Demodex folliculorum in polycystic ovary syndrome patients

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Abstract. – OBJECTIVE: In this study, we aimed to investigate frequency of Demodex (D.) folliculorum infestation in Polycystic Ovary Syndrome patients.

PATIENTS AND METHODS: The study population consisted of 30 PCOS patients and 30 matched healthy control subjects admitted to the Hospital of Mustafa Kemal University, Gynecology and Obstetrics Clinic between March 2013 and January 2014. The demographic characteristics of the patients were recorded. Samples from the face region of the subjects were taken by standard method of superficial skin biopsy and evaluated by microscopy. Presence of five or more D. species in a cm² was considered as positive.

RESULTS: There were no significant differences in age, body mass index, diabetes mellitus incidence between PCOS patients and the control group. However, D. folliculorum infestation was found to increased in PCOS patients (n = 9; 30%) when compared to the control group (n = 2; 6.7%) (p: 0.04).

CONCLUSIONS: Our study results revealed that Demodex folliculorum appearance increased in PCOS patients.

Key Words: Demodex folliculorum, Polycystic ovary syndrome.

Introduction

Polycystic ovary syndrome (PCOS), first described by Stein and Leventhal in 1935, is a common endocrinologic disorder characterized by insulin resistance, chronic anovulation and hyperandrogenism¹². It is observed in women of reproductive age and associated with some hormonal and metabolic abnormalities. Central obesity appears as an important factor to increase the risk of metabolic abnormalities³⁴. PCOS patients usually have hirsutism, acne vulgaris, anovulation and infertility¹³.

Demodex (D.) lives on mammals and is a tiny spindle-shaped mite 0.3-0.4 mm long. Although there are numerous species of Demodex, only Demodex folliculorum and Demodex brevis live on the human body. It was revealed that D. infestation is transmitted via close skin contact⁶-⁹. These mites are found most frequently on the face (forehead, nose, cheek, nasolabial fold, and eyelids) where there is more sebum and less frequently on scalp and chest. It is shown that immunosuppression could increase D. infestation incidence. Increase in the number of D. folliculorum infestation in leukemic children receiving chemotherapy or in acquired immunodeficiency syndrome (AIDS) patients also support this theory⁶-⁹. Also it has been recently shown that D. folliculorum infestation is increased in diabetic patients especially with uncontrolled glucose levels and associated with pruritus and itching¹⁰.

The aim of the current study is to investigate the existence of Demodex folliculorum mite in PCOS patients.

Patients and Methods

The study population consisted of 30 PCOS patients and 30 matched healthy control subjects admitted to the Hospital of Mustafa Kemal University, Gynecology and Obstetrics Clinic between March 2013 and January 2014. Local
Ethics Committee approved the study, and written informed consent was obtained from all patients and controls. The study population was chosen consecutively. All of the women were recruited from our clinic with a chief complaint of irregular menstrual cycles and/or clinical hyperandrogenism; none of the women had been prescribed any medications before enrollment. According to Rotterdam criteria the diagnosis of PCOS was made as the presence of at least two of the following three criteria, (1) amenorrhea or oligomenorrhea (< 8 spontaneous menstrual cycles per year for at least 3 years before enrollment) (2) biochemical hyperandrogenemia (serum total testosterone level e” 2.78 nmol/l) and (3) polycystic ovaries (> 12 follicles of 2-9-mm diameter per ovary by transvaginal ultrasonography)11. Blood samples were obtained in the follicular phase of menstruation. Levels of hemoglobin (Hb), platelet (plt), thyroid stimulating hormone (TSH), follicle stimulating hormone (FSH), luteinizing hormone (LH), prolactin (PRL) and estradiol (E2) were determined.

All the study population was examined for dermatological lesions and symptoms such as pruritus, redness, scaling, telangiectasia, pustules and papules on the face. D. folliculorum was examined by a noninvasive method called standardized skin surface biopsies (SSSB). Five samples of standardized SSSBs of the same location were taken from the forehead, cheeks, jaw and nose of the patient of included in the study. The skin was cleared by ether to improve adherence. After placing a drop of cyano-acrylic adhesive on the other side, it was applied to the skin for 45-60 s until it was firmly attached10,11. It was then gently removed and clarified with 2-3 drops of glycerine and covered with a coverslip. Following this, samples were studied microscopically at a magnification of ×10 and ×40. The examination was performed within 1 h of sampling. The number of mites counted on a surface area of 1 cm² was accepted as the density of D. folliculorum. Infestation was defined as e” 5 living parasites/cm² of skin13.

Statistical Analysis
All statistical analyses were performed using the SPSS software package, version 13.0 (SPSS Inc., Chicago, IL, USA) for Windows. Continuous variables were analyzed using the Kolmogorov-Smirnov test in terms of their normal distribution. Relationships between nominal variables were calculated using, χ²-test and Fisher’s Exact test. For continuous variables, Student’s t-test and Mann-Whitney U-test were used. A p-value < 0.05 was considered statistically significant.

