Case Report

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2,4- Dichlorophenoxyacetic acid poisoning in St.Paul's hospital millennium medical college: A case report

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ABSTRACT

Background: *2,4-Dichlorphenoxyacetic acid (2,4-D) is an extremely lethal toxin. Poisoned patients should get urine alkalization & early hemodialysis in addition to supportive care.*

This report aimed to explain the diagnosis, treatment, and challenges.

Case presentation: *we reported a case of a 20-year-old male patient who presented to the ED after he ingested an unspecified amount of 2,4-D herbicide & lost consciousness for about 16 hours duration. Associated with this was frequent vomiting of unspecified amounts of ingested matter.*

Conclusion: *Delayed presentation to the ED & delayed hemodialysis had a negative effect on patient outcome.*

Key words: 2,4-Dichlorophenoxyacetic acid, herbicide, poisoning, Ethiopia

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1. Introduction

Any substance hazardous to the body when swallowed, inhaled, administered intravenously, or absorbed through the skin is considered a poison. Poisoning can happen purposefully or unintentionally[1, 2].

Data from WHO showed that accidental poisoning is thought to have killed 193,460 individuals globally in 2012. Of them, developing nations accounted for 84% of deaths. Pesticides are one of the most prevalent poisons. According to WHO, intentional poisoning from pesticides results in 370,000 fatalities annually, placing it among the world's top 50 causes of death [1-3].

It is observed that the prevalence of acute poisoning is declining in industrialized countries. Only a few studies were conducted in Ethiopia, and they have shown that most affected individuals were under the age of 30 and that intentional poisoning was the most common cause of poisoning. The most typical type of poisoning was caused by an organophosphate pesticide. The reported case mortality rate ranged from 2.4% to 8.6%[3]. Potential health risk factors for pesticide exposure are lack of awareness, inability to use personal protective equipment, absence of formal training, a causal attitude, and unsatisfactory safety practices[3, 4]. This report aims to contribute information for future clinical practice, management, research, and policymakers.

2. Case presentation

A 20-year-old male patient presented to our ED after he ingested an unspecified amount of 2,4-D herbicide intentionally & lost consciousness for about 16 hours' duration. He had frequent episodes of vomiting of ingested matter.

At the ED, he was critically ill with BP= 120/80, PR= 150, RR= 50, SpO_2 = 95% with 15 L/min of 100% oxygen, T^o= 40.8^{o}c, GCS=3/15 and pupils were dilated & fixed bilaterally.

For this, he was intubated and was on a ketofol drip started with 5mcg/kg/min on an escalated basis. In addition, he was resuscitated with 2 liters of normal saline & put on Paracetamol 1g per mouth QID, ceftriaxone 1g IV BID, and metronidazole 500 mg IV TID.

Table 1: Post-intubation follow-up

Date	**August 17, 2022**							
Time	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00
PEEP	5	5	5	5	5	5	5	5
FiO2	100	60	55	55	55	55	55	55
PIP	33	36	35	22	31	33	34	34
Vt	209	325	392	360	333	317	383	433
RR(total)	37	39	37	37	19	26	20	19
SPO2	98%	98%	98%	99%	99%	99%	98%	97%
BP	125/64	144/69	154/72	96/57	82/32	69/25	78/34	55/22
T˚(˚C)	40.8			41.5	41.5			
PR	146	153	151	179	179	149	152	147

He was also given sodium bicarbonate 150 Meq in 400 ml of normal saline & Furosemide 20 mg IV stat. Furthermore, he was on adrenalin and noradrenalin drip with escalation up to the dose of 2mcg/kg/min and 1.5mcg/ kg/min, respectively. The patient was on strict vital sign follow-up, and fluid balance was -500ml. His BP was still dropping, and his pulse became weaker

despite a high vasopressor infusion. CPR was differed as it is a futile activity for him.

The patient passed away after 7 hours of ED stay, with the possible immediate cause of death being multiple organ failure secondary to refractory distributive shock secondary to 2,4-D poisoning.

3. Discussion

As 2,4-D has a broad leaf selectivity, it is the preferred herbicide for many home gardeners and agricultural workers. After deliberate oral intake, severe systemic toxicity necessitating hospitalization and intensive care generally happens. In developing countries where such compounds are frequently used in farming and easily accessible in households, 2,4-D poisoning is an under-recognized cause of a possibly fatal toxic syndrome. Different studies showed that farmers and unemployed individuals were more affected. The most common mode of poisoning was intentional poisoning & oral ingestion being the primary route. Although organophosphates were the common poison, 2,4-D poisoning was the primary cause of death[3-5].

Research done on farmers shows a lack of proper training to use pesticides[4, 5].

According to reports around the globe, the toxin had an almost 100% fatality rate. The severe pulmonary, renal, neurological, gastrointestinal, and myotoxic effects of this poison result in fast demise and multi-organ failure [6-8].

There have been reports of metabolic acidosis, rhabdomyolysis, renal failure, elevated aminotransferase activity, pyrexia, and hyperventilation. In addition to supportive care, herbicide clearances are achieved by hemodialysis and urine alkalization [9-11].

For this patient, the delayed presentation & failure to get early hemodialysis could be factors for his death.

4. Conclusions

Delayed presentation & lack of hemodialysis had a negative effect on patient outcome.

Abbreviation

BP -Blood pressure
ED - Emergency department
FiO_2 -Fraction of inspired oxygen
GCS- Glasgow coma scale
IV- Intravenous
PEEP -Positive end-expiratory pressure
RR- Respiratory rate
SPo2 -Peripheral capillary oxygen saturation
V-AC - Volume Control Assist control Ventilation
WHO - World Health Organization

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Conflict of Interest

The authors declare that they have no competing interest

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