

# Exercise induced rhabdomyolysis. A case report

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## Case Report

Emergency Medicine



### Background:

Rhabdomyolysis is a clinical entity characterized by the release of intracellular elements after the destruction of skeletal muscle. The classic triad is characterized by the presence of muscle pain, weakness and dark urine, associated with elevated creatine kinase (CPK). The causes related to this syndrome are varied, with traumatic etiology, immobilization, sepsis, drug use, certain medications and alcohol consumption being the most common. CPK values are used for diagnosis and prognosis, with renal dysfunction being the most serious complication. Treatment is based on intensive and early fluid therapy to avoid kidney complications.

All causes share a common pathogenesis, which can be explained by traumatic injury to the sarcolemma or by depletion of ATP (adenosine triphosphate) in the myocyte. The result of these alterations is the destruction of the muscle cell due to the increase in intracellular calcium and the subsequent persistent muscle contraction, mitochondrial dysfunction, the production of oxygen species and the activation of calcium-dependent proteases.

Magnetic resonance imaging is the technique of choice to define the extent and distribution of muscle involvement. Its indication gains weight in those cases in which a fasciotomy is considered.

**Keywords:** Rhabdomyolysis, CPK, ATP, renal replacement, urine.

## Case report

19-year-old female student with a personal pathological history of giant cystadenoma removed by open abdominal approach in 2021, with a non-pathological history of alcoholism and occasional smoking.

She began her condition on March 15, 2022 with the presence of dark-colored urine accompanied by weakness and muscle pain in the lower extremities, especially in the thighs. The patient reports that on March 12 she performed intense aerobic exercise for a period of 45 minutes without rest, commenting that she does not exercise regularly. On March 16, 2022, she went to the emergency room of our Hospital after continuing to have muscle pain and dark urine.

Upon admission to the emergency room, we received a patient with BP 120/80 RR 18 HR 68 SAT 99% on ambient air. On examination, we found a patient without neurologic alterations, with no evidence of lower limb edema or color changes. Initial laboratories with CPK 157,423 UI/L, AST 2218 UI/L, ALT 583 UI/L, LDH 3119 UI/L, CPK MB 1562.5 UI/L.

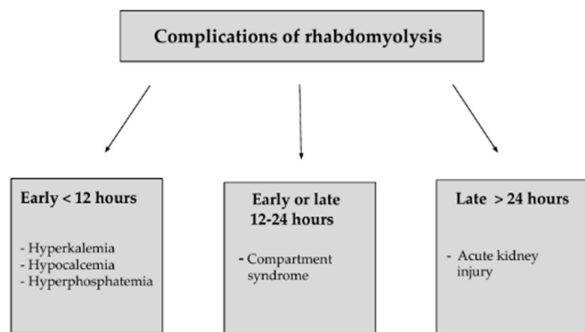
She begins management with high intravenous fluid solution with Hartmann solution at 250cc per hour and pain management with Paracetamol 1g IV every 8 hours with which she has improvement in her symptoms.

The patient was kept under surveillance on the internal medicine floor for two days where she continued with a fluid solution and kidney function monitoring. She did not present data on compartment syndrome. CPK levels decreased as low as 5029 UI/L. Therefore, we discharged her from the hospital.

## Discussion

When acute kidney injury produces hyperkalemia, resistant acidosis, or volume overload, renal replacement treatment should be initiated, with intermittent hemodialysis, because it can correct electrolyte alterations quickly and efficiently. Conventional hemodialysis does not effectively remove myoglobin, because the size of the protein limits its removal by peritoneal dialysis. We have to

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**Figure 1.** Classification of complications of rhabdomyolysis according to time criteria.

remember that the peak of elevation of CPK levels usually takes from 48 to 72 hours.

**Conclusion**

Exercise-induced rhabdomyolysis is a serious clinical condition that can result in serious complications if not properly diagnosed and treated. Although it is commonly associated with intense exercise or exercise outside the individual's usual physical level, early identification of symptoms and timely medical intervention are crucial to prevent kidney damage and other systemic complications. Education about risks, gradual progression in exercise intensity, and monitoring predisposing factors such as hydration and fitness are key elements in preventing rhabdomyolysis. In general, the approach should be multidisciplinary, involving doctors, physiotherapists and trainers to ensure the safety and health of patients during physical exercise. Treatment is primarily supportive and preventive, with a focus on rehydration, management of electrolyte imbalances, and prevention of serious kidney and muscle complications.

Classification of rhabdomyolysis severity by level of blood creatine phosphokinase values (38)	
Normal	5× the UNL
	1,000 IU/L
Middle	Less than 10× the UNL
	2,000 IU/L
Moderate	10 to 50× the UNL
	2,000–10,000 IU/L
Severe	Greater than 50× the UNL
	Above 10,000 IU/L

UNL = upper normal limit.

**Figure 2.** Classification of rhabdomyolysis severity by level of blood creatine phosphokinase values.

**Conflicts of interests**

There was no conflict of interest during the study, and it was not funded by any organization.

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