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Rhabdomyolysis due to multiple fire ant bites a case report

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ABSTRACT

Rhabdomyolysis is a clinical and biochemical syndrome that occurs due to skeletal muscle injury. The main cause of rhabdomyolysis is muscle crush injury, toxins, ischemia, metabolic disorders, and drugs. Rare cases of rhabdomyolysis have been reported after insect stings. Damage to skeletal muscle may be due to physical damage to muscle cells directly or due to interferences with their blood supply. Breakdown products of damaged muscle cells are released into the bloodstream; some of these, such as the protein myoglobin, are harmful to the kidneys and may lead to kidney failure. The symptoms of rhabdomyolysis depend on the severity of the condition. Milder forms of rhabdomyolysis may not cause any muscle symptoms, and the diagnosis is based on abnormal blood tests. Here in, we report an unusual case of rhabdomyolysis triggered by fire ant bites to alert the medical community of this rare complication.

1. Introduction

Rhabdomyolysis is a clinical and biochemical syndrome that occurs due to skeletal muscle injury^[1]. Damage to skeletal muscle may be due to physical damage to muscle cells directly or due to interferences with their blood supply. Breakdown products of damaged muscle cells are released into the bloodstream; some of these, such as the protein myoglobin, are harmful to the kidneys and may lead to kidney failure. It may result in myoglobinuria, and may often lead to acute renal failure. Acute renal failure occurs in 33–50% patients with rhabdomyolysis^[1]. The main cause of rhabdomyolysis is muscle crush injury because of trauma^[2], excessive muscle activity^[3], toxins, ischemia, metabolic disorders, drugs^[4], alcohol, cocaine and infections. However, drug induced rhabdomyolysis is rare. But high dose of statins^[5], diabetes and hypothyroidism may cause rhabdomyolysis. Rare cases of rhabdomyolysis have been reported after insect stings^[6].

Here in, we report an unusual case of rhabdomyolysis triggered by fire ant bites to alert the medical community of this rare complication.

2. Case report

A 46 year old male was admitted to the casualty with multiple bites by red ants. Soon after the bites he complained of severe abdominal pain and vomiting and could not tolerate oral feeds. He had a history of schizophrenia for the last 25 years and was on medication. He had no history of diabetes, hypertension or asthma. He had no family history of liver, muscle, or kidney disease, had not traveled recently.

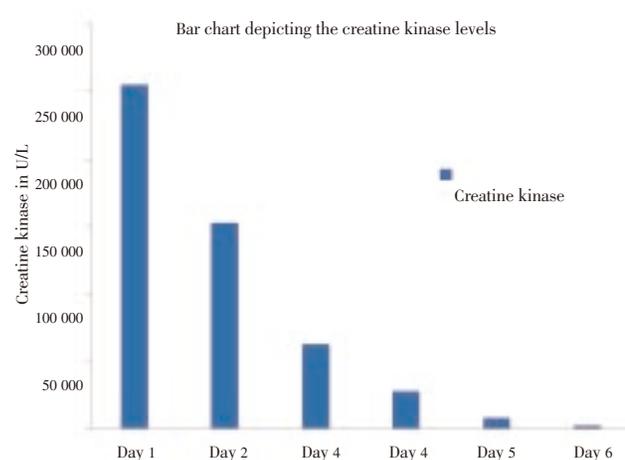


Figure 1. Serial follow up of serum creatinine kinase levels

Laboratory data on admission included: serum sodium

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– 124 mEq/L; potassium – 5.0mEq/L; chloride – 82mEq/L; random glucose – 73mg/dL; urea – 22mg/dL; creatinine – 1.0mg/dL; total bilirubin – 1.8mg/dL; direct bilirubin – 0.5 mg/dL; total protein – 7.1g/dL; albumin – 4.6g/dL; globulin – 2.50g/dL; aspartate transaminase – 1635u/L; alanine transaminase – 211u/L; alkaline phosphatase – 60u/L; creatine kinase – 254500 U/L (Figure 1).

3. Discussion

Rhabdomyolysis is a condition in which damaged skeletal muscle tissue breaks down rapidly. Breakdown products of damaged muscle cells are released into the bloodstream; some of these, such as the protein myoglobin, are harmful to the kidneys and may lead to kidney failure. The symptoms, may include muscle pains, vomiting and confusion. Damage to skeletal muscle may be due to physical damage to muscle cells directly or due to interferences with their blood supply. When damaged, muscle tissue rapidly fills with fluid from the bloodstream, including sodium and calcium ions. The accumulation of calcium in the sarcoplasmic reticulum leads to continuous muscle contraction and depletion of ATP. The persistent contraction of the muscle cell leads to breakdown of intracellular proteins and disintegration of the cell^[7,8].

The symptoms of rhabdomyolysis depend on the severity of the condition. Milder forms of rhabdomyolysis may not cause any muscle symptoms, and the diagnosis is based on abnormal blood tests. More severe rhabdomyolysis is characterized by muscle pain, tenderness, weakness and swelling of the affected muscles. The movement of fluid from the bloodstream into damaged muscle may cause low blood pressure and shock. Other symptoms are nonspecific and result either from the consequences of muscle tissue breakdown or from the condition that originally led to the muscle breakdown. Release of the components of muscle tissue into the bloodstream causes disturbances in electrolytes, which can lead to nausea, vomiting, confusion, coma or abnormal heart rate and rhythm^[9].

The composition of venom from fire ants is complex. Formic acid, an important constituent of fire ant venom, is produced in ants mainly for hunting and protection of their brood. The presence of formic acid in fire ant venom is responsible for the local pain at the sting bite. In small doses, formic acid is an antibiotic, but in larger doses, it acts as an inhibitor of the mitochondrial cytochrome oxidase complex, causing tissue suffocation, and consequently cell death which may have led to rhabdomyolysis in this case^[10].

The most reliable test in the diagnosis of rhabdomyolysis is the level of creatine kinase (CK) in the blood. This enzyme is released by damaged muscle, and levels above 5 times the upper limit of normal (ULN) indicate rhabdomyolysis. Depending on the extent of the rhabdomyolysis,

concentrations up to 100 000 U/L are not unusual. CK concentrations rise steadily for 12 h after the original muscle injury, remain elevated for 1–3 days and then fall gradually. Initial and peak CK levels have a linear relationship with the risk of acute renal failure: the higher the CK, the more likely it is that kidney damage will occur. Elevated concentrations of the enzyme lactate dehydrogenase (LDH), Aldolase, troponin, muscle specific carbonic anhydrase type 3, fatty acid-binding protein (FABP) and transaminases may be seen in some cases^[11,12]. Here creatine kinase level is more than 20 times the upper limit of normal strongly suggesting that this is a case of rhabdomyolysis.

Conflict of interest statement

We declare that we have no conflict of interest.

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