Thyroid Storm in Pregnancy: A Case Report

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ABSTRACT

Background

Thyrotoxic crisis is a rare endocrine complication of pregnancy and is associated with a high risk of adverse outcomes for both the mother and the fetus. Its clinical presentation is often polymorphic and may mimic manifestations of other conditions typical of pregnancy, which frequently leads to diagnostic challenges. In this context, early diagnostic confirmation and timely involvement of a multidisciplinary team are essential to reduce maternal and perinatal morbidity.

Case

A 32-year-old pregnant woman at 33 weeks of gestation was admitted with complaints of abdominal pain, palpitations, excessive sweating, headache, and generalized weakness. Despite the administration of maximally intensive medical therapy, an adequate clinical response was not achieved; therefore, a multidisciplinary team consultation was conducted, and the decision was made to perform an emergency delivery. Comprehensive treatment was initiated immediately, including antithyroid medications, beta-blockers, and glucocorticoids, as well as measures aimed at preventing respiratory complications in the newborn.

Conclusion

This clinical case highlights the importance of timely recognition of thyroid storm, implementation of individualized treatment strategies, and strict monitoring of therapeutic adherence in pregnant patients with thyroid disorders. The presented findings contribute to the accumulation of clinical experience and may help optimize management strategies for similar patients in routine clinical practice.

Keywords

thyroid storm; Graves' disease; thyrotoxicosis ; preterm delivery

INTRODUCTION

Hyperthyroidism in pregnancy is a relatively rare endocrine condition, with epidemiological data indicating a prevalence of approximately 0.2–0.9% among pregnant women, most commonly attributable to Graves' disease[1,2]. Maternal thyrotoxicosis during gestation is associated with an elevated risk of adverse maternal and perinatal outcomes, including spontaneous miscarriage, preeclampsia, preterm delivery, and fetal growth restriction[3,4].

Poorly controlled hyperthyroidism is recognized as a major predisposing factor that significantly increases the risk of developing a thyrotoxic crisis, particularly in the peripartum period.

Thyrotoxic crisis in pregnancy is generally a clinical diagnosis, based on the severity of systemic manifestations such as hyperthermia, tachyarrhythmia, decompensated heart failure, central nervous system dysfunction, and severe metabolic derangements [5,6]. The absence of uniform, validated diagnostic criteria tailored to the physiological changes of pregnancy complicates early recognition. Given the high maternal and perinatal morbidity, prompt identification of thyrotoxic crisis and immediate initiation of intensive therapy are essential to improve outcomes [5,7].

Although antithyroid drugs and β-blockers remain the cornerstone of thyrotoxicosis management, thyroid storm in pregnancy

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requires a comprehensive multidisciplinary approach. This includes intensive cardiorespiratory support, correction of fluid and electrolyte disturbances, glucocorticoid therapy, and continuous fetal monitoring, while considering potential teratogenic and functional effects of the medications used [8,9]. Such an approach aims to minimize severe complications and optimize prognosis for both mother and fetus.

Case Presentation

Patient B., a 32-year-old woman, was admitted on an emergency basis to Regional Perinatal Center No. 3 on December 15, 2025 (Turkestan, Kazakhstan). Upon admission, the patient complained of abdominal pain, marked palpitations, shortness of breath, excessive sweating, headaches, and general weakness.

History of Present Illness

According to the patient, lower abdominal pain had been present for approximately 5–6 hours prior to admission. Due to progressive worsening of the pain, she was brought by her relatives to the emergency department of the Regional Perinatal Center.

Past Medical History

The patient's physical development was appropriate for her age and sex. She denied any known hereditary diseases. Her childhood history was notable for jaundice. She reported no history of sexually transmitted infections or tuberculosis. Her surgical history included five cesarean deliveries. There was no history of blood transfusions or traumatic injuries.

Since 2022, the patient has been diagnosed with diffuse toxic goiter (Graves' disease). She had previously received thiamazole therapy at a dose of 10 mg/day, which resulted in partial clinical and laboratory remission. Approximately two months prior to hospitalization, the patient independently discontinued antithyroid therapy without informing her healthcare providers.

Epidemiological History

The patient reported no contact with individuals with infectious diseases during the preceding 35 days. She denied diarrhea, vomiting, animal or tick bites, and blood transfusions within the past six months. A history of sexually transmitted infections was also denied.

