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Various Specialist Approaches for the Management of Candiduria: A Questionnaire Study

Kandidüriye Farklı Uzmanların Yaklaşımı: Bir Anket Çalışması

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SUMMARY

Various Specialist Approaches for the Management of Candiduria: A Questionnaire Study

Introduction: *Management of candiduria remains controversial, mainly due to uncertainties of clinicians about diagnosis and treatment. In this study, we aimed to investigate diagnostic and therapeutic approaches of different specialists for candiduria.*

Materials and Methods: *An interview survey composed of 10 questions on candiduria was applied interactively to 429 randomly selected clinicians in six different tertiary care hospitals. We compared the answers of infectious diseases (ID) specialists with the others. Data were evaluated by Statistical package for Social Sciences version 11. In Independent samples, t-test and chi square test were performed for data analysis.*

Results: *Out of the 429 participants, 91 (21.2%) were ID and 338 (78.8%) were specialists from other fields. For asymptomatic patients with candiduria, 213 (49.6%) participants stated that a second culture was required. Compared to others, a higher number of ID specialists [76 (83.5%)] asked for a second culture. It was determined that ID specialists joining this study, whose mean length of experience after specialization was longer than the others, encountered a significantly higher number of candiduria cases and referred current guidelines to use frequently compared to others.*

Conclusion: *Clinicians can treat candiduria largely, but have difficulty in diagnosing. The fact that only 49.6% of all specialists included into the study order a second urine culture test shows that without differentiating colonization and contamination, half of them start therapies, which are likely to be unnecessary.*

Key Words: *Urinary infection; Questionnaire study; Candiduria management*

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ÖZET

Kandidüriye Farklı Uzmanların Yaklaşımı: Bir Anket Çalışması

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Giriş: *Kandidüri yönetimi klinisyenlerin tanı ve tedavisi hakkındaki tereddütleri nedeniyle tartışmalıdır. Bu çalışmada farklı uzmanlık alanlarından hekimlerin kandidüri için tanı ve tedavi yaklaşımlarını araştırmayı amaçladık.*

Materyal ve Metod: *Altı farklı üçüncü basamak hastanede randomize seçilen 429 klinisyene, interaktif olarak kandidüri hakkında 10 sorudan oluşan anket uygulandı. İnfeksiyon hastalıkları uzmanları ile diğer uzmanların cevapları karşılaştırıldı. Veriler Statiscial Package for Social Sciences (SPSS 11.0) paket programı kullanılarak analiz edildi. İstatistiksel analiz için bağımsız gruplarda t testi ve ki-kare testi kullanıldı.*

Bulgular: *Toplam 429 katılımcının 91 (%21.2)'i infeksiyon hastalıkları uzmanı, 388 (%78.8)'i diğer alanlardandı. Asemptomatik kandidürili hastada, 213 (%49.6) katılımcı ikinci bir idrar kültürü istediğini belirtti. Diğer uzmanlarla karşılaştırıldığında, infeksiyon hastalıkları uzmanları daha fazla oranda [76 (% 83.5)] ikinci kültürü önerdiler. Çalışmaya katılan infeksiyon hastalıkları uzmanlarının uzmanlık sürelerinin diğer uzmanlara göre daha uzun olduğu, daha fazla sayıda kandidüri olgusu izledikleri ve güncel kılavuzları daha fazla kullandıkları saptandı.*

Sonuç: *Klinisyenler kandidüriyi fazlasıyla tedavi edebilmekle birlikte, tanıda zorluklar yaşamaktadırlar. Çalışmaya katılan bütün uzmanların yalnızca %49.6'sının ikinci bir idrar kültürü istediği gerçeği, uzmanların yaklaşık yarısının kolonizasyon ve kontaminasyonu dışlamaksızın olasılıkla gereksiz yere tedavi başladığını göstermektedir.*

