

Case Report

Black Stone (Paraphenylenediamine) Poisoning: A Case Report

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Abstract

This case report highlights the fatal effects of Paraphenylenediamine (PPD) poisoning, also referred to as "Kala Pathar" in the Urdu language. A 25-year-old male farmer from Balochistan took PPD after suffering from psychological strain due to domestic issues. He first arrived at the ER of a local hospital in Balochistan with significant respiratory distress, dysphagia, and muscle stiffness, which required an emergency intubation and subsequent tracheostomy. Following five days in the hospital, he was discharged prematurely due to financial issues and sent back to the city for further treatment. However, later in that week, his symptoms worsened, including fever, dyspnea, increased respiratory secretions, and decreased responsiveness. He was readmitted and kept in the critical care unit, where he developed acute kidney damage as a result of rhabdomyolysis. Despite receiving intensive care, the patient's condition worsened, and he eventually passed away. This case highlights the dire need for awareness, prompt intervention, and comprehensive mental health and healthcare strategies to combat PPD poisoning in socio-economically vulnerable populations.

1. Introduction

Suicide ranks among the top three causes of death among youngsters, those aged 15 to 44. Over the last 50 years, the attempt to suicide rates have skyrocketed in developing countries [1]. Many nations use various forms of self-harm, and the vast majority of people choose suicide as a means of ending their lives, for example, ingesting harmful substances/overdose, jumping from heights, hanging with a rope, cutting or stabbing deep wounds in arms, etc. As a result, a significant number of suicidal cases are occurring in emergency rooms at various healthcare facilities [2]. Hair dye poisoning is becoming a popular suicide technique, particularly among Asia's low-income populations [3]. The highly poisonous chemical paraphenylenediamine (PPD) is an organic by-product of aniline dye, with the formula $C_6H_4(NH_2)_2$, which turns black from white when oxidized in the air [1]. This substance is easily available in the Pakistani market and is a common ingredient of many hair color products, which enhances its coloring process and color depth. Although it poses hazards, this chemical is readily available to the general public over the counter with no restriction, and there are no efficient rules or monitoring to ensure its safe and legitimate usage. This easy accessibility and inexpensive cost make it a convenient option for individuals seeking methods of self-harm. Therefore, a significant death rate is linked to hair dye poisoning.

2. Case Scenario

A 25-year-old male with no known comorbidities and allergies

presented to the emergency department (ED) of a tertiary care hospital with complaints of fever, productive cough, shortness of breath, increased respiratory secretions, and decreased responsiveness for 3 days. Upon investigation, the patient's cousin shared that he belongs to a very conservative family in a rural setting, is married with three children, and is a farmer by profession. He frequently travels to the city for farm-related work. Lately, during his visits to the city/farm for work, he met a girl and eventually decided to marry her. When he shared this with his family, they strongly refused, believing it compromised the rights of his first wife, children, and parents, viewing it as against their values. Frustrated, he returned to the city. Overcome by despair, he took the packet of a "Kala Pathar" to a secluded area near his apartment and consumed it. Within moments, he experienced an acute burning sensation in his throat, along with dysphagia, laboured breathing, abdominal pain, muscle stiffness, and then he collapsed on the ground.

He was sent to the emergency room of a local tertiary care facility, where the physical examination showed tachycardia, hypotension, and swollen airways compromising his breathing. To stabilize his airway, an emergency intubation was performed, followed by tracheostomy. He stayed at the hospital for five days, but his family took him back home against medical advice due to financial reasons. After 4 days, he was presented to the ER again. Upon arrival in the ER, the patient showed signs of tachycardia, decreased responsiveness, paleness, and drowsiness. His Glasgow Coma

Scale (GCS) was 07/10. Cardiac and Abdominal examinations were unremarkable. The chest examination revealed tachypnea with bilateral crepitation, stridor, and an increased respiratory workload. His vital signs showed: blood oxygen saturation was 90%, body temperature of 37.5°C, heart rate of 150 beats per minute, respiratory rate of 45 beats per minute, and blood pressure was 150/90 mmHg. The medical team took the patient on 10L high- ow oxygen via face mask.