Obstetric and Gynecological History

Menarche occurred at the age of 13 years. The menstrual cycle was regular and painless. The patient had been sexually active since the age of 20. Obstetric history included six pregnancies and five deliveries.

- *First pregnancy (2014):* Cesarean section performed due to fetal distress; neonatal birth weight 3,600 g; live birth.
- *Second pregnancy (2016):* Planned cesarean section indicated by maternal and fetal conditions; neonatal birth weight 3,700 g; live birth.
- *Third pregnancy (2018):* Planned cesarean section based on maternal and fetal indications; neonatal birth weight 3,400 g; live birth.
- *Fourth pregnancy (2022):* Planned cesarean section due to maternal and fetal indications; neonatal birth weight 3,700 g; live birth.
- *Fifth pregnancy (2024):* Preterm delivery by cesarean section; neonatal birth weight 3,500 g; live birth.
- *Sixth pregnancy (2025):* Current pregnancy.

The patient was registered for antenatal follow-up at 12 weeks of gestation. The date of the last menstrual period could not be recalled.

Gestational Age Assessment

- According to the date of the last menstrual period: not established.
- According to ultrasound examination: 33 weeks of gestation.

Allergy History

No known drug or food allergies.

Physical Examination

The patient's general condition was assessed as severe, primarily due to the obstetric status. She was conscious and fully oriented. The skin and visible mucous membranes were pale; the skin was warm and moist. Body temperature was 37.6 °C. The patient had a normosthenic body habitus.

Respiration was spontaneous and unlabored, with no signs of respiratory distress. Lung auscultation revealed vesicular breath sounds bilaterally, without focal abnormalities.

Cardiac examination demonstrated loud and rhythmic heart sounds with normal cardiac borders. Blood

pressure was 140/90 mmHg, and heart rate was 130 beats per minute. Marked sinus tachycardia was noted.

A fine tremor of the fingers was present. Varicose veins of the lower extremities were observed and were non-tender on palpation. Costovertebral angle tenderness was absent bilaterally. Urination was spontaneous and painless, with preserved urine output.

Additional physical findings included:

- bilateral exophthalmos;
- nail changes consistent with onycholysis ("Plummer's nails");
- diffuse thyroid enlargement, grade III, with increased density;
- bilateral jugular venous distension;
- peripheral edema of the lower extremities.

Local Examination

A transverse postoperative scar was present on the anterior abdominal wall, located 2–3 cm above the pubic symphysis. Palpation revealed tenderness in the area corresponding to the uterine scar.

Obstetric Status

The abdomen was ovoid in shape and consistent with the gestational age. The uterus was hypertonic. The fetus was in a longitudinal lie with cephalic presentation. The fetal head was engaged at the pelvic inlet (4/5). Fetal heart sounds were best auscultated to the right of the umbilicus, rhythmic, with a heart rate of 178 beats per minute.

Vaginal Examination (Per Vaginam)

The vagina was multiparous. The cervix was effaced and dilated to 3 cm. The amniotic membranes were intact and tense. The fetal head was pressed against the pelvic inlet. The promontory was not reachable, and no pelvic exostoses were detected.

Preliminary Diagnosis

Pregnancy at 33 weeks of gestation. First stage of labor, latent phase. Gestational hypertension.

Postoperative uterine scar following five previous cesarean sections, requiring close medical surveillance. Suspected uterine scar insufficiency. Thyrotoxicosis secondary to diffuse toxic goiter. Sinus tachycardia. Varicose veins of the lower extremities.

Clinical Assessment

The presence of persistent severe maternal tachycardia, autonomic instability, and low-grade fever, together with fetal tachycardia, was initially interpreted as being consistent with gestational hypertension, with a clinical suspicion of chorioamnionitis.

The patient's obstetric history was significantly burdened, as all five previous pregnancies had resulted in operative delivery. In addition, the pregnancy in 2024 was complicated by preterm birth via cesarean section. To clarify the underlying pathological process, a comprehensive set of laboratory and instrumental investigations was performed, and consultations with relevant specialists were obtained. Given the clinical and laboratory findings and the presumed high likelihood of an acute inflammatory process, the scope of antibacterial therapy was broadened.

