Differences In Clinical Manifestation, Prognostic Factors, and Outcomes Between Patients With Community-onset And Nosocomial Candidemia

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Background

Candidemia is an invasive fungal infection caused by Candida species with a high case-fatality rate. The associated risk factors of candidemia include immunosuppression, broad-spectrum antibiotics, central venous catheters, glucocorticoids, critical illness, abdominal surgery, neonates, hemodialysis, previous candida colonization, and, more recently, illicit drug use. According to international guidelines, an echinocandin or triazole was recommended as first-line therapy. In previous studies, the characteristics of patients with community-onset candidemia were distinct from those with nosocomial candidemia.

Purposes

The purpose of this study is to investigate the differences in the clinical characteristics, outcomes, and associated risks of death between patients with either community-onset candidemia or nosocomial candidemia.

Methods

Patients who were admitted for equal or more than two days in Taichung Veterans General Hospital in Taiwan from 2015 to 2018 were selected. The diagnosis of candidemia was defined as Candida species identified in blood cultures by commercial identification systems. We applied Kaplan-Meier survival estimates to generate survival curves with a log-rank test and built multivariate Cox proportional-hazards models for risk factors associated with in-hospital mortality. Statistical analysis was performed by using Rstudio (Version 1.4.1717) with appropriate accordingly.
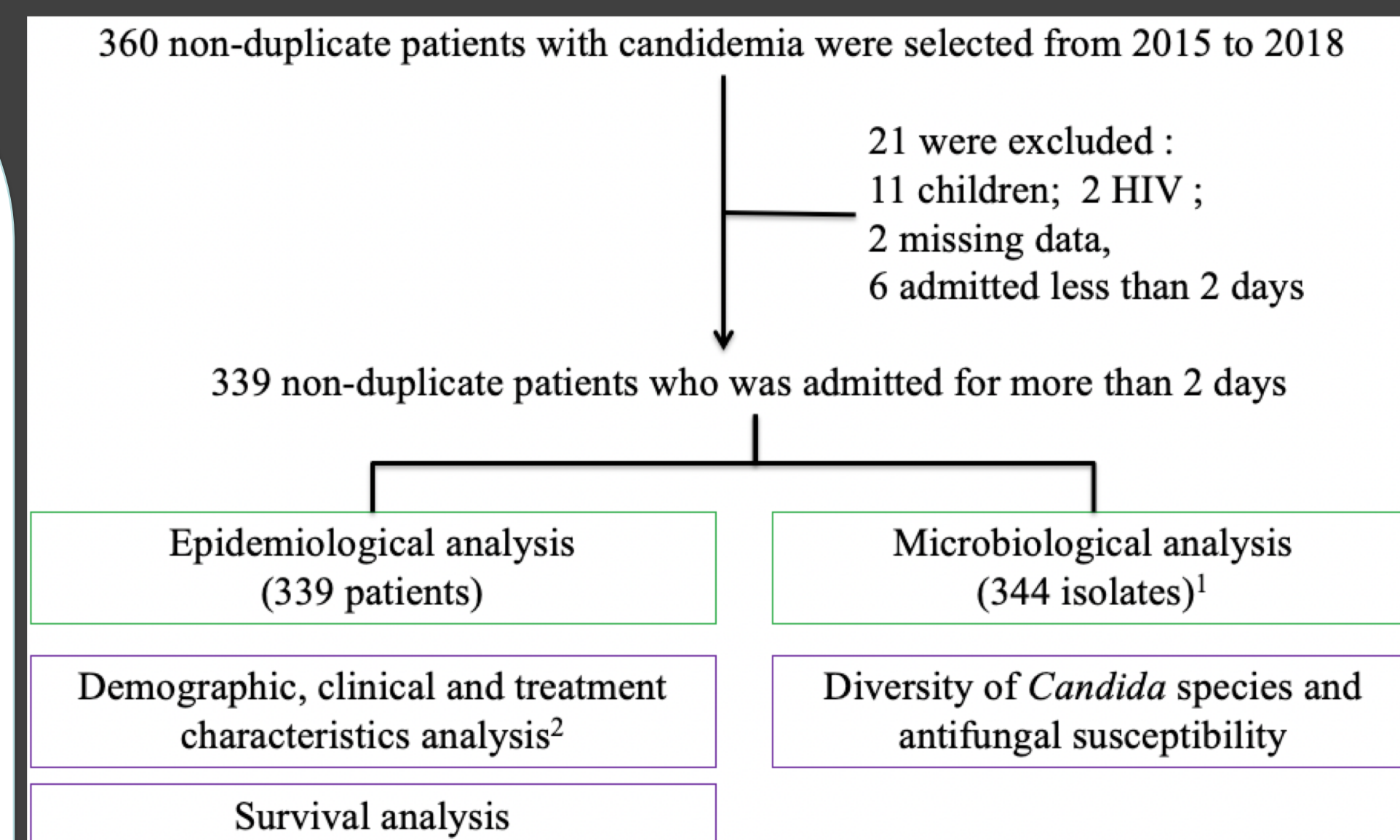

