ORIGINAL RESEARCH PAPER
Volume - 10 | Issue - 01 | January - 2021 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

# STUDY OF EFFECT OF MYOINOSITOL IN PATIENTS DIAGNOSED WITH POLYCYSTIC OVARIAN SYNDROME IN A TERTIARY CARE CENTRE

Obstetrics & Gynaecology

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## ABSTRACT

**BACKGROUND:** Polycystic ovarian syndrome is a complex heterogenous reproductive endocrinopathy associated with insulin resistance , hyperandrogenism and obesity. Insulin resistance and hyperinsulinemia is an important backbone of this endocrinopathy , irrespective of the body mass index. Thus, insulin sensitisers can play an important role in correcting the pathophysiology of this endocrinopathy . **METHODOLOGY:** A prospective clinical study was carried out in a tertiary care centre where hundred women diagnosed with polycystic ovarian syndrome were administered 1.1 gram myoinositol orally for a period of 12 weeks and assessment was done at the end using menstrual record ,biochemical profile and ultrasonography. **RESULTS:** Following treatment , 86 percent presented with regular monthly menstrual cycle and almost all patients had spontaneous ovarian activity measured by increased luteal phase serum progesterone levels .There was improvement in insulin resistance and fall in free testosterone levels .**CONCLUSION:** Myoinositol is a promising drug for polycystic ovarian syndrome with no major side effects.

## KEYWORDS

Polycystic ovarian syndrome ,Myoinositol ,Insulin Resistance

**INTRODUCTION:**
Polycystic ovarian syndrome is a complex disorder wherein numerous genetic and environmental factors interact to contribute to the pathophysiology leading to a wide variety of symptoms and signs.It was first described in 1935 by two gynaecologists,Chicago-born,Rush Medical College graduates, Irving F Stein and Michael L Leventhal ,so also called as Stein Leventhal Syndrome.Women diagnosed with polycystic ovarian syndrome are at increased risk of gestational diabetes mellitus(five fold increased risk),type 2 diabetes mellitus,endometrial cancer(2-6 fold increased risk) and cardiovascular disease ,dyslipidemia , metabolic syndrome ,obstructive sleep apnoea, mood disorders ,
psychological disorders: depression,anxiety and eating disorders.

**INCIDENCE:**Polycystic ovary syndrome (PCOS) affects 5%–10% of women in reproductive age, and it is the most common cause of infertility due to ovarian dysfunction.

**PATHOPHYSIOLOGY:**Exact pathophysiology of PCOS is still a dilemma.The cyclic pattern of hormone concentrations that occurs during the normal cycle is lost,rather there is a “steady state” in which gonadotropin and sex steroid concentrations vary relatively little, by comparison, resulting due to chronic anovulation. Ongoing genome-wide association studies (GWAS) have begun to identify candidate genes for PCOS with autosomal dominant trait and low penetrance.

**ROLE OF INSULIN:** About 70-80% of obese patients with the syndrome will have insulin resistance and 20-25% of lean patients with the syndrome will have insulin resistance.Thus,insulin resistance is common in PCOS women, regardless of the body mass index.Insulin basically acts on theca cell insulin receptors and upregulates 17-hydroxylase,17-20 lyases and 17-betahydroxysteroid dehydrogenase activity thus potentiating leutenising hormone mediated ovarian androgen synthesis.Insulin leads to partial escape from desensitisation of ovarian responsiveness to leutenising hormone.Moreover,it stimulates aromatase activity in the peripheral adipocytes. Insulin resistance is important in the pathophysiology of PCOS.

**ROLE OF MYOINOSITOL:**Insulin sensitisers have proved to be beneficial in this hyperinsulinemia-induced dysfunction of ovarian response to endogenous gonadotropins and acceleration of leutenising hormone pulse frequency.Myoinositol is one of the nine stereoisomers resulting from epimerization of the six hydroxyl groups of inositol.Myoinositol ,is a precursor of dichiroinositol,both of which increases the sensitivity to insulin.It acts as a direct messenger of insulin signaling and thus improve glucose tissue uptake.

