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Case Report

Acute 2,4-dichlorophenoxyacetic acid (2,4-D) poisoning in a young adult: A case report of rhabdomyolysis, conservative management, and favorable outcome

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Abstract

Dichlorophenoxyacetic acid (2,4-D) is one of the herbicides mainly used to control broadleaf weeds in many crops. This is a case report about 18-year-old young male who referred to the emergency department (ED) with chief complaints of nausea, vomiting, and gastroesophageal reflux According to the medical history, he had been exposed to the 2,4-D, by drinking of this toxic agent. In addition, his vital signs were as follows: Blood pressure = 75/110, heart rate = 97, respiratory rate = 19, and SPO2 = 96%. The electrocardiogram and arterial blood gas analysis obtained (ABG), as well as total laboratory tests were normal. He had a normal state of consciousness and was hemodynamically stable. All clinical examinations were also normal. As a therapeutic measure, hydration was performed via infusion of normal saline (1 Liter), and the patient was admitted to the toxicology ward for further follow-up. Upon 12 hours of hospitalization, the patient's serum creatine kinase (CK) began to rise and reached 1308 within two days. Finally, CK serum levels were reduced following treatment with normal saline. After 48 h, the patient was discharged with normal CK.

Introduction

Phenoxy acid herbicides are defined as synthetic auxins, playing a crucial role in the growth of many plant tissues.[1] All growth-regulator herbicides are known as weak acids with PKa values ranging from 2 to 4. They are applied to control broadleaf weeds in cereals, corn, and other crops and noncropland grass.[2] Among them, Dichlorophenoxyacetic Acid (2,4-D) belongs to the indole acetic acid family.[3,4] Of note, there is limited data regarding 2,4-D poisoning.[5] Clinical manifestations of 2,4-D poisoning include abdominal pain, diarrhea, vomiting, hypotension, hypertonia, hyperreflexia, convulsion, paralysis, coma, myopathy, metabolic acidosis, rhabdomyolysis, renal failure, and increased aminotransferase activities.[6]

Case Report

An 18-year-old young man, referred to the emergency department (ED) on June 9, 2009. According to the medical history record, it has been found that he has drunk approximately 10-15 mL of 2,4-D. The chief complaints included heartburn and vomiting three times. The vital signs were as follows: blood pressure = 110/75, pulse rate = 97, respiratory rate = 19, and SPO2 = 96%. The findings of electrocardiogram and ABG were normal. Initially, the hydration, as a therapeutic measure, was performed using 1L normal saline.

As the results of laboratory test, WBC: 11400, PT: 14.7, INR: 1.28, PTT: 68, CkMB: 44, CK: 624 and other items such as K, Na, AST, ALT, ALP, BIL (D AND Total), urea, Cr, Mg, P, and Ca were in reference range. Next, the patient was admitted to the toxicology ward and received 1L of normal saline every 6 hours. During hospitalization, the amount of CK increased to 1066 and then to 1308. From the third day, CK decreased and 2 days later, the patient was discharged with normal CK and good general condition.

Discussion

Dichlorophenoxyacetic Acid is one of the most widely used herbicides around the world to control broad-leaved weeds in many crops.[7] These agents are highly soluble in the aqueous media, which are potential contaminants of drinking water. However, they can affect human health because of chronic toxicity through aquatic animals, such as fish.[8,9]

Pesticide poisoning is common in Iran, especially in rural communities. In the present case report, Dichlorophenoxyacetic Acid had been used orally by a young boy. In this case, the patient had no significant clinical symptoms other than nausea and palpitations due to exposing to the low dose of toxin, however the CPK

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tests markedly raised.

Finally, the patient received serum therapy and was monitored during hospitalization. On the fourth day of hospitalization, serum levels of CPK, and subsequently the clinical symptoms improved, and the patient was discharged. Published case reports indicate that appropriate utilization of urinary alkalinization and forced diuresis, supplemented by hemodialysis in severe cases, has been shown to enhance clinical outcomes and reduce mortality rates in poisoning management.[10,11]

Conclusion

Dichlorophenoxyacetic acid can increase serum CPK levels.

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Authors' Contribution

Conceptualization: Sajjad Ahmadi.
Data curation: Sasan Ghazanfar Ahari.
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Writing–original draft: Sajjad Ahmadi.
Writing–review & editing: Sasan Ghazanfar Ahari.

Competing Interests

There is no conflict of interest.

Ethical Approval

The patient's consent to publish data was obtained.

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