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Carbimazole-Resistant Graves' Disease in Pregnancy Successfully Managed with the Addition of Steroids in a Rural Kenyan Hospital

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Abstract

Graves' disease (GD) affects 0.1-0.4% of pregnancies and is associated with increased risks of maternal and fetal complications, including fetal hyperthyroidism, low birth weight, stillbirth, maternal hypertension and preeclampsia, atrial fibrillation, and heart failure. To achieve and maintain a euthyroid state, antithyroid drugs (ATDs) are used, specifically propylthiouracil in the first trimester and carbimazole (methimazole) in the later trimesters. Resistant GD happens when hyperthyroidism continues clinically and biochemically despite the maximum ATD doses, often due to poor adherence, drug malabsorption, or rapid drug metabolism. In pregnancy, a euthyroid state must be achieved before definitive treatment by surgery or by use of radioactive iodine much later after pregnancy and lactation in select patients. Steroids, cholestyramine, and iopanoic acid may be added to the ATDs to achieve a euthyroid state in resistant GD. In this study, we report on the successful addition of prednisone 20 mg daily to a carbimazole-resistant GD in a pregnant Kenyan woman in the second trimester. Her thyroid profile normalized in two weeks, and the steroid was withdrawn. She remained euthyroid until a successful vaginal delivery of twin boys. The case highlights the challenges in diagnosing and managing resistant GD in pregnancy.

Keywords: *Graves' disease, antithyroid drug resistance, carbimazole resistance, carbimazole, Kenya*

1. INTRODUCTION

Graves' disease (GD) is an autoimmune disorder where antibodies in the blood bind to and overstimulate thyroid-stimulating hormone receptors (thyrotropin receptor antibodies, TRAbs), causing hyperthyroidism and goiter (1). The clinical manifestations of GD include heat intolerance, sweating, weight loss, palpitation, oligomenorrhea or amenorrhea, tachycardia, hypertension, atrial fibrillation, and heart failure. Physical findings that are specifically seen in GD include ophthalmopathy (eyelid retraction, proptosis, periorbital edema, chemosis, and scleral injection), thyroid bruit, thyroid dermopathy (pretibial myxedema), and subperiosteal bone inflammation and swelling in the metacarpal bones mimicking finger clubbing (i.e., thyroid acropachy) (2). GD occurs in 0.1-0.4% of pregnancies (1, 3). Uncontrolled GD in 1 to 5% of pregnant women is associated with increased risk of fetal and neonatal hyperthyroidism, including thyroid storm (4). Other complications include pregnancy loss, pregnancy-induced hypertension and preeclampsia, prematurity, low birth weight, intrauterine growth restriction, stillbirth, maternal hypertension, heart failure, and atrial fibrillation (5, 6, 7). The management of GD in pregnancy is challenging since the antithyroid drugs (methimazole/carbimazole and propylthiouracil) are both associated with some risk of teratogenicity, hepatotoxicity, and agranulocytosis (5).

The American College of Obstetrics and Gynecology and the European Thyroid Association treatment guidelines for thyrotoxicosis in pregnancy recommend using the antithyroid drugs (ATDs) propylthiouracil (PTU) in the first trimester and methimazole/carbimazole in the second and third trimesters with close monitoring. Most patients respond to these drugs. (8, 9). Resistant

thyrotoxicosis occurs when thyrotoxicosis persists (both clinically and biochemically) despite the maximum dosages of ATDs. The causes of resistant thyrotoxicosis include poor drug compliance (the main reason) (10), drug malabsorption, antidrug antibodies, and rapid drug metabolism (11). Definitive treatment for resistant thyrotoxicosis is surgery or radioactive iodine ablation. In pregnancy, radioactive iodine ablation is absolutely contraindicated, while surgery may be safely done in the second trimester. Preoperative euthyroid status must be achieved first by adding certain agents to the ATDs, including iopanoic acid (12), cholestyramine (13), and corticosteroids (14). We report the case of a 33-year-old woman in a rural Kenyan hospital with carbimazole-resistant GD in pregnancy in whom the addition of prednisone 20 mg daily to her maximum carbimazole dose led to the normalization of the thyroid profile within 2 weeks. She has since had a normal vaginal delivery of twin boys with no complications and is scheduled for an elective thyroidectomy.

2. Case Summary

2.1. History and Physical Examination

A 33-year-old married mother of 3 from Maili Sita, Nakuru County, Kenya, was on follow-up at our medical clinic since November 2024 following a diagnosis of Grave's disease (GD). This assessment relied on clinical signs such as palpitations, intolerance to heat, unintended weight loss, oligomenorrhea characterized by irregular menses, a rapid baseline pulse rate of 148 bpm (tachycardia), hand tremors, exophthalmos, goiter accompanied by a thyroid bruit, and bilateral non-pitting pedal edema (pretibial myxedema).

