



A comparison between the effects of metformin and N-acetyl cysteine (NAC) on some metabolic and endocrine characteristics of women with polycystic ovarian syndrome

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Abstract

Objective: To compare N-acetyl cysteine (NAC) with metformin on polycystic ovary syndrome (PCOS).

Method: Study was performed in two groups by randomized double blind clinical trial, in women with diagnosed PCOS without additional complication. In one group oral NAC 600mg, three times a day and in other group oral metformin 500mg, three times a day was prescribed for 24 weeks duration. After completion of this duration of treatment Fasting blood glucose (FBS), insulin, lipid profile, Homeostasis model assessment (HOMA) index were measured. The entire blood sample was taken in fasting state and was compared in two groups.

Result: Fifty women in NAC group and fifty women in metformin group finished the study. High-density lipoprotein was higher in NAC group.

Conclusion: NAC can improve lipid profile and fasting blood sugar and fasting blood insulin better than metformin.

Keywords: Abnormal uterine bleeding, BMI, fasting blood insulin, fasting blood glucose, insulin resistance, lipid profile-acetyl cysteine, metformin, polycystic ovarian syndrome.

Introduction

Polycystic ovarian syndrome (PCOS) is the most common endocrine, metabolic and reproductive disorder in women in reproductive ages with an incidence of about 5-10 %,

PCOS is diagnosed by chronic anovulation or oligo ovulation and hyperandrogenism and is the most frequent cause of infertility due to anovulation

and menstrual irregularity in women. Its pathogenesis is not very well known, although the role of insulin resistance and hyperinsulinemia plays important role, inheritance rate of PCOS is about 70 %, however genetic study of PCOS is difficult. The definition of PCOS has been reported by consensus in 2003 Rotterdam workshop. PCOS is a diagnosis is diagnosis of

exclusion of the other hyper androgenic conditions.

The relationship between PCOS and insulin resistance has been extensively reported. It is associated with an increased risk of type II diabetes and cardiovascular problem. Among cardiovascular risk factors, high LDL, low HDL and high triglyceride has been reported in PCOS in women.

Metabolic and endocrine disorder of PCOS may be responsible for the oxidative stress .NAC have anti oxidant and anti-inflammatory effect that can improve dyslipidemia and insulin resistance in women with PCOS.

Recent studies have shown that NAC is a mucolytic drug and acts as an insulin sensitizer that's why it could be used as a safe and effective agent to modify the biochemical changes associated with PCOS.

Metformin is a bioguanide and is used as an oral antidiabetic agent in type II diabetes. Metformin is a insulin sensitizing agent that can a cause improvement in menstrual regulation, ovulatory cycle, reduction in serum androgens and body weight.

The purpose of this study was to compare the effect of NAC and metformin on some metabolic and clinical symptoms of PCOS.

Materials and Methods

The study was performed as a double blind randomized clinical trial in women with PCOS reported in Nalanda Medical College & Hospital, Patna, Bihar, between Jan 2018 and Jan 2019.

A written informed consent was taken from all participants, who were fully informed about study. Altman nomogram was used for calculating sample size, and a sample size of 100 women with PCOS was considered enough to previous study. Intention to treat was used to follow the patients.

PCOS was defined according to Rotterdam European Society Criteria. Inclusion criteria was based on women of ages between 20 to 36 years, who having PCOS.Exclusion criteria was PCOS with additional complications, and the women

who were pregnant during the study. During study period requested to all women that did not change their diet habit, and all adverse effects of drugs were explained to women.

The eligible women were randomly divided into two groups. In experimental group, NAC and in control group, metformin was prescribed. The metformin group received 500mg oral metformin three times a day and NAC group received 600mg oral NAC three times a day. Duration of treatment for both group were 24 weeks, and after finishing treatment, fasting blood glucose and insulin, lipid profile and HOMA index were measured and compared.

The researcher did not know the group of study and the women were checked by mobile and had monthly visits to the hospital for accuracy of drug use.

Intention to treat was used for analysis. SPSS version 19 was used for statistical analysis. Paired t-test, student t-test, chi-square test and were used for statistical analysis. p Value<0.05 was considered significant.

Results

In total 125 women with PCOS entered in study. Ten women did not continue the study. Because of gastrointestinal problems two women in metformin group and two women in NAC group discontinued the study.

Five women in NAC group and four women in metformin group were excluded from study because of being pregnant and two women were excluded because of using other fertility drugs. Finally 100 women finished the study and were analyzed.

The two groups did not shows significant difference according to age, body mass index of more than 30; mean BMI, FBS, Fasting blood insulin, lipid profile and HOMA index before treatment. After 24 week of treatment; BMI >30[17(35%) versus 7(15%), p=0.033], mean BMI [(28+/- 2) versus 27.5+/-3.2), p=0.44,], number of women with the complain of abnormal uterine bleeding [24(50% versus 30(28%)

,p=0.035], FBS [(90+/-6) versus (86.6+/-7.8),p=0.02], fasting insulin (10+/-2 versus 8.88 +/-2.20,p=0.004),HOMA index (2.08+/- 0.68 versus 1.70 +/-0.05,p=0.001),low density lipoprotein (141.5 +/- 27 versus 128+/-28.5, p=0.016) was less in NAC group. Triglyceride and total cholesterol did not show significant difference between two groups after treatment.

Conclusion

In total the women of NAC group showed significant improvement according to BMI, fasting blood glucose, fasting insulin, HOMA index and LDL than metformin.

References

1. Rotterdam ESHRE/ASRM-Sponsored PCOS Consensus Workshop Group, Revised 2003 consensus on diagnostic criteria and long – term health risks related to polycystic ovary syndrome .Hum Reprod 2004; 19:42-7
2. Stankiewicz M, Norman R, Diagnosis and management of polycystic ovarian syndrome: a practical guide, Drugs 2006; 66:903-907
3. Yasmin E, Balen AH, Management of polycystic ovary syndrome, Women's Health (Lond Engl) 2007; 3:355-67
4. Teede H, Deeks A, Moran L, polycystic ovary syndrome; a complex condition with psychological, reproductive and metabolic manifestations that impact on health across the lifespan, BMC Med 2010; 8:41
5. Oner G, Muderiss II, clinical, endocrine and metabolic effect of metformin vs N-acetyl cysteine in women with polycystic ovarian syndrome .Eur j Obstet Gynecol Reprod Biol 2011;159:159:127-31.
6. Barber TM, Franks S. Genetics of polycystic ovary syndrome, Front Horm Res 2013; 40:28-39
7. Saha L, Kaur S, Saha Pk.N-acetyl cysteine in clomiphene citrate resistant polycystic ovarian syndrome; a review of reported outcomes. J Pharmacol Pharmacother 2013;4:187-91.
8. Sprizer PM, Polycystic ovarian syndrome: reviewing diagnosis and management of metabolic disturbances, Arq Bras Endocrinol metabol 2014;58:182-7.
9. Rocca MI, Venturella, Mocciaro R, et al. Polycystic syndrome: chemical pharmacotherapy. Expert opin pharmacotherapy 2015;16:1369-93
10. Pasquali R, Metformin in women with PCOS pros. Endocrine 2015;48:422-6.