

Amitraz poisoning: Early gastric lavage can prevent life-threatening complications

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ABSTRACT

Amitraz is a worldwide available pesticide of formamidine chemical family, proven to have reversible toxic effects on both animals and humans. Upon intoxication by ingestion, inhalation, or dermal route, it can cause various central nervous system (CNS), CVS, respiratory and gastrointestinal effects, some of which may be life threatening. Because of lack of specific antidote patients are usually managed with supportive and symptomatic management. We describe a case of 36-year-old female patient who presented to us with alleged history of 120 ml amitraz ingestion. She was given early gastric lavage with activated charcoal at emergency along with supportive and symptomatic management. She developed mild CNS depression, bradycardia, miosis, and fluctuating blood pressure. She was managed in intensive care unit and was kept under close hemodynamic monitoring. Her clinical course during hospital stay was uneventful and was successfully discharged without any residual deficits. According to previously published data, this amount of amitraz intoxication could have caused more serious clinical manifestations. This disproportionately less severe clinical manifestation in our patient is attributed to early gastric lavage. Ominous of reducing amitraz-related health hazards lies in the hands of primary health care physicians and regulatory bodies of government.

Keywords: Amitraz, atropine, formamidine, gastric lavage

Introduction

Amitraz [1, 5 di-(2, 4-dimethylphenyl)-3-methyl-1, 3, 5-triazapenta-1, 4-diene], a member of the formamidine chemical family, is an acaricide and insecticide and pharmacologically acts as an $\alpha 2$ adrenergic agonist.^[1,2] This antiparasitic agent is used for treatment of ectoparasites in animals.^[3] Human intoxication usually occurs by accidental exposure or suicidal intentions. Potential routes of intoxication are oral, dermal exposure, and inhalation.^[4] Proposed mechanisms of action of amitraz are stimulates $\alpha 2$ adrenergic receptor sites in the central nervous

system (CNS) and $\alpha 1$ adrenergic and $\alpha 2$ adrenergic receptor sites in the periphery, inhibition of monoamine oxidase (MAO) enzyme activity, and prostaglandin E2 synthesis.^[5] Clinical features depend on extent of organ involvement varying from CNS depression (drowsiness, coma, and convulsion), to miosis, or, rarely, mydriasis, respiratory depression, CVS (bradycardia, hypotension, hypertension), hypothermia or fever, hyperglycemia, polyuria, GIT involvement (vomiting, decreased gastrointestinal motility, and intestinal distension).^[2] There is scarcity of published data regarding human intoxication of amitraz. Based on available evidence it has very high mortality rate especially when taken with suicidal ideation. But unfortunately it does not have any specific antidote.^[6] Gastric lavage if done early may reduce gastric absorption of poison and thereby reduce extent of organ involvement. We report a successfully managed case of large amount of amitraz intoxication. We assume that early gastric lavage was life saving measure for our patient.

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Case Presentation

A 33-year-old female patient, mother of two children living with her husband ingested around 100–120 ml of amitraz poison as a suicidal attempt on 29/9/2019 at 1:00 pm. Within 5–10 min of consumption she had an episode of vomiting followed by drowsiness. The patient was immediately brought by her husband to emergency department, in AIIMS Rishikesh, Uttarakhand, India. At presentation patient was conscious, oriented but drowsy, had miosis and her vitals were as following: PR: 62/min; BP: 114/82 mmHg. Gastric lavage was done in emergency and 50 gm of activated charcoal was given through Ryle's tube. After half an hour her BP was: 150/90 mmHg; RR: 20/min; Temp: 98.4°F. Her ABG showed: pH: 7.40; pCO₂: 36; pO₂: 82; HCO₃: 16. Along with gastric lavage and activated charcoal supportive and symptomatic management was given and the patient was shifted to intensive care unit for monitoring as she was having bradycardia (50–60 beats/min) and fluctuating blood pressure. Patient improved symptomatically without any further intervention by the same evening and she was less drowsy giving history by herself. During the hospital stay she maintained hemodynamic stability without any further issues. Psychiatric evaluation and counseling was done following which the patient was discharged on 1/10/2019 in stable condition.

Discussion

Formamidines show reversible toxic effects on both humans and animals.^[1] Exact lethal dose of human intoxication is unknown till date nor any specific management guideline. Patients are usually managed symptomatically based on available published data and long-term prognosis is good.^[6,7]

Our patient had mild CNS depression, miosis, bradycardia, and fluctuating blood pressure attributed to α 2- and α 1-agonistic action of amitraz.^[8] Co-existence of miosis and bradycardia may also occur in organophosphate and opioid poisoning both of which were readily excluded in our patient as container of amitraz poison was brought with patient and other clinical features were absent.^[9] Our patient received gastric lavage with activated charcoal within 15 min of alleged incident. CNS symptoms of our patient resolved within 6 h and CVS symptoms after 24 h. In most of previously reported cases, CNS symptoms resolved within 2–48 h.^[1-5,8-10]

Large amount of amitraz can cause coma, respiratory failure, and hemodynamic instability leading to significant morbidity and mortality. Early respiratory support, fluids, and electrolyte balance, continuous hemodynamic monitoring may be considered in those cases.^[11] Despite being controversial, bradycardia in most reported cases was managed by injection atropine.^[11] However atropine was not used in our case as bradycardia was non-life threatening. Amitraz can also lead to laboratory abnormalities in the form of transaminitis, dysglycemia, dyselectrolytemia which [Table 1] were absent in our case.^[1]

Table 1: Laboratory parameters

Laboratory indices	Values
Hemoglobin (g/dl)	11.12
Total leucocyte count (/mm ³)	7,822
Platelet count (lakh/mm ³)	1.74
Total bilirubin (mg/dl)	0.9
ALT (U/L)	28.1
AST (U/L)	13.2
ALP (U/L)	298.3
Serum protein (gm/dl)	6.7
Albumin (gm/dl)	4.2
Urea (mg/dl)	19.8
Creatinine (mg/dl)	0.65
Sodium (mEq/L)	139.3
Potassium (mEq/L)	3.8
Calcium (mg/dl)	9.8

Despite taking large amount (probably lethal dose) of amitraz our patient had only mild, non-life threatening clinical manifestations probably because of early gastric lavage.

Gastric lavage is a very simple bedside procedure. Family and primary care physicians are often approached first in periphery therefore they should be well aware about the clinical manifestations and basic management of amitraz poisoning. Gastric lavage, intravenous fluids, and atropine if so indicated should be given before referring the patient to appropriate higher center. Primary care physicians should educate the patient and relatives regarding appropriate use, proper handling and harmful effects of this toxic agent. Role of government regulatory bodies cannot be over emphasized in this regard.

Learning points

1. Early gastric lavage can prevent life-threatening complications of amitraz poisoning
2. Clinical manifestations are reversible upon proper administration of early supportive management and long-term prognosis is good
3. Particular attention must be given to monitoring of the respiratory, cardiac, and central nervous systems
4. Strengthening primary care system and government initiatives can largely prevent amitraz poison related adverse effects.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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