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Successful Pregnancy in a Patient with Polycystic Ovary Syndrome Following Lifestyle Modification and Pharmacological Intervention: A Case Report.

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ABSTRACT

Polycystic ovary syndrome (PCOS) is a common endocrine disorder in women of reproductive age, often associated with obesity and fertility problems. This case report documents the management of a 32-year-old female patient diagnosed with Polycystic Ovary Syndrome (PCOS), who sought to conceive. Despite having normal hormonal levels, the patient exhibited insulin resistance, a common feature in PCOS. Intervention strategies included pharmacotherapy (metformin, spironolactone, and phentermine) and lifestyle modifications leading to significant weight loss (10.5% of total body weight). The treatments led to an improvement in the patient's metabolic profile, menstrual regularity, and reduction in hyperandrogenic symptoms. By December 2021, the patient had maintained her weight loss and improved metabolic parameters. She successfully conceived in January 2022 and delivered a healthy baby at term in August 2022. This case underscores the importance of weight management and metabolic control in improving fertility outcomes in patients with PCOS.

KEYWORDS: Polycystic Ovary Syndrome; Weight Loss; Insulin Resistance; Lifestyle Modifications; Successful Pregnancy.

MANUSCRIPT

Introduction

Polycystic Ovary Syndrome (PCOS) is a common endocrine disorder affecting women of reproductive age worldwide. It is characterized by anovulation, hyperandrogenism, and polycystic ovaries. The syndrome has a diverse clinical presentation, with symptoms ranging from menstrual irregularities, hirsutism, acne, and obesity to more severe manifestations such as infertility. PCOS has also been associated with metabolic disorders, including insulin resistance, type 2 diabetes mellitus, dyslipidemia, and cardiovascular disease[1].

The etiology of PCOS is complex and multifactorial, involving genetic, environmental, and lifestyle factors. Several theories have been proposed, with the most widely accepted being that insulin resistance, leading to hyperinsulinemia, plays a key role in the pathogenesis of the syndrome. The resultant

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hyperinsulinemia is believed to stimulate ovarian androgen production, contributing to the hyperandrogenism observed in PCOS. Concurrently, obesity, particularly central obesity, is not only prevalent in PCOS but may further exacerbate insulin resistance and hyperandrogenism, creating a vicious cycle [2-5].

The clinical management of PCOS is challenging due to the heterogeneity of the syndrome. It often requires a tailored, patient-centered approach, addressing both the reproductive and metabolic aspects of the disorder. The cornerstones of management include lifestyle modifications - including diet, physical activity, and weight control - and pharmacological treatments such as oral contraceptives, insulin-sensitizing drugs, and anti-androgens[6].

