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OLGU SUNUMU **CASE REPORT**

Inhalation-Induced Rhabdomyolysis Following Lime Solvent Exposure: A Case Report

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Abstract

Inhalation-related rhabdomyolysis is a severe medical condition resulting from exposure to toxic substances. This case report discusses a 24-year-old male who presented with dyspnea and cough after inhaling lime solvent. Elevated creatine kinase (CK) levels were indicative of rhabdomyolysis, managed successfully with intravenous hydration. The discussion highlights the clinical implications, diagnostic challenges, and effective management strategies for such cases, emphasizing the importance of early intervention.

Keywords: *Inhalation, rhabdomyolysis, lime solvent, toxic exposure, creatine kinase, intravenous hydration.*

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Özet

İnhalasyonla ilişkili rabdomiyoliz, toksik maddelere maruziyet sonucu ortaya çıkan ciddi bir tıbbi durumdur. Bu olgu sunumu, lime çözücü inhalasyonu sonrası nefes darlığı ve öksürük şikayetleri ile başvuran 24 yaşındaki bir erkeği ele almaktadır. Yüksek kreatin kinaz (CK) seviyeleri, rabdomiyolizi işaret etmiş ve intravenöz hidrasyon ile başarılı bir şekilde yönetilmiştir. Tartışmada, kireç çözücü inhalasyonu vakalarının klinik sonuçları, tanı zorlukları ve etkili yönetim stratejilerini vurgulayarak erken müdahalenin önemi ortaya konulmuştur.

Anahtar Kelimeler: *İnhalasyon, rhabdomyolysis, lime çözücü, toksik mağuruziyet, kreatin kinaz, intravenöz hidrasyon.*

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INTRODUCTION

Inhalation-related rhabdomyolysis is a medical condition typically induced by the inhalation of chemical substances, gases, or fumes. This condition is characterized by the detrimental impact of inhaled toxic agents on muscle cells, leading to the release of cellular contents into the bloodstream. Rhabdomyolysis is a condition arising from the destruction of muscle cells, and it may result in the leakage of myoglobin, a protein, into the bloodstream, potentially culminating in kidney failure (1). Inhalation-related rhabdomyolysis can be triggered by the inhalation of industrial chemicals, gases, or other toxic substances. This condition occurs because of inhaled substances causing damage to muscle cells, leading to their breakdown and the release of their contents into the circulatory system (2).

The rhabdomyolysis condition is notably characterized by a significant increase in creatine kinase (CK) levels in the blood, primarily due to the release of myoglobin. This condition may induce damage to the kidneys, electrolyte imbalances, and other potential complications (3). Inhalation-related rhabdomyolysis represents a severe medical condition necessitating urgent medical intervention. The identification of the inhaled toxic substance, assessment of the patient's respiratory function, and overall clinical status are crucial determinants, guiding the planning of treatment strategies (4).

The aim of this case presentation is to highlight the clinical manifestations, diagnostic approach, and successful management of inhalation-induced rhabdomyolysis following accidental exposure to a lime solvent.

Case report

A 24-year-old male patient presented with complaints of dyspnea and cough after accidentally inhaling lime solvent. The patient reported inhaling the solvent for approximately 10 minutes. There was no significant medical history or medication use in the patient's past. The family history revealed a case of Multiple Sclerosis in the patient's mother, while detailed information about the father was unavailable. The patient denied any history of trauma, reported engaging in regular physical activity with no recent increase in intensity, and confirmed the absence of supplement usage. Vital signs upon admission were as follows: temperature 37.2°C, pulse rate 82 bpm, blood pressure 110/60 mmHg, oxygen saturation 94%, and respiratory rate 15 breaths per minute.

Upon physical examination, the patient appeared well, alert, oriented, and cooperative with a Glasgow Coma Scale score of 15. Lung auscultation revealed rales. Abdomen examination was unremarkable. Laboratory investigations demonstrated elevated levels of creatine kinase (CK) at 29135 U/L, lactate dehydrogenase (LDH) at 970 U/L, aspartate transaminase (AST) at 108 U/L, alanine aminotransferase (ALT) at 111 U/L, creatinine at 0.82 mg/dL, blood urea nitrogen (BUN) at 14.98 mg/dL, sodium at 141 mEq/L, potassium at 3.9 mEq/L, hemoglobin at 10.9 g/dL, and mean corpuscular volume (MCV) at 66.3 fL.

The patient was admitted and received intravenous hydration at a rate of 3000 cc per day. During the three-day hospitalization, CK levels gradually decreased to 10126, 4863, and 1826 U/L. The patient showed improvement without complications and was discharged.

DISCUSSION

Inhalation of lime solvent and subsequent emergency room admissions represent a critical aspect of toxicological emergencies. Instances where individuals accidentally inhale lime solvents, commonly used in various industrial and domestic settings, have been documented with varying degrees of severity. The clinical presentation often includes symptoms such as respiratory distress, coughing, and, in some cases, systemic manifestations. Understanding the patterns of emergency room admissions following lime solvent inhalation is crucial for healthcare professionals to provide prompt and effective care (5). The inhalation of lime solvents can lead to serious respiratory and systemic complications. Respiratory symptoms may range from mild irritation to severe distress, necessitating immediate medical attention. Additionally, lime solvents may cause chemical pneumonitis, leading to inflammation

of the lung tissue and impairment of respiratory function. The severity of symptoms may depend on factors such as the duration of exposure, concentration of the inhaled substance, and individual susceptibility (6). Emergency room evaluations typically involve a thorough clinical assessment, respiratory support, and monitoring for potential systemic effects. Diagnostic measures may include laboratory tests to assess markers of organ damage, imaging studies to evaluate lung involvement, and close monitoring of vital signs. Prompt initiation of appropriate medical interventions is essential to mitigate the risk of complications and improve patient outcomes (2,5).

Rhabdomyolysis is a condition that occurs due to the breakdown of muscle cells, often resulting from the exposure to inhaled toxic substances. Inhalation of a chemical such as lime solvent, commonly used in industrial and household settings, can have serious effects on muscle health (7,8). The pathogenesis of this condition is associated with the damage to muscle cells triggered by the inhalation of toxic substances. Here are plausible explanations for this process: (Effect of Inhaled Toxic Substances on Muscle Cells) Chemicals like lime solvent, when inhaled, enter the body through the respiratory tract. These substances may possess toxic properties specifically harmful to muscle tissues. (Damage to Muscle Cells) Inhaled toxic substances, particularly, can cause damage to muscle cell membranes, resulting in cell injury. The breakdown of the cell membrane leads to the leakage of cell contents, including enzymes, electrolytes, and proteins.

The treatment of acute kidney injury involves a broad spectrum, including hydration, hemodialysis, and renal transplantation (9). The management of rhabdomyolysis cases typically focuses on supportive treatments. Alleviating relevant symptoms and preserving kidney function are crucial. Patients in such cases are often advised to maintain adequate fluid intake, and in some instances, treatment methods such as dialysis may be considered. In our case, the patient's CK levels decreased after hydration, and dialysis was not required (10-12).

In conclusion, cases of rhabdomyolysis presenting to the emergency department following inhalation of lime solvent represent significant medical conditions that can lead to severe complications. Early diagnosis and effective treatment are critically important for improving the health outcomes of patients.

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