Results
There was no significant difference between PCOS patients (22.90 ± 4.25) and the control group (23.50 ± 3.75) regarding to age (p: 0.56).

While D. folliculorum infestation was present in 9 (30%) of PCOS patient and only 2 (6.7%) of control subjects which was statistically significant (p: 0.04) (Table I).

When the PCOS patients were divided into two groups according to presence of D. folliculorum infestation, there were no significant differences between groups regarding to age, hemoglobin, platelet, FSH, LH and E2 (Table II).

Discussion
The current study demonstrated that PCOS patients have increased D. folliculorum infestation when compared to healthy control subjects.

PCOS is the most frequent hormonal disease of women in reproductive age. PCOS usually associated with hirsutism, obesity, menstrual disturbances, acne vulgaris, recurrent abortion and

Table I. Demodex Follicorum counts in patient and control groups.

<table>
<thead>
<tr>
<th></th>
<th>PCOS (n=30)</th>
<th>Control (n=30)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demodex n (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive</td>
<td>9 (30.0%)</td>
<td>2 (6.7%)</td>
<td>0.042*</td>
</tr>
<tr>
<td>Negative</td>
<td>21 (70.0%)</td>
<td>28 (93.3%)</td>
<td></td>
</tr>
<tr>
<td>Age (mean)</td>
<td>22.90 ± 4.25</td>
<td>23.50 ± 3.75</td>
<td>0.565**</td>
</tr>
</tbody>
</table>

Fisher’s exact test, **Student’s t test.
Table II. The relationship between the presence of a *Demodex folliculorum* infestation and the age, hemoglobin, platelet, FSH, LH and E2 level in patients with PCOS.

<table>
<thead>
<tr>
<th>Demodex</th>
<th>Negative (n = 21)</th>
<th>Positive (n = 9)</th>
<th>ρ*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yas Med (min-max)</td>
<td>22 (15-31)</td>
<td>21 (15-27)</td>
<td>0.362</td>
</tr>
<tr>
<td>Hb Med (min-max)</td>
<td>12.7 (10.2-14.3)</td>
<td>12.4 (11.6-15.0)</td>
<td>0.751</td>
</tr>
<tr>
<td>Plt Med (min-max)</td>
<td>287 (213-444)</td>
<td>282 (201-310)</td>
<td>0.482</td>
</tr>
<tr>
<td>Fsh Med (min-max)</td>
<td>5.4 (2.1-7.9)</td>
<td>6.2 (5.0-6.4)</td>
<td>0.197</td>
</tr>
<tr>
<td>Lh Med (min-max)</td>
<td>8.8 (3.6-32.5)</td>
<td>13.9 (5.7-14.7)</td>
<td>0.197</td>
</tr>
<tr>
<td>E2 Med (min-max)</td>
<td>56.1 (18-179.4)</td>
<td>54.4 (26.4-498.3)</td>
<td>0.497</td>
</tr>
</tbody>
</table>

*Mann-Whitney U test.

*Demodex folliculorum* in polycystic ovary syndrome patients

Zhao et al[^29] revealed that mite prevalence is high after 18 years old in the student population but the inception rate of *Demodex* infested patients is low. This results indicated that the increase in the number of mites favors an inflammatory process, or may cause an impaired cutaneous immunological response to the parasites. Although some people with severely infested by *D. folliculorum*, they did not show a dramatic clinical presentation. Therefore, further investigation is needed to explain *D. mite count in facial dermatosis*.[^29]

Mumcuoglu et al[^30] reported an increased demodicosis incidence in patients with human leucocyte antigen (HLA) Cw2 and Cw4 alleles due to a decrease in natural killer cells. Thus, HLA alleles might play a role in susceptibility to demodicosis by regulating the end phase of the immune response.

Although Okyay et al[^31] concluded that there was no connection between *Demodex* infestation and acne vulgaris, Sun et al[^32] and Wang et al[^33] revealed a significant connection between the infestation and acne vulgaris. Besides, Zhao et al[^29] reported that the inception rate of acne vulgaris and amount of infested mites were positively correlated. The students with acne vulgaris had higher number of *Demodex* mites. As a result, acne vulgaris might be associated with excessive *Demodex* infestation, but the association between acne vulgaris and *Demodex* density needs to be investigated further.

Accordingly, although the exact mechanism is not known, acne vulgaris, skin changes related to hyperadrogenism, central obesity, abnormal inflammatory response, abnormal cytokine discharge and a tendency to chronic disease like diabetes mellitus might explain increased *Demodex folliculorum* infestation in PCOS patients.
Conclusions

PCOS patients have increased D. folliculorum infestation when compared to the healthy control subjects. Accordingly, physicians should keep in mind the increased parasitic infestation in PCOS patients. Further large scale studies are needed to exact pathogenesis of increased D. infestation in PCOS patients.

Conflict of Interest

The Authors declare that there are no conflicts of interest.

References


30) MUMCUOĞLU KY, AKİLOV OE. The role of HLA A2 and Cw2 in the pathogenesis of human demodiosis. Dermatology 2006; 210: 109-114.

