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# Unexpected Pregnancy Following Tirzepatide Therapy for Obesity in a Woman with Polycystic Ovary Syndrome (PCOS)

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**Abstract**

Background: Tirzepatide is a dual glucose-dependent insulinotropic polypeptide (GIP) and glucagon-like peptide-1 (GLP-1) receptor agonist that is increasingly used to manage type 2 diabetes and obesity. Its use in women of reproductive age is expanding, but safety data during pregnancy remain limited.

Case: We report the case of a 32-year-old woman with polycystic ovary syndrome (PCOS) and a body mass index (BMI, kg/m$^2$) of 34 who was treated with tirzepatide for weight management and subsequently conceived unexpectedly. Exposure occurred at the time of conception and during early pregnancy. The pregnancy was not recognized until late gestation, when the patient first presented for antenatal care at 27 + 6 weeks of gestation. Despite confirmed early pregnancy exposure, no major structural abnormalities were identified, and neonatal outcomes were largely reassuring.

Conclusion: This case highlights the potential for incretin-based therapies to restore ovulatory function and increase the likelihood of conception in women with PCOS and obesity. Although the outcomes were reassuring, safety data on tirzepatide exposure during pregnancy remain limited, and more reports are needed to guide clinical practice.

**Keywords:** Tirzepatide; Mounjaro; Pregnancy; GLP-1 receptor agonist; GIP receptor agonist; Polycystic ovary syndrome; Obesity; Early pregnancy exposure; Incretin-based therapy

## Introduction

The prevalence of overweight and obesity has risen significantly in recent decades, with more women beginning pregnancy with an elevated body mass index (BMI) [1]. BMI is commonly used as a clinical indicator of adiposity and metabolic risk, with overweight defined as 25–29.9kg/m$^2$ and obesity as ≥30kg/m$^2$ (1). Among women of reproductive age, a high BMI is strongly associated with insulin resistance, metabolic dysfunction, infertility, and anovulation, and it correlates with a higher risk of adverse pregnancy outcomes [2].

Polycystic ovary syndrome (PCOS) affects approximately 6-12% of women of reproductive age and is one of the most common causes of reproductive dysfunction, including anovulation and subfertility [3]. The condition is frequently associated with elevated BMI and insulin resistance [4]. Optimisation of weight and metabolic health is a key part of management strategies to enhance reproductive outcomes in women with PCOS.

Management approaches include lifestyle modifications, bariatric surgery in selected cases, and pharmacological therapy. In recent years, incretin-based therapies have gained increasing prominence. Tirzepatide is a novel dual agonist of the glucose-dependent insulinotropic polypeptide (GIP) and glucagon-like peptide-1 (GLP-1) receptors, approved for treating type 2 diabetes and increasingly used for weight management. Its effects include improved glycaemic control, reduced appetite, and significant weight loss [5]. As use of these therapies expands, prescribing them to women of reproductive age is becoming more common.

Pharmacological therapies that improve metabolic function and promote weight loss may restore ovulatory cycles and enhance fertility in women with PCOS [6]. Consequently, women receiving these treatments may experience an unanticipated pregnancy, especially if effective contraception is not used.

Despite the growing use of tirzepatide and related agents, information about their safety during pregnancy remains limited. Animal studies have shown harmful reproductive effects at high exposure levels, and current guidelines recommend stopping the medication before conception [7]. However, in clinical practice, accidental exposure can occur, often in early pregnancy before conception is recognized.

Given the increasing use of incretin-based therapies in women of reproductive age and the limited safety data available, reporting pregnancy outcomes after exposure is important. We present a case of an unexpected pregnancy in a woman treated with tirzepatide for obesity and PCOS, with exposure occurring at conception and early pregnancy. This case highlights the potential for fertility restoration, the risk of exposure during unexpected pregnancy, and the safety considerations for the neonate related to incretin-based therapies during pregnancy.

