Type of the Paper (Case Report)

Unusual Suicide Method, Vaginal Aluminum Phosphide Induced Toxicity: A Case Report

Amro Saleh[1], Amal R. Saleh[1], Mai A. Abd Elaziz[1*]

[1]Forensic medicine and clinical toxicology Department, Faculty of Medicine, Fayoum University, Fayoum, 63514 Egypt.

[*]**Correspondence:** Mai A. Abd ELaziz, maielsheikh08@gmail.com, Tel:(002) 01006363091.

Received: 20 January, 2025 Reviewed: 30 March, 2025

Accepted: 23 June, 2025 Published online: 20 September 2025

Abstract:

Introduction: Pesticide consumption is a prevalent method of suicide. Nearly 77% of suicides happen in developing nations with low-middle income. Celphos is the Egyptian word for aluminum phosphide. It is inexpensive, easily accessible, and available in every little grocery store in localized regions in Fayoum Governorate. It is a dark grey tablet, which becomes a very poisonous substance when exposed to moisture, as it emits phosphine gas, which is colorless and odorless; when exposed to air, it generates a garlic odor. ALP is commonly known as licorice poison or wheat grass pills.

Aim of the study: We aim to present a case of an unusual method of suicide by ALP through vaginal tablet insertion.

Subjects and methods: A 20-year-old pregnant patient inserted one tablet of ALP intra-vaginally. The case presented systemic symptoms such as metabolic acidosis, hypotension, tachycardia, tachypnea, vaginal erosion, and ECG changes. The severity of symptoms was unlike oral use of ALP. The patient had the fetal outcome of her pregnancy and abortion.

Conclusion: The case demonstrates not just the unpredictability of suicide attempts using unconventional techniques, but also the significance of understanding the particular pharmacokinetics involved.

Keywords: Abortion; Aluminium Phosphide; Aluminum Phosphide Pregnancy.

1. Introduction

Worldwide health statistics reveal that annually, over 700,000 individuals lose their lives to suicide. Notably, developing nations with low to moderate economic status account for approximately 77% of these deaths. Consumption of pesticides

stands out as a common method among those who take their own lives. One particular substance, Aluminum phosphide (ALP)—marketed under various names including Celphos, Alphos, and Synfume—appears as dark-gray tablets that, upon contact with moisture, generate phosphine gas (PH_3), a highly toxic substance [1].

The colorless and odorless nature of PH_3 belies its danger; atmospheric exposure produces a distinctive garlic-like scent. This gas penetrates rapidly through pulmonary tissue and the digestive system, causing widespread harmful effects. Its mechanism of toxicity involves compromising cell membrane integrity, transforming oxyhemoglobin into methemoglobin, and blocking crucial mitochondrial processes essential for cellular energy production and metabolic functions [2].

Toxicity from ALP exposure, whether through inhalation or consumption, presents with diverse clinical manifestations ranging from subtle to critical. Victims frequently experience digestive disturbances such as vomiting and nausea, coupled with cognitive symptoms including confusion and cephalgia. Patients may additionally suffer from upper abdominal pain, thoracic discomfort, respiratory compromise, and liver dysfunction manifesting as hepatitis or yellowing of the skin and eyes [3].

Death resulting from ALP poisoning typically unfolds in two temporal phases. Within the initial 24-hour period post-exposure, abnormal heart rhythms constitute the predominant cause of mortality. Subsequently, deaths are commonly attributed to persistent circulatory collapse, severe acid-base imbalances, or pulmonary complications characteristic of ARDS [4]. This documentation presents an unusual case where ALP was deliberately introduced vaginally as a self-harm method—an exceptionally rare route of administration in suicide attempts.

2. Case Presentation

A 20-year-old pregnant woman, 6 weeks of gestation, presented to Al Hayah private hospital with a history of vaginal insertion of 1 tablet of aluminum phosphide (ALP) with 4 4-hour delay. The patient was agitated with pale skin. Blood pressure was 110/70 mmHg, pulse 84 beats/min, and RR 28 breaths per minute. Oxygen saturation was 95% on ambient air. Admission ABG was done, which showed fully compensated metabolic acidosis. The patient was admitted

to the intensive care where the following treatments were started immediately: IV fluids, proton pump inhibitors (Losec infusion 8 mg/hr), Hidonac (N-Acetyl Cysteine) 21-hour protocol, then 50 mg/kg/8hr. Vaginal douching was performed carefully using diluted NaHCO3 to remove any remnant particles of the ALP tablet. The vagina was also inspected, and it showed mild erosion. No parenteral NaHCO3 was given on admission.

