



Rhabdomyolysis (Potentially Life-Threatening Syndrome)

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Introduction

Rhabdomyolysis is a potentially life-threatening syndrome resulting from the breakdown of skeletal muscle fibers with leakage of muscle contents into the circulation. The most common causes are crush injury, overexertion, alcohol abuse and certain medicines and toxic substances. Several inherited genetic disorders, such as McArdle's disease and Duchenne's muscular dystrophy, are predisposing factors for the syndrome. Clinical features are often nonspecific, and tea-colored urine is usually the first clue to the presence of rhabdomyolysis. Early complications include severe hyperkalemia that causes cardiac arrhythmia and arrest. Early recognition of rhabdomyolysis and prompt management of complications are crucial to a successful outcome.

Pathophysiology

Muscle injury, regardless of mechanism, results in a cascade of events that leads to leakage of extracellular calcium ions into the intracellular space. The excess calcium causes a pathologic interaction of actin and myosin that ends in muscle destruction and fiber necrosis. With muscle injury, large quantities of potassium, phosphate, myoglobin, creatine kinase (CK) and urate leak into the circulation. Under physiologic circumstances, the plasma concentration of myoglobin is very low (0 to 0.003 mg per dL)

Causes

Traumatic causes

A crush injury such as from an auto accident, fall, or building collapse, Long-lasting muscle compression such as that caused by prolonged immobilization after a fall or lying unconscious on a hard surface during illness or while under the influence of alcohol or medication, Electrical shock injury, lightning strike, or third-degree burn, Venom from a snake or insect bite

Non- Traumatic causes

The use of alcohol or illegal drugs such as heroin, cocaine or amphetamines, A very high body temperature (hyperthermia) or heat stroke, Diseases of the muscles (myopathy) such as congenital muscle enzyme deficiency or Duchenne's muscular dystrophy, Extreme muscle strain, especially in someone who is an untrained athlete; this can happen in elite athletes, too, and it can be more dangerous if there is more muscle mass to break down.

Diagnosis

The physician must have a high index of suspicion and a thorough history and physical examination to accurately diagnose rhabdomyolysis. With the classic triad being observed in only <10% of patients, any patient with known risk factors including trauma, sepsis, muscular disease, and immobilization should be suspected for rhabdomyolysis. creatine kinase, which is an enzyme found in the skeletal muscles, the brain, and the heart, myoglobin in blood and urine, which is a protein that's a byproduct of muscle breakdown, potassium, which is another important mineral that may leak from injured bone and muscles, creatinine in blood and urine, which is a breakdown product created by muscle that's normally removed from the body by the kidneys.

Treatment

Rhabdomyolysis is treated by injecting fluids and electrolytes intravenously (through veins). Medical therapy for rhabdomyolysis focuses on restoring adequate intravascular volume. Hydration with isotonic sodium chloride solution (0.9% NaCl) is the cornerstone of rhabdomyolysis therapy. Many clinicians recommend the use of sodium bicarbonate. Use furosemide or other diuretics (such as mannitol in adults) with sufficient hydration if urine output is inadequate. Hyperkalemia should also be addressed.