A Study of Clinical Profile and Management of Amitraz Poisoning: A Case Series of Not So (Un) Common Poisoning

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Abstract-

Introduction: Amitraz is a formamidine pesticide that is used to treat generalised demodicosis in dogs as well as to manage ticks and mites on cattle and sheep. The stimulatory actions of the a2 agonist in amitraz cause its neurotoxic and proconvulsant effects. Aim: To study the clinical features, complications, management and outcome of the patients with acute amitraz intoxication. Material and Methods: Our study is a prospective cross-sectional study done on 10 cases presented in emergency medicine department of GMC Miraj.

Result: Patients had CNS involvement, miosis/mydriasis, hypotension, bradycardia/tachycardia and nonspecific complaints like pain abdomen, vomiting etc. Gastric lavage was given to every case of amitraz poisoning.

Conclusion: In patients who presented with history of pesticide consumption with features of bradycardia, drowsiness and features similar to organophosphorus poison physician should think of amitraz poisoning that will help to initiate rapid treatment for this rare, potentially life-threatening intoxication.

Keywords: **Amitraz, a2 agonist, Bradycardia, Miosis, Central nervous system.**

INTRODUCTION:

Amitraz, chemically it is 1,5-di-(2,4-dimethylphenyl)-3-methyl-1,3, 5-triazapenta-1,4-diene, a member of formamidine pesticide, being used worldwide in a pharmaceutical, veterinary and agricultural industries as an acaricide, insecticide and antiparasitic.[1] It is a pharmacologically active centrally acting alpha-2 adrenergic agonist and characterized by CNS and respiratory depression, bradycardia, hypotension, nausea, vomiting, hyperglycemia and hypothermia. It also inhibits monoamine oxidase enzyme activity and prostaglandin E2 synthesis.[2]

There have been cases reported worldwide, a very few from india as well mostly due to underreporting of cases with no preventable cure or an specific antidote
with no reliable diagnostics. In humans, the US Environmental Protection Agency classifies amitraz as slightly toxic by the oral and inhalation routes (Toxicity Category III) and moderately toxic by the dermal route (Toxicity Category II).[3] Clinical presentation of poisoning can be confusing as it mimic organophosphate poisoning with several shared features (miosis, bradycardia, hypotension). But the presence of hyperglycemia, hypothermia, and reduced gastrointestinal motility along with normal serum cholinesterase levels and the absence of fasciculations and a hypersecretory state (salivation, lacrimation, perspiration, and diarrhea) point against OP poisoning.[4,5] With rising number of cases , and to create awareness, we report 10 confirmed cases of amitraz poisoning presented to emergency medicine department of GMC, Miraj with focus on clinical features and a structured management protocol.

METHODS AND MATERIAL:

Methodology: - This study is done at the department of emergency medicine, GMC Miraj. This is prospective, cross sectional study done on 10 confirmed cases of amitraz poisoning admitted to our hospital from January 2022 to October. After obtaining informed consent patients were enrolled in study with following
inclusion and exclusion criteria.

Inclusion criteria: -

1. Patients of age of 12 years and above.
2. Evidence of confirmed amitraz poisoning (who brought container/ label of amitraz on admission / during period of hospitalization).

Exclusion criteria: -

1. Patients of age less than 12 years.
2. Poisoning with other compounds along with amitraz.

All these patients were followed up in intensive care unit and observed for
requirement of mechanical ventilation , number of days in ICU, days in hospital,
morbidity and mortality

RESULTS:

In our study, a total of 10 patients were included out of which 7 were males and 3 were females.(Table 1)

Table 1: Sex distribution of amitraz poisoning cases.

Sex	Number of cases	Percentage (%)
Male	7	70
Female	3	30
Total	10	

Majority of the patients were between the age group of 41-60 years with highest incidence between age group of 41-50 years. (Table 2)

Table 2: Age distribution of amitraz poisoning cases.

