Content available at: https://www.ipinnovative.com/open-access-journals

IP International Journal of Forensic Medicine and Toxicological Sciences

Journal homepage: https://www.ijfmts.com/

Case Report

Yellow phosphorus as a homicidal tool – A case report

Julius R[1], Ramalingam S[1]*, Narayanan S[2], Veeravijayan A.[3]

[1]Institute of Forensic Medicine, Madras Medical College Chennai, Tamil Nadu, India.
[2]Dept. of Forensic Medicine, Stanley Medical College, Chennai, Tamil Nadu, India.
[3]Dept of Forensic Medicine, Chettinad Medical College, Chennai, Tamil Nadu, India.

Abstract

Poisoning by administration of phosphorus was frequently employed for committing murder. Numerous such cases are mentioned in the literature where poisoning was done by clandestinely mixing phosphorous in jam, soup or alcohol and given to the unsuspecting victims. This is one such case of a four year old girl baby who was poisoned by her mother due to the mother's conflict with her husband. Poisoning due to rodenticides is not very uncommon and remains as a significant concern in the field of public health. Accidental ingestion of rodenticides leading to poisoning is common among children. They usually present with symptoms of bleeding diathesis, neurological and metabolic disturbances. Early identification of the toxic compound is crucial for initiating effective treatment and management. Consultation with poison control centers or toxicologists is essential for guidance on appropriate treatment of rodenticide toxicity.

Keywords: Homicide, Rodenticide, Yellow phosphorus

Received: 10-06-2025; **Accepted:** 26-08-2025; **Available Online**: 04-10-2025

1. Introduction

Phosphorus shares its place with aluminium and zinc phosphides as a common inorganic element in toxicological practice. Phosphorus is a luminous element isolated in 1669 by germen alchemist Hennig Brand from his own urine. It was widely used in the field of medicine for gout, colic and tetanus. Other than medicines it was used in matches / Lucifer where their chronic exposures lead to osteonecrosis. After the international convention at Berne, Switzerland in 1906 it was banned from use and then born the modern safety matches. It also gained importance in the World War II, for its use in making incendiary bombs. In recent times it is used mainly to manufacture insecticides, rat baits and fertilizers. There are 4 allotropes of phosphorus known to mankind, White / Yellow Phosphorous, Red Phosphorus, Violet Phosphorous and Black Phosphorus; out of which white and Red are most common allotropes.[1]

2. Case Summary

As per the case records, the couple always used to fight over family issues where every time to end the fight, the wife used to pretend as if she has consumed poison. During one such quarrel on a fine day around 10.00 A.M (Day 1) the lady has consumed Rat killer paste and Paint thinner and gave the same to her two female kids aged 07 and 04 years mixing it with food and fruit juice. Later all three developed vomiting and giddiness which was noticed by their relatives and they were taken to the nearest Government Hospital. Later all three were referred to Rajiv Gandhi Government General Hospital (Day 2). All three were admitted in the Intensive Critical Care Unit and were given treatment. In-spite of appropriate treatment, the child aged 4 years died on Day 5. The cause of Death as mentioned in the hospital records was death due to Hepatic Encephalopathy as a consequence of Acute Liver Failure due to Rat Killer Paste Poisoning. The body was shifted to the mortuary of Rajiv Gandhi Government General Hospital and Madras Medical College

*Corresponding author: Ramalingam S
Email: ramssurgeon@gmail.com

https://doi.org/10.18231/j.ijfmts.13059.1758703961

for Medico-Legal Autopsy. A thorough Medico-Legal Autopsy was performed and findings were noted.

3. Autopsy Findings

Well-nourished female child dead body with length of 100 cm and Breadth of 16 cm. Post Mortem hypostasis fixed on the back with areas of contact pallor; Rigor mortis - present partially on both the lower limbs only. Condition of eyes – conjunctiva congested (**Figure 1**) Natural orifices (Mouth, Nose, Ears, vagina, anal canal and urethra) - no discharges seen; bluish discoloration of the nail beds of all the fingers and toes (**Figure 2**). Head circumference: 46 cm, Chest circumference: 48 cm, Abdominal circumference: 43 cm, Mid arm circumference: 14 cm, Mid-Thigh circumference: 20 cm.

