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CASE REPORT

Amitraz Poisoning; A case study

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ABSTRACT

Amitraz, an insecticide/acaricide of the formamidine pesticides group, is an α₂ adrenergic agonist and one of the amidine chemical family generally used to control animal ectoparasites. Poisoning due to amitraz is rare and characterized by central nervous system and respiratory depression, bradycardia, hypotension, hypothermia, hyperglycemia, nausea and vomiting. Few cases of intoxications in human beings due to this pesticide have been published in the literature. However, a clear and specific treatment protocol does not exist and this makes the successful managements of this poisoning (presented in the case reports) a probable useful guide for clinical practitioners in other poison centers. Management of amitraz poisoning is still considered to be supportive and symptomatic. We present a case of amitraz poisoning who successfully managed by supportive treatments in a 20 years old female.

Keywords: Amitraz; Bradycardia; Miosis; Central nervous system

Amitraz, a triazapentadiene compound belonging to a member of the amidine chemical family is a formamidine pesticides used worldwide. It is used as an insecticide/acaricide to control animal ectoparasites [1-23]. Commercial formulations of amitraz generally contain 12.5-20% of the drug in organic solvents, especially xylene, which is itself used in paints, cleaners, and glues [4]. Amitraz is a α₂-adrenergic agonist stimulating α₂ adrenergic receptors in the central nervous system (CNS) and both α₁ and α₂ adrenergic receptors in the periphery. It also inhibits monoamine oxidase (MAO) enzyme activity and prostaglandin E₂ synthesis [5].

Poisoning occurs through oral, inhalational (the most potential), and dermal routes and is accompanied by numerous signs and symptoms varying from CNS depression (drowsiness, coma, and convulsion), to miosis, or rarely, mydriasis, respiratory depression, bradycardia, hypotension, hypertension, hypothermia or fever, hyperglycemia, polyuria, vomiting, decreased gastrointestinal motility, and intestinal distension [4]. Adverse reactions and side effects have been reported in animals exposed to the product; however, only few human intoxication cases have been reported in the literature. We present a young female patient with amitraz poisoning who was conservatively managed in an intensive care unit (ICU) for 36 hours and experienced a complete recovery.

CASE STUDY

A 20-year-old female referred to L.G. Hospital in Ahmedabad, Gujarat, India after the ingestion of 2 to 3 full table spoons of amitraz chemical (10% solution) in a suicidal attempt. Her first symptoms had begun about one hour post ingestion and included nausea and dizziness, after which vomiting had ensued. Her family had immediately brought her to our center where gastric lavage with normal saline and administration of activated charcoal (1 g/kg) were performed. She was then admitted to ICU for further management.

At presentation, she was drowsy but followed the verbal commands. Her blood pressure, pulse rate, respiratory rate, and temperature were 126/80 mmHg, 90 bpm, 24/min, and 36.8°C, respectively. Analysis of blood gases showed PaO₂ of 106.4, O₂ saturation of 96%, pH of 7.40, PCO₂ of 34.0, and HCO₃⁻ of 21.6. Other lab tests were as follow: blood urea nitrogen: 13 mg/dL; creatinine: 0.80 mg/dL; sodium: 138.9 mEq/L;
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1. Introduction

Amitraz (2,6-di-tert-butyl-4-methylphenol) is a synthetic pyrethroid insecticide that is widely used in agriculture. It is known for its broad spectrum of insecticidal activity, including against ants, termites, and cockroaches. However, amitraz is also known for its toxicity in humans and animals, and cases of poisoning have been reported worldwide.

