



# A Case Report on Lambda Cyhalothrin – A Rare Pyrethroid Poisoning in the Northern Karnataka

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## Abstract

Pesticides and insecticides are agricultural products that can cause poisoning in rural India, and suicide attempts are more common than inadvertent consumption in most cases. Compared to other less common compounds, organophosphate toxicity accounts for the majority of cases of pesticide poisoning. In earlier investigations, lambda-cyhalothrin toxicity and therapy were reported in a few individuals, despite the fact that it is no longer as often used in India as it formerly was. This case report describes the clinical presentation and treatment of a 67-year-old man who accidentally ingested lambda-cyhalothrin poisoning while intoxicated. It also details how the Poison Detection Center (PDC) assisted in the patient's diagnosis and effective management, preventing the patient's death.

**Keywords:** Pyrethroid; Agriculture; Management; Poison Detection Center; Hospital; Toxicity

**Abbreviations:** PDC: Poison Detection Center; LCP: Lambda Cyhalothrin Poisoning.

## Introduction

Because pesticides and insecticides are more widely available, self-poisoning occurrences have drastically increased in rural India [1]. Comparably, the problem has gotten worse globally, with annual reports of around 300,000 poisoning deaths, the most of which are caused by pesticide and insecticide exposure [2]. While aluminum phosphide poisoning accounts for the majority of cases in northern India, organophosphates are the primary cause of pesticide/insecticide poisoning in central and southern India [3,4]. Although incidences of organochlorine, carbamate, and pyrethroid poisoning are less common [1], they have increased recently, and there are a number of detrimental

outcomes linked to them [5]. Synthetic pyrethroid pesticide lambda-cyhalothrin is used in household pest management, agriculture, and the prevention of disease vectors.

Research has linked endocrinological issues, reproductive system disruptions, and cancer to lambda cyhalothrin exposure [6]. Here, we describe the case of a 67-year-old male patient who had accidentally consumed lambda-cyhalothrin while intoxicated and was experiencing vomiting, altered sensorium, and convulsions upon arrival at our institution. We had trouble diagnosing this case in the case report, but the poison detection center helped us identify that the patient was suffering from a pyrethroid compound, for which there is currently no known treatment. This information allowed the treating physician to treat the patient with supportive care, which helped the patient recover.

## Materials and Methods

An uncommon instance of pyrethroid poisoning that was admitted to a tertiary care hospital is described in this case report. The medical records department provided the case files for retrieval after receiving approval from the institutional ethics committee and the patients' relatives' signed informed consent. Clinical symptoms and indicators such as vomiting, convulsions, and tiny tremors were used to make the diagnosis. PDC is the most significant factor that helped us diagnose and properly manage the case; local examination and studies, such as laboratory values, revealed no changes directly related to the substance.

## Case Details

A 67-year-old guy arrived at our casualty with a purported history of inadvertently consuming around 125 milliliters of Lambda cyhalothrin compound on April 9, 2023, at approximately 6.30 p.m. while under the influence of alcohol at his Hukkeri apartment. He first visited the Sankeshwar Community Health Center, which is close, where he received

IV fluids, an injection of atropine, and a stomach wash. When he was referred to KLE Hospital, his vitals were as follows: Temperature: 37°C; BP: 130/80 mm Hg; Pulse: 84/min; RR: 24/min. With a history of three episodes of vomiting and altered sensorium following intake, he was transferred to our hospital for additional care. The patient was a recognized case who had been a chronic drinker for over 25 years and known case of depression for 10 years and on tab. Diazepam 5mg HS.

## On Admission

Patient was conscious but not oriented, moderately built and nourished. Her Glasgow Coma scale was E2V1M4, BP-140/80 mmHg, Pulse - 98/min, SPO<sub>2</sub>- 100 % on 5 litters of O<sub>2</sub>, CVS - S1, S2 heard, RS - Bilateral air entry was equal, P/A - soft & non-tender. CXR was normal with Ryle's tube intact and USG abdomen with pelvis was done on 06/09/2023 which showed fatty liver. The stomach wash was done and sent the sample to our hospital poison detection center where it showed a positive report of Pyrethroid compound.

