Acute Pyrethroids Insecticide Ingestion in An Elderly Patient

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Abstract

Insecticide ingestion is not an uncommon phenomenon found in daily practices. An elderly woman, 69-year-old, was rushed to emergency room due to household cleaning liquid ingestion. There was a history of previous suicide attempt and severe depressive episode before. Since there was no sign of severe intoxication, patient received symptomatic treatment. Patient was discharged with symptomatic treatment and antidepressants.

Keywords: *pyrethroids, elderly, chemical ingestion, intoxication, depression*

Introduction

Chemicals and chemical products stored in homes are the source of many accidental or intentional exposures that can be found in different ages. Elderly people are vulnerable to intoxication since they are more fragile than younger age groups so poisoning leads to severe complications.[1] Pyrethroids have been developed for the control of household and agricultural insects, and human lice. Pyrethroids have extremely high selective toxicity for insects compared to mammals, due to higher insect nerve sensitivity, lower mammalian skin absorption and more efficient mammalian hepatic metabolism.[2]

Patients with significant pyrethroid ingestion can present with severe symptoms and signs, from nausea, headache to seizure and coma which would constitute a medical emergency and should be immediately referred to hospital for proper medical management.[2]

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We reported a case of an elderly with pyrethroids ingestion.

Case Illustration

Mrs. L, 69-year-old, a widow, was brought by her son to emergency room after ingesting household insecticide liquid 12 hours prior to admission. She complained nausea and vomiting after she ingested approximately 250 milliliters of the liquid 12 hours prior to admission. She vomited 3 – 4 times with food contents and accompanied with abdominal pain and soft stool defecation once. There was no trouble in swallowing meal or liquid. Excessive salivation, cough, lightheadedness, and seizure were denied. There was no problem in urinating. She intentionally ingested the household cleaning liquid to end her life. There was decreasing appetite in a month and weight loss 3 kilograms in one month. There was a history of diabetes mellitus for one year, controlled with metformin 500 milligram three times daily. She had controlled hypertension for two years with amlodipine 10 milligram daily. There was a history of being admitted in Psychiatric ward one month ago for four days, diagnosed with severe depression episode and suicide attempt. She received clobazam 5 milligram twice daily and sertraline 25 milligram once daily. History of recreational drugs abuse was denied. There is no psychosis history in her family. She is a

widow with four children.

From physical examination, it was found weak condition with GCS 456. Blood pressure was 130/80 mmHg, respiratory rate was 20 times per minute, heart rate was 88 beats per minute and axillary temperature 36,8° Celsius. From head and neck examination, no miosis pupils and no hypersalivation were found. No abnormality found in chest examination. From abdominal examination, epigastric tenderness was found. No abnormality found in extremities examination.

Laboratory results showed hemoglobin level 13,1 g/dL, hematocrit level 38,3%, leucocyte 11300/ mm^3, granulocyte 79,2%, platelet 387000 mm^3, serum glutamic oxaloacetic transferase level 27 IU/L, serum glutamic pyruvate transferase level 34,4 IU/L, blood urea nitrogen 15 mg/dL, serum creatinine level 1,01mg/ dL, serum sodium level 141 mmol/L, serum potassium level 3,9 mmol/L, serum chloride level 98 mmol/L, random blood sugar level 132 mg/dL, Blood gas analysis showed pH 7,38, pCO2 43 mmHg, pO2 69 mmHg, BE 0,3 mmol/L, HCO3 25,4 mmol/L and SpO2 98% in room oxygen level. Chest x ray showed no abnormality with cardiothoracic ratio 54% and electrocardiography showed normal sinus rhythm with 92 beats per minute. Patient was consulted to Psychiatry Department in Emergency Room and assessed severe depressive episode without psychotic symptoms. Advises were delaying psycho-pharmacy with tight observation on organic conditions, placing at near nurse station, putting away dangerous substances or tools that patient could use as suicide media and psychotherapy intervention for patients and family.

Based on history taking, physical examination and laboratory findings, patient was assessed chemical ingestion, suicide attempt, severe depressive episode without psychotic symptoms, diabetes mellitus and hypertension. Diagnostic plans were fasting blood glucose, 2-hour post prandial glucose and HbA1c. Early management was intravenous line insertion with Ringer Dextrose 5% 1000 milliliters per day and intravenous omeprazole 40 milligram twice daily. Monitor plans were vital signs, complains and suicidal ideation.