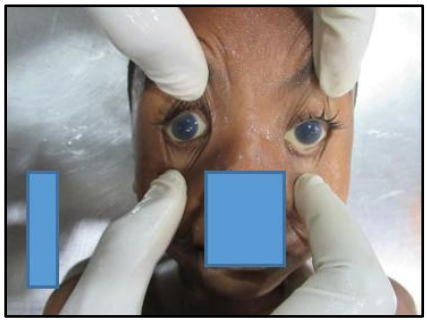

Figure 1:

Figure 2:

1. Therapeutic Intravenous cannulation marks were seen on the back of the right and left hand, front of right and left elbow.
2. Therapeutic Intra-venous cannulation marks were seen on the front of the right groin and left side of the neck.

Scalp: Intact; on reflection of Scalp: Dark red petechial - ecchymotic hemorrhages on the frontal region of scalp; Skull and duramater: Intact; Brain: Oedematous and weighed 800 grams; surface vessels congested; cut section:Soft; Base of skull - Intact. (**Figure 3 and Figure 4**)

Figure 3:

Figure 4:

1. Mouth, Tongue & Pharynx: Normal; Tongue seen inside oral cavity in normal position.
2. Larynx & Vocal cords: Normal.
3. Thyroid & other laryngeal cartilage: Intact and Normal.
4. Soft tissues of neck and blood vessels of the neck: Intact and normal except for the iatrogenic wound in the neck
5. Ribs and Chest wall: Intact and normal.
6. Oesophagus: Normal and empty.
7. Tracheal & Bronchial Tree: Intact.
8. Diaphragm: Intact and Normal.
9. Lungs: Normal in size; Right Lung weighed – 200 grams; Left Lung weighed – 200 grams; Petechial hemorrhage on anterior surface of both the sides of Lungs; cut section: Congested. (**Figure 5** and **Figure 6**)

Figure 5:

Figure 6:

1. Pericardial Sac: Intact and contained 10 ml of straw colored fluid.
2. Heart: Normal in size and weighed 100 grams; multiple petechial and ecchymotic haemorrhage on anterior surface; cut section: All chambers contained fluid and clotted blood; Valves: Normal; Coronary ostia: Patent; Great vessels and Coronaries: Intact and Normal. (**Figure 7**).

Figure 7:

1. Condition of abdominal wall: Normal.
2. Peritoneum: Normal with no free fluid in the peritoneal cavity.
3. Stomach: Empty with no definite odour; mucosa: Patchy areas of congestion. (**Figure 8**)
4. Ecchymotic hemorrhage seen all along the intestinal wall and mesentery.(**Figure 9**)

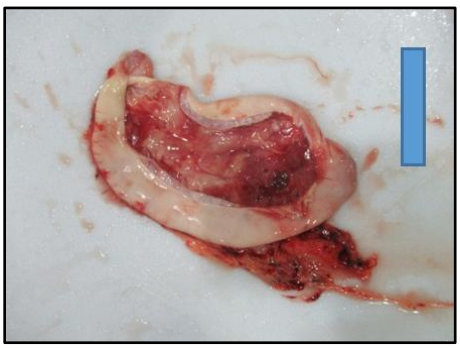

Figure 8:

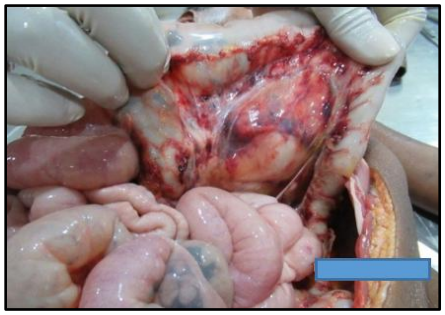

Figure 9:

Liver including gall bladder weighed 500 grams; normal in size and pale; sub capsular hemorrhage seen; cut section: Hard to cut with yellow discoloration of the parenchyma. (**Figure 10** and **Figure 11**)

Figure 10:

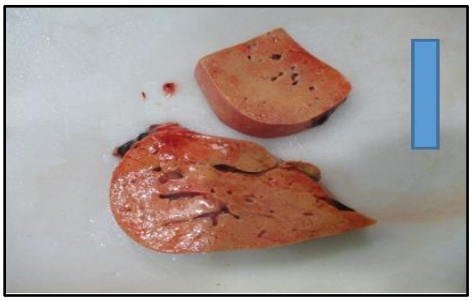

Figure 11:

1. Spleen: Normal in appearance and weighed 75 grams; cut section: Congested.
2. Pancreas: Normal in size; cut section: Congested.
3. Right Kidney weighed 75 grams; Left Kidney weighed 75 grams; Normal in appearance; cut section: Congested. (**Figure 12**)

Figure 12:

1. Urinary bladder: Intact and Empty.
2. Pelvic cavity: Normal.
3. Uterus: weighed 20 grams; cut section: Cavity empty.
4. Pelvis and Spinal column: Intact and Normal.
5. Female external genitalia: Intact and Normal.

