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Demodex infestation in gynecologic cancers

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Abstract

Aim: The study aims to investigate the incidence and infestation of Demodex folliculorum in patients with gynecological cancer.

Material and Methods: This cross-sectional study was carried out at Reyhanlı MMT Amerikan Hospital, Hatay, Turkey. Forty patients with gynecological cancer and 40 control subjects were included in the study. The age, presence of diabetes mellitus, body mass index (BMI), cancer type of individuals and treatment method for cancer were recorded. A standardized skin surface biopsy method was used to determine if the patients had D. folliculorum infestation (>5 mites/cm^2 of skin).

Results: D. folliculorum was found to be positive in 14 (35.0%) of the patients with gynecological cancer and in 1 (2.5%) of the subjects in the control group. There was a significant difference between patient group and control group (p = 0.001). There were no significant differences in age, presence of diabetes mellitus, chemotherapy and radiotherapy given or not, BMI between patients and control group. In cancer groups, particularly in ovarian cancer, density of D. folliculorum was found higher.

Discussion: The findings of this study suggest that immunosuppression state such as cancer increases the susceptibility to D. folliculorum mite infestation in patients with gynecological cancer.

Keywords

Cancer, Demodex Folliculorum, Immunosuppression

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Introduction

Gynecological cancers, with incidence rates increasing annually, are a leading cause of death in women [1]. There are many treatment modalities such as surgery, chemotherapy and radiotherapy in the management of gynecological cancers. The presence of cancer as well as many treatment modalities cause immunosuppression via increasing some immunosuppressive cytokines and interleukins such as transforming growth factor – β (TGF-β) and interleukin-10 (IL-10) [2]. The immunosuppressive cytokines and interleukins (i.e., IL-10 and TGF-β) could cause development of parasitic infections in cancer patients [3, 4].

The human body, especially in immunosuppression state, contains many ectoparasites such as Demodex (D.) folliculorum and D.Brevis. D. folliculorum and D. brevis. Ectoparasites might be present in anywhere such as hair follicles, nasolabial folds, eye lids, cheeks, forehead, nose, and chin [5]. Although many people are colonized by D. folliculorum, most of them remain asymptomatic. For that some authors stated the D. folliculorum is a opportunistic pathogen. Furthermore, density of this opportunistic pathogen has been shown to be increased in immunosuppressive status such as leukemia, cancer and AIDS (acquired immune deficiency system) [6].

In the present study, we aimed to investigate incidence and infestation of D. folliculorum in patients with gynecologic cancers.

Material and Methods

Forty patients with gynecological cancer and 40 control subjects were included in the study. All examinations of patients were performed at Reyhanli MMT Amerikan Hospital, Hatay, Turkey.

Demographic (age and body mass index (BMI)) and clinical characteristics (cancer type, operation status, chemotherapy, radiotherapy, presence of diabetes mellitus and skin type) of patients were obtained from clinical records. The patients were divided into three groups according to the cancer type: ovarian cancer group (OCG), endometrium cancer group (ECG) and cervix cancer group (CCG). Exclusion criteria were as follows; dermatitis related to Demodex species, previously diagnosed rosacea and facial seborrheic dermatitis, blepharitis, allergic disease and the use of local or systemic antibiotics within last two weeks.

Standardized skin surface biopsy (SSSB) technique was used to evaluate the presence of D.folliculorum. Eyelashes and skin samples taken from cheek, chin, forehead and nose were collected with SSSB technique from patients [7]. The presence of D.folliculorum mites was investigated to determine the density of demodex mites. A drop of cyanoacrylate-glue adhesive was put on slide and the adhesive- carrying surface of the slide and was applied to skin after wiping the patients' face with alcohol. The slide was removed after one min. from the surface. A light microscope (Olympus CH20; Olympus Optical, Tokyo, Japan) at 40x and 100x magnifications was used to determine the density of D.folliculorum mites. The identification of >5 mites/cm2 of skin was defined as a D. folliculorum mite infestation (Fig.1). The clinical examination, SSSB, and microscopy were done by the same clinician.

The statistical analysis was performed using the Statistical Package for Social Sciences version 21 for Windows (SPSS Inc., Chicago, IL, USA). The Pearson Chi-square (x^2) test was performed to compare the prevalence of mites and in the patient groups. The student T test was used to evaluate the ages of patients. Local statistical significance was considered to be a p value less than 0.05 for all parameters.

Ethical Approval

The study was approved by the ethical committee of Adana City Education and Research Hospital (Date: 2024-05-30, No: 3) and written informed consent was obtained from all patients.

Results

The mean age of patients with gynecologic cancer was 50.35 ± 9.72 and ranged between 40 -72 years. In the control group, the mean age was 53.85 ± 5.23 and ranged between 42 -67 years. The difference in age was not statistically significant ($p > 0.05$). BMI mean values of patients with gynecologic cancer and control group were 25.72 ± 2.36 and 24.83 ± 3.38, respectively. There was no statistical difference ($p > 0.05$). In the current study, while 14 patients (35.0%) had D.folliculorum, one patient of the control group had D.folliculorum. There was a significant difference in the patient group and the control group ($p = 0.001$). D. Folliculorum infestation was positive in 9 (45.0%) of OCG patients, 4 (26.6%) of ECG patients and 1 (20.0%) of CCG patients. The high rate of D. folliculorum in OCG and ECG was observed. There was no significant difference in the infestation of D.follicullorum according to the cancer type (p

