

DELAYED AND FATAL TOXICITY OF CHLORFENAPYR

Chun-Chi Lin^{1,2}; Chen-Chang Yang^{2,4}

¹ Department of Medicine, National Yang-Ming University Hospital, Yi-lan County, Taiwan

² Department of Environmental & Occupational Medicine, Faculty of Medicine, School of Medicine, National Yang-Ming University, Taipei, Taiwan

³ Institute of Environmental & Occupational Health Sciences, School of Medicine, National Yang-Ming University, Taipei, Taiwan

⁴ Division of Clinical Toxicology & Occupational Medicine, Department of Medicine, Taipei Veterans General Hospital, Taipei, Taiwan

Introduction: Chlorfenapyr is a novel pyrrole group insecticide. In animal studies, its acute oral LD₅₀ was 626 mg/kg in rats and 55 mg/kg in mice. WHO has thus classified it as a class 2, i.e. moderately hazardous, chemical. Case reports of human chlorfenapyr poisoning are rare; however fatalities due to rapid deterioration of delayed onset neurological dysfunction had previously been reported. We herein present a fatal case of acute chlorfenapyr exposure.

Case Report: A 44-year-old woman with a history of schizophrenia, depressive disorder and hypertension allegedly ingested 250 mL of 10% chlorfenapyr in a suicide attempt. She was sent to the emergency department of a district hospital manifesting nausea, vomiting and abdominal pain three hours post-ingestion. Her vital signs were as follows: blood pressure 137/96 mmHg, pulse rate 105/min, respiratory rate 18/min, and body temperature 36.5°C. Physical examinations and laboratory data were both unremarkable. Initial ECG showed sinus tachycardia without QT prolongation. After receiving gastric lavage and activated charcoal, she was hospitalized and was given supportive treatments. Although she did present with intermittent diaphoresis and tachycardia after hospitalization, she remained stable until day 6 when she suddenly manifested disorientation and confusion. High fever, tachypnea and coma developed within one hour. Her vital signs were as follows: blood pressure 93/64 mmHg, pulse rate 134/min, respiratory rate 29/min, and body temperature 41.3 C. Laboratory data were remarkable for serum CK 3,459 IU/L, CK-MB 43.6 IU/L, and lactate 29.1 mg/dL. Despite the commencement of emergent resuscitation, asystole was witnessed two hours after the occurrence of confusion and she passed away thereafter.

Discussion: Diaphoresis and tachycardia observed in this patient probably indicated the presence of sympathetic stimulation in early stage of chlorfenapyr poisoning. The patient then had sudden onset and rapidly deteriorating neurotoxicity on day 6 post-exposure, which was followed by asystole. Similar clinical features had been reported in a few fatal cases of chlorfenapyr poisoning. It was hypothesized that the delayed onset of severe toxicity of chlorfenapyr might be attributable to its pro-insecticidal property. Chlorfenapyr takes time to convert to its toxic metabolite (*N*-dealkylated product, CL 303268), which contributes to uncoupling of oxidative phosphorylation in the mitochondria and disruption of ATP production. This then leads to the toxic effects observed in this patient as well as previously reported cases of chlorfenapyr poisoning. Magnetic resonance imaging (MRI) performed in animal studies and a human case report further revealed the presence of demyelinating changes of brain and spinal cord. Currently, there is no specific treatment for chlorfenapyr poisoning and management of such poisonings remains supportive.



Conclusion: This case alerts emergency physicians and clinical toxicologists to the likely late occurrence of severe/fatal toxicity in patients with chlorfenapyr poisoning. More effective treatments should be sought in the future.