Viscera preserved and sent for chemical analysis to the State Forensic Sciences Laboratory, which detected Yellow Phosphorus. (**Figure 13**)

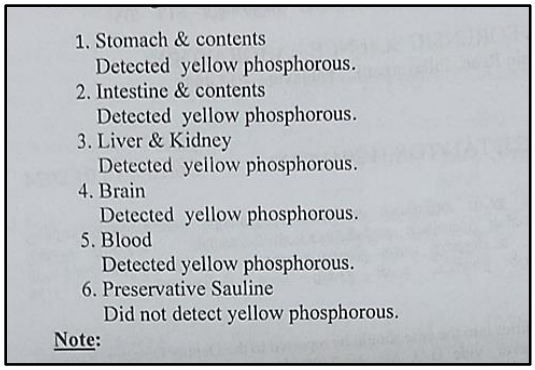
1. Stomach & contents
Detected yellow phosphorous.
2. Intestine & contents
Detected yellow phosphorous.
3. Liver & Kidney
Detected yellow phosphorous.
4. Brain
Detected yellow phosphorous.
5. Blood
Detected yellow phosphorous.
6. Preservative Sauline
Did not detect yellow phosphorous.
Note:

Figure 13:

Tissue bits preserved and sent to Institute of Pathology, Madras Medical College for Histopathological analysis, which showed pulmonary edema (**Figure 14**) and hepatic steatosis. (**Figure 15**)

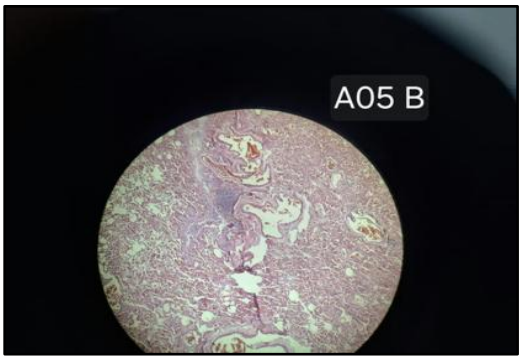

Figure 14:

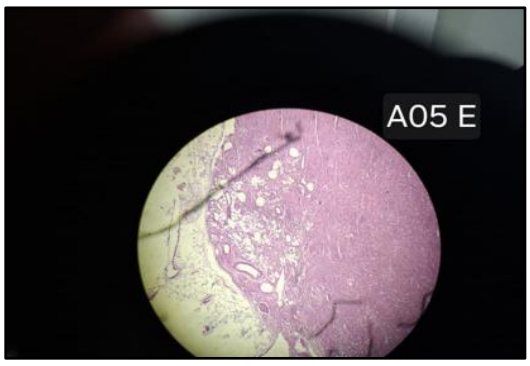

Figure 15:

Arriving at an opinion from the post-mortem findings and chemical analysis of viscera and Histopathological analysis of tissue bits, it was inferred that the deceased would appear to have died due to effects of Yellow Phosphorus Poisoning.

