

Investigating the Relationship between Cervical Erosion and Ectropion in Patients with Polycystic Ovary Syndrome and the Relationship with Estrogen Levels in Compared to the Control Group

Farshad Banouei ^{1*}, Atryeh Gholizadeh Tahamtan ²

¹ Urology Resident, Urology & Nephrology Research Center, Hamedan University of Medical Sciences, Hamedan, Iran.

² Obstetrics & Gynecology Resident, Educational Department of Obstetrics & Gynecology, Fatemeh Hospital Research Center, Hamedan University of Medical Sciences, Hamedan, Iran.

***Corresponding Author:** Farshad Banouei, Urology Resident, Urology & Nephrology Research Center, Hamedan University of Medical Sciences, Hamedan, Iran.

Received Date: 28 June 2023 | **Accepted Date:** 12 July 2023 | **Published Date:** 31 July 2023

Citation: Farshad Banouei, Atryeh G. Tahamtan, (2023), Investigating the Relationship between Cervical Erosion and Ectropion in Patients with Polycystic Ovary Syndrome and the Relationship with Estrogen Levels in Compared to the Control Group, *J. Endocrinology and Disorders*. 7(5): DOI:10.31579/2640-1045/143

Copyright: © 2023, Farshad Banouei. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Abstract

Introduction: Polycystic ovary syndrome is one of the most common diseases in society that one of its prominent features is the increase in blood estrogen levels. This increase in estrogen levels in these patients is significantly associated with the occurrence of cervical lesions. In this study, we investigated the relationship between these disorders.

Materials and methods: The present study is a prospective case-control study that was conducted between December 2021 and March 2023 on 200 patients that referred to the infertility clinic. The number of 200 patients was divided into 2 groups of 100 patients and 100 controls group, and the estrogen level and the presence of erosion and ectropion were measured in them, and the results were expressed by descriptive and analytical statistical methods.

Results: In this study, estrogen levels in two groups of patients and controls were compared with each other and compared with the results of clinical examination in terms of the presence or absence of erosion, and a significant correlation was seen between estrogen levels in the two groups with the presence of erosion ($P=0.006$). There was no significant relationship between estrogen level and the presence or absence of ectropion ($P=0.76$).

Discussion: The results of this study confirmed the existence of a significant relationship between the level of estrogen and the occurrence of erosion in patients, therefore, according to this, regular measurement of the level of estrogen in these patients and regular periodic examinations to prevent progression to malignancy seems to be necessary.

Key words: polycystic ovary; ectropion; erosion; estrogen

Introduction:

Today, the health and social welfare of women, who make up half of the society's population, is not only recognized as a human right, but also its effect on the health of the family and society has become increasingly important [1]. The importance of women's health in both developed and developing countries is undeniable, and studies in this field have a special

importance [2]. According to the information of the World Health Organization, women, due to playing multiple roles in the family and society, going through different physiological periods such as puberty, menstruation, pregnancy, childbirth and menopause, as well as the possibility of a greater risk of suffering from poverty, hunger and malnutrition, heavy workload and gender discrimination are considered a high-risk group. Women's health is

vulnerable for various reasons and in addition to biological characteristics, it is influenced by cultural, social, economic and political factors. In addition to these, the social, economic, cultural and many other dimensions of health in the society affect women's health [3, 4].

- **Polycystic Ovary Syndrome:** One of the diseases that commonly affect women's health in different societies today is Polycystic Ovary Syndrome (PCOS), the prevalence of which is increasing. Polycystic ovary syndrome is known as the most common endocrine disease in women. Its definition and etiological hypotheses are constantly changing and evolving to accommodate the expanding knowledge about this syndrome with current findings about it. Increased androgen synthesis, folliculogenesis disorder and insulin resistance are at the pathophysiological core of this syndrome. An unfavorable metabolic milieu may reveal genetic features of ovarian dysfunction, and overt endocrine disruption can further exacerbate metabolic dysregulation [5, 6].

Polycystic ovary syndrome is defined when at least two of the following three features are present:

- ✓ Oligo and/or lack of ovulation (menstrual irregularity)
- ✓ Clinical and/or biochemical symptoms of hyperandrogenism (hirsutism, virilization, etc.)
- ✓ Polycystic ovary in ultrasound [7].

