

Amitraz Acute Poisoning: An Experience of 83 Cases from Rural Area in Western Maharashtra

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Abstract

Amitraz is a triazapentadiene compound, and is a member of amidine chemical family. It is used as an insecticide and acaricide for controlling red spider mites, leaf mines, scale insects and aphids. In animals, it is used to control ticks, mites, lice, and other animal pests. **Aim:** to study the clinical features, laboratory abnormalities, complications, and outcome of the patients with acute amitraz intoxication. **Materials and methods** – retrospective analysis of patients of acute amitraz intoxication admitted to rural medical college loni over a period of 2 years (from september 06 to august 08) was done. **Result** – a total of 83 patients were admitted to our hospital with acute amitraz intoxication (54 males and 29 females). **Analysis of the clinical features** revealed that patients had following symptoms in decreasing order of frequency: cns depression (83 patients), vomiting (72 patients), bradycardia (26 patients), hypotension (3 patients) and respiratory failure requiring mechanical ventilation (2 patients).

Summary & conclusion: the most common clinical feature is cns depression and patients should be watched for signs of impending respiratory failure. Treatment is essentially symptomatic as there is no specific antidote.

Keywords: amitraz, cns depression, respiratory failure.

Introduction

Amitraz is a triazapentadiene compound, and is a member of amidine chemical family. It is used as an insecticide and acaricide for controlling red spider mites, leaf mines, scale insects and aphids. On cotton, it is used to control bollworms, white fly, and leaf worms. In animals, it is used to control ticks, mites, lice, and other animal pests¹.

It is straw coloured, crystalline solid and odourless powder. It is dissolved in solvent xylene, and is available in liquid form. Commercial formulations of amitraz generally contain 12.5-20% of the active chemical in organic solvent. It is diluted with water before applying to the plants and therapeutic purposes in animals². Extensive

knowledge regarding the pharmacology, its uses as well as toxic effects is known to veterinarians. However, there are few reported cases of amitraz poisoning in human beings especially from india. Most of the reported cases of acute amitraz intoxication are as a result of accidental ingestion in paediatric age group, especially in rural areas. An analysis of the cases of acute amitraz intoxication, admitted to rural teaching hospital, over a period of 2 years, was carried out.

Aim: to study the clinical features, laboratory abnormalities, complications, and outcome of the patients with acute amitraz intoxication.

Materials and methods

Retrospective analysis of patients of acute amitraz intoxication admitted to rural medical college loni over a period of 2 years (from september 2006 to august 2008) was done.

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The diagnosis was ascertained by history of consumption of poison as narrated by patient's relatives and brought empty containers of amitraz. Detailed history regarding the quantity, time, and interval between ingestion of amitraz and hospitalisation, was studied from case records. As per case-records, all samples of stomach wash were sent to forensic science laboratory for chemical analysis.

A detailed retrospective analysis of amount of amitraz consumed, sex, age, marital status of patients, therapeutic intervention, clinical features, outcome and duration of hospitalization was done.

Inclusion criteria

The data of all those patients admitted with evidence of amitraz poisoning (those who brought container of amitraz on admission / during period of hospitalisation) were recorded and included for study.

Result

A total of 83 patients were admitted to our hospital with acute amitraz poisoning (54 males and 29 females) with a conclusive evidence of empty container of poison consumed. Male: female ratio of 1.86:1. All patients were in the age group of 13 - 52 years. Maximum numbers of patients were in age

group of 21-30 years and minimum in 51-60 years (table 1).

Out of 83 patients, 43 were farmers by occupation, and remaining 40 were in occupation directly or indirectly related to farming (eg.-goat rearing, farm labourers, cow and buffalo rearing) (fig.-1).

Analysis of marital status showed that 43 patients (51.8%) out of 83 were married, and remaining was unmarried.

The most common intention of poisoning was suicidal, according to alleged history in 60 patients; in remaining 23 it was accidental. The route of poisoning was oral in all the cases.

Review of records of analysis by psychiatrist, of suicidal cases prior to discharge from hospital, revealed that family conflict, failure in examinations, financial problems marital disharmony accounted for 26.5%, 13.25%, 12.05%, 8.43% respectively (table -2).

Seventy patients, out of 83, had brought containers of amitraz on admission (tactic); whereas remaining 13 patients, who were initially admitted with a diagnosis of unknown poisoning, had revealed substance consumed to be amitraz on subsequent day of the admission.