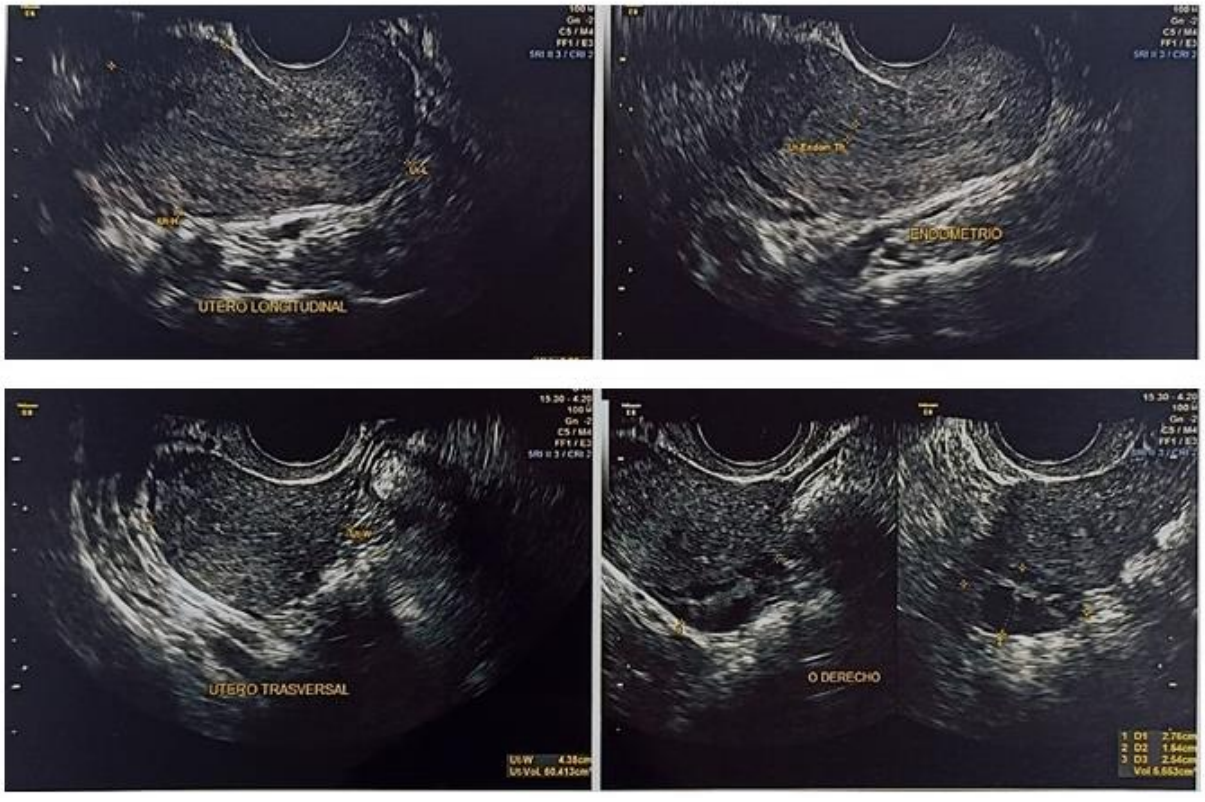
Among the array of therapeutic options, weight reduction has shown promising results, particularly in overweight and obese women with PCOS. Weight loss, as modest as 5-10% of initial body weight, has been associated with improvements in the hormonal and metabolic abnormalities of PCOS, leading to the regularization of menstrual cycles and increased rates of ovulation and fertility. It is believed that weight loss reduces insulin resistance, leading to lower levels of circulating insulin, which in turn decreases androgen production and improves follicular development and ovulation[7].

Pharmacological interventions, such as metformin, an insulin-sensitizing drug, have been widely used in managing PCOS. Metformin improves insulin sensitivity, leading to reductions in insulin levels, and therefore may ameliorate the symptoms of PCOS. Moreover, anti-androgens like spironolactone can effectively manage hirsutism, a frequent and distressing symptom of PCOS. In addition, drugs that promote weight loss, like phentermine, have been used as adjuvants in the management of PCOS[8-9].

In light of the above, the comprehensive management of PCOS in women seeking fertility, such as the one described in this case report, presents a unique opportunity to study the effects of weight reduction, lifestyle modification, and pharmacotherapy on the reproductive and metabolic aspects of PCOS. This patient-centered, multifaceted approach to PCOS could potentially revolutionize how the syndrome is managed, ultimately enhancing the quality of life and reproductive potential of these women.

Case presentation

A 32-year-old female with a primary goal of conception was diagnosed with Polycystic Ovary Syndrome (PCOS), characterized by hyperandrogenism and a cystic pattern on transvaginal ultrasound. She was referred to our weight control service given the well-established link between obesity and PCOS, particularly the role obesity plays in exacerbating PCOS symptoms and fertility issues.



