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Cypermethrin Poisoning

Medical Science

KEYWORDS :

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INTRODUCTION

The widespread use of insecticides in public health protection has lead to the easy availablablity of insecticides over the counter. In recent times, incidence of consumption of these commonly used household insecticides has increased dramatically for suicidal attempts. Acute human poisoning from exposure is rare. However consumed in large doses patient may become symptomatic within 10-60 minutes following ingestion. Here we are reporting an unusual case of Fulminant hepatitis and coma, 9 days after ingestion of a pyrethroid compound, cypermethrin (Super Fighter).

CASE PRESENTATION:

A 22year old male presented to the ER with sudden onset of generalized weakness, multiple episodes of vomiting, loose stools and abdominal pain of one day duration. He also complained of yellowish discoloration of skin and mucous membranes, with high colored urine and burning sensation all over the body. On obtaining a detailed history, Patient claimed to have ingested cypermethrin (Super fighter) 8 days ago, due to personal reasons; however the amount consumed was not known. Pt was taken to a local hospital 10 hours after ingestion, pt remained asymptomatic and his stay in the hospital was uneventful. He was discharged in 3 days time. Pt remained asymptomatic for the next 5 days and then presented to us with the above complaints (Day 9).

On examination in the ER, patient's vitals were stable; pt was severely icteric with tenderness in the epigastric region. Complete hemogram was done which showed grossly deranged Liver function tests (total bilirubin-9.8mg/dl, direct bilirubin-7.8mg/dl, indirect bilirubin-21mg/dl, SGOT-1236mg/dl, SGPT-1440mg/dl). Chest x ray, ECG, ECHO and ABG was normal. Ultrasonography of the abdomen showed grade 1 renal parenchymal changes, endoscopy was normal. Psychiatrist opinion was obtained. Patient was conservatively managed with IV fluids and IV antibiotics.

48 hours after admission (Day 11), patient had repeated episodes of hypoglycemia with a declining GCS of 7/13. Within a span of 8hours (Day 12) pt was found unresponsive to call, desaturating, with pupils mildly dilated and reacting to light. Patient was shifted to high dependency unit and laboratory investigations were repeated which showed a prolonged prothrombin time (PT- Test 56.8, Control 15.4, INR- 4.42.) With a progressing deranged Liver function tests. ABG and Chest X ray were normal. Pt was transfused with 8 pints of fresh frozen plasma, along with vit k injections, IV Fluids, broad spectrum antibiotics (ceftriaxone-salbactam, rifaximin), ursodeoxycholic acids.

Within next few hours, patient started having multiple episodes of seizures at an interval of every 30-45mins, with each episode lasting for around 5-7mins. Seizures were uncontrolled with Lorazepam, valproate and phenytoin. Patient arrested. Resuscitated with one cycle of CPR, Intubated and mechanically ventilated (Day 14) and started on IV anesthesia with Midazolam. Except for the deranged liver function tests and prolonged Prothrombin time, and remaining parameters were unremarkable. Patient was started on hepamerz (L-Ornithine-L-aspartate granules) and N-acetyl cystiene as infusion in view with the deranged LFTs.

Patient continued to have mild clonic movements of only the fingers or fine, rapid movements of the eyes. There were paroxysmal episodes of tachycardia, hypertension, and pupillary dilation. EEG revealed an ongoing status epilepticus. Patient arrested for the second time. Despite adequate resuscitative measures patient could not be revived and was declared dead (Day 15).

DISCUSSION

The first pyrethroid pesticide, allethrin, was identified in 1949. Pyrethroids with a basic cyclopropane carboxylic ester structure are type I pyrethroids. Pyrethroids with addition of a cyano group give alpha-cyano (type II) pyrethroids,

Out of 18 synthetic pyrethroids available, few are used as insecticides and pediculocides. Among the pyrethroid compounds, deltamethrin and cypermethrin are often used in the form of miraculous Chinese chalk stick, (locally named as Lakshman rekha), powder and liquid to ward off the kitchen insects.

Cypermethrin is a synthetic pyrethroid insecticide. First synthesized in 1974 (1). It acts as stomach and contact insecticide. Its structure is based on pyrethrum, a natural insecticide which is contained in the chrysanthemum flowers. Cypermethrin is classified by world health organization as "moderately hazardous" (class II). [5]

Despite their extensive world-wide use, there are relatively few reports of human pyrethroid poisoning. Less than ten deaths have been reported from ingestion or following occupational exposure. This probably due to rapid metabolic breakdown in the liver. However, in commercial formulations, the activity of pyrethroids is usually enhanced by the addition of a synergist such as piperonyl butoxide.

Piperonyl butoxide (PBO) is a synergist that is usually incorporated with pyrethrins and pyrethroids. PBO enhances the effect of these insecticides by inhibiting cytochrome P450, a class of enzymes that break the down the pesticides. This allows the insecticides to be effective with less active ingredient than would otherwise be required.

The pyrethroids act on sodium and chloride channels. Pyrethroids modify the gating characteristics of voltage-sensitive sodium channels to delay their closure. These

channels remain open for up to seconds, compared to the normal period of few milliseconds. At high concentrations, pyrethroids can also act on GABA-gated chloride channels, which may be responsible for the seizures.

The toxic oral dose is greater than 1g/kg body weight and the minimal lethal dose of pyrethrum is not clearly established, probably is in the range of 10-100grams. Effects of cypermethrin on human health and the environment depend on how much cypermethrin are present and the length and frequency of exposure. Effects also depend on the health of a person and/or certain environmental factors.

Ingestion in large doses is known to cause paraesthesias, nausea, vomiting, vertigo, fasciculations, seizures, pulmonary edema, and coma.

Since pyrethroids are rapidly metabolized, analysis of pyrethroids in body fluids is not possible. Blood cholinesterase levels are normal. ECG may demonstrate ST-T changes, Sinus Tachycardia, and Ventricular Premature Beats.

WHO guidelines recommend no specific antidotes but symptomatic and supportive measures for this type of poisons [7]

REFERENCES

1. World Health Organization. (1989). *Environmental Health Criteria. Cypermethrin.* (Vol. 82). Geneva: United Nations Environmental Programme, the International Labour Organization, and the World Health Organization.
2. Badrane et al. *Severe oral and intravenous insecticide mixture poisoning with diabetic ketoacidosis: a case report. BMC Research Notes,* 2014, 7:485
3. *Olsen KR. Poisoning and Drug Overdose, 2nd edition, Appleton, Lange, Norwalk, Connecticut. 1994.*
4. *Podosinovikova NP, Soloveva NE, Mukovskii LA, et al. Pharmacological analysis of the pathogenesis of acute poisoning with the synthetic pyrethroid cypermethrin using the hydrobiont Daphnia magna Straus. Eksp Klin Farmakol. 2002 Sep-Oct;65(5):56-7.*
5. *WHO recommended classification of pesticides by hazard 14-5, WHO, geneva, 1989.*
6. *Cypermethrin a synthetic pyrethroid. Pesticide news, NO 30, December 1995, p20-21.*
7. *World Health Organization. World health report 2002 reducing risk, promoting healthy life. Geneva: WHO, 2002.*