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CASE REPORT OPEN ACCESS

Black Phenyl induced Intravascular Hemolysis: A rare complication

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ABSTRACT

Black Phenyl is widely used as a germicide in homes, hospitals, offices and other places for cleaning of floors and other surfaces. Due to its easy availability suicidal attempts by its ingestion is increasingly being reported. Often considered to be of little consequences, phenyl poisoning can be life threatening as it contains a mixture of coaltar acids and phenolic compounds which can result in death due to respiratory or cardiovascular failure within a few hours. Rarely it can result in HemolyticAnemia due to Intravascular Hemolysis following inhalation, ingestion or absorption of phenyl through skin. Here we report a case where a 20 years old female patient developed severe Intravascular Hemolysis after consuming around 50 ml of black phenyl.

Keywords: *Black phenyl, Phenolic compounds, Hemolytic Anemia Intravascular Hemolysis)*

Introduction

Phenolic Compounds were used as antibacterial agents as early as 1815. These are produced by fractional distillation of coaltar. Various phenoliccompounds include Phenol, Cresol, Xylenol, Propylphenol, Tetramethylphenol, Diethylphenol, Napthaletc [5]. The black phenyl is a powerful germ killer used for homes, hospitals and other places of human habitation. It contains 40% w/w Coaltar acids, Phenolic compounds and Coaltaroils[2]. Due to its easy availability it is increasingly being used by people for self harm. Phenol and its derivatives are quite toxic and poisoning can occur by ingestion, inhalation and absorption through skin. Although considered as a poisoning of little consequences, consumption of large quantity of phenyl can result in death due to respiratory and circulatory failure within a few hours or due to hepatic and renal failure within four days[2]. Cases of Intravascular Hemolysis through inhalation and dermal absorption of phenolic compounds have been reported [3,4] but intravascular hemolysis following ingestion of blacks phenyl is rarely reported in the literature.

Case Report

One 20 year old unmarried lady was taken to the nearby Primary Health Centre on 27/04/2024 at 07:00 PM with the history of consuming around 50ml of Black Phenyl at around 05:30 PM on the same day. There was no complaints of vomiting, diarrhea, dysphagia or pain abdomen after the consumption. On arrival at the PHC she was examined by the medical officer and was found to be conscious, oriented with normal vitals such as pulse rate of 80/mt, BP:120/80, SPO2 at 100% at room air. Her oral cavity and throat didn't show any ulcerations and abdomen examination did not elicit any tenderness. She was kept nil orally,administered IV fluids and IV proton pump inhibitor. The patient was stable on 28/04/2024 with no complaints of vomiting, diarrhea or pain abdomen and was initiated on liquid diet. The investigations showed that her Hemoglobin was 11.5 gm, Total leukocyte count was 7560/cumm, and Differential Leukocyte Count

was Neutrophils-65%, Lymphocytes-28%,Monocytes-4%, Eosinophils-3% on admission. On 29/04/2024 she complained of passing red color urine and generalized weakness and on examination was found to have severe pallor and mild icterus, BP was 100/80 and PR 92/min. Repeat investigation showed that her Hemoglobin had dropped to 6.5 gm. and she had Neutrophilic leukocytosis. Suspecting some unknown complication, the medical officer referred the patient to our hospital for further management. On arrival at our hospital, at 03:40 pm on 29/04/2024, the patient was found to be conscious, oriented, had gross pallor, mild icterus, tachycardic with a pulse rate of 110/min, maintained her BP at 110/80mm Hg, had an SPO2 of 85% at room temperature which increased to 100% on 4 liters oxygen/min. There were no ulcers in the oral cavity and per abdomen examinationshowed that she had mild epigastrictenderness. The investigations showed that her Hemoglobin was 5.8gm%, Total count was 16800 with 80% Neutrophils, Serum Bilirubin was 3.1mg % with indirect Hyperbilirubinemia. Suspecting Intravascular Hemolysis resulting in severe Hemolytic Anemia, one unit of PRBC was transfused. On 30/04/2024 the patient became lethargic, urine became dark red, the oxygen saturation dipped further requiring oxygen at high flow through NRBM, pallor increased and icterus deepened, became more tachycardicwith a pulse rate of 120/min but maintained a Blood pressure of 100/60 mm of Hg. Her peripheral smear showed that her Hemoglobin had dropped down to 3.8 mg/dl, total count had increased to 19830 with 80% Neutrophils and peripheral smear findings showed features of Hemolysis as evidenced by polychromatophils (Reticulocyte count 8.4%) and nucleated RBCs with presence of blister cells, few microspherocytes and fragmented RBCs along with neutrophilic leukocytosis (Fig 1). Serum Bilirubin had gone up to 4.2 mg with Indirect Hyperbilirubinema with minimal elevation of enzymes. However her renal function remained normal. She was shifted to intensive care unit and was transfused with three units of packed red blood cells. Her Hemoglobinuria decreased over the next 48 hourswith improvement in her symptoms and Hemoglobin level and decrease in serum Bilirubin and total count. Her G6PD level was ordered to rule out its deficiency which came out to be normal. She was shifted to general ward on 03/05/2024 and was discharged on 04/05/2024 with Hemoglobin of 8.3 gm%, normal total count and Bilirubin.