## Case Presentation

A 32-year-old woman with a known history of polycystic ovary syndrome (PCOS) presented for antenatal care at 29 weeks' gestation. Her body mass index (BMI) at booking was 34kg/m$^2$, classified as obesity class I. Prior to pregnancy, she was treated with tirzepatide (Mounjaro) for weight management. The pregnancy occurred unexpectedly during this treatment. She received her last dose early in pregnancy, indicating exposure at conception and during early gestation.

She was gravida 5, para 2. She previously delivered two healthy babies vaginally at term. The first was at 40 weeks' gestation, resulting in a 3260 g infant. The second was at 39 weeks, resulting in a 3590g infant, complicated by a hypotonic postpartum haemorrhage of approximately 1.5 litres. Both prior pregnancies tested positive for Group B Streptococcus (GBS) at term. She also had two uncomplicated terminations of pregnancy at 6 and 10 weeks of gestation.

During this pregnancy, the first ultrasound assessment was performed at 27 + 6 weeks' gestation. The examination provided suboptimal views but demonstrated no apparent structural abnormalities. At presentation, she reported occasional alcohol use during the first and second trimesters and intermittent cigarette smoking, roughly one cigarette every few days. She was advised to stop both. Routine prenatal blood investigations were normal. The patient declined a routine oral glucose tolerance test; however, both HbA1c and fasting blood glucose levels were within normal ranges. She received routine prenatal vaccinations during pregnancy. Her cervical screening in the year before pregnancy showed human papillomavirus (HPV) positivity for a non-16/18 subtype, and she declined further testing until after the pregnancy.

Serial foetal growth assessments were performed. A growth scan at 33 weeks' gestation showed an estimated foetal weight (EFW) at the 23rd percentile, symmetrical growth, and normal Doppler studies. A subsequent growth scan at 37 + 5 weeks revealed an EFW of 3243 g (56th percentile), with normal amniotic fluid volume and Doppler indices. At 36 weeks, the patient tested positive for vaginal GBS. At 38 weeks' gestation, she experienced a single episode of decreased foetal movements; cardiotocography (CTG) was reassuring, and foetal movements returned to normal.

Spontaneous labour occurred at 40+1 weeks' gestation. Antibiotic prophylaxis was given for GBS. Continuous CTG monitoring was reassuring. Spontaneous rupture of membranes occurred during labour, with meconium-stained amniotic fluid observed. The patient progressed to an uncomplicated vaginal delivery of a female infant in good condition. Apgar scores were 9 at one and five minutes. Paediatric staff were present at delivery, but active resuscitation was not required.

Prophylactic ergometrine was administered during the third stage of labour. Estimated blood loss was 565mL. The placenta was delivered intact by controlled cord traction, and examination confirmed a three-vessel umbilical cord.

Umbilical cord blood gas analysis showed an arterial pH of 7.21 (reference range 7.20-7.30), with a lactate level of 7.2mmol/L (reference range 3-6mmol/L), and a venous pH of 7.30 with a lactate of 6.5mmol/L.

Repeat neonatal blood gases performed several hours later were within normal limits.

The infant's birth weight was 4020g, length 52cm, and head circumference 34.5cm. Postnatal examination revealed a minor physical finding: a unilateral overlapping fifth toe over the fourth toe; otherwise, the examination was unremarkable. Following birth, the infant was briefly admitted to the special care nursery and received one dose of intravenous gentamicin and two doses of intravenous benzylpenicillin. Antibiotic therapy was discontinued after clinical assessment confirmed a low risk of neonatal sepsis.

On day five of life, after commencement of cow's milk protein-based formula, the infant developed blood-stained stools and was subsequently diagnosed with cow's milk protein allergy. The rest of the postnatal course was uneventful for both mother and infant.

## Discussion

### Obesity, fertility, and pregnancy risks associated with elevated BMI

Obesity has a well-known impact on reproductive physiology and fertility. It is strongly linked to insulin resistance and broader metabolic issues affecting glucose, lipids, and hormonal regulation [4]. These changes can interfere with normal hypothalamic–pituitary–ovarian axis function, leading to anovulation and reduced


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fertility. In women with polycystic ovary syndrome (PCOS), obesity may worsen insulin resistance and hyperandrogenism, intensifying the reproductive dysfunction characteristic of the condition [4]. On the other hand, weight loss and improved metabolic health can help restore ovulatory function and improve fertility, highlighting the importance of effective weight management strategies in this group [6].

