

Status epilepticus: An association with pyrethroid poisoning

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Abstract

This report describes a 35 year old male who presented with seizures after consuming 4-5 bottles of "ALL-OUT" a commercial composition of pyrethroid used as insecticides. Our case report supports authors reporting an association of pyrethroid poisoning with status epilepticus.

Keywords: Pyrethroid, status epilepticus, therapeutic coma

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Introduction

Pyrethrums are organic, environment-friendly insecticides having a "KNOCK DOWN" effect on a variety of insects. Pyrethroids are synthetic analogues of the natural pyrethrins. Pyrethrin and pyrethroids have quick action against insects, low toxicity, repellent properties, and virtually no insect immunity.^[1] The very low potential for toxicity in human being is due to its rapid metabolism into non-toxic metabolites following ingestion or exposure. Fewer than 10 deaths have been reported from the ingestion or occupational exposure of pyrethroids.^[1] We describe a case of deliberate poisoning of pyrethroid (prallethrin) presenting as status epilepticus.

Case Report

A 35-year-old male was admitted to our emergency department with giddiness as the major complaint following ingestion of an unknown quantity of an unknown poison. Patient was conscious, oriented with stable cardio-respiratory parameters at the time of arrival. After sometime, despite being well oxygenated via face

mask, patient started having generalized tonic-clonic seizures. Initial attention to airway, breathing and circulation (ABC) was given, followed by a bolus dose of diazepam. Seizures subsided for a brief period only to recur repeatedly.

On repeated enquiry, the patient's relative brought empty bottles of "ALL OUT," a commercial composition of pyrethroid used as insecticides providing a circumstantial evidence of the nature of the poisoning.

Patient was given a bolus dose of thiopentone sodium, and soon his trachea was intubated. This was followed by a loading dose of the anti-convulsant phenytoin to control seizures.

Patient was shifted to the intensive care unit for further management. On examination, he was deeply comatose. There was profuse sweating. His pulse rate was 136 per minute, and the blood pressure was 90/60mmHg. His pupils were dilated bilaterally and sluggishly reacting to light. Examination of the other systems was unremarkable. Hemogram, liver and kidney function tests, X-ray chest, ECG, and arterial blood gases were normal. Patient was put on a ventilator on the SIMV mode.

Again the patient started showing tonic-clonic seizures,

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which were continuous and unresponsive to anti-convulsant therapy. Thereafter, thiopentone sodium and midazolam infusions were administered and titrated clinically as no bedside EEG monitoring was available. Gradually, thiopentone sodium and midazolam infusions were tapered off, and patient was weaned off the ventilator to be extubated after 72 hours. The patient was discharged from the hospital on the 7th day after a psychiatry consultation.

Discussion

The pyrethrin insecticides were discovered in the last decade of the 19th century as pyrethrum, pyrethrin, and pyrethroid. Pyrethrum is an extract from the dried flowers of the compositae family such as *Chrysanthemums* or daisies. The active chemical in the extract is known as pyrethrin. Pyrethroids, on the other hand, are synthetic derivatives of pyrethrin. They are widely-used organic, environment-friendly, and multipurpose insecticides with a long safety record for both acute and chronic intoxication in human beings. They are not stored in the body fat, nor penetrate the intact skin, and are very rapidly metabolized in the body into non-toxic metabolites. Pyrethrins have been established to be an allergen and are responsible for dermatitis, conjunctivitis, rhinitis-like symptoms. Fatal hypersensitivity reactions affecting the respiratory tract may be possible.^[2]

“ALL-OUT,” the commercial brand of pyrethroid insecticide, contain a chemical “prallethrin.” As per WHO norms, prallethrin is a racemic mixture of 8 isomers used as household insecticides and pesticides with very low mammalian toxicity and no carcinogenicity or mutagenicity.

On the basis of their chemical structure, pyrethroids are divided into 2 groups. Type -1, which produce hyperexcitability with fine tremors, and Type -11, which produce more severe symptoms and seizures on intoxication.^[1-3]

The poisoning syndrome includes nausea, vomiting, headache, fine tremors, hyperexcitability, and paresthesia in milder cases. However, severe toxicity is characterized by dizziness, gross tremors, hypersalivation, sympathetic stimulation leading to hypotension, tachycardia, profuse sweating, and dilated pupils.^[3] Our patient presented with the severe form of the toxicity.

There is no antidote for reversing the effects of intoxication. Patient needs to be treated symptomatically i.e., atropine for excessive salivation and diazepam for control of seizures. Paresthesias lasting for short periods do occur and are treated successfully with vitamin E.^[3] Gastric lavage was deferred due to continuous

convulsions but was performed later. As seizures could not be controlled with diazepam and anti-convulsants, therapeutic coma was induced with thiopentone sodium and midazolam infusions, but for a brief period, due to lack of bedside EEG monitoring.

The exact mechanism of poisoning is a change at the voltage-gated sodium channels i.e. leading to repetitive discharges and synaptic disturbances.^[4] Severe toxicity is believed to be due to decrease in chloride through voltage-dependent chloride channels.^[1]

Pyrethroids in high concentration act on GABA-activated chloride channels, leading to seizures.^[1,5] This explains an unusual association of status epilepticus to pyrethroid poisoning. Role of voltage-sensitive calcium target for Type -II poisoning is still debated.^[6]

Conclusions

With ever increasing demand for more powerful insecticidal agents for agriculture and household use, the chances of intoxication after long-term exposure presents a real risk to human beings and animals.

Very few cases of pyrethroid poisoning have been reported with status epilepticus. In India, only 2 children of allethrin poisoning^[7] and 1 adult of pyrethroid poisoning had presented with convulsions^[7,8]. A similar case presenting as status epilepticus after the consumption of a large amount of pyrethroid was reported earlier.^[5]

Pyrethroid poisoning should be considered among the differential diagnoses for a patient of suspected poisoning presenting with seizures.

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