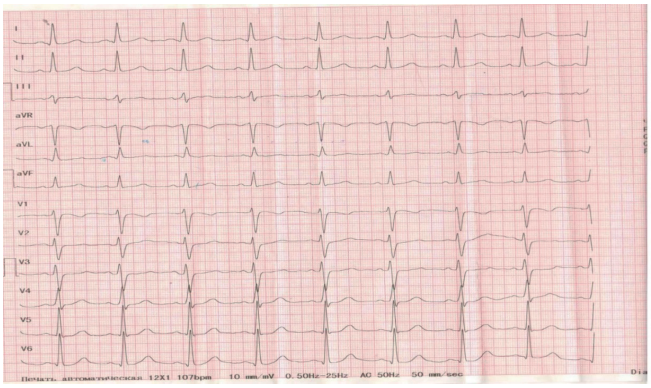


Figure 1. Twelve-lead electrocardiogram demonstrating sinus tachycardia.

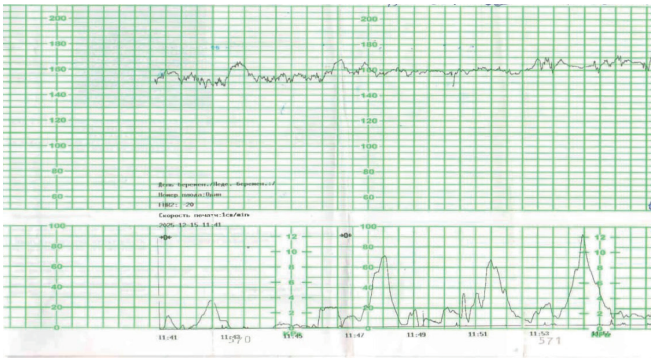


Figure 2. External electronic fetal monitoring revealed tachycardia in both the mother and the fetus.

Given the severity of the maternal condition and evidence of fetal compromise, an emergency cesarean section was performed. A live preterm female infant was

delivered, weighing 2,520 g and measuring 46 cm in length, with Apgar scores of 7 and 8 at 1 and 5 minutes, respectively. The newborn's condition at birth was assessed as moderate based on neonatal parameters, and early postnatal adaptation was uneventful. The amniotic fluid was clear, transparent, and without pathological odor. The postpartum period was uncomplicated. Lactation was adequate, and the mother and newborn remained together in the postnatal ward.

The surgical procedure was completed without intraoperative or immediate postoperative complications. In the early postoperative period, the patient was monitored in the recovery unit. Despite ongoing therapy, no clinical improvement was observed, and the previously reported symptoms persisted. On the second postoperative day, the patient's condition deteriorated, with the development of hyperthermia up to 39 °C and persistent tachycardia with a heart rate of 130 beats per minute. A multidisciplinary medical consultation was convened, during which the current treatment regimen was revised and antibacterial therapy was further intensified. Nevertheless, the patient's clinical status did not improve.

In view of the ongoing deterioration, an urgent comprehensive reassessment was undertaken, including repeated laboratory and instrumental investigations. Additional consultations were obtained from an endocrinologist, cardiologist, internist, ophthalmologist, infectious disease specialist, and pulmonologist.

An infectious disease specialist was consulted via air medical transport. At the time of evaluation, there was no evidence of an acute infectious process.

Pulmonology consultation on December 16, 2025, initially raised the possibility of right-sided pneumonia; however, subsequent evaluation did not confirm acute pneumonia. Imaging revealed a nodular consolidation in the lower lobe of the right lung. Following consultation with a phthisiologist on the same date, a preliminary diagnosis of chronic bronchitis was established.

Additional Diagnostic Findings

An oncologist consultation on December 17, 2025, resulted in a preliminary diagnosis of a suspected benign neoplasm in the lower lobe of the left lung.

Chest computed tomography with mediastinal assessment (December 16, 2025) revealed linear fibrotic changes in the lower lobe of the left lung, nodular formations in the lower lobe of the right lung, and radiological signs of chronic bronchitis. Mediastinal and bilateral axillary lymphadenopathy were also noted.

Chest radiography (December 16, 2025) demonstrated radiographic features consistent with chronic bronchitis.