Parameters	Day 1	Day 2	Day 3	Day 4	Reference value
Hemoglobin	10.8	8.4	8.8		12-14 g/L
WBC	17.6	11.3	8.9		4.5-11 *10 <sup>3</sup> /uL
RBC count	3.09	2.41			
MCV	109.1				82-102 fL
MCH	35				27-35 pg/cell
MCHC	32				32-36 %
Hematocrit/PCV	33.7				
Platelet count	89	66	66		150-450* 10 <sup>9</sup> /L
Mean platelet volume	9.9				7.5-11.7 fL
Absolute eosinophil count	0.2	0			
Red cell distribution width	25.1				11.5- 14.5%
Neutrophils	90	85			54-74 %
Reticulocyte count	1.9				0.5-1.5 %
Absolute neutrophil count	15.8	9.7			
Absolute lymphocyte count	0.7	1.2			
Urea	16.3				7-21 mg/dL
Creatinine	0.73		0.69		0.7-1.0 mg/dL
Sodium	137				135-145 mmol/L
Potassium	4.33				3.5-5.0 mmol/L
Bicarbonate	19.2				18-23 mmol/L
Chloride	103				95-105 mmol/L
Cholinesterase	6602				

Procalcitonin	0.06				0.15 ug/L
HSCRp	6.6				5-6 mg/L
Albumin	4				3.5-4.8 U/L
Total bilirubin	0.8				0.29-1.4 mg/dL
Direct bilirubin	0.34				0-0.4 mg/dL
AST	66				8-56 U/L
Total protein	88				53-84 g/L
A/G ratio	1				
PT INR	C -11.70				C -12-15s
	T - 11.10				INR - 0.9-1.2
	INR - 0.95				
Urine routine & microscopy	Ph -5.0, clear, light yellow, RBC- 1, Bacteria - 4				

**Table 1:** Lab Parameters.

**Day 1:** All pertinent investigations were sent, he was admitted to the intensive care unit, and IV fluids, antiepileptic drugs, antibiotics, and proton pump inhibitors were administered along with Ryle's feeding tube.

**Day 2:** Ryle's tube was taken out, the patient was put on a liquid diet, and his health improved enough that he was moved to the step-down ICU. He was kept under the same care, but to combat the symptoms of alcoholism, thiamine injection IV was added.

**Day 3:** A psychiatrist's opinion was sought, and the psychiatrist provided counselling.

**Day 4:** The patient was discharged after receiving symptomatic treatment and feeling better.

## Discussion

Lambda-cyhalothrin is a chemical compound that belongs to the pyrethroid class. Pyrethroids fall into two categories: type 1 (which includes substances like permethrin and allethrin) and type 2 (which includes related substances like lambda-cyhalothrin). The symptoms of type 1 and type 2 pyrethroid intoxication differ. While type 2 syndrome causes moderate to severe symptoms including incoordination, choreoathetosis, seizures, hypersalivation, and direct injury to the heart and skeletal muscles, type 1 syndrome, also known as T syndrome, causes modest symptoms like fine tremors and hyperexcitability [7].

The three primary and possibly lethal signs of pyrethroid poisoning are seizures, pulmonary edema, and hemorrhage [8]. The toxicity's mechanism is believed to involve direct oxidative damage to tissues and modifications in ionic conduction across the various sodium, calcium and chloride channels [9,10]. Due to the lack of a known remedy for

lambda-cyhalothrin poisoning, the care provided is mostly supportive. Decontamination and removal from the exposure environment are the initial steps in treatment, much like in other poisoning scenarios. Prior to doing anything else at the medical facility, the breathing, heart rate, and airway should be stabilized. The right antiepileptic drug should be used to treat concurrent seizures, such as those seen in type 2 syndrome.

## Limitations

The case of Lambda Cyhalothrin was only partially understood by us because we only looked at one case report in this instance. Therefore, study on Lambda Cyhalothrin case series is necessary for future studies as it will facilitate a better understanding and more efficient treatment of the case. Researchers have not yet looked into the antidote for pyrethroid poisoning in humans, despite studies on animals suggesting that methocarbamol may have a therapeutic purpose [11].

## Conclusion

This case study highlights the challenges associated with managing pesticide poisoning when the specific type of pesticide used is unknown. Patients exhibiting symptoms similar to organophosphorus poisoning may have poisoning from pyrethroid compounds, such as lambda-cyhalothrin. To differentiate between organophosphorus (OPC) poisoning and non-organophosphorus chemical poisoning, a comprehensive clinical evaluation, laboratory parameters, and a poison detection center using the Thin Layer Chromatography method should be used to establish the course of treatment in such instances. This distinction

facilitates the making of therapeutic decisions, such as the consideration of atropine delivery in cases of OPC poisoning and supportive therapy, such as antiepileptic medicines, in cases of Lambda Cyhalothrin poisoning [12].

### Ethical Approval

Informed written consent from the patient is required for case reports at our institution, and it has been acquired. Nevertheless, our institution's institutional review committee does not need to conduct an ethical evaluation for case reports.

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