



## CASE REPORT

# Near Fatal Accidental Organophosphate and Phosphine Poisoning Of a Family of Eight: Case Report

Durodola Adewumi Ojeniyi<sup>1</sup>, Afinowi Idowu Adewunmi<sup>2</sup>, Amole Isaac Olusayo,<sup>1</sup>

<sup>1</sup> Consultant Physician, Department of Family Medicine, Bowen University Teaching Hospital, Ogbomosho, Nigeria.

<sup>2</sup> Medical Officer, Charis Medical Centre, Igboho, Nigeria.  
 Email: durodolamichael@yahoo.com

### ABSTRACT

We describe a near fatal poisoning in a family of eight caused by accidental ingestion of Aluminium Phosphide (ALP) and Dichlorvos (DDVP), common and readily available pesticides used to kill rodents and insects in stored farm products. Management challenges in a rural hospital, where most accidental agricultural based poisoning cases are likely to present, are also discussed.

Keywords: poisoning, organophosphate, aluminium phosphide, rural

### CASE PRESENTATION

A 55 year old farmer, his wife and six children were rushed by neighbors to a small 10-bedded rural hospital, few minutes after ingesting a meal of freshly prepared maize porridge. They presented with history of abdominal cramps, vomiting, diarrhea, foaming from the mouth, difficulty in breathing and muscle spasms. There was eventual loss of consciousness and seizures in all of the children except the last child who had only taken a very small quantity of the meal before he started vomiting.

The maize meal was grounded, then cooked that morning from left over maize seeds stored in an airtight container for planting. It had been stored for about 5 months and preserved using tablets of Aluminum Phosphide and generous sprinkling of a locally available organophosphate (trade name *DD Force*, Dichlorvos (DDVP) 1000 g/L EC, Jubaili Agrotec). Due to the fact that the characteristic garlic like odor of phosphine was not perceived by the couple on opening the container, they concluded that the pesticides had evaporated and the maize seeds safe for consumption.

Immediately symptoms were noticed, Palm oil (a local vegetable oil) was given orally by the neighbors as an antidote before rushing the family to the hospital. On arrival, all the patients were in severe distress, having profuse diarrhea, vomiting recently ingested meal and later clear bile stained fluids, they all had muscular spasms and Child 1-5 were unconscious with tonic-clonic seizures. There were increased bronchial secretions and labored breathing. Each patient had the blood pressure, pulse rate, respiratory rate, oxygen saturation axillary temperature and weight taken. Their airways were suctioned, intravenous line secured and normal saline infusion administered to ensure 1ml/kg/hour of urine output. Intravenous atropine 0.01mg/kg was given every 15 minutes until pupils dilated and mucus membranes dry. Spasms were aborted with intravenous Diazepam 0.2mg/kg body weight and all patients with seizures had loading dose of intravenous Phenobarbitone 15mg/kg slowly over 20minutes. Prophylactic antibiotic, Ceftriaxone 20mg/kg/day, as well as hydrocortisone 4mg/kg were given.

The summary of the clinical progress is given in Table 1.

Patient	Sex	Age in years	Weight in Kg	Spasm severity	Spasm duration in hours	Seizures severity	Seizures duration in hours	Cardiovascular instability	Duration of all symptoms	Hospital stay
Father	M	55	62	++	3	-	-	No	12 hours	24 hours
Mother	F	44	52	+	2	-	-	No	9 hours	24 hours
Child 1	M	18	61	+++	6	++	2	No	24 hours	48 hours
Child 2	F	16	58	++++	6	++++	3	No	40 hours	72 hours
Child 3	F	14	46	++++	5	++++	3	No	36 hours	60 hours
Child 4	M	12	45	+++	6	+++	3	No	30 hours	60 hours
Child 5	F	8	23	+++	4	++	2	No	28 hours	48 hours
Child 6	M	5	18	+	2	-	-	No	6 hours	24 hours

**Table 1: Shows summary of the clinical features and progress of the patients.**

All the patients had clinical improvement and the last member of the family was discharged 72 hours after admission. Regular follow up over two years did not reveal any complication.

## DISCUSSION

This is a rare case of double pesticide poisoning of the whole family. Aluminum phosphide (AIP) is an effective and commonly used pesticide and unfortunately, because it is also very cheap, it is now one of the most common causes of poisoning among agricultural pesticides [1]. When exposed to either atmospheric moisture or with hydrochloric acid in the stomach, it liberates lethal phosphine gas and this is absorbed rapidly by inhalation, dermally, or through the gastrointestinal tract [1,2]. Phosphine gas is a cytotoxic compound that causes free radical mediated injury, inhibits vital cellular enzymes and is directly corrosive to tissues. It is an extremely lethal poison with mortality rates from 40 to 80 percent [3]. Nausea, vomiting and abdominal pain are the earliest symptoms that appear after ingestion. After ingestion, toxic features usually develop within few minutes. In mild poisoning nausea, repeated vomiting, diarrhea, headache, abdominal discomfort or pain and tachycardia are common clinical features, and these patients usually show recovery [4]. On the other hand, in moderate to severe ingestional poisoning, the signs and symptoms of the gastrointestinal, cardiovascular, respiratory and nervous systems appear initially and, later on, features of hepatic and renal failure and disseminated intravascular coagulation may also occur [1-3].

Patients may remain conscious till the late stage but can have manifestations like headache, dizziness, altered sensorium, convulsion and coma [5]. Care is mainly supportive as there is no known antidote to phosphine poisoning. To reduce absorption and encourage passage of the poison, patients presenting within 1 hour of AIP ingestion undergo gastric lavage with vegetable oil in some centres [6]. In this case presented, the relatives gave Palm oil, a locally available vegetable oil believed to counteract abdominal poisons, immediately they suspected poisoning and this could have contributed to the favorable outcome obtained.

As all organophosphate insecticides, Dichlorvos (also called DDVP) acts on the nervous system as inhibitor of acetylcholinesterase. As a consequence, acetylcholine accumulates in the neuromuscular synapses including those in skeletal, smooth and cardiac muscles. After accidental ingestion or massive dermal overdose, intoxication develops quite rapidly, since ingested Dichlorvos is vastly and quickly absorbed into blood with symptoms appearing within a few minutes to 2 hours after. Main symptoms include excessive salivation, lacrimation, excessive sweating, nausea, vomiting, diarrhea, tenesmus, fecal incontinence, lethargy, fatigue, trembling, spasms and coma with respiratory paralysis. Treatment involves airway, breathing and circulation support and the administration of high doses of Atropine as antidote.

Most cases of pesticide poisoning occur in rural areas [7]; areas with associated rudimentary social and medical infrastructure incapable of coping with the immediate and intensive care required by such victims. Managing a single case of poisoning demands a lot of man-hours and managing eight cases of critically ill patient can overwhelm most rural health care facility. In cases that lead to death, most of these cases (94.9%) seen by Siwach and Gupta [7] were not given any preliminary treatment in the village primary health centre (PHC) nearest to the site of mishap and they were either brought or referred to the hospital straight and thus most valuable time crucial for effective treatment was lost.

In developing countries, access to intensive care unit could be difficult. Igboho is a rural town in southwestern Nigeria and the nearest Intensive care unit that should best handle such cases, is in Bowen University Teaching Hospital, Ogbomoso, more than 140 km away. Transportation by any other means than Air-ambulance, which was not available, would further delay best of care.

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