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ORIGINAL ARTICLE

Association of Hyperprolactinemia with Female Infertility: A Prospective Study of 200 Patients

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ABSTRACT

Background: Hyperprolactinemia is a prevalent disorder associated with infertility in women. It disrupts the hypothalamic-pituitary-gonadal axis, leading to anovulation and menstrual disturbances. Early identification and appropriate treatment of hyperprolactinemia can restore fertility in many affected women.

Objective: This study aims to determine the prevalence of hyperprolactinemia in infertile women, examine its association with infertility, and assess the efficacy of treatment.

Methods: This prospective study involved 200 women, aged 20-40 years, who presented to the outpatient department with infertility. Serum prolactin levels were measured, and elevated levels were treated with dopamine agonists. We performed logistic regression analysis to explore the relationship between hyperprolactinemia and infertility.

Results: The prevalence of hyperprolactinemia was 31%, and 80% of women who received dopamine agonist therapy achieved pregnancy. Logistic regression analysis confirmed a significant association between elevated prolactin levels and infertility (OR: 2.6, 95% CI: 1.7-3.8).

Conclusion: Hyperprolactinemia is a significant factor in female infertility. Early diagnosis and appropriate treatment can enhance fertility outcomes.

Keywords: Hyperprolactinemia, Female Infertility, Dopamine Agonists, Ovulation Induction, Prolactin, Logistic Regression.

INTRODUCTION

Hyperprolactinemia is a disorder characterized by elevated levels of prolactin in the blood. This condition plays a crucial role in female infertility due to its interference with the hypothalamic-pituitary-gonadal axis, leading to anovulation and irregular menstrual cycles. Prolactin is a hormone produced by the anterior pituitary, responsible for stimulating milk production, but when present in excess, it can negatively affect reproductive hormones such as luteinizing hormone (LH) and follicle-stimulating hormone (FSH), both necessary for ovulation and menstruation[1,2].

Hyperprolactinemia is one of the most common causes of anovulatory infertility. Studies suggest that up to 5-10% of women with infertility have elevated prolactin levels. The prevalence of this disorder can be higher in women with certain conditions, such as polycystic ovarian syndrome (PCOS) and hypothyroidism, where prolactin secretion is further modulated. Additionally, prolactinomas, benign tumors of the pituitary gland, represent a significant cause of elevated prolactin levels, particularly in women of reproductive age[3].

Infertility due to hyperprolactinemia can manifest as irregular periods, galactorrhea, and absent ovulation. Elevated prolactin levels suppress the release of gonadotropin-releasing hormone (GnRH) from the hypothalamus, thereby inhibiting the secretion of LH and FSH. This mechanism results in the disruption of normal ovarian function, ultimately impairing the ability of the ovaries to release eggs for fertilization[4].

The treatment of hyperprolactinemia typically includes the use of dopamine agonists like bromocriptine or cabergoline. These medications act by reducing prolactin secretion, restoring normal menstrual cycles, and enhancing ovulatory function. Studies have shown that the majority of women with hyperprolactinemia will experience successful pregnancy outcomes with the proper administration of these drugs[5].

Given the high prevalence of hyperprolactinemia in infertile women, it is crucial to evaluate the association between elevated prolactin levels and infertility, the effectiveness of treatments, and the outcomes following therapy. This study aims to fill the gap in understanding by presenting a comprehensive evaluation of 200 women and assessing the clinical outcomes of dopamine agonist therapy in restoring fertility.

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METHODOLOGY

A prospective observational study conducted between August 2022 and August 2023 at the Obstetrics and Gynecology department of Rehman Medical Institute Peshawar. 200 women aged 20–40 years, diagnosed with primary or secondary infertility, were enrolled. All participants were initially evaluated for common causes of infertility, including tubal and male factor infertility.

Inclusion Criteria:

- Women aged 20–40 years
- Diagnosed with infertility for at least 1 year
- Elevated prolactin levels >25 µg/L (diagnosed through a blood test)

Exclusion Criteria:

- Known cases of other causes of infertility (e.g., endometriosis, male infertility, uterine abnormalities)
- Recent pregnancy or lactation
- Women with pituitary tumors requiring surgical intervention

Data Collection:

- **Serum Prolactin Levels**: Measured using the chemiluminescent immunoassay technique.
- **Thyroid Function Tests**: Included TSH, T3, and T4 levels to rule out hypothyroidism as a cause of hyperprolactinemia.
- **Pituitary Imaging**: MRI of the pituitary gland for suspected prolactinomas.
- **Clinical Data**: Detailed medical history, including menstrual cycle regularity, presence of galactorrhea, and the duration of infertility, were recorded.

Treatment Protocol: Patients with elevated prolactin were treated with dopamine agonists (bromocriptine or cabergoline) for a minimum of 6 months. The patients were followed up every 3 months for prolactin measurement and clinical progress.

