



The Importance of Scoring Systems in Patients with Candidemia

Barış Ertunç¹, Gürdal Yılmaz², İftihar Köksal²

¹Alaşehir Public Hospital Department of Infectious Diseases and Clinical Microbiology, Manisa, Turkey

²Karadeniz Technical University Medical Faculty Department of Infectious Diseases and Clinical Microbiology, Trabzon, Turkey



OBJECTIVES

- For reasons such as the increasing need for both broad spectrum antibiotic use and total parenteral nutrition and the prolongation of life spans of patients with malignancies, candidemias are becoming a growing problem.
- The fact that, despite all technological advances, *Candida* spp. are seen in 50% of blood cultures shows that the problem is more serious than expected.
- The purpose of our study was to evaluate patients with candidemia and determine the importance of scoring systems.

METHODS

- Patients with *Candida* spp. growth in blood cultures at the Karadeniz Technical University Medical Faculty Hospital between January 2009 and December 2014 were investigated retrospectively.
- Patients' demographic and clinical characteristics, laboratory results, time to start of appropriate treatment, Charlson comorbidity index (CCI), SOFA and Pitt scores and prognoses were recorded from medical files and infection control committee records.
- The data obtained were analyzed on SPP 13 software. $P < 0.05$ was set as significance threshold. Measurable values were expressed as mean \pm standard deviation or mean (percentage quartile).

RESULTS

- 115 patients were enrolled. Mean age of patients was 53.4 ± 22.2 , and 52.2% were male. Candidemia developed in 15 (8-28) days, and patients were hospitalized for observation for 33 (23-46) days.
- Mean CCI score was 4.2 ± 2.2 , mean SOFA score was 7.4 ± 4.1 and mean Pitt score was 4.8 ± 3.2 . The most common risk factors were long-term hospitalization, antibiotic use, presence of central venous catheter, receipt of total parenteral nutrition and being in the intensive care unit.
- Agents were *Candida albicans* in 41.7%, *Candida guilliermondii* in 20%, *Candida parapsilosis* in 17.4% and other non-*Candida* spp. in 20.9%.
- The crude mortality rate in the patients enrolled in the study was 65.2%. CCI, SOFA and Pitt scores were significantly high in the non-surviving patients (Table 1).
- Ten of the non-surviving patients were not started on antifungal therapy, 32 patients were started on appropriate antifungal therapy after 3 days and 8 of the surviving patients were started on appropriate antifungal therapy after 3 days ($p=0.026$).
- Multivariate analysis of the risk factors affecting mortality showed that a 1-unit increase in a patient's CCI, SOFA and Pitt scores increased mortality 1.6-, 1.3- and 2.0-fold, respectively, and that failure to start appropriate antifungal therapy in the first 3 days increased mortality 4.6-fold (Table 2).
- A CCI score above 4, a SOFA score above 7 and a Pitt score above 3 predict mortality in patients with candidemia with high specificity and sensitivity (Table 3).

Table 1: Patients' epidemiological characteristics, risk factors and mean scoring values

	Non-surviving	Surviving	OR	P
	75 (65.2%)	40 (34.8%)		
Age	58.2 ± 21.5	44.6 ± 20.9		0.002
Charlson comorbidity index	4.7 ± 2.1	3.2 ± 1.9		0.001
SOFA	9.4 ± 3.3	3.6 ± 2.4		<0.001
Pitt	6.3 ± 2.8	2.0 ± 1.6		<0.001
Sex (Male/Female)	40/35 (53.3/46.7%)	20/20 (50/50%)	1.14	0.733
History of surgery	22 (29.3%)	22 (55%)	0.34	0.007
TPN	67 (89.3%)	23 (57.5%)	6.19	0.000
Stay in ICU	55 (73.3%)	19 (47.5%)	3.04	0.006
DM	21 (28%)	7 (17.5%)	1.83	0.307
Renal insufficiency	23 (30.7%)	8 (20%)	1.77	0.313
Immunosuppressive	31 (41.3%)	11 (27.5%)	1.86	0.142
Malignancy	24 (32%)	13 (32.5%)	0.98	0.956
Trauma	15 (20%)	11 (27.5%)	0.66	0.360
Antibiotic use	75 (100%)	40 (100%)		-
Central venous catheter	71 (94.7%)	34 (85%)	3.13	0.093
Not starting appropriate treatment in the first 3 days	32 (42.7%)	8 (20%)	2.98	0.026

Table 3: Scoring systems' power to predict mortality in patients with Candidemia

	Cut-off	p	AUC	Sensitivity (%)	Specificity (%)	NPV (%)	PPV (%)
Charlson comorbidity index	>4	0.001	0.686	46.7	80.0	44.4	81.4
SOFA score	>7	<0.001	0.918	73.3	95.0	65.5	96.5
Pitt score	>3	<0.001	0.910	84.0	82.5	73.3	90.0

AUC: Area under the curve; NPV: Negative predictive value; PPV: Positive predictive value

Table 2: Multivariate analysis of risk factors affecting mortality

	P	OR	95%CI
CCI	0.009	1.64	1.13-2.37
SOFA	0.033	1.34	1.02-1.76
Pitt	0.002	2.04	1.30-3.19
Failure to start appropriate treatment in the first 3 days	0.048	4.56	1.01-20.53

CONCLUSION

- Difficulties are still experienced in determining candidemias despite all the advances in today's culture technology. Growth generally occurs after 3 days, leading to delays in treatment and increased mortality rates.
- Greater care is therefore required in the evaluation of at-risk patients in particular.
- At such evaluation, the use of CCI, SOFA and Pitt scoring systems in patients with risk factors and prompt initiation of antifungal therapy in patients with scores above cut-off values can be life-saving.