Figure 1. Flows of the study design

Results

Table 1. The comparison of demographics and clinical characteristics of patients with candidemia between community-onset and nosocomial candidemia

Patient demographics [a]	Total patients n=339	Community-onset n=82	Nosocomial n=257	p value [b]
Sex				
Male	219 (64.602)	54 (65.854)	165 (64.202)	0.785
Age, y, mean (SD)	64.24 (15.16)	66.95 (14.28)	63.38(15.35)	0.063
Age, y, median (IQR)	64 (54 – 76)	65.5(58 – 79.8)	63 (53 – 75)	0.10
Previous admission within 30 days	123 (36.283)	31 (37.805)	92 (35.798)	0.742
DNR registry	177 (52.212)	35 (42.683)	142 (55.253)	
no DNR registry	162 (47.788)	47 (57.317)	115 (44.747)	0.137
Register 1-7 days before discharge	53 (15.634)	10 (12.195)	43 (16.732)	
Register > 7 days before discharge	124 (36.578)	25 (30.488)	99 (38.521)	
Terminal disease registry	131 (38.643)	25 (30.488)	106 (41.245)	0.082
Risk factors of candidemia				
Presence of non-tunnel catheter	123 (36.283)	7 (8.537)	116 (45.136)	**<0.001**
Status of port-A				**0.002**
Without port-A implant	231 (68.142)	62 (75.610)	169 (65.759)	
With port-A, removal	60 (17.699)	18 (21.951)	42 (16.342)	
With port-A without removal	48 (14.159)	2 (2.439)	46 (17.899)	
Ever received steroid within seven days before candidemia	136 (40.118)	16 (19.512)	120 (46.693)	**<0.001**
Ever received chemotherapy within one month before candidemia	60 (17.699)	12 (14.634)	48 (18.677)	0.404
Any risks of candidemia development [d]	310 (91.445)	64 (78.049)	246 (95.720)	**<0.001**
Simultaneous bacteremia				0.233
Monomicrobial	29 (8.555)	4 (4.878)	25 (9.728)	
Polymicrobial	3 (0.885)	0 (0.000)	3 (1.167)	
Underlying conditions				
Charlson comorbidity index, mean (SD)	5.56 (2.78)	5.73 (2.70)	5.56 (2.80)	0.619
Malignancy	195 (57.52)	40 (48.78)	155 (60.31)	0.066
Post-organ transplant	13 (3.835)	1 (1.220)	12 (4.669)	0.157
Hollow organ perforation	32 (9.440)	12 (14.634)	20 (7.782)	0.065
Severe skin defect [e]	7 (2.065)	0 (0.000)	7 (2.724)	0.131
Diabetes mellitus	104 (30.678)	35 (42.683)	69 (26.848)	**0.007**