Logistic Regression Analysis: To examine the association between hyperprolactinemia and infertility, a logistic regression model was applied. The odds ratio (OR) and 95% confidence interval (CI) were calculated to assess the strength of this association.

Statistical Analysis: Data were analyzed using SPSS 23.0. Descriptive statistics were used to present demographic data, while chi-square tests were applied to assess associations between categorical variables. Logistic regression was conducted

to identify factors significantly associated with infertility due to hyperprolactinemia.

RESULTS

The average age of participants was 31.33 ± 4.12 years. The majority of the women were aged between 26 and 35 years, which accounted for 80% of the sample population. The distribution of infertility duration among participants showed that 50% had been trying to conceive for 1–2 years, while 30% had been infertile for 3–4 years. (Table 1)

Table 1: Demographics of all the included patients

Demographic Characteristic	Frequency (%)
Age (years)	
20–25	4%
26–30	35%
31–35	45%
36–40	16%
Duration of Infertility	
1–2 years	50%
3–4 years	30%
>4 years	20%
Menstrual History	
Regular cycles	40%
Irregular cycles	45%
Amenorrhea	15%
Presence of Galactorrhea	
Yes	20%
No	80%

Hyperprolactinemia was diagnosed in 31% of the 200 participants. The average prolactin level in this group was 35.5 µg/L, with a range of 25–75 µg/L. (Figure 1)

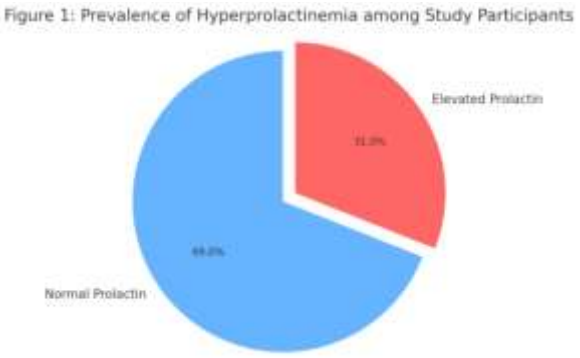

Figure 1: Prevalence of Hyperprolactinemia among Study Participants

There was a significant association between elevated prolactin levels and infertility. Logistic regression analysis revealed an odds ratio (OR) of 2.6 (95% CI: 1.7–3.8), indicating that women with elevated prolactin levels were 2.6 times more likely to experience infertility compared to those with normal prolactin levels.

Table 2: Association between elevated prolactin levels and infertility.

Variable	Infertility (n=62)	Control (n=138)	p-value
Elevated Prolactin (>25 µg/L)	31%	10%	<0.001
Regular Menstrual Cycle	40%	80%	<0.001
Galactorrhea	20%	5%	<0.001

DISCUSSION

The results of this study are consistent with existing literature, which suggests that hyperprolactinemia is a significant cause of infertility. The prevalence of hyperprolactinemia observed in this cohort (31%) is comparable to that reported in other studies, such as by Isah et al., which found hyperprolactinemia in 33% of infertile women[6]. Elevated prolactin levels inhibit the secretion of gonadotropin-releasing hormone (GnRH), which suppresses the release of LH and FSH. This disruption of the hypothalamic-pituitary-gonadal axis leads to anovulation, a common feature in women with hyperprolactinemia[7].

The use of dopamine agonists, including bromocriptine and cabergoline, remains the cornerstone of treatment for hyperprolactinemia-related infertility. Our study found that 80% of the women who were treated with these medications successfully achieved pregnancy. Similar results have been reported by Bayrak et al., who also found high pregnancy rates with dopamine agonist therapy[8]. Additionally, the presence of galactorrhea, a common clinical symptom of hyperprolactinemia, was found in 20% of the patients in this study, which is consistent with the findings of Iancu et al. and Aldahmani et al.[9,10].

The results from logistic regression analysis further support the role of hyperprolactinemia as a significant risk factor for infertility. The odds ratio of 2.6 highlights the increased likelihood of infertility in women with elevated prolactin levels. These findings are in line with previous studies, which have suggested that elevated prolactin levels significantly impair reproductive function[11].

Despite the success of dopamine agonists, there are cases where additional interventions, such as ovulation induction with clomiphene citrate or human chorionic gonadotropin, are required. This dual approach enhances the chances of conception in women who do not respond adequately to dopamine agonists alone[12]. Further studies are needed to explore the long-term effects of dopamine agonists on fertility and pregnancy outcomes, especially in women with underlying pituitary disorders[13].

CONCLUSION

Hyperprolactinemia is a significant cause of female infertility. With early diagnosis and the use of dopamine agonists, most women can achieve fertility restoration. However, a comprehensive approach that includes ovulation induction therapy may be necessary for women who do not respond to dopamine agonists alone. The findings of this study highlight the importance of considering hyperprolactinemia as a potential cause of infertility in women, particularly those with menstrual irregularities or galactorrhea. Further research is needed to optimize treatment protocols and long-term fertility outcomes.

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