H7 An Unusual Case of Repeat Exertional Rhabdomyolysis With Associated Lymphocytic Thyroiditis and Sickle Cell Trait

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The goals of this presentation are to: (1) highlight clinical findings of a death following a second episode of exertional-rhabdomyolysis in a Sickle Cell Trait (SCT) patient also found to have lymphocytic thyroiditis at autopsy; and, (2) review return to play/duty recommendations for rhabdomyolysis in SCT individuals.

This presentation will impact the forensic science community by detailing a case in which SCT, exertional-rhabdomyolysis, and lymphocytic thyroiditis contributed to the death of an otherwise healthy person.

A 33-year-old male soldier in the National Guard began complaining of difficulty breathing and pain and requested medical assistance during a fitness test. Following emergent transfer to the hospital, he became combative and showed altered mental status. He was diagnosed with rhabdomyolysis. Three days after admission, the patient went into full cardiac arrest and died.

According to the decedent's relatives, he was hospitalized a year earlier for exertional rhabdomyolysis following the same annual fitness test. He was known to be positive for SCT, but was otherwise physically fit and without ongoing medical problems. The patient did not take any prescription medications and did not smoke or drink alcohol. He was not placed on any restrictions following this episode of rhabdomyolysis, other than recommendations to adequately hydrate.

His death resulted from complications of exertional rhabdomyolysis, including acute renal failure, intestinal ischemia, disseminated intravascular coagulation, and multiple organ failure. An unexpected finding at autopsy occurred on microscopic examination of the thyroid gland: significant lymphocytic infiltrates with germinal centers and destruction of thyroid follicles. He had a significantly elevated Thyroid Stimulating Hormone (TSH) and anti-thyroid peroxidase hormone on antemortem and postmortem samples. His toxicology screen of admission blood was negative for all screened substances.

For single-episode cases of rhabdomyolysis, the most common causes are cocaine use, exercise, and immobilization.[1] However, if an individual has recurrent episodes of exertional rhabdomyolysis, that person should undergo investigation for an underlying cause. Repeat episodes may be a result of SCT, hypothyroidism, or acquired myopathies, such as polymyositis, congenital muscle disorders such as muscular dystrophy, or metabolic myopathies impair fat metabolism.[1] Recommendations suggest athletes and military personnel should not return to play or duty if they have SCT since many activities can cause repeat episodes of exertional rhabdomyolysis.[2,3]

SCT and hypothyroidism are both risk factors for developing rhabdomyolysis. A study of 47,944 United States Army Black soldiers on active duty who had undergone testing for SCT had a significantly higher risk of exertional rhabdomyolysis.[4] A few case reports revealed hypothyroidism predisposes individuals to rhabdomyolysis and Acute Kidney Injury (AKI). The pathogenesis is unclear, but the hypothesis is hypothyroidism impairs glycogenolysis and mitochondrial oxidative metabolism, which can lead to rhabdomyolysis under physical stress.[5,6] Hypothyroidism as a cause of rhabdomyolysis and AKI should be considered in patients with decreasing renal function, high creatinine kinase, and no obvious cause.[7]

Though not the most common causes of rhabdomyolysis, underlying etiologies, including SCT and hypothyroidism, should be considered by the pathologist performing the autopsy in deaths due to exertional rhabdomyolysis. Microscopic examination of the thyroid is recommended.

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Rhabdomyolysis, Sickle Cell Trait, Forensic Pathology

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