RESEARCH ARTICLE

TO ESTIMATE THE URIC ACID LEVELS IN PATIENTS WITH POLYCYSTIC OVARIAN SYNDROME (PCOS)

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Manuscript Info

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Abstract

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Background- Pcos is most common endocrine disorder now a day in females, it appears due to abnormalities in metabolism of androgen and estrogen. It is not only an endocrine disorder but also a metabolic, hormonal and psychological disorder. It causes infertility, distress, hirsutism, irregular menstrual, or biochemical findings. This study aims to evaluate the biochemical parameter, Uric Acid in PCOS women and to assess its effect in these patients and to compare the assessed parameter with that of normal controls.

Methods - After applying inclusion and exclusion criteria, blood samples are collected from 50 menopausal women diagnosed to have PCOS by ultrasound and 50 healthy controls (Pre-Menopausal Women) aged 18-40 years. Serum Uric Acid was done in both PCOS patients and controls. The correlation between the biochemical parameters are studied in the PCOS group.

Results- There was a significant increase in serum uric acid levels in PCOS patients as compared to controls. So, uric acid in PCOS cases as an indicators of early metabolic changes that can be used to diagnose PCOS women at risk of cardio metabolic syndrome. And also it showed that, increased uric acid levels in PCOS patients as compared to controls which were statistically significant.

Conclusion- The findings of this study confirms the Uric acid in PCOS and may help to identify women with PCOS at risk of cardio metabolic syndrome, there by confirming the association between PCOS and cardiovascular risk factors.

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Introduction:-

Polycystic despite its name is a metabolic and endocrine disorder PCOS affecting 4 to 18% of reproductive age females. In patients with PCOS general characters are observed like irregular menstrual periods, polycystic ovaries and excess androgenic hormone level.[1, 2]

Pcos syndrome requires early diagnosis which is better because there are many complications which are associated with Pcos like infertility, miscarriage, premature birth, gestational diabetes, nonalcoholic fatty liver diseases. Also in Pcos, many metabolic complications occur like elevated sugar, elevated BP, elevated TG, obesity. [3, 4]

Increaseinserumuricacid(UA)concentrationhasemergedasacardiovascular risk factor in high risk subjects. In a study conducted byMarkkola and Jarvinen, an inverse correlation between serum uric acidconcentration and insulin sensitivity was noted in patients with metabolicsyndrome.Theresearchershaveconcludedthathyperuricemiaisconsideredasanintrinsicbiochemicalfeatureofth esyndrome,andinsulin resistance is recommended as a simple marker of hyperuricemia.[5]

Uric Acid is a metabolic end product of purine metabolism. It is a strong reducing agent and potent antioxidant. The possible relationship between androgens and serum uric acid concentrations is supported by animal experiments showing that androgens may increase serum uric acid levels by inducing the hepatic metabolism of purines.[6] The studies available at present regarding serum uric acid levels in PCOS patients are scarce and led to controversial results.[7] In view of this, the present study was undertaken to analyze and correlate the biochemical parameters that may help to identify women with PCOS at risk of Cardio-metabolic syndrome.

Materials and Methods:-

The study population included 50 ultra sound diagnosed PCOS women with 18-40 age group and normal healthy controls group attending gynecology OPD at Nandha Medical College, Erode.

Inclusion criteria:
Cases:
Female patients diagnosed with PCOS based on ultra sound, in the age group of 18-40 years. Diagnosis based on ultra sound.
a. Women presenting with Oligomenorrhoea/ Amenorrhoea.
b. Non pregnant between 18 to 40 years of age giving constantly.
c. Clinical / Biochemical signs of hyperandrogenism.
i. Hirsutism
ii. Acne
iii. Alopecia
iv. Elevated androgen levels (testosterone)
d. Presence of Polycystic ovaries on USG
e. LH/FSH ratio

Controls:
For controls women with the age group of 18 to 40 without PCOS as judged by ultrasound.

Exclusion criteria:
1. Age <18yr and >40 yrs were excluded from this study.
2. Women with diabetes mellitus.
3. Women with hypertension
4. Women with thyroid disorders, Renal diseases, Cardiovascular diseases, Cushing's syndrome.
5. Pregnant or lactating women.
6. Women on Oral contraceptive pills.
7. Women on drugs like hypoglycemic agents / lipid lowering drugs.
8. Women on Hormonal medicines within 6 weeks.

Special Collection and storage:-
The venous Blood of PCOD Patients will be taken without anticoagulant for the estimation of serum uric acid (by Uricase – POD method). The sample will be left standing for one hour. Serum will be separated at 2500 rpm centrifugation and analyzed on fully automated chemistry Analyzer AU 680 (Beckman Coulter).

Result:-

Serum Uric acid, the (Mean±SD) of the study group is 4.8±0.614 mg/dl and of the control group was 4.0±0.583 mg/dl. The mean difference in serum uric acid between cases and controls was statistically significant. The mean value and standard deviation of serum uric acid is shown in table 1 & graphically represented in fig 1.

Table1:   -   Showingmean±SDandthesignificantdifferenceinthemean serumuricacidvalues(mg/dl)betweenthestudygroup.

