

## Amitraz poisoning – an uncommon pesticide poisoning in children

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### Abstract

Amitraz is a triazapentadiene pesticide used predominantly for ectoparasitic infections. The poisoning is usually caused by accidental ingestion. It is a centrally acting alpha-2 adrenergic agonist and leads to depression of the respiratory and central nervous systems, as well as, bradycardia, hypotension, nausea, vomiting, hyperglycemia and hypothermia. There are only limited reports on Amitraz poisoning in children. We report 2 children admitted to us with amitraz poisoning with variable severity of illness to highlight the rarity of life threatening poisoning by amitraz and excellent prognosis with early recognition and supportive management.

**Keywords:** amitraz; poisoning; alpha-2 adrenergic receptors; child; intensive care

### Introduction

Amitraz is a *triazapentadiene* pesticide used worldwide as an insecticide against ectoparasites. Poisoning can occur by oral, inhalational or dermal route. It is a centrally acting alpha-2 adrenergic agonist and characterized by CNS and respiratory depression, bradycardia, hypotension, nausea, vomiting, hyperglycemia and hypothermia. Most patients recover completely with supportive management and deaths are rare. Although there is no specific antidote, alpha 2-antagonists can be used in selected cases. Very few cases of amitraz poisoning have been reported from India. Our case report contributes to the limited data available, thereby raising awareness among paediatricians.

### Case history

#### Case 1

A 5-year-old girl presented with acute onset irritability and excessive cry followed by unresponsiveness. There was no history of fever, seizures, animal bite, head trauma, or recent vaccination. At admission, the child had heart rate of 76/ minutes, normal blood pressure, Glasgow Coma Scale (GCS) of 3 and shallow breathing efforts. Neurological examination revealed bilaterally constricted pupils, generalized hypotonia, areflexia, and mute plantar response.

She was immediately intubated and started on invasive ventilation. Gastric lavage was done, and the lavage fluid had “kerosene-like” odour. On careful review of circumstantial history, it became apparent that the child had consumed some unknown liquid from an unlabelled container which later was confirmed to be Amitraz. All laboratory parameters which included hemogram, electrolyte profile, arterial blood gas, renal, and liver function tests were normal. She was continued on supportive care with ventilation, on which the encephalopathy gradually improved. She was successfully extubated at 24 hours of hospital stay and discharged without any neurological sequelae.

#### Case 2

A 2-year-old boy was brought with accidental consumption of unknown

insect repellent liquid 8 hours back while playing. Examination revealed GCS of 13, normal hemodynamic parameters, and normal systemic examination. Since the presentation was delayed, gastric lavage was not done. He was started on intravenous fluids and continuous monitoring. His electrolyte profile and arterial blood gas were normal. On further probing, parents revealed that amitraz was used as pesticide in their neighbourhood and was found in the spot where the boy had been playing. His symptoms improved over 24 hours with supportive treatment and he was discharged at 48 hours uneventfully.

### Discussion

Amitraz is a triazapentadiene, used as a pesticide as well as insect repellent. It is an uncommonly reported poison, with the minimum toxic dose in humans is considered to be 3.57 mg/kg. The major metabolite is 3-methyl-4-aminobenzoic acid, which is excreted by the kidneys, with a half-life of 4 hours [1]. The predominant mechanism of action is stimulation of central alpha-2 adrenergic receptors leading to CNS depression, reduced adrenergic and cholinergic output. It is also said to interact with octopamine receptors and inhibit prostaglandin synthesis and monoamine oxidase, although not seen in human beings [2].

In children, most cases are due to accidental ingestion, and onset of symptoms is between 30-120 minutes. The commonest manifestation is CNS depression leading to altered sensorium, which is almost universal, followed by miosis and respiratory failure [3]. It greatly mimics organophosphorus poisoning, but lacks the features of lachrymation, bronchorrhea, increased sweating and bronchorrhea. Cardiovascular manifestations in the form of bradycardia and hypotension are seen in less than 30% of patients [4]. Hyperglycemia and deranged liver function tests are the predominant laboratory findings [5] [6]. Diagnosis is clinical based on a detailed history and relevant clinical findings.

Management is largely supportive, and includes maintenance of airway, breathing and circulation [7]. Skin decontamination is very important, and removal of soiled clothes and thorough cleaning are mandatory. Gastric lavage is indicated in cases with massive ingestion but only after the airway is protected, to minimize risk of aspiration [8].

Mechanical ventilation is extremely important in cases with respiratory



depression. Hypotension should be corrected with fluids and vasopressors, and atropine may be used for symptomatic bradycardia [9]. Seizures are usually treated with benzodiazepenes. Experience with alpha-2 antagonists like yohimbine and atimepazole are limited, and indicated in refractory symptoms [10].

In a meta-analysis published by Dhooira et al, more than half of all reported cases were children, with oral route being the commonest. Onset of symptoms was by 3 hours, and proposed lethal dose was 200 mg/kg. Although CNS depression was the commonest symptom and was directly proportional to the dose ingested, universal recovery was seen by 48 hours. Cardiovascular manifestation was seen in about one-third of cases, while hyperglycemia was seen in almost half of them. Death occurred in 1.9% of patients, the causes being respiratory failure, pulmonary embolism, sepsis and arrhythmia [11].

### Conclusion:

Amitraz is an under-reported poisoning in the pediatric age group, even though it may be commonly available in different households. Treatment is mainly supportive with excellent recovery rates. Parental education to sensitise them about proper label and appropriate storage in places out of reach of children is important to prevent exposure of any toxic substance.

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