A thorough diagnostic workup was performed, which revealed sepsis, hyperkalaemia, dehydration, acute renal injury that required dialysis, and multidrug-resistant (MDR) Acinetobacter and

Pseudomonas infections. The diagnosis of paraphenylenediamine poisoning was confirmed. He was admitted to the intensive care unit, where comprehensive treatment was provided, including steroids, antifungals, antiepileptics, antibiotics, adequate hydration, and anticoagulation for thrombosis, over several days. During his stay at the hospital, the patient had two episodes of seizures, and his condition continued to deteriorate due to rhabdomyolysis-induced kidney damage, eventually resulting in his death after 10 days. Table 1 shows the summary of laboratory investigations, and Figure 1 shows his chest films. These reports were retrieved after obtaining approval from his family members.

Investigation	Value	Reference Range
POTASSIUM	6.1	(3.5-5.1mmol/L)
SODIUM	127	(136-145mmol/L)
Calcium	5	(8.6–10.3 mg/dL)
Magnesium	0.9	(1.6-2.6mg/dl)
TROP-I	2367	(0-57ng/L)
BIC	20.0	(22-29mmol/L)
C-REACTIVE PROT	150	(0-10mg/L)
WBC	17.8	(4.8-11.3x10E9/L)
NEUTROPHILS	96.6	(34.9–76.2%)
LYMPHOCYTES	2.2	(17.5–45%)
EOSINOPHILS	0.0	(0.3–7.4%)
O2 SAT	90	(94-98mmHg)
PCO2	32.90	(35-48mmHg)
PH	7.0	(7.35-7.45mmHg)
BICARBONATE	15	(19-24mEq/L)
CR	5.0	(0.9-1.3mg/dl)
BUN	41	(5-18mg/dl)
SERUM ALBUMIN	2.9	(3.2-4.5g/dl)
SGPT(ALT)	1331	Male: <45IU/L - Female: <34IU/L
SGOT(AST)	4482	Male: <35IU/L - Female: <31IU/L
Urinalysis	Oliguria with cola brown color urine	

Table 1: Summary of Laboratory Investigations

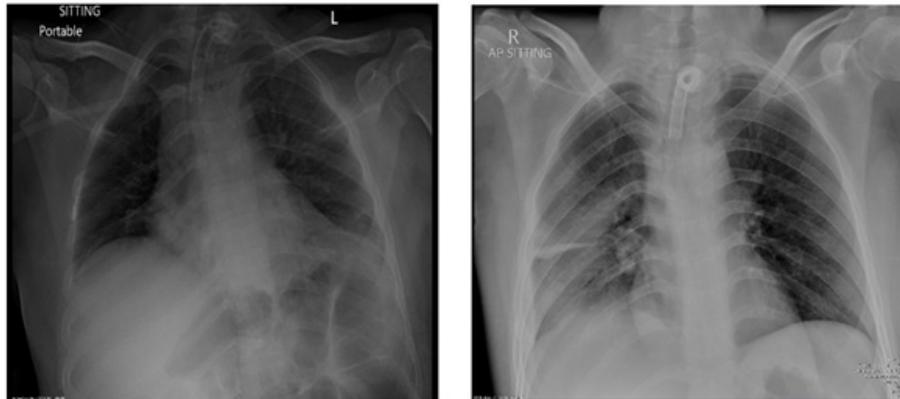


Figure 1: Chest X-ray showed Increased Opacity in the Right Lower Lobe with Subsegmental Atelectasis

