



A STUDY OF EFFICACY OF MYOINOSITOL IN WOMEN WITH POLYCYSTIC OVARIAN SYNDROME IN TERTIARY MEDICAL CENTRE , HAPUR, UTTAR PRADESH

Pharmacology

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ABSTRACT

Introduction: The inositol stereoisomers, are the most abundant members of a family of nine stereoisomeric inositols, and is a precursor of inositol triphosphate (InsP3). InsP3 is a second messenger for many hormones including insulin and follicle-stimulating hormone (FSH). **Aims and objective:** To study the efficacy of myoinositol in the patients of PCOS and compare it with patients treated by metformin. **Material and Methods:** This was prospective observational study conducted during June 2019 to June 2020 on patients attending the department of Gynaecology & Obstetrics of Saraswathi Institute of medical sciences, Results: In the group A (myoinositol) There was a significant reduction LH levels. FSH level and LH/FSH ratio and reduction is statistically significant. There was also reduction in DHEA, Free insulin but these reduction were not statistically significant. **Conclusion:** Myoinositol and Metformin both have good effect in the management of PCOD, Myoinositol did better in this study

KEYWORDS

PCOD, LH, FSH, Myoinositol, Metformin

INTRODUCTION

In recent years, a large amount of attention from the scientific and medical community has been focused on the etiology and treatment of polycystic ovary syndrome (PCOS). It has been demonstrated that PCOS is the most common cause of infertility in women during reproductive age. Among the current treatments for PCOS, first-line therapies can be distinguished, such as lifestyle modification or oral contraceptive pills, as well as treatments for patients with ovulation disorders, including ovarian hippocampal signal path block theory, the theory of leptin, or inositol treatment.¹

In 2003 a consensus workshop sponsored by ESHRE/ASRM in Rotterdam indicated PCOS to be present if any 2 out of 3 criteria are met. It also includes many women without androgen excess too.

- 1) Oligoovulation and/or anovulation
- 2) Excess androgen activity
- 3) Polycystic ovaries (by ultrasound)
- 4) Other entities are excluded that would cause these.²

Studies of PCOS in India carried out in convenience samples reported a prevalence of 3.7% to 22.5%, with 9.13% to 36% prevalence in adolescents only.³

The inositol stereoisomers, are the most abundant members of a family of nine stereoisomeric inositols, and are found widely in nature. Present in fruits and beans, the inositols are incorporated into cell membranes as phosphatidyl-MI, which is a precursor of inositol triphosphate (InsP3). InsP3 is a second messenger for many hormones including insulin and follicle-stimulating hormone (FSH). Defects in this pathway can lead to impaired insulin signaling and cause insulin resistance.⁴

They also participate in several physiological processes, including calcium metabolism, proliferation, endocrine and metabolic modulation, stress response and signal transduction downstream neurotransmitter stimulation. Inositol is a hexahydroxycyclohexane alcohol of cyclohexane belonging to the glucose family. Nine stereoisomers are existing; among them myo-inositol and D-chiro-inositol are the two main stereoisomers present in human body. Both D-chiro-inositol and myo-inositol have similar structures, differing in the stereochemistry for one hydroxyl group. The other isomers are scyllo-inositol, mucosinositol, L-chiro-inositol, neo-inositol, allo-inositol, epi-inositol, and ci-inositol.⁵

Although metformin has represented the landmark of PCOS therapy in the recent past, to date several studies have tested the efficacy of Inositols.⁶

With the above background we conducted study had following aims and objectives

Aims and objective

To study the efficacy of myoinositol in the patients of PCOS and compare it with patients treated by metformin.

Material and Methods

This was prospective observational study conducted during June 2019 to June 2020 on patients attending the department of Gynaecology & Obstetrics of Saraswathi Institute of medical sciences, Hapur. Institutional ethics committee permission was taken. A total of 100 women with PCOS and infertility were selected and their reports generated according to Rotterdam classification. Out of 100 patients 50 were recommended Myoinositol 2000 mg thrice a day and Folic acid 200 µg twice a day and continued for at least 3 months. Another 50 patients were treated with Metformin 1500 mg/ day in three divided dosages. The primary outcome of the study was to determine the restoration of ovulatory function and the pregnancy rate following treatment. The secondary outcome was to evaluate the compliance rate and side effects reported in both groups of the patients receiving treatment. In our study the pregnancy outcome was also studied

Inclusion Criteria

PCOS selected according to Rotterdam's criteria in the age group of 18-40 years were included in this study

Exclusion Criteria

Patients on hormonal treatment for infertility in last 6 months, patient with increased risk of lactic acidosis, diabetic patients on insulin and insulin sensitizers, pregnancy and lactation, liver failure, renal failure, lung diseases, ischaemic heart disease and peripheral vascular disease were excluded from the study

Clinical Assessment:

All the subjects were interviewed regarding age, past history, personal history, family history, menstrual history, obstetric history, treatment history before starting the study. Height, weight, BMI, abdominal circumference, blood pressure and ultrasonogram (USG) were assessed for all the patient at baseline and periodically during the study period. Patients were advised to follow regular exercise and life style modifications during the study period

Result

In our study total 100 study subjects were taken, The mean age of study subjects was 26.04±3.59 yrs in grp A (myo-inositol grp) whereas it was 24.78±3.26 yrs in grp B (Metformin grp). The BMI of both the groups were 24.04±3.33 and 24.46±4.08. Age and BMI of both the groups were comparable and there is no statistically significant

difference with p value=0.069 and 0.57.Changes in Fasting and postprandial blood sugar level is not significant in myo-inositol group.