Among other common and worrying problems in women are cervical ulcers, which should be given special attention due to their appearance and their effects on the physical and mental health of women.

- **Ectropion:** Cervical ectropion is a benign condition seen in women of reproductive age. This disorder results in the deposition of cylindrical cells in the vaginal environment, also known as cervical ectopy, this condition is also known as cervical erosion, which is a misleading term because there is actually no cervical erosion [8]. It is a common disease among teenagers and pregnant women [9]. The etiology of cervical ectropion is related to increased estrogen levels. The cervix is very sensitive to estrogen, which causes the proliferation and differentiation of its epithelium. Therefore, cervical ectropion is usually found in conditions of exposure to high levels of estrogen, which is seen in conditions such as pregnancy, women using hormonal contraceptives, and during the menstrual years, mostly in the ovulation phase [10]. This disorder may also be a congenital disease. During the late development of the fetus and the first month of life, exposure to the mother's hormone stimulates the hyperactivity of the cylindrical epithelium of the endometrium and causes cervical ectropion. This disorder is uncommon in postmenopausal women. During the menopause stage, the level of estrogen is decreasing, causing the cervix to shrink, and therefore the extra uterine squamous cell epithelium is drawn into it. The prevalence of cervical ectropion is between 17% and 50%. The prevalence increases with the number of pregnancies, but decreases from the age of 35 years [11]. Cervical ectropion can be seen in 80% of sexually active adolescents. Its prevalence also depends on the type of contraception. This disease is more common in women who use oral contraceptive pills and is less common in women using physical methods of contraception [9].
- **Hirsutism:** Hirsutism is defined as terminal hair growth that usually appears in a male pattern in women. Hirsutism is divided into two types caused by androgen and non-androgen. Polycystic ovary syndrome is the most common cause of hyper androgenic hirsutism and idiopathic hirsutism is the most common cause of non-androgenic hirsutism. Idiopathic hirsutism and polycystic ovary syndrome together account for 95% of the causes of hirsutism [12]. Because increased androgen levels may lead to pilosebaceous responses such as acne, excessive sebum

secretion, or localized or diffuse hair loss, a skin examination is important in these patients [13, 14].

The Ferriman-Gallwey scoring system was developed by Ferriman and Gallwey in 1968 and today, it is widely used to evaluate and quantify hirsutism in women. This method now includes nine body areas (excluding legs and forearms). To evaluate hair growth, it is rated from 0 (no terminal hair growth) to 4. Therefore, the total score can vary from 0 to 36, and a score of less than 8 is considered a sign of increased androgen in Caucasian women. A score of 8 to 15 is considered mild hirsutism and more than 15 is considered moderate to severe hirsutism. For other ethnicities, the amount of hair expected for that ethnicity should be considered [15]. Obstetrics and Gynecology issues include reproductive disorders or dysfunction of estrogen-controlled organs in women. While some of these female problems are treatable, some are chronic or fatal, and a number of these disorders also interfere with fertility. With increasing invasion and exposure to highly endocrine-disrupting chemicals, cases of hormonal disorders are on the rise [16]. Some of these reproductive and hormonal abnormalities that these patients face are amenorrhea, endometriosis, polycystic ovary syndrome, fibroids, infertility, ovarian cancer, miscarriage, ectopic pregnancy and premature birth [17, 18]. Apart from the physical effects, polycystic ovary syndrome can affect the psychiatric aspects of the patient's life. Anxiety, depression, binge eating disorder and bipolar disorder have been observed as diseases associated with polycystic ovary syndrome [19].

Considering this problem and the very destructive effects of this disorder and the wide spread of this disease, it seems necessary to investigate other aspects of this disease and its related disorders. Among other important disorders that are sometimes observed in these patients are ectropion and erosion in the cervix. Considering their association with cervical cancer and its higher prevalence in these patients, it seems that it is vital to investigate the relationship between these lesions in the cervix and polycystic ovaries and to investigate their relationship with estrogen levels. Considering the importance of this issue in fertility results, in this study, the frequency of cervical erosion and ectropion in patients with polycystic ovary syndrome compared to the control group and the relationship with estrogen levels in patients referred to infertility clinic were investigated.