Two hours later, blood pressure was 90/60, pulse 106/ min, respiratory rate 28/min, CVP 12 cm H20, and ABG showed metabolic acidosis. Norepinephrine infusion 2mic /min, Hydrocortisone (Solu-Cortef) 100 mg/6 hrs, and parenteral administration of 8.4% sodium bicarbonate, adjusted for gas analysis results and acid-base status (1-2 mEq/kg), were given. Six hours later, the ECG showed sinus rhythm with mild ST segment elevation in all leads, and Mg sulfate 1 ampoule on 100cc saline over 2 hours was given. 12 hours after the vaginal insertion of the tablet, mild vaginal bleeding was detected. Ultrasonography was done, and fetal movement was not detected. The gynecologist recommended giving antifibrinolytic measures, misoprostol tablets, then referral after stabilization of the patient or re-consultation if the bleeding is increasing.

Table 1: ABG analysis on the 1st day of presentation at different hours.

	On Admission	**2 hours after admission**	**10 hours after admission**
PH	7.36	7.30	7.33
PCO2 mmHg	31	15	28
HCO3 mmol/L	20	7.5	16.8
BE mmol/L	-4.4	-15.3	-7.3

On the 2nd day, the patient was conscious and oriented. ECG showed sinus rhythm with T wave inversion, and arterial blood gas (ABG) results showed marked improvement with the total dose given for the patient, 300 mEq/L; other laboratory investigations were recorded in Table 2. Over the course of four hours, the patient received maintenance MgSO4 2 gm and 40 mEq K. By the third day, the patient's vitals were stable, the vaginal bleeding was lessening, the ALT level had slightly decreased, and the ECG was normal. The patient received a total of 10 mg NE, and norepinephrine was tapered gradually until the infusion stopped. Other laboratory results were within normal limits on the fourth day, and the patient's vital signs

stabilized. To monitor her vaginal bleeding and receive additional care, the patient was referred to the gynecology department.

Table 2: Laboratory investigations data on different days**.**

	Day 1	**Day 2**	**Day 3**	**Day 4**
PH		7.38	7.47	7.44
PCO2 mmHg		41	44	45
$HCO3^-$ mmol/L		24	32	27
Na^+ mg/dL	135	137	138	138
K^+ mg/dL	3.6	3.5	3.8	3.5
Mg^{++} mg/dL	1.5	-	1.7	1.5
AST U/L	-	-	43	55
ALT U/L	-	-	15	25
Creatinine mg/dL	0.95	-	0.97	-
Troponin I ng/ml	0.3	-	0.245	0.171
CK-Total U/L	-	548	178	70
CK-MB ng/ml	-	25	7	5
PT	14.4	-	-	-
PTT	28	-	-	-
Hg	15	-	-	-
WBC	10	-	-	-
Platelet	320	-	-	-

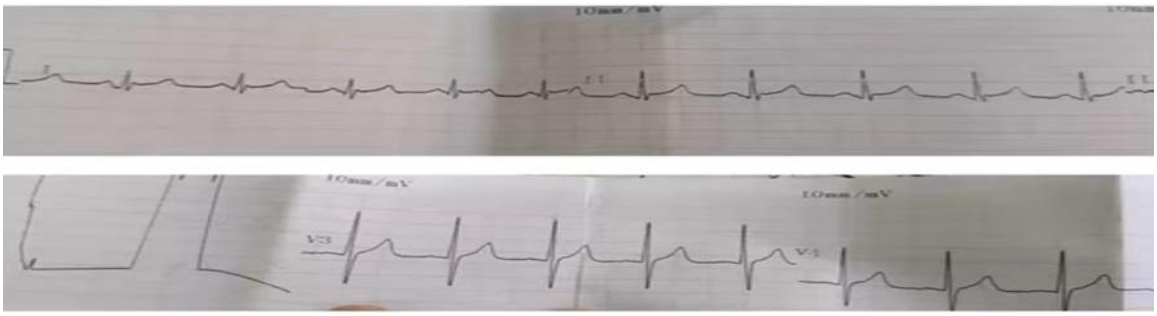

Figure 1: ECG showing mild ST-segment elevation 8 hours after presentation.

