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Organophosphorus compound masquerading Amitraz: An uncommon case report

Sheetal Sehrawat[1], Kashif Ali[2*]
[1] Undergraduate, Department of Forensic Medicine and Toxicology, J.N. Medical College, Belagavi, Karnataka, India
[2] Postgraduate, Department of Forensic Medicine and Toxicology, J.N. Medical College, Belagavi, Karnataka, India

Abstract
Amitraz is a formamidine chemical compound which is widely used in numerous industries like pharmaceutical, veterinary and agricultural and is used for the treatment of generalised demodisosis in dogs & ticks and mites in cattle. A 13 year old female was referred to KLE hospital in semiconscious state with GCS-10/15 and intermittently irritable with delirium having accidentally in taken an unknown compound. Organophosphorous and Amitraz have a similar kind of clinical presentation and moreover Amitraz poisoning is quite uncommon i.e. why most of the time it is mistaken for organophosphorous poisoning. So it is important to get the poison detected especially when two poisons have similar clinical presentation but different plan of management. Despite of its widespread use, very few cases of human poisoning have been described leading to low awareness among the healthcare providers.

Keywords: Amitraz, organophosphorus, poison detection centres

1. Introduction
According to WHO 3 million cases of pesticide poisoning occur every year in the world [1]. In developing countries like India due to their agricultural based economy, lack of protective clothing, poverty and easy availability of highly toxic pesticides. Pesticide is the commonest cause of poisoning in these developing countries [2]. Commercial formulation of Amitraz generally contains 12.5-20% of the drug in organic solvents especially xylene, an aromatic hydrocarbon [3].
WHO Recommended Classification of Pesticides by hazard-
1. Class Ia- Extremely hazardous
2. Class Ib- Highly hazardous
3. Class II- Moderately hazardous
4. Class III- Slightly hazardous
5. Class U- Unlikely to present acute hazard

Amitraz (Moderately hazardous, Class II) is a formamidine chemical compound used worldwide as acaricide and insecticide. Most of the poisons we came across as medical practitioners have their specific clinical features which makes them different from other poisons and make the differential diagnosis easier but we should be sure about the poison we are dealing with especially when two different poison with totally different plan of management have similar clinical presentation that's why its suggested that while dealing with such kind of poisons our first step should be to send the required sample to the poison detection centre till report comes gastric lavage, maintenance of airways should be done. We hereby present an unusual accidental Amitraz intoxication which was initially misdiagnosed as Organophosphorous poisoning.

2. Case Report
A 13 year old secondary school female child belonged to an agricultural family of the village Bennnali, Belagavi was referred to the casualty of KLE Hospital in an intermittently irritable and delirium state. Patient was alleged to have accidentally ingested a suspicious compound from the leftover chemical after spraying in the fields on 10/12/18 at 03:30 pm at home. After a while she lost her consciousness and was rushed to the government civil hospital, Belagavi. On inspection her pupils were pin point size along with bradycardia and hypotension there she was diagnosed to have organophosphorous poisoning and was managed using standard detoxification guidelines and soon after was put on atropine. But the patient was not responding to the treatment and the patient's condition was deteriorating with time. Then the patient was referred to KLE Hospital at 01:00 am on 11/12/18 in semiconscious state. Patient's vital signs were revealed as follows- heart rate of 110 beats/min, BP of 116/72 mm Hg when measured on the right arm, Respiratory rate of 26 cycles/min and oxygen saturation (SpO_2) 98%. On patient's CVS, RS and per abdomen examination the following observations were made S_1 & S_2 heard with no murmurs, Normal vesicular breath sounds were heard along with bilateral air entry & Abdomen was soft and tender with no organomegaly appreciated. On patient's CNS examination following were the observations; patient was in semiconscious state with a Glasgow coma scale 10/15. Patient was intermittently irritable & was in a state of delirium. Pupils were dilated with sluggish light reflex. The following investigations were done- Haemoglobin- 13.1 g/dl, RBC- 4.55×10^6, WBC- 11,100 per microlitre, Platelets- 3.65×10^5, Blood Urea- 13 mg/dl, Serum Creatinine- 0.34 mg/dl, Sodium- 138 mEq/L, Potassium- 4.31mEq/L, Chloride- 102 mEq/L, Cholinesterase- 5907. Patient was put on the treatment where I.V. fluids (DNS), atropine infusion, Injection Rantac 40 mg i.v. BD, Injection Emeset 2cc SOS, Injection Pralidoxime 1gm i.v. was given and patient was put on nil by mouth.
But still no improvement could be observed in the patient's condition. Meanwhile patient's RT aspirate was sent to the Poison Detection Centre of Department of Forensic Medicine & Toxicology, JNMC where screening by Thin

Layer Chromatography was done for common agricultural poison all result were negative including screening for organophosphorous compound. But when checked for amitraz it was positive i.e. the poison was not organophosphorus as initially assumed rather it was Amitraz which has similar clinical presentation but different plan of management. As soon as the findings were made Atropine and Pralidoxime were immediately stopped. Patient was put on supportive and symptomatic treatment as there is no specific antidote of amitraz. The patient responded well to the treatment and after 24 hours of surveillance in PICU the patient was shifted to general paediatric ward. Finally the patient was discharged on the third day of hospitalisation back to her daily routine.

3. Discussion

Agricultural poisons are organophosphorous compounds, carbamate, paraquat, amitraz, etc. Amitraz poisoning is not common that's why it's often mislead to Organophosphorous poisoning which is on the other hand the common poisoning due to agricultural compounds. Some of its effects on humans may mimic OP poisoning. As a result cases of Amitraz intoxication are not recognized and are therefore incorrectly treated as the much more commonly recognized Organophosphate poisoning.[4] Amitraz is α-2 adrenergic agonist and inhibits prostaglandin synthesis. It interacts with octopamine receptors of CNS and inhibits monoamine oxidase. Amitraz acts centrally by activation of presynaptic α-2 adrengic receptors thereby inhibiting nor-adrenaline release due to which suppression of outflow of sympathetic activity occurs from CNS.[5] It is important for a medical practitioner to differentiate between two despite of their similar clinical presentation, amitraz has its specific features which differentiates it from OP poisoning; hypothermia, hyperglycaemia and altered sensorium along with CNS depression can be acknowledged in the amitraz poisoning. Moth ball like odour is appreciated in the patient unlike in OP poisoning where kerosene like odour is smelt, serum cholinesterase level are not affected while in OP poisoning they are. According to a report from a poison information centre, 89% of the clinicians were unaware and not familiar with Amitraz poisoning.[6] The poison containers or the bottles should be recovered and the active compound in the preparation should be identified and treated accordingly.

4. Conclusion

Basic approach to a patient with Amitraz poisoning consists of initial stabilization, reducing absorption and increasing elimination of the toxin. Awareness and education about the potential toxicity of commonly used pesticides may help in reducing the burden of poisoning. There is need for stringent pesticide regulation laws, counseling and training programs to reduce the incidence of poisoning. More Poison Detection Centres as well as Poison Information Centres should be established.

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