Age groups (years)	Number of cases	Percentage (%)
21-30	1	10
31-40	2	20
41-50	4	40
51-60	3	30
>60	0	0

Out of 10 patients, 7 were farmers by occupation, 3 were in occupation indirectly related to farming (eg.-goat/cow and buffalo rearing), Analysis of marital status showed that 9 patients (90%) out of 10 were married, and remaining one was unmarried. The route of poisoning was oral in all the cases. Most of patients had low socioeconomic status.The amount of amitraz consumed was from 5-25 ml in 6 subjects and was unknown for the other 4 cases . Onset of symptoms started from 30 minutes to 90 minutes after ingestion. Time between ingestion and presentation was 30 minutes to 12 hours. In the initial clinical evaluation 6 cases presented with miosis, 2 with mydriasis, and 2 with normal size pupils. Hypotension was present in two cases. There was bradycardia in five cases and tachycardia in two. Out of 10, 3 patients required oxygen support and intubated at the time of admission ivo impending respiratory failure due to delayed presentation and aspiration. 2 patients were put on inotropic support. Most common clinical presentation in the present study was loss of consciousness and bradycardia . All these patients showed normal serum cholinesterase level and were shifted to intensive care unit for further mangament. CNS depression resolved spontaneously within 4-28 hours (median 12 hours) in all patients. The length of hospital stay was four to five days. All the patients had good outcomes and were discharged without neurological sequel.

Table 3: clinical features of amitraz poisoning

Symptoms	Number of patients	Percentage (%)
vomiting	6	60
drowsiness	7	70
disorientation	2	20
Respiratory difficulty	3	30
signs		
Hypotension	2	20

bradycardia	5	50
miosis	6	60
mydriasis	2	20
Altered mental status	2	20
Lab		
hyperglycemia	4	40
Metabolic alkalosis	3	30

Management- A nasogastric tube was inserted and gastric lavage done. Endotracheal intubation was done to secure airway in three patients. Symptomatic treatment was given as there is no specific antidote for the poisoning. Patients with bradycardia treated with 1 - 3 doses of atropine i.v (1 mg).

Hypotension responded to fluid therapy, and two required noradrenaline (4µg/min) infusion for six to eight hours. The average duration of ICU stay of 10 patients was 3-4 days and overall average hospital stay of 5 days. In this study, there was 100% survival with 0 % case fatality. All patients were discharged without neurological sequel.

DISCUSSION:

MITAC, TRIATOX, TRITIX, TAKTIC, ECTODEX, and other trade names are some of the brand names used to market the veterinary agricultural product amitraz. CNS depression, hypothermia, bradycardia, hypotension, hyperglycaemia, vomiting, convulsions, and respiratory failure are among the consequences that have been recorded. In our study, central nervous system depression was the main symptom, which was consistent with amitraz's impact on a2 adrenergic receptors. A direct inhibitory action of the drug on the respiratory centre may be implied by the finding of respiratory depression occurring simultaneously with central nervous system depression [6] . a2 -agonists' sedative effects are dose-dependent [7].

The main symptom in our patients was CNS depression, which is presumably caused by alpha-2-adrenoceptor activity.

In our cases, CNS symptoms appeared after 30 to 60 minutes of intake and subsided within 4 to 24 hours. The length of CNS depression in previously published investigations has varied from a few hours to 24 hours [3,4,5]. In some cases, if bradycardia and miosis are present in the same patient, amitraz poisoning may be mistaken for poisoning from an organophosphorus substance. Hypothermia wasn't seen in any of our patients, though. Recent years have shown an upsurge in amitraz poisoning, particularly in rural regions. In our 10 patients who were hospitalised with acute amitraz poisoning, there was no fatality.

Initial stabilisation, decontamination measures like gastric lavage to limit absorption, and actions to increase toxin removal like removal of contaminated clothes and washing body with water are key components of the standard treatment plan for a patient with acute amitraz poisoning.[8] Initial medical care focuses on treating symptoms and providing support, paying close attention to the monitoring and assessment of the respiratory, cardio-vascular, and central neurological systems. Amitraz has no specific antidote[9]. Yohimibine and other a2-receptor antagonists have been demonstrated to enhance survival, even in severe cases[10]. Increased ingestion may cause respiratory failure and coma. All cases could eventually fully recover.

CONCLUSION:

Amitraz poisoning mimics organophosphate poisoning in a lot ways and hence can be misdiagnosed. Investigating the poison container will help in such intoxications for correct identification. Though there is no antidote for amitraz, good supportive management is needed to manage respiratory failure and cardiac effects like bradycardia and hypotension.

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