Got Micafungin? The Incidence of Fungemia in Septic Shock

Mackenzie Piché, PharmD, BCPS; Alina Adeel, MD; Maureen Campion, PharmD, BCIDP
UMass Memorial Medical Center, Worcester, MA; University of Massachusetts Medical School, Worcester, MA

INTRODUCTION

- There are several studies evaluating empiric use of antifungal agents in sepsis that have failed to demonstrate a clinical benefit.[1-3] For example, the EMPIRICUS trial in 2016 did not find a reduction in invasive candidiasis in septic intensive care unit (ICU) patients with candida colonization if empiric micafungin was administered.[3] However, few studies have evaluated the actual incidence of septic shock secondary to candidemia.
- In 2015, a large investigation of ICU patients demonstrated that candidemia occurred at a rate of about 1% over an 8-year time period. This subset of patients had severe presentations, with relatively high rates of sepsis (27%), severe sepsis (31%), and septic shock (40%). The major limitation of this study was that other causes of sepsis were not excluded, including bacterial causes.[4]
- The Surviving Sepsis Campaign (SSC) recommends to initiate empiric therapy covering "all likely pathogens" in patients with sepsis.[5] However, no specific recommendations are made regarding indications for antifungal coverage.
- The study site, UMass Memorial Medical Center (UMMMC), is a tertiary academic medical center in Worcester, Massachusetts with bone marrow transplant and solid organ transplant (SOT) services (liver, kidney, pancreas).

METHODS

A retrospective chart review of patients admitted to UMMMC between October 1, 2017 and October 1, 2019 was performed. Adults with a positive fungal blood culture were eligible for inclusion. MS-DRG* codes identified all patients with sepsis/septic shock and electronic medical record reports identified all patients with a positive fungal blood culture. Patients with fungemia were reviewed for the presence of risk factors for fungal infections and the incidence of septic shock (based on the Sepsis-3 definition).

*Medicare-Severity Diagnosis-Related Group

PRIMARY OBJECTIVE

The objective of this study was to determine the incidence with which fungemia presented as septic shock at a large, academic medical center.

RESULTS

4,253 — Total patients with a diagnosis of sepsis/severe sepsis/septic shock during study period

↓

68 (1.6%) — Patients with a blood culture positive for fungal species during study period

↓

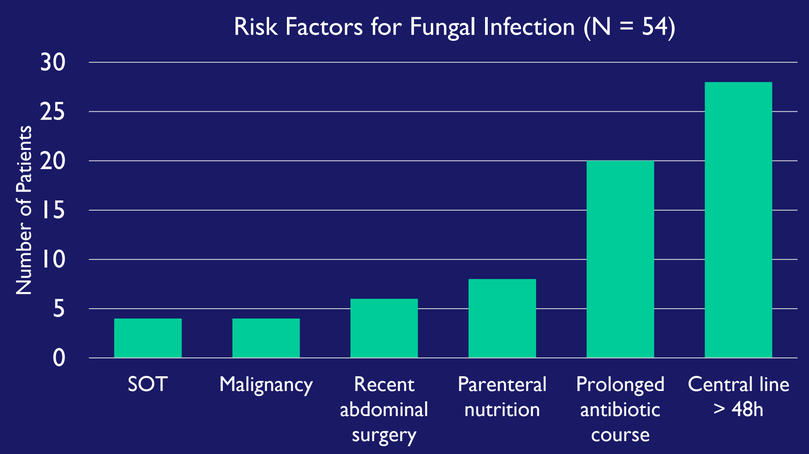
54 (1.3%) — Patients included in the study (after 14 patients were excluded)

↓

8 (0.19%) — Patients met criteria for septic shock (based on Sepsis-3 definition)

↓

4 (0.09%) — Patients with fungemia and co-existing septic shock had died at day 30



RESULTS, CONT.

Baseline Characteristics (N = 54)	
Male sex, n(%)	31 (57.4%)
Age, years, median (IQR)	60 (38.5,70)
Admitted to ICU, n(%)	34 (63%)
qSOFA score, median (IQR)	2 (1,2)
SOFA score, median (IQR)	4.5 (2, 8.25)
WBC, 10^3/uL, median (IQR)	8.9 (6.675, 15.15)
Temperature >38 or < 36°C, n(%)	29 (53.7%)
SCr, mg/dL, median (IQR)	1.49 (0.8, 2.29)
Lactic acid ≥ 2 mmol/L, n(%)	17 (31.5%)
Need for vasopressors, n(%)	12 (22.2%)
Concomitant positive bacterial blood culture, n(%)	16 (29.6%)

Mortality: At 30 days, 12 patients (22.2%) had died
- 4 patients had septic shock and fungemia
- 1 patients had concomitant bacteremia
- All patients that died had risk factors for fungemia

CONCLUSION

Based upon our review over a two year period within a complex, critically ill patient population, fungemia presenting as septic shock is exceedingly rare. Therefore, empiric antifungal therapy in patients presenting with septic shock is not warranted. A thorough risk factor assessment is critical in tailoring empiric antimicrobial therapy to minimize adverse drug events related to unnecessary use.

REFERENCES

1. Ostrosky-Zeichner, Shoham S, Vazquez J, et al. MSG-01: A Randomized, Double-Blind, Placebo-Controlled Trial of Caspofungin Prophylaxis Followed by Preemptive Therapy for Invasive Candidiasis in High-Risk Adults in the Critical Care Setting. *Clin Infect Dis*. 2014; 58(9): 1219-25.
2. Schuster MG, Edwards JE, Sobel JD, et al. Empirical Fluconazole versus Placebo for Intensive Care Unit Patients. *Ann Intern Med*. 2008; 149: 83-90.
3. Timsit J, Azoulay E, Schwebel C, et al. Empirical Micafungin Treatment and Survival Without Invasive Fungal Infection in Adults With ICU-Acquired Sepsis, *Candida* Colonization, and Multiple Organ Failure The EMPIRICUS Randomized Clinical Trial. *JAMA*. 2016; 316(15): 1555-1564.
4. Ng K, et al. Incidence and mortality of sepsis, severe sepsis, and septic shock in intensive care unit patients with candidemia. *Infect Dis*. 2015; 47(8): 584-587.
5. Rhodes A, Evans L, Alhazzani W, et al. **S**urviving Sepsis Campaign: International Guidelines for Management of Sepsis and Septic Shock: 2016 *Crit Care Med*. 2017; 45(3): 486-552.

The authors of this presentation have no relationships to disclose concerning possible financial or personal relationships with commercial entities.