Anahtar Kelimeler: *İdrar yolu infeksiyonu; Anket çalışması; Kandidüri yönetimi*

INTRODUCTION

Urinary symptoms, pyuria and growth in urine culture are essential in the definitive diagnosis of urinary infections. Although most infections are of bacterial origin, the prevalence of causative fungi detected in urine cultures has been reported as 12% in the literature[1]. Among these causative agents, the most commonly detected one is *Candida*, followed by *Aspergillus* and *Cryptococcus*[1,2]. However, regardless of the causative agent, growth confirmed by a single urinary culture test is not enough for the definitive diagnosis of asymptomatic urinary infections, which is because there are no recognized standards to be used in the diagnosis of urinary system infections caused by fungi. Candiduria may be the indicator of contamination, perineal colonization, upper urinary system infection, and disseminated candidiasis[3-5]. When clinicians detect bacterial pathogens in urine culture, they do not have difficulty in choosing an appropriate antibiotic for the treatment. However, they frequently have reservations about starting a treatment. Due to the particular increase in the number of immunosuppressive cases in recent years, the prolonged duration of life owing to transplantation, the increase in the number of intensive care units and recent technical advancements; clinicians encounter patients with candiduria more often, which, in turn diversifies their approaches to the management of these patients[6-8]. Thus, we aimed to prepare a questionnaire study and determine the differences between clinicians from different specialization fields in terms of their diagnostic and therapeutic approaches to patients with candiduria and their compliance to guidelines regarding candiduria.

MATERIALS and METHODS

Since there is no questionnaire study on the subject, a questionnaire form based on the guidelines regarding candiduria was prepared by our West Anatolian Fungus Study Group. As a

pilot study, the reliability of questionnaire was tested by administering it to eighteen people. Changing the questions of this pre-questionnaire was not deemed necessary. We divided the questions into two parts. The questions in the first part addressed the demographic characteristics and the specialization fields of the participants, the length of experience in their specialization fields, the yearly number of candiduria cases they encounter, whether they keep up with up-to-date guidelines about *Candida*, whether they instruct a patient to receive a second culture test if *Candida* is identified in the patient's urine culture, and what they recommend in case that they do not order a second urine culture test (Table 1). Since *Candida* guidelines recommend that a repeat culture should be obtained if *Candida* grows in the urine culture for the first time, the second part of the questionnaire was administered only to the participants who mentioned that they always order a second culture test. In doing so, the aim was to query the therapeutic approach of the clinicians who make right diagnoses. Accordingly, the second part of the questionnaire was not administered to the participants who did not order a second urine culture test. The second part consisted of six questions about diagnostic and therapeutic approaches. These questions addressed whether the urinary catheter is changed if a patient with candiduria already has one, the approaches of the clinicians to asymptomatic, high-risk patients, whether the clinicians seek another fungal infection focus in another part of the body, which antifungal treatment option the clinicians prefer in neutropenic and non-neutropenic patients, and whether they use alternative treatment methods (such as bladder irrigation). The questionnaires were administered through face-to-face interviews by our group members. On average, each interview lasted for 10 to 15 minutes.

The data on ID specialists were also compared with the data on the specialists from other fields (internal medicine, surgery and intensive care). Differences between the independent groups were analyzed using t-test and chi-square test.

RESULTS

A questionnaire study composed of 10 questions on candiduria was applied interactively to 429 clinicians over a period of three months. Based on their specialization fields, the participants were assigned into four groups. These groups consisted of infectious diseases and clinical microbiology specialists, specialists in surgical sciences (general surgeons, urologists, orthopedists, cardiac surgeons, etc.), specialists in internal medicine (general internal medicine specialists, thoracic medicine specialists, hematologists, nephrologists, gastroenterologists, etc.), and intensive care specialists. The data on each specialization field are presented in Table 2. Of the 429 participants, 91 (21.2%) were ID specialists and 338 (78.8%) were specialists from other fields (213 internists, 98 surgeons and 27 intensivists). 242 participants (56.4%) were male, 187 (43.6%) were female. Mean age was 34.58 ± 8.56 (24-63) years. The length of experience in the specialization field was significantly higher among

Table 1. A questionnaire form

No	Questionnaire
1	About how many patients do you examine with candiduria a year?
2	How many patients did you examine with candiduria in the past month?
3	Can you follow the guidelines regarding candiduria?
4	Which/what do you apply on the patients with candiduria growth in urine culture?
5	Which/what do you apply to asymptomatic patients with candiduria growth in the second urine culture?
6	Do you replace the urinary catheter in patients?
7	Do you investigate another fungal infectious focus in patients with candiduria?
8	What is your choice as first line antifungal agent in neutropenic patients with candiduria?
9	What is your choice as first line antifungal agent in non-neutropenic patients with candiduria?

