

CASE REPORT

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Successful reversal of a rare case of amitraz poisoning with yohimbine—a case report

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Abstract

Background: Amitraz is an insecticidal agent and its poisoning cases are rare. We report the successful treatment of amitraz poisoning using yohimbine as an antidote. There is only a single other case report in literature of usage of yohimbine as antidote to amitraz poisoning in a 3-year-old child.

Case presentation: A 27-year-old woman presented to the hospital with features of severe amitraz intoxication—respiratory depression and loss of consciousness. Along with supportive management in the intensive care unit, she was administered parenteral yohimbine, which resulted in quick recovery and discharge from hospital.

Conclusions: Yohimbine may serve as a useful antidote in severe amitraz intoxication. However, the conclusive benefit of yohimbine in human cases of amitraz poisoning is yet to be established and is a potential area of research.

Keywords: Amitraz poisoning, Yohimbine, Critical care

Background

Amitraz is used as an insecticide and pesticide in crops as well as animals. It mainly acts as an agonist on the central α_2 adrenergic receptors leading to features of central nervous system depression, respiratory depression and bradycardia. We report the case of a 27-year-old woman who presented with suicidal consumption of amitraz with manifestations of severe poisoning.

Case presentation

Written informed consent from the patient was obtained for the publication of this case report.

A 27-year-old woman, weighing 48 kg, was admitted to our hospital with an alleged history of ingestion of an insecticide (about 15 ml of 12.5% w/v solution of amitraz) (Fig. 1). She was a known case of depressive illness, on medical management for the past 8 years. On presentation, her Glasgow Coma Score was E1V1M3, and bilateral

pupils were mid-dilated and sluggishly reactive to light. She had been referred from a local hospital, where she had been managed with gastric lavage and administered atropine (undocumented dosage). Her vitals were as follows: pulse rate: 88/min and blood pressure: 118/68 mmHg and respiratory rate: 6 bpm. A definitive airway by means of a size 7.0 mm cuffed endotracheal tube was immediately secured and mechanical ventilation was initiated. Systemic examination did not reveal any other abnormality. The patient was transferred to intensive care unit (ICU) for further management. Chest X-ray did not reveal any abnormality. The poisoning was treated successfully with enteral yohimbine administration. She was administered crushed tablets of yohimbine 5 mg (0.1 mg/kg), 8 hourly through nasogastric tube. She had return of consciousness after 24 h and was extubated subsequently following standard ventilatory weaning protocol. Tablet yohimbine was continued for 48 h, and she was transferred to ward on day 3 and discharged home after another 2 days.

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Fig. 1 Amitraz solution ingested by the patient

Discussion

Amitraz is a widely used agent to repel insects and pests and belongs to the formamidine family of chemical compounds (Dhooria and Agarwal 2016). It has α_2 adrenergic agonist action on both pre- and post-synaptic receptors (Dhooria and Agarwal 2016; Yilmaz and Yildizdas 2003). The clinical features of amitraz poisoning include altered sensorium, miosis, seizures, hyperglycaemia, bradycardia, hypotension, respiratory depression, hypothermia, polyuria, and vomiting (Dhooria and Agarwal 2016; Yilmaz and Yildizdas 2003). Respiratory depression, absence of pupillary light reflex and coma indicate severe amitraz poisoning (Yilmaz and Yildizdas 2003). The case in discussion presented with respiratory depression and loss of consciousness, which points towards a severe case of amitraz poisoning. The differential diagnosis of amitraz poisoning includes overdose with other drugs like clonidine (another central α_2 adrenergic agonist), opioids, organophosphates, sedative-hypnotic drugs like benzodiazepines, barbiturates, and antidepressants (Yilmaz and Yildizdas 2003).

