



Autoimmune Thyroid Disorder in a 15-Year-Old Female with Concurrent Dengue: A Case Study

Dr. Rahul Gopalakrishnan¹, Dr. Vijayakumar PG², Dr. Seethalakshmi S³, Dr. Lydia Jeris W⁴

1 Biochemist, Department of Laboratory Medicine, Dr. Mehta's Multispecialty Hospitals Pvt Ltd, Global Campus, Velappanchavadi, Chennai, Tamil Nadu, India.

2 Consultant Biochemist, Department of Laboratory Medicine, Dr. Mehta's Multispecialty Hospitals Pvt Ltd, Chetpet Campus, Chennai, Tamil Nadu, India.

3 Director, Department of Laboratory Medicine, Dr. Mehta's Multispecialty Hospitals Pvt Ltd, Chetpet Campus, Chennai, Tamil Nadu, India.

4 Consultant Pathologist and HOD, Department of Laboratory Medicine, Dr. Mehta's Multispecialty Hospitals Pvt Ltd, Global Campus, Velappanchavadi, Chennai, Tamil Nadu, India.

*Corresponding author's E-mail: rahulbiochem23@gmail.com

Received: 15-08-2024; Revised: 28-11-2024; Accepted: 10-12-2024; Published on: 15-12-2024.

ABSTRACT

We report a case of a 15-year-old female who presented with high grade fever and thrombocytopenia, slightly elevated creatinine levels, initially diagnosed with dengue fever. Elevated LDH and Ferritin level indicated the severity of dengue, yet after 7 days of treatment, her elevated creatinine levels remained unchanged, prompting further investigation. Thyroid function tests revealed severe hypothyroidism with a TSH level exceeding 250 μ IU/mL and antibody testing (Anti-Tg and Anti-TPO) confirmed autoimmune thyroiditis (Hashimoto's Thyroiditis). This case highlights the importance of considering underlying autoimmune conditions in patients with persistent abnormal laboratory findings, even in the context of infectious diseases such as dengue. After initiating thyroid hormone replacement therapy, the patient's creatinine levels returned to normal and she is expected to lead a healthy life with ongoing management. Early detection and treatment of thyroid disorders are crucial to preventing further complications, particularly in patients with coexisting conditions. This case emphasizes the need for thorough diagnostic evaluation in patients whose clinical abnormalities don't resolve with initial treatment modalities.

Keywords: Dengue, Autoimmune thyroiditis, Hashimoto's thyroiditis.

INTRODUCTION

Autoimmune thyroid disorders, particularly Hashimoto's thyroiditis represent one of the leading causes of hypothyroidism, especially in adolescents and young adults¹. Hashimoto's thyroiditis occurs when the immune system mistakenly targets the thyroid gland, producing antibodies against thyroid components such as thyroid peroxidase (TPO) and thyroglobulin^{2, 3}. This autoimmune reaction results in chronic inflammation which gradually impairs the thyroid gland's ability to produce hormones leading to hypothyroidism. While hypothyroidism is typically recognized by classic symptoms such as unexplained weight gain, fatigue, dry skin, constipation and cold intolerance, it can sometimes present with more subtle or atypical clinical signs, particularly when it coexists with other acute medical conditions. In these instances, the diagnosis of autoimmune thyroiditis can be challenging as the symptoms may overlap or be masked by the concurrent illness^{4, 5}.

Dengue fever, on the other hand, is a mosquito-borne viral infection that is endemic in tropical and subtropical regions⁶. It is transmitted primarily by *Aedes aegypti* mosquitoes and causes a wide spectrum of illness, ranging from mild febrile episodes to severe dengue haemorrhagic fever and dengue shock syndrome⁷. The clinical features of dengue include high fever, severe headache, retro-orbital pain, muscle and joint pain, skin rashes, and significant thrombocytopenia. In severe cases, complications such as

plasma leakage, haemorrhage and multi-organ dysfunction may develop affecting organs like the liver and kidneys^{8, 9}. Renal impairment, though uncommon in mild cases, is more likely in severe forms of the disease and can persist even after other clinical parameters normalize.

The presence of autoimmune thyroiditis and dengue fever in the same patient is a rare and complex scenario. In such cases, the acute symptoms of dengue, including fever, fatigue, and thrombocytopenia can obscure the underlying thyroid disorder. Similarly, autoimmune thyroiditis, which progresses gradually, may be overlooked when more acute symptoms dominate the clinical picture^{10, 11}. The presence of concurrent conditions requires a high index of suspicion and a comprehensive diagnostic approach to avoid missing a secondary unrelated condition. In particular, when patients with dengue fever do not show expected recovery or present with persistent abnormalities such as renal dysfunction or unexplained fatigue, we should consider additional or coexisting diagnoses such as autoimmune thyroid disease¹².