Ultrasound examination of the abdominal and pelvic organs (December 16, 2025) showed postoperative changes following cesarean section on postoperative day 1, with a small hematometra.

Electrocardiography (December 16, 2025) demonstrated a regular sinus rhythm with a heart rate of 110 beats per minute, consistent with sinus tachycardia, and a normal electrical axis.

Ultrasound of the hepatobiliary system and pancreas (December 16, 2025) revealed diffuse hepatic changes. Additionally, thickening and deformation of the renal pelvis and calyces of both kidneys were observed, with echographic signs suggestive of chronic pyelonephritis.

Laboratory Findings

Laboratory investigations demonstrated severe anemia, leukopenia, elevated erythrocyte sedimentation rate and C-reactive protein levels, and other inflammatory markers. The white blood cell differential showed a left shift, accompanied by hypoproteinemia.

Final Clinical Diagnosis

Based on the cumulative clinical, laboratory, and instrumental findings, the following diagnosis was established:

Postpartum postoperative period, day 2. Gestational hypertension. Uterine scar following cesarean section. Polyserositis. Diffuse toxic goiter, grade II. Thyrotoxicosis. Sinus tachycardia. Severe chronic anemia. Carrier state of herpes simplex virus (HSV) and cytomegalovirus (CMV). Post-acute sequelae of SARS-CoV-2 infection (IgG-positive).

Therapeutic Management

The patient's treatment regimen was revised. Antibacterial therapy was intensified and expanded according to clinical indications. Thromboembolic prophylaxis was continued and escalated. Antianemic therapy was administered as indicated.

Clinical Course

On the third postoperative day, the patient's condition remained severe. Persistent symptoms were noted, and the therapeutic measures implemented did not result in the expected clinical improvement. In view of ongoing

complaints and deterioration, consultations with an endocrinologist and an intensive care specialist were conducted via air medical transport.

Repeat comprehensive laboratory testing was scheduled, including screening for viral hepatitis A, B, C, and D, as well as assessment of thyroid hormone levels (free T3, free T4, TSH), ferritin, and interleukin concentrations.

At that time, the patient's general condition was assessed as severe, attributable to the postpartum state and signs of systemic endocrine decompensation. She remained conscious and oriented, with preserved communication; however, pronounced psychomotor agitation and marked psychoemotional instability were observed.

After reviewing the medical history, clinical presentation, and all available diagnostic data, the consulting endocrinologist established the following final diagnosis:

Postpartum postoperative period, day 3. Severe thyrotoxicosis, decompensated stage. Thyrotoxic heart disease. Gestational hypertension. Uterine scar following cesarean section. Polyserositis. Sinus tachycardia. Severe chronic anemia.

Endocrinologist's Assessment and Management

The patient was advised to continue treatment. The previously prescribed antibacterial therapy was discontinued and replaced in accordance with current clinical indications.

The following investigations were ordered: thyroid ultrasound examination; measurement of serum thyroid-stimulating hormone (TSH), free thyroxine (FT4), free triiodothyronine (FT3), and thyroglobulin antibodies (TgAb).

Antithyroid therapy was initiated with thiamazole (Thyrozol®) 10 mg, administered as two tablets three times daily (at 09:00, 13:00, and 19:00) after meals, with dynamic monitoring of TSH, FT4, and FT3 levels.

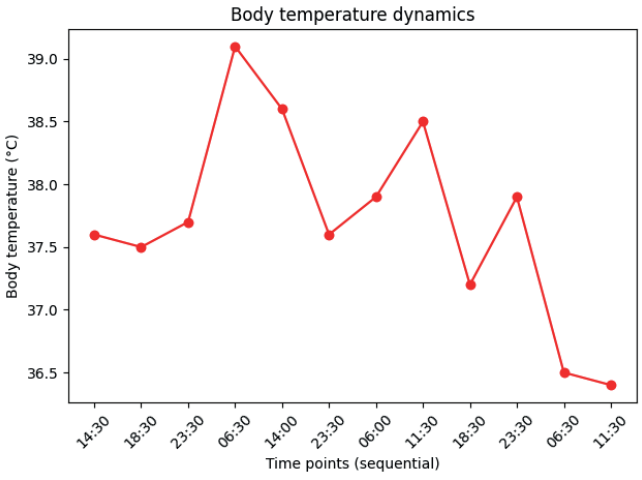
Following a telemedicine consultation with an endocrinologist, the patient's clinical condition stabilized. Vital signs normalized, clinical symptoms resolved, and treatment was continued under enhanced monitoring. After stabilization on the third postoperative day, the patient was transferred to a regional multidisciplinary hospital for further observation and management by specialized consultants.