Materials & methods:

The present study is a case-control study that was conducted between December 2021 and March 2023 in Iran. In this study, 100 patients with polycystic ovary syndrome in the age range of 18 to 50 years, whose disease was diagnosed based on ultrasound and lab tests, as the patient group, and 100 women without polycystic ovary syndrome as the control group were chosen.

Patients were selected from among the patients referred to the clinic without a history of diabetes and oral contraceptive use and based on the following criteria:

Inclusion criteria:

- Patients' satisfaction to participate in the study
- Age ranges from 18 to 50 years
- Polycystic ovary syndrome in the case group and not in the control group
- Having a normal pap smear test
- Having a normal vaginal ultrasound in the control group

Exclusion criteria:

- Lack of consent of patients to participate in the study
- Vaginal bleeding
- Having an abnormal pap smear test
- Virginitis of patients

First, a full medical history was obtained from the patients with polycystic ovary syndrome and the control group, and the patients were fully examined

by 3 gynecologists and examined for the presence of ectropion and erosion (in cases of disagreement about the examination results, examination by 2 persons another specialist was done). Then the estrogen level in the follicular phase was measured by ELISA method in all subjects and the obtained information was entered in the questionnaires prepared for this purpose. Informed consent was obtained from all patients to participate in this research project.

In the descriptive statistics section, mean and standard deviation were used to describe and report quantitative variables with normal distribution, and median and interquartile range were used for non-normal variables. For qualitative variables, ratios were expressed as percentages. SPSS version 27 software was used for data analysis. One way ANOVA test was used to

compare quantitative variables in three groups if the data distribution was normal, and if the data distribution was not normal, the Kruskal Wallis parametric bread test was used, and Mann Whitney test was used to compare qualitative variables in three groups. A statistically significant level of 5% was considered.

Results:

In the current study, the average level of estrogen in the patients and the control group was measured, and the average level of estrogen in the control group was 72.91 pg/dl and the average level in the patient group was 78.46 pg/dl. The minimum and maximum levels of estrogen are also shown in Table1. (P<0.05).

Group	Minimum estrogen level	Maximum estrogen level	Average estrogen level
Control	14 pg/dl	239 pg/dl	72.91 pg/dl
Case	16 pg/dl	390 pg/dl	78.46 pg/dl

Table 1: The level of estrogen in polycystic ovary syndrome patients and the control group.

In the next step, the frequency of erosion in the patient group and the control group was measured, and in the group of patients with polycystic ovary syndrome, the frequency was 28% and in the control group, the frequency

was 19%, which was significantly higher in the group of patients with polycystic ovary syndrome. It was more than the control group (P<0.05).

Group	With erosion	Without erosion	Sum
Control	19%	81%	100%
Case	28%	72%	100%

Table 2: Prevalence of cervical erosion in patients with polycystic ovary syndrome compared to the control group.

Then, the frequency of ectropion was measured in two groups of patients with polycystic ovary syndrome and the control group, the average frequency of which was 23% in the group of patients with polycystic ovary syndrome and 15% in the control group, and this difference was not statistically significant (P=0.63).

Group	With ectropion	Without ectropion	Sum
Control	15%	85%	100%
Case	23%	77%	100%

Table 3: Prevalence of cervical ectropion in patients with polycystic ovary syndrome compared to the control group.

In the current study, estrogen levels were measured in two groups of patients and controls and compared with each other, and these values were compared with the results of clinical examination in terms of the presence or absence

of erosion. According to the values obtained from the statistical analysis, there was no significant relationship between the estrogen level in the two groups with the presence of erosion (P=0.063).

Group	Erosion	Percentage	Average estrogen level
Case	Yes	28%	67.00 pg/dl
	No	72%	75.20 pg/dl
Control	Yes	19%	66.21 pg/dl
	No	81%	71.62 pg/dl

Table 4: Relationship between estrogen level and cervical erosion in patients with polycystic ovary syndrome and control group.

