Online Journal of Health and Allied Sciences
Peer Reviewed, Open Access, Free Online Journal
Published Quarterly : Mangalore, South India : ISSN0972-5997
Volume 12, Issue 4; Oct-Dec 2013

Case Report:
Prallethrin Poisoning Presenting as Status Epilepticus.

Authors
D Vijayaraju, Assistant Professor,
Ramkumar S, Post Graduate Student,
SR Subramanian, Professor and Head,
Department of General Medicine, Government Mohan Kumaramanglam Medical College and Hospital, Salem, Tamil Nadu, India.

Address for Correspondence
Dr D Vijayaraju,
No. 25/8, Vaithi Street,
Shevapet, Salem – 636002,
Tamil Nadu, India.
E-mail: vijaydr@sify.com

Citation
Vijayaraju D, Ramkumar S, Subramanian SR. Prallethrin Poisoning Presenting as Status Epilepticus. *Online J Health Allied Scs.* 2013;12(4):11. Available at URL: http://www.ojhas.org/issue48/2013-4-11.html

Open Access Archives
http://cogprints.org/view/subjects/OJHAS.html
http://openmed.nic.in/view/subjects/ojhas.html

Submitted: Oct 15, 2013; Accepted: Jan 4, 2014; Published: Feb 20, 2014

Abstract: Mosquito repellents contain pyrethroid derivatives, as the active ingredient. Data regarding human toxicity following oral intake is limited. This is a case report of an individual who presented with neurotoxicity following oral ingestion of prallethrin (2.4% w/w) of a higher concentration present in formulations commercially available than previously. A 22 year old male presented to the emergency Room (ER) in status epilepticus. He was managed in the Intensive Care Unit (ICU). No cause for his status could be determined after all laboratory investigations. A review of history with the patient revealed that he had ingested a bottle of liquid mosquito repellent (45 ml). The patient has had no further symptoms on follow up and has been off anti epileptics. Pyrethroid containing mosquito repellents act on neuronal sodium channels causing hyperexcitiability. With no known specific antidotes, symptomatic treatment is the main stay of management.

Key Words: Pyrethroids; Status Epilepticus; Sodium Channel

Introduction:
Mosquito repellents commonly used, contain pyrethroid class of compounds, as the active ingredient. Data regarding toxicity following oral intake is limited. Most data regarding toxicity of pyrethroids are gathered from dermal or inhalational absorption. While authors have reported toxicity of these compounds following consumption of solutions containing lower concentration of prallethrin, this is a case report of an individual presenting with neurotoxicity following ingestion of a higher concentration (2.4% w/w) present in newer formulations commercially available.

Case Report:
A 22 years old healthy male presented to our hospital with generalized tonic clonic seizures that started one hour prior to admission. There was no history of trauma, fever or drug usage prior to the onset of seizures. There was no past or family history of seizures. On presentation to our hospital, patient was unconscious and immediate airway protection was done in view of low Glasgow Coma Score and persistent seizures. Pupils were dilated but reacting to light. Blood sugar at presentation was found to be normal. He was administered intravenous lorazepam (4 mg repeated after 15 mins) followed by intravenous phenytoin (1g loading dose) with which his seizures were controlled. Subsequently he was given a maintenance dose of phenytoin. His sensorium improved and was gradually weaned off the ventilator by day 4. He was oriented and fully cooperative by day 4. The seizures did not recur and he was subsequently managed with oral phenytoin. The CT and MRI brain showed no structural abnormalities. Blood investigations and metabolic panel inclusive of electrolytes, renal and liver function tests sent at the time of admission were also normal.
Prior informants were the patient's parents. Consequently on repeated questioning the patient revealed the history of consuming the entire contents of a liquid vaporizer mosquito repellent which contains prallethrin (45 ml, 2.4 % w/w liquid) 2 hours prior to the onset of seizures. He was discharged in a stable condition and is asymptomatic on follow up with no neurological deficit and has not required anti-epileptics.

