

Primary Hyperparathyroidism in Pregnancy: A Case of Antenatal Hypercalcaemia, Postpartum Hypertension and Cardiac Dysfunction



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INTRODUCTION

Hypercalcaemia in pregnancy is a relatively uncommon but clinically significant condition with potentially severe maternal and fetal consequences. Over 90% of cases are attributed to primary hyperparathyroidism (PHPT), a disorder characterized by excessive parathyroid hormone (PTH) secretion, typically due to a parathyroid adenoma. The diagnosis of hypercalcaemia in pregnancy is complicated by physiological changes in calcium homeostasis, including increased calcium mobilization to meet fetal requirements and hemodilution, which may mask elevated calcium levels in standard serum measurements. Additionally, the nonspecific nature of symptoms, such as fatigue, nausea, and polyuria, can delay recognition and appropriate intervention.

PHPT remains the most common cause of persistent hypercalcaemia in pregnancy, necessitating differentiation from other potential etiologies, including familial hypocalcaemic hypercalcaemia (FHH), malignancy-associated hypercalcaemia, and granulomatous disorders. If left untreated, PHPT poses significant maternal risks, including nephrolithiasis, pancreatitis, hypercalcaemic crisis and pregnancy-related hypertensive disorders, such as preeclampsia. The fetal consequences of maternal hypercalcaemia are equally concerning, as elevated maternal calcium levels suppress fetal parathyroid function, potentially leading to intrauterine growth restriction (IUGR), preterm delivery, and neonatal hypocalcaemia, which can result in tetany or in severe cases, neonatal death.

The complexity of PHPT management during pregnancy requires a tailored approach based on disease severity and gestational age. While conservative management—including hydration and pharmacologic options such as calcitonin—may be appropriate in mild cases, surgical intervention remains the definitive treatment for symptomatic or severe hypercalcaemia. Current evidence supports the second trimester as the optimal window for parathyroidectomy, as it balances maternal and fetal surgical risks.

CASE PRESENTATION

A 32-year-old woman, gravida 3, para 2, presented at seven weeks' gestation with a history of gestational diabetes mellitus (GDM), requiring insulin therapy in prior pregnancies. In this pregnancy, she was diagnosed with GDM at seven weeks and managed with protaphane.

Since 2022, the patient had exhibited progressively rising serum calcium levels. Laboratory investigations confirmed hypercalcaemia, with a corrected calcium level of 2.75 mmol/L and an ionized calcium level of 1.55 mmol/L. Parathyroid hormone levels were markedly elevated at 20 pmol/L (normal range <9 pmol/L), suggesting primary hyperparathyroidism. Additional testing revealed normal vitamin D levels and low 24-hour urinary calcium excretion, raising suspicion for an underlying parathyroid adenoma. Imaging confirmed the presence of a right parathyroid adenoma, which was surgically removed at 24 weeks' gestation. Histopathological examination verified the benign nature of the lesion and genetic testing for familial hypocalcaemic hypercalcaemia (FHH), specifically analyzing the calcium-sensing receptor gene, yielded negative results.

Following surgery, the patient developed persistent hypokalaemia, with serum potassium levels consistently below 3.3 mmol/L, raising concerns about distal renal tubular acidosis secondary to prolonged hypercalcaemia. This was effectively managed with oral potassium supplementation. Serial ultrasounds performed at 23, 27, 29, and 36 weeks demonstrated normal fetal growth, normal amniotic fluid levels, and reassuring Doppler indices. At 39 weeks and four days, the patient underwent induction of labor due to concerns regarding glycemic control in GDM. She delivered vaginally but experienced a postpartum hemorrhage, which was successfully managed.