2.2. Pre-Pregnancy Evaluation and Management

A thyroid ultrasound had revealed a multinodular goiter, while the baseline thyroid profile was consistent with hyperthyroidism with a total T3 of 8.2 (1.2-3.1 nmol/L), a total T4 of 274 (68-181 nmol/L), and a TSH of <0.1 (0.5-5 mIu/L). Her EKG had shown a normal sinus rhythm, and the other baseline laboratory tests were normal. She had been managed with carbimazole (whose dosage had been up-titrated to 20 mg thrice daily) and propranolol 40 mg daily. She was counselled about the potential risks that carbimazole poses to the fetus during the first trimester if she were to become pregnant. She and her husband opted to use condoms for contraception. She had achieved a euthyroid status by February 2025 and was scheduled for a subtotal thyroidectomy in mid-March 2025.

2.3. Management during Pregnancy

In late March 2025, when she came for clinic, she was discovered to be pregnant at about 6 weeks gestation, as estimated by ultrasound. She had had irregular menses until then. In all her previous clinic visits, her pregnancy tests had been negative. In light of the early pregnancy, we switched her from carbimazole to propylthiouracil (starting at 100 mg thrice daily and up-titrated to 150 mg thrice daily) and continued propranolol 40 mg daily for the entire first trimester. Despite good adherence, she did not reach a euthyroid status in the first trimester. There was no history of hyperemesis gravidarum. We switched her back to carbimazole in the second trimester beginning week 13, starting at a dose of 15 mg thrice daily and up-titrating to a maximum dose of 20 mg thrice daily within a month. She was co-managed by the consultant physician and the gynecologist. Her adjunctive medications included aspirin 150 mg daily and ferrous sulfate and folate supplementation as per the local guidelines.

However, from gestation week 17 onwards, she had persistent hyperthyroidism both clinically (with ongoing palpitations and hand tremors) and biochemically despite the maximal dosages of carbimazole (20 mg thrice daily). This situation was confirmed in a different laboratory. See table 1 below. This happened despite her adherence to the carbimazole (she and her husband were fully motivated to the treatment, with her husband personally issuing the prescribed dosages at the prescribed times). At gestation week 24, we decided to give her a trial of adjunctive steroids, i.e., oral prednisone, starting at a dose of 20 mg daily for 2 weeks, with a plan to adjust the prednisone dose based on her clinical and biochemical response. We also gave her adjunctive vitamin D-calcium combo tablets for osteo-protection and omeprazole for gastroprotection. When she came for review 2 weeks later, her thyroid profile had completely normalized, and she was euthyroid. We tapered off the prednisone over 1 week and stopped. We reviewed her again at 28 and 32 weeks. She remained euthyroid until she subsequently transferred her care to the county referral hospital due to medical insurance. A decision was made to offer surgery after delivery. She maintained carbimazole treatment at 20 mg thrice daily and

went on to have a successful vaginal delivery at 37 weeks of gestation of healthy twin boys weighing 2.5 kg and 2.2 kg. She returned to our care 7 weeks postpartum and in a hyperthyroid state, having inadvertently stopped the antithyroid treatment in the immediate postpartum period. We have since brought her to a euthyroid state on carbimazole and propranolol, and she is scheduled for a sub-total thyroidectomy soon.

Table 1. *The trend of the thyroid profile and the interventions given*

Date	Total T3 (1.2-3.1 nmol/L)	Total T4 (68-181 nmol/L)	TSH (0.5-5 mIu/L).	Estimated gestation week	Antithyroid drug treatment
18/11/2024	8.2	274	<0.1	N/A	CBZ 10mg TDS
19/12/2024			<0.1	N/A	CBZ 15mg TDS
17/01/2025	6.3	245	<0.1	N/A	CBZ 20mg TDS
18/02/2025	3.3	179	0.9	N/A	CBZ 20mg TDS
25/03/2025	-	-	<0.1	5	PTU 100mg TDS
24/04/2025	7.1	>300	<0.1	9	PTU 150mg TDS
22/05/2025	8.6	>300	<0.1	13	CBZ 15mg TDS
19/06/2025	8.9	>300	<0.1	17	CBZ 20mg TDS
Thyroid profile done in a different laboratory					
	Free T3 (2.0-4.4pg/mL	**Free T4 (0.8-1.8ng/dL)**	**TSH (0.45-4.5µIU/mL)**	**Estimated gestation week**	**Antithyroid drug treatment**
20/06/2025	11.76	3.65	<0.005	17	CBZ 20mg TDS
16/07/2025	5.55	2.20	<0.005	21	CBZ 20mg TDS
	Total T3 (1.2-3.1 nmol/L)	**Total T4 (68-181 nmol/L)**	**TSH (0.5-5 mIu/L).**	**Estimated gestation week**	**Antithyroid drug treatment**
08/08/2025	9.3	>300	<0.1	24	CBZ 20mg TDS plus 2 weeks of PDL 20mg OD
22/08/2025	2.9	167	0.9	26	CBZ 20mg TDS plus 1 week of PDL 10mg OD
05/09/2025	2.7	174	1.9	28	CBZ 20mg TDS
03/10/2025	2.9	180	2.8	32	CBZ 20mg TDS
15/12/2025	5.9	227	0.3	N/A	CBZ 10mg TDS
12/01/2026	2.7	163	1.8	N/A	CBZ 10mg TDS