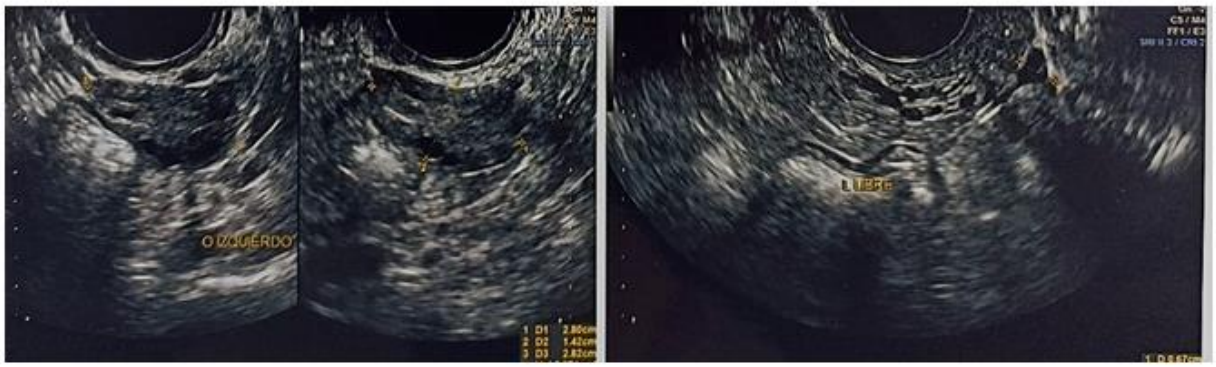


Figure 1. Transvaginal ultrasound images showing bilateral ovarian morphology. The left ovary measures 28x14x28 mm with a volume of 5.8 cc, and the right ovary measures 27x15x25 mm with a volume of 5.6 cc. Both exhibit a follicular pattern and cysts. Homogeneous stromal tissue is observed in both ovaries. The endometrium presents as a Type I, bilaminar, measuring 3.9 mm across both walls.

Figure 1 displays the ultrasound imaging conducted by the Gynecology department, providing visual representation of the patient's polycystic ovarian morphology.

The patient had a family history of systemic arterial hypertension, type 2 diabetes mellitus, and hyperandrogenic PCOS. Her lifestyle was devoid of alcohol, tobacco, and drug use. Her gynecological history included irregular menstrual cycles with amenorrhea, severe cramping, and heavy bleeding. On physical examination, hirsutism was evident, with hair in androgen-dependent areas. Her initial anthropometric measurements indicated Grade I obesity.

Metabolic and hormonal evaluations were performed, revealing insulin resistance and a hormonal pattern compatible with PCOS. The patient was initiated on metformin, spironolactone, and phentermine, with tolerable side effects observed only with phentermine. A comprehensive lifestyle modification plan focusing on diet, physical activity, sleep patterns, and hydration was concurrently implemented. It is relevant to note that a weekly follow-up was maintained with the patient, which likely contributed to improved adherence to the treatment.

Six months following these interventions, she had achieved a significant weight loss of 10.5% from her baseline, with improvement in her anthropometric measures. She also reported regularization of her menstrual cycles and a decrease in hirsutism. Upon achieving the target weight loss, her medication was discontinued, and emphasis was placed on maintaining her healthier lifestyle.

Three months after discontinuation of medication, her laboratory parameters had normalized, and she had maintained her weight loss. In **Table 1**, we present the patient's laboratory results, showing key metabolic and hormonal levels at different stages of the intervention and their response to treatment. Notably, she conceived in the following month. The pregnancy was uneventful, and she delivered a healthy baby girl via caesarean section at 39 weeks gestation.

This case underscores the potential of lifestyle modification in conjunction with pharmacotherapy in managing PCOS, controlling weight, and enhancing fertility.

Discussion

The presented case report provides valuable insights into the management of an atypical case of hyperandrogenic Polycystic Ovary Syndrome (PCOS), highlighting the intricate relationship between hormonal, metabolic, and phenotypic characteristics of the syndrome, and the paramount importance of a patient-centered, multifaceted approach.