Elevated BMI is also associated with a higher risk of several obstetric complications. Maternal risks include hypertensive disorders during pregnancy, gestational diabetes, labour dystocia, and increased rates of labour induction and operative delivery [8]. Additionally, clinical assessment of antenatal foetal growth can be more challenging in women with obesity, which may delay the detection of growth disorders and increase reliance on ultrasound monitoring [8].

From a foetal perspective, maternal obesity is linked to a higher risk of abnormal growth patterns, including large-for-gestational-age (LGA) infants, macrosomia, and, in some cases, fetal growth restriction [9]. These infants face increased risks of complications during delivery, such as shoulder dystocia and birth trauma [8]. Additionally, maternal metabolic dysfunction, especially insulin resistance, may affect the child's long-term metabolic health and contribute to a greater intergenerational risk of obesity and metabolic disease [2].

These reproductive and obstetric risks highlight the importance of managing obesity in women of reproductive age and have led to increased use of pharmacological therapies to enhance metabolic health and promote weight loss.

## Management strategies for PCOS and obesity

Insulin resistance is a key factor in the pathophysiology of polycystic ovary syndrome (PCOS) and plays a significant role in both metabolic dysfunction and impaired reproductive performance [4]. Losing weight has been shown to improve insulin sensitivity and metabolic control, which may, in turn, help restore ovulatory function and fertility in women with PCOS [6]. For these reasons, treatment strategies for women with PCOS and obesity often focus on weight loss and improving metabolic health.

Lifestyle modification remains the cornerstone of treatment and generally involves dietary changes, increased physical activity, and behavioural interventions to support long-term weight loss, with even small weight reductions shown to confer benefit [6].

In addition to lifestyle interventions, pharmacological and bariatric therapies are increasingly used to promote weight loss and improve metabolic control. Recently, incretin-based medications, including glucagon-like peptide-1 (GLP-1) receptor agonists and dual incretin agents, have become effective treatments for obesity [10]. These medications work through multiple mechanisms and have shown significant effects on weight loss [5,10]. For selected patients, bariatric surgery may also be considered as part of a comprehensive management strategy. Surgical weight loss can lead to significant metabolic improvements and has been associated with the restoration of ovulatory cycles in some women with PCOS [11].

## Tirzepatide pharmacology and potential effects on fertility

Tirzepatide is a new incretin-based medication that acts as a dual agonist of the glucagon-like peptide-1 (GLP-1) and glucose-dependent insulinotropic polypeptide (GIP) receptors. By targeting both incretin pathways, tirzepatide increases glucose-dependent insulin secretion and enhances overall metabolic regulation [5,7]. The drug has shown significant efficacy in managing obesity and type 2 diabetes, leading to notable weight loss and improvements in glycaemic control [5].

The metabolic and weight-loss effects of tirzepatide result from several complementary mechanisms, including appetite suppression, delayed gastric emptying, and enhanced insulin sensitivity [5,10]. Together, these effects lead to decreased calorie intake and sustained weight loss. Clinical trials have shown significant reductions in body weight among individuals treated with tirzepatide, often surpassing those seen with earlier incretin-based therapies [5].

Improvements in metabolic health and insulin sensitivity may also have important implications for women in their reproductive years, where weight reduction and improved metabolic control may restore ovulatory cycles and increase the likelihood of conception in women who were previously experiencing subfertility, as occurred in this case [4,6].

## Late recognition of pregnancy in women using weight-loss therapies

Women with polycystic ovary syndrome (PCOS) often experience irregular menstrual cycles and impaired ovulation [3]. Treatment with GLP-1 receptor agonists and related incretin-based therapies, such as tirzepatide, may improve ovulatory function without necessarily restoring regular menstrual cycles, potentially delaying recognition of early pregnancy. Additionally, weight-loss therapies can alter appetite, metabolic state, and patterns of weight change, which may obscure early physiological signs of pregnancy.