This case report underscores the importance of considering multiple diagnoses in a patient whose clinical features are atypical or persist despite appropriate treatment. Early identification and management of both conditions are crucial in preventing long-term complications, particularly in young patients who might face significant health consequences if left untreated. The case also highlights the need for awareness of the potential overlap between infectious and autoimmune



diseases, which can complicate the diagnostic process and delay the appropriate treatment.

Case Presentation:

A 15-year-old female presented with a 2-day history of high-grade fever, fatigue, and generalized malaise. She reported muscle pain, headaches, and extreme weakness. She had no prior history of chronic illness and there was no significant family history of autoimmune or thyroid disorders. Initial investigations included a complete blood count (CBC), dengue serology, scrub typhus, leptospirosis,

C-reactive protein (CRP), renal function tests, liver function test (AST, ALT) and serum electrolytes.

RESULT

The patient's complete blood count (CBC) test result revealed significant abnormalities: hemoglobin (8.9 g/dL (low)), platelet count (less than 10,000/mm³ (severely low)) as in table 1, and biochemical parameters showed an increase in creatinine and SGOT level (1.93 mg/dL and 50 U/L) while other parameters were within normal ranges revealed in table 2. Fever profile was done which showed positivity for Dengue IgG was negative for NS1 and IgM.

Table 1: Result of complete blood count with low Hemoglobin and Platelet count

Parameters	Result	Reference range	Units	Methodology
Hemoglobin	8.9	12-16	gm/dL	Photometric measurement
PCV (Hematocrit)	26.9	38-46	%	Calculated
Total RBC count	3.10	3.8-4.8	Millions/mm ³	Coulter principle
Total WBC count	6.9	4-11	10 ³ /μl	Coulter principle
DIFFERENTIAL COUNT				
Neutrophils	30	40-75	%	Optical / Impedance
Lymphocytes	62	20-45	%	Optical / Impedance
Eosinophils	01	1-6	%	Optical / Impedance
Monocytes	07	0-10	%	Optical / Impedance
Platelet count	less than 10	150-450	10 ³ /μl	Coulter principle

Table 2: Normal value of urea, lactate and ALT with increased level of creatinine and AST.

Parameters	Result	Reference range	Units	Methodology
Urea	32	10.7-38.5	mg/dl	Urease GLDH
Creatinine	1.93	0.17-0.79	mg/dl	Enzymatic
Lactate	0.89	0.5-2.2	mmol/dl	Enzymatic
SGOT	50	10-35	U/L	UV without P5P
SGPT	22	0-33	U/L	UV without P5P

Table 3: Results show dengue IgG positive, scrub typhus and leptospira antibody negative

Parameters	Result	Reference range	Methodology
Dengue IGG	Positive		RAPID
Dengue IGM	Negative (0.06)	Negative: <9 Equivocal: 9-11 Positive: >11	ELISA
Dengue NS1 Antigen	Negative		RAPID
Scrub Typhus IGM Qualitative	Negative (3.69)	Negative: <9 Equivocal: 9-11 Positive: >11	ELISA
Leptospira IGM	Negative (6.16)	Negative: <9 Equivocal: 9-11 Positive: >11	ELISA
CRP	Negative	0-5 mg/L	Immunoturbidity
ESR	140	0-12	Westergren

Table 4: Elevated level of both LDH and Ferritin

Parameters	Result	Reference range	Units	Methodology
LDH	400	85-222	U/L	Lactate to Pyruvate
Ferritin	658.3	13-150	ng/ml	ECLIA

Additionally, the erythrocyte sedimentation rate (ESR) was elevated at 140 mm/hr. Based on the positive IgG result, a diagnosis of dengue fever was made, and other febrile illnesses, including scrub typhus and leptospirosis, were ruled out shown in table 3. To assess the severity of dengue, lactate dehydrogenase (LDH) and ferritin levels were tested, both of which were elevated in table 4. These high levels indicated a more severe form of dengue infection as elevated LDH and ferritin are associated with heightened inflammatory responses and cellular damage.

The patient was treated symptomatically with intravenous fluids and close monitoring of platelet counts. After 7 days of treatment, her platelet counts improved to over 100,000/mm³, and her hemoglobin rose to 10.2 g/dL. However, her serum creatinine remained persistently elevated (1.9–2.0 mg/dL), suggesting possible renal dysfunction in table 5.

