



Onychomycosis and Erectile Dysfunction. Does Common Etiology Cause Togetherness?

Onikomikoz ve Erektile Disfonksiyon. Ortak Etiyoloji Birlikteliğe Neden Olur mu?

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ABSTRACT

Aim: We tried to determine the frequency of co-occurrence of erectile dysfunction (ED) and Onychomycosis (OM).

Material and Methods: The sociodemographic form and IIEF-5 form were filled by the male patients who were admitted to the Urology Polyclinic of Karabük University Medical Faculty with the complaints of ED between April 2019 - April 2020. The patients with ED were included in the study. All the male patients were divided into three groups as mild, moderate and severe according to ED severity. The dermatologist (H.A) examined the presence of OM by taking samples from the toenails of the male patients.

Results: Looking at the IIEF-5 scores of 95 patients accepted to the study, it was found that 22 (23.1%) had mild, 20 (21%) moderate and 53 (55.9%) severe ED. Smoking history was higher in the severe ED group ($p < 0.001$). It was found that a total of 32 (33.7%) patients had OM. However, there was no relationship between the severity of ED and the presence of OM ($p > 0.114$).

Conclusion: Erectile dysfunction and OM disease can often be seen together. However, no relationship was found with the severity of ED.

Keywords: Onychomycosis, Erektile disfonksiyon, Etiyoloji

ÖZ

Amaç: Erektile Disfonksiyon (ED) ile Onikomikoz (OM) hastalığının birlikte görülme sıklığını saptamaya çalıştık.

Gereç ve Yöntemler: Nisan 2019 - Nisan 2020 tarihleri arasında Karabük Üniversitesi Tıp Fakültesi Üroloji Polikliniği'ne ED şikâyeti ile başvuran erkek hastalara sosyodemografik form ve IIEF-5 formu doldurtuldu. ED saptanan hastalar çalışmaya dahil edildi. Tüm erkekler ED ciddiyetine göre hafif, orta, ciddi olmak üzere üç gruba ayrıldı. Dermatoloji uzmanı (H.A.) erkeklerin ayak tırnaklarından örnek alıp OM mevcudiyetini araştırdı.

Bulgular: Çalışmaya kabul edilen 95 hastanın IIEF-5 skorlarına bakılarak 22'sinde (%23.1) hafif, 20'sinde (%21) orta ve 53'ünde (%55.9) ciddi düzeyde ED bulunduğu saptandı. Sigara kullanma öyküsü ciddi ED grubunda daha fazla idi ($p < 0.001$). Toplam 32 (%33.7) hastada OM bulunduğu tespit edildi. Ancak, ED şiddeti ile OM mevcudiyeti arasında bir ilişki saptanmadı ($p > 0.114$).

Sonuç: Erektile disfonksiyon ile OM hastalığı sıklıkla bir arada görülebilmektedir. Ancak ED şiddeti ile bir ilişkisi saptanmamıştır.

Anahtar Sözcükler: Onikomikozis, Erektile disfonksiyon, Etiyoloji



INTRODUCTION

Erectile Dysfunction (ED), which has been recently diagnosed in thousands of men around the world, is defined as the inability of a man to achieve and/or maintain sufficient penile erection for at least 6 months. Penile erection occurs as a result of increased arterial blood flow and decreased venous blood flow. All the factors that cause damage to these mechanism result in ED. It has also been shown that atherosclerosis, which negatively affects all vascular structures, begins to influence penile arteries, before coronary and carotid arteries (1). Atherosclerosis causes endothelial dysfunction and disrupts the nitric oxide synthesis process, leading to inadequate expansion of penile arteries and consequently to ED (2).

Onychomycosis (OM) is a fungal infection of the nail and its bed. It is seen between 2% and 11% of the healthy population and includes some risk factors such as endothelial dysfunction that gives cause for atherosclerosis, decreased microcapillary circulation, oxidative stress and inflammation, as in ED (3-5.) Peripheral artery diseases (PAD) are also closely related to atherosclerotic risk factors such as ED and OM. PAD, which can be frequently seen with cardiovascular and cerebrovascular diseases, is more common among those who are in advanced age, and have smoking history, hyperlipidemia, hypertension, and diabetic, but it is much more prevalent among male patients (1,2). Studies have reported that patients with symptomatic and asymptomatic PAD have an equal risk of early death (6). Therefore, when patients within the asymptomatic period PAD are admitted to the hospital due to other diseases with common risk, the diagnosis of PAD will help to reduce the risk of premature death (7). As it has been shown that OM can be an independent marker for PAD, the close relationship between ED and PAD has also been shown in many studies (8-10). In a patient admitted to the outpatient clinic due to OM or ED, PAD must be considered and the referral of the patient to the relevant branch will be an important step for the patient's future life.

