

Antifungal Prescribing in Critical Care

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Background & Rationale

- Determining the presence of invasive fungal infection (IFI) can be difficult as the clinical presentation is non-specific and it is difficult to differentiate sepsis caused by bacteria from sepsis caused by fungi
- Risk factors associated with IFI include colonization, severity of illness, exposure to broad-spectrum antibiotics, recent major surgery, necrotizing pancreatitis, dialysis, parenteral nutrition, corticosteroids, ICU length of stay, and the use of central venous catheters.
- IDSA guidelines recommend starting empiric antifungal treatment in critically ill patients who display signs of septic shock and who have risk factors for IFI with no other known cause for fever.
- To support and develop antifungal stewardship in Calgary Zone ICUs, we aim to describe antifungal use to identify potential opportunities for improvement.

Objectives

- Primary:
 - Describe patients who were prescribed antifungals in the ICU in terms of patient demographics and risk factors for IFI
- Secondary:
 - Describe reported sites of fungal growth
 - Identify fungal pathogens that grew on culture
 - Assess if antifungal therapy is tailored to culture data
 - Determine the average duration of antifungal therapy

Methods

- Retrospective descriptive chart review of adult ICUs in Calgary, Alberta
- Timeline: August 1, 2020 to July 31, 2021
- Data extracted from SCM and Tracer by data analyst and study investigator
- Data Analysis: Data collected on demographic variables and clinical outcomes were reported using descriptive statistics.

Inclusion Criteria	Exclusion Criteria
<ul style="list-style-type: none">• Adult patients ≥ 18 years of age• Admitted to a medical, surgical, neurological, or trauma critical care ward• Received systematic antifungal therapy	<ul style="list-style-type: none">• Did not receive antifungal therapy while in ICU

Results: Primary Outcome

Patient Demographics

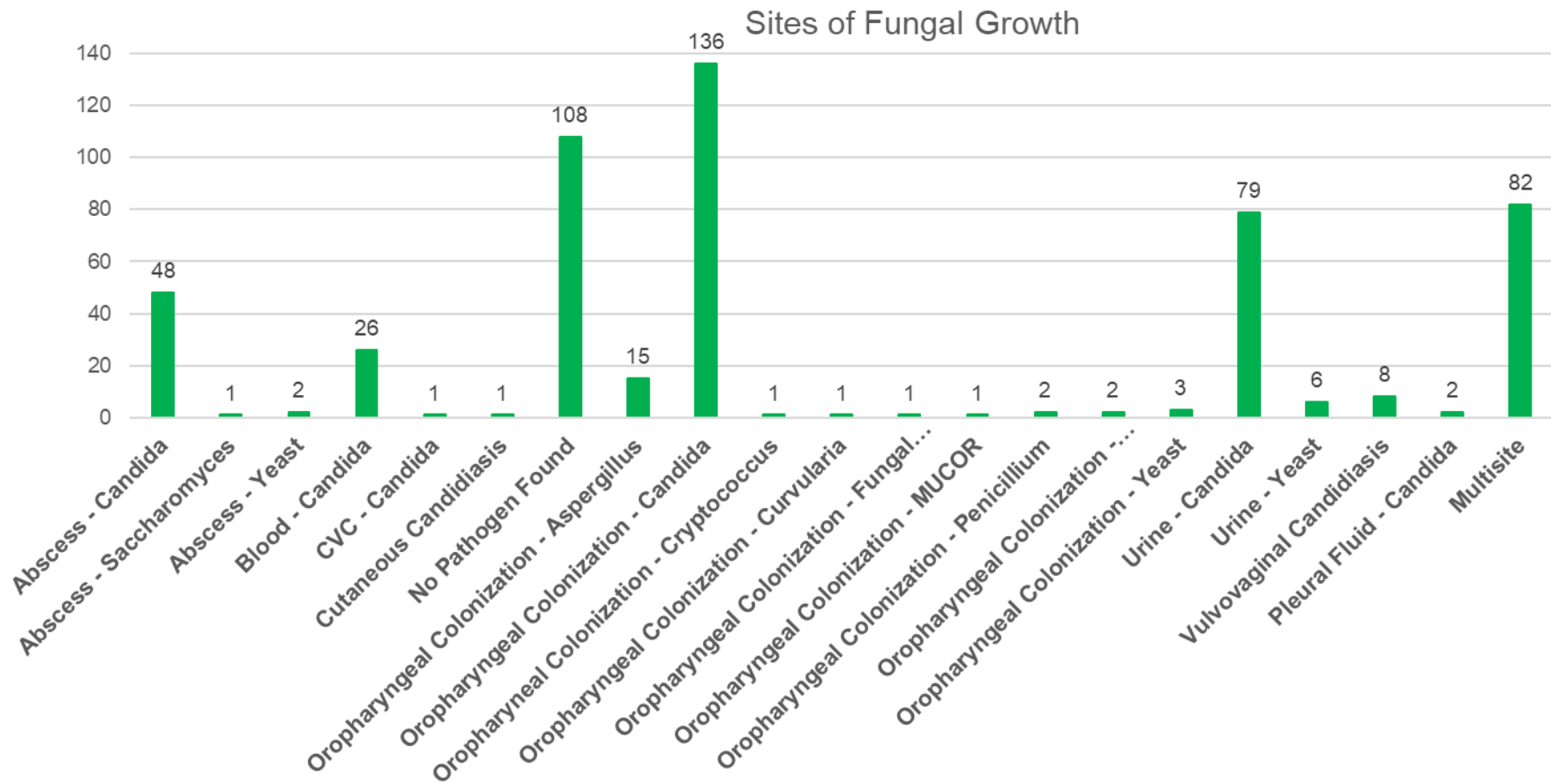
Patient Characteristics (n =334)		n (%)
ICU Class	Medical	235 (70.4%)
	Surgical	79 (23.7%)
	Neuro	13 (3.9%)
	Trauma	7 (5.6%)
Male		199 (59.6%)
Parenteral Nutrition		98 (29.3%)
Mortality		154 (46.1%)
		Median (IQR)
Age		61 (18)
ICU Length of Stay		14 (28)
APACHE II Score		24.2 (8.0)