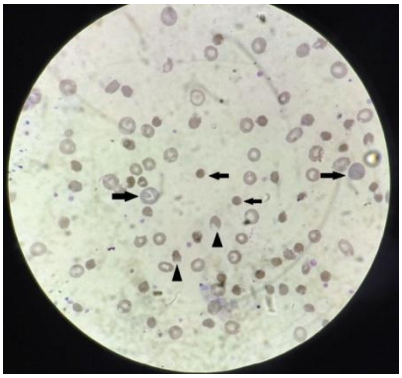

Figure 1: Photomicrograph of peripheral smear findings [Leishman stain, X1000]
Peripheral smear findings showed features of Hemolysis as evidenced by polychromatophils (right arrow), nucleated RBCs with presence of blister cells(arrowhead), few microspherocytes (left arrow) and fragmented RBCs along with neutrophilic leukocytosis

INVESTIGATIONS

DATE	28/04/24	29/04/24	30/04/24	01/05/24	03/05/24	04/05/24
Hb.	11.5	5.8	3.8	5.7	7.0	8.3
TLC	7560	16800	19830	10570	6770	7390
Platelets	2.56	2.55	2.30	1.39	1.77	1.90
Retic. Count			8.4%			
S.Bilinibin(T)		3.1	4.2	3.4	0.7	0.7
S.Bilininin(D)		0.7	1.2	1.0		
AST		52	66	58	24	24
ALT		38	72	40	31	30
Urea		38	35	39	32	32
Creatinins		0.9	0.8	1.0	1.0	1.0
INR			1.1			
APTT			21.0			
LDH			1400			
G6PD				10.9 (7-20.5)		

Urine: - Color Reddish, PH = 5.0, Specific gravity:1.015, Albumin ++,
RBC =Nil

Discussion

Accidental and intentional poisoning due to Black Phenyl is increasingly being reported in our country due to its easy availability. Phenolic compounds present in Black phenyl can get absorbed into the body by inhalation, skin contract and by ingestion. More than ninety percent of the patients present with mild symptoms. However some patients can have adverse outcome depending upon the amount consumed and promptness of treatment made available to the victim. Apart from the known complications affecting various organs of the body, rarely it can cause often unsuspected complications such as Intravascular Hemolysis. The extract mechanism is not known but it is speculated that the phenolic compounds present in Black phenyl can interfere with the oxidative phosphorylation in cells, disturbing the osmotic equilibiriumof cell membraneresulting in premature red cell lysis[2]. Intravascular Hemolysis due to inhalation and following skin exposure have been reported [3,4]so also by ingestion [1,2]but only a few cases are on record making it a rare complication. As reported by Archi et all and L.K Dash et all our patient also developed Intravascular hemolysis more than 36 hours after ingestion of Black phenyl as evidenced by passage of red color urine, fall in Hemoglobin with Reticulocytosis, rise in indirect Bilirubin and elevated LDH. The process of intravascular haemalysis continued for next three days without involving the kidney and the patient improved with transfusion of packed cells and other symptomatic treatment. Since there is a lag between consumption of Black phenyl and onset of intravascular Hemolysis (36-72) hours, on many occasions the patients are discharged from the hospital only for them to return with symptoms due to intravascular Hemolysis. As there is a lack of awareness among the Doctors regarding this complication which if unrecognized and untreated may result in significant morbidity or even mortality, all patients presenting with poisoning due to black phenyl should be admitted and kept under observation for at least two days .The rarity of this complication and lack of awareness among Doctors prompted us to publish this case report.

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