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ORIGINAL RESEARCH

Role of vitamin D supplementation among PCOS women with vitamin D deficiency

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ABSTRACT

Background: Polycystic ovary syndrome (PCOS) is a common hormonal disorder affecting women, often in their reproductive years. The present study was conducted to assess role of vitamin D supplementation among PCOS women with vitamin D deficiency. **Materials & Methods:** 100 women with PCOS with Vitamin D deficiency were divided into 2 groups of 50 each. Group I women were given Metformin &calcium 1000mg daily along with Vitamin D3 60K IU weekly for 6weeks followed by monthly for 4 months. Group II women were given Metformin 1000mg daily only. Assessment of serum total testosterone, serum fasting insulin for hyperandrogenism & IR was done. All were subjected to transabdominal ultrasound scan. **Results:** Age group 16-20 years had 8 patients in group I and 7 patients in group II, 21-25 years had 14 in group I and 19 in group I and, 26-30 years had 18 patients in group I and 14 patients in group II and 31-35 years had 10 in patients in group I and 8 patients in group II. The difference was non- significant (P>0.05). Vitamin D before treatment and after treatment in group I was 12.5 and 13.1 respectively and in group II was 13.2 and 13.7 respectively. The difference was significant (P< 0.05). In group I and II, mean BMI before treatment was 27.4Kg/m2 and 25.7 Kg/m2 and after treatment was 25.6 Kg/m2 and 24.8 Kg/m2 respectively. Waist hip ratio before treatment was 0.82 and 0.81 and after treatment was 0.80 and 0.78 respectively. Hirsutism before treatment was 13.4 and 13.56 and after treatment was 9.3 and 11.2 respectively. Ovarian volume before treatment was 8.6 cm3 and 8.7 cm3 and after treatment was 6.5 and 7.1 cm3 in group I and II respectively. The difference was non- significant (P> 0.05). **Conclusion:** Women deficient in vitamin D, should take calcium and vitamin D supplementation as it is safe and have few side effects.

Keywords: Calcium, vitamin D, Women

INTRODUCTION

Polycystic ovary syndrome (PCOS) is a common hormonal disorder affecting women , often in their reproductive years.[1,2] It can have a range of symptoms and effects, including irregular, or prolonged menstrual cycles, multiple small fluid-filled sacs on the ovaries, elevated levels of androgens (male hormones) which can lead to symptoms like acne, excessive hair growth (hirsutism), and thinning hair on the scalp. Many with PCOS have insulin resistance, which can lead to weight gain and an increased risk of type 2 diabetes. PCOS can affect ovulation, making it harder to get pregnant.[3]

The classic signs of PCOS include polycystic ovaries with increased ovarian volume and stromal thickness, hyperandrogenic symptoms such hirsutism, acne, and alopecia, and increased ovarian and adrenal androgen release.[4,5] Dyslipidemia, insulin resistance, central obesity, hypertension, subclinical atherosclerosis, impaired glucose tolerance, type 2 diabetes, metabolic syndrome, endometrial hyperplasia, and ovarian and endometrial cancers are among the risk factors associated with PCOS. Early diagnosis and treatment of the condition are critical. Recently, there has been talk that the missing link between PCOS and IR may be vitamin D inadequacy.[6] This notion is supported by the finding that the active vitamin D–vitamin D receptor (VDR) complex regulates approximately 300 genes, including those essential for glucose and lipid metabolism, blood pressure regulation, and both. Furthermore, IR and low vitamin D levels are correlated in those with type 2 diabetes mellitus.[7]The present study was conducted to assess role of vitamin D supplementation among PCOS women with vitamin D deficiency.

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MATERIALS & METHODS

The present study was conducted on100women with PCOS with Vitamin D deficiency.All were informed regarding the study and their written consent was obtained.

