Original Article

Frequency of Pelvic Endometriosis and Serum Prolactin Levels Among Infertile Women at a Tertiary Care Hospital - An Observational Study

Zubia Afzal[1], Abdul Wasae[2], Afifa Afzal[3], Freeha Naeem[4], Talha Laique[5]

[1]Department of Obstetrics & Gynaecology, Patel Hospital, Karachi; [2]Department of Cardiology, Tabba Heart Institute, Karachi; [3]Department of Pharmacy and Allied Health Sciences, Iqra University, Islamabad; [4]Department of Diagnostic Radiology, Jinnah Hospital, Lahore; [5]Department of Medicine, Mayo Hospital, Lahore.

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Abstract

Background: Endometriosis, a common benign condition affecting 10–15% of women of reproductive age, is strongly associated with infertility. It is detected in 25–50% of infertile women and 12–32% of those with pelvic pain. Prolactin secretion from endometriotic implants may contribute to ovarian dysfunction and impaired fertility.

Objective: This study aims to determine the frequency of pelvic endometriosis in infertile patients and compare serum prolactin levels among infertile patients with and without endometriosis.

Methods: It was a cross-sectional study. One hundred and fifty female patients who met the inclusion criteria and presented with complaints of infertility to the outpatient clinic of Jinnah Hospital Lahore were included after informed consent. A 5 mL blood sample was sent to the laboratory for serum prolactin analysis. A consultant radiologist performed transvaginal ultrasound on all patients, for the confirmation of pelvic endometriosis. Mean prolactin levels in females with and without endometriosis were compared using Student's t-test ($p < 0.05$ was considered significant).

Results: The study found that 20.67% (n=31) of infertile female patients who presented to the tertiary care hospital's outpatient department had pelvic endometriosis. When the mean serum prolactin levels of infertile patients with and without endometriosis were compared, the prolactin levels in cases with endometriosis were 22.74±2.03 ng/mL, and in cases without endometriosis were 13.50±2.49 ng/mL, with a p value of 0.0001.

Conclusion: It is concluded that hyperprolactinemia does exist in infertile patients with endometriosis. However, further studies assessing prolactin concentrations across different stages of endometriosis are required to confirm this association.

Keywords: Infertility, Endometriosis, Prolactin, Hyperprolactinemia.

Correspondence:
Talha Laique, *Department of Medicine, Mayo Hospital, Lahore.*
Email: *talhalaique51@gmail.com*

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Introduction

Endometriosis is a benign condition characterized by the presence of endometrial glands and stroma outside the uterine cavity. While lesions are most commonly found in the pelvis,

they can also occur in the intestines, diaphragm, or pleura. Despite being non-malignant, ectopic endometrial tissue often leads to infertility, dysmenorrhea, and dyspareunia due to associated inflammation.[1] It affects approximately 10% of women of reproductive age globally, although prevalence estimates vary by population. Accurate diagnosis is challenging, as many women are asymptomatic or present with nonspecific symptoms, and confirmation typically requires surgical evaluation.[2]

The existence and growth of functioning endometrial glands and stroma outside of the uterine cavity are the hallmarks of endometriosis, a chronic and recurring condition. It causes a wide range of debilitating symptoms and negatively impacts the ability to reproduce. Dysmenorrhea, dyspareunia, infertility, dyschezia, pelvic or lower abdominal pain, irregular bleeding, and persistent exhaustion are among the symptoms.[3] Endometriosis is primarily diagnosed and treated via laparoscopy, which remains the gold standard for both diagnostic confirmation and therapeutic intervention.[2] International studies report a prevalence ranging from 29% to 48.4%, whereas local data, derived from an older retrospective study based on secondary sources, suggest a considerably lower prevalence of 16.8%. While one study demonstrated significantly elevated prolactin levels in women with endometriosis another study found no statistically significant difference between the two groups.[3,4] This discrepancy highlights the need for further well-designed studies to elucidate the potential role of hyperprolactinemia in the pathophysiology of endometriosis.[5]

More recent studies show that prolactin can contribute to the development of endometriosis by sensitizing the nociceptors, which intensifies the pain experienced in the pelvis. Furthermore, research has shown that infertile women with more advanced stages of endometriosis tend to have higher prolactin levels in comparison to women without the disease, which indicates that it may serve as a prognostic biomarker. Still, the differing results fro+m studies emphasize the need to further understand this complex relationship.[6] An infertile woman may have high prolactin levels. Prolactin levels should be low in women who are not nursing or pregnant. A non-pregnant woman may have trouble getting pregnant if her prolactin levels are abnormally high.[7]

