

Decrease in *Candida* Bloodstream Infections in Veterans in Atlanta

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Introduction

Despite increased focus on prevention of healthcare-associated infections, rates of *Candida* blood stream infections (BSI) in adults did not decrease until recently.

Objectives

- To examine trends in *Candida* BSI at the Atlanta VA Medical Center (VAMC)
- To compare *Candida* BSI to hospital onset (HO) *Staphylococcus aureus* BSI
- To ascertain changes in infection control practices and antimicrobial use that may explain these trends

Methods

- Included total and HO *Candida* and *S. aureus* BSI in inpatients at Atlanta VAMC from fiscal year 2000 to 2013
- Ascertained implementation dates of infection control practices through a survey to infection preventionist and hospital epidemiologist
- Reported antimicrobials in 3 groups:
 - Gram-positive agents (vancomycin, daptomycin)
 - Gram-negative agents (piperillin-tazobactam, carbapenems, cefepime, ceftazidime)
 - Antifungal agents (IV and oral fluconazole)
- Data available for calendar years 2006 to 2012 for antimicrobials and fluconazole, not available for echinocandins
- χ^2 Test used to compare rates over time

Results

- 311 *Candida* BSI cases were identified
- Rates (cases/100,000 unique patients) of *Candida* BSI declined from 39 in 2011 to 6 in 2013 ($p < 0.0001$)
- No changes in *Candida* species distribution
- HO-*Candida* BSI rate (cases/100,000 patient days) declined from 42 in 2011 to 7 in 2013 ($p < 0.0001$, Figure 1)
- Similar decline in HO-*S. aureus* from 28 in 2011 to 11 in 2013 ($p < 0.0001$).
- Notable Infection control interventions (Figure 1):
 - Ongoing hand hygiene campaign started in 1999
 - Use of antiseptic-coated central venous catheters (CVCs) in 2002
 - Institute for Healthcare Improvement's central line bundle in 2002
 - Chlorhexidine bathing in 2010
 - Chlorhexidine dressing for central lines started between 2011-2013
 - Alcohol caps in 2013

Results (continued)

- Antibiotic use (defined daily doses/1,000 patient days) increased between 2006 and 2012:
 - Predominantly gram-positive (141 to 213, $p = 0.002$)
 - Predominantly gram-negative (108 to 155, $p = 0.04$)
- Oral and IV fluconazole use decreased significantly over the same time period (72 to 30, $p < 0.0001$) (Table 1)

Table 1: Antimicrobial Use at the Atlanta Veterans Affairs Medical Center, 2006-2012

Year	Rates of Antimicrobial use (DDD*/1,000 patient days)			
	Gram Positive Agents**	Gram Negative Agents***	Fluconazole (oral)	Fluconazole (intravenous)
2006	108	141	38	34
2007	120	150	31	37
2008	127	169	22	26
2009	137	173	39	25
2010	150	211	27	24
2011	143	186	28	16
2012	155	213	17	12

* DDD: defined daily doses

**Predominantly gram positive agents: vancomycin and daptomycin

***Predominantly gram negative agents: piperillin-tazobactam, carbapenems, cefepime and ceftazidime

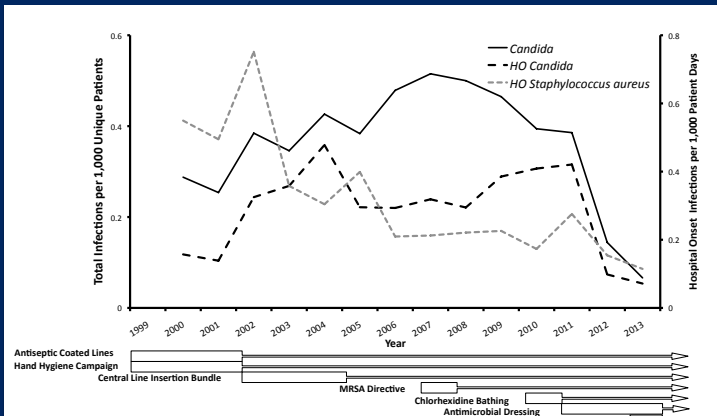


Figure 1: Rates of *Candida* blood stream infections (black solid line) at the Atlanta Veterans Affairs Medical Center during fiscal years 2000-2013 per 1,000 unique patients (left vertical axis). Dashed line represents hospital-onset (HO) portion of *Candida* (black) and *Staphylococcus aureus* (grey) per 1,000 patient days (right vertical axis). p -value < 0.0001 , χ^2 for change in *Candida* and *S. aureus* rates. Calendar years of period of implementation of infection control practices below the graph.

Summary and Conclusions

- Candida* BSI rates decreased at the Atlanta VAMC in 2012 and 2013 after a decade of stability
- Declines cannot be explained by other factors such as decreasing broad spectrum antibiotic use, or increasing fluconazole prophylaxis
- Declines were temporally associated with several infection control interventions that relate to CVC maintenance rather than insertion
- Determining which specific interventions are most effective need to be explored

Supported by National Center for Advancing Translational Sciences of the National Institute of Health under Award Number UL1TR000454, and the National Institute of Allergy and Infectious Diseases of the National Institute of Health under Award number 5T32AI074492.