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Acute Rhabdomyolysis Following Synthetic Cannabinoid Use in a 16-Year-Old Patient: A Case Report

Dr. Lordian Nunci[1], Olta Ajasllari[2]

[1]PhD, Department of Anesthesiology and Intensive Care Medicine, "Mother Teresa" University Hospital Center, Faculty of Medicine, Medical University of Albania, Tirana, Albania

[2]Department of Anesthesiology and Intensive Care Medicine, "Mother Teresa" University Hospital Center, Faculty of Medicine, Medical University of Albania, Tirana, Albania

Abstract: ***Rhabdomyolysis, characterized by the breakdown of skeletal muscle, can lead to severe complications such as acute kidney injury (AKI). This case report describes a 16-year-old female who developed severe rhabdomyolysis without renal impairment following synthetic cannabinoid (K2) use. Presenting with muscle weakness, dark urine, and metabolic acidosis, the patient responded well to aggressive fluid resuscitation. This case serves as a reminder for healthcare professionals to consider synthetic cannabinoids as a possible cause of rhabdomyolysis, even when renal function appears preserved, emphasizing the importance of early intervention to prevent complications.***

Keywords: rhabdomyolysis, synthetic cannabinoids, acute kidney injury, fluid resuscitation, adolescent health.

1. Introduction

Rhabdomyolysis occurs when damaged skeletal muscle releases intracellular components into the bloodstream. It can be caused by drugs, trauma, intense exercise, metabolic disorders, and electrolyte imbalances. Synthetic cannabinoids, such as K2, are are now recognized by clinical studies as potential triggers for rhabdomyolysis. This report presents a case of severe rhabdomyolysis following K2 ingestion in a 16-year-old patient with preserved renal function. The purpose of this report is to raise awareness of the potential link between synthetic cannabinoid use and severe rhabdomyolysis, even in the absence of renal impairment.

2. Case Report

A 16-year-old female presented to the emergency room with body weakness, fatigue, breathing difficulty, cough, muscle pain, and dark urine. The patient's initial laboratory tests revealed severe metabolic acidosis (pH 6.9, BE-27.1) and elevated liver enzymes (ALT 466 U/L, AST 2250 U/L). The patient had a history of Hashimoto's thyroiditis and was previously treated with levothyroxine, which had been discontinued a week prior.

Initial vital signs included a temperature of 37.4°C, blood pressure of 105/55 mm Hg, heart rate of 121/min, and respiratory rate of 18/min. Peripheral edema was noted in the upper and lower extremities. Urine analysis revealed a dark color, pH of 5.5, ketones, proteinuria, and myoglobinuria.

The patient was immediately started on aggressive intravenous fluid resuscitation with isotonic saline (200-300 ml/h) to prevent AKI. Despite this, the patient developed oligoanuria (less than 0.5 mL/kg/h urine output) the following day. The patient was treated with diuretics and fluid therapy (150-200 ml/h) with central venous pressure (CVP) monitoring. Urine alkalinization with sodium bicarbonate was also attempted.

The patient initially denied drug use, but later admitted to using synthetic cannabinoids (K2). Liquid chromatography-tandem mass spectrometry (LC-MS/MS) was sent to a foreign lab to detect synthetic cannabinoid metabolites in the patient's urine.

3. Results

The patient's creatine kinase (CK) levels were significantly elevated, peaking at over 42, 670 U/L. Despite the high CK levels, renal function remained normal (creatinine 0.65-0.86 mg/dL). The metabolic acidosis gradually resolved with treatment.

4. Discussion

This case illustrates a rare instance of severe rhabdomyolysis with preserved renal function following synthetic cannabinoid use. AKI is a common complication of rhabdomyolysis, but the correlation between CK activity and AKI risk remains complex and inconsistent across cases. Some studies suggest that AKI is less likely when CK levels on admission are below 15, 000-20, 000 U/L. In this case, the patient's relatively preserved renal function may have been due to self-hydration and the specific etiology of the rhabdomyolysis. This case highlights the clinical importance of recognizing emerging synthetic substances as triggers for life-threatening conditions like rhabdomyolysis, emphasizing the need for early diagnosis and appropriate intervention.

5. Conclusion

Rhabdomyolysis from synthetic drugs requires prompt recognition and treatment with aggressive fluid resuscitation to prevent renal damage. Healthcare providers should

consider synthetic cannabinoid use as a potential cause of rhabdomyolysis, even in the absence of AKI.

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