Data such as name, age, gender etc. was recorded. A thorough clinical examination was carried out. Patients were divided into 2 groups of 50 each. Group I women were given Metformin &calcium 1000mg daily along with Vitamin D3 60K IU weekly for 6weeks followed by monthly for 4 months. Group II women were given Metformin 1000mg daily only. Assessment of serum total testosterone, serum fasting insulin for hyperandrogenism & IR was done. All were subjected to transabdominal ultrasound scan. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Age group (years)	Group I	Group II	P value
16-20	8	9	0.73
21-25	14	19	
26-30	18	14	
31-35	10	8	

Table I shows that age group 16-20 years had 8 patients in group I and 7 patients in group II, 21-25 years had 14in group I and 19 in group I and, 26-30 years had 18 patientsin group I and 14 patients in group II and 31-35 years had 10 in patients in group I and 8 patients in group II. The difference was non- significant (P>0.05).

Table II Assessment of vitamin D before and after treatment

Vitamin D (ng/ml)	Before	After	P value
Group I	12.5	13.2	0.05
Group II	13.1	13.7	

Table II shows that vitamin D before treatment and after treatment in group I was 12.5 and 13.1 respectively and in group II was 13.2 and 13.7 respectively. The difference was significant (P< 0.05).

Table III Assessment of parameters

Parameters	Variables	Before	After	P value
BMI (Kg/m2)	Group I	27.4	25.6	0.75
	Group II	25.7	24.8	
Waist hip ratio	Group I	0.82	0.80	0.81
	Group II	0.81	0.78	
Hirsutism	Group I	13.4	9.3	0.62
	Group II	13.6	11.2	
Ovarian volume (cm3)	Group I	8.6	6.5	0.27
	Group II	8.7	7.1	

Table II, graph I shows that in group I and II, mean BMI before treatment was 27.4Kg/m2and 25.7Kg/m2and after treatment was 25.6Kg/m2and 24.8Kg/m2respectively. Waist hip ratio before treatment was 0.82 and 0.81 and after treatment was 0.80 and 0.78 respectively. Hirsutism before treatment was 13.4 and 13.56 and after treatment was 9.3 and 11.2 respectively. Ovarian volume before treatment was 8.6 cm3 and 8.7 cm3 and after treatment was 6.5 and 7.1 cm3 in group I and II respectively. The difference was non- significant (P> 0.05).

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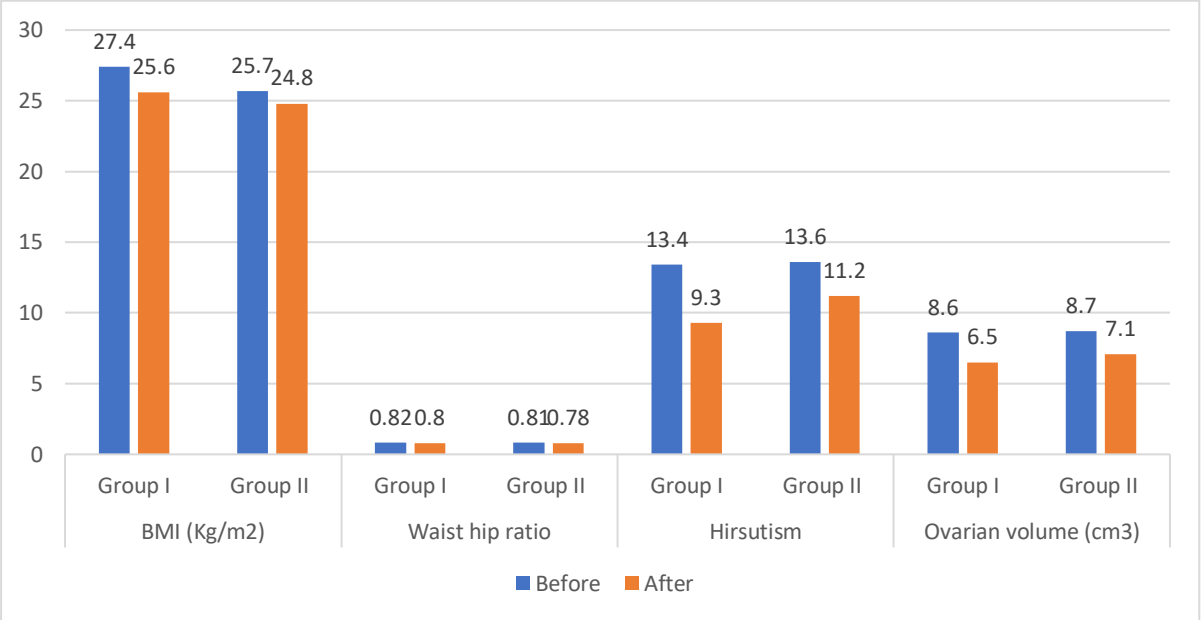
Graph I: Assessment of parameters