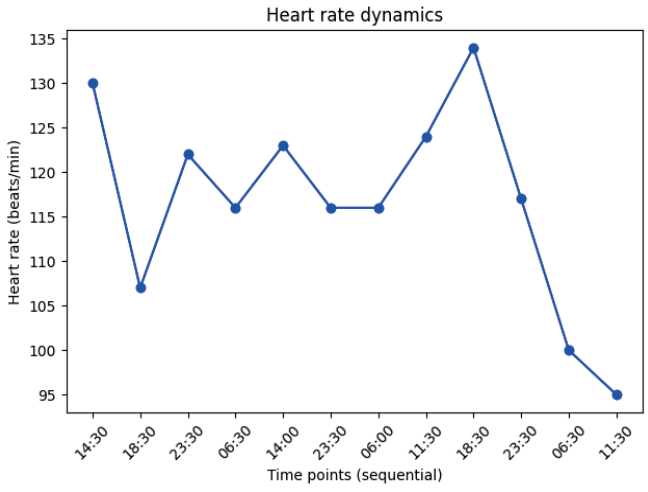
The results of laboratory and instrumental investigations are summarized in **Table 1**. The findings demonstrated severe hormonal thyrotoxicosis, anemia, metabolic acidosis, cardiovascular involvement, and fetal tachycardia in the presence of preserved uteroplacental blood flow.

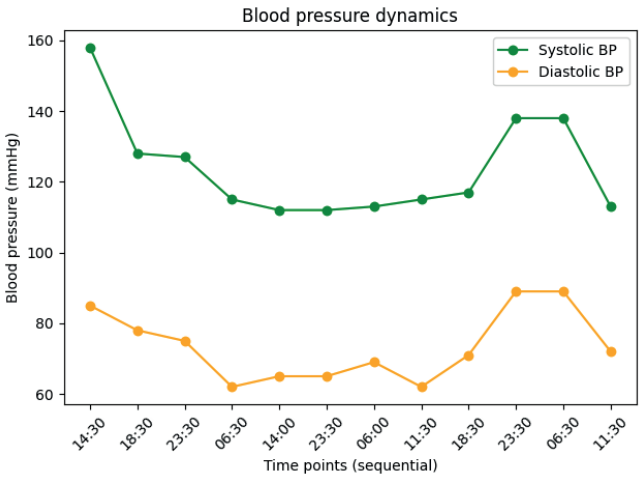
Thyroid ultrasonography confirmed grade III–IV autoimmune thyrotoxicosis.

Echocardiography revealed myocardial hypertrophy and pulmonary hypertension with preserved global systolic function *(Table 1)*.

According to the Burch–Wartofsky scoring system, the total score was consistent with thyroid storm (Table 1).







