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IP International Journal of Forensic Medicine and Toxicological Sciences

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

Case Report

Intravascular hemolysis in phenol poisoning: An unforeseen and rare complication

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ARTICLE INFO

Article history:
Received 10-03-2023
Accepted 30-03-2023
Available online 04-05-2023

Keywords:
Phenol poisoning
Intravascular hemolysis

ABSTRACT

The black phenyl is a powerful germ killer used for homes, hospitals, which is easily accessible and can be consumed with the intention of self harm. Cases of intravascular hemolysis through inhalation or spillage has been reported, but intravascular hemolysis following ingestion is rarely reported. A 25 year old previously healthy male presented after alleged ingestion of black phenyl and was asymptomatic at presentation. By day 4, he developed fever, icterus, tachycardia, fatigue and dark brown urine. Labs were Hgb 3.6g/dl, platelet count 2.75 lakhs/ul, creatinine 1.1mg/ dI, AST 244U/L, ALT 69U/L, Total Bilirubin 4.65g/dl (Indirect 3.35) PT 14.6, INR 1.23. By Day 6, urine color darkened, suggestive of ongoing hemolysis with LDH level of 3614 U/L. Over the full hospital stay, urine output was maintained, and he didn't develop acute kidney injury. By Day 9, patient's symptoms improved & he was discharged on day 12. These compounds interfere with oxidative phosphorylation in cells, making red blood cells losing osmotic equilibrium. This metabolic handicap may lead to premature red blood cell lysis. Though asymptomatic at presentation, patient developed serious intravascular hemolysis and hemoglobinuria by day 4. This suggests the need for admission of asymptomatic patients, constant monitoring and to anticipate toxic potentials of the compound. The dearth of enough literature on this rare complication made us report this first case from North East India.

1. Introduction

The black phenyl is a powerful germ killer used for homes, hospitals, and other places. It contains 40% w/w coal tar acids, phenolic (carbolic) compounds and coal tar oils. The wide use makes it easily accessible and can be consumed with the intention of self harm. Phenol is a flammable, highly corrosive chemical which is well absorbed by all routes including inhalation, cutaneous, or oral. Phenols denature and precipitate cellular proteins and resulting in tissue injury.[1] Acute phenol toxicity chiefly occurs due to unintentional exposure at workplace or household; and intentional exposures are lesser in number.[2] Cases of intravascular hemolysis through inhalation or spillage has been reported, but intravascular hemolysis following ingestion is rarely reported.[3] Here, we report a patient who developed haemolytic anemia, jaundice and hemoglobinuria following alleged ingestion of black phenyl.

2. Case Description

A 25 year old previously healthy male presented to the Emergency department at 4pm, after alleged ingestion of black phenyl at around 2:45pm on the same day. Patient was asymptomatic at presentation and on examination, his vitals were, BP 130/80 mmhg, PR 70/min, afebrile, 98% oxygen saturation on room air, RR 14/min, with normal systemic and general examination findings. Patient had no history of comorbidities, or addiction history.

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https://doi.org/10.18231/j.ijfmts.2023.006

He was admitted, and conservative treatment was started. By day 4, he developed fever, icterus, tachycardia, fatigue and dark brown urine. Systemic examination revealed no significant abnormality. Laboratory values were hemoglobin of 3.6g/dl, platelet count 2.75 lakhs/ul, creatinine 1.1mg/dI, AST 244U/L, ALT 69U/L, Total bilirubin 4.65g/dl (indirect 3.35) PT 14.6, and INR 1.23.

Patient was shifted to ICU, blood transfusion was started, with monitoring of vitals. On further workup, chest x ray revealed normal study, ultrasonography of whole abdomen reported grade 2 fatty liver. Tests for malaria and typhoid fever were negative. G6PD deficiency and Coombs test were negative. By Day 6, urine color darkened (Figure 1), suggestive of ongoing hemolysis with LDH level of 3614 U/L.

Over the full hospital stay, urine output was maintained, and he didn't develop acute kidney injury. Total 4 units of blood transfusion were given. By Day 9, patient's symptoms improved with the resolution of jaundice, tachycardia, and urine color. He was discharged on day 12.

Fig. 1:

3. Discussion

The exact mechanism of carbolic acid resulting in hemolysis is speculative. These compounds interfere with oxidative phosphorylation in cells, making red blood cells losing osmotic equilibrium. This metabolic handicap may lead to premature red blood cell lysis.[1] Our patient improved with blood transfusions, and there was accelerated erythropoiesis (Table 1).

A data from The National Poison Data System of USA stated that it received approximately 1000 calls per year related to phenol exposure; and about 90% of those were unintentional. In majority cases, there was minimal or no significant clinical effects, with 6 to 8% of cases ending up with moderate to major clinical effects, like in this case.[4,5]

While searching for similar events, following ingestion of black phenyl, only one study describing 2 similar cases were reported from Orissa in 2011.[3] Another study reported four cases of children with carbolic acid poisoning, where two suffered from hemolysis and AKI, following accidental spillage of the phenol.[6] In this case, there was mild elevation of serum transaminases suggesting hepatic injury, without development of acute kidney injury.

Variety of decontamination agents for external decontamination of phenol exposure can be used like low molecular weight polyethylene glycol.[7] Most of the patients with phenol toxicity are expected to recover, provided they receive prompt decontamination and good supportive care. But multisystem organ failure will require extensive critical care support until resolution.[8]

Table 1:

Day of admission	Total count (1000/ul)	Hemoglobin (g/dl)
D1	14.8	12.3
D4	28	3.6
D5	31.2 (20% nRBCs)	3.5
D6	25.7 (17% nRBCs)	4.3
D7	20	5.4
D8	16.8	4.5
D9	12.4	9.1

4. Conclusion

Though asymptomatic at presentation, patient developed serious intravascular hemolysis and hemoglobinuria by day 4. This suggests the need for admission of asymptomatic patients, constant monitoring and to anticipate toxic potentials of the compound. The dearth of enough literature on this rare complication made us report this first case from North East India.

5. Source of Funding

None.

6. Conflicts of interest

There are no conflicts of interest.

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Cite this article: Sharma A, Saikia G. Intravascular hemolysis in phenol poisoning: An unforeseen and rare complication. *IP Int J Forensic Med Toxicol Sci* 2023;8(1):32-34.