New Onset Hashimoto's Thyroiditis Associated with Severe Rhabdomyolysis After Infection with COVID19

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Abstract:

This case study is of a 74 year-old female with three hospital admissions over the year of 2022. During her second admission she presented with generalized weakness and fatigue with an initial creatinine kinase of greater than 50,000 Units/L (reference range 25-192) and a thyroid stimulating hormone level of 178. She was initially treated with intravenous fluids, IV levothyroxine, and IV hydrocortisone. Halfway through her hospitalization, intravenous immunoglobulin was added to her treatment regimen. The patient was discharged after having returned to her baseline functional and mental status after receiving multiple blood transfusions in addition to the continuation of oral levothyroxine and oral steroids.

Keywords: Hashimoto's Thyroiditis, Auto-immune Thyroiditis, Rhabdomyolysis, Severe Hypothyroidism, Intravenous Immunoglobulin, COVID19

Introduction:

Rhabdomyolysis is the breakdown of muscle tissue causing end organ damage. Common causes are trauma or medications such as statin agents. Other factors that can lead to rhabdomyolysis are:
- infection/sepsis,
- ischemia,
- metabolic imbalance,
- idiopathic, and
- neurologic disorders such as seizures.

Hashimoto's Thyroiditis (HT) is a deficiency of thyroid hormone caused by lymphocytic infiltration or autoimmune mediated destruction. Two theories of association between HT and Rhabdomyolysis are:
- lack of thyroid hormone increases glycolysis resulting in higher levels of lactate causing muscle cramping and fatigue.
- lack of thyroid hormone indirectly decreasing the production of myosin heavy chains which are the building blocks of skeletal myofibrils.

Table 1: Patient Laboratory Values

Variables (reference range)/ Day of Admission:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
CK Units/L (25-192)	50000			21067	17715	17079	18148			4604	3168	1583				
LDH Units/L (81-234)					1320											1558
Hgb g/dL (12-16)	12.7	12	11.5	10.5	11.2	11.2	11.1		10.1	9.2	9			3.5	7.7	8.4
Free T4 ng/dl (0.59-1.17)			0.3											0.7		
TSH (0.42-5.47)	178		128.2											96.7		
Serum Myoglobin ng/ml (25-58)						17293				4459	2213	1040				
Creatinine mg/dl (0.6-1.0)	8.03	8.23	8.17	8.02	7.48	6.69	6.09		5	3.54	3.22	2.92				
Anti-TPO antibody IU/ml (0-34)			543													
AST Units/L (15-37)	1111	1108	748	528	380	299	326							90	112	98
ALT Units/L (30-65)	325	344	307	275	255	244	260							59	52	54
Aldolase Units/L (3.3-10.3)					25.6											
HMGCR Antibodies Units (<20)						<20										

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Case Presentation:

This case study will discuss the inpatient care of a 74 year-old female who had three hospital admissions throughout 2022 with a detailed focus on the second admission.

First Admission: The patient was diagnosed with severe rhabdomyolysis and acute renal failure requiring outpatient hemodialysis for three months. She was positive for COVID19 approximately two weeks before her first admission and presented with progressive generalized weakness, body ache, dyspnea on exertion, fever, chills, and oliguria. The patient stopped her statin medication once hospitalized. Initial creatine kinase 42,600. A thyroid stimulating hormone (TSH) level was not drawn and the patient reported no previous history of thyroid disease.

Second Admission: Patient had similar symptoms 5 months after previous admission excluding oliguria, fever, and chills. Her initial creatine kinase was greater than 50,000 U/L with a TSH level of 177.95 mIU/L. The patient was started on 100mg IV levothyroxine daily and 100mg IV hydrocortisone every 8 hours. With the utilization of risk-benefit analysis, a muscle biopsy was recommended to assess for myositis. The patient was started on intravenous immunoglobulin (IVIG) for four days and the biopsy was negative for myositis. As shown in Figure 1, the creatinine and creatine kinase levels dramatically decreased after administration of IVIG. It is important to note that the patient started to feel improvement of her fatigue and weakness on day 11 of hospital stay. Table 2 shows pertinent laboratory results.

Third Admission: The patient was readmitted to the hospital for 11 more days due to severe blood loss from the biopsy site and altered mental status. The patient's initial hemoglobin was 3.7 and CT imaging revealed a 12x3x6 cm intramuscular hematoma. She received ICU care with appropriate blood transfusions and was discharged after being able to ambulate with a walker and at baseline mental status.

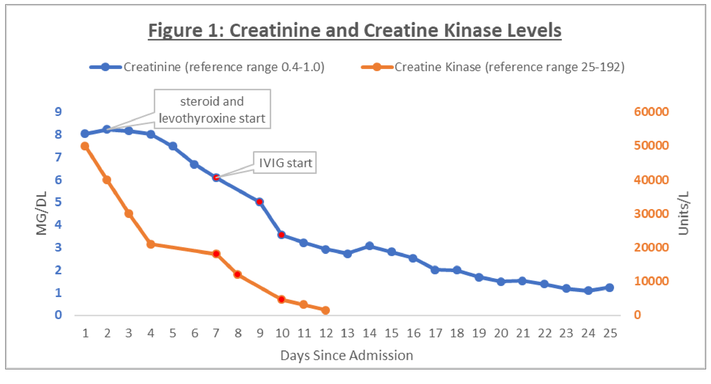

Figure 1: Creatinine and CK Levels interpretation: (red dots note IVIG treatment days) Creatinine levels are noted in blue while CK levels are noted in orange. Both creatinine and CK levels are shown to decrease over the 25-day admission period, however, there was a greater decrease in both levels once IVIG was started. A steroid and levothyroxine were administered starting on day 2 and were continued throughout the admission.

Discussion:

There may be an association between HT and COVID19 infection due to presenting with HT post infection with COVID19. There is growing evidence associating viral infections with HT. Two common theories are molecular mimicry and the bystander effect.

Screening for hypothyroidism remains to be controversial when looking at recommendations by expert groups. This case study suggests more investigation into guidelines regarding screening patients for thyroid disease, especially during hospitalization.

Starting IVIG in this patient was done due to high clinical suspicion for autoimmune myositis before biopsy results were available.

Conclusion:

This case study represents another contribution to scientific literature towards an association between HT, severe rhabdomyolysis, and COVID19. In these circumstances, physicians should consider ordering a TSH during hospital admissions with close outpatient follow up. This case study is unique due to the long duration and extreme severity of HT with rhabdomyolysis observed.

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