Given the lack of improvement in creatinine levels despite recovery from dengue, as per consultant advice further investigations were done. Antinuclear antibodies (ANA), C3 and C4 complement levels and creatine phosphokinase (CPK) were normal shown in table 6. These results ruled out autoimmune and muscular disorders as potential causes of

prolonged inflammation or renal impairment. However, a thyroid function test revealed a highly elevated thyroid-stimulating hormone (TSH) level of more than 250 μ U/mL, indicating severe hypothyroidism shown in table 7. Subsequent testing for thyroid antibodies revealed elevated anti-thyroglobulin (anti-Tg) and anti-thyroid peroxidase (anti-TPO) antibodies, confirming a diagnosis of autoimmune thyroiditis (Hashimoto's thyroiditis) shown in table 8. The elevated thyroid antibodies suggested that the patient's immune system was attacking her thyroid gland leading to her hypothyroidism.

Table 5: Platelet count, hemoglobin and creatinine level during 7 days of the treatment

Days	Platelet Count	Hemoglobin	Creatinine
Day 2	18,000	6.4	1.93
Day 3	31,000	6.4	1.83
Day 4	43,000	7.0	1.98
Day 5	58,000	6.9	2.00
Day 6	82,000	7.9	1.96
Day 7	1,02,000	9.2	2.01

Table 6: Normal ANA, CPK, C3 and C4 levels.

Parameters	Result	Reference range	Units	Methodology
Anti-Nuclear Antibody screening	NEGATIVE (0.2)	Negative: <1 Equivocal: 1.0-1.2 Positive: >1.2	Index	EIA
C3 (Complement-3)	80.54	84-168	mg/dl	Immuno turbidometry
C4 (Complement-4)	20.85	13-44	mg/dl	Immuno turbidometry
CPK	85.8	0-170	U/L	UV Kinetic

Table 7: Thyroid profile shows highly elevated levels of TSH.

Parameters	Result	Reference range	Units	Methodology
Free T3	0.626	2.4-4.9	pg/ml	ECLIA
Free T4	0.133	0.89-1.76	ng/dl	ECLIA
TSH	More than 250	0.27-4.20	μ U/ml	ECLIA

Table 8: The confirmation of autoimmune thyroid disorder.

Parameters	Result	Reference range	Units	Methodology
Thyroglobulin Antibody, Anti Tg	141.70	<4.00	IU/ml	CLIA
Peroxidase Antibody: Anti-TPO	785.50	<9.00	IU/ml	CLIA

Thyroid hormones play a crucial role in regulating metabolism, impacting various physiological functions including muscle and kidney function. These hormones are

essential for maintaining metabolic rate and energy production within the body. In case of hypothyroidism, where there is a deficiency of thyroid hormones, significant



metabolic disruptions occur. This deficiency results in decreased protein synthesis, which is vital for muscle growth and repair, leading to muscle weakness and fatigue. Additionally, hypothyroidism affects kidney function by reducing the clearance of creatinine, a waste product of muscle metabolism. This reduced clearance can lead to elevated creatinine levels in the blood, further complicating the patient's overall health status and highlights the intricate relationship between thyroid function and renal health^{13, 14}.

Complications:

The main complication in this case was persistent renal dysfunction, as evidenced by the elevated serum creatinine levels. While dengue fever is known to cause acute kidney injury (AKI) in severe cases, the persistence of high creatinine after the acute phase of infection suggested an underlying chronic condition. The patient's hypothyroidism, likely to have been present before the dengue infection, may have contributed to impaired renal function, as hypothyroidism is known to reduce glomerular filtration rate (GFR) and cause fluid retention. Thrombocytopenia was another major complication, but it resolved following treatment for dengue fever.

DISCUSSION

This case presents a unique challenge, with the overlapping presentations of dengue fever and an underlying autoimmune thyroid disorder. Dengue, especially in severe forms, can present with thrombocytopenia, which may obscure the diagnosis of coexisting conditions such as hypothyroidism. The patient's elevated creatinine levels, initially attributed to dengue-related acute kidney injury, persisted beyond the recovery period, prompting further investigation.

The diagnosis of Hashimoto's thyroiditis was confirmed by elevated TSH levels and anti-thyroid antibodies. Autoimmune thyroid disorders are common in adolescence, and their coexistence with infections can complicate diagnosis and treatment. Hypothyroidism can exacerbate renal dysfunction, which may explain the persistent elevation in creatinine despite resolution of other dengue-related symptoms^{15, 16}.

