International Journal for Multidisciplinary Research (IJFMR)
E-ISSN: 2582-2160 ● Website: www.ijfmr.com ● Email: editor@ijfmr.com

Restoration of Menstrual Cycles in High-Androgen PCOS Through Meal Timing Intervention and Inositol Supplementation: A Case Report

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Abstract

This case report describes metabolic and reproductive recovery in a 23-year-old woman with high-androgen phenotype Polycystic Ovary Syndrome (PCOS), whose menstrual cycles had never been regular since menarche. Menstrual bleeding historically occurred primarily following hormonal birth control or withdrawal therapy and was frequently followed by prolonged amenorrhoea or episodes of excessive and painful bleeding. The patient also demonstrated significant insulin resistance.

A structured intervention combining reduced meal frequency (initially two meals daily progressing to one meal per day), addition of inositol supplementation, and gradual weight reduction resulted in improved insulin sensitivity and restoration of spontaneous menstrual cycles. Menstrual quality improved from heavy and debilitating bleeding to normal-duration cycles permitting routine functioning. This case highlights the metabolic–reproductive relationship in PCOS and illustrates potential benefits of meal timing interventions combined with metabolic support.

Introduction

Polycystic Ovary Syndrome is a common endocrine disorder characterized by insulin resistance, hyperandrogenism, ovulatory dysfunction, and metabolic disturbances. Elevated insulin levels stimulate ovarian androgen production and disrupt ovulation, often leading to menstrual irregularity or amenorrhoea. When menstruation occurs, bleeding may be excessive due to irregular endometrial shedding.

Lifestyle modification focused on metabolic improvement remains central to management, especially in insulin-resistant phenotypes of PCOS.

Case Presentation

A 23-year-old woman presented with:

- Lifelong menstrual irregularity since puberty
- Dependence on hormonal therapy to induce menstruation
- Episodes of heavy and painful bleeding
- Amenorrhoea
- Insulin resistance

- Sedentary lifestyle

Initial body weight was approximately 69–70 kg. Baseline fasting insulin measured 34 µIU/mL, indicating significant insulin resistance.

Intervention

Nutritional Strategy

Meal timing modification was prioritized over severe caloric restriction.

Phase 1: Two meals daily, each consumed within a one-hour eating window without snacking.

Phase 2: Integration of One Meal A Day (OMAD) on several days weekly while maintaining flexibility as needed.

This approach reduced repeated daily insulin stimulation and supported metabolic recovery.

Supplementation

Inositol supplementation was introduced to support insulin signaling and ovarian function.

Outcomes

Metabolic Outcomes

- Weight reduction from ~70 kg to 63 kg
- Improved appetite regulation
- Reduced bloating and cravings
- Improved energy stability
- Improvement in insulin sensitivity

Reproductive Outcomes

Following metabolic improvement:

- Spontaneous menstrual cycles resumed
- Cycle predictability improved
- Menstrual flow normalized to approximately five days
- Severe discomfort resolved
- Normal daily functioning became possible during menstruation

Laboratory Findings During Recovery

HbA1c: 34 mmol/mol – Normal glycaemic status

Testosterone/SHBG/FAI: Within range – Reduced androgen excess

Estradiol: <88 pmol/L – Consistent with prior anovulation

Prolactin: 365 mIU/L – Normal

FSH: 4.5 IU/L – Normal reproductive range

LH: 7.2 IU/L – Relative elevation consistent with PCOS

Progesterone: <1.6 nmol/L – Suggests non-ovulatory cycle at testing

Ferritin: 60 µg/L – Iron stores within normal range

Vitamin D: 97 nmol/L – Sufficient

Bilirubin: 8 µmol/L – Normal

ALT: 17 U/L – Normal

Folate: 4.2 µg/L – Borderline, monitoring advised

Discussion

This case reinforces the central role of insulin resistance in PCOS pathophysiology. Reducing meal frequency lowered insulin exposure, which likely contributed to decreased ovarian androgen stimulation and restoration of ovulatory cycles. Inositol supplementation further enhanced insulin sensitivity and ovarian function.

Unlike many dietary strategies, metabolic regulation here was achieved without extreme caloric restriction, underscoring that meal timing and metabolic sensitivity are key therapeutic targets in PCOS.

Conclusion

Meal timing modification combined with inositol supplementation and gradual lifestyle adaptation resulted in:

- Improved insulin sensitivity
- Reduction of PCOS symptom burden
- Restoration of spontaneous menstrual cycles
- Normalization of menstrual flow

These findings illustrate that structured meal timing strategies alongside metabolic support may serve as useful adjunct approaches in insulin-resistant PCOS.

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