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Research Article

Study of Polycystic Ovarian Syndrome in Infertile Women in a Rural Hospital in Central India, Prospective Design

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Abstract

Introduction: Polycystic Ovarian Syndrome (PCOS) is a leading cause of infertility, affecting 7-15% of women of reproductive age. With improving laboratory facilities, sonography, and laparoscopy for evaluation of infertility, PCOS has shown a remarkable increase in prevalence. Ovulation induction is the first-line treatment in such cases.

Aims & Objective: To find prevalence and clinical scenario of PCOS in rural background and provide an overview of the medical management available to improve fertility in PCOS.

Material and Methods: This is a prospective observational study from November 2016 to October 2021. Out of 231 infertile patients, 96 women had PCOS with infertility and were recruited in a rural tertiary care centre. Clomiphene citrate, Clomiphene plus metformin and letrozole were used as medical management. Variables studied were morphological feature, menstrual pattern, hormonal profile and outcome of medical management in form of successful ovulation induction and conception.

Results: In our study mean BMI of study subject was 31.25.Chief complaint was oligo-hypomenorrhea (42.7%). 39.58 % of patients had LH/FSH Ratio of >2.Successful ovulation rate was 50% in the CC group (n=18), 76.60%, in the CC plus metformin group (n=47), and 70.97% in the letrozole treatment group (n=31). Conception rate was highest in letrozole group (22.58%) compared to Clomiphene plus metformin (14.89%) group.

Conclusion: Successful ovulation rates for letrozole and clomiphene were comparable after three cycles of treatment and letrozole appears to improve the conception in sub-fertile women with PCOS when compared to clomiphene in a rural setting.

Keywords: Clomiphene; Infertility; Letrozole; Metformin; Ovulation induction; Polycystic Ovarian Syndrome (PCOS)

Introduction

Infertility affects 15% of couples worldwide [1]. Polycystic Ovary Syndrome (PCOS) is a leading cause of infertility and a common endocrine disorder affecting 7-15% of women of reproductive age [1]. The prevalence of PCOS in India is between 3.7% and 22.5% depending on the population studied [2]. Ovulation disorders make up 20% of all cases of female infertility, and they are typically among the most quickly identifiable and treated causes of infertility [3]. PCOS is the leading cause of oligo-ovulation and anovulatory infertility, accounting for 70% of women undergoing fertility treatment [4]. Ovulation induction is therefore the first-line treatment in such cases. To optimize the efficacy of the treatment of infertile women with PCOS, evaluations of tubal patency and semen analysis are mandatory before deciding on treatment. Variations could exist in the prevalence of PCOS in urban and rural settings

due to dissimilar dietary practices, levels of physical activity, and lack of awareness [5].The rural population lives a physically active lifestyle hence, there is no role of lifestyle modification. The mainstay of our management is ovulation induction. The purpose of this study is to find prevalence and clinical scenario of PCOS in rural backgrounds and provide an overview of the different options available to improve fertility in PCOS. Patients suffering from PCOS seek consultation for varying degrees of hyperandrogenism, menstrual cycle dysfunction, obesity, and infertility. The associated comorbidities causing PCOS and infertility are addressed in this study. The objective of the study is to find out the prevalence of PCOS in our area, a district in central India. Till the last five years, there was no infertility clinic here. We receive women from different strata of society, as PCOS was not very much identified in this area we tried to find out etiology of infertility in our patient. Analyzing the various etiological causes, we could get a small proportion of causes other than ovulation failure. Anovulation is treatable medically. Our goal was to evaluate the most effective treatment for inducing ovulation and pregnancy. By doing the study we were able to know the distribution of PCOS responsible for infertility in this area. The relevance of the study is that we all gynaecologists will be able to have a wide vision of isolating such females in general outpatient clinics.

