



**A 30 year old marathon runner suffers a tonic-clonic seizure in the middle of a cross-country marathon race. The seizure lasts for a short while after which he is transported**

**to the nearest emergency department. After regaining consciousness the patient complains of painful muscles. The doctor on duty suspects a diagnosis and quickly collects a urine sample where she notices a typical color of the urine sample (Given in the picture).**

**1. What is your provisional diagnosis?**

Answer-

Rhabdomyolysis resulting from

1. Severe Exertion (Cross country marathon)
2. Generalised tonic clonic seizure (May be precipitated by exercise associated hyponatremia, can cause muscle breakdown)

Rhabdomyolysis in simple terms means breakdown of muscles leading to release of myoglobin in the bloodstream. Myoglobin is toxic to renal tubules and can result in Acute Kidney Injury. The most immediate test to do here would be a urine analysis which would reveal dark colored urine without red blood cells (dark color is due to the myoglobin pigment).

Rhabdomyolysis is confirmed when the CPK level is markedly high in the range of 10,000 to 100,000.

Rhabdomyolysis is also associated with rapidly rising creatinine level due to both renal failure and massive release of muscle products hence the BUN:Creatinine ratio is low i.e. below 10:1.

**2. What is the most important test to do in the above situation?**

Answer-

The most important test to do here is an ECG or potassium levels to detect hyperkalemia. Muscle breakdown causes several electrolyte abnormalities out of which hyperkalemia is the most important as it can lead to fatal arrhythmia. Peaked T waves will clinch the diagnosis.

Apart from hyperkalemia we can also see hypocalcemia due to deposition of calcium in the damaged muscle and hyperuricemia due to release of purines from damaged muscles. In the given case hyponatremia may be present due to excess water drinking by athletes.

**3. How will you treat this patient?**

Answer-

If Hyperkalemia is detected the most immediate treatment is with calcium chloride or calcium gluconate. Hypertonic saline is used to treat the hyponatremia if present.

The management aims primarily at preventing Acute Kidney Injury by reducing the contact of the toxic myoglobin with the renal tubules.

This is achieved by the following means-

- Rapid fluid rehydration using normal saline only or alternating between normal saline and 5 % Dextrose. Usually a rate of 500 ml to 1500 ml /hr fluid is to be infused with the goal of at least 200 ml/ hr of urinary output.
- Urine pH is to be made alkaline to prevent deposition of casts. This is achieved using Bicarbonate infusion ( 75 mmole/ l) added to 0.45 % Normal Saline.
- Use of diuretic is controversial and may be tried if urine output of 200 ml/ h is not achieved.
- Dialysis is the mainstay of management for severe rhabdomyolysis due to complex electrolyte imbalance associated with it.