Parameter	CasesMean± SD	ControlsMean ±SD	t-test	Pvalue
UricAcid	4.8±0.614	4±0.583	6.443	<0.0001 ***

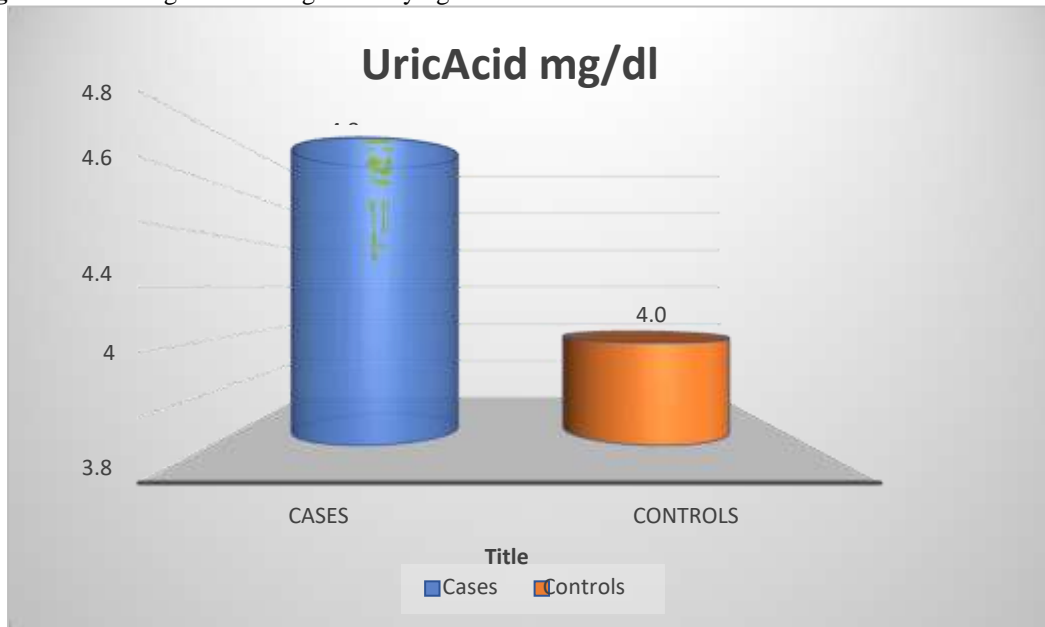**Fig 1: -** ThebardiagramshowssignificantlyhighermeanserumuricacidlevelinPCOScasesthancontrols.

Figure2:-BardiagramrepresentsmeanUric Acid ofcasesandcontrolgroup.

Discussion:-

PCOS is characterized by increased ovarian and adrenal androgen secretion, hyper androgenic metabolic syndrome symptoms such as hirsutism, acne or alopecia, menstrual irregularity and polycystic ovaries also. PCOS is a chronic, reproductive, inflammatory disorder. Its manifestations usually begin in adolescence with evolution to include infertility and cardio-metabolic complications over a period of time. PCOS should no longer be considered as purely gynecological disorder because of its predisposition to various cardiac and metabolic risk factors such as; obesity, glucose intolerance, atherogenic dyslipidemia and hypertension.

Increased uric acid levels in PCOS women can be explained by the inhibitory effect of hyper insulinism on renal excretion of uric acid.[8] Endothelial dysfunction and chronic inflammation in PCOS also contributes to elevated uric acid level.[9] Studies have shown that, decrement in serum uric acid concentration of high-risk patients improved the endothelial function and resulted in reduced cardiovascular morbidity and mortality.[10] As PCOS women have 50% increased risk for cardiovascular complications, serum uric acid can be used for early detection of high risk patients.

PCOS is a proinflammatory state.[11] Insulin resistance and consequent hyperglycemia in PCOS leads to the inflammation by producing various inflammatory mediators. Chronic low grade inflammation in PCOS results in endothelial dysfunction and facilitates the initiation of an early atherosclerotic process. Serum inflammatory biomarkers are being increasingly recognized as early predictors of atherosclerosis and cardiovascular diseases.

Uric acid is one of this newly described inflammatory risk factor for CVD.[12] They concluded that uric acid can be used as non-classic cardiovascular risk marker in PCOS patients for early prediction of disease.

About 60%-70% of PCOS women present with central obesity. Obesity is linked with insulin resistance and increased risk of diabetes, hypertension, dyslipidemia, endothelial dysfunction and heart disease.[13] This indicates that obesity also plays an important role in this disorder.

Until now, management of PCOS is typically focused on the specific symptoms such as menstrual irregularity and infertility. However, looking into the intricate nature of the syndrome, a large number of complications will have to be addressed in the near future. PCOS has a long prodromal phase with noticeable abnormalities throughout the life cycle of affected women. Accordingly, adolescent girls with PCOS should be evaluated and treated in a manner analogous to adult PCOS. This will ensure quality health in adulthood, restore self-esteem and will reduce the healthcare burden.

The results of our study showed the mean serum uric acid levels in PCOS cases as 4.82 ± 0.54 mg/dl and in controls as3.99 ± 0.589 mg/dl. There was highly significant statistical difference in the mean serum uric acid values, being higher in PCOS cases than controls. But, in our study, we found elevated serum uric acid levels in PCOS patients as compared to the controls which were statistically significant.

Conclusion:-

This study shows the biochemical parameter of uric acid in PCOS cases as indicators of early metabolic changes that can be used to diagnose PCOS women at risk of cardio metabolic syndrome.

And also it showed that, increased uric acid levels in PCOS patients as compared to controls which were statistically significant. In addition, use of these simple and cost-effective biochemical parameters might prove to be biomarkers in early detection of these metabolic changes and may help to identify women with PCOS.

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