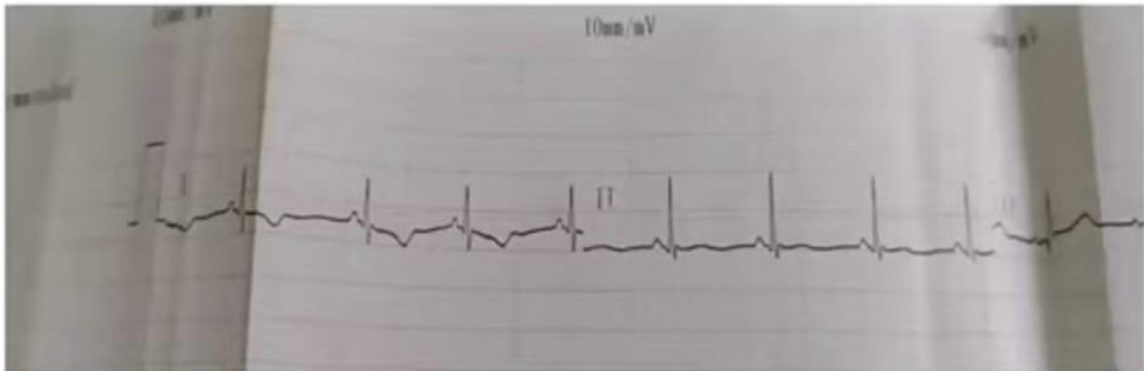

Figure 2: ECG showing T wave inversion on the 2nd day.

3. Discussion

Celphos, the Egyptian term for aluminum phosphide, is notable for its affordability and extensive availability in retail outlets throughout the Fayoum Governorate. In local parlance, it is frequently referred to as "licorice poison" or "wheatgrass pills," reflecting both its common usage and cultural characterization.

This case presents a 20-year-old female who survived aluminum phosphide (ALP) poisoning following an exceptionally rare method of suicide—vaginal insertion. There is a significant lack of data regarding ALP exposure during pregnancy, as well as its physiological effects when administered via the vaginal route. In this instance, it is plausible that vaginal absorption of ALP contributed directly to abortion through systemic toxicity. Several potential reasons may have influenced the patient's choice of this uncommon method. She may have sought to avoid the tablet's unpleasant taste, attempted to terminate her pregnancy discreetly without alerting her family, or mistakenly believed that this route would not cause self-harm. Additionally, she might have intended to delay symptom onset, as vaginal absorption of ALP is potentially slower than oral ingestion. However, these remain speculative hypotheses, and the patient's true motive remains undetermined.

ALP's lethal dosage in a normal adult weighing 70 kg is between 150 to 500 mg, according to literature [5]. hindering cytochrome oxidase conduces to critical cellular deterioration and ultimately breakdown of cells, which is how phosphorus directly damages the myocardium [6].

Based on prior studies examining the timing and repercussions of suicide attempts among pregnant women, 61% of these incidents took place before the conclusion of the third month following conception. The early identification of unintended pregnancies has been a significant factor contributing to numerous suicide attempts and fetal fatalities [7].

The previous research corresponds with our documented case, in which the individual attempted to end her life during the early gestational period (approximately six weeks) and subsequently experienced a terminal result. This circumstance potentially underscores the necessity for enhanced emotional reassurance and psychological intervention for expectant mothers, elucidating their significant societal contribution, and illuminating the

profound consequences that suicidal actions may have on their existence.

As far as we know, the amount of research showed the dangers and consequences of ALP during pregnancy is limited. In addition, its use through vaginal insertion was extremely rare. We found an earlier case report about vaginal usage of ALP during pregnancy in Iran, where their patient inserted one-quarter of a tablet vaginally and had a fatal outcome without reporting any systemic symptoms of ALP [8]. Consistently, our case also had a fatal outcome, but with systemic manifestations in the form of metabolic acidosis, ECG changes, and hypotension, which are severe symptoms of poisoning. This difference in presentation may be related to the high dose of ALP used in our case.

Cardiogenic shock, ECG arrhythmias, and metabolic acidosis are poor prognostic criteria for the outcomes of toxicity of ALP were reported in earlier studies either in Egypt [3] or worldwide [9]. On the contrary, our case had nearly the same bad prognostic criteria, but she survived. This could be attributed to differences in the mode of suicide, as the vaginal epithelium has distinct features that can affect the absorption of ALP in comparison to oral ingestion. The pH of the vagina, the surface area of absorption, and the local blood supply all have an impact on the bioavailability of drugs delivered.

