A Multicenter, Mixed-Method Evaluation of Delayed Hospital Discharge in Patients with Invasive Candidiasis Receiving Echinocandins

Jinhee Jo, Pharm.D[1], Truc Tran, Pharm.D[2], Nicholas Beyda, PharmD[1], Debora Simmons, PhD[2], Masaad Almutairi Pharm.D[1], Faris Alnezary, Pharm.D[1], Joshua Hendrickson, Pharm.D[1§], Anne J. Gonzales-Luna, Pharm.D[1], Kevin W. Garey, Pharm.D, MS, FASHP[1]

[1]University of Houston College of Pharmacy; [2]University of Texas Health Science Center; [§]Current Affiliation: University of Pittsburgh Medical Center Mercy

Contact Information:
Jinhee Jo
University of Houston
Phone: (713) 743-2974
Email: jjo2@uh.edu

BACKGROUND

- Invasive candidiasis (IC) is a devastating fungal infection and candidemia is the most common bloodstream infection with high mortality rates of 30-40% in US hospitals[1,2]
- Rates of IC caused by drug-resistant *Candida* spp, designated by the CDC as a serious threat, are increasing, and *Candida auris* has become an urgent threat[3]
- Echinocandins are currently recommended as empiric and/or initial therapy for IC due to their activity against most *Candida* species and favorable toxicity profile[4]
- Rezafungin (RZF) is a novel echinocandin in Phase 3 clinical trials characterized by high front-loaded drug exposure and a once-weekly dosing interval[5]

OBJECTIVES

1. To perform a pharmacoepidemiologic analysis on echinocandin use at quaternary care medical centers
2. To identify barriers to discharge for patients with proven or suspected IC and develop a transition of care (TOC) model to facilitate discharge

METHODS

- Echinocandin use and clinical microbiologic data from 2 large health care systems (20+ hospitals) were reviewed between 2017 and 2019
- Patients given an echinocandin until hospital discharge were evaluated for continued outpatient use and barriers to earlier discharge
- Both quantitative and qualitative tools were utilized to develop a TOC model and R, STATA, and/or SAS software were used for analysis

CONCLUSION

- Approximately, one third of all echinocandin courses in hospitalized patients with IC were continued until the last day of hospitalization
- Intra-abdominal candidiasis was the most common indication in patients who continued on echinocandins after discharge and osteomyelitis and other deep-seated infection were predictors for outpatient echinocandin use
- A novel IC discharge model demonstrated the future potential for RZF to reduce length of stay however further studies applying the model in clinical, policy, and research decision-making processes to evaluate the potential impact of a long acting echinocandin in the real-world are warranted

FUNDING

- This study was funded by Cidara Therapeutics

RESULTS

Table 1. Pharmacoepidemiology evaluation of echinocandin use

Number of echinocandin courses	4,211
Total echinocandin days of therapy (DOT)	22,888
Median length of hospital stay in days	18 (IQR, 9-32)
Median time from hospital admission to echinocandin indication in days	3 (IQR, 1-6)
Number of echinocandin courses continued until the last day of hospitalization	1,405 (33%)
Number of randomly selected patients for in-depth chart review	536 (38%)

Table 2. Univariate and multivariate results on predictors for outpatient echinocandin use

		Discharged on an echinocandin					
		Univariate Analysis			Multivariable analysis		
Variable	N	No (n=178)	Yes (n=151)	P value	OR	95% CI	P value
Age, years		54±17	59±15	0.0039			
Sex, female	136	64.0%	36.0%	0.003			
Race, White	236	68.0%	76.2%	0.101			
ICU anytime during admission	164	48.9%	51.0%	0.702			
Echinocandin initiation in ICU	127	37.6%	39.7%	0.615			
Azole administered concomitantly during hospitalization	28	10.7%	6.0%	0.127			
Culture positive for *Candida* spp.	179	43.8%	66.9%	<0.0001			
C. albicans	69	18.0%	24.5%	0.147			
Non-albicans *Candida* spp.	130	31.5%	49.0%	0.0012			
Mixed (*C. albicans* + *C. glabrata*)	20	5.6%	6.6%	0.012			
Indication for echinocandin therapy							
Candidemia	46	10.1%	18.5%	0.028			
Intra-abdominal	124	36.5%	39.0%	0.634			
Esophageal candidiasis	6	66.7%	33.3%	0.533			
SSTI	20	40.0%	60.0%	0.192			
Osteomyelitis	21	1.7%	11.9%	0.0002	4.07	1.06-15.66	0.041
Respiratory	18	5.6%	5.3%	0.900			
Lung transplant prophylaxis	14	100.0%	0.0%	0.000			
Suspected IC	80	33.2%	13.9%	<0.0001			
Other deep-seated infection	49	8.99%	21.9%	0.001	4.44	1.65-11.96	0.003
Inpatient echinocandin DOT				0.0002			
≤ 7 days	194	68.5%	47.7%				
8 to 14 days	81	21.4%	28.5%				
≥ 14 days	54	10.1%	23.8%				
Transfer to another healthcare facility	109	21.4%	47.0%	<0.0001	3.89	1.95-7.74	0.000