Results: Primary Outcome

Risk Factors

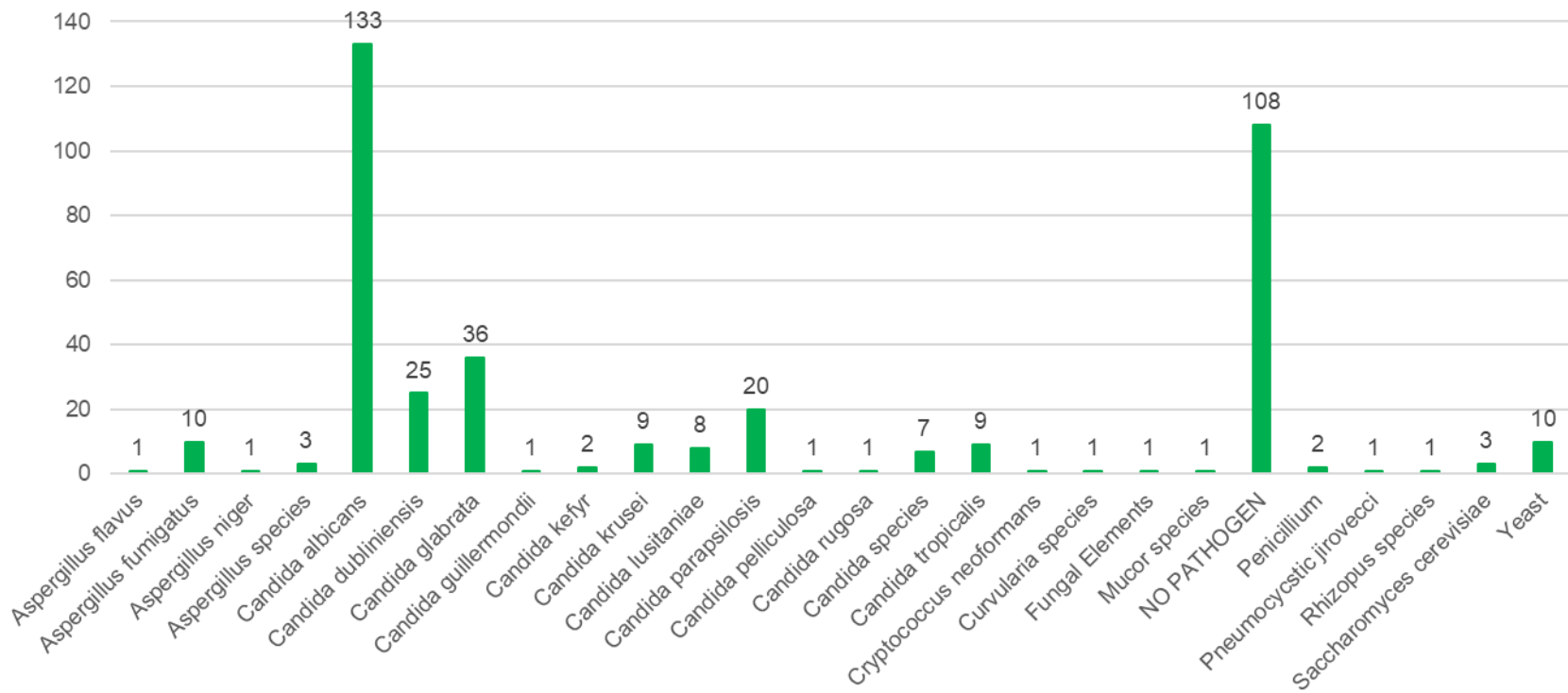
Risk Factor (n=334)	n (%)
Fever	192 (57.5%)
Number of Colonization Sites	0 113 (33.8%)
	1 143 (42.8%)
	2 62 (18.6%)
	3 13 (3.9%)
	4 3 (0.9%)
Leukocytosis	185 (55.4%)
Neutrophilia	187 (56.0%)
Immunosuppression	72 (21.5%)
Severe Acute Pancreatitis	14 (4.2%)
Dialysis	87 (26.1%)
Severe Sepsis	195 (58.4%)
Source Control	49 (14.7%)
Candida Score	0 47 (14.1%)
	1 43 (12.9%)
	2 149 (44.6%)
	3 60 (18.0%)
	4 31 (9.3%)
	5 4 (1.2%)
Median (IQR)	
Length of Stay Pre-Antifungal Therapy	10 (15.75)
CVC Duration Pre-Antifungal Therapy	4 (11)
Duration of TPN Prior to Antifungal Therapy	0.5 (4.25)
Duration of Antibiotics Prior to Antifungal Therapy	7 (11)