Table 2. Approach to Candiduria according to different professional fields

Specialist (n)	Ordering a second urine culture test n (%)			Total n (%)
	No n (%)	Yes		
		I start a therapy without waiting for the second culture result	I start a therapy according to the second culture result	
ID	15 (16.5)	25 (27.5)	51 (56.0)	91 (21.2)
Internist	112 (52.6)	23 (10.8)	78 (36.6)	213 (49.7)
Surgeon	75 (76.5)	22 (22.4)	1 (1.0)	98 (22.8)
Intensivist	14 (51.9)	0 (0)	13 (48.1)	27 (6.3)
Total n (%)	216 (50.4)	70 (16.3)	143 (33.3)	429 (100)

the ID specialists compared to the other specialist groups (p= 0.000). 44 (48.3%) ID specialists and 33 (9.76%) participants from other specialization fields stated that they encounter more than 20 candiduria cases every year. It was determined that ID specialists encountered a significantly higher number of candiduria cases compared to the remaining groups (x^2= 72.49; p= 0.0000). Additionally, compared to the specialists from the remaining fields [60 (17.8%)], a higher rate of ID specialists [66 (72.5%)] were referring to a significantly higher number of up-to-date guidelines about candiduria (p= 0.000002).

Overall, 213 participants (49,6 %) stated that they generally order a second culture test. These participants were asked to respond the questions in the second part of the questionnaire. This second part was completed by 76 (83.5 %) ID specialists and 137 (40.5%) specialists from the remaining fields. Compared to the other specialist groups, a higher number of ID specialists were asking for a second urine culture test. However, in the meantime, the number of clinicians who were inclined to recommend a therapy before receiving the results of the second urine culture test was also higher in the ID group than in the remaining groups (p= 0.0106) (Table 3). In consistency with the guidelines, the therapy of choice was determined as amphotericine B for neutropenic patients and fluconazole for non-neutropenic patients. However, only 71 (33.3%) of the 213 participants who ordered a second urine culture test were using fluconazole for non-neutropenic patients. A statistically significant difference was present between the ID specialists and the remaining specialist groups in terms of compliance to guidelines in the management of patients with candiduria.

DISCUSSION

The current study was aimed to investigate diagnostic and therapeutic approaches of specialists from different fields for candiduria to address the gaps in the field. There are no recognized standards to be used in the diagnosis of urinary system infections caused by *Candida* species. Candiduria may be the indicator of contamination, perineal colonization, upper urinary system infection and disseminated candidiasis[3-5]. While the number of bacteria colonies grown in the urine culture is significant in the diagnosis of bacteriuria, the significance of the number of candida colonies in the diagnosis of candiduria has not been defined yet. The studies on patients diagnosed with *candida* infections report that there is no correlation between renal candida infection and the number of candida colonies in the urine[1,5]. Accordingly, in case candiduria is detected in a patient, the main purpose should be to determine whether the pathogen is actually the cause of the infection. If urinary symptoms including fever, dysuria, pollacuria, costovertebral angle tenderness are accompanied by candiduria, the treatment of a patient is started. However, therapy is not recommended in asymptomatic patients unless they are at high risk for dissemination (neutrophenic patients, infants and patients scheduled for urological interventions are considered to be in the high-

Tablo 3. The approach of Infectious Diseases (ID) specialists and other specialist groups to candiduria

	ID Specialists n= 91 (%)	Other Specialists n= 338 (%)	Statistic p
Mean age (year)	38.20 ± 8.27 (24 - 60)	33.60 ± 8.38 (24 - 63)	
Mean length of experience after specialization training	7.46 ± 7.85 (min 0 - max 30)	4.21 ± 7.43 (min 0 - max 39)	**0.000**
Keeping up with related up-to-date guidelines	66 (72.5)	60 (17.8)	**0.000002**
SECOND URINE CULTURE	**76 (83.5)**	**137 (40.5)**	**0.00000**
I start a therapy without the second culture result	25 (32.9)	24 (17.5)	**0.0106**
I start a therapy according to the second culture result	51 (67.1)	113 (82.5)	
Starting a therapy in high risk patients when the second urine culture test is positive	68 (89.4)	93 (67.8)	**0.0004**
Replacement of the urinary catheter	57 (75.0)	102 (74.4)	0.9298
Searching for another fungal infection focus	68 (89.4)	111 (81.0)	0.1066
Choice of therapy for patients with neutropenia			
Fluconazole	29 (38.1)	42 (30,6)	0.2659
Other antifungal agents	47 (61.9)	95 (69.4)	
Choice of therapy for patients without neutropenia			
Fluconazole	74 (97.3)	122 (89.1)	0.031
Other antifungal agents	2 (2.7)	15 (10.9)	