Material and Methods

In the prospective observational study (November 2016 to October 2021) all women attending infertility clinic, and diagnosed with PCOS in C.R.Gardi Hospital according to Rotterdam's criteria, were recruited as study subjects. After obtaining written informed consent, a standard questionnaire was used to document the detailed history and medical information. History taking of all study subjects regarding their demographic data, age, education, occupation, income, and socioeconomic status was done. Then their marital life, menstrual history, duration of infertility, last menstrual period, cutaneous features like acne, hirsutism, acanthosis nigricans, and husband semen analysis were observed. The patient's medical history, family history, history of physical activity, and dietary habits were noted. History of previous infertility treatment was also recorded. Her pulse, blood pressure, weight, and height were recorded in a proforma. Ultrasonography was done to know the follicular status and endometrial thickness. Furthermore, investigation of the patient was done which includes routine investigations like Complete Blood Count, ABO, HIV, HBsAg, VDRL, and urine routine. We also got specific investigations for infertility like Thyroid Stimulating Hormone, Random Blood Sugar, Luteinizing Hormone, Follicular Stimulating Hormone, and Anti Mullerian Hormone of the patient done. According to a detailed history, cutaneous features of hyperandrogenism, laboratory findings, and ultrasonography showing polycystic ovarian pattern, infertile women who were diagnosed with PCOS according to Rotterdam's criteria, were recruited as study subjects. According to Rotterdam consensus, PCOS is defined by the presence of two out of threeof the following: Menstrual irregularities (oligo-ovulation/ anovulation), hyperandrogenism, and polycystic ovaries in USG (≥12 follicles measuring 2-9 mm in diameter and ovarian volume >10 ml in at least one ovary) [6]. Women eligible for medical treatment were selected. The aim of ovulation induction is the therapeutic restoration of the release of one egg every cycle in a woman who has either not been ovulating periodically or not at all [7]. The first-line therapy for ovulation induction is clomiphene and planned intercourse [7]. PCOS patients often present with insulin resistance and hyperinsulinemia [7]. Several studies have shown that metformin (alone or in combination with clomiphene) increased the ovulatory cycle in women with PCOS [8]. Letrozole lowers the possibility of developing numerous follicles [9]. Medical management of anovulation, with the drugs like Clomiphene Citrate (CC) in a dose of 50mg once a day, started on day 3 of menses for 5 days, clomiphene plus metformin in a dose of 500mg twice a day, and letrozole in a dose of 2.5 mg once a day from day 3 of menses for 5 days,were performed. These patients who were given ovulation induction drugs were followed up for 3 cycles and her serial ultrasonography was done on days 10, 12, and 14 of the last menstrual periods to assess the ovulation induction occurring in these females. These females whose ovulation induction was successful were followed up further to know about their conception. We also looked into the prevalence of PCOS among infertile women. This project was cleared by Institutional Ethics Committee at R D Gardi Medical College, Ujjain. Certficatae no ECR/1030/inst/MP/2018/RR-21.

Results

In our study majority, 66 (68.8%) of the patients were in the age group of 21-30 years, followed by 30 (31.3%) in the age group of >30 years. 38 (39.58%) women had BMI of >32, 35 (36.46%) with a BMI of 28.1-32, 12 (12.50%) had a BMI of 25.1-28, and 6 (6.25%) with BMI of 23-25. The mean BMI of the study subject was 31.25 (Table 1).The Mean waist Circumference (cm) among the patients with PCOS was 91.36 ± 8.03; 57 (59.4%) had acne, 24 (25%) had Acanthosis nigricans (%), and 51 (53.1%) had hirsutism.

Morphological feature	n-(%)	
Mean waist circumference (cm)	91.36 ± 8.03	
Acne (%)	57 (59.4%)	
Acanthosis nigricans (%)	24 (25%)	
Hirsutism (%)	51 (53.1%)	
BMI	23-25	6(6.25%)
	25.1-28	12(12.50%)
	28.1-32	35(36.46%)
	>32	38(39.58%)
	Mean BMI	31.25

Table 1: Morphological features in PCOS patients.

In our study most commonly encountered chief complaint was menstrual irregularities. 41 (42.7%) had Oligo-hypomenorrhea, followed by 33 (34.4%) with metrorrhagia and 23 (24%) with hypomenorrhea (Table 2).This is because of anovulation in PCOS.

Menstrual pattern	n-(%)
Hypomenorrhea	23 (24%)
Oligo-hypomenorrhea	41 (42.7%)
Metrorrhagia	33 (34.4%)

Table 2: Menstrual complaints in PCOS for which women report to gynae clinic.

In our study, the majority 60 (62.5%) had a non-ovulatory cycle, and 36 (37.5%) had an ovulatory cycle. The mean LH value was 9.86 ± 3.7 mIU/ml and the mean FSH was 6.59 ± 8.21 mIU/ml. 39.58 % of patients had an LH/FSH Ratio of more than two (Table 3).

Biochemical parameters	Mean ± SD
LH (mIU/ml) Reference range:16-19 FSH (mIU/ml)	9.86 ± 3.7
FSH (mIU/ml) Reference range:3.2-10	6.59 ± 8.21
AMH (ng/ml)	7.80 ± 4.27
Prolactin(µIU/ml) Reference range:204-412	11.2 ± 6.23
LH/FSH Ratio [>2]	38 (39.58%)
LH/FSH	1.77 ± 0.80
TSH(µIU/ml) Reference range:0.5-5.5	3.09 ± 6.02
(AMH- Anti Mullerian Hormone, LH- Luteinising Hormone, FSH-Follicular Stimulating Hormone, TSH-Thyroid Stimulating Hormone)	

Table 3: Hormonal profile of PCOS with infertility patients.