**AIM OF STUDY:**The aim is to study the effect of myoinositol on patients diagnosed with polycystic ovarian syndrome.

**STUDY DESIGN:** It is a prospective clinical study.
**SELECTION OF CASES:**A total of hundred women in the age group 15- 45 years diagnosed with polycystic ovarian syndrome visiting gynaecological outpatient facility of Nalanda Medical College Hospital ,Patna during the period january 2019 to february 2020 were selected and analysed.

**SAMPLE SIZE:**A total of 100 cases were selected and studied.
**INCLUSION CRITERIA:** Women fulfilling the Rotterdam's criteria proposed at a conference cosponsored by the European Society of Human Reproduction and Embryology (ESHRE) and the American Society for Reproductive Medicine (ASRM), convened in Rotterdam, the Netherlands, in 2003, concluding that diagnosis of PCOS should be based on at least two of the three major criteria: (1)anovulation-amenorrhoea,oligomenorrhoea(six or fewer menstrual cycle during one year period) (2)clinical signs(acne and hirsuitism assessed by Ferriman Gallaway scoring , androgenic alopecia assessed by Ludwig Visual Score ,acanthosis nigricans)or biochemical parameters of hyperandrogenism, and (3) polycystic-appearing ovary(ies) (assessed by ultrasonography, described as an ovarian volume of more than 10 mL and/or more than 20 follicles measuring between 2 and 9 mm in size in at least one ovary).

**EXCLUSION CRITERIA:**The following were excluded from the study-

1. Hyperprolactinoma
2. Hypothyroidism /hyperthyroidism
3. Diagnosed case of diabetes mellitus
4. Cushing Syndrome
5. Adrenal hyperplasia or adrenal secreting tumour
6. Patients not willing for study or not willing to come for follow up

**MATERIALS AND METHOD:**The selected cases were given 1.1 gm myoinositol tablet orally for a period of 12 weeks .These patients were instructed to have a menstrual calender record.During observation period,patients were assessed using menstrual cycle,biochemical profile ( day3 LH/FSH ratio, fasting blood glucose , fasting insulin,serum free testosterone,serum progesterone,serum glucose :insulin ratio,homeostatic model of insulin resistance value) and ultrasonography. The data were expressed in mean +_SEM and analysis was done using paired t test.A p value of less than 0.05 was considered statistically significant.

**RESULTS AND ANALYSIS:** At the end of the study , the patients were enquired about menstrual cycle, and biochemical

profile ( day3 LH/FSH ratio, fasting glucose , fasting insulin, serum free testosterone ,serum progesterone ,serum glucose :insulin ratio, homeostatic model of insulin resistance value) and ultrasonography were done. Table 1 shows the study population characteristics;

**Table1:Study Population Characteristics:**

| | Mean +_SEM |
|---|---|
| Age in years | 25+_5 |
| BMI | 28.5+_2.4 |
| Age at menarche in years | 12+_2 |

The mean age at presentation was 25 +_5 years. After twelve weeks of treatment , 86 patients presented with regular monthly menstrual cycle .The length of successive cycles were reduced to 31+_2 days.All the patients had spontaneous ovarian activity measured by increased luteal phase serum progesterone levels which was found to be statistically significant. There was improvement in HOMA index [( Fasting glucose *fasting insulin)/405] which reduced to 2.99+_0.30 which was found to be statistically significant.

Furthermore, insulin resistance was shown to improve following 12 weeks treatment with myoinositol as documented by reduced levels of fasting insulin and increased serum fasting glucose to fasting insulin ratio. The concentrations of serum free testosterone was reduced during course of treatment.

During the follow up period , an ultrasonography was done and the ovarian volume was also reduced to 6.9+_2.1cc which was found to be statistically significant .

The drug was well tolerated and no major side effects were noted . Nausea and abdominal bloating were noted in less than 5 percent of cases.

