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CLINICAL VIGNETTE

Exertional Rhabdomyolysis in the Primary Care Setting: More Common Than We Think?

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Case Report Patient 1

A 27-year-old female with no past medical history presented for routine check-up. She reported that she has not seen a doctor in several years after having children. In the past two weeks, the patient has been trying to “get back into shape.” She was working with a trainer for 60-90” sessions 3-4 times a week. The sessions included weight training and running. She noted fatigue, sore muscles and dark urine following her workouts. She denied fever, chills, sore throat, nausea or vomiting, abdominal pain, rash or chest pain. She takes no medications, nor supplements and has no recent illnesses. She does not smoke nor use recreational drugs.

Physical exam showed BP 120/70, Pulse 69, afebrile and BMI of 25.89. The rest of her exam was unremarkable. Laboratory studies included: Normal CBC, Comprehensive metabolic panel with normal electrolytes and kidney function, but mildly elevated AST of 113 and ALT of 67 with normal alkaline phosphatase and bilirubin. Creatinine Kinase was elevated at 5391 and urinalysis was negative for blood or rbc's.

Exertional rhabdomyolysis was suspected and the patient was managed as an outpatient given her mild symptoms and normal kidney function. She was asked to increase oral fluids and abstain from exercising. One week later, she returned and reported resolution of myalgias and dark urine. Repeat CK decreased to 611 U/L, transaminases and urine were normal. The patient resumed exercise 2 weeks later with light running and weights for 60 minutes sessions twice a week. She was also encouraged to drink 2-3 liters of water daily. Repeat CK level 4 weeks later was 185 U/L.

Patient 2

A 65-year-old male with Meniere's disease presents for an annual wellness visit. His only complaint was that he “over did it” the prior day, and developed fatigue and muscle cramping in his calves. He is a retired body-builder and avid weight trainer. The day prior, he worked out “extra hard” with a trainer. Afterward his workout, he worked in his yard in the sun for several hours without a break. Aside from muscle cramping, the patient denied fevers, chills, nausea, vomiting, dark urine, abdominal pain, sore throat, cough or rash. The patient is taking omega 3 fatty acids and niacin for cholesterol. His exam was notable for BP was 120/70, pulse 63, afebrile, BMI 24.39. He was well-developed and comfortable. General exam was

remarkable for mild tenderness in bilateral distal lower extremities, without erythema or edema. The rest of the exam was unremarkable.

Laboratory included: normal CBC, Comprehensive panel notable for elevated AST of 60 with normal ALT 37, and normal electrolytes, renal function, alkaline phosphatase and bilirubin. Total Creatinine Kinase was elevated at 1286 U/L and Urinalysis was normal.

Exertional rhabdomyolysis was also suspected in this patient. He was asked to stop all exercise, and increase water intake to 2-3 liters per day. At follow up two weeks later, all myalgias had resolved and CK improved to 640 U/L with normal transaminases.

Discussion

Exertional or exercise induced rhabdomyolysis is a subset of rhabdomyolysis that is specifically caused by the breakdown of skeletal muscle cells after intense or prolonged exercise. ATP depletion of the skeletal muscle cells leads to an influx of intracellular calcium. Once intracellular calcium reaches a critical threshold, cellular death and lysis ensues. As skeletal muscle cells lyse, intracellular muscle contents are released, including creatinine kinase and myoglobin. Myoglobin is nephrotoxic and can result in myoglobinuria and acute kidney injury.^{1,2}

Exertional rhabdomyolysis is believed to have a higher prevalence than reported in the literature. One study reported a 0.2% prevalence of exertional rhabdomyolysis in American Soldiers.³ A cross-sectional analysis of a Swiss emergency department database of patients with CK >1000 U/L over a 5 year period found that only 2.1% of cases of rhabdomyolysis were caused by overexertion or exercise. Strength training was the most common type of exercise associated with exertional rhabdomyolysis.⁴

Exertional rhabdomyolysis varies in severity from asymptomatic elevations in CK levels to life threatening disease with end organ damage. The most common symptoms include soreness, muscle swelling, weakness, and reddish-brown urine. Fever, tachycardia, nausea and vomiting are seen in more severe cases.¹

The diagnostic hallmark of rhabdomyolysis is marked elevation of CK. Most authors agree that for diagnosis of exertional rhabdomyolysis, CK should be at least 1000 U/L.^{4,5} Other studies set the CK cutoff at five times the upper limit of normal.⁶ Myoglobinuria is also characteristic of rhabdomyolysis. Urine dipstick may be positive for blood caused by the presence of hemoproteins in myoglobin, with little to no red blood cells identified per high-power field.¹ Other common laboratory findings include hyperkalemia, metabolic acidosis, hyperuricemia and elevated AST and ALT. The first patient had initial elevation in both AST and ALT with AST nearly double ALT. Similarly the second patient had isolated elevated AST. CK was later added in both cases, and found to be elevated >1000 U/L. Both patients' CK normalized as AST normalized. Weibrecht also observed that AST concentrations fell in parallel to CK concentrations during rhabdomyolysis recovery.⁵

Treatment depends on severity of symptoms and presentation. Generally, intravenous fluid resuscitation, with bicarbonate is considered if CK levels are above 5000 U/L and acute kidney injury is present.² Both patients had mild symptoms, normal kidney function, lack of metabolic acidosis and myoglobinuria and were safe for outpatient treatment with close monitoring. We encouraged increased fluids and holding exercise until CK normalized and symptoms resolved. Both patients improved significantly within the first two weeks, with complete resolution within 4 weeks.

Conclusion

We suspect exertional rhabdomyolysis is more common than what is reported in the literature. Many patients do not seek medical attention, and physicians may lack awareness to initiate diagnostic testing. Physically active patients that present with muscle soreness, dark urine, and an elevated AST, should have CK testing to rule out exertional rhabdomyolysis.

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