This case underscores the importance of considering autoimmune diseases in patients with persistent abnormal laboratory findings, even in the setting of an acute infection. Had the thyroid function not been tested, the patient's hypothyroidism might have gone undiagnosed, leading to continued renal dysfunction and other systemic complications.

CONCLUSION

Autoimmune thyroiditis (Hashimoto's thyroiditis) is a chronic condition that can present in atypical ways, especially when accompanied by other illnesses such as dengue. In this case, the patient was initially treated for dengue fever, but further investigation revealed an underlying autoimmune thyroid disorder, which was

contributing to renal dysfunction. This case highlights the importance of a comprehensive approach to diagnosis when abnormal lab findings persist, even in the context of a known acute infection.

The patient was started on thyroid hormone replacement therapy to manage her hypothyroidism. With regular monitoring and appropriate treatment, she is expected to live a near healthy and normal life. This case serves as a reminder to us that autoimmune disorders may coexist with infections and must be considered when patients fail to recover from clinical condition as expected.

Financial Disclosure:

This study did not receive any funding.

Source of Support: The author(s) received no financial support for the research, authorship, and/or publication of this article.

Conflict of Interest: The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

REFERENCES

1. McLeod DS, Cooper DS. The incidence and prevalence of thyroid autoimmunity. *Endocrine*. 2012; 42:252-65.
2. Antonelli A, Ferrari SM, Corrado A, et al. Autoimmune thyroid disorders. *Autoimmunity Rev*. 2015; 14:174-80.
3. Caturegli P, De Remigis A, Rose NR. Hashimoto thyroiditis: clinical and diagnostic criteria. *Autoimmunity Rev*. 2014; 13:391-7.
4. Rayman MP. Multiple nutritional factors and thyroid disease, with particular reference to autoimmune thyroid disease. *Proc Nutr Soc*. 2019; 78:34-44.
5. Larry JJ, Weetman AP. Disorders of the Thyroid gland. In: Brunwald E, Fauci A, editors. *Harrison's Principles of Internal Medicine*. 15th ed. Vol. 2. USA: McGraw-Hill; 2001. p. 2060-84.
6. Yousaf MZ, Siddique A, Ashfaq UA, Ali M. Scenario of dengue infection & its control in Pakistan: An update and way forward. *Asian Pac J Trop Med*. 2018;11(1):15.
7. de Almeida RR, Paim B, de Oliveira SA, Souza AS, Gomes ACP, Escuissato DL, et al. Dengue hemorrhagic fever: a state-of-the-art review focused in pulmonary involvement. *Lung*. 2017;195(4):389-95.
8. Paixao ES, Teixeira MG, Costa MCN, Rodrigues LC. Dengue during pregnancy and adverse fetal outcomes: a systematic review and meta-analysis. *Lancet Infect Dis*. 2016. Available from: [http://dx.doi.org/10.1016/S1473-3099\(16\)00088-8](http://dx.doi.org/10.1016/S1473-3099(16)00088-8).
9. Muller DA, Depelsenaire AC, Young PY. Clinical and laboratory diagnosis of dengue virus infection. *J Infect Dis*. 2017;215(S89-S95).
10. García G, González N, Pérez AB, Sierra B, Aguirre E, Rizo D, et al. Long-term persistence of clinical symptoms in dengue-infected persons and its association with immunological disorders. *Int J Infect Dis*. 2011;15



11. Bhatt P, Sabeena SP, Varma M, Arunkumar G. Current understanding of the pathogenesis of dengue virus infection. *Curr Microbiol.* 2021;78:17-32.
12. Li HM, Huang YK, Su YC, Kao CH. Increased risk of autoimmune diseases in dengue patients: a population-based cohort study. *J Infect.* 2018;77:212-9.
13. Fowler MR, Williams D. The effect of thyroid hormones on muscle metabolism. *Endocrinol Metab Clin North Am.* 2019;48(1):157-74.
14. Maruani G, Charpentier A. Thyroid dysfunction and kidney disease: an overview. *Clin Kidney J.* 2021;14(5):1396-403.
15. Chacko B, Subramanian P. Clinical, laboratory and radiological parameters in children with dengue fever and acute kidney injury. *Indian J Pediatr.* 2016;83(1):20-5.
16. Shin DH, Lee MJ, Kim SJ, Oh HJ, Kim HR, Han JH, et al. Hypothyroidism and chronic kidney disease. *J Nephrol.* 2013;26(1):209-15.

For any questions related to this article, please reach us at: globalresearchonline@rediffmail.com

New manuscripts for publication can be submitted at: submit@globalresearchonline.net and submit_ijpsrr@rediffmail.com