4. Discussion

Legally homicide can be defined as destruction of human life by the act, agencies, procurement or culpable omission of some other person or persons.[2] To commit murder, mens -rea and actus - rea are the two important elements, which when implicated together constitutes a crime.[3] Various methods are used for committing a homicide like, using a weapon, firearm, asphyxia, burns and poisoning.[4] Substances like Organo-Phosphorous Compound, Organo Chlorine Compound and Rodenticides are easily available and accessible in India, since it is commonly used in agriculture practices.[5] In ninety percent of the homicides involving a child, perpetrators were usually the biological parents. In our case, the perpetrator is the biological mother. In around 30% of the filicide cases, mothers who kill their children end up committing suicide.[6] In our case, the mother not only committed filicide on her 2 children but also attempted suicide by consuming the same poison. The Psychiatric illness in the parents, especially in acute psychotic states, delirious states, or postictal confusion states can also result in death or harm to a child[7,8] In our case, the conflict between the husband and wife lead to mental distress, which made her to take this extreme step. Poisoning among children is a major concern. In a study conducted by Das Adhikari et al., 77.42 % of children were below the age of 5 years, which seem to be in line with the study done by Reddy et al., where 70.4% were within the age group of < 5 years.[9] The study conducted by Agarwal et al. also reiterated this point with the majority of children belonging to 1–3 year age group.[10] Hence, in India children below 5 years of age are a vulnerable population with an increased risk of homicidal poisoning or filicide. In many cases, children less than 10 years of age who has consumed poison accidentally were not referred to psychiatrists, where there might be a chance of them being homicidal in nature. As there is a scarcity of data from India for better understanding the factors responsible for poisoning in children, there is a need for further exploration to formulate early interventions and better treatment strategies to address poisoning in the children, including intentional poisoning.[11] It is important to recognize that apart from legal experts, mental health specialist can look into the mental health issues in the family so that management and prevention strategies can be carried out together. It is possible that in many suspected cases, family members may have refused consultation from psychiatrist due to stigma or might not have reported the homicidal nature due to legal implications. Hospital social workers or psychiatric social workers can be involved in such issues. It is possible in some cases that homicidal attempts are part of suicidal pacts, these can be explored if the multidisciplinary team involving pediatrician, psychiatrist, and forensic medicine looks into all cases of childhood poisoning.

5. Conclusion

Cases of homicidal deaths are increasing and this is probably due to increasing population, urbanization, poverty, unemployment, frustration, illiteracy, prevailing economic, social and political environment, insurgency, terrorism, drugs, and widening of gap between rich and poor.[12] An effective cannon of law, made upon legitimate law enforcement, survivor protection are dire to reduce the incidence of such violence and other measures like reducing illiteracy by educational programmes, uplifting the status of the poor both socially and economically, restrict the sale and use of alcohol and drugs, providing job opportunities, community awareness regarding superstition and religious disharmony.

6. Source of Funding

None.

7. Conflict of Interest

None.

References

1. Aggrawal A. Textbook of Forensic Medicine and Toxicology (2nd ed.). 2021. APC Books Pg 594.
2. Gupta S, Prajapati P. Homicide trends at Surat region of Gujarat, India. *J Forensic Med Toxicol*. 2009;26(1):45-8.
3. Hugar BS, Chandra GYP, Harish S, Jayanth SH. Pattern of homicidal deaths, *J Ind Acad Forensic Med.* 2010;32(3):194-8
4. Parikh C.K. Parikh's text book of medical jurisprudence, Forensic Medicine and Toxicology for classrooms and courtrooms. CBC Publishers and Distributors, New Delhi, 6th Ed. 1990:2.1pp,3.51p,4.23p.
5. Aaron R, Joseph A, Abraham S, Muliyil J, George K, Prasad J. et al. Suicides in young people in rural southern india. *Lancet.* 2004;363(9415):1117-8.
6. Friedman SH, Resnick PJ. Mothers thinking of murder: Considerations for prevention. *Psychiatr Times.* 2006;23:9-10.
7. Holden CE, Burland AS, Lemmen CA. Insanity and filicide: Women who murder their children. *New Dir Ment Health Serv*. 1996;69:25-34.
8. Smith D. Mom Convicted of Murder in 2011 Killing of Infant Daughter, The Sacramento Bee; 2020. Available from: https://www.sacbee.com/news/local/crime/article44774280. html.
9. das Adhikari D, Das S, Winston AB, Vazhudhi K, Kumar A, Fx MS, et al. A retrospective study on non-drug related poisoning in the community among children from South India. *Hosp Pract.* (1995) 2017;45(2):39-45.
10. Agarwal G, Bithu KS, Agarwal R. An epidemiological study of acute poisoning in children in a tertiary care hospital of western Rajasthan, India. *Int J Contemp Pediatr.* 2016;3(4):1249-51.
11. Reddy KS, Kishor M, Manjunath VG. Poisoning in Children – A Study from Tertiary Care General Hospital. *J Med Sci Health.* 2020;6(3):14-8.
12. Shivakumar BC, Vishwanath D, Srivastava PC, Trends of homicidal deaths at a tertiary care centre Bengaluru. *J Ind Acad Forensic Med.* 2011;33(2):102-4.

Cite this article: Julius R, Ramalingam S, Narayanan S, Veeravijayan A. Yellow phosphorus as a homicidal tool – A case report. *Int J Fotren Med Toxicol Sci.* 2025;10(3):98-102