Discussion:
This case report describes the clinical manifestation of prallethrin ingestion with suicidal intent. Since no contributory medical history was available at the time of admission, other rarer causes of status epilepticus were considered in this patient. The patient's airway and circulation were looked into first. Status epilepticus is defined as continuous seizures or repetitive, discrete seizures with impaired consciousness in the interictal period. The duration of seizure activity sufficient to meet the definition of status epilepticus has traditionally been specified as 15–30

minutes. However, a more practical definition is to consider status epilepticus when seizures last beyond 5 minutes.[1]

Pyrethroids are molecules extracted from the plant, Chrysanthemum cinerariaefolium.[2] There are two types: Type I and Type II. Type II pyrethroids, such as cypermethrin are more potent than Type I. Pyrethroids are used widely as insecticides at home and commercially, and in medicine for the topical treatment of scabies and head lice. The commercial formulations in addition, contain a synergist such as piperonyl butoxide, which inhibits metabolic degradation of the active ingredient. Pyrethroids are more toxic to insects than mammals because insects have increased sodium channel sensitivity, a smaller body size and have lower body temperatures. In addition, mammals are protected by poor dermal absorption and rapid degradation to non-toxic metabolites.[3]

The main effects of pyrethroids are on central nervous system sodium and chloride channels, consequent to their lipophilic nature.[2] Pyrethroids, through their action on sodium, GABA and chloride channels in the central nervous system can cause development of seizures on exposure.[3-8]

While earlier repellent preparations contained 1.6% prallethrin, recent formulations available contain 2.4% of the same, thus predisposing to toxicity if consumed. This patient had consumed repellent liquid containing 2.4% w/w of the compound.

Management in cases of pyrethroid poisoning is mainly supportive with anti convulsants being the main line of treatment. Paraesthesiae that may occur, usually resolve in 12-24 hours, and specific treatment is not generally required.[3, 9] Following ingestion of large amount of pyrethroids, gastrointestinal decontamination may prove helpful if patients report to hospital within a few hours.[10]

This case report highlights one of the possible fatal complications of ingestion of a commonly used household product. This is the first case report of acute toxicity following oral consumption of a higher concentration of prallethrin.

Key Messages: This case report highlights a treatable cause for status epilepticus. Pyrethroids too need to be considered in the management of status epilepticus in a patient. This is the first case report of the toxic manifestation following oral consumption of a higher concentration of prallethrin.

References:

1. Milikan D, Rice B, Silbergleit R. Emergency Treatment of Status Epilepticus: Current Thinking. *Emerg Med Clin N Am*. 2009;27(1):101-113.
2. Holland MG. Insecticides: Organic Chlorines, Pyrethrins/Pyrethroids and DEET. In Hoffman RS, Nelson LS, Howland MA, Lewin NA, Flomembaun NE, Goldfrank LR (editors). Goldfrank's Manual of Toxicologic Emergencies. New York: The McGraw-Hill Companies; 2007. P 851-54.
3. Bradberry SM, Cage SA, Proudfoot AT, Vale JA. Poisoning due to pyrethroids. *Toxicol Rev*. 2005;24(2):93-106.
4. Philip CC, Deodhar D, John M. Prallethrin and Status-A Rare Association. *The Internet Journal of Toxicology*. 2010;7(2). DOI: 10.5580/8df Available at http://yester.ispub.com/journal/the-internet-journal-of-toxicology/volume-7-number-2/prallethrin-and-status-a-rare-association.html#sthash.OEALem1F.dpbs
5. Wolansky MJ, Harril JA. Neurobehavioral toxicology of pyrethroid insecticides in adult animals: A critical review. *Neurotoxicology and Teratology*. 2008;30:55–78.
6. Hossain MM, Suzuki T, Unno T, Komori S, Kobayashi H. Differential presynaptic actions of pyrethroid insecticides on glutamatergic and GABAergic neurons in the hippocampus. *Toxicology*. 2008;243:155–163.
7. Soderlund DM, Clark JM, Sheets LP et al. Mechanisms of pyrethroid neurotoxicity: implications for cumulative risk assessment. *Toxicology*. 2002;171:3–59.
8. Shafer TJ, Meyer DA. Effects of pyrethroids on voltage-sensitive calcium channels: a critical evaluation of strengths, weaknesses, data needs, and relationship to assessment of cumulative neurotoxicity. *Toxicology and Applied Pharmacology*. 2004;196:303–318.
9. Soderlund DM, Bloomquist JR. Neurotoxic actions of pyrethroid insecticides. *Annu Rev Entomol*. 1989;34:77-96.
10. Flannigan SA, Tucker SB, Key MM et al. Synthetic pyrethroid insecticides: A dermatological evaluation. *Br J Ind Med*.1985;42:363-72.