The effects of calcitriol on improvement of insulin resistance, ovulation and comparison with metformin therapy in PCOS patients: a randomized placebo-controlled clinical trial

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Abstract

Background: Polycystic ovary syndrome (PCOS) is the most common endocrine disorder in females of reproductive age. Insulin resistance is a frequent metabolic disturbance in PCOS. Vitamin D deficiency is a common problem. Accumulating evidence suggests that vitamin D has a role on insulin sensitivity so may contribute to reduction of hyperandrogenemia.

Objective: The aim was to determine the effects of vitamin D treatment in metabolic components and ovulation evidence in PCOS.

Materials and Methods: Fifty one untreated PCOS patients were randomly divided into three groups and treated with calcitriol, metformin, or placebo. Before and 3 months after treatment, ovulation evidence was assessed by ovarian trans abdominal sonography. Plasma fasting glucose, insulin, homeostasis model assessment insulin resistance (HOMA-IR), 25-hydroxyvitamin D, parathyroid hormone and androgen levels were measured before and after treatment. A 75gr glucose test was performed before and after treatment and two set of results was compared.

Results: Three patients did not continue this study. Only 11 patient (22.9%) had sufficient vitamin D levels (>30 ng/ml). Metformin caused a significant decrease in weight (p=0.027), insulin level (p=0.043), and insulin resistance (p=0.048). Systolic blood pressure and PTH significantly improved after calcitriol (p=0.029, p=0.009 respectively). An improvement in ovulation was detected after calcitriol and seven patients, without evidence of ovulation before treatment, illustrated ovulation after 3 months. Difference with calcitriol in ovulation was significant versus other two methods (p=0.02).

Conclusion: Calcitriol treatment in PCOS may be prior to metformin in ovulation induction.

Key words: PCOS, Ovulation, Vitamin D, Insulin resistance.

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Introduction

Polycystic ovary syndrome (PCOS) with a prevalence of about 5-10% in different communities is the most common endocrine disease in reproductive age women (1). This syndrome is diagnosed with two criteria of three: An unovulation or oligoovulation, clinical or laboratory markers of increase in androgen levels and diagram of PCO in sonography (2).

Insulin resistance and increase in insulin levels resulted from resistance to it and also other components of metabolic syndrome including: glucose intolerance, lipid disorder and increase in blood pressure is common in PCOS (3). New researches are confirmed the probable role of vitamin D in secretion of insulin and improvement of insulin resistance and even it seems that deficiency of vitamin D is probable factor in metabolic syndrome pathogenesis (4, 5). Some of studies show that treatment with vitamin D has useful effect on decrease in insulin resistance, blood sugar, lipid profiles and blood pressure and even decrease in body weight in diabetic patients or patients with metabolic syndrome (6, 7). There are similar limited studies at the same topics about patients with PCOS.