Journal of Experimental and Clinical Medicine
http://dergipark.ulakbim.gov.tr/omujecm

Case Report

J. Exp. Clin. Med., 2015; 32(3): 127-128
doi: 10.5835/jecm.omu.32.03.006

A case of rhabdomyolysis related with low intensity body building exercise

Hasan Kara*, Aysegul Bayir, Ahmet Ak, Ali Dogru, Selim Degirmenci, Murat Akinci

Department of Emergency Medicine, Faculty of Medicine, Selcuk University, Konya, Turkey

ARTICLE INFO

Article History
Received 04 / 06 / 2014
Accepted 21 / 07 / 2014

*** Correspondence to:**
Hasan Kara
Department of Emergency Medicine,
Faculty of Medicine,
Selcuk University,
Konya, Turkey
e-mail: hasankara42@gmail.com

Keywords:
Creatine phosphokinase
Low intensity exercise
Rhabdomyolysis
Trauma

ABSTRACT

Rhabdomyolysis is a clinical and biochemical syndrome resulting from the acute necrosis of muscle fibers and the leak of cellular elements into circulation. It can usually develop after trauma and severe exercises. However, it may also occur following low intensity exercises. In our case, a 24-year-old man was admitted to our emergency department because of severe abdominal pain after low intensity bodybuilding exercise. The development of an acute exertional rhabdomyolysis was confirmed by the increased serum enzyme levels. The patient was treated with intravenous sodium chloride, and sodium bicarbonate. In patients admitted to the emergency room after trauma or intensive exercise who are suspected of having rhabdomyolysis, the serum creatine phosphokinase, creatinine and potassium levels should be evaluated and if found to be high, fluid treatment should be started early to avoid any potential complications.

1. Introduction

Rhabdomyolysis is a clinical and biochemical syndrome resulting from the acute necrosis of muscle fibers and the leak of cellular elements into circulation. It may develop with or without trauma. Crush injuries and exercises are the leading causes of traumatic injuries. It can rarely occur with low intensity exercises, although it is more common in military training, weight lifting and marathon running (Nâcul and O'Donnell, 2010). It is presented a rare case of rhabdomyolysis which had developed after doing sit-ups.

2. Case

A twenty four-year-old male patient was admitted to our emergency department with the complaint of severe abdominal pain. It was learnt that severe abdominal pain had started after he had performed an uninterrupted series of 380 sit ups. On physical examination, his general condition was good, he was conscious, blood pressure was 130/80 mmHg, heart rate was 95 bpm and temperature was 36.9°C. He had severe tenderness in the lower abdominal quadrants bilaterally, however, there was no defense or rebound. In the light of his physical examination and clinical situation, rhabdomyolysis was considered and blood tests were performed. The initial blood tests results were as follows: Creatine phosphokinase (CPK) 3812 u/l (30-200), aspartate aminotransferase (AST) 85 u/l (0-55) and alanine aminotransferase (ALT) 96 u/l (5-34). Urine analysis was positive for hemoglobin, leukocyte esterase (LE) (+) and ketons (++). The remaining blood tests were within normal ranges. A forced diuresis was provided by administering alkaline fluid. Abdominal ultrasonography revealed no pathology. Nephrology consultation was made and renal insufficiency was not seen. It was recommended that medical treatment be continued and that the patient be followed at the outpatient clinic. The CPK level regressed to

2561 u/l on day 2, CPK decreased to 2010 u/l, AST to 58 u/l and ALT to 59 u/l. His abdominal pain decreased on day 3 of treatment, AST and ALT levels decreased to normal levels and CPK to 1210 u/l. It was recommended that the patient come to outpatient clinic controls. CPK levels tested 3 days after that were normal.

3. Discussion

Rhabdomyolysis was defined as hemoglobinuria seen with muscle exercise in the 19th century (Bontempo and Kaji, 2009). Researchers revealed a presence of acute tubular necrosis in skeletal muscle injury (Bywaters and Beall, 1998; Counselman, 2000). Due to the myocyte damage that occurs in rhabdomyolysis, potassium sulphate, purins and myoglobin are displaced into the extracellular space and leak into circulation which leads to hypovolemia, hypocalcemia, hyperkalemia, metabolic acidosis and myoglobinuria. Prerenal acute renal failure develops due to hypovolemia. Myoglobin or free hemoglobin entering the systemic circulation results in the obstruction of the renal tubules, vasoconstriction of the afferent arteriols and consequently free oxygen radical formation. Free oxygen radicals lead to renal insufficiency through the direct toxic effect on the renal tubular cells (Bosch et al., 2009). Rhabdomyolysis can develop with or without trauma. While traumatic rhabdomyolysis is usually seen with strenuous exercise, marathon runners, traffic accidents and in patients who are trapped under rubble (crush), it may rarely be seen with low intensity exercise (Gagliano et al., 2009; Nâcul and O'Donnell, 2010; Have and Drouet, 2011). In our case, rhabdomyolysis developed after the low intensity exercise of sit-ups. The complaints and clinical findings of patients with rhabdomyolysis may vary.

