Rhabdomyolysis in a College Football Player

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Abstract

Abstract

Background: This Level 4 Case Study presents an athlete was a 22-year-old (182.88 cm and 100.24 kg) male NAIA football athlete. Athlete's prior medical history included two episodes of acute kidney injury and rhabdomyolysis following training. Athlete reported to athletic trainer that he had experienced muscle cramps at the conclusion of a two-hour training session. Once cramps progressed above the waistline, EMS was summoned. EMS administered 500mL of a saline solution. Upon arrival to the hospital athlete was still experiencing body cramps and complained of lack of strength. Other associated symptoms included nausea and chills. Laboratory tests indicated athlete's creatinine levels were elevated to 1.30 mg/dL with normal range between 0.76 to 1.27 mg/dL. The athlete's CK levels were also measured and extremely elevated, 3150 unit/L whereas the normal range is 55-170 unit/L. The physician's final diagnoses were rhabdomyolysis and acute kidney injury. Differential Diagnosis: Exertional heat illness, Dehydration, Heat Cramps, Rhabdomyolysis. Treatment: Athlete began a return to play progression with the athletic training staff. Phase I consisted of the athlete returning to activities of daily living for two weeks. The athlete was assessed for muscle soreness, hydration status, and urine characteristics daily. The athlete was allowed to progress to phase II if clinical symptoms remained absent and creatinine kinase levels remained below 5 times normal. Phase II consisted of twenty minutes of cardio every other day three times a week and foam rolling at controlled room temperature. Daily monitoring of muscle soreness, hydration status, and urine characteristics continued. The next week he was progressed to field work and sprints. Athlete's blood work came back at the end of the week and his creatinine levels were too high. The doctor instructed the athlete not to engage in any physical activity for a week. Athlete struggled physiologically with not being able to play and quit the team. Two weeks later he rejoined the team and continued his return to play program starting again with phase II. Athlete was then progressed into practice but only allowed to play one repetition every five minutes during practice. Uniqueness: This case report presented a unique case of rhabdomyolysis because of its low rate of occurrence. Rhabdomyolysis is likely under-reported and may occur in as many as 26,000 cases per year. It is also unique because the athlete had a history of two episodes of rhabdomyolysis in the last two years. This athlete was also the only athlete at the university to acquire this pathology. Conclusion: This case highlighted the diagnosis and treatment of an athlete suffering from rhabdomyolysis and acute kidney injury. This case review further highlighted the complications that can arise while treating someone suffering from rhabdomyolysis. The athlete is currently engaged with the athletic training staff and continuing to progress well with the return to play protocol.

Introduction

Exertional or exercise-induced rhabdomyolysis (ER) is a potentially life threatening condition that can develop unexpectedly. Rhabdomyolysis is underreported with only 26,000 cases being reported each year in the United States. Rhabdomyolysis can sometimes be misinterpreted as an exertional heat illness. The diagnosis is confirmed by myoglobinuria, and an elevated serum Creatinine Phosphokinase (CPK) level, usually 10 times the normal range. During exercise that results in muscle fatigue, adenosine triphosphate (ATP) cannot supply the demand. Rhabdomyolysis occurs faster in extreme heat which is the reason why heat illnesses are likely to occur as well. This case study describes the predisposing factors on rhabdomyolysis, clinical evaluation, and management of the condition.

Purpose

The purpose of this case report was to introduce a 22 year-old NAIA football athlete who was diagnosed with rhabdomyolysis. An overview of this injury is presented to obtain a better understanding of rhabdomyolysis and how it affects the body.

Case Report

Patient

This NAIA football player is 20 years old (182.88 cm and 100.24 kg) who was diagnosed with rhabdomyolysis during preseason football. The following information will explain the mechanism of injury, clinical assessments, treatments, and return to play to provide additional information pertaining to the athlete's injury.

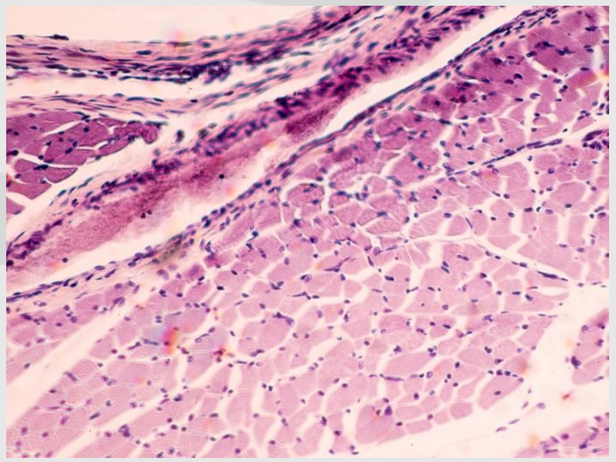
Mechanism of Injury/Clinical assessment

The athlete reported to athletic trainer that he had experienced muscle cramps at the conclusion of a two-hour training session. The athlete stated that he had not properly hydrated prior to this training session. Once cramps progressed above the waistline, EMS was summoned. Ice bags were applied to the athlete's axilla, groin, and neck. Once EMS arrived they administered 500mL of a saline solution. Upon arrival to the hospital the athlete was still experiencing body cramps and complained of lack of strength. Other associated symptoms included nausea and chills. Laboratory tests indicated athlete's creatinine levels were elevated to 1.30 mg/dL with normal range between 0.76 to 1.27 mg/dL. The athlete's CK levels were also measured and extremely elevated, 3150 unit/L whereas the normal range is 55-170 unit/L. Th

e physician's final diagnoses were rhabdomyolysis and acute kidney injury. The athlete stayed overnight in the hospital and was released the following day.

Pathophysiology

Rhabdomyolysis is an injury of the skeletal muscles where muscles breakdown with associated vigorous exercise. It is usually encountered by primary care doctors and sports medicine providers. Exertional rhabdomyolysis is sometimes combined with heat stress and dehydration but not all the time. Symptoms of rhabdomyolysis include severe muscular pain, tea-colored urine, and elevations of serum creatine kinase (CK). Researchers believe that CK leaks into the interstitial fluid and is absorbed by the lymphatic system. The kidneys usually filter the CK but because of its high concentration the kidneys are unable to. Exertional rhabdomyolysis can be diagnosed by having CK levels that are more than five times normal or if a urine dipstick tests positive for blood. Normal CK levels are usually <100 IU/L. Limiting the extent of the potentially life-threatening complications of rhabdomyolysis depends strongly on early diagnosis and adequate therapy. Medical providers should be very aware of this condition, because of the extensive damage to the muscles, the muscles can swell and cause compartment syndrome which would require surgery. The muscles can also become deficient in potassium which would likely cause blood flow the muscles to cease. Acute renal failure can also occur as a result of ER. Although it is rare acute renal failure almost always resolves completely.



Discussion and Summary

Most patients who develop ER will have none of the high risk factors identified and may return gradually to normal activity after proper treatment and clinical recovery. Some athletes may have more than one of the predisposing factors. Rhabdomyolysis may not occur often but it can be life threatening if not treated the right way. Although it does not occur as often as other injuries do in athletes, more research is warranted. There needs to be an excepted return to play guidelines for athletes who have suffered from rhabdomyolysis. This can give health care providers a safe and effective guideline to follow when returning their athletes to play. Athletes, parents, and coaches should also be educated on rhabdomyolysis and what to do if it occurs. It may not occur often but it occurs enough that education is warranted. This paper has discussed the predisposing factors, diagnosis, and management of exertional rhabdomyolysis.

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