

Candiduria in Renal Transplant Recipients

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ABSTRACT

Introduction: The incidence of candiduria has increased significantly in recent years. A prospective study was carried out from January 1, 2017 to June 31, 2017 in the nephrology department at the Batna University Hospital, the aim of which is to determine the incidence of candiduria.

Method: A total of 35 patients were included in our study, eight of them (22.85%) developed candiduria during their hospitalization. The majority of patients were women. The age group between 40-60 years was the most representative. Several risk factors were sought, the most frequently found were: immunosuppressive treatment, corticosteroid therapy and broad-spectrum antibiotic therapy. *Candida albicans* was the most isolated species (62.5%).

Results: This study demonstrated the role of candiduria as a potential risk factor for systemic infection (candidemia), three cases of candidemia were diagnosed in patients with high candiduria. The death rate in our study was (37, 5%), they all had candidemia.

Conclusion: Candiduria can be associated with high morbidity and mortality. It is a major risk factor for systemic infections. Early post-transplantation screening is therefore essential.

Keywords: Candiduria; Renal transplant recipients; Candidemia; *Candida albicans*

INTRODUCTION

Solid organ transplantation has been established as a treatment for patients with end stage kidney disease. This procedure is the picture that reflects the advances in medicine after the first successful kidney transplant between identical twins in hospital Peter Bent Brigham in Boston on December 23, 1954 [1]. In 2013 it represented 60% of all solid organ transplants in the United States [2]. In fact it is considered a regular practice of nephrology and the treatment of choice, as it improves not only the quality of life of patients, but also their quantity of life [3]. In the last ten years immunosuppressive therapy has evolved a lot and become more specific which has reduced the possibility of transplant rejection, but this does not prevent the occurrence of infectious episodes. Induced immunosuppression predominates over specific cellular immunity and to a lesser extent over humoral immunity, and is thus particularly likely to directly promote the occurrence of certain infectious complications, in particular viral and bacterial, but also to opportunistic microorganisms of the fungal type and parasitic [4]. These infectious complications could negatively affect the clinical prognosis [5]. They remain a major cause of morbidity and mortality in this group of patients despite improved surgical techniques, antimicrobial prophylaxis, new immunosuppressive

therapy regimens and hygiene measures. *Candida* urinary tract infections are not as frequent compared to bacterial or viral infections in renal transplant recipients (with a percentage of 2%) [6]. The yeasts of the *Candida* genus are commensals of the digestive, vaginal and skin mucous membranes in healthy subjects, but can become opportunistic by taking advantage of a state of weakness, temporary or prolonged vulnerability of the host, to implant themselves and express its pathogenic power, and caused candidiasis which are varied from superficial to systemic forms. The distinction between colonization and infection is often difficult to establish.

The aim of this study is to establish the epidemiological profile of candiduria in renal transplant patients hospitalized in the nephrology service at the University Hospital Center of Batna, to know the *Candida* species the most incriminated and to search for the various risk factors involved.

PATIENTS AND METHODS

This is a prospective study spread over a 6-month period from January 1, 2017 to June 31, 2017, involving 35 renal transplant patients hospitalized in the nephrology department at Batna-Algeria University Hospital. The main objective of this study

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Received: March 12, 2021; Accepted: March 27, 2021; Published: April 03, 2021

Citation: Hamouda O, Fendri AH (2021) Candiduria in Renal Transplant Recipients. J Kidney 7:216. doi-10.35248/2472-1220.21.7.216.

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was to assess the incidence of candiduria in renal transplant recipients and to determine the role of candiduria as a risk factor for systemic candidiasis. The data were collected prospectively in real time using a standardized information sheet. As with any biological examination, the quality of the mycological analyzes requires mastery of the pre-analytical phase which includes taking the sample and sending it to the laboratory. The urine collection technique involved several steps:

- Careful hand washing with a mild antiseptic.
- Disinfection of the vulva in women and of the urethral meatus in men with an antiseptic.
- Then collect urine in the middle of the stream in a sterile 10cc swab.
- Immediate transport to the Parasitology -Mycology laboratory.
- In the laboratory, the urine is centrifuged at 3000 /5 minutes. The urine was then homogenized using a vortex type shaker. The contents are ready for direct examination and culture performed on solid Sabouraud-chloramphenicol inclined media in 10 cc tubes.
- The cultures were then incubated in the oven at 37 ° C for 24 to 48 hours.
- The identification of the different *Candida* species was carried out by blastesis and chlamydo sporulation tests positive for the species *Candida albicans* and by using the Api Candida gallery of biomérieux based on the assimilation of sugars and enzymatic tests.
- A yeast count was performed using a Malassez cell to determine the concentration of yeast in each urine sample.