The relationship between the estrogen level in the two groups of patients and controls was also measured, and according to the values obtained from the statistical analysis, a significant relationship between the estrogen level and the presence or absence of ectropion was seen (P=0.0076).

Group	Ectropion	Percentage	Average estrogen level
Case	Yes	23%	115.21 pg/dl
	No	77%	60.27 pg/dl
Control	Yes	15%	96.20 pg/dl
	No	85%	65.90 pg/dl

Table 5: Correlation between estrogen level and cervical ectropion in patients with polycystic ovary syndrome and control group.

According to the results obtained from the experiments in this study, the frequency of menstrual disorders was measured in two groups of patients with polycystic ovary syndrome and the control group. In the control group,

75% of patients had no menstrual disorders, 13% had oligomenorrhea, 8% amenorrhea, and 4% polymenorrhea, and these values for the group with polycystic ovary syndrome were 49%, 32%, 9%, and 10%, respectively.

In the investigation of the prevalence of hirsutism among these patients in the present study, the frequency of hirsutism was measured in two groups with polycystic ovary syndrome and the control group. In the control group, 82% had no hirsutism, 15% had mild hirsutism, and 3% had moderate hirsutism, and no case of severe hirsutism was seen. In the polycystic ovary syndrome group, 65% had no hirsutism, 25% had mild hirsutism, 9% had moderate hirsutism, and 1% had severe hirsutism.

In the next step, the average body mass index (BMI) was measured in both patient and control groups. which was 23.38 kg/m² in the patient group and 22.72 kg/m² in the control group, which was slightly higher in the group of patients with polycystic ovary syndrome, but this difference was not statistically significant (P=0.012).

In the current study, the relationship between estrogen level and body mass index was measured in two groups of patients with polycystic ovary syndrome and the control group. In the group with polycystic ovary syndrome, the relationship between estrogen level and body mass index was significant, but in the control group, the relationship was Not very strong significance was found (the significance level of the correlation coefficient was considered 0.05).

And finally in the current study, the average age of erosion was 28.79 years and the average age of ectropion was 28.05 years, in both groups the average age was slightly higher than the non-affected group.

Discussion:

Today, due to the widespread prevalence of polycystic ovary syndrome, as well as erosion and ectropion in the cervix, and due to the effects, these diseases have on the physical and mental health of the general public, it is necessary to investigate the various aspects of these diseases and identify their effects as much as possible. It is of particular importance to the physical and mental health of people. Some of these effects are related to ovulatory dysfunction, in that when ovulation does not occur, the normal hormone cycle is disrupted, exposing the uterine wall to a constant level of estrogen, thus causing the endometrial layer to become too thick and cause abnormal bleeding occurs in women, this may also lead to endometrial cancer or a prelude to the onset of precancerous changes. In addition, lack of regular ovulation can cause infertility. In addition, metabolic syndrome is more common in women with polycystic ovary syndrome.

In the treatment of polycystic ovary syndrome, lifestyle changes such as weight loss, nutrition and exercise usually play a very important role. Losing just 5 to 10 percent of your body weight can help regulate your menstrual cycle and improve symptoms of PCOS. At the same time, weight loss also reduces the risk of diabetes and heart diseases in these patients. Also, it reduces androgen, cholesterol and insulin levels in many women with PCOS [20-25].

Studies comparing diets for polycystic ovary syndrome have shown that low-carbohydrate diets are effective for both weight loss and insulin levels [26]. A diet that includes fruits, vegetables, and whole grains can help regulate the menstrual cycle. Several studies have shown that 30 minutes of moderate-intensity exercise at least 3 days a week can help women with PCOS lose weight [27]. Besides, losing weight with exercise improves ovulation and lowers insulin levels. Exercise is more beneficial if combined with a healthy diet.

Among the other common disorders discussed in this study are cervical erosions and ectropion. These disorders have a special place among women's diseases due to their overlap with cervical cancer and disorders such as cervicitis.

In the present study, the estrogen levels in patients and control group were examined, and a significant correlation was seen between the two, which was expected. And in examining the relationship between estrogen level and

ectropion, a significant relationship was also found, which was consistent with the results of similar studies.