In this study on managing the patients medically, majority of the obese women were managed by Clomiphene and Metformin (n=47), 36 (76.60%) of them, had successful ovulation induction but only 7 (14.89%) had conception. Among the patients treated with Letrozole (n=31), 22 (70.97%) had successful ovulation induction, and success concerned with conception was 7 (22.58%). Eighteen patients were treated with Clomiphene, among which 9 (50%) had successful ovulation induction, and 3 (16.67%) had conception (Table 4).

Medical management	Successful Ovulation induction n- (%)	Conception n-(%)
Clomiphene (n=18)	9 (50%)	3 (16.67%)
Clomiphene + Metformin (n=47)	36 (76.60%)	7 (14.89%)
Letrozole (n=31)	22 (70.97%)	7 (22.58%)

Table 4: Comparison of various Medical Management with successful ovulation induction and its outcome.

Discussion

PCOS is the most common cause of anovulatory infertility in reproductive-age women [4]. A simple oral medicine that could be given with little oversight and without the possibility of hyperstimulation would be the recommended course of treatment. In this study, we provide our preliminary observations from using the CC, CC and metformin, and the aromatase inhibitor letrozole in a particular group of women. Out of 231 total infertility OPD patients, 96 patients were diagnosed with PCOS with infertility. That contributes to 41.5 % of the prevalence. The mean age of the patients in this study is 28.1 years. The average duration of infertility in the present study is 6.5 years. In our study majority, 42.7% had oligo-hypomenorrhea, 34.4% had metrorrhagia and 24% had hypomenorrhea. Various studies done by Detti Let al, and S.A. Amer et al also had oligomenorrhea as the most common menstrual pattern in PCOS with infertile women, which was 52.2% and 53.8% respectively [10,11]. A study conducted by Zain MM et al had 29.3% oligomenorrhea, which may be because of geographical variation.59.4% had acne, 53.1% had hirsutism, and 25% had acanthosis nigricans [9]. Some authors reported 37.5% of patients with acne, 44.5% hirsutism, and 21%acanthosis nigricans

[11]. Another study reported 47.6% of patients had acne and 62% had hirsutism [10]. The mean BMI was 31.25 and 88.5% of patients had a BMI > 25. Some studies find mean BMI was 30.9, 33.2 and 65.8% of patients had BMI above 25, Which was in concordance with the present study [10,12].The mean LH level was 9.86 ± 3.71 Miu/ml. 39.58% of patients had an LH to FSH ratio of >2 in the present study. These elevated LH levels can harm the endometrium and oocytes by creating an unfavourable environment [13]. In more than half (52%) of the cases, LH to FSH ratio was found >2 by Nahar et al [14]. This is consistent with Begum et al findings (51%) [12]. In our study on managing the patients medically, the majority of the obese patients were managed by Clomiphene and Metformin (n= 47), among which, 36 (76.60%), had successful ovulation induction but only 7 (14.89%) had conception. Eighteen patients (17.28%) were treated with Clomiphene, among which 9 (50%) had successful ovulation induction, and 3 (16.67%) had conception. Patient treated with Letrozole (n=31), 22 (70.97%) had successful ovulation induction, which is comparable to the ovulation induction done by Clomiphene plus Metformin group, and had higher conception 7 (22.58%) as compared to Clomiphene plusMetformin group. Study conducted by Wang L et al, the letrozole group had a higher conception rate (36.3%) than the clomiphene group (21.3%) [15,16]. Rezk M et al also found higher ovulation induction (82%) and higher conception rate (36%) in the letrozole group over a cohort of PCOS patients treated with clomiphene plus metformin [17]. According to Amer SA et al letrozole group had a pregnancy rate of 61% which was superior to the clomiphene group (43%) [11]. Khaled boudhraa et al and Zain MM et al also found the superiority of clomiphene citrate along with metformin on clomiphene alone in ovulation induction and conception [18,12]. After considering all these studies, we conclude that letrozole is a superior choice to treat anovulatory infertility in women with PCOS.

Implication

By fostering and encouraging preventive health care attitude in anovulatory women, we might lessen serious negative impacts on overall health as well as particular clinical repercussions of anovulation. Early reporting to an In Vitro Fertilization (IVF) centre has changed scenario of PCOS in Rural setting. We identified and treated women of infertility resulting in increase in successful ovulation induction. The very location of this IVF facility is a boon to rural infertile women.