Infertility is a distinct medical condition that affects couples and refers to the inability to conceive despite regular, unprotected intercourse. It is defined as failure to achieve pregnancy after 12 months in women under 35 years of age, and after 6 months in women aged 35 or older.[8,9] A study conducted among 518 recently married textile workers in China, aged 20–34 years and actively attempting conception, reported a cumulative pregnancy rate of approximately 50% within two menstrual cycles and 88% within six months. The estimated monthly fecundability ranged between 0.30 and 0.35.[10] Similarly, in a population-based study involving 867 women from the general community engaging in unprotected intercourse, conception rates were 54%, 76%, and 89% within 6, 12, and 24 months, respectively.[11]

There is a lack of research specifically focused on pelvic endometriosis and its association with prolactin, and existing studies show inconsistent findings. This study aims to contribute to the understanding of the local disease burden in our community. As both elevated serum prolactin levels and pelvic endometriosis are associated with infertility, clarifying their relationship may assist gynecologists in providing more effective care. This study aims to determine the frequency of pelvic endometriosis in infertile patients and compare serum prolactin levels among infertile patients with and without endometriosis.

Methods

This cross-sectional study was conducted at the Gynecology Unit of Jinnah Hospital, Lahore, following **ethical approval; (Reference No. CPSP/REU/OBG-2016-055-7472).**

Inclusion criteria: Infertile female patients between the ages of 18 and 45 who presented to this tertiary care hospital were included. Informed consent was taken from all the participants. **Exclusion criteria** were as follows: patients with history of more than five prior abdominal surgeries, those with active

infections identified by a total leukocyte count (TLC) greater than 11,000 cells/mm³, patients with a pituitary adenoma diagnosed on CT scan, individuals with thyroid dysfunction defined by serum TSH levels less than 0.5 mU/L or greater than 5.7 mU/L, patients diagnosed with pelvic inflammatory disease or polycystic ovarian syndrome based on ultrasound findings and clinical history, and those who had used tranquilizers, dopamine antagonists, or antiemetic medications within the previous three months.

At a 95% confidence level, a sample size of 150 was determined using a non-probability consecutive sampling technique. After obtaining informed consent, 150 female patients who fulfilled the inclusion criteria and presented with infertility complaints at the gynecology outpatient department of Jinnah Hospital, Lahore, were enrolled in the study. Data for all study variables were recorded using a structured Performa. A 5 mL venous blood sample was collected from each participant under aseptic conditions. The samples were transferred to serum vials and sent, along with baseline investigations, to the laboratory at Allama Iqbal Medical College, Lahore, for serum prolactin analysis. Laboratory reports were retrieved on the following day. Additionally, all participants underwent transvaginal ultrasonography performed by a consultant radiologist, for diagnosis of pelvic endometriosis. Strict confidentiality of patient data was maintained throughout the study.

Statistical Analysis: SPSS 17.0 was used to analyze and evaluate the data. Frequencies and percentages are given for categorical variables. Mean and standard deviation is given for continuous variables as data distribution was normal. The mean prolactin level in females with and without endometriosis was compared using the Student's t-test, with a p-value of less than 0.05, which is considered significant.

Results

In this study a total of 150 cases who met the selection criteria were enrolled. The mean ± SD (standard deviation) age was 27.75 ± 4.76 years. Out of total 70.67% (n=106) had primary infertility and 29.33% (n=44) had secondary infertility. The frequency of pelvic endometriosis among infertile females presenting to the outpatient department is 20.6% (31/150 patients). Descriptive features of the study participants are given in table-I.

Table I: *Descriptive characteristics of the study population*

Distribution of age (n=150)		
Age in years	**Number of patients**	**%**
18-30	113	75.33
31-45	37	24.67
Total	150	100
Mean ± SD	27.75 ± 4.76	
Type of infertility (n=150)		
Type of infertility	No. of patients	**%**
Primary	106	70.67
Secondary	44	29.33
Total	150	100
Frequency of pelvic endometriosis among infertile females		
Pelvic Endometriosis	No. of patients	**%**
Yes	31	20.67
No	119	79.33
Total	150	100

n = Number of participants, % = Percentage

A comparison of mean serum prolactin levels in infertile females with and without endometriosis

Table II: *Comparison of mean serum prolactin levels among infertile patients with and without endometriosis*

	With endometriosis	**Without endometriosis**	**p-value**
Serum prolactin level	Mean ± SD	Mean ± SD	
	22.74 ± 2.03 ng/mL	13.50 ± 2.49 ng/mL	0.0001*

The mean prolactin level in females with and without endometriosis was compared using the Student's t-test. A p value of less than 0.05 is considered significant.

showed significantly higher levels in the endometriosis group (table-II).