These considerations have significant clinical implications, especially for medications with limited safety data during pregnancy. They highlight the importance of counselling women of reproductive age who are prescribed anti-obesity pharmacotherapies about the potential for fertility restoration [6]. Therefore, discussions about contraception and pregnancy planning should be part of routine clinical care. Additionally, pregnancy testing should be considered if menstrual cycles change or if symptoms suggest possible conception.


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### Current evidence on GLP-1 and incretin-based therapies in pregnancy

Glucagon-like peptide-1 (GLP-1) receptor agonists were originally developed to treat type 2 diabetes mellitus but are increasingly used for obesity management due to their strong effects on weight loss and metabolic control [10]. Commonly prescribed medications in this class include semaglutide, liraglutide, and dulaglutide, along with the newer dual incretin agent tirzepatide, which functions as a combined glucose-dependent insulinotropic polypeptide (GIP) and GLP-1 receptor agonist [5,10]. As the use of these medications continues to grow, especially among women of reproductive age with obesity or polycystic ovary syndrome (PCOS), the chances of pregnancy exposure are expected to rise.

Despite their increasing use, human pregnancy safety data for GLP-1 receptor agonists and related incretin-based therapies remain limited [12]. Animal reproductive toxicity studies have raised concerns, with reports of reduced foetal growth, skeletal abnormalities, and embryofetal loss at high exposure levels [7].

Most reported human exposures occur inadvertently early in pregnancy, before conception is recognized. This case reflects that pattern, with confirmed exposure at the time of conception and during early pregnancy. Human data, mostly from case reports and small observational studies, have not shown a consistent pattern of congenital anomalies; however, the evidence remains limited and insufficient to confirm safety [12].

Based on these findings, GLP-1 receptor agonists and related agents are generally not recommended for use during pregnancy. Current clinical guidelines advise discontinuing these medications before conception, and manufacturers typically recommend stopping therapy at least two months prior to planning a pregnancy [7].

### Timing of medication exposure

In this case, the patient's last dose of tirzepatide was given early in pregnancy. Based on the pharmacokinetic profile of tirzepatide, with its long half-life, this suggests exposure both at conception and during early embryonic development [7].

Exposure during early pregnancy is particularly important because this period includes embryogenesis and early organ development. Although human data are limited, animal reproductive studies have shown adverse developmental effects, such as reduced foetal growth and skeletal abnormalities at high exposure levels [7]. In this case, despite confirmed early pregnancy exposure, no major structural abnormalities were found on later antenatal imaging or postnatal examination, and the neonatal outcome was reassuring.

More generally, the clinical implications of exposure to incretin-based therapies depend on the timing during pregnancy. Exposure before conception or after an adequate washout period is unlikely to cause significant fetal risk [7]. In contrast, exposure during early pregnancy, as seen in this case, may pose a greater theoretical concern. Later exposure is less likely to affect structural development but could still affect fetal growth or metabolism, although human data remain limited [12].

### Neonatal findings from this case report

In this case, the mother had a BMI of 34kg/m$^2$ at antenatal booking. Serial ultrasound assessments showed an estimated foetal weight at the 23rd percentile at 33 weeks' gestation and at the 56th percentile at 37 + 5 weeks, indicating appropriate growth throughout the third trimester. The infant was delivered at 40 + 1 weeks' gestation with a birth weight of 4020 grams. Although this birth weight is slightly above average for gestational age and may be considered borderline macrosomic, the antenatal growth trajectory remained within normal percentile ranges [9].

During the postnatal examination, the infant was observed to have an overlapping fifth toe over the fourth toe. This is a common minor anatomical variation that is often inherited or positional in nature. Such findings are generally benign and can occur in otherwise healthy infants without any underlying structural issues. Currently, no link has been established between GLP-1 receptor agonists, including dual incretin therapies like tirzepatide, and this minor physical variant.