In general, the results of this study confirm the relationship between high levels of estrogen in these patients and suggest the need for frequent measurement of estrogen levels in patients at risk and frequent periodic examinations in these patients.

Conclusion:

Considering that the association of ectropion in polycystic ovary syndrome patients is high, this point has a special importance in the initial examinations and history of patients with ectropion and erosion referred to gynecologists, in other words, considering that ectropion is a benign finding. It is and does not require additional measures and in contrast to cervicitis and erosion, they need more investigation. Gynecologists can differentiate ectropion from cervicitis and other lesions of the cervix clinically by obtaining a proper history and examination and knowing the relationship between polycystic ovary syndrome and polycystic ovary syndrome. Ectropion can be helped by this item in better diagnosis.

Authors' contributions:

F B (the corresponding author) is responsible for ensuring that the descriptions are accurate and agreed by all authors. All authors had made substantial contributions to all of the following: (1) the conception and design of the radiological work, (2) the measurement, analysis and interpretation of data; (3) drafting the work and revising it; (4) conduction of revision and corrections as per reviewers' comments. All authors have agreed both to be personally accountable for the author's own contributions and to ensure that questions related to the accuracy or integrity of any part of the work, even ones in which the author was not personally involved, are appropriately investigated, resolved, and the resolution documented in the literature. All authors approved the revised version. All authors read and approved the final manuscript.

Ethical statements:

The medical ethics were considered and respected. The study was approved by Institutional Ethics Committee in Hamedan University of Medical Sciences.

Conflict of interest:

None of the authors has conflict of interests.

Acknowledgment:

I am grateful to all of those with whom I have had the pleasure to work during this and other related projects.

References:

1. Crooks DL. (2001). The importance of symbolic interaction in grounded theory research on women's health. *Health care for women international*, 22(1-2):11-27.
2. Kettel B. (1996). Women, health and the environment. *Social Science & Medicine*, 42(10):1367-1379.
3. Tayeri S, Jafari M, Alimohammadzadeh K, Hosseini SM, Shahanaghi K. (2021). A conceptual model for Iranian older women's health: A review study. *Iranian Journal of Ageing*, 16(3):304-329.
4. Kashanian Z, Raghfar H, Mousavi MH. (2018). Simulation of macroeconomic effects of population ageing (application of general equilibrium overlapping generations model). *Journal of Economic Research (Tahghighat-E-Eghtesadi)*, 53(1):93-115.
5. Özdemir S, Özdemir M, Görkemli H, Kiyici A, Bodur S. (2010). Specific dermatologic features of the polycystic ovary syndrome and its association with biochemical markers of the metabolic