Table 1: Biochemical parameter of study subjects in myo-inositol grp

	Grp A(Myo-inositol group)		
	Before treatment	After treatment	P value
FBS	82.88±8.84	85.28±8.02	0.16
PPBS	101.46±16.9	103.30±12.03	0.53
F.insulin	10.44±3.69	9.78±2.60	0.30
LH	12.14±1.29	9.46±1.58	<0.01
FSH	4.94±0.74	4.66±0.688	0.05
DHEA in mcg/dl	281.70±93.66	275.60±66.56	0.70
LH/FSH	2.56±0.50	1.98±0.473	<0.001
F.Testosterone	10.76±5.8	10.98±5.69	0.85
S.Androgen	2.36±0.776	2.38±0.923	0.91
TGL	108.18±23.03	105.7±22.49	0.59

In the group A(myo-inositol) There was a significant reduction LH levels. FSH level and LH/FSH ratio and reduction is statistically significant. There was also reduction in DHEA, Free insulin but these reduction were not statistically significant.

Table 2: Biochemical parameter of study subjects in Metformin grp

	Grp B(Metformin group)		
	Before treatment	After treatment	P value
FBS	83.48±8.67	87.20±8.15	0.03
PPBS	102.0±15.19	100.90±10.57	0.67
F.insulin	11.04±4.04	10.62±3.76	0.59
LH	11.72±1.73	10.98±1.78	0.03
FSH	4.80±1.01	4.82±1.12	0.92
DHEA in mcg/dl	259.06±41.83	254.10±48.68	0.58
LH/FSH	2.46±0.542	2.40±0.495	0.56
F.Testosterone	10.20±4.69	10.62±3.76	0.62
S.Androgen	2.38±0.725	2.38±0.72	0.99
TGL	107.62±21.09	105.26±20.08	0.56

In group B(Metformin) there was significantly decrease in level of LH, DHEA, LH/FSH ratio were also decreased but not significant.

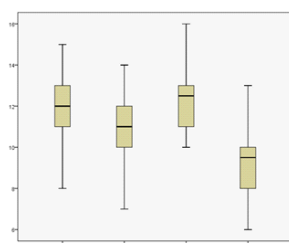


Fig 1 shows Boxplot of LH levels in both the groups before and after the treatment. This shows the difference in both the groups.

Fig 2: Error plot showing FSH level before and after treatment in both the group

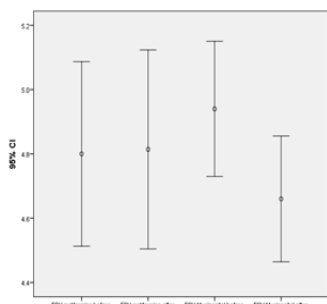


Fig 2 shows Error plot for FSH level in both the groups before and after the treatment. This also show difference in both the groups.

DISCUSSION

This study could show that a new treatment option for women with PCOS and infertility is available. 70% of the patients restored ovulation following treatment with Myo-inositol 2000 mg thrice a day and Folic acid 200 µg twice a day for at least three months. The administration of this molecule

improves the glucose uptake by acting as a direct Insulin signaling messenger. It thus improves the insulin resistance and hormonal status, thereby restoring the ovulation process. There is also marked difference in safety and compliance between myo-inositol and metformin as found in this study. The patients on metformin have reported mild to severe gastro-intestinal sideeffects like abdominal pain, nausea, anorexia and diarrhoea. Myo-inositol seems to be a safe and well tolerated drug with comparable efficacy as Metformin. Poor compliance and side effects of Metformin makes it less acceptable. The efficacy, absence of significant side effects, and the fact that myo-inositol is a natural component of human diet makes it an attractive insulin sensitizer in PCOS. In recent years many studies have demonstrated that an improvement in ovulation rate and regulation of menstrual cycles was obtained by the combined use of 4 grams of Myo-inositol and 400 µg of Folic acid. Also in study by Rani M et al7, Treatment with 1200 mg/d of myo-inositol for 12 weeks was effective in reducing hormonal, metabolic and oxidative abnormalities in patients with PCOS by improving insulin resistance Awalekar J et al2 in their prospective study concluded that Metformin group LH/FSH ratio was mean 2.56,dropped to 1.70,(p<0.000) after treatment, which is significant,found to be statistically significant. In Myo-inositol group LH/FSH ratio was 2.mean & later 3 months it became 2.10,(p=001).

Nehra J et al3 in their study concluded that There was a definite improvement in biochemical profile with both metformin and myo-inositol. Thus, myo-inositol can be a new addition in the armamentarium for the treatment of PCOS.

Shah P8 in their study concluded that By using MI, the changes in metabolic and endocrine parameters were noted in as little as 12 weeks and in most this was comparable to the metformin therapy Costantino et. al9 in his double blinded placebo controlled study found that after 16 weeks of Myo-inositol treatment improved the blood pressure, triglyceride, cholesterol, glucose and insulin values after a 75 gram oral GTT significantly. The evaluated hormonal values were significantly decreased. Total and free Serum testosterone and Progesterone levels as a marker of ovulation were increased significantly in the group receiving Myo-inositol. Thalamati S10 in their study concluded that Combination of Myo-inositol and D-chiro-inositol and use of metformin, significantly improved insulin sensitivity in PCOS women. But combination of Myo-inositol and D-chiro-inositol was effective in controlling the hormonal profiles (LH/FSH ration and free testosterone) when compared to Metformin. This confirms that myo-inositol is not only an effective alternative in the treatment of PCOS patients but also a safe and secure drug as no side effects could be observed in the standard dosages.

On the other side easy compliance results in the better outcome in the management of ovulation, hyperandrogenism and metabolic parameters on patients with PCOS.

CONCLUSIONS

Myo-inositol and Metformin both have good effect in the management of PCOD, Myo-inositol did better in this study. Being physiological component It may be combined in treatment of PCOD with other treatment options

Conflict of Interest : NA

Funding : NA

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