PCOS is a heterogeneous disorder with a broad spectrum of manifestations. Our patient, in particular, presented with hirsutism, irregular menstrual cycles, and obesity - classic features of PCOS - but with hormonal levels within the normal range. This atypical presentation underscores the limitations of strictly adhering to a set criterion for diagnosing PCOS, such as the Rotterdam criteria, which emphasizes the presence of hyperandrogenism, ovulatory dysfunction, and polycystic ovaries. It suggests that a more inclusive diagnostic approach may be warranted to capture the full spectrum of PCOS phenotypes, particularly those with normoandrogenic or 'vague' symptoms.

The patient's initial hormonal profile, notably normal, reveals another intriguing aspect of PCOS: the role of insulin resistance. Despite the normal hormonal levels, our patient exhibited significant insulin resistance, as evidenced by the elevated HOMA-IR. This underlines the central role of insulin resistance in the pathogenesis of PCOS, potentially triggering hyperandrogenism and ovulatory dysfunction, independent of overt changes in hormonal levels. Thus, it may be necessary to routinely evaluate insulin resistance in women with PCOS, irrespective of their hormonal status.

	Baseline	Follow-up
Anthropometric Measurements		
Weight (kg)	72	64.5
Height (cm)	150	150
BMI	32	28.5
Classification	Grade I Obesity	Overweight
Body Fat (%)	44	37
Non-fat Mass (kg)	39	38.5
Waist Circumference (cm)	94.4	80
Hip Circumference (cm)	107.5	90
Biochemical Parameters		
Glucose (mg/dL)	87	92
Serum Insulin (UI/dL)	25	10
HOMA-IR	5.2	2.2
Uric Acid (mg/dL)	6.9	4
Cholesterol (mg/dL)	203	180
HDL (mg/dL)	30	36
LDL (mg/dlL	150	100
Triglycerides (mg/dL)	181	132
AST (U/L)	59	9
ALT (U/L)	52	11
GGT (U/L)	66	27
FSH (mUI/L)	6.07	7.29
LH (mUI/L)	1.61	3.93
Prolactin (ng/mL)	19	21.4
Progesterone (ng/mL)	5.67	2.08
Testosterone (ng/mL)	0.22	0.22
Estradiol (pg/mL)	91	113
TSH (Uu/Ml	2.37	1.56
Total T4 (ug/dL)	8.85	12.07
Total T3 (ng/dL)	1.23	0.87

Table 1. Comparison of Anthropometric Measurements and Laboratory Findings at Baseline (March 2021) and at Follow-up (September 2021 and December 2021).

The effectiveness of weight reduction and lifestyle modifications, as demonstrated in our patient, is another crucial point of discussion. The substantial weight loss of 10.5% achieved over six months, along with the implementation of a hypocaloric diet, regular physical activity, and increased water intake, led to improvements in insulin resistance and amelioration of PCOS symptoms. These changes were subsequently followed by the regularization of menstrual cycles, reduction in hirsutism, and, most importantly, a successful pregnancy. This underscores the critical role of weight loss and lifestyle modification in the management of PCOS, especially in overweight or obese patients.

Finally, the use of pharmacological interventions - metformin, spironolactone, and phentermine - provided supportive management for the patient's symptoms and facilitated weight loss. The eventual discontinuation of these medications, without recurrence of symptoms, underlines the effectiveness of lifestyle interventions in managing PCOS.

CONCLUSION

In conclusion, this case study adds to the growing body of evidence supporting the benefits of a comprehensive, individualized approach in managing PCOS. It underscores the potential benefits of focusing not only on hormonal imbalance but also on addressing metabolic issues, specifically insulin resistance and obesity. Future research should continue to explore the complexity and heterogeneity of PCOS to optimize diagnosis and treatment strategies, ultimately improving the reproductive health and quality of life of these patients.

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CONFLICT OF INTEREST

The author declares he has no conflict of interest.

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