DISCUSSION

Polycystic ovarian syndrome, also known as PCOS, is the most common endocrine illness affecting women in their reproductive years. It affects 6–10% of the general population.[8] What defines PCOS is as follows: The morphology of polycystic ovaries, hyperandrogenism, hirsutism, and ovulatory failure resulting in oligo-and/or anovulation are the three main causes. Women with PCOS showed increased levels of LDL and non-HDL cholesterol, regardless of BMI.[9,10] Based on current information, IR is a major contributor to the pathophysiology of PCOS by interfering with reproduction and metabolism. The mechanism causing metabolic abnormalities, specifically insulin resistance (IR), in women with PCOS has been extensively studied. There is a chance that obesity plays a role in IR.[11] There is a chance that obesity plays a role in IR. However, even in the absence of obesity, IR is also found in a significant fraction of slender PCOS-affected women.[12]The present study was conducted to assess role of vitamin D supplementation among PCOS women with vitamin D deficiency.

We found that age group 16-20 years had 8 patients in group I and 7 patients in group II, 21-25 years had 14 in group I and 19 in group I and, 26-30 years had 18 patients in group I and 14 patients in group II and 31-35 years had 10 in patients in group I and 8 patients in group II. Kancharlaet al[13]determined the effectiveness of Vitamin-D3 supplementation with Metformin in woman with established diagnosis of PCOS & Vitamin D3 deficiency. On comparing between the two groups, it was found that addition of Vitamin D & Calcium to Metformin regularize the menstrual cycles significantly with p value 0.031. In relation to mean ovarian volume, after 6months of treatment there was a significant reduction by 30%in group A i.e Vitamin D, Calcium & Metformin supplemented women. Regarding BMI, waist hip ratio, acne, hirsutism & serum fasting insulin there was reduction in mean values after treatment for 6months in both groups, but reduction is more in group A (Vitamin D, Calcium & Metformin) than in group B women (Metformin). But this difference was not statistically significant.

We found that vitamin D before treatment and after treatment in group I was 12.5 and 13.1 respectively and in group II was 13.2 and 13.7 respectively. We found that in group I and II, mean BMI before treatment was 27.4Kg/m2 and 25.7 Kg/m2 and after treatment was 25.6 Kg/m2 and 24.8 Kg/m2 respectively. Waist hip ratio before treatment was 0.82 and 0.81 and after treatment was 0.80 and 0.78 respectively. Hirsutism before treatment was 13.4 and 13.56 and after treatment was 9.3 and 11.2 respectively. Ovarian volume before treatment was 8.6 cm3 and 8.7 cm3 and after treatment was 6.5 and 7.1 cm3 in group I and II respectively. Gokosmanoglu F et al[14]investigated the role of vitamin D deficiency in complex PCOS pathophysiological pathways.Two hundred sixty-seven patients with PCOS were divided into two groups Group 1 with 25(OH)D3 deficiency, and Group 2 with normal 25(OH)D3. Biochemical and hormonal parameters (androgen hormones, gonadotropins, and thyroid function tests) were compared between the two groups.Eighty-six percent of the patients (n=231) were in Group 1 and 14% (n=36) in Group 2. Statistically significantly higher concentrations of serum testosterone, dehydroepiandrosterone-sulfate and LH were determined in Group 1 ($p<0.05$). 25(OH)D3 concentrations were negatively correlated with body mass index ($r=-0.459$), serum testosterone ($r=-0.374$) and dehydroepiandrosterone-sulfate levels ($r=-0.418$); (all; $p< 0.05$).

The shortcoming of the study is small sample size.

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CONCLUSION

Women deficient in vitamin D, should take calcium and vitamin D supplementation as it is safe and have few side effects.

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