Argon J, Chu J, Berlin JA, Walsh TJ, Feudtner C. The epidemiology and attributable outcomes of candidemia in adults and children hospitalized in the United States: a propensity analysis. Clin Infect Dis 2005; 41:1232–9.
2. Trick WE, Fridkin SK, Edwards JR, Hajjeh RA, Gaynes RP, and the National Nosocomial Infections Surveillance System Hospitals. Secular trend of hospital-acquired candidemia among intensive care unit patients in the United States during 1989–1999. Clin Infect Dis 2002; 35:627–30.
3. Wenzel RP. Nosocomial candidemia: Risk factors and attributable mortality. Clin Infect Dis 1995*; 20:1531–1534*
4. Ostrosky-Zeichner L. Pappas PG. Invasive candidiasis in the intensive care unit. Crit Care Med. 2006; 34(3):857-63.