**Table 2 shows Basic Assessment features:**

| | BASELINE | AT END OF STUDY | |
|---|---|---|---|
| LENGTH OF CYCLE (days) | 45+_5 | 31+_2 | p-value<0.05 |
| BIOCHEMICAL | | | |
| DAY3 LH/FSH RATIO | 2.77+_0.24 | 2.64+_0.33 | p-value<0.05 |
| FASTING BLOOD GLUCOSE | 96+_5 | 84+_4 | p-value<0.05 |
| FASTING INSULIN | 18.9+_1.1 | 15.2+_0.6 | p-value<0.05 |
| SERUM GLUCOSE:INSULIN RATIO | 5.03+_0.56 | 6.03+_0.46 | P-value>0.05 |
| HOMA index | 3.9+_0.33 | 2.99+_0.30 | p-value<0.05 |
| SERUM PROGESTERONE(ng/ml) | 1.6+_0.7 | 10.4+_1.6 | p-value<0.05 |
| SERUM TESTOSTERONE (pg/ml) | 6.6+_1.2 | 3.9+_0.4 | p-value<0.05 |
| ULTRASONOGRAPHY | | | |
| OVARIAN V0LUME (MEAN in cc) | 12.2+_1.4 | 6.9+_2.1 | p-value<0.05 |

**DISCUSSION:** Polycystic ovarian syndrome is becoming a major health problem and is the most common cause of female infertility . A defect in the insulin signaling pathway (inositol-containing phosphoglycan mediators ) or endocellular defect of the precursor of inositolphosphoglycan might trigger the compensatory hyperinsulinemia in most PCOS subjects seems to be implicated in the pathogenesis of insulin resistance . Myoinositol is an important constituent of follicular microenvironment, playing a determinant role in both nuclear and cytoplasmic oocyte development ,thus deficiency can result in anovulation which is a major constituent of the syndrome.

Myoinositol administration increases the action of insulin in patients with polycystic ovarian syndrome, thereby improving the increased LH pulse frequency abnormality and normalising the FSH levels, improving ovulatory function leading to increased serum progesterone levels and decreasing serum testosterone concentration.

The present study demonstrated that myoinositol administration improved insulin resistance as documented by reduced fasting insulin and increased serum fasting glucose to fasting insulin ratio and improved HOMA index. The luteal phase serum progesterone level was found to increase which was found to be statistically significant.

Myoinositol is able to induce normal menstrual cycles .The drug action is mainly based on improving insulin sensitivity of target tissues, resulting in a positive effect on the reproductive axis , restoring ovulation , improves oocyte quality ,and hormonal functions ,henceforth normalising clinical and biochemical hyperandrogenism and dyslipidemia.

## CONCLUSION:

Polycystic ovarian syndrome is becoming a major public health problem , thus there is need to identify the basic causation of the syndrome complex and an effective treatment to halt and reverse the pathophysiology. Myoinositol is a safe and well tolerated drug that is capable of restoring spontaneous ovarian activity and, consequently fertility.

## REFERENCES:


1. Revised 2003 consensus on diagnostic criteria and long-term health risks related to polycystic ovary syndrome. Fertil Steril 2004;81:19–25
2. Asplin I, Galasko G, Larner J. chiro-inositol deficiency and insulin resistance: a comparison of the chiro-inositol- and the myo-inositol- containing insulin mediators isolated from urine, hemodialysate, and muscle of control and type II diabetic subjects. Proc Natl Acad Sci U S A 1993;90:5924–5928
3. Costantino D, Minozzi G, Minozzi E, Guaraldi C. Metabolic and hormonal effects of myo-inositol in women with polycystic ovary syndrome: a double-blind trial. Eur Rev Med Pharmacol Sci 2009;13:105–110
4. Gerli S, Mignosa M, Di Renzo GC. Effects of inositol on ovarian function and metabolic factors in women with PCOS: a randomized double blind placebo-con trolled trial. Eur Rev Med Pharmacol Sci 2003; 7:151–159.
5. Larner J, Craig JW. Urinary myo-inositol-to-chiro-inositol ratios and insulin resistance. Diabetes Care 1996;19:76–78
6. Gerli S, Mignosa M, Di Renzo GC. Effects of inositol on ovarian function and metabolic factors in women with PCOS: a randomized double blind placebo-controlled trial. Eur Rev Med Pharmacol Sci 2003; 7:151–159