

Original Research Article

## **The Incidence of Invasive Candidiasis and the Risk Factors at the Patients of ICU at University Hospital Center “Mother Teresa” Tirana, Albania**

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### **ABSTRACT**

**Objective of the study:** To analyze the incidence of invasive candidiasis at the patients of ICU and to associate this incidence with the risk factors that favor this infection.

**The material and methods:** The study was conducted at the hospitalized patients of ICU at the University Hospital Center “Mother Teresa” Tirana. There were selected patients that had over 3 days of hospitalization, with central venous catheter, that had been taking antibiotics with wide specter of action, with neutropenia, kidney’s diseases or hemodialysis, diabetes, carcinoma, intubated and with parental nutrition, with high fever even though they were treated with antibiotics. From the patients were taken these samples: blood for blood culture, serum, endotracheal secretion, aspire branching, urine, swab from mouth. The identification of fungus was made by several standard criteria. The statistical analysis was made by using the Fisher’s and Chi-square test from Statistical Package for the Social Sciences (SPSS) software version 20.

**Results:** At the study were included 264 patients. From them 14.77% (39) resulted with candidemia. By the examination of other samples resulted: candida in urine resulted positive at 15.3%. From the mouth cultures 38.6% resulted with oral candidiasis, from the endotracheal aspire 6.1%, from the bronchial aspire 5.7%. From blood cultures resulted: *Candida albicans* 48.71 %, *Candida parapsilosis* 20.5%, *Candida tropicalis* 15.38 %, *Candida glabrata* 10.25% and *Candida krusei* 5.1 %.

**Conclusion:** The invasive fungal infections at ICU are linked with high morbidity and mortality even at optimal conditions of treatment, so delays in diagnosis and treatment can influence at the patient, risking his life.

**Keywords:** Candidiasis, Patients, ICU, non albicans *Candida*, Candidemia.

### **INTRODUCTIONS**

The fungal infections nowadays are becoming a huge problem. Invasive fungal infections caused by candida are one of the most important causes of nosocomial infections (8%). The advances at medicine, technology, invasive procedure, treatment with wide specter antibiotics have resulted to increased fungal infections. [1,2] These infections are one of the causes of the high cost of medical care in ICU because both their investigation and therapeutic treatment

have a high cost. The aim of the study is to determine the incidence of invasive candidiasis and its connection with risk factors for invasive fungal infections.

### **MATERIALS AND METHODS**

The study was conducted at the period of March 2012- June 2014 at the hospitalized patients of ICU.

We selected patients with these risk factors: patients that had over 3 days of hospitalization, with central venous catheter,

that had been taking antibiotics with wide specter of action, neutropenia, kidney's diseases or hemodialysis, diabetes, carcinoma, surgical intervention especially at the gastrointestinal tract, colonized with *Candida* spp, pancreatitis, intubated and with parental nutrition, high fever even though they were treated with antibiotics, and with urinary catheter. [3,4]

The age group selected was over 18 years old. For each patient there was formulated a cartel, where it was documented information, the day of hospitalization and discharge, acceptance and final diagnosis, therapy and the presence of risk factors. From the patients were taken these samples: 10 ml blood for blood culture, serum, endotracheal secretion, aspire branching, urine, swab from mouth. The samples were cultivated at Dextrose Sabouraudagar with chloramphenicol at the temperature 37°C up to 72 hours and at Brajan Hart Infuzbrouth. *Candida* species were identified using Integral System Yeasts *Plus* (Liofilchem). The system uses a panel of 24 wells inoculated with a cell suspension with 0, 5 MF density and incubated for 48 hours at the temperature of 37°C.

Candidemia was determined with at least one positive blood culture, while candida in urine was defined positive when

the number of yeast in culture was more than 100 000 cfu/ml.

The statistic analysis was made using the Fisher's and Chi-square test from Statistical Package for the Social Sciences (SPSS) software version 20. The value of P was calculated for all risk factors and it was considered significant when  $P < 0.05$ .

## RESULTS

At the study were included 264 patients. 19.7 % of them were with diabetes, 15.2 % were with carcinoma, 12.11 % with pancreatitis and cholecystitis, 6.4% with renal insufficiency 58 % were intubated, 34.8 % with parenteral treatment and 6.1 % with sepsis conditions. From all the patients 39 (14.77%) resulted with candidemia.

Antibiotics were used at all the patients and the value of P was not significant  $P=0.2$ . The values of P were significant  $P<0.05$  for all patients that had a central catheter, diabetic, with parenteral nutrition, respiratory insufficiency, endotracheal intubation and sepsis condition (tab.1). The patients with cancer, pancreatitis, renal insufficiency status post operator had a value of P respectively  $P=0.15$ ,  $P=0.4$ ,  $P=0.7$  and  $P=0.8$ , so these factors did not resulted significant in candidemia.