RESULTS

Epidemiological data

- The study population consisted of 35 patients who had undergone a renal transplant and hospitalized in the nephrology department at Batna-Algeria University Hospital, including 8 patients (22.85%) presented with candiduria (Figure 1).
- All patients with candiduria (08 patients) were women (100%).
- The age group between (40-59), was the most representative 4/8 (50%) (Figure 2).
- The reasons for hospitalization of transplant patients with candiduria are different: Transplant rejection was the most frequent reason for hospitalization, 4/8 (50%) patients, followed by 2/8 (25%) sepsis (Figure 3).
- The main risk factors found in our patients were the immunosuppressive and corticosteroid treatments found in all patients to avoid graft rejection, followed by broad-spectrum and prolonged antibiotic therapy which is present in 75% of patients.
- The other risk factors are detailed in (Figure 4)
- We performed a blood culture for each patient, they were positive for three patients.

Mycological data

- After the identification of the *Candida* species in the different urine cultures, we noticed the predominance of the species

Candida albicans 5/8 (62.5%) (Figure 5).

- The association of candiduria with bacterial infection was found in 5/8 (62.5%). Different germs have been isolated: *Escherichia coli*, *Pseudomonas aeruginosa*, *Staphylococcus aureus*, *Klebsiella* 3/5 (37.5%) of patients had isolated candiduria.
- The quantification of the yeasts for the 8 transplanted patients demonstrated a significant number of yeasts in the majority of cases (75%) with a number ≥ 105 CFU / ml. as well as a significant increase depending on the length of hospitalization.
- Three cases of candidemia were diagnosed in patients with high candiduria.
- The death rate in our study was 3/8 (37, 5%), they all had candidemia (Figure 6).

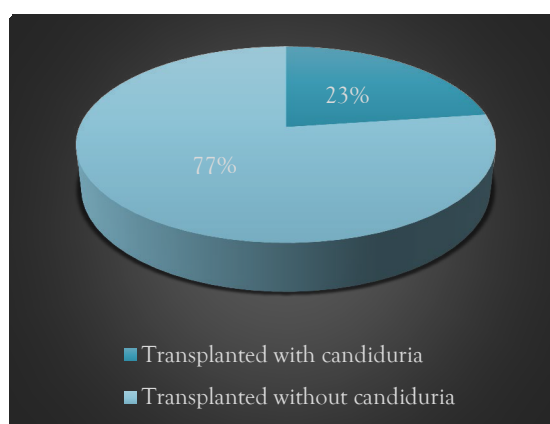


Figure 1: General distribution of patients.

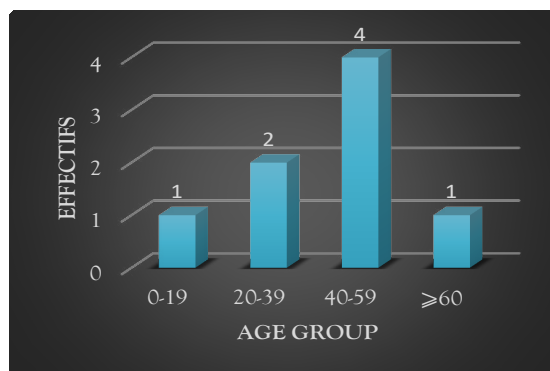


Figure 2: Distribution of patients by age group.

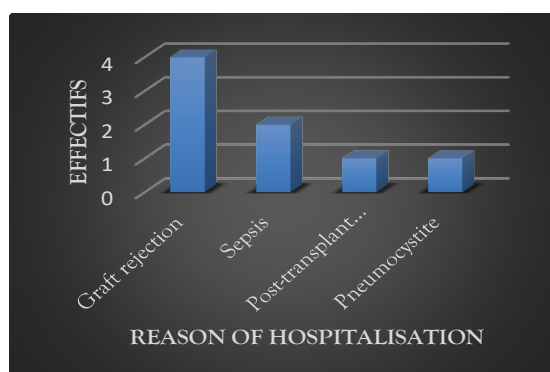


Figure 3: The Different Reasons for Hospitalization.

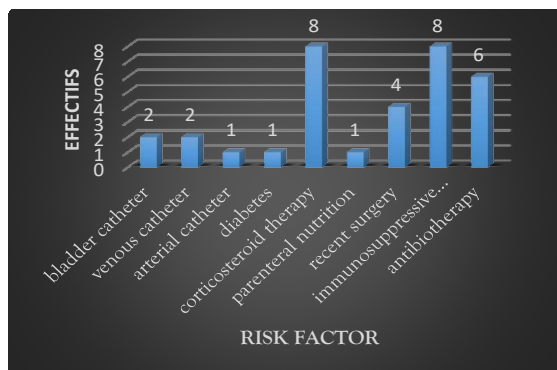


Figure 4: Distribution of the different risk factors.

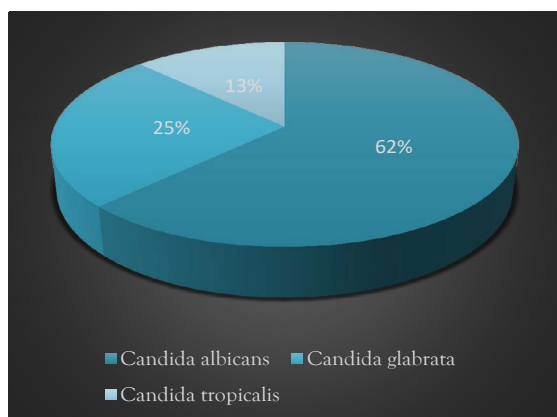


Figure 5: Total distribution of isolated species.

