

Aluminium Phosphide Poisoning and Ignition in a Forensic Case

Akhgari Maryam

Legal Medicine Research Center, Legal Medicine Organization, Forensic Toxicology Department, Tehran, Iran

Corresponding Author: Akhgari Maryam, Legal Medicine Research Center, Legal Medicine Organization, Forensic Toxicology Department, Tehran, Iran, Tel: 982156524763; E-mail: akhgari1349@yahoo.com

Received date: Oct 05, 2015, **Accepted date:** Jan 21, 2016, **Published date:** Jan 22, 2016

Copyright: © 2016 Maryam A. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Keywords: Aluminium phosphide; Ignition; Forensic Toxicology

Introduction

Aluminium phosphide (AIP) poisoning is one of the most common causes of death in Iran. It is available in 3-gm tablet forms (Phostoxin, Celphos, Quickphos, and Phostek) known as "rice tablet" in Iran [1,2]. AIP is converted to phosphine gas (PH_3) following contact with hydrochloric acid in the stomach and water or moisture. PH_3 is a highly toxic and gas [3,4]. It is odourless in its pure form; however some reagents such as ammonium carbamate, ammonium bicarbonate, methanethiol (methylmercaptane), urea, and are added to AIP tablets to regulate and produce warning against phosphine dispersion in air [5]. Phosphine and air mixture may ignite spontaneously and cause health hazards such as burns in poisoned patients [6].

Case Presentation

A 35 year old woman with a past history of major depression was referred for postmortem examination and determination the cause of death to Legal Medicine Organization, Tehran, Iran. Her face and neck was burnt. Relatives' reports indicated that she was found dead in her bed. She had ingested 4 AIP tablets and the container of AIP tablets was found empty besides her bed. It was estimated that death has occurred less than 6 hours before her body. Erosions of the stomach mucosa and a garlic odour were detected at autopsy examination. Liver, stomach content, femoral blood and vitreous humour were gathered for toxicological analysis. Systematic toxicological analysis was performed using Headspace Gas Chromatography (HS/GC) for ethanol and methanol; Layer Chromatography (TLC), High Performance Liquid Chromatography (HPLC), Gas Chromatography/ Mass Spectrometry (GC/MS) for organic drugs, opioids and other poisons; and spectrophotometry for Carboxy haemoglobin detection. Headspace gas chromatography/ Nitrogen Phosphorous detector (HSGC/NPD) was used for the detection of phosphine gas in liver and stomach content samples. Toxicological analysis results were negative for all mentioned substances except for phosphine. Phosphine gas was detected in liver and stomach content samples.

cause of death was reported "phosphine poisoning" in death by forensic medicine specialist.

Discussion

purpose of the present study was to introduce a case with a history of AIP poisoning and skin burns. Phosphine is a toxic and

highly gas. If phosphine concentration exceeds its lower limit (1.8% volume by volume) in air, it may ignite and burns cause explosion. Explosion may occur in an enclosed space. AIP tablets liberate diphosphine (P_2H_4) too [5,7]. Diphosphine is a gas and ignites along with phosphine [5]. are some reports that describe spontaneous ignition in cases of AIP poisoning [8-10]. In this case the probable cause of self-ignition is the production of phosphine gas at high concentrations generated from 4 tablets in the stomach.

Conclusion

Results of the present case study highlight the fact that toxicological analysis is an important factor for the determination the cause of death. In this case the cause of death was phosphine poisoning. It should be taken into consideration that the signs of burn in the face and neck of the decedent must not mislead the physician for his/her decision making to clarify the cause of death.

References:

1. Etemadi-Aleagha A, Akhgari M, Iravani FS (2015) Aluminum Phosphide Poisoning-Related Deaths in Tehran, Iran, 2006 to 2013. *Medicine (Baltimore)* 94: e1637.
2. Mehrpour O, Singh S (2010) Rice tablet poisoning: a major concern in Iranian population. *Hum Exp Toxicol* 29: 701-702.
3. Bumbrah GS, Krishan K, Kanchan T, Sharma M, Sodhi GS (2012) Phosphide poisoning: a review of literature. *Forensic Sci Int* 214: 1-6.
4. Shadnia