**Table no 1: The risk factors at the patients with candidemia**

Risk factors	Total of Patients	Positive culture	$\chi^2_{(df)}$	Value of P
	n = 264 n (%)	n =39 n (%)		
Central venous catheter	203 (76.9)	19 (48.7)	12.3 (1)	0.0004
Antibiotics with wide specter	264 (100.0)	39 (100.0)		0.2*
Diabetes	42 (19.7)	12 (30.8)	4.1 (1)	0.04
Carcinoma	40 (15.2)	10 (25.6)	2.0 (1)	0.15
Parental nutrition	92 (34.8)	21 (53.8)	4.4 (1)	0.03
Pancreatitis and Cholecystitis	32 (12.1)	7 (17.9)	0.5 (1)	0.4
Kidneys' insufficiency	17 (6.4)	3 (7.7)		0.7*
Respiratory insufficiency	83 (31.4)	6 (15.4)		0.04*
Sepsis and septic shock	16 (6.1)	11 (28.2)	17.8 (1)	<0.0001
Endotracheal intubated	153 (58.0)	32 (82.1)	7.3 (1)	0.006
Status post operator	33 (12.5)	6 (15.4)	0.06 (1)	0.8

\*Fisher's exact test

*Candida* in urine was positive in 15.3% of patients, oral candidiasis in 38.6 %, endotracheal aspire in 6.1 %, and bronchial aspire in 5.7%.

At all blood cultures were made the identification of the *Candida* species:

*Candida albicans* was isolated with 48.71 %, *Candida parapsilosis* 20.5 %, *Candida tropicalis* 15.38 %, *Candida glabrata* 10.25 % and *Candida krusei* 5.1 %.

It was noticed that *Candida albicans* was more isolated at diabetic patients in 8

cases, *Candida tropicalis* at the patients with carcinoma in 4 cases and *Candida parapsilosis* at patients with sepsis and respiratory insufficiency in 2 cases.

42 % of the patients resulted with fungal colonization. The colonization of mycosis with candida was linked with invasive candidiasis. 89.3 % of the patients with candidemia resulted positive with candida in urine, mouth and bronchial aspire. Mortality at the patients with candidemia was 82 % (32/39).

## DISCUSSION

At the hospitalized patients candidemia has become a frequent and dangerous infection because it can lead the patient toward death. *Candida* normally colonizes the skin and the mycosis of the respiratory, gastrointestinal and urogenital tract without causing any problem.

At the immunocompromised patients that have risk factors for invasive infections, candida enters the blood stream through a central venous catheter, during surgical intervention, from the hands of the medical personnel. [5] The yeast may infect the blood, the heart, the brain, the eyes, the bones, and other parts of the body.

The study showed the importance of Candidemia at diabetic patients. 30.8 % of the patients with diabetes resulted with Candidemia. *Candida albicans* was isolated more often of them. *Candida* is strongly related with diabetes. The high levels of sugar in blood serve as a favorable medium for the growth of the yeast. [6]

*Candida tropicalis* was isolated more often at the patients with cancer. It was less virulent than candida albicans as a commensal microorganism. This yeast may be carried for a long period of time in an asymptomatic form. The patients that have a damaged immune system are more sensible than healthy patients. Such an incidence is reported from Harris at al. [7]

In an Italian study 40% of the candidemia episodes were due to *C. albicans*, followed by *C. parapsilosis* (23%),

*C. glabrata* (15%), *C. tropicalis* (9%) and other species (13%). [8]

In a surveillance study in USA, candida was ranked forth as the cause of hospital infections. The highest percentage of isolation was found at ICU. The incidence of candida was 9.82% in 1000 cases. 48 % of the species were *Candida albicans*. The mortality rate due to candidemia was up to 41 %. [9]

In a prospective national study conducted in 180 in France ICUs, *C. albicans* accounted for 57% of blood isolates followed by *C. glabrata* (16.7%), *C. parapsilosis* (7.5%), *C. krusei* (5.2%) and *C. tropicalis* (4.9%). [10]

At another study in the UK in 6 hospitals for a period of 2 years the incidence of candidemia was determined with 18.7%. 45% were from ICU and *Candida albicans* was more often isolated with 65 %. [11]

*Candida albicans* has been the most usual isolated specie from the clinical samples, but now days have happened a change in the distribution of species. It has been observed a growth in the number of non albicans *Candida*. In our study non albicans *Candida* was isolated with (51.29%) in comparison with *Candida albicans* with (48.71%). That is also been shown in the studies of the other authors. [12]

From non albicans *Candida* is been observed that *Candida glabrata* was more prevalent in some hospital in USA. In India *Candida tropicalis* is ranked first from the group of non albicans *Candida*. In our study *Candida parapsilosis* was more frequent (40%). [13]

Now candida is known as a cause of morbidity and mortality at patients of ICU. The index varies between studies, the most of the authors have report a high percentage. It is very difficult to differentiate the mortality that attributed to candidemia and the mortality connected with the base disease. If candidemia is manifested with sepsis, mortality is related with it. It is necessary that diagnosis to be confirmed

with other histological examinations after autopsy. [14]

## CONCLUSION

Invasive fungal infections at ICU are linked with high morbidity and mortality even at the most optimal conditions of treatment. It's important to know what the risk factors are. It is recommended an immediate diagnosis of the proved infections, followed by an antifungal therapy and antifungal prophylaxis according to the standard protocols. The delays in diagnosis and treatment can affect the patient, risking his life.

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