***KEY**: CBZ = carbimazole, PTU = propylthiouracil, PDL = prednisone, T3 = triiodothyronine, T4 = thyroxine, TDS = three times daily, OD = once daily*

3. DISCUSSION

Our patient had well-controlled GD on carbimazole before she got pregnant. Her preferred method of using condoms for contraception proved ineffective because she and her husband did not strictly adhere to their use. Due to the irregularity of her periods, we did a pregnancy test in each of her clinic visits to forestall the risks of teratogenicity in early pregnancy while on carbimazole.

When she got pregnant, we changed her from carbimazole to propylthiouracil (PTU) for the rest of the first trimester as per the ACOG recommendations (8). Notably, her GD was not controlled on the maximum tolerated dose of PTU despite good compliance with the treatment. She had no significant history of vomiting or hyperemesis gravidarum. She was on adjunctive propranolol, folate, ferrous sulfate, and aspirin. She was additionally monitored for hypertension, gestational diabetes, and fetal anomalies as per the local and ACOG guidelines (8). After changing her back to carbimazole from the second trimester onwards and up-titrating the dose to the maximum, she was noted to have persistent hyperthyroidism (i.e., carbimazole-resistant GD) both clinically and biochemically. This was despite her adherence to the treatment and no history of vomiting. We did not consider switching her back to PTU because she had previously failed to achieve a euthyroid state at maximum doses. Switching to PTU is not a guideline-based indication for carbimazole resistance, and patients have poor responses to the PTU (15). Some of the mechanisms of

resistant GD to conventional drug therapy in the literature include poor drug compliance, malabsorption, rapid drug metabolism, antidrug antibodies, and impaired intrathyroidal drug accumulation or action (11). A careful history and physical examination ruled out poor drug adherence and malabsorption in our patient. Whereas additional advanced tests can be done to rule out the other causes of resistant GD, they are expensive and often not used in routine clinical care. We did not perform them due to unavailability.

Due to the significant risks of uncontrolled GD to both mother and fetus, it was important to achieve a euthyroid status rapidly. We decided to give her a trial of adjunctive steroids (prednisone), which made her euthyroid within two weeks. She remained euthyroid even after the steroid withdrawal until she had a successful vaginal delivery. We chose steroids because they are cheap, locally available, safe in pregnancy, and have been demonstrated to be effective in carbimazole-resistant thyrotoxicosis (14). The presumed mechanism of the effectiveness of adjunctive steroids in resistant GD is the suppression of the autoimmune inflammation of the thyroid gland (thereby reducing the overall production of T3 and T4) and the inhibition of the peripheral conversion of T4 to T3 (16). We cannot explain adequately why she remained euthyroid on carbimazole alone after withdrawing the steroids. Other strategies for achieving a euthyroid status in carbimazole-resistant GD have been documented. The addition of iopanoic acid to carbimazole for type 1 amiodarone-induced thyrotoxicosis rapidly achieved euthyroid status in 3 patients by inhibiting the conversion of T4 to T3 (17). The addition of cholestyramine, a bile acid sequestrant, to antithyroid drugs led to the normalization of the thyroid levels within a week in a patient. This treatment is most likely because it binds the T3/T4 in the gut and promotes their excretion in stool (13, 18). Other methods tried include Lugol's iodine, lithium, and an herbal plant (*Anemarrhena bunge*) (15). Most of these adjunctive treatments are contraindicated in pregnancy. When a euthyroid state is achieved, the definitive treatment for resistant GD is surgery or radioactive iodine. Our patient will soon undergo a near-total thyroidectomy.