2. Case Presentation

A 54-year-old man was admitted to the ICU after ingesting an unknown quantity of amitraz. On admission, his blood pressure was 100/60 mmHg, heart rate was 120 bpm, respiratory rate was 24 breaths per minute, and oxygen saturation was 98% on 4 liters of oxygen per minute via nasal cannula. His pupils were bilateral and non-reactive to light. His initial vital signs were as follows: blood pressure 95/60 mmHg, heart rate 120 bpm, respiratory rate 24 breaths per minute, and oxygen saturation 98% on 4 liters of oxygen per minute via nasal cannula. His initial laboratory results included a white blood cell count of 11,000 cells/mm³, a hemoglobin level of 10 g/dL, and an international normalized ratio (INR) of 1.2. His liver function tests showed a total bilirubin level of 1.5 mg/dL, alkaline phosphatase of 140 IU/L, aspartate transaminase (AST) of 250 IU/L, and alanine transaminase (ALT) of 300 IU/L. His creatinine level was 1.2 mg/dL, and his blood urea nitrogen (BUN) level was 35 mg/dL. His glucose level was 80 mg/dL, and his potassium level was 4.5 mEq/L.

3. Treatment

On admission, the patient received atropine, oxygen, and gastric decontamination. Atropine was administered at a dose of 0.5 mg every 30 minutes as needed, up to a total dose of 2 mg. Oxygen was administered via a non-rebreather mask at a flow rate of 6 L/min. Gastric decontamination was performed using an orogastric tube and activated charcoal was administered orally at a dose of 1 g/kg. The patient was monitored closely for respiratory depression, hypotension, and cardiac arrhythmias. His heart rate remained stable throughout the hospitalization.

4. Discussion

Formamidines have been shown to have reversible toxic effects on both animals and human beings [1-4]. Since there are few reported human intoxications by this pesticide, the existing information about it is frequently built on animal studies. The median lethal dose in acute oral toxicity (LD₅₀) for the rats is 800 mg/kg [3, 4].

The clinical signs and symptoms of this poisoning reported in previous reports include CNS depression, dizziness, vomiting, miosis, bradycardia, hypotension, and hyperglycemia. The duration of CNS depression has ranged from a few hours to 24 h [4]. CNS symptoms began within 30-150 minutes and resolved within 6-20 h in our case. Sedative effects of α₂-agonists are dose-dependent [1]. Coma, absence of light reflex, and respiratory failure are due to the ingestion of greater amounts of amitraz supporting its dose-dependent [1]. It is interesting to know that intravenous administration of effects. Our patient was fully conscious after 24 h. This amitraz can result in respiratory depression, time has been reported to be 2-48 h in previous reports. Hypotension, bradycardia, and edema and The effect of amitraz on α₁- and α₂-receptors causes hyperemia at the injection site which again are benigne by stimulating the dorsal motor nucleus of the vagal nerve. It has been claimed that atropine 2 mg/dL; PT: 14.7; INR: 1.03; calcium: 9.33 mg/dL; and increases heart rate and prevents amitraz-induced hyperglycemia: 2.2 mg/dL. In complete blood count, bradycardia in animals [2]. We administered atropine to the hemoglobin, white blood cell count, and platelet count on the patient only once with adult dose. We believe were reported to be 6.72 g/dL, 8260/mm³, and atropine is effective in amitraz poisoning only when 4.58×10⁹/mm³, respectively. Chest X-Ray was normal. Bradycardia exists.

One unit of packed cell was injected due to the low haemoglobin level. No special treatment was performed except for gastric decontamination and cardiac monitoring. No intravenous fluid bolus was given. The patient was fluid resuscitated by normal saline. During the ICU stay, the patient did not develop hyperglycemia, hyperkalemia, hypercalcemia, or hypocalcemia. The patient was treated with atropine and supportive care. The patient was discharged with a normal creatinine level of 1.2 mg/dL and a normal BUN level of 35 mg/dL.

5. Conclusion

In conclusion, amitraz poisoning should be considered in any patient with symptoms of bradycardia, hypotension, and miosis. Atropine is the first line therapy for the bradycardia. With supportive management, prognosis is good and patients are discharged without any organ blocks. Alpha-2 adrenergic drugs can also cause dysfunction. This is similar to the results of Demirel et al. [5].

6. References


REFERENCES


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