



## Exertional Rhabdomyolysis and Heat Wave: A Tropical Affair

Kishore KA<sup>1</sup> and Dhiraj A<sup>2\*</sup>

<sup>1</sup>Department of Nephrology, PACE Hospitals, India

<sup>2</sup>Department of Gastroenterology and Hepatology, PACE Hospitals, India

### Keywords

Rhabdomyolysis; Exertional rhabdomyolysis; Tropical climate; Heat wave

### Abbreviations

AST: Aspartate Aminotransferase; ALT: Alanine Aminotransferase; CPK: Creatine Phosphokinase

### Letter to the Editor

Exertional rhabdomyolysis is potentially a life-threatening condition resulting from the damage to striated muscle cells due to intense muscle activity during increased exertion, epileptic status or convulsions, exposure to very high temperatures in malignant neuroleptic syndrome, heat stroke or malignant hyperthermia [1]. India is a tropical country with summer temperatures approaching >35°C in southern parts. The rise in average temperatures and heavy exertions during such times directly impact health and social health spending. Heat-related illness includes milder sunburn, syncope, and cramps to severe and potentially life-threatening forms, such as heat stroke. High temperatures are associated with profuse sweating. Dehydration combined with a lack of access to drinkable water or frequent rehydration with hypotonic sugary drinks makes the situation worse.

Here we report a 28-year-old teetotaler who presented to the hepatology clinic with generalized fatigue and body aches for two days. He was incidentally detected to have chronic asymptomatic Hepatitis B two years ago. On evaluation, he was hemodynamically stable, and systemic examination was within normal range. Investigations revealed normal liver function tests except for elevated AST and ALT levels of 988 and 233 U/L. Gamma-glutamyl transferase levels were within limits. IgM Anti-Hepatitis-B-core antibody was negative, while HBV DNA was undetectable. Markers for acute viral hepatitis A and E were negative. Urine examination showed dipstick positivity for blood. On enquiry, he reported a history of cola-colored urine. He recently joined a fitness center and underwent intense physical training for five successive days before presentation involving both upper and lower limbs and the trunk muscles. Despite body aches, he continued the training. On re-evaluation, serum lactate dehydrogenase levels were 2198 IU/L and serum Creatine Phosphokinase (CPK) levels were 7500 IU/L (24-171 IU/L). Urine myoglobin levels were 1926 ug/L, which confirmed the diagnosis of rhabdomyolysis. Kidney functions and serum electrolytes were within limits. He was treated with aggressive intravenous fluids and urinary alkalization with sodium bicarbonate, post which his urine color and laboratory parameters improved. He was discharged in stable condition with precautions advised.

In rhabdomyolysis, CPK concentration peaks 24 h to 72 h after the triggering factor. An essential clinical concept here is in the presence of very high blood CPK; the measured CPK values can be falsely low by the colorimetric method [2]. In our case also, the initial CPK value was 12.5 IU/L, which was reported to be 7,500 IU/L after dilution. Urinary Myoglobin levels are not routinely done everywhere, and myoglobinuria can lead to a visible change in urine color at values >100 mg/dL. Without urinary myoglobin estimation and correct values of CPK, the diagnosis of rhabdomyolysis would have been missed. Second, in exertional rhabdomyolysis, AST levels are much higher than ALT [3]. AST has a wide distribution in the body and is present in the liver, muscles, heart, and erythrocytes [4]. It has been shown that AST levels strongly correlate with CPK concentrations. On the other hand, ALT, a more specific liver enzyme, is found in much lower concentrations in the skeletal muscles [4]. Normal LFTs and gradual improvement of AST/ALT with CPK levels with hydration alone strengthen the suspicion that AST/ALT was released from muscles and should

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#### \*Correspondence:

Dhiraj Agrawal, Department of Gastroenterology and Hepatology, PACE Hospitals, Hitec City, Hyderabad, 500081, India, Tel: 91-8779196125/9403172833; E-mail: dhirajagrawal24@gmail.com

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preclude further evaluation of liver-related causes.

Exertional rhabdomyolysis can have an acute or subacute presentation with muscle pain, weakness, and dark-colored urine. However, this classic triad occurs in only 10%, while 50% of patients present with no clinical symptoms. Therefore, hepatologists should be aware of this entity and promote measures to mitigate the effects of a heat wave, especially during times of heavy exertion. Early recognition and treatment increase the chances of preventing complications, including acute kidney injury.

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