Rhabdomyolysis in a Collegiate Female Soccer Player

Emma Hunniford
Jason C. Craddock EdD, ATC, LAT, CSCS,
Florida Gulf Coast University, Department of Rehabilitation Sciences

Background

A 20 year old female soccer player reported severe muscle pain and cramping, lightheadedness, and blurred vision during pre-season conditioning on August 2nd, 2018. On this day particularly is was above 90 degrees Fahrenheit and 70% humidity. The Florida Gulf Coast University women's soccer team was completing their third conditioning session of the day when the patient started feeling symptoms. The patient reported that she had been hydrating adequately throughout the day and the athletic trainer had witnessed the patient consume the recommended amount of water; dehydration was ruled out as a possible cause of symptoms. The patient never lost consciousness and was able to respond to all questions asked while she was experiencing symptoms. The patient has no previous history relating to the diagnosis and is sickle-cell negative.

Clinical Presentation

- Severe muscular cramping
- Lightheadedness
- Fatigue
- Blurred vision
- Muscular weakness
- Myalgia
- Pigmenturia
- Muscle swelling

Differential Diagnosis

- Rhabdomyolysis
- Heat exhaustion
- Hyponatremia
- Sickle-cell anemia

Treatment

Immediate/On-Field:

- The athlete was moved into the shade and ice towels were placed on the head, neck, axilla, hamstrings, and inginual regions for five minutes
- Increase in water and Powerade consumption

Secondary:

- The athlete was moved inside and reported that all symptoms resided within 30 minutes. She then reported severe muscle cramping in the hamstrings, calves, and low back without provoking incident.
- The athlete was immediately placed in the cold whirlpool (55 degrees F) for five minutes, there was no relief of symptoms. The ATC activated the EAP and EMS was summoned. EMS took the athlete to the Gulf Coast Medical Center emergency room. Lab results reveal current creatine kinase levels are 3136 U/L. Urine-analysis is negative for kidney dysfunction. Athlete remained in the emergency room for further evaluation and monitoring of creatine kinase levels.

Patient with rhabdomyolysis pigmenturia

Patient with heat exhaustion urine sample

Return to Play

- **Phase 1**
  - Daily assessment for recurring muscle soreness, hydration status, sleep pattern, and urine characteristics.
  - Return to activities of daily living for 2 weeks.
  - Physician evaluation and monitoring of CK levels.
- **Phase 2**
  - Daily monitoring of hydration status, muscle soreness, and swelling.
  - Initiation of physical activity: foam rolling, dynamic warm-up, aquatic jogging, and stretching.
- **Phase 3**
  - Daily monitoring of hydration status, muscle soreness, and swelling.
  - Progression of physical activity: body-weight resistance movements, resistance training with elastic band, core training, stationary bicycling, and stretching.
- **Phase 4**
  - Daily monitoring of hydration status, muscle soreness, and swelling.
  - Initiation of resistance exercises at 25% of 1-rep maximum, agility training, cardiovascular training.
- **Return to Play**

Conclusions

- Proper hydration as well as electrolyte replenishing through sport drinks during exercise could prevent or delay the onset of Rhabdomyolysis. Ensuring that athletes understand the gray area of optimal hydration between over-hydration and dehydration is key. Athletes should consume 13 to 20 ounces of fluids at least 4 hours prior to exercise, and 7 to 10 ounces in the 10 to 20 minutes before exercise. During exercise, athletes should be aware to not use thirst as a guide and drink small amount of fluid frequently. Post exercise, athletes should drink 2 to 3 cups of fluid for every pound lost. The athlete should not be over exerted with exercise, in order to ensure this, coaches should create training protocols for each specific group of conditioned athlete during the strength and conditioning portions of the "four-a-day" practices. This will acclimate athletes to high temperature and exacerbating situations, preventing them from experiencing overload. Athlete acclimation to intense training at high Florida temperatures can off-put the onset of rhabdomyolysis.

Full reference list available by emailing jcraddock@fgcu.edu