There is still no specific antidote for amitraz poisoning in humans and treatment consists of supportive and symptomatic management with continuous management of respiratory, cardiac and central nervous functions

(Yilmaz and Yildizdas 2003). There is still no clear and defined role of use of activated charcoal or gastric lavage in amitraz poisoning. In case of attempted gastric lavage, the petroleum distillates in amitraz may rather increase the risk of aspiration (Yilmaz and Yildizdas 2003). Therefore, gastric lavage may only be recommended in cases of massive amitraz ingestion and must preferably be performed after endotracheal intubation (Dhooria and Agarwal 2016). The role of atropine is also doubtful, though it has been successfully used in patients who developed bradycardia (Dhooria and Agarwal 2016). The administration of atropine is warranted only in cases of symptomatic bradycardia. Atropine use is not required for treatment of asymptomatic bradycardia or miosis (Yilmaz and Yildizdas 2003). In our patient, bradycardia was not one of the presenting features, probably because the patient had already received atropine in the previous hospital. In cases with hypotension, use of appropriate intravenous fluids and inotropic agents (dopamine or noradrenaline) is warranted. Oxygen therapy must be administered depending upon respiratory parameters. Patients presenting with severe respiratory depression require immediate intubation and ICU care and management.

α_2 adrenergic antagonist drugs such as yohimbine and atimepazole have been successfully used in experimental studies on animals (Andrade and Sakate 2003; Andrade et al. 2006). However, regarding their use as antidote for treatment of amitraz poisoning in humans, there is insufficient evidence in literature. Hence, they may be used in humans only in severe intoxication (Yilmaz and Yildizdas 2003). Yohimbine possesses high affinity for the α_2 -adrenergic receptors- α_2A , α_2B , and α_2C , and low affinity for the α_2D receptor (Schwartz and Clark 1998). It also acts indirectly on other receptors like GABA, cholinergic, dopamine, and serotonin receptors (Schwartz and Clark 1998). Atipamezole behaves as a potent and selective α_2 -adrenergic antagonist drug. It is considered a new generation of α_2 -adrenergic antagonist due to its high selective affinity of α_2 -adrenergic receptors, like α_2A , α_2B , and α_2C receptors, and a 100-times higher affinity for the α_2D receptor than that of yohimbine in sheep brain (Schwartz and Clark 1998). Atipamezole does not possess antagonistic effect on any other receptors.

We preferred to use yohimbine because of its easy availability and affordable price. To the best of our knowledge and literature search, there is only a single other case report of usage of yohimbine as antidote in human amitraz poisoning in a 3-year-old child (Nasa and Juneja 2016). The time of resolution of central nervous system depression has been seen within 48 h in the previous reports (Yilmaz and Yildizdas 2003; Nasa and Juneja

2016). The use of yohimbine in our patient resulted in quick neurological recovery. Further human studies may be required to evaluate and establish the role of yohimbine as an antidote in management of amitraz poisoning.

Conclusions

Amitraz poisoning may not be commonly encountered, but it can be fatal in severe cases. Expeditious intensive care management and supportive care may suffice in most cases; however, antidotes like yohimbine may be beneficial in severe poisoning. However, larger human trials are required to establish the conclusive benefits of yohimbine in severe cases of amitraz intoxication.

Abbreviation

ICU: Intensive care unit.

Acknowledgements

None

Authors' contributions

AG contributed to the care of the patient, acquisition of data, and drafting of the manuscript. AN contributed to critical revision and final approval of the version of manuscript to be published. NS, AS, and RK contributed to the care of the patient and acquisition of data published in the manuscript. AG contributed to the drafting, revision, and final approval of the version of manuscript to be published. All authors have read and approved the manuscript.

Funding

None

Availability of data and materials

Data sharing is not applicable to this article as no datasets were generated or analyzed during the current study.

Declarations

Ethics approval and consent to participate

Not applicable, because our manuscript is a case. Consent for publication of the case details was obtained from the patient.

Consent for publication

Written informed consent from the patient was obtained for the publication of the case report including case details and images in the manuscript.

Competing interests

The authors declare that they have no competing interests.

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Received: 15 September 2021 Accepted: 24 June 2022

Published online: 07 July 2022

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