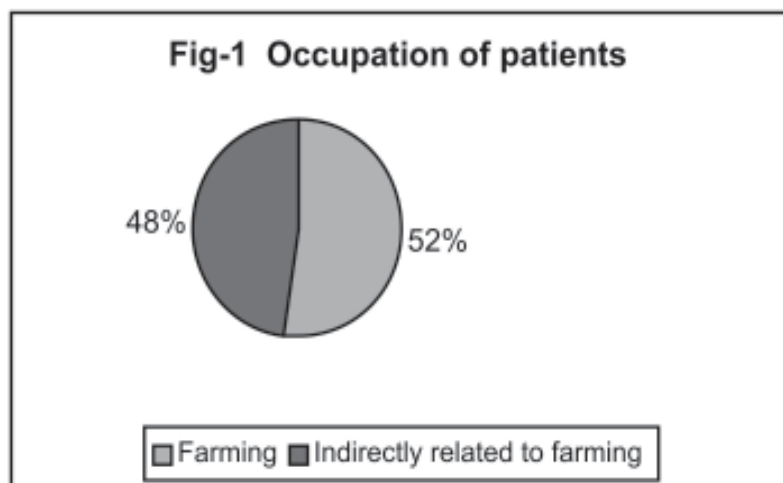


Table 1. Age and sex- wise distribution of cases

Age group	Males	Females	Total	Percentage
12-20	2	8	10	12.04%
21-30	37	9	46	55.42
31-40	6	6	12	14.45%
41-50	8	6	14	16.86%
51-60	1	0	1	1.20%
Total	54	29	83	100

Table 2. Factors responsible for poisoning

Factors	No.	Percentage
Family conflict	22	26.50
Failure in examinations	11	13.25%
Financial problems	10	12.04%
Marital disharmony	7	8.43%
Chronic illness	3	3.64%
Failure in love	3	3.64%
Unemployed	2	2.40%
Psychiatric illness	1	1.20%
Accidental	23	27.71%
Cause not known	1	1.20%
Total	83	100%

Analysis of the clinical features

It is observed that the patients had following symptoms in decreasing order of frequency: - CNS depression (83 patients), vomiting (72 patients), bradycardia (26 patients), hypotension (3 patients) and respiratory failure requiring mechanical ventilation (2 patients). None of the patients had miosis, convulsions or hypothermia (table-3).

On laboratory investigations, liver function test, blood urea, serum creatinine, serum electrolytes and ECG were normal in 80 patients. One patient had LBBB on ECG (the old ECG was not available), and it remained same till the discharge. Two patients had deranged liver function test in the form of increased transaminases levels. Ten patients out of 83 had hyperglycemias on admission (random blood sugar in the range of 180 to 210) (table-4).

They were not known diabetic initially. Their blood sugar level returned to normal values on subsequent follow up without any treatment. The amount of amitraz consumed was from 5-15 ml in all the subjects, except in 2 patients who developed respiratory failure and had consumed about 25 ml of compound.

All patients were admitted to the intensive care unit facility of our hospital. The average duration of icu stay of 81 patients was 12-18 hours. However, for 2 patients who had to be put on ventilation for less than 10 hours duration, the icu stay was of 48 hours.

Treatment- all patients were treated by gastric-lavage followed by activated charcoal, and symptomatic treatment was given as there is no specific antidote for the poisoning. Patients with bradycardia responded to 1 - 3 doses of atropine i.v (0.6 mg). Hypotension responded to fluid therapy, and no ion-tropes were required. Only 2 patients, out of 83, required mechanical ventilatory support. All the patients were discharged from hospital without any 'in-hospital mortality' with a very a good prognosis.

Table 3. Clinical profile of patients

Most common Clinical Features	No. of Patients	Percentage
CNS Depression	83	100%
Vomiting	72	86.74%
Bradycardia	26	31.32%
Hypotension	3	3.64%
Respiratory failure	2	2.40%

Table 4. Abnormalities on biochemical investigations

Biochemical Abnormality	No. of patients	Percentage
Deranged LFT (raised transaminases)	02	2.4%
Hyperglycaemia	10	12.04%
Total	12	14.45%

Discussion

Amitraz is a veterinary agriculture product sold worldwide under various trade names (MITAC, TRIATOX, TRITIX, TAKTIC, ECTODEX etc). Majority of patients who attended our hospital for acute amitraz poisoning had brought the container of Taktic. Ours being an agricultural area (Rural Medical College) the compound is mostly used to spray on cattles as an acaricide.