4. Conclusion

Carbimazole-resistant GD in pregnancy is uncommon and remains both a diagnostic and therapeutic challenge. Poor adherence to treatment and malabsorption of the drugs, especially related to vomiting and hyperemesis gravidarum, need to be ruled out first by a careful history and physical examination. Due to the significant risks of uncontrolled GD in pregnancy to both mother and fetus, a euthyroid status needs to be rapidly achieved. Steroids are cheap, widely available, and safe in pregnancy. These can be added to the antithyroid drugs to ensure a euthyroid state is achieved before definitive management by either surgery or radioactive iodine ablation.

5. Ethical Compliance

Informed consent was obtained from the patient for this publication.

References

[1] Cooper DS, Laurberg P. Hyperthyroidism in pregnancy. Lancet Diabetes Endocrinol. 2013; 1(3):238-49.

[2] Pokhrel B, Bhusal K. Graves Disease. StatPearls. Treasure Island (FL): StatPearls Publishing

[3] Copyright © 2025, StatPearls Publishing LLC; 2025.

[4] Glinoer D. Management of hypo- and hyperthyroidism during pregnancy. Growth Horm IGF Res. 2003; 13 Suppl A: S45-54.

[5] Kurtoğlu S, Özdemir A. Fetal neonatal hyperthyroidism: diagnostic and therapeutic approachment. Turk Pediatri Ars. 2017; 52(1):1-9.

[6] Nguyen CT, Sasso EB, Barton L, Mestman JH. Graves' hyperthyroidism in pregnancy: a clinical review. Clin Diabetes Endocrinol. 2018; 4:4.

[7] Davis LE, Lucas MJ, Hankins GD, Roark ML, Cunningham FG. Thyrotoxicosis complicating pregnancy. Am J Obstet Gynecol. 1989; 160(1):63-70.

[8] Laurberg P, Bournaud C, Karmisholt J, Orgiazzi J. Management of Graves' hyperthyroidism in pregnancy: focus on both maternal and foetal thyroid function, and caution against surgical thyroidectomy in pregnancy. Eur J Endocrinol. 2009; 160(1):1-8.

[9] Thyroid Disease in Pregnancy: ACOG Practice Bulletin, Number 223. Obstet Gynecol. 2020; 135(6):e261-e74.

[10] Kahaly GJ, Bartalena L, Hegedüs L, Leenhardt L, Poppe K, Pearce SH. 2018 European Thyroid Association Guideline for the Management of Graves' Hyperthyroidism. Eur Thyroid J. 2018; 7(4):167-86.

[11] Cooper DS. Propylthiouracil levels in hyperthyroid patients unresponsive to large

doses. Evidence of poor patient compliance. Ann Intern Med. 1985; 102(3):328-31.

[12] Li H, Okuda J, Akamizu T, Mori T. A hyperthyroid patient with Graves' disease who was strongly resistant to methimazole: investigation on possible mechanisms of the resistance. Endocr J. 1995; 42(5):697-704.

[13] Pandey CK, Raza M, Dhiraaj S, Agarwal A, Singh PK. Rapid preparation of severe uncontrolled thyrotoxicosis due to Graves' disease with Iopanoic acid--a case report. Can J Anaesth. 2004; 51(1):38-40.

[14] Sebastián-Ochoa A, Quesada-Charneco M, Fernández-García D, Reyes-García R, Rozas-Moreno P, Escobar-Jiménez F. Dramatic response to cholestyramine in a patient with Graves' disease resistant to conventional therapy. Thyroid. 2008; 18(10):1115-7.

[15] Jude EB, Dale J, Kumar S, Dodson PM. Treatment of thyrotoxicosis resistant to carbimazole with corticosteroids. Postgrad Med J. 1996; 72(850):489-91.

[16] Lee S, Kapoor D, Thomas W, Jones T, editors. Thionamide resistant thyrotoxicosis-three illustrative cases. Endocrine Abstracts; 2005: Bioscientifica.

[17] Bartalena L, Brogioni S, Grasso L, Bogazzi F, Burelli A, Martino E. Treatment of amiodarone-induced thyrotoxicosis, a difficult challenge: results of a prospective study. J Clin Endocrinol Metab. 1996; 81(8):2930-3.

[18] Bogazzi F, Aghini-Lombardi F, Cosci C, Lupi I, Santini F, Tanda ML, et al. Iopanoic acid rapidly controls type I amiodarone-induced thyrotoxicosis prior to thyroidectomy. J Endocrinol Invest. 2002; 25(2):176-80.

[19] Castagna G, Zanchi L, Rossini A, Cassibba S, Trevisan R, Ippolito S. Cholestyramine in Hyperthyroidism and Thyrotoxicosis: Have You Ever Used It? Endocrines. 2025; 6(3):30.

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