## Limitations

Several limitations should be considered when interpreting the findings of this report. Since it is a single case report, it cannot establish a causal link between tirzepatide exposure and the observed maternal or neonatal outcomes. The neonatal finding of an overlapping fifth toe is likely an incidental congenital variant unrelated to medication exposure.

Interpretation of foetal development is further limited by late presentation to antenatal care. The patient first presented at approximately 27–29 weeks of gestation, so standard first-trimester screening and early foetal morphology assessment were not performed. Although medication exposure occurred during early pregnancy, precise dosing intervals and serum drug levels were unavailable, limiting the ability to quantify exposure [7].

Additionally, several maternal factors may have independently affected pregnancy outcomes in this case. These include maternal obesity, underlying polycystic ovary syndrome, intermittent cigarette smoking, and occasional alcohol consumption during early pregnancy. Each of these factors could contribute to metabolic and obstetric risks and thus serve as potential confounders [2,8].

Finally, findings from a single clinical observation cannot be generalized to larger populations. More extensive observational studies, pregnancy registries, and pharmacovigilance data will be necessary to better understand maternal and neonatal outcomes following exposure to GLP-1 receptor agonists and dual incretin therapies during pregnancy [13].


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## Contribution to the Literature

In the absence of large prospective cohorts or comprehensive pregnancy registries, individual case reports remain a crucial source of early clinical observations about maternal and neonatal outcomes after medication exposure.

This case adds to the limited literature on pregnancy outcomes after exposure to tirzepatide. Such observations can help clinicians in counselling women of reproductive age and support the development of an evidence base that enables informed clinical decisions and risk assessments.

## Clinical Implications and Future Research

The use of pharmacological weight-loss therapies, including glucagon-like peptide-1 (GLP-1) receptor agonists and dual incretin agonists, in women of reproductive age is increasing rapidly as these medications become more common for the management of obesity and metabolic disease [5,6]. Improvements in metabolic function and insulin sensitivity can restore ovulatory cycles in some women, especially those with polycystic ovary syndrome, and may thus raise the chances of conception during treatment [3]. Consequently, exposure to these medications during an unplanned pregnancy may become more frequent.

These considerations highlight the importance of proper counselling when prescribing anti-obesity medications to women of reproductive age. Counselling should discuss the potential for fertility restoration, the need for effective contraception if pregnancy is not desired, and the significance of pre-pregnancy planning when conception is planned [3,11].

Systematic collection of maternal and foetal outcomes after pregnancy exposure to these therapies will be crucial to better understand potential risks, including congenital anomalies, foetal growth patterns, and neonatal metabolic outcomes. Such data may also help clarify the best timing for medication cessation before conception and guide clinical recommendations for women using incretin-based therapies [12].

## Conclusion

This case describes an unexpected pregnancy in a woman with polycystic ovary syndrome and obesity who was treated with tirzepatide for weight management. Exposure occurred at the time of conception and early pregnancy. As incretin-based therapies become more common in women of reproductive age, clinicians should recognize that improvements in metabolic health may restore ovulatory function and enhance the chances of conception. Although the pregnancy and neonatal outcomes in this case were reassuring, human safety data on tirzepatide exposure during pregnancy remain limited. Ongoing reporting of pregnancy outcomes after exposure to newer anti-obesity therapies will be essential to support clinical counselling and guide future evidence-based recommendations.

## Learning Points

a) Pharmacological weight-loss therapies, including GLP-1 receptor agonists and tirzepatide, are increasingly prescribed to women of reproductive age.

b) Improvements in metabolic function may restore ovulation in women with polycystic ovary syndrome, increasing the likelihood of unintended pregnancy.

c) Human safety data on incretin-based therapies during pregnancy remain limited.

d) Clinicians prescribing these medications should discuss contraception and pregnancy planning with women of reproductive age.

e) Reporting pregnancy exposures to newer anti-obesity therapies contributes to the development of evidence on maternal and foetal outcomes.

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