In the immediate postpartum period, the patient developed severe hypertension, with blood pressure readings reaching 184/109 mmHg, accompanied by dyspnea. A chest X-ray revealed a small left pleural effusion and echocardiography demonstrated mild left ventricular dilation with an ejection fraction of 45–50%, compared to a pre-pregnancy ejection fraction of 60%. Given the potential for peripartum cardiomyopathy and hypertension-related cardiac dysfunction, further investigations were conducted to exclude secondary causes, including pheochromocytoma. Labetalol was discontinued due to concerns about unopposed alpha-adrenergic activity, and the patient was initiated on hydralazine (25 mg three times daily) and enalapril (5–10 mg daily). This regimen successfully stabilized her blood pressure at approximately 140–144/80–90 mmHg, and she was discharged with close outpatient follow-up.

DISCUSSION

This case underscores the complexities associated with diagnosing and managing PHPT in pregnancy. The physiological alterations in calcium metabolism during pregnancy can obscure hypercalcaemia, making early recognition challenging. The patient's prolonged exposure to elevated calcium levels likely contributed to her postpartum hypertensive crisis and transient cardiac dysfunction. Existing literature suggests that hypercalcaemia-induced cardiomyopathy results from myocardial contraction band necrosis, excessive intracellular calcium accumulation, and impaired cardiac relaxation, which may lead to reduced diastolic function and progressive cardiac compromise. Reports have also documented peripartum cardiomyopathy in patients with PHPT, highlighting the need for further research into the cardiovascular effects of chronic hypercalcaemia.

The management of PHPT in pregnancy must be individualized based on biochemical severity and clinical symptoms. In mild, asymptomatic cases, conservative management through hydration and dietary measures may suffice. However, in moderate to severe cases, parathyroidectomy is the preferred treatment to prevent adverse maternal and fetal outcomes. Surgery is optimally performed in the second trimester, as it reduces the risk of fetal loss associated with first-trimester interventions and avoids the complications of late-gestation surgery. Recent studies demonstrate the safety and efficacy of minimally invasive parathyroidectomy under regional anesthesia during pregnancy, providing a viable option for definitive treatment.

Postpartum complications in PHPT demand close surveillance. The abrupt postpartum shift in calcium metabolism can predispose mothers to rebound hypercalcaemia, while neonates may experience transient hypocalcaemia due to in utero suppression of fetal parathyroid function. In the present case, proactive monitoring of the neonate ensured that no significant biochemical abnormalities developed.

CONCLUSION

PHPT in pregnancy presents significant challenges, necessitating prompt diagnosis and appropriate intervention to mitigate maternal and fetal risks. This case highlights the importance of early recognition, timely surgical management, and vigilant postpartum care to prevent complications such as postpartum hypertension and cardiomyopathy.

REFERENCES

1. Sadiq NM. Hypercalcemia [Internet]. U.S. National Library of Medicine; 2024 [cited 2025 Mar 18]. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK430714/>
2. JC; DCJT. Hypercalcemic cardiomyopathy associated with primary hyperparathyroidism mimicking primary obstructive hypertrophic cardiomyopathy [Internet]. U.S. National Library of Medicine; [cited 2025 Mar 18]. Available from: <https://pubmed.ncbi.nlm.nih.gov/9854522/>
3. Knoll K, Kurovski V, Schunkert H, Sager HB. Management of hypercalcaemia-induced heart failure using mechanical circulatory support. *European Journal of Cardio-Thoracic Surgery*. 2018 Mar 30;54(4):784–5. doi:10.1093/ejcts/ezy139
4. Appelman-Dijkstra NM, Ertl D-A, Zillikens MC, Rjenmark L, Winter EM. Hypercalcemia during pregnancy: Management and outcomes for mother and child. *Endocrine*. 2021 Feb 5;71(3):604–10. doi:10.1007/s12020-021-02615-2
5. Hu Y, Cui M, Sun Z, Su Z, Gao X, Liao Q, et al. Clinical presentation, management, and outcomes of primary hyperparathyroidism during pregnancy. *International Journal of Endocrinology*. 2017;2017:1–7. doi:10.1155/2017/3947423
6. Dandurand K, Ali DS, Khan AA. Hypercalcemia in pregnancy. *Endocrinology and Metabolism Clinics of North America*. 2021 Dec;50(4):753–68. doi:10.1016/j.ecl.2021.07.009