As a result of the literature review, no study was found evaluating the association of ED and OM, although they have common risk factors. In this study, we tried to reveal whether there is OM association in men who applied to the urology outpatient clinic because of ED.

MATERIALS and METHODS

The study was carried out under the ethical principles of the Declaration of Helsinki and was approved by the Local Ethics Committee of Karabük University (1/4 / 2019- 4/19). Between April 2019 and April 2020, the male patients who applied to Karabük University Faculty of Medicine Department of Urology polyclinic with ED complaints, met the study criteria and accepted to participate in the present study.

Sociodemographic form and the International Index of Erectile Function (IIEF) -5 form for the evaluation of sexual functions were filled by the patients who met the inclusion criteria and accepted to partake in the study both in writing and orally. In this study, we classified the patients according to the IIEF-5 scores, as done by Spessoto et al. (11), for ease of grouping. In the ED classification, those with the IIEF-5 score of 25 and above is normal; 17-24 score range is mild; 11-16 score range is moderate and scores of 10 and below are considered as severe ED. After form-filling process, the toenails of the patients were evaluated by a dermatologist. Samples taken from the nails of patients with clinical suspicion of OM were prepared with potassium hydroxide and evaluated under a microscope to identify fungal filaments.

The exclusion criteria were the absence of a history of regular sexual intercourse, recent genital surgery, any psychiatric and/or neurological disease, chronic heart and/or respiratory diseases, chronic kidney disease, any oncological disease, and previous OM treatment and/or having nail disease apart from OM.

Continuous data are given as Mean \pm Standard Deviation. Categorical data are given as percentage (%). Shapiro Wilk's test was used to investigate the compliance of the data to normal distribution. One-way analysis of variance (One-Way ANOVA) was used for the cases with three or more groups in comparison of the groups showing normal distribution. Pearson Chi-Square and Pearson's Exact Chi-Square analysis were used in the analysis of the cross tables created. IBM SPSS Statistics 21.0 (IBM Corp. Released 2012. IBM SPSS Statistics for Windows, Version 21.0. Armonk, NY: IBM Corp.) program was used in the application of the analyzes. $P < 0.05$ value was accepted as the criterion for statistical significance.

G* Power (G* Power Ver. 3.0.10, Franz Faul. Kiel University, Deutschland) (12) package program was used to determine the sample size. The sample size was found to be 45 people for a study with 95% power, Type 1 error (alpha) 0.05 and effect size 0.5. A total of 95 patients were planned to be included in the study.

RESULTS

Between April 2019 and April 2020, 147 male patients applied to the Urology Department with the complaint of ED. Of the 132 patients who agreed to participate in the study, 27 patients were excluded from the study because they did not meet the inclusion criteria. Sociodemographic form and IIEF-5 were applied to 105 patients. 10 patients with an IIEF-5 score of 25 and above were not included in the study because ED was not detected. The remaining 95 patients were evaluated by a dermatologist in terms of OM.

When classified according to IIEF-5 scores, 22 (23.1%) patients were in the mild group, 20 (21%) patients were in

the moderate group, and 53 (55.9%) patients were in the severe group (Table 1). Smoking was statistically higher in the severe group compared to the other groups ($p < 0.001$). OM was detected in 33.7% of 95 ED patients who were included in the study. When the presence of OM was examined in all 3 groups, no statistical difference was found between the groups in terms of ED severity ($p = 0.11$).

DISCUSSION

Diseases such as hypertension, diabetes, dyslipidemia, and smoking are common risk factors for PAD, ED and OM. However, endothelial dysfunction is the most important underlying cause of all three diseases. (13-15) All of the above mentioned risk factors and endothelial dysfunction play a huge role in the development and progression of atherosclerosis. Cardiovascular diseases, one of the most important causes of death in the world, are caused by atherosclerosis. Since cardiovascular diseases may not cause symptoms until they cause hardening of systemic arteries, they are described as 'silent killers' (16). Therefore, it is very important that these types of diseases are caught in the asymptomatic period.

