Journal of Advanced Research in Medicine
Volume 12, Issue 1 - 2025, Pg. No. 1-3
Peer Reviewed & Open Access Journal

Case Study

A Case Report: Forced Alkaline Diuresis in a Case of 2, 4 D Dimethyl-Amine Herbicide Poisoning

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DOI: https://doi.org/10.24321/2349.7181.202501

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How to cite this article:
Gupta S, Deshmukh R, Deshpande S, Patki S, Akotkar S, Suradkar P. A Case Report : Forced Alkaline Diuresis in a Case of 2, 4 D Dimethyl Amine Herbicide poisoning. J Adv Res Med 2025; 12(1): 1-3.

Date of Submission: 2025-02-02
Date of Acceptance: 2025-03-05

A B S T R A C T

To study the use of 2, 4 D is increasing because of resistance emerging in Paraquat and Glycophosphate for weed control, hence accidental or suicidal intoxication incidences are rising. Action of this is dose dependent with detrimental effects on cell membrane of Acetyl - CoA metabolism and oxidative phosphorylation.

It is fatal if not treated timely, having no specific antidote involving CNS, CVS, RS, Hepatoblliary, muscle and endocrine systems. Usually, it is very common with intoxication of organophospate compounds in India, similar to alcohol, sedative drugs, aromatic compounds which is suspected when patient comes to emergency room. So, Identification of correct compound for timely management can be lifesaving.

Prolonged Coma, Metabolic complications, Skeletal muscle complication are some of the complications of 2 4 D. Treatment with forced alkaline diuresis is life saving measure in resource limited rural area where hemodialysis is not available.

Keywords: 2, 4 D Dimethylamine, Weedicide Intoxication, No Antidote, Forced Alkaline Diuresis-Life Saving

Introduction

2, 4 D Dimethylamine Poisoning is relatively uncommon but used widely for control of weeds. Timely use of Forced alkaline diuresis has very good outcome in severe intoxication associated with 2, 4 Dimethylamine herbicide and related chemical products, like 2,4 dichloro-phenoxy acetic acid.

Figure 1 shows mechanism of toxicity of 2, 4 D Dimethylamine while figure 2 shows chemical structure of 2, 4 D Dimethylamine salt.

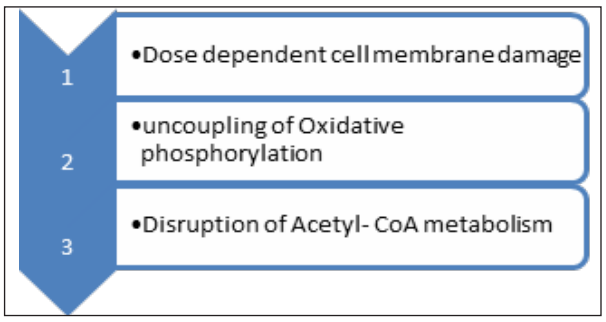

Figure 1.Mechanism of Toxicity 2, 4 D

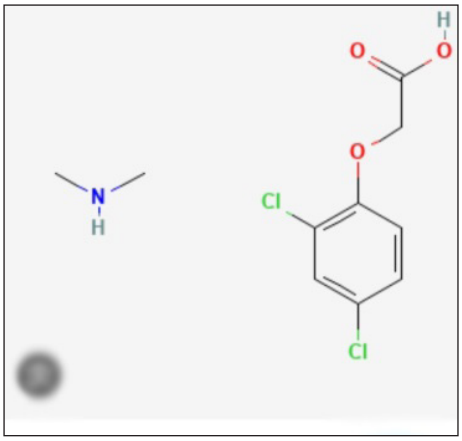

Figure 2.Dimethylamine Salt

Case Report

65 yr old female residing at her own place farm presented to emergency medicine department at our hospital with h/o ingesting approximately 40-50 ml liquid containing 58% 2,4Dimethylamine salt at around 7 am morning.

She came around one hour after ingesting in irritable behavior state. O/E- her GCS was 9, PR-110/min, BP-126/90 mm hg & RR-22/min, pupils were equal and reacting to light, gradually she became drowsy over the period of 6-8 hrs (Table 1). ECG minor ST -T changes & Chest radiogram was normal. Figure 3, 4

We could not do CT at time of admission due to aggressive and irritable behavior. She was given symptomatic treatment with gastric lavage, IV hydration with DNS/NS and sodium bicarbonate solution, she was started on urinary alkaline diuresis 1 meq/kg.

Sodium bicarbonate as IV bolus and later by infusion 80 meq sodium bicarbonate + 20 meq KCL in D5% for 48 hrs. Her biochemical and neurological parameters gradually improved. She became neurologically better over 48-72 hrs.