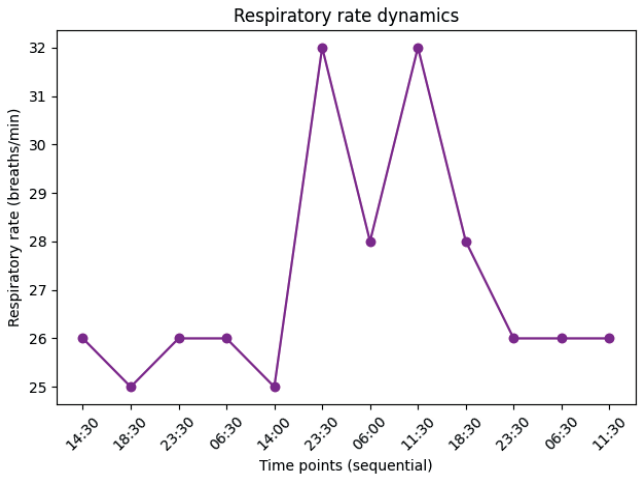


Table 1. Summary of laboratory and instrumental findings at admission

Category	Indicator	Result	Reference Values / Comment
Clinical indicators	Body temperature	37.6 °C	Low-grade fever
	Heart rate	130–135 bpm	Sinus tachycardia
	Blood pressure	140/90 mmHg	Moderate arterial hypertension
	Respiratory rate	22/min	Moderate tachypnea
	Neurological status	Psychomotor agitation	Prodromal phase of thyrotoxic crisis
Hormonal profile	TSH, μIU/mL	0.005	0.27–4.20 (markedly decreased)
	Free T3, ng/mL	7.21	2.02–4.40 (elevated)
	Free T4, ng/mL	5.09	0.90–1.70 (elevated)
Complete blood count	Hemoglobin, g/L	74	Severe anemia
	Leukocytes, $\times 10^9$/L	6.0	No leukocytosis
Blood biochemistry	AST, U/L	22	Within normal range
	ALT, U/L	17	Within normal range
Urinalysis	24-hour proteinuria	Negative	Preeclampsia unlikely
Acid–base status	Arterial blood pH	7.18	Metabolic acidosis
Fetal assessment	Estimated fetal weight (US)	2520 g	Appropriate for gestational age
	Fetal heart rate	Tachycardia	Sign of intrauterine distress
	Amniotic fluid	Normal	No signs of infection
	Doppler velocimetry	Normal	Preserved placental blood flow
Thyroid ultrasound	Diagnosis	Autoimmune thyrotoxicosis grade III–IV	Diffuse enlargement
	Right lobe	2.6 × 2.6 × 2.6 × 5.6 cm	
	Left lobe	2.6 × 2.8 × 2.6 × 5.6 cm	
	Isthmus	0.3 cm	
Echocardiography	Left ventricular ejection fraction	61%	Preserved systolic function
	LV and IVS hypertrophy	Present	
	Mitral regurgitation	Grade I	
	Tricuspid regurgitation	Grade I	
	Pulmonary artery pressure	57 mmHg	Pulmonary hypertension
Diagnostic scale	Burch–Wartofsky score	30 points	Consistent with thyrotoxic crisis

The differential diagnosis included severe thyrotoxicosis, chorioamnionitis, and decompensated heart failure. The absence of membrane rupture, lack of an identifiable infectious focus, and the presence of a systemic inflammatory response without evidence of infection allowed chorioamnionitis to be excluded. Preserved left ventricular systolic function on echocardiography ruled out primary cardiac failure. Integration of the clinical presentation with laboratory findings supported the diagnosis of thyroid storm as the primary cause of clinical decompensation.

The constellation of clinical features—marked tachycardia, autonomic instability, low-grade fever, and pronounced psychoemotional agitation—was consistent with the prodromal stage of thyroid storm. Comprehensive therapy was promptly initiated, including antithyroid medications, beta-blockers, and glucocorticoids.

DISCUSSION

This clinical case illustrates the development of thyroid storm in a pregnant woman with previously diagnosed Graves' disease following spontaneous discontinuation of antithyroid therapy. Published clinical observations consider poor treatment adherence to be one of the most significant and potentially preventable triggers for thyroid decompensation during pregnancy [10,11]. This mechanism of decompensation is discussed in detail in modern review papers on thyroid storm during pregnancy [6]. Our observation confirms this pattern and emphasizes the need for continuous endocrinological monitoring throughout pregnancy.

The clinical course in this case was characterized by a predominance of cardiovascular and neurovegetative manifestations, which significantly hampered early diagnosis. The overlap of symptoms of thyrotoxic crisis with obstetric complications and infectious conditions has been repeatedly described in the literature as a reason for diagnostic delay, especially in the third trimester of pregnancy [12,13]. A number of publications note that the initial interpretation of symptoms as manifestations of gestational hypertension or chorioamnionitis can delay the initiation of specific therapy [12], which was consistent with the clinical picture of the observed case.

The patient's laboratory profile reflected severe thyroid hyperfunction without signs of a systemic inflammatory response or liver damage, which allowed us to exclude chorioamnionitis and other acute infectious complications. This diagnostic approach meets the criteria for thyroid storm and the clinical and biochemical characteristics described in international diagnostic guidelines [6,14], as well as in clinical reviews devoted to the management of this condition [15].