| Patient demographics [a]	Total patients n=339	Community-onset n=82	Nosocomial n=257	p value [b]
Cirrhosis	30 (8.850)	9 (10.976)	21 (8.171)	0.436
HBV carrier	30 (8.850)	8 (9.756)	22 (8.560)	0.74
HCV carrier	13 (3.835)	4 (4.878)	9 (3.502)	0.572
Any liver disease	46 (13.569)	12 (14.634)	34 (13.230)	0.746
Renal function impairment	66 (19.469)	17 (20.732)	49 (19.066)	0.405
CKD	42 (12.389)	13 (15.854)	29 (11.284)	
ESRD	24 (7.080)	4 (4.878)	20 (7.782)	
Chronic Obstructive Pulmonary Disease	15 (4.425)	5 (6.098)	10 (3.891)	0.398
Any rheumatic disorders	20 (5.900)	6 (7.317)	14 (5.447)	0.532
Active influenza infection	5 (1.475)	2 (2.439)	3 (1.167)	0.406
Any central nervous system disorder	35 (10.324)	10 (12.195)	25 (9.728)	0.523
Pancreatitis	9 (2.655)	1 (1.220)	8 (3.113)	0.353
Total parenteral nutrition	7 (2.065)	1 (1.220)	6 (2.335)	0.536
Short bowel disease	6 (1.770)	3 (3.659)	3 (1.167)	0.136
Clinical complications				
Acute respiratory failure	106 (31.268)	33 (40.244)	73 (28.405)	**0.044**
Acute respiratory distress syndrome	15 (4.425)	3 (3.659)	12 (4.669)	0.698
Acute kidney injury	46 (13.569)	10 (12.195)	36 (14.008)	0.676
Acute liver failure	18 (5.310)	3 (3.659)	15 (5.837)	0.444
Sepsis	39 (11.504)	13 (15.854)	26 (10.117)	0.156
Septic shock	89 (26.254)	24 (29.268)	65 (25.292)	0.476
Clinical outcome				
Hospital stay, days, mean (SD)	46.12 (50.02)	31.43 (25.20)	50.81 (54.88)	**0.002**