Table 1.General Investigation chart

Parameters	D1	D2	D3
Hb	12.6	9.9	10.6
HCT	38	30.4	33
WBC	18770	12540	6690
Platelets	251	246	212
N L M E	N92, L3.9, M2.9, E0.2	N79, L13, M6.9, E0.0	N65, L27, M5.5, E0.7
Urea	26.6	59	22
Creatinine	0.8	1.24	0.82
T Bili	0.35	0.23	0.22
SGOT	66.8	47	42
SGPT	27.3	21	22
Alk P	110	71	72
T Protein Albumin/Globulin	7.16/4.3/2.8	5.67/3.4/2.22	-
Na	143	153	142
K	3.25	2.67	4.28
PT	15.8	-	-
INR	1.07	-	-
Mg	1.99	-	-
Ca	7.77	-	-
Choline esterase Ref: (3930-10,800)	8157	-	-
ABG Report			
Ph	7.4		
PCo2	36.7		
Po2	31.7		
SO2	54.5		
Na+	144		
K+	4.6		
Lactate	3.3		

ISSN: 2349-7181
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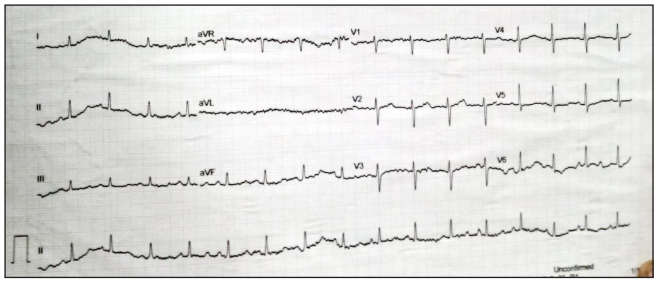

Figure 3.ECG: Case 1

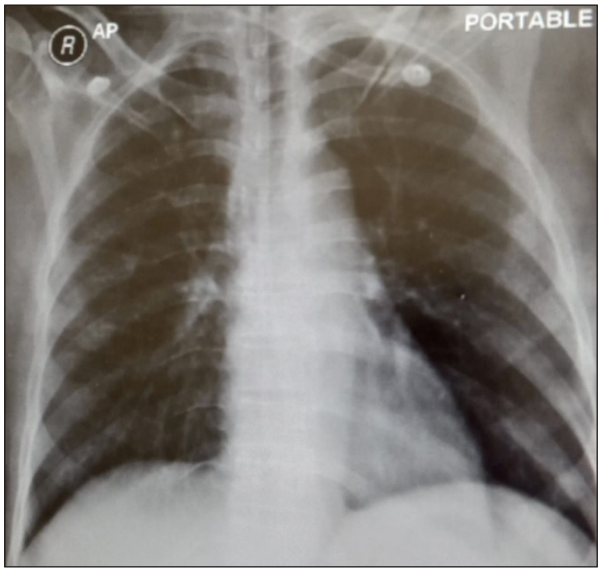

Figure 4.Chest X ray Case 1

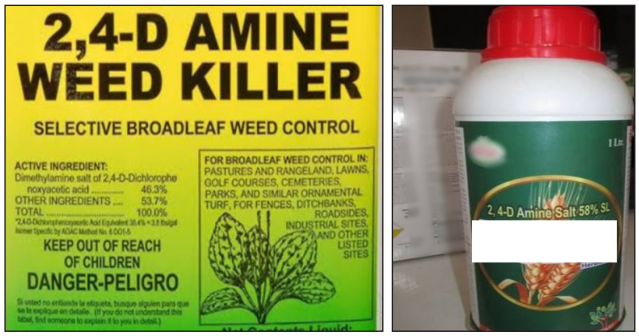

Figure 5.Sample of poison taken by case 1

Discussion

Acetyl-choline Esterase compounds are supposed to be one of the most common poisoning happening in India. But now a days in recent times herbicide associated suicidal ingestion is becoming more frequent which is associated with high mortality & morbidity.

Commonly used Paraquat & Gyphoset toxicity associated with ingestion (accidental/purposeful) made worst by high concentration of active ingredients, stabilizers, emulsifiers & solvents.

Use of 2,4-D becoming more common now as a plant herbicide & plant growth regulator in agriculture sector, these herbicides are easily available in spite of their commonly use they are not commonly encountered poisons and that's why suspicion of intake at presentation to emergency room is low. Acute poisoning with compound has fatal outcome having determental effects on CNS, CVS, GI, RS systems leading to septic shock as a clinical consequence.

Urinary alkalization helps in preventing and curing the toxic effects. In one of the few cases reported in India had severe muscle injury & cerebral odema which was treated by alkaline diuresis which is promising in resource limited settings, hemodylisis is alternative effective methods to treat severe cases with coma.

Conclusion

Apart from paraquat as a plant herbicide, 2,4 dimethylamine or 2,4 diethylamine which is currently widely used maybe associated with accidental or suicidal intoxication, should be kept in mind during insecticide or weedicide poisoning.

Forced alkaline diuresis helps in prompt and early recovery as a treatment regime in resourse limited area where hemodialysis is not avalaible.

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