In the literature, 48% of men with ED had cardiovascular disease and 46% had coronary heart disease (17). In a study by Kumagai et al. (18) ED was defined as an independent risk factor for PAD. On the other hand, Montorsi et al. (19) showed that men who started to show symptoms of ED were more likely to show the symptoms of cardiovascular disease over a period of 2-3 years. Other studies have shown that the severity of ED symptoms is positively correlated with atherosclerotic heart disease status, and the presence of ED is an independent risk factor for cardiovascular diseases (1,20). Peripheral circulation disruption is one of the important risk factors in the development of onychomycosis (21). Many studies have also shown that the presence of ED will be a marker for peripheral vascular diseases (22). The fact that circulatory dysfunction is an important etiology for both onychomycosis and ED suggests the possibility of ED in

patients with onychomycosis and the development of onychomycosis in patients with ED.

Studies have shown that OM can be an early marker for atherosclerosis and it has a close relationship with atherosclerosis like ED. In the study of Fukunaga et al. (14), the incidence of asymptomatic PAD in patients with OM was found more frequently than in the group without OM. In a study conducted on 127 patients with type-2 diabetes, the presence of OM and subclinical atherosclerosis was examined; and, it was stated that there might be a relationship between OM and subclinical atherosclerosis in diabetic patients. OM could be used as a marker for the diagnosis of atherosclerotic vascular diseases. (23) Contrary to this study, although venous insufficiency was found more frequently in patients with OM compared to the control group, no statistical difference was found between the o study groups in terms of PAD (24).

There are many studies reported that dermatological diseases and ED can accompany each other. It has been shown that 81% of men with systemic sclerosis and 67% of men with amyloidosis have ED (25). In another study, ED was found in 60% of men with dermatological disease. (26). The side effects of the drugs used for the disease and thought of skin findings have a negative impact on the partner, since they cause sexual reluctance and loss of confidence. Besides, common etiological factors such as atherosclerosis have been suggested to play a role on the increased frequency of ED (27).

Although OM and ED have been shown to be early markers for atherosclerosis in different studies, there is no study in the literature about the co-occurrence of OM and ED. In this study, to our knowledge, we showed firstly that OM was found in 33.7% of men with ED. However, no statistically significant relationship was found between the severity of ED and the frequency of OM. Further multicenter study including more patients and control groups is needed to show relationship with ED and OM.

Table 1: Socio-Demographic Characteristics and Incidence of OM in ED Patients

		IIEF-5			p	
		Total (n=95)	Mild (n=22)	Moderate (n=20)		Severe (n=53)
Age (Year)	(Mean±S.D)	51.47±0.97	50.50±0.53	50.82±0.84	54.48±1.01	0.102*
Cigarette n (%)	Yes	63 (66.3)	10 (45.5)	10 (50)	43 (81.1)	<0.001***
	No	32 (33.7)	12 (54.5)	10 (50)	10 (18.9)	
Diabetes n (%)	Yes	19 (20)	3 (13.6)	4 (20)	12 (22.6)	0.097***
	No	76 (80)	19 (86.4)	16 (80)	41 (77.4)	
Onychomycosis n (%)	Yes	32 (33.7)	6 (27.3)	9 (45)	17 (32.1)	0.114**
	No	63 (66.3)	16 (72.7)	11 (55)	36 (67.9)	

* One-Way Analysis of Variance, ** Pearson Chi-Square Analysis, *** Fischer (Exact) Chi-Square Analysis

Single-center study being said, if there is insufficient number of patients included in the study, the questionnaire evaluated the results of patients with relatively subjective, that may be a risk factor for OM in the patient's self-care ability of assessment; factors that we restrict our study.

Conclusion

Early detection of atherosclerosis markers such as ED and OM will play an important role in preventing the progression of atherosclerosis and other complications. That is why; OM should be kept in mind in the patients presenting the complaint of erectile dysfunction, and these patients should be directed to the relevant branch.

Author Contributions

Concept: **Özer Baran**, Design: **Coşkun Kaya**, Data collection or processing: **Özer Baran**, **Habibullah Aktaş**, Analysis or Interpretation: **Aykut Aykaç**, Literature search: **Aykut Aykaç**, **Coşkun Kaya**, Writing: **Özer Baran**, Approval: **Habibullah Aktaş**.

Conflicts of Interest

The authors declare that there is no conflict of interest

Financial Support

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Ethical Approval

The study was carried out under the ethical principles of the Declaration of Helsinki and was approved by the Local Ethics Committee of Karabük University. (1/4 / 2019- 4/19)

Peer Review Process

Extremely peer-reviewed.

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