Table III: *Comparison of serum prolactin level among infertile patients after stratification for age and type of infertility*

Stratification for age (n=150)			
Age in years	Mean ± SD serum prolactin level		p-value
	With endometriosis	Without endometriosis	
18-30	22.96 ± 1.93 ng/mL	13.47 ± 2.45 ng/mL	0.0001*
31-45	21.60 ± 2.41 ng/mL	13.56±2.63 ng/mL	0.0001*
Stratification for type of infertility (n=150)			
Infertility	Mean ± SD serum prolactin level		p-value
	With endometriosis	Without endometriosis	
Primary	23.04±1.99 ng/mL	13.57 ± 2.54 ng/mL	0.0001*
Secondary	21.50±1.87 ng/mL	13.34± 2.41 ng/mL	0.0001*

The mean prolactin level in females with and without endometriosis was compared using the Student's t-test while using stratification for age and type of infertility. A p value of less than 0.05 is considered significant.

Comparison of serum prolactin level in females with and without endometriosis after stratification for age and type of infertility showed significant difference depicted in table-III

Discussion

This study was conducted to determine the prevalence of pelvic endometriosis among infertile female patients and to explore its association with serum prolactin levels. Based on the clinical diagnostic criteria prevalence of endometriosis was found to be 20.67% in the current study. Furthermore, a comparative analysis of serum prolactin levels revealed that women with endometriosis had significantly elevated levels of prolactin (22.74 ± 2.03 ng/mL) compared to those without endometriosis (13.50 ± 2.49 ng/mL). The statistically significant difference observed in prolactin levels suggests an underlying hormonal dysregulation in women with endometriosis. This finding highlights hyperprolactinemia as a potential contributing factor in the disease development or progression. Elevated prolactin may influence reproductive hormone balance, potentially disrupting ovulatory function and endometrial receptivity, thereby playing a role in the infertility commonly associated with endometriosis.[12,13]

When these findings were compared with the global data, they fell within the lower range of reported prevalence rates. International literature indicates that the frequency of endometriosis among women of reproductive age, particularly those experiencing infertility, ranges from 29% to 48.38%.[14] Another study conducted in Ireland reported the prevalence of 37%.[15] However, our results are closely aligned with a regional study conducted in Pakistan, which reported a prevalence of 24% among infertile women.[16] This similarity concurs credibility to our findings and suggests a relatively consistent prevalence rate within the local population across different tertiary care settings. The variation in prevalence across studies could be attributed to differences in study design, diagnostic criteria or sample size. Geographical and demographic differences, such as variations in ethnicity, healthcare access, and awareness levels, may also contribute to the inconsistent prevalence rates observed in the literature.[15]

Along with highlighting the prevalence of endometriosis, our study also found elevated prolactin levels in affected women, which is consistent with previous research findings. For instance, one study demonstrated significantly higher mean prolactin levels in patients with endometriosis compared to controls (23.02 ± 1.25 ng/mL vs. 17.22 ± 1.22 ng/mL, p=0.004).[17] These findings are in concordance with our results and reinforce the fact that hyperprolactinemia may be more than a coincidental finding in endometriosis. It may, in fact, reflect an underlying pathophysiological mechanism linking hormonal imbalance to the development or exacerbation of endometrial lesions, particularly

among women presenting with infertility.[18] Taken together, these findings contribute to the growing body of evidence suggesting that endometriosis is not only underdiagnosed but also potentially influenced by hormonal alterations, including elevated prolactin levels.[18,19] Recognizing this association is important for clinical management, as it opens avenues for targeted hormonal evaluation and therapy in women presenting with unexplained infertility or pelvic pain.

Conclusion

It is concluded through this study that hyperprolactinemia is associated with endometriosis in infertile patients.

Limitations and Recommendations: The generalizability of this study is limited as it is being conducted at a single institution. Further prospective studies with larger sample sizes and multicenter involvement are warranted to validate these findings and explore the clinical implications of hyperprolactinemia in the diagnosis and management of endometriosis.

Conflict of Interest: None

Funding Disclosure: None

Ethical consideration: The study was approved by the ethical review board (Reference No. CPSP/REU/OBG-2016-055-7472). Informed written consent was obtained from the participants, and the confidentiality of their data was clearly explained.

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Authors Contribution

All the authors made substantial contributions equally in accordance with ICMJE guidelines as mentioned below:

ZA: Conception of the work, interpretation of data, critical review, and final approval of version

AW: Acquisition of idea of study, reviewing it critically and approving the final version of work

AA: Contribution to the design of the work, Critical review of the work, helped in drafting of work, assisted in interpretation of data, and final approval of work

FN: Contribution to the study: Drafting the work and revising it critically, reviewing data for the study, helped in conceptualization of idea, helped in shaping the final version to be published.

TL: Conception of the work, interpretation of data, helped in critical review, and final approval of version

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