Evaluation of the Impact of a Micafungin Time-Out Pathway for Hospitalized Patients

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Background

- Incidence of invasive fungal infections has increased in the past two decades, contributing to more widespread use of echinocandins.[1]
- Echinocandin overuse is linked to increasing prevalence of non-albicans *Candida* species (spp.) infections and resistance.[2-3]
- Instituting a clinical pathway can guide clinicians on appropriate use of echinocandins to mitigate prolonged or inappropriate courses once a confirmed diagnosis is made.[1]
- Micafungin, our institution's preferred echinocandin, requires infectious diseases (ID) approval at the time of initiation.
- An echinocandin "time-out" initiated by an antimicrobial stewardship team member can prompt reassessment of the continuing need for echinocandin therapy versus appropriate de-escalation.[4-5]

Purpose

Evaluate the impact of an antimicrobial stewardship program (ASP)-initiated micafungin time-out (MTO) on antifungal appropriateness as guided by a clinical pathway.

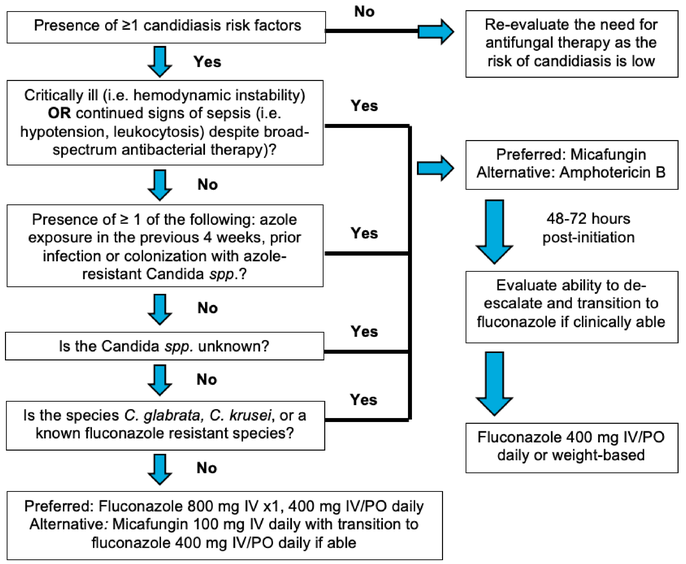
Endpoints

Primary: Assess the appropriateness of antifungal therapy at days 1 and 5 pre- and post-implementation of an ASP-driven MTO pathway.

Secondary: Describe the ASP-driven interventions and the intervention acceptance rate.

Methods

Study Design: Single center quasi-experimental study evaluating antifungal appropriateness pre-MTO (2019) and post-MTO implementation (2020). Assessment was guided by a clinical pathway.



Results

Table 1: Patient Demographics*

	Pre-MTO (2019) (n=50)	Post-MTO (2020) (n=50)
Male#	26 (52)	37 (74)
Age, median (IQR)	61 (51-68)	65 (44-69)
Comorbid conditions		
▪ Diabetes mellitus	11 (23)	13 (31)
▪ COPD	4 (9)	4 (10)
▪ Heart failure#	12 (26)	6 (14)
▪ Cirrhosis#	9 (19)	3 (7)
▪ Renal replacement therapy	11 (22)	10 (20)
▪ Malignancy	26 (55)	27 (64)
▪ Solid organ transplant	12 (26)	8 (19)
▪ Bone marrow transplant	8 (16)	7 (17)
Critical care admission	14 (28)	15 (30)
▪ Intubated	8 (57)	12 (80)
▪ Vasopressors	10 (71)	13 (87)
Oncology admission	14 (28)	19 (38)
Medicine admission	22 (44)	16 (32)
Infectious diseases consult	41 (82)	36 (72)
Mortality	19 (38)	19 (38)

