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Kelly Ferian

Baldwin Wallace University, kferian15@bw.edu

Dane Eberle

Baldwin Wallace University

Jake Woodruff

Baldwin Wallace University


Elizabeth Walters

Baldwin Wallace University

Karyn Gentile

Baldwin Wallace University

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Collegiate Football Athlete Presents with Nontraditional Case of Rhabdomyolysis and Secondary Finding of Ureterocele

Authors

Kelly Ferian, Dane Eberle, Jake Woodruff, Elizabeth Walters, Karyn Gentile, and Tricia Hamad

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Kelly Ferian; Dane Eberle; Jake Woodruff; Elizabeth Walters, EdD, AT, ATC; Karyn Gentile, MS, AT, ATC, Tricia Hamad, MEd, AT, ATC
School of Health Physical Education Sports Sciences, Baldwin Wallace University

OBJECTIVE

To examine the medical treatment and return to play guidelines for collegiate football player with acute rhabdomyolysis.

PERTINENT MEDICAL HISTORY

A 20 year old, 228 pounds, 6 foot 2 inch, African American male, defensive lineman reported to the athletic training facility on August 12th, 2018 with a chief complaint of hematuria. When questioned by the athletic training staff, the athlete did not recall any direct blows or any other known mechanism of acute trauma to his flank/trunk region. This line of questioning was used to discover a possible mechanism in the events leading up to the hematuria. No other signs or symptoms related or unrelated to the hematuria were discovered upon initial patient exam. There was no relevant family medical history reported that would assist in an immediate differential diagnosis related to the reported hematuria. It was noted that the father's medical history is unknown. He denied taking supplements, such as creatine, but did report he had been self-medicating with ibuprofen daily but did not specify the amount.

INITIAL TREATMENT AND MANAGEMENT

Due to the athlete's reported symptoms and limited knowledge of any possible traumatic mechanism, the athletic trainer who completed the evaluation deemed it necessary to refer him to the emergency department (ED). He was sent immediately to the ED for further evaluation and he was admitted on August 12th for initial chief complaint of hematuria. After various diagnostic labs were conducted, the athlete was initially diagnosed with an acute kidney injury. Blood results indicated high levels of creatine kinase (CK)

resulting in the secondary diagnosis of rhabdomyolysis. A computed tomography (CT) scan showed evidence of a dilated right ureter. No kidney stones were identified.

The athlete was discharged on August 15th and was instructed to maintain adequate hydration and decrease physical activity. Due to his CK levels remaining abnormally high from original readings, the urologist ordered further investigational procedures to evaluate for post urethral valves. The athlete was referred to the nephrologist on August 30th for specialist review prior to medical clearance.

On September 4th, the athlete was cleared to start cardiovascular fitness. On September 14th, after approximately ten days of gradual activity, the athlete was removed from participation due to high levels of CK. On September 20th, the nephrologist concluded the athlete's CK levels fluctuated between 1.4-1.5 mg/dL since August 15th. Normative values range from 0.7-1.3mg/dL.¹ The athlete was said to have true hematuria with many red blood cells found in the urinalysis, which is less consistent with pigment injury related to muscle break down in a more common case of rhabdomyolysis. The urologist described the athlete as having ureterocele on the right side, which could possibly be related to the hematuria. The athlete was cleared for full return to sport on February 12th, 2019 by the nephrologist and team physician.

DIFFERENTIAL DIAGNOSIS

Myopathy, heat related illness, acute renal failure, cancer, sickle cell anemia.

RELATED LITERATURE

Rhabdomyolysis is a relatively uncommon, but fatal condition if left untreated or managed inappropriately.² Exertional rhabdomyolysis (ER) is characterized by the breakdown in skeletal muscle after performing physical activity and exercise. Literature indicates that ER can result from a variety of mechanisms, but the end result of each mechanism is an increase in intracellular free ionized calcium to a level higher than normal. To be classified as ER, elevated CK levels of 5 times greater than normal must be present.³

TREATMENT AND MANAGEMENT

Preserving renal function and stunting skeletal muscle damage are the priorities in the treatment of rhabdomyolysis. Intravenous (IV) hydration must be initiated as early as possible. Initially, normal saline should be administered at a rate of 1-2 L per hour. Urine output is then to be monitored and maintained at 200 mL per hour until myoglobinuria (myoglobin in the urine) has ceased. Once the oliguria has been prevented, an addition of one or two ampules of sodium bicarbonate and 10 g per L of mannitol to a .45 percent saline solution can be started. The objective of the treatment is to increase hydration status and increase alkalinity of the urine to a pH of greater than 6.5 to decrease the toxicity of myoglobin to the tubules. If CK levels continue to elevate 48 to 72 post injury, the consultation of a nephrologist or surgeon should be considered, depending on the severity of kidney disease or presence of compartment syndrome.²

UNIQUENESS

Related literature has shown that the incidence of rhabdomyolysis to be 29.9 per 100,000 patients per year.² Fewer than 200,000 reported cases of rhabdomyolysis

per year in the US. About 1 in 500 to 1000 people are born with uretoceles.⁴ The athlete presented with no signs of heat illness prior to chief complaint of hematuria. Furthermore, it is unknown if the identified uretocele exacerbated the rhabdomyolysis.

CONCLUSION

Early diagnosis and treatment of rhabdomyolysis is crucial in preventing muscle ischemia, cardiac arrhythmia, and death of the athlete. While the NATA and NCAA have addressed important recognition, treatment and management strategies of rhabdomyolysis, there is no current method of best-practice of return-to-play guidelines for an athlete that has been diagnosed with rhabdomyolysis.⁵ The NATA has published a step-wise process to help return an athlete to participation. The Consortium for Health and Military Performance (CHAMP) guidelines for return to sport following exertional rhabdomyolysis could also be utilized by athletic trainers returning athletes to activity.⁶ Understanding risk factors and predispositions associated to rhabdomyolysis is essential in providing optimal care. Following the diagnosis of rhabdomyolysis, the athletic trainer plays a key role in monitoring the athlete in a return to play progression.

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KEY WORDS: *Rhabdomyolysis, Collegiate Football Athlete, Ureterocele, Nontraditional*