

Case Report

Abamectin: an uncommon but potentially fatal cause of pesticide poisoning

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ABSTRACT

Human intoxication with abamectin is not frequently reported. It is an uncommon but potentially fatal cause of pesticide poisoning. In contrast to common organophosphate poisoning the toxic effects of avermectin in humans are not clearly defined. Ingestion of a large dose of avermectin may be associated with life-threatening complications. The therapy for avermectin poisoning is mainly symptomatic and supportive. The prognosis of patients with avermectin poisoning is likely to be favorable unless they are complicated by severe hypotension or aspiration. We hereby report a case with abamectin poisoning with neurological toxicity and respiratory failure which responded to supportive line of therapy.

Keywords: Abamactin, Avermactin, Neurological toxicity, Respiratory failure

INTRODUCTION

Abamectin is a recently introduced pesticide. It is an analogue of Ivermectin. There is little data concerning human abamectin poisoning. Nausea, vomiting, diarrhoea, drowsiness, agitation and weakness are reported in mild poisoning and hypotension, tachycardia, coma and respiratory failure in severe poisoning. A patient was seen at our unit following poisoning with abamectin. We present clinical details of the case and follow it with a brief discussion on relevant toxicology.

CASE REPORT

45 years male was admitted to intensive care unit with history of consumption of pesticide Abamectin 3 hours prior to admission. Patient developed altered sensorium within 1 hour of consumption of the compound. There was no history of vomiting, loose motions, hematemesis, hematuria, loss of consciousness, convulsions, alcohol intake and psychiatric illness. On examination patient was conscious, irritable, confused, moving all his four limbs, not responding to oral commands. Patient's

hemodynamic parameters were within normal limits. Both pupils were of normal size reacting to light and neurological examination was within normal limits.

Gastric lavage was given and supportive treatment started. Next day patients condition deteriorated, patient went into respiratory failure. Patient was intubated and put on mechanical ventilation. Further patients neurological status deteriorated, patient remained comatose for next 2 days. After two days patient regained consciousness, started moving all four limbs and eventually regained complete power in all four limbs. Patient's respiratory effort improved and was successfully extubated after 2 days. During the hospital stay patients all investigations were within normal limits. Patient was discharged on 10th day of admission without any residual neurological deficit.

DISCUSSION

Abamectin is a mixture of avermectins. Avermectin is a macrocyclic lactone effective against agriculturally important insects and mites. Abamectin is an analogue of

Ivermectin which has been used in humans against *Onchocerca volvulus*. The toxic effects of avermectin in humans are not clearly defined.¹ It is a Chinese pesticide whose acute oral lethal dose is reported to be 10 mg / kg. Symptoms usually appear within 8 hours of exposure. Early symptoms include dilated pupils, movement disorders and muscle tremors. Avermectin on the human body is toxic at high concentrations.²

Avermectins can be absorbed orally, parenterally and dermally.³ Humans are less susceptible to the toxic effects of abamectin as it does not cross the blood brain barrier readily. Abamectin stimulates gamma-amino butyric acid (GABA) receptors in central nervous system. Toxic effects can be attributed to the GABAergic effects of avermectins.¹ Higher concentrations lead to neuronal release of GABA, thereby causing the increase of the membrane permeability of Chloride ions, resulting in central nervous system inhibition and nerve muscle conduction delay. The central nervous system inhibition results in anxiety, irritability, drowsiness, mental depression, convulsions, ataxia, and even coma. Peripheral nerve muscle conduction delay, results in tremors and motor weakness.² In addition to GABA-mimetic effects, avermectins may induce hypotension in vertebrates through an increase in serum nitric oxide levels.⁴

A case series of 18 patients who ingested abamectin has been reported by Wu Liqiang HU Ye Jia Jiang Haiming. Out of 18 patients, 6 cases developed acute pulmonary edema, 4 cases went into cardiorespiratory arrest; 2 cases presented with gastrointestinal bleeding. Patients with mild poisoning presented with nausea, vomiting, diarrhoea, drowsiness, agitation and weakness. Patients with severe poisoning presented with hypotension, tachycardia, coma and respiratory failure. Aspiration pneumonia was related to the adverse outcome in this series.²

Another retrospective study conducted by Chung K, Yang C-C and et al reported eighteen patients with abamectin (Agri-Mek; 2% wt/wt abamectin) exposure and 1 with ivermectin (Ivomec; 1% wt/vol ivermectin) ingestion were identified. Most patients were exposed as a result of attempted suicide. Oral ingestion was the most common route of exposure. Seven patients manifested severe symptoms, such as coma, aspiration with respiratory failure and hypotension after a mean ingestion of 100.7 mg/kg avermectin. All 7 patients received intensive supportive care. This study concluded that Ingestion of a large dose of avermectin may be associated with life-threatening coma, hypotension, and subsequent aspiration.⁵ Sriapha et al further reported 49 cases with abamectin poisoning.⁶ Most of the patients

were asymptomatic or developed only mild symptoms. However, 16 cases (34%) had serious symptoms, manifesting coma, hypotension, and metabolic acidosis, and 5 of them died.⁶

Treatment of abamectin poisoning is supportive. This product does not have a dedicated detoxification agent.² Protection of the airway is vital. It can prevent aspiration pneumonia. Gastric decontamination and use of activated charcoal is recommended as abamectin is largely excreted via faeces. Use of GABA inhibitor Flumazenil has not been useful. Avermectins do not regulate cholinergic transmissions. GABAergic drugs such as benzodiazepine and barbiturates should be avoided in acute setting. Appropriate fluid resuscitation and inotropic agents may be required in hypotensive patients.¹

CONCLUSION

Avermectins are newer pesticides that have a wide margin of safety. Although avermectin poisonings are uncommon, avermectins can produce toxicity primarily through their effects on GABAergic neurons. Severe poisoned patients may then develop coma, hypotension, metabolic acidosis, and even death due to the toxicity of avermectins. Despite the lack of specific therapy, the prognosis of patients with avermectin poisoning is likely to be favourable unless they are complicated by severe hypotension or aspiration.

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