Hospital stay, days, median (IQR)	35 (23 – 56)	27 (13 – 44)	40 (26 – 60)	**< 0.001**
In-hospital mortality	189 (55.752)	29 (35.366)	160 (62.257)	**<0.001**
30-day mortality	165 (48.673)	24 (29.268)	141 (54.864)	**<0.001**
90-day mortality	194 (57.227)	32 (39.024)	162 (63.035)	**<0.001**
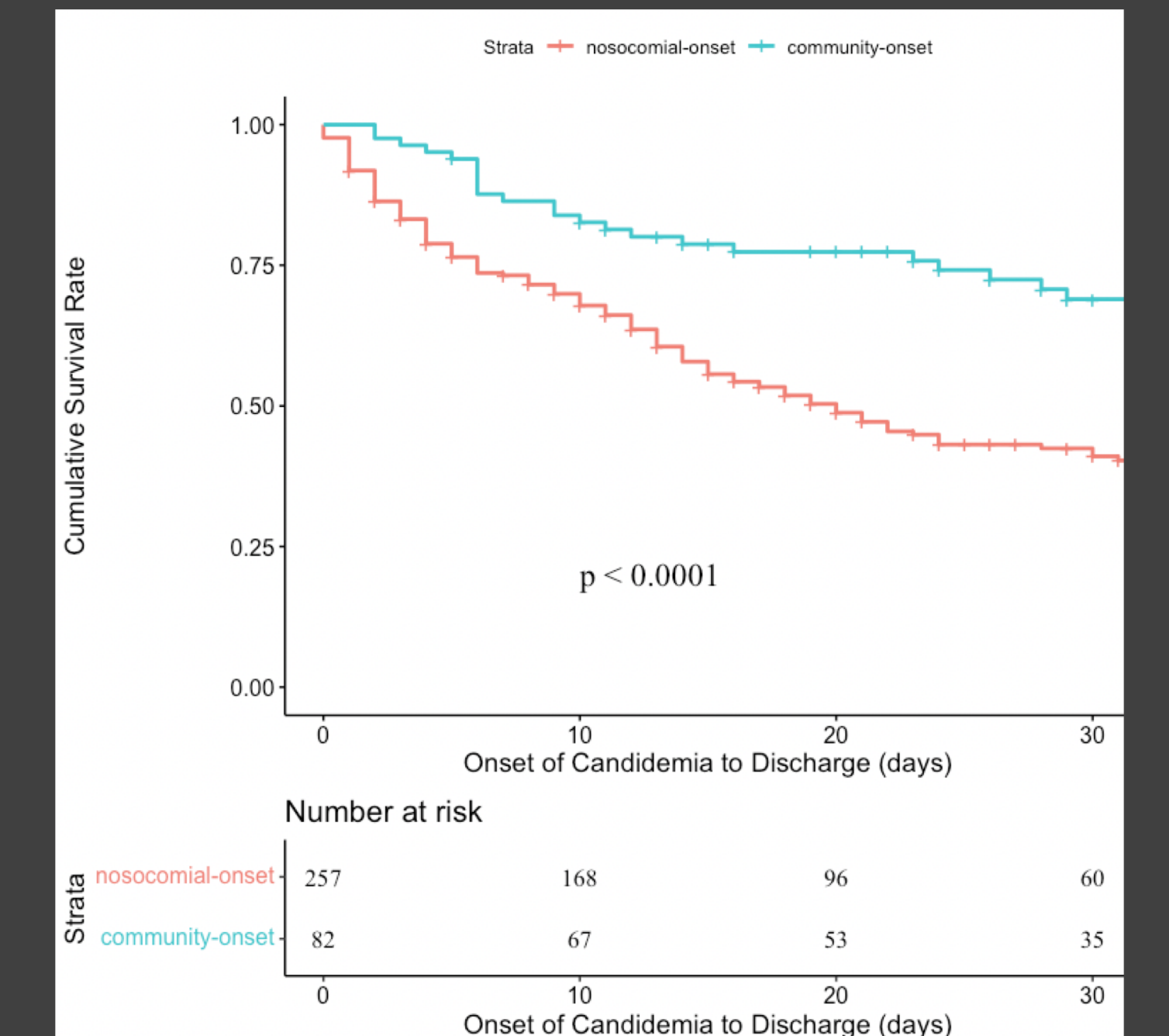
Figure 2. Survival curves analysis between community-onset candidemia and nosocomial candidemia.
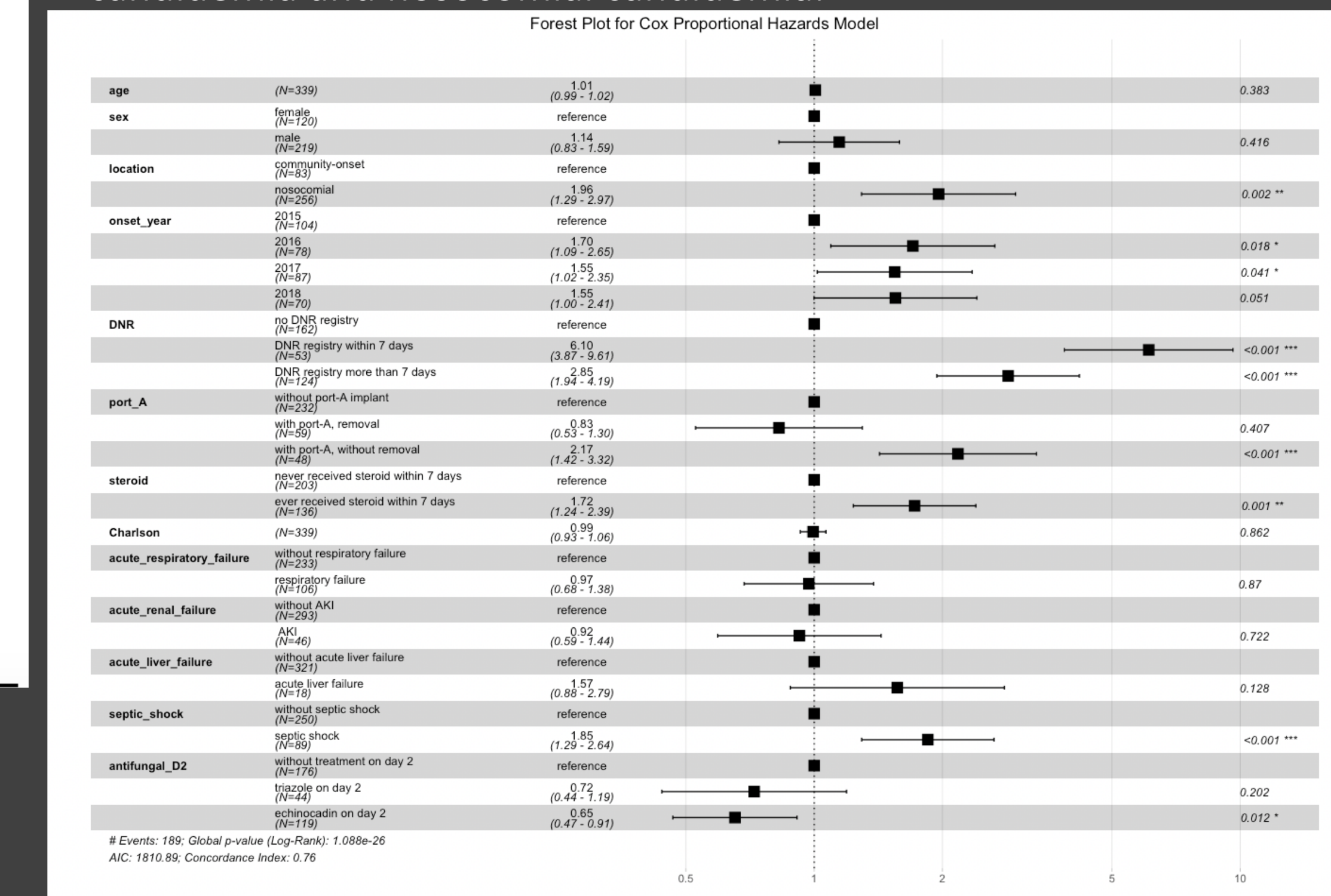

Figure 3. Forest Plot of Cox Proportional-Hazards model

A total of 339 patients were included for analysis. The incidence was 1.50 per 1000 admission person-years. The mean of the Charlson comorbidity index was 5.6. The characteristics of patients with candidemia were similar in both groups except for age, the status of port-A, glucocorticoid usage, and DM. The all-cause mortality rate was 55.75%. Multivariate Cox proportional-hazards models showed that patients with community-onset candidemia had a better outcome. However, glucocorticoids within seven days before candidemia, septic shock were associated with poor outcome

Conclusion

In conclusion, candidemia is a life-threatening infectious disease. Patients with community-onset candidemia showed a better outcome than those with nosocomial candidemia. Early initiation of antifungal therapy should be considered to reduce the risk of mortality.