Acute amitraz poisoning occurs by ingestion, through skin or by inhalation. The reported effects include cns depression,

hypothermia, bradycardia, hypotension, hyperglycaemia, glycosuria, vomiting, convulsions and respiratory failure³⁻⁵.

CNS depression, which is probably attributable to alpha-2-adrenoceptor action, was the predominant sign in our cases. CNS symptoms, in our cases, began within 30-60 minutes of consumption, and were resolved within 8-10 hours. In previous reported studies, the duration of CNS depression has ranged from a few hours to 24 hours^{3, 4}. Sometimes, amitraz poisoning could be confused with organophosphorus compound poisoning, if bradycardia and miosis are

present in the same patient. However, none of the reported patients, had miosis.

Amitraz has antipyretic and anti-inflammatory activity in-vivo. It also inhibits prostaglandin e2 synthesis⁶. However, hypothermia was not observed in any of our cases. Amitraz poisoning has been increased in recent years, more so in rural areas. There have been 2 reported deaths in humans: one ingested 6 grams of amitraz, and the dose in other was not known^{7,8}. The minimal toxic dose reported was 3.57 mg/kg⁹. There was no mortality in our 83 patients admitted with acute amitraz poisoning.

The basic approach to the patient with acute amitraz poisoning includes initial stabilization, treatment to reduce absorption and measures to improve elimination of toxin¹⁰. The medical management is initially symptomatic and supportive with particular attention towards monitoring and evaluation of respiratory, cardio-vascular and central nervous system. There is no specific antidote to amitraz. Increased intake may lead to coma and respiratory failure. All cases may eventually recover completely.

Summary & Conclusions

A retrospective analysis of cases of acute amitraz poisoning showed that it is not an uncommon entity in rural population, although its reported incidence is low in urban areas. The most common clinical feature is CNS depression and patients should be watched for signs of impending respiratory failure. Treatment is essentially symptomatic as there is no specific antidote.

Recommendation

In India insecticides are easily available without any prescription. There is no legal control on sale and lack of strict licensing norms. Farmers are negligent about use of protective equipments and awareness about toxic effects as well as safety. Due to overcrowding insecticides are not kept at safe place away from reach of children. Accidental amitraz poisoning could be prevented by designing child proof packages with warning labels. Wearing of gloves, mask, washing hands with soap and water after use and

before taking food/consuming tobacco will add to safety and prevent hazards. Suicidal poisoning however has to be dealt with socioeconomic development of farmers in draught prone area by providing subsidy packages, providing easy loans at low interest and fair price to agricultural products.

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References

1. Thomson, w.t. Agricultural chemicals. Book ii: herbicides. Thomson Publications, Fresno, CA.; 1993.
2. Jones RD. Xylene/ Amitraz: a pharmacologic review and profile. *Vet Hum Toxicol* 1990; 32: 446-8.
3. Ulukaya S, Demirag K, Moral AR. Acute amitraz intoxication in human intensive care med. 2001; 27:930-933.
4. Aydin K, Kurtoglu S, Poyrazoglu. Amitraz poisoning in children: clinical and laboratory findings of eight cases. *Hum Exp Toxicol* 1997; 16: 680-682.
5. Kennel O, Prince C, Garnier R. Four cases of amitraz poisoning in humans. *Vet Hum Toxicol* 1996; 38:28-30.
6. Vim GKW, Holsapple MP, P. Fister. prostaglandin synthesis inhibited by formamidine pesticides. *Life Sci* 1978; 23:2509-2516.
7. Bansali JL, Turnbull GJ. Extrapolation from safety data to management of poisoning with reference to amitraz (a formamide poisoning) and xylene. *Hum Toxicol* 1983; 2: 587-92
8. Crosby AD, Geiler RI. Human effects of veterinary biological products. *Vet Hum Toxicol*; 1986;28: 569-71
9. Yaromis A., Saker M, Bilici M. Amitraz poisoning in children. *Hum Exp Toxicol* 2000;19: 431-2
10. Doganay Z, Aaygun D, Altintop L, Guven H, Bildik F. Basic toxicological approach has been effective in two poisoned patients with amitraz ingestion: case reports. *Hum Exp Toxicol* 2002; 21: 55-57.