

# Muscle disease



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Amanda Fallon Professor Jed Wolfson Anatomy and Physiology 1 October 27, 2011 Rhabdomyolysis: Disease of Muscular Breakdown Rhabdomyolysis is the breakdown of damaged muscle tissues resulting in the release of muscle fiber contents into the bloodstream (Patel M. D.). This disease occurs when there is damage to the skeletal muscle. The breakdown products of damaged muscle cells, such as myoglobin, are harmful to the kidneys and frequently result in kidney damage or even kidney failure. The severity of the symptoms depends on the degree of muscle damage and the degree of the kidney damage, if any. The primary muscle damage can be caused by physical damage, medications, drug abuse and some infections. Some patients may have a higher risk of rhabdomyolysis because of a hereditary muscle condition that is already present. There are many causes of rhabdomyolysis. One of the most common causes of this disease is a crush accident, such as an auto accident. Long lasting muscle compression is also another cause of rhabdomyolysis. Long lasting muscle compression derives from "lying unconscious on a hard surface during an illness or while under the influence of drugs or alcohol" (Chang M. D.). An untrained athlete can also get this disease from severe muscle strain where the muscle becomes damaged. Significant muscle injury can cause fluid and electrolyte shifts from the bloodstream into the damaged muscle cells, and in the opposite direction (eMedicineHealth). Other causes of rhabdomyolysis are electrical shock, very high body temperature (hyperthermia) or heat stroke, diseases of the muscular system such as "congenital muscle enzyme deficiency or Duchenne's muscular dystrophy" (Chang M. D.). Signs and symptoms of this disease may be hard to pinpoint because the course of the disease varies depending on the cause and each patient may experience different

symptoms. Complications of this disease may also be present in the early stages as well as in the later stages. The symptoms of rhabdomyolysis come from the medical history of the patient. The patient may experience painful swollen bruised or tender areas of the body. Muscle weakness may also be experienced by the patient, such as difficulty moving the arms or the legs. Nausea, vomiting and a general sense of illness can be experienced by the patient. The rise in body temperature (hyperthermia) may cause confusion, dehydration, and even a lack of consciousness if not treated. The signs of rhabdomyolysis come from the physical findings of an examination done by a doctor or a healthcare provider. Less severe forms of rhabdomyolysis may not cause any symptoms or signs, and the diagnosis can only be found in abnormal blood tests. The urine, as seen in the photo to the right, may be dark, often described as "tea-colored", due to the presence of myoglobin in the urine. Damage to the kidneys can occur due to decreased or absent urine production, usually 12 to 24 hours after the initial muscle damage (Patel M. D.). A second recognized complication is disseminated intravascular coagulation (DIC), a severe disruption in blood clotting that may lead to uncontrollable bleeding (Warren M. D.). Muscle biopsies can be useful if an episode of rhabdomyolysis is thought to be the result of an underlying muscle disorder. A biopsy sample taken during an episode is often uninformative, as it will show only evidence of cell death or may appear normal (eMedicineHealth). Taking the sample can be delayed for several weeks or even months. The histopathological appearance on the biopsy indicates the nature of the underlying disorder (eMedicineHealth). Biopsy sites may be identified by medical imaging, such as using magnetic resonance imaging (MRI), as the muscles may not be equally affected by this

disease. Early laboratory findings include increased levels of myoglobin, potassium, urea, and phosphorus found in blood levels. An "anion gap metabolic acidosis" could progress because of release of acids from damaged muscle tissue (Patel M. D.). Myoglobin testing would be the best indication and the diagnostic basis because an increase of myoglobin usually will not occur in the absence of rhabdomyolysis. Diagnostic tests for urine myoglobin are often not easily available, and it may take more than 24 hours for the physician to get the results of the test. However, a typical urine screening for rhabdomyolysis may be performed as long as the urine sediment is examined as well. Complications of rhabdomyolysis also include disseminated intravascular coagulation, a condition that occurs when small blood clots begin forming in the body's blood vessels (eMedicineHealth). These clots ingest all the clotting factors and platelets in the body, and bleeding begins suddenly. When muscles are damaged swelling within the muscle can occur, causing what is called compartment syndrome. If this occurs in an area where the muscle is bound by fascia, a tough fibrous tissue, the pressure inside the muscle compartment can increase to the point at which blood supply to the muscle is compromised and muscle cells begin to die. Rhabdomyolysis is treatable and patients may recover quickly if the disease is caught in the early stages. The main goal of treatment is to prevent kidney damage or to prevent any further kidney damage. However, if left untreated, acute kidney failure develops in 30-40% of patients (Ritz). Early and aggressive hydration may prevent difficulties from this disease by rapidly removing the myoglobin from the kidneys. Hydration of the body may include using several liters of intravenous fluids until the condition is stabilized. Diuretics can also help with removing the iron-containing pigment

out of the kidneys. If the patient produces an acceptable amount of urine a doctor may administer bicarbonate, which can prevent the myoglobin from breaking down into toxic compounds within the kidney (Warren M. D.).

Kidney failure occurs when the kidneys are not able to filter and process waste from the body. If the disease progresses enough and kidney failure occurs then the patient may have to undergo dialysis. Dialysis is a procedure that takes the blood out of the body and sends it into a machine, as seen in the picture to the left. The machine filters the waste products from the blood. In severe cases of kidney or renal failure a kidney transplant may be required. If the case of rhabdomyolysis is mild it can be treated at home. The home treatment would include lots of rest and sufficient hydration by drinking plenty of fluids. The overall prognosis of rhabdomyolysis is pretty good as long as it is diagnosed and treated promptly. If the instance of this disease is not severe then the patient may only have to be in the hospital for a short time period for rehydration with IV fluids and lots of rest so the muscles can recover. Acute kidney failure occurs in many of the patients. Rhabdomyolysis is the cause for as many as 15% of patients with kidney failure (eMedicineHealth). While the mortality rate for this disease is approximately 5% (eMedicineHealth). The risk of death caused by this disease depends mainly on the primary health of the patient, the amount of muscle damage that has been caused and any other associated injuries. If kidney failure occurs, the mortality rate can increase to 20% (eMedicineHealth). Rhabdomyolysis can be prevented in almost all cases. Exercise programs and routines need to be thoughtfully planned to prevent any kind of injury and to lower the risk of getting rhabdomyolysis. This includes avoiding exercising in extreme heat conditions and drinking a

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sufficient amount of fluids. Both these situations can lead to dehydration, which increases the risk of muscle damage. Also, the risk of rhabdomyolysis exists highly for patients taking statin and fibrate medications for high cholesterol control. Information is often provided to these patients to be aware of the symptoms of this disease and the information should be read carefully and thoroughly. In conclusion, this is a disease of the muscular system that could affect anyone in their lifetime. This disease is more common than what I had originally thought. Although it is easily treatable, it can be a very dangerous and painful disease. I am glad that I researched rhabdomyolysis because I have learned what can happen and what to do if I ever experience any of the symptoms. I have also learned the consequences of not training properly for exercise. In doing this research paper I have learned about a disease that I may see affect people in my career as a physical therapist. Bibliography Chang M. D., Louise. WebMD. 13 September 2010. 22 October 2011 . eMedicineHealth. Rhabdomyolysis (Cont.). 2011. 30 October 2011 . Patel M. D., Parul. U. S. National Library of Medicine. 13 August 2009. 21 October 2011 . Ritz, Eberhard. " Disease of the Month: Rhabdomyolysis." Journal of the American Society of Nephrology (2000): 1553-1561. Warren M. D., JD. " Rhabdomyolysis: a review." Muscle and Nerve (2002): 32-47.