The use of the Burch-Wartofsky scale in the presented observation allowed us to objectively assess the severity of the condition and support the clinical decision to initiate intensive care. Despite the lack of validation in pregnant women, this scale remains the most widely used tool in published peripartum case reports and review papers, where it is used as an auxiliary method for clinical risk stratification [15,16]. The treatment strategy in our case was consistent with modern clinical approaches and included antithyroid therapy, β-blockers, and glucocorticoids in combination with intensive supportive care, which is consistent with recommendations for the management of thyroid storm in pregnancy [6,15,17]. However, despite partial stabilization of the endocrine status, persistent cardiorespiratory failure and signs of fetal distress necessitated emergency delivery. A similar management strategy has been described in peripartum clinical cases of thyroid storm, where timely cesarean section was considered an important factor in improving perinatal outcomes [11].

A postoperative complication such as acute respiratory viral infection (ARVI) can be considered a consequence of a severe systemic condition and a stay in the intensive care unit. It has previously been reported that such complications often accompany the course of thyroid storm; however, with timely treatment, they do not significantly affect the final prognosis [15].

Overall, this clinical case highlights that thyroid storm in pregnant women requires a high level of clinical suspicion, especially in patients with known thyroid pathology. This case report complements existing clinical data and demonstrates that early diagnosis, a multidisciplinary approach, and timely decisions regarding delivery can significantly improve maternal and perinatal outcomes, even in severe cases.

Study Limitations

This clinical observation has a number of methodological and clinical limitations typical of case reports, which must be considered when interpreting the presented data. Firstly, the study is based on a single clinical case, precluding statistical analysis and precluding causal generalizations or the development of clinical

recommendations. However, given the extreme rarity of thyroid storm during the gestational period, even isolated observations have significant scientific and practical value.

Secondly, the retrospective nature of the clinical analysis limits the completeness of the initial data, particularly the inability to accurately reconstruct the transition time from uncontrolled thyrotoxicosis to crisis. This could have impacted the assessment of the role of individual triggers and the rate of disease progression.

Thirdly, the diagnosis of thyroid storm was based on clinical criteria and the Burch-Wartofsky scale, which is widely used internationally but has not been adapted or validated for pregnant women, potentially reducing the accuracy of assessing the severity of the condition during the physiological changes of pregnancy.

Furthermore, the presence of overlapping clinical syndromes (gestational hypertension, heart failure, suspected infection) significantly complicated early diagnosis and could have led to diagnostic delays, a situation typically described in other published clinical cases of thyroid storm in pregnancy.

It should also be noted that the emergency delivery and the need for intensive care limited the possibility of standardized monitoring of the patient's endocrine status in the early postpartum period, and long-term maternal and neonatal outcomes were not assessed, preventing a judgment on the possible long-term consequences of thyroid storm and the therapy used.

Finally, this case reflects real-world clinical practice under time and resource constraints, which could have impacted the completeness of diagnostic and therapeutic measures. However, it simultaneously highlights the importance of clinical judgment and a multidisciplinary approach in the management of life-threatening endocrine conditions during pregnancy. Conclusion

This clinical case demonstrates the complexity of diagnosing and managing thyroid storm in pregnant women, especially in the setting of previously established thyroid disease and poor adherence to therapy. This observation highlights that even with prodromal manifestations of thyroid storm, the clinical picture can masquerade as obstetric complications, requiring a high level of vigilance on the part of physicians across various specialties.

The key factor determining the unfavorable progression of the patient's condition was the spontaneous discontinuation of antithyroid therapy, which indicates the need for continuous endocrinological monitoring and interdisciplinary collaboration throughout the pregnancy. Timely administration of combination therapy and the decision to perform an emergency delivery prevented the development of severe maternal and perinatal complications.

This clinical case highlights the practical importance of early recognition of thyroid storm, an individualized approach to treatment, and the need for strict adherence to therapy in pregnant women with thyroid pathology. This case report contributes to the accumulation of clinical experience and may be useful for optimizing the management of similar patients in real-life clinical practice.

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Ethical clearence:__This study was conducted in accordance with ethical standards. Ethical approval was obtained from the appropriate institutional review board, and informed consent was secured from all participants prior to data collection.

Authors's contribution:

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