- syndrome and hyperandrogenism. *Acta obstetrica et gynecologica Scandinavica*, 89(2):199-204.
6. Guzick DS. (2004). Polycystic ovary syndrome. *Obstetrics & Gynecology*, 103(1):181-193.
 7. Alsamarai S, Adams JM, Murphy M, Post M, Hayden D, Hall JE, et al. (2009). Criteria for polycystic ovarian morphology in polycystic ovary syndrome as a function of age. *The Journal of Clinical Endocrinology & Metabolism*, 94(12):4961-4970.
 8. Mitchell L, King M, Brillhart H, Goldstein A. (2017). Cervical ectropion may be a cause of desquamative inflammatory vaginitis. *Sexual medicine*, 5(3): 212-214.
 9. Jacobson DL, Peralta L, Graham NM, Zenilman J. (2000). Histologic development of cervical ectopy: relationship to reproductive hormones. *Sexually transmitted diseases*, 27(5):252-258.
 10. Goldacre MJ, Loudon N, Watt B, Grant G, Loudon JD, McPherson K, et al. (1978). Epidemiology and clinical significance of cervical erosion in women attending a family planning clinic. *Br Med J*, 1(6115):748-750.
 11. Madile BM. (1976). The Cervical Epithelium from Fetal Age to Adolescence. *Obstetrics and Gynecology*, 47(5):536-539.
 12. Burns T, Breathnach SM, Cox N, Griffiths C. (2008). *Rook's textbook of dermatology*: John Wiley & Sons.
 13. Blume-Peytavi U. (2013). How to diagnose and treat medically women with excessive hair. *Dermatologic clinics*, 31(1):57-65.
 14. Lumezi BG, Pupovci HL, Berisha VL, Goçi AU, Gerqari A. (2014). Acne in hirsute women. *Advances in Dermatology and Allergology/Postępy Dermatologii i Alergologii*, 31(6):356-361.
 15. Cook H, Brennan K, Azziz R. (2011). Re analyzing the modified Ferriman-Gallwey score: is there a simpler method for assessing the extent of hirsutism? *Fertility and sterility*, 96(5):1266-1270.1.
 16. Shi L, Liu S, Zhao W, Shi J. (2015). miR-483-5p and miR-486-5p are down-regulated in cumulus cells of metaphase II oocytes from women with polycystic ovary syndrome. *Reproductive biomedicine online*, 31(4):565-572.
 17. Marshall JC, Dunaif A. (2012). Should all women with PCOS be treated for insulin resistance? *Fertility and sterility*, 97(1):18-22.
 18. Movahed Z, Kohan L, Fallahi S, Tabiee O. (2015). Influence of chemerin rs17173608 polymorphism on polycystic ovary syndrome susceptibility. *Taiwanese Journal of Obstetrics and Gynecology*, 54(3):280-253.
 19. Santh Rani T, Premitha Rajya Lakshmi P, Manga Devi C. (2023). Network pharmacology and molecular docking study of the active ingredients in Saptasaram kashayam for the treatment of Polycystic ovary syndrome. *Indian Journal of Biochemistry and Biophysics (IJBB)*, 60(2):108-121.
 20. Hoeger K. (2001). Obesity and weight loss in polycystic ovary syndrome. *Obstetrics and gynecology clinics of North America*, 28(1):85-97.
 21. Escobar Morreale HF. (2008). Polycystic ovary syndrome: treatment strategies and management. *Expert Opinion on Pharmacotherapy*, 9(17):2995-3008.
 22. Wolf WM, Wattick RA, Kinkade ON, Olfert MD. (2018). The current description and future need for multidisciplinary PCOS clinics. *Journal of clinical medicine*, 7(11):395.
 23. Legro RS, Dodson WC, Kunselman AR, Stetter CM, Kris-Etherton PM, Williams NI, et al. (2016). Benefit of delayed fertility therapy with preconception weight loss over immediate therapy in obese women with PCOS. *The Journal of Clinical Endocrinology & Metabolism*, 101(7):2658-2666.
 24. Ornstein RM, Copperman NM, Jacobson MS. (2011). Effect of weight loss on menstrual function in adolescents with polycystic ovary syndrome. *Journal of pediatric and adolescent gynecology*, 24(3):161-165.
 25. Dokras A, Sarwer DB, Allison KC, Milman L, Kris-Etherton PM, Kunselman AR, et al. (2016). Weight loss and lowering androgens predict improvements in health-related quality of life in women with PCOS. *The Journal of Clinical Endocrinology & Metabolism*, 101(8):2966-2974.
 26. Gower BA, Chandler-Laney PC, Ovalle F, Goree LL, Azziz R, Desmond RA, et al. (2013). Favourable metabolic effects of a eucaloric lower-carbohydrate diet in women with PCOS. *Clinical endocrinology*, 79(4):550-557.
 27. Aly JM, Decherney AH. (2021). Lifestyle modifications in PCOS. *Clinical obstetrics and gynecology*, 64(1):83-89.



This work is licensed under Creative Commons Attribution 4.0 License

To Submit Your Article Click Here:

Submit Manuscript

DOI:[10.31579/2640-1045/140](https://doi.org/10.31579/2640-1045/140)

Ready to submit your research? Choose Auctores and benefit from:

- fast, convenient online submission
- rigorous peer review by experienced research in your field
- rapid publication on acceptance
- authors retain copyrights
- unique DOI for all articles
- immediate, unrestricted online access

At Auctores, research is always in progress.

Learn more <https://auctoresonline.org/journals/endocrinology-and-disorders>