Patients usually present with local clinical findings and a severe clinical course like compartment syndrome may be seen. These patients usually have myalgia, muscle fatigue, firmness, edema and pain (Oh et al., 2012). Laboratory tests should be performed when there is the suspicion of rhabdomyolysis. Our case was also admitted with abdominal pain following intense exercise. There were no findings of acute abdomen in the first examination. The abdominal pain was considered to be related to widespread muscle pain and laboratory tests were performed. In previous studies, serum creatine (Cre) levels have been observed to become significantly elevated after exercise (Machado et al., 2012). The evaluation of serum CPK is not among the routine laboratory tests such as Cre and potassium (K^+) for patients admitted to the emergency room with a prediagnosis of rhabdomyolysis. However, muscle enzymes, CPK and K^+ elevation should be kept in mind in patients with rhabdomyolysis. The serum CPK levels begin to increase after 12 hours in clinical conditions like rhabdomyolysis, reach a peak and then regress close to 50% every 48 hours. CPK may be >5000 U/l in severe rhabdomyolysis cases and there is a high risk of acute renal failure (Nâcul and O'Donnell, 2010). In our case, the serum CPK level was measured as 3812 U/l. Our case did not develop renal failure due to early diagnosis and appropriate fluid therapy. Imaging methods are not required for the diagnosis of rhabdomyolysis. However, magnetic resonance imaging may be beneficial for the detection of the affected muscle mass (Moratalla et al., 2008).

Early complications of rhabdomyolysis include severe hyperkalemia, hypocalcemia and related cardiac arrhythmias. Late complications include temporal hepatic dysfunction and metastatic calcification (Nâcul and O'Donnell, 2010). No early or late complications developed in the presented patient. Early and adequate hydration, analgesia, alkalinization of the urine and forced diuresis are recommended in the treatment of rhabdomyolysis and secondary acute renal failure (Donmez et al., 2001). In our case, the patient responded well to the administered hydration with alkaline fluid and forced diuresis.

Rhabdomyolysis should be suspected regardless of the affected muscle mass in patients who are admitted to the emergency room with abdominal pain after trauma or exercise and serum CPK, Cre and K^+ levels should be examined. Medical therapy should be initiated in the early period, in order to prevent the potential complications in patients whose laboratory results are consistent with rhabdomyolysis.

REFERENCES

Bontempo, L.J., Kaji, A.H., 2009. Rhabdomyolysis. In: Marx JA, Hockberger RS, Walls RM, eds. Rosen's emergency medicine: Concepts and clinical practise 7th ed. Philadelphia, Mosby, pp. 1650-1657. doi: 10.1111/j.1553-2712.2011.01011.x.

Bosch, X., Poch, E., Grau, J.M., 2009. Rhabdomyolysis and acute kidney injury. N. Engl. J. Med. 361, 6272. doi: 10.1056/NEJMra0801327.

Bywaters, E.G.L., Beall, D., 1998. Crush injuries with impairment of renal function. J. Am. Soc. Nephrol. 9, 322-332.

Counselman, F.L., 2000. Rhabdomyolisis. In: Tintinalli JE ed. Emergency medicine a comprehensive study guide 5th ed. North Carolina; McGraw-Hill, pp. 1841-1845.

Donmez, O., Meral, A., Yavuz, M., Durmaz, O., 2001. Crush syndrome of children in the Marmara Earthquake, Turkey. Pediatr. Int. 43, 678-682.

Gagliano, M., Corona, D., Giuffrida, G., Giaquinta, A., Tallarita, T., Zerbo, D., Sorbello, M., Paratore, A., Virgilio, C., Cappellani, A., Veroux, P., Veroux, M., 2009. Low intensity body building exercise induced rhabdomyolysis: A case report. Cases J. 2, 7. doi: 10.1186/1757-1626-2-7.

Have, L., Drouet, A., 2011. Isolated exercise-induced rhabdomyolysis of brachialis and brachioradialis muscles: An atypical clinical case. Ann. Phys. Rehabil. Med. 54, 525-529. doi: 10.1016/j.rehab.2011.09.010.

Machado, M., Zini, E.N., Valadao, S.D., Amorim, M.Z., Barroso, T.Z., de Oliveira, W., 2012. Relationship of glomerular filtration rate and serum CK activity after resistance exercise in women. Int. Urol. Nephrol. 44, 515-521. doi: 10.1007/s11255-011-9963-4.

Moratalla, M.B., Braun, P., Fornas, G.M., 2008. Importance of MRI in the diagnosis and treatment of rhabdomyolysis. Eur. J. Radiol. 65, 311-315.

Nâcul, F.E., O'Donnell, J.M., 2010. Rhabdomyolysis. In: O'Donnell, J.M., Nâcul, F.E., ed. Surg. Int. Care Med. 2nd Ed. Springer, pp. 529-533.

Oh, J.Y., Laidler, M., Fiala, S.C., Hedberg, K., 2012. Acute exertional rhabdomyolysis and triceps compartment syndrome during a high school football camp. Sports Health. 4, 57-62.