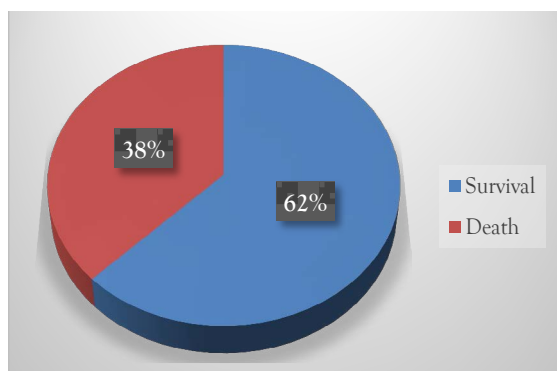


Figure 6: Global evolution of patients with candiduria.

DISCUSSION

In our study the prevalence of candiduria was (22.85%). In comparison with a study done at the University of Wisconsin, the rate of candiduria was (11%) in renal transplant recipients [7]. In the present study, candiduria affected only women, which is not the case in other studies which have shown that candiduria also affects men [8]. The female predominance can be explained by the fact that the urinary tracts are shorter, germs can enter and spread more easily, thus *Candida* saprophytic from the vagina which facilitates infections by contiguity. In our study, the age of renal transplant patients with candiduria was in the age range of 40 - 60 years. Studies have not shown a significant relationship between age and the occurrence of candiduria in hospitalized renal transplant patients. In our study (62.5%) of patients presented an association of a bacterial urinary tract infection with candiduria, with a high frequency of the *Eschirechia coli* germs, while (37.5%)

suffered from an isolated *Candida sp* infection. Delgado et al found an association of all diagnosed candiduria cases with bacterial infection [9]. Safdar et al, found an association with bacterial infections in 40% of cases of candiduria [7]. All transplant patients undergo heavy immunosuppressive therapy to prevent all transplant rejection, which leads to immune system failure and is considered a first degree risk factor. Broad-spectrum antibiotic therapy is a risk factor found in (75%) of our patients. The majority of studies have shown the influence of antibiotic therapy on the occurrence of candiduria through an imbalance of intestinal and vaginal flora in women. Candiduria can be associated with care equipment (urinary catheter, central venous catheter, mechanical ventilation, etc.). Richards et al, have shown that the frequency of candida urinary tract infection in patients who have a central venous catheter is more reduced by intake in patients who do not (40% vs. 22%) [10]. In our study, the majority of patients (75%) had urinary symptoms and 25% were asymptomatic. Yazdani et al, found that (68%) of patients with candiduria were asymptomatic [8].

Three patients (37.5%) had confirmed candidemia with positive blood cultures. This rate is quite significant when compared with other studies [7, 8]. This discrepancy may be due to differences in the severity of the underlying diseases, the high degree of immunosuppression in our study population, the use of invasive devices, and the presence of urologic abnormalities. It has been noticed that cases of candida have been diagnosed in patients with a high density of candida in the urine, which proves the role of candiduria as a risk factor for systemic candidiasis.

Candida albicans was the most frequently isolated species (62.5%), which is consistent with the majority of studies. The emergence of *non-albicans* species in some studies [8, 11] such as *Candida glabrata* in connection with the increasing use of Fluconazole in the curative and preventive treatments of candidiasis.

After carrying out a numbering of the yeasts, it was observed that the number of yeasts increases according to the length of hospitalization. This is explained by the fact that *Candida* infections are mainly nosocomial and in the majority of cases linked to the multiple manipulation of the care equipment (probe, catheter, etc.). In the present study cultures with $\geq 10^5$ CFU / mL are found in (75%) of cases (Table 1). In another study, only (32%) of cases had this high density of yeasts. This study demonstrated the role of candiduria as a potential risk factor for systemic infection (candidemia), three cases of candidemia were diagnosed in patients with high candiduria. The death rate in our study was (37, 5%), they all had candidemia.

Table 1: The number of yeasts/ml according to the length of hospitalization.

The length of hospitalization (days)	Number of yeasts/ml
10	10^4
20	3×10^5
30	25×10^6
40	42×10^6
50	66×10^6
60	80×10^6
70	92×10^6
80	112×10^6

CONCLUSION

In renal transplant recipients, candiduria is associated with morbidity and high mortality. It is essential to take into account post-transplantation mycological monitoring in these patients. Throughout this work we have tried to determine the epidemiological profile, incidence of candiduria, analysis of risk factors, as well as mycological data. The early diagnosis of candiduria as well as the identification of the species involved allows for better and well-adapted therapeutic management. Overall and despite the limitations imposed by the relatively small number of patients, this study provided a general description of candiduria and its risk factors in renal transplant recipients. Finally, it is necessary to strengthen hospital hygiene measures and to respect rigorous aseptic measures during catheterization, and the ablation of indwelling bladder catheters. It is also necessary to continuously sensitize the populations on the danger of the uncontrolled use of antibiotics.

Declaration of interest

The authors declare that they have no conflict of interest directly or indirectly related to this article.

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