* n (%) unless otherwise specified. # $p<0.05$

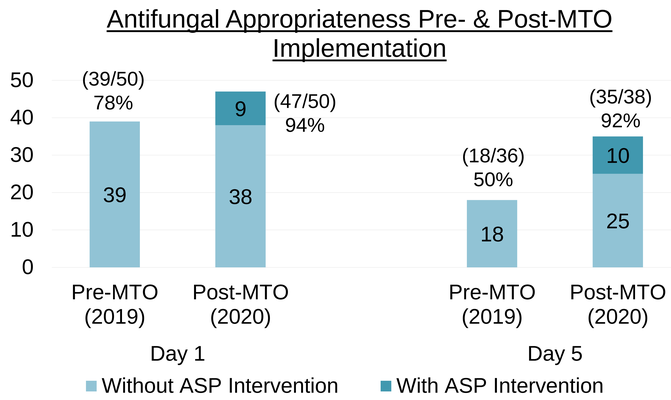
Implementation of a micafungin time-out, guided by a clinical pathway, increased antifungal appropriateness by 18 and 26% on days 1 and 5 of therapy, respectively.

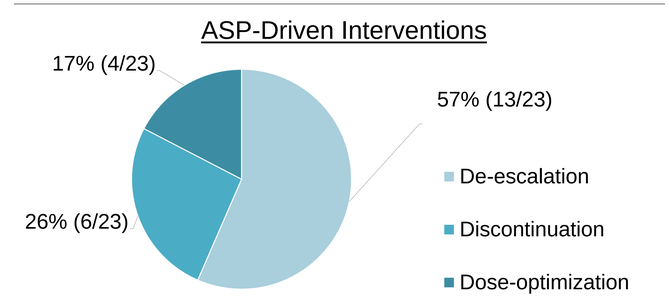
Table 2: Assessment Criteria for Micafungin Use According to Pathway*

	Pre-MTO (2019) (n=50)	Post-MTO (2020) (n=50)
Invasive Candidiasis Risk Factors		
▪ Broad spectrum antibiotics ≥72 hours	33 (66)	32 (64)
▪ Central venous catheter	18 (36)	17 (34)
▪ Total parenteral nutrition	12 (24)	10 (20)
▪ Gastrointestinal surgery	12 (24)	14 (28)
▪ Hematologic malignancy	15 (30)	19 (38)
▪ Renal replacement therapy	11 (22)	10 (20)
▪ ANC <500	11 (22)	14 (28)
▪ Solid organ transplant	12 (24)	8 (16)
▪ Bone marrow transplant	8 (16)	7 (14)
▪ Implanted prosthetic device	7 (14)	3 (6)
▪ Immunosuppressive therapy	35 (70)	36 (72)
Ventilated	9 (18)	12 (24)
History of Candida spp. infection(s) in ≤12 months	6 (12)	7 (14)
Azole use in ≤4 weeks	15 (30)	12 (24)
History of Candida spp. resistant infection	1 (2)	2 (4)
LFT elevations >3x ULN	7 (14)	9 (18)
QTc elevations >500	7 (14)	2 (4)
Febrile neutropenic ≥4 days *OR* hemodynamically unstable *OR* persistent shock despite antibiotics ≥48 hours	22 (44)	27 (54)
None	1 (2)	3 (6)

* n (%) unless otherwise specified. All p>0.05

Results (continued)





- Overall, 23 ASP interventions were performed post-MTO and pathway implementation with 19 (83.0%) executed successfully.
- ASP interventions post-MTO and pathway implementation increased overall antifungal appropriateness at day 1 and at day 5:
  - Day 1: 76% (n=38) to 94% (n=47) (p=0.47)
  - Day 5: 66% (n=25) to 92% (n=35) (p=0.33)

Conclusion

- This study demonstrated that ASP review of micafungin orders early in the course of treatment utilizing a MTO pathway optimized antifungal use and promoted antifungal stewardship.

References

1. Van Engen A, Casamayor M, et al. ClinicoEconomics and Outcomes Research 2017;9:763-774.
2. Carr A, Colley P, et al. Proc 2018;31(1):30-34.
3. Micallef C, Aliyu SH, et al. J Antimicrob Chemother 2015;70:1908-1911.
4. Pappas P, Kauffman C, Andes D, et al. Clin Infect Dis 2016;62(4):e1-50.
5. Thom KA, et al. Clin Infect Dis. 2019;68:1581-1584.

Disclosures

Authors of this presentation have no financial or personal relationships with commercial entities to disclose that may have a direct or indirect interest in the subject matter of this presentation.