risk group)[9]. Although the approach to patients with asymptomatic candiduria is highly similar to the approach to patients with asymptomatic bacteriuria, many clinicians do not order a second urine culture test and apply unnecessary therapies without feeling the need to exclude contamination and perineal colonization[4,5]. The results of our questionnaire study showed that ID specialists encounter a significantly higher number of patients with candiduria and they order a second urine culture test more often than other specialists. This is because, in our country, the use of antifungals is under the supervision of ID specialists and consultation of ID specialists is required when patients with candiduria are scheduled for parenteral therapy. It was also determined by the questionnaire that ID specialists were inclined to start therapies without waiting for the results of the second urine culture. This may result from the fact that ID specialists encounter a higher number of patients with candiduria, compared to other specialists. While 43.8% of the ID specialists stated that they encounter more than 20 patients every year, the rate was 9,76% in the remaining specialist groups. As a result, ID specialists order a second urine culture test to exclude contamination and colonization and start a therapy without waiting for the results of the second urine culture test to minimize the risk of dissemination in patients at high risk. Additionally, considering that only 40.5% of the specialists from the remaining fields order a second urine culture, it is possible to conclude that unnecessary therapy may have been recommended in more than half of the cases. As the specialists from the fields of internal medicine, surgery and intensive care were evaluated separately, it was seen that, compared to the ID specialists, an identical rate of intensive care specialists were ordering a second culture test. However, this result may be misleading since a small number of intensive care specialists responded to the questionnaire. The weakness of the present study is that equal number of specialists from each field did not respond to the questionnaire study. Even so, it was determined that, regardless of their fields,

all specialists who order a second urine culture test investigate for a second fungal infection focus without fail, especially when candiduria is detected in high-risk patients.

Candida infections of the urinary system are commonly related to the presence of a urinary catheter. Although the prevalence of candiduria is low (0-0.3%) in healthy people, it has been reported that the second most common cause of urinary system infections is fungal pathogens in in-patients with urinary catheters. Overall, these pathogens constitute 12 to 27% of all detected pathogens[1,10]. It has also been shown that, particularly in patients hospitalized in intensive care units, removal of the catheters is enough to prevent candiduria. The removal and the replacement of catheters have been reported to successfully prevent candiduria in 40% and 20% of the patients, respectively. It is gratifying that catheter replacement, the simplest and first-step approach in the management of patients with candiduria, is applied by 74-75% of all the specialists included in the present study. The responses to the questions about the specific antifungal treatment approach, which may be necessary after the removal of the catheter, were consistent with the IDSA Candidiasis guidelines[9], and there was not a significant difference between the specialist groups. This shows that the problem is mainly with the diagnosis. All specialists were using fluconazole for non-neutropenic patients and amphotericine B and other antifungal drugs for neutropenic patients. 33.3% of the participants who were using fluconazole in non-neutropenic patients stated that the main reason for their choice was that they most commonly identify *C. albicans* in these patients, which has low resistance to fluconazole, and that amphotericine B is prone to a higher risk of side effects. These participants stressed that the data collected in their respective hospitals were also a major factor in this decision. They also mentioned that their policy is to change fluconazole with another drug in case it is determined that the species is non-albicans.

As a result, the clinicians are highly successful in treating candiduria but experience problems with the diagnosis. The fact that only 49.6% of all specialists included in the study order a second urine culture test shows that, without differentiating colonization and contamination, half of them start therapies, which are likely to be unnecessary. It is seen that the ID specialists adopt a more proactive and consistent approach to candiduria treatment than the other specialist groups. In the management of asymptomatic patients with candiduria, better approaches can be adopted by specialists from all fields if candiduria is confirmed by two consecutive culture tests.

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