Figure 1. Invasive Candidiasis [I Can] Discharge model

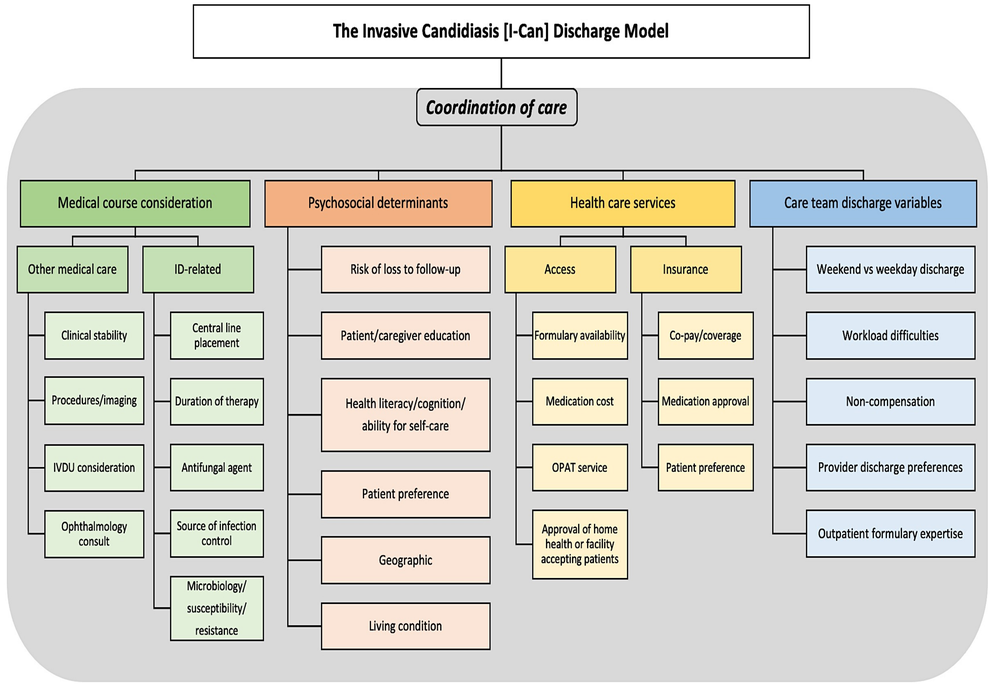
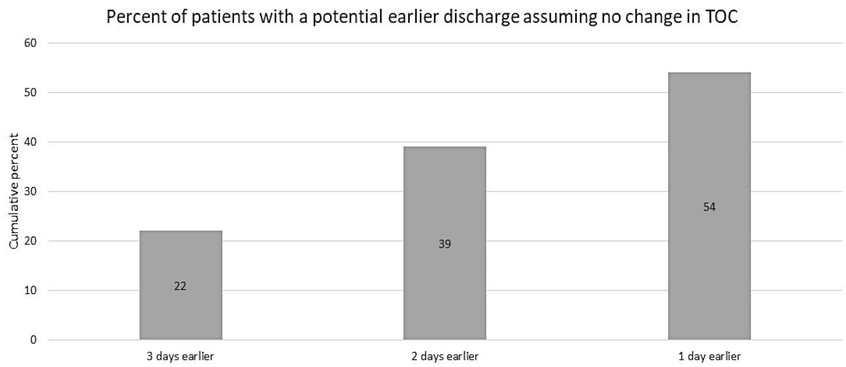


Figure 2. Using the I Can Discharge Model, summary estimates on possible reduction in length of stay if RZF was available



Potential average earlier discharge from the 144 patients evaluated: 1.65±1.16 days

REFERENCES

1. Guery BP, Arendrup MC, Auzinger G, et al. Management of invasive candidiasis and candidemia in adult non-neutropenic intensive care unit patients: Part I. Epidemiology and diagnosis. *Intensive Care Med*. 2009;35:55-62
2. Strollo S, Lionakis MS, Adjemian J, et al. Epidemiology of hospitalizations associated with invasive candidiasis, United States, 2002-2012. *Emerging Infect Dis*. 2017;23:7-13
3. Centers for Disease Control and Prevention. Antibiotic resistance threats in the United States, 2019. Atlanta, GA
4. Pappas PG, Kauffman CA, Andes DR, et al. Clinical practice guideline for the management of candidiasis: 2016 update by the Infectious Diseases Society of America. *Clin Infect Dis*. 2016;62(4)e1-50
5. Thompson GR, Soriano A, Skoutelis A, et al. Rezafungin versus caspofungin in a phase 2, randomized, double-blind study for the treatment of candidemia and invasive candidiasis – The STRIVE trial. *Clin Infect Dis*. 2020;ciaa1380