On second day of admission, patient felt nauseous decreased, vomiting decreased and abdominal pain decreased. Vital signs were stable. No abnormalities were found in the physical examination.

On third day of admission, patient felt no nausea, no vomiting, and no abdominal pain. She could sleep soundly in the night. She still felt regret of what her doing. Vital signs were stable. Fasting blood glucose was 95 mg/dL, 2-hour post-prandial glucose was 123 mg/dL and HbA1c 6,2%. Therapy continued as previous day. On fourth day of admission, patient had no complains. Vital signs were stable. Patient was discharged with amlodipine 5 milligram peroral daily omeprazole 20 milligram peroral daily, sertraline 25 milligram peroral daily, clobazam 5 milligram peroral daily, and aripiprazole 5 milligram daily.

Discussion

HIT 0,26 AE mosquito repellent spray contains active ingredients of prallethrin 0,120%, cypermethrin 0,100%, and dimefluthrin 0,040%.[3] Prallethrin, cypermethrin, and dimefluthrin are classified into pyrethroid group.[4,5]Pyrethroids are insecticides created from synthetic modifications of natural pyrethrins, which are extracted from *Chrysanthemum* species.[2]

Pyrethroids are ion channel toxins which interfere with nervous system function. They modify the gating characteristics of neuronal voltage-sensitive sodium channels by delaying the closure, thereby extending neuronal excitation. The toxic effects of pyrethroids result from this neuronal excitation, including a wide spectrum of signs and symptoms from mild to severe. Allergic reactions, including contact dermatitis or asthma, are rarely reported.[2]

Type I pyrethroids (allethrin, permethrin) have a basic cyclopropane carboxylic ester structure and produce reflex hyperexcitability and fine tremor (T syndrome). Type II pyrethroids (cypermethrin, deltamethrin, fenvalerate) have a cyano-group and they cause salivation, hyperexcitability, choreoathetosis and

seizures (CS syndrome). Both types produce sympathetic activation. Dermal exposure causes paresthesia of the exposed skin while ingestion results in gastrointestinal irritation. Life threatening toxicities could be resulted from pyrethroid poisoning.[6,7]

The symptoms of acute pyrethroid poisoning in humans are supposed to be subdivided into two classes. However, since most of the reports on human poisoning are related to type II pyrethroids, it is not yet known whether the T-Syndrome applies also to humans.[4,5,7]

Acute pyrethroid poisoning may be confused with organophosphorus intoxication. There may be difficulty in making the diagnosis of pyrethroid poisoning since similar features are also found in severe organophosphorus pesticide poisoning. Pyrethroid ingestion causes sore throat, nausea, vomiting and abdominal pain within minutes. As systemic toxicity due to pyrethroid exposure is rare, most patients exposed to pyrethroids require only skin or eye decontamination and symptomatic and supportive measures. Measurement of the red cell cholinesterase activity which is reduced in acute organophosphorus poisoning but not in pyrethroid intoxication allows clarification.[6,8]

Following ingestion, gastric lavage is probably best avoided since solvents present in many formulations may increase the risk of aspiration pneumonia. Alternatively, although there is only limited experimental evidence that pyrethroid insecticides are adsorbed to charcoal, the administration of active charcoal 50 – 100 grams to an adult may be considered if a potentially toxic amount has been ingested within 1 hour. Isolated brief convulsions do not require treatment but intravenous diazepam 5–10 milligram should be given if seizures are prolonged. Rarely, it may be necessary to paralyze and ventilate the patient. Hypersalivation and pulmonary oedema are known to develop in cases of severe pyrethroid poisoning. Intravenous atropine 0.6 – 1.2 milligram may be useful in controlling excess salivation.[8,9]

Most patients with pyrethroid poisoning recover within 6 days and fatality is rare. There were seven fatalities among 573 cases in one series and one among 48 in another. Out of the 573 cases of acute pyrethroid poisoning reported by He *et al.*, four of seven fatalities were due to convulsions and one was due to pulmonary edema.[10,11]

Although pyrethroids are considered less toxic than organophosphates, poisoning with large doses could be life threatening. Since its presentation mimics organophosphates, thorough history taking, and examinations are needed to manage the intoxication properly.[6]

Conclusion

Pyrethroids ingestion could be found in daily practice case since pyrethroids products are easy to access. We reported a mild case of intoxication which successfully treated symptomatically. Predisposing factors of ingestion such as depression should be investigated and treated to prevent repeated incidence.

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