Aligning with our clinical observations, investigations by Mathai and Bhanu [10] have documented arterial blood gas (ABG) pH levels at initial clinical presentation as a reliable prognostic indicator. Their analysis revealed that non-survivors exhibited substantially lower acid-base measurements (7.148 ±0.120) compared to surviving patients (7.284 ±0.151), with this biochemical parameter demonstrating critical predictive capacity.

Previous reports indicate that pregnant women have succumbed to exposure to ALP. However, there is no documented evidence of its vaginal use for abortion, and its direct impact on the fetus remains uncertain. No studies have specifically examined the effects of ALP on pregnancy progression, particularly its teratogenic potential. The likely impact of ALP on the fetus is attributed to both systemic maternal effects and the transplacental passage of phosphine gas [8]. This case report underscores the necessity for well-structured and targeted research investigating the consequences of ALP exposure during pregnancy, whether through

ingestion or vaginal administration, on both the mother and the fetus.

Conclusion: this report documents an atypical suicide involving the vaginal insertion of an alp tablet. It not only accentuates the inherent unpredictability associated with employing nontraditional methods for suicide but also underscores the critical importance of comprehending the unique pharmacokinetic properties of the agent involved

4. Recommendation

Aluminum phosphide use should be restricted. Increase awareness about the dangers of aluminum phosphide misuse.

Conflict of interests: No conflict of interest.
Funding: This research is not funded.
Authors' contributions: AS: Protocol/project development, Data collection and management, manuscript writing/editing. ARS: Data analysis, manuscript writing, and editing. MAA: Data management, Manuscript writing/editing. All authors have read and approved the manuscript.
AI declaration: Not applicable

References

1. Sarkar MK, Ghosh N, Rakesh U, Prasad R, Raj R. Acute aluminum phosphide poisoning: A case report of rare survival with cardiac, metabolic, hepatic, and renal complications. J Family Med Prim Care. 2022; 11:7452-5.
2. Singh RK, Tripathy S, Sinha S, Goyal K, Narain S. Mysterious death due to accidental inhalation of phosphine – A unique case study. 2022. Forensic Science International: Reports [Internet] 5(100264):100264. Doi: 10.1016/j.fsir.2022.100264
3. Saleh A, Makhlof M. Outcome of toxicity and mortality predictors of aluminum phosphide poisoning in Fayoum governorate, Egypt. Zagazig J Forensic Med [Internet].2018; 16(2):40–52. Doi: 10.21608/zjfm.2018.6009.1019.
4. Wahab A, Zaheer M, Wahab S, Khan R. Acute aluminium phosphide poisoning: An Update. Hong Kong Journal of Emergency Medicine. 2008; 15:152-5. doi: 10.1177/102490790801500306.
5. Ferrer MI, Alvarez Li F, Cepero A. Suicide by ingestion of aluminum phosphide: a case report. Emergencias. 2009; 21: 228–31.
6. Anand R, Sharma DR, Verma D, Bhalla A, Gill KD, Singh S. Mitochondrial electron transport chain complexes, catalase, and markers of oxidative stress in platelets of patients with severe aluminum phosphide poisoning. Hum Exp Toxicol [Internet]. 2013: 32(8):807–16. Doi: 10.1177/0960327112468909

7. Czeizel AE, Tímár L, Susánszky E. Timing of suicide attempts by self-poisoning during pregnancy and pregnancy outcomes. Int J Gynaecol Obstet [Internet]. 2017; 65(1):39–45. Doi: 10.1016/S0020-7292(99)00007-7
8. Khalighi Z, Hashemi F, Bazgir N, Azami G, Shafiei E. Induced Abortion by Vaginal Use of Aluminum Phosphide in a 44-Year-Old Woman: A Case Report. International Journal of Medical Toxicology and Forensic Medicine. 2020; 10(2):29025. Doi: 10.32598/ijmtfm.v10i2.29025
9. Agrawal VK, Bansal A, Singh RK, Kumawat BL, Mahajan P. Aluminum phosphide poisoning: Possible role of supportive measures in the absence of specific antidote. Indian J Crit Care Med [Internet].2015; 19(2):109–12. Doi: 10.4103/0972-5229.151019
10. Mathai A, Bhanu MS. Acute aluminium phosphide poisoning: Can we predict mortality? Indian J Anaesth [Internet]. 2010; 54(4):302–7. Doi:10.4103/0019-5049.68372