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A Case of Suicidal Attempt with Chlorantraniliprole

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Abstract

A desperate man will do just about anything! and in this desperation to end his life he would take recourse to whatever means is most easily available to him. India still having a predominantly agricultural population, the most commonly used chemical for attempted suicide is Organophosphorus. A new form of insecticide called Chlorantraniliprole has been recently launched in India and soon enough we encountered a patient presenting to us with history of ingesting 1 full bottle (175ml) of the chemical. As such we would like to report the first case of self-harm using Chlorantraniliprole in this part of the world.

Keywords: Chlorantraniliprole, Intubation, Poisoning

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1. Introduction

Suicidal attempt in the form of insecticide ingestion is very common in this part of the world. Organophosphorus stands out as the most common substance in rural agricultural community due to its easy availability. Extensive studies on organophosphorus poisoning have broadened our knowledge in diagnosis and prompt management of this condition which in turn have saved millions of lives. Chlorantraniliprole is a new generation insecticide which is gradually gaining popularity in agriculture for pest control. It is potentially less toxic compared to organophosphorus compounds as reported by expert groups. We would like to share our experience in a young male presenting with suicidal poisoning with this agent which is contrary to the manufacturer's claim as non-toxic and broadens significantly our existing knowledge of this chemical. Hopefully, in the future there would be further reports from other Point-of-care Clinicians who would treat patients presenting with poisoning due to this chemical.

2. Case Report

A 26 yrs gentleman was brought to the Accident and Emergency department from a peripheral hospital in West Midnapur (in West Bengal) with history of gradually decreasing sensorium and fever after having ingested 1 full bottle of Chlorantraniliprole (175ml) about 24 hours back following an altercation with his family members. He belongs to an agricultural family. He did not have any history of addiction or psychiatric illness. Family members deny any previous suicidal attempt but admit that this event was a result of a sudden altercation in the family. No history of concomitant alcohol or use of other chemicals along with Chlorantraniliprole.

On examination the patient had a temperature of 99.4°F, Pulse 100/min, BP 120/70 mm of Hg, Respiratory

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Rate 32/min, SpO2 70% on room air (FiO_2 20.9%), GCS: E2 V2 M4 (8/15). Pupils bilaterally mid-dilated, equal and responding to light. There was no muscle fasciculation/fibrillation. No corrosion marks were visible in the mouth and throat. There were no abnormalities detected in clinical examination of the Cardiovascular or per abdominal examination. Bilateral coarse crepitations were noted on chest auscultation. He was diagnosed as severe poisoning based on clinical severity and available history. He was intubated in Emergency and shifted to Intensive care unit and put on mechanical ventilator with PCV-SIMV mode with PEEP 5 mm Hg.

3. Investigations

Initial hematological and biochemical parameters as follows. On admission his haemoglobin was 14.7g%, white blood cells (TLC) 16200/mm3 with differential of Neutrophil 68%, rest were Lymphocytes. Liver Function Test with Prothrombin Time (PT)/ international normalized ratio and activated partial thromboplastin time were normal, so also Serum Urea, Creatinine 38 mg/dl and 1.2mg/dl respectively. Sodium (Na+) 130 mEQ/L, Potassium(K+) 3.1mEQ/L, Ca2+ 1.04 and C-Reactive Protein 62mg/dl and Random blood glucose was 140mg/dl. Routine analysis of Urine showed 3-4 RBC & few White Blood Cell on HPF. Culture resulted in growth of E. coli (>105 colonies) on 3rd day. Arterial blood gas analysis showed pH 7.5, pCO2 35mm Hg, pO2 53 mm Hg, HCO3 27.3, Lactate 3.4 mmol/L on room air. Chest X-ray showed diffuse basal infiltrates [Figure 1]. Computed Tomography of brain reveals no abnormality.

Repeat investigations after 24 hours of ICU care: TLC 12400, Urea 24 mg/dl, Creatinine 1.2mg/dl, Na 136 mEQ/L, K 3.6 mEQ/L. Arterial blood gas analysis (ABG) showed pH 7.48 mmHg , pCO2 35 mm Hg, pO2 121 mm Hg, HCO3 26.1, Lactate 1.6 mmol/L.Repeat investigations after 48 hours of In-patient care TLC 8600, Creatinine 0.8, all other reports within normal limit. FiO2 gradually decreased from 100% to 50% and patient was extubated. Inj. CeforperazoneSalbactum (1.5g) was started empirically. Patient was resuscitated as per Critical care guidelines and supportive therapy given as per need. Patient regained full consciousness within 24 hours and was taken off mechanical ventilation. He became afebrile within 72 hours and all his medications were changed to oral. Within 5 days he was up and about and was discharged from the hospital after 1 week. Psychological counselling and follow-up under our Psychiatrist.

Patient is being followed up in our OPD for the past 4 weeks and is currently afebrile and asymptomatic.

4. Discussion

Chlorantraniliprole is a new generation insecticide,[1] which in India is gradually finding increased popularity for use as rice pest control. Manufacturers also recommend it for use in other crops like cabbage, cotton, sugarcane, brinjal, tomato, soybean, pigeon pea, Bengal gram, black gram, bitter gourd, etc[2]. It prevents the build-up of the pest population and has a long duration of action. It is an Anthralinic Diamides in nature and inactivates the insect ryanodine (RyR) receptors, which plays a critical role in the action of the muscles of the insects. The mechanism of action of the RyR receptor,[3] is in the modulation of the Calcium release into the cytoplasm. Sustained release of calcium levels within the cytosol leads to muscle contraction, paralysis and eventual death of the organism.[2] While insects possess a single form of the ryanodine receptor distributed in muscle and neuronal tissue, mammals possess three forms which are widely distributed in muscle and nonmuscle tissues. Chlorantraniliprole, along with other anthranilic diamide compounds tested, exhibits >500-fold in vitro differential selectivity for insect ryanodine receptors over those of the mammals. Insects show rapid cessation of feeding, lethargy, muscle paralysis and death after ingestion of this compound. Being recently launched in the market, there is the only data available of its toxic effects from exposure of experimental mammals to this chemical namely rats and mice; where large doses both by oral ingestion as well as inhalation has been found to be lethal.[3] But no such data is available regarding human exposure. Review of published literature is yet to show any lethal effects on humans but as per our experience, if this patient was not intubated and ventilated in time, he would have succumbed to the respiratory failure. Whether or not this respiratory failure and altered sensorium were due to the chemical itself or due to any other cause (viz. Aspiration pneumia) are beyond the capability of our setup. However, we can only hypothesize that since muscle paralysis as well lethal effects have been seen in other smaller mammals, large doses of this chemical might also have the same effect in humans. But one thing is definite that there is no

antidote and only supportive care is needed and nature will heal itself. [1,4] We are reporting this case to share our experience of the potentially lethal situation due to Chlorantraniliprole poisoning if not timely intervened with proper supportive care. In addition to the chemical itself there is also a possibilty that the solvents that are used while bottling these chemical can themselves also cause toxicity to humans. So although we are not in a position to definitely say that Chlorantraniliprole had led to the lethal situation but to the best of our knowledge this is the first reported case of Chlorantraniliprole poisoning in humans in published literature.

5. References

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