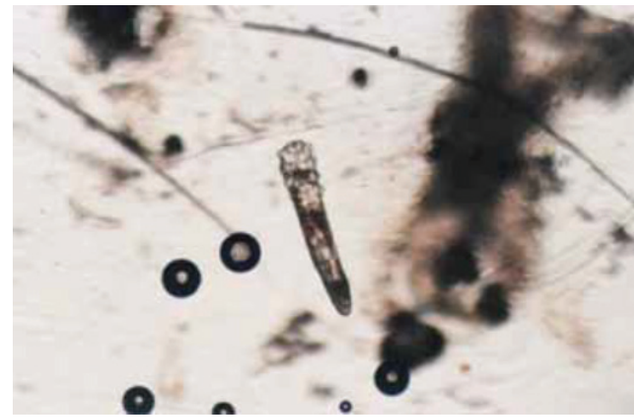

Figure 1. Adult of D. folliculorum (Original magnification 40x)

Table 1. Distribution of D.folliculorum according to cancer type

Cancer types	Positive status of D.F. n(%)
OCG(n = 20)	9 (45.0)
ECG (n = 15)	4 (26.6)
SCG (n = 5)	1 (20.0)
Total (n = 40)	14 (35.0)

D.F.: Demodex Folliculorum, OVG; Ovarian Cancer Group, ECG; Endometrium Cancer Group, SCG; Cervix Cancer Group, VCG; Vulva Cancer Group

Table 2. Baseline clinical charecteristics of study population

	Patient group (n =64) (mean ± SD), (%)	Control group (n =64) (mean ± SD) (%)	p
Age	50.36 ± 9.72	53.85 ± 5.23	p>0.05
BMI	25.72 ± 2.36	24.83 ± 3.38	p>0.05

BMI: Body Mass Index

= 0.172). The rate of presence of diabetes mellitus in patients with gynecologic cancer was 52.5% and in control group was 48.8%. The difference in incidence of diabetes mellitus was not statistically significant between the patient and the control group ($p > 0.05$). There was significant relation between patients with diabetes mellitus and D. folliculorum ($p = 0.052$). In the patient group with gynecologic cancer, 36 of 40 cases underwent operation (90.2%) and there was no significant association with D. folliculorum according to whether the operation was performed or not ($p = 0.756$). Additionally, the rate of D. folliculorum was not significantly different in patients to whom chemotherapy and radiotherapy were given or not ($p = 0.15$, 0.48, respectively).

The density of D.folliculorum (34.6%) was found more in eyelashes of patients with gynecologic cancer than skin area.

Discussion

Our study results revealed that patients with gynecological cancers had increased density of D. folliculorum when compared to the control group. As far as we know, this is the first study to investigate association between D.folliculorum infestations and gynecologic cancers.

There are few studies which investigated relationship between D. folliculorum and premalign lesions and cancers [8]. Sonmez et al. showed increased D.folliculorum infestations in various cancer types especially breast cancer [9]. Inci et al. found a high density of D.folliculorum in urological cancer [10]. Erbagci et al. reported the high incidence of D.folliculorum infestations in eyelid basal cell carcinomas [11]. In addition, hematological malignancies and non-melanoma skin cancer were found to be associated higher density of D.folliculorum [12, 13]. Those studies suggested that immunosuppression plays a major role for increased density of D. folliculorum in eyelashes and skin. Accordingly, in the current study, we found a high incidence of D. folliculorum infestation in patients with gynecological cancer which might also be related to the immunosupression state. In our study, the incidence of D.folliculorum infestation in OCG was higher than in other gynecologic cancers. That might be the result of further immunosuppression seen in ovarian cancers. There are some studies which investigated the relationship between ovarian cancer and serum TGF-β and IL-10 levels [14-16]. Therefore, high incidence of D.folliculorum infestation in OCG in our study might be related to these further immunosuppression states in ovarian cancers.

There are some predisposing factors related to increased D. folliculorum infestation such as old age, immunosuppressive status, AIDS, systemic or local corticosteroid usage, and diabetes mellitus [17, 18]. Aycan et al. reported that old age increases the density of D. folliculorum [17]. However, in our study the mean age of patients and control groups was comparable. Gokce et al. showed the incidence D. folliculorum is increased in diabetic patients at 24% in the study population [19]. Besides, there were no significant differences between patient and control groups regarding diabetes. Although chemotherapy has immunosuppressive effects and leads to development of microbial infection, there were no differences in D. follicularum infestation regarding whether chemotherapy was given or not in our study population. For that, we propose that gynecological cancers rather than chemotherapy might be related to increased D. follicularum infestation.

Limitation

First, important limitation of the study was the small sample size. Second, we could not investigate D.folliculorum in other gynecological cancer types such as vaginal and tubal cancer.

Conclusion and recommendations

We demonstrated a high density of D. folliculorum in patients with gynecological cancers. Moreover, D. folliculorum infestation was particularly increased in ovarian cancer subtype. To reveal exact pathogenesis of increased D. follicularum infestation in gynecological cancers, further large scale studies should be carried out.

Scientific Responsibility Statement

The authors declare that they are responsible for the article's scientific content including study design, data collection, analysis and interpretation, writing, some of the main line, or all of the preparation and scientific review of the contents and approval of the final version of the article.

Animal and Human Rights Statement

All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or compareable ethical standards.

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Conflict of Interest

The authors declare that there is no conflict of interest.

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