Conclusion

The majority of cases in the current study came with complaints of infertility along with oligo-hypomenorrhea, hirsutism, excessive acne, and obesity, which can aid in making a preliminary clinical diagnosis of PCOD even in the periphery and prompt referral to the infertility centre.We found LH: FSH ratios greater than 2:1 in 39.58% of study subjects.Successful ovulation rates for letrozole and clomiphene were comparable after three cycles of treatment and we observed that letrozole appears to improve the rate of conception in sub-fertile women with PCOS when compared to clomiphene citrate.

Reference

1. Collée J, Mawet M, Tebache L, Nisolle M, Brichant G (2021) Polycystic ovarian syndrome and infertility: overview and insights of the putative treatments. Gynecol Endocrinol 37: 869-874.
2. Ganie MA, Vasudevan V, Wani IA, Baba MS, Arif T, et al. (2019) Epidemiology, pathogenesis, genetics & management of polycystic ovary syndrome in India. Indian J Med Res 150: 333-344.
3. Brugo-Olmedo S, Chillik C, Kopelman S (2001) Definition and causes of infertility. Reprod Biomed Online 2: 41-53.
4. Cunha A, Margarida AP (2021) Infertility management in women with polycystic ovary syndrome: a review. Porto Biomedical Journal 6: e116.
5. Bozdag G, Mumusoglu S, Zengin D, Karabulut E, Yildiz BO (2016) The prevalence and phenotypic features of polycystic ovary syndrome: A systematic review and meta-analysis. Hum Reprod 31: 2841-2855.
6. Rotterdam ESHRE/ASRM-sponsored PCOS consensus workshop group (2004) Revised 2003 consensus on diagnostic criteria and long-term health risks related to polycystic ovary syndrome. Hum Reprod 19: 41-47.
7. Sharma M, Balasundaram P (2023) Ovulation Induction Techniques. 2023 Mar 8. In: StatPearls. Treasure Island (FL): StatPearls Publishing.
8. Vause TDR, Cheung AP, Reproductive Endocrinology and Infertility Committee (2010) Ovulation induction in polycystic ovary syndrome. J ObstetGynaecol Can 32: 495-502.
9. Poulsen LC, Warzecha AK, Bülow NS, Bungum L, Macklon NS, et al. (2022) Effects of letrozole cotreatment on endocrinology and follicle development in women undergoing ovarian stimulation in an antagonist protocol. Hum Reprod 37: 1557-1571.
10. Detti L, Jeffries-Boyd HE, Williams LJ, Diamond MP, Uhlmann RA (2015) Fertility biomarkers to estimate metabolic risks in women with polycystic ovary syndrome. J Assist Reprod Genet 32: 1749-1756.
11. Amer SA, Smith J, Mahran A, Fox P, Fakis A (2017) Double-blind randomized controlled trial of letrozole versus clomiphene citrate in subfertile women with polycystic ovarian syndrome. Hum Reprod 32: 1631-1638.
12. Zain MM, Jamaluddin R, Ibrahim A, Norman RJ (2009) Comparison of clomiphene citrate, metformin, or the combination of both for first-line ovulation induction, achievement of pregnancy, and live birth in Asian women with polycystic ovary syndrome: a randomized controlled trial. FertilSteril 91: 514-521.
13. Tesarik J, Hazout A, Mendoza C (2003) Luteinizing hormone affects uterine receptivity independently of ovarian function. Reprod Biomed Online 7: 59-64.
14. Nahar K, Mahfuza G, Begum SA, Khatun K, Islam MR (2018) Clinical, Biochemical and Hormonal Profile of Polycystic Ovary Syndrome. Journal of National Institute of Neurosciences Bangladesh 3: 94-98.

15. Begum F (2009) P872 Clinical and hormonal profile of polycystic ovary syndrome. International Journal of Gynecology& Obstetrics 1: 22-25.

16. Wang L, Wen X, Lv S, Zhao J, Yang T, et al. (2019) Comparison of endometrial receptivity of clomiphene citrate versus letrozole in women with polycystic ovary syndrome: a randomized controlled study. Gynecological Endocrinology 35: 862-865.

17. Rezk M, Shaheen AE, Saif El-Nasr I (2018) Clomiphene citrate combined with metformin versus letrozole for induction of ovulation in clomiphene-resistant polycystic ovary syndrome: a randomized clinical trial. Gynecol Endocrinol 34: 298-300.

18. Boudhraa K, Jellouli MA, Amri M, Farhat M, Torkhani F, et al. (2012) La Métformine dans la Prise en Charge de l'Infertilité du SOPK hors FIV Etude prospective comparative à propos de 63 cas. La tunisieMedicale 88: 335-340.