Results: Secondary Outcomes



Results: Secondary Outcomes

Identified Pathogens



Results: Secondary Outcomes

Candida species and susceptibilities

Species (n=252)	Rate of Growth, n (%)	Number of Isolates With Reported Susceptibility	Fluconazole		Amphotericin	Micafungin	Voriconazole	Caspofungin	Anidulafungin
			S	SDD					
<i>C. albicans</i>	133 (52.8%)	19	19 (100%)		19 (100%)	1 (100%)	NT	NT	NT
<i>C. glabrata</i>	36 (14.3%)	10	1 (10%)	9 (90%)	10 (100%)	6 (100%)	NT	NT	NT
<i>C. krusei</i>	9 (3.6%)	4	0 (100%)		4 (100%)	4 (100%)	4 (100%)	NT	NT
<i>C. parapsilosis</i>	20 (7.9%)	5	4 (80%)	1 (20%)	5 (100%)	2 (100%)	1 (100%)	NT	NT
<i>C. tropicalis</i>	9 (3.6%)	3	3 (100%)		3 (100%)	1 (100%)	0 (100%)	1 (100%)	1 (100%)
<i>C. dubliniensis</i>	25 (9.9%)	0							
<i>C. lusitaniae</i>	8 (3.2%)	0							
Candida species	7 (2.8%)	0							
<i>C. kefyr</i>	2 (0.8%)	0							
<i>C. guilliermondii</i>	1 (0.4%)	0							
<i>C. pelliculosa</i>	1 (0.4%)	0							
<i>C. rugosa</i>	1 (0.4%)	0							

Results: Secondary Outcomes

- **Antifungal Tailoring**
 - Antifungal spectrum narrowing and broadening occurred in the same proportion of patients, 13.2%.
 - 74.0% of patients had an opportunity to have their antifungal spectrum narrowed based on pathogens cultured and the locations they were cultured from.
- **Duration of Antifungal Therapy:**
 - The median duration of antifungal therapy was 9 days, with the longest duration of therapy for one patient at 168 days.

Discussion

- These results demonstrate opportunities for better rationalized antifungal prescribing in Calgary Zone adult ICUs based on the large percentage of patients who were:
 - Culture negative
 - Had microbial growth more compatible with colonization
- Prescribing of antifungal therapy for oropharyngeal contamination or colonization, particularly with a *Candida species*.
- Broad reliance on micafungin

Conclusion

- This study suggests that antifungals may be overprescribed and that there is potential for antimicrobial stewardship efforts.
- Clinical decisions regarding not treating non-infectious colonization, and tailoring therapy when appropriate are opportunities for improved prescribing practices.

Questions?

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