3. Discussion

Paraphenylenediamine (PPD) is a mutagenic, white, solid odoriferous stone that turns black when oxidized. Crushed black stone crystals are readily available in the markets of the Middle East, India, and Africa. They are commonly used to dye hands, feet, and hair when combined with henna and Lawsonia leaves [4]. The ingestion of poisonous chemical substances enters the systemic circulation and works on destroying various body organs. Its toxicity depends upon its ingested concentration, which is likely to be 7-10g [5]. Studies revealed that out of many reasons, one cause for ingesting PPD poisoning is linked to social pressure and family conflicts in middle-income countries [4,6]. The symptoms of angioneurotic edema, cervicofacial swelling, cardiotoxicity, tachycardia, and dyspnea were also present in our patient in the current case. According to previous studies, ingesting it can have serious side effects, such as hypoxia, rhabdomyolysis that leads to renal failure, angioneurotic edema, and cardiotoxicity that causes fatal arrhythmias [5]. Convulsions, hemodynamic instability, odynophagia, sleepiness, muscle rigidity, sinus bradycardia, edema of the neck, face, tongue, larynx, and pharynx, and toxic hepatitis are additional symptoms [1,2,4,7].

One of the most serious complications, rhabdomyolysis—the breakdown of muscle tissue that releases myoglobin into the bloodstream—was also seen in the current case. The kidneys are overloaded by this process, which results in acute kidney damage (AKI) with myoglobin accumulation, causing nephrotoxicity, acute tubular necrosis, and ultimately renal failure. Patients with acute renal failure must have dialysis, as it further intensifies the deadly effects of black stone poisoning. The inability to eliminate waste products causes metabolic imbalances, fluid overload, and electrolyte abnormalities, particularly hyperkalaemia. These complications result in fatal arrhythmias and hemodynamic instability [6]. In addition, our patient experienced asphyxia-induced hypoxia and the toxic aftereffects of ingestion, which upset his electrolyte balance and resulted in hyperkalaemia and hypocalcaemia. These factors cause seizures and neuronal hyperexcitability by interfering with the brain's electrical activity. All these elements ultimately led to his demise.

There is no known specific antidote for PPD poisoning, and supportive care is the mainstay of treatment [6]. The biggest threat to life is respiratory failure. Thus, tracheostomy, assisted ventilation, and endotracheal intubation are essential and life-saving procedures. If prompt medical attention fails to take place, serious complications can quickly advance from rhabdomyolysis and AKI to multisystem organ failure, which can result in death. To enhance survival outcomes, early identification and vigorous supportive care—including renal replacement therapy in cases of severe AKI—are crucial, as seen by the high death rate linked to black stone poisoning. There is no particular test to make a diagnosis, but a high suspicion index is necessary to diagnose based on clinical evaluation, laboratory testing, and a thorough medical history [8]. Because of hair dye's easy availability in LMICs, low cost, and salty taste, its excessive intake is putting a significant strain on the emergency departments of the hospitals, which results in significantly high mortality rates. To avoid these preventable deaths, efforts must be made to increase public knowledge about the risks associated with consuming black stone crystals [8]. The frequency of such poisonings and their terrible effects can be decreased by public health initiatives and more stringent regulation of products containing potentially harmful compounds, such as PPD.

4. Conclusion

PPD poisoning is more prevalent among young individuals, illiterate, and poor people in developing nations, particularly in rural areas. PPD poisoning has become a health concern due to its high rate of morbidity and fatality. The cornerstones of management include appropriate interventions, such as tracheostomy, and intensive supportive care. Because of its easy accessibility in many places, it is still widely used in Pakistan and should be prohibited. Public education and knowledge of the health risks associated with PPD are urgently required so that PPD should be used for 'dyeing only and not for dying'. Furthermore, the need for high-quality research should be highlighted to identify an effective antidote for PPD to lower morbidity and mortality.

Declaration

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Contributions

KK is the author who conceived this Case Report and took care of the patient at the hospital. All three authors, KK, SS, and FA, have significantly contributed to this study, starting from the drafting to the analysis of the data findings and finally to the writing of this manuscript.

Ethics Declarations

Ethics approval and Participate

Consent to Participate

All authors agreed to participate.

Conflict of Interest

No

Disclosure

No.

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References

1. Omer Sultan, M., Inam Khan, M., Ali, R., Farooque, U., Hassan, S. A., Karimi, S., . . . Javed, R. (2020). Paraphenylenediamine (Kala Pathar) Poisoning at the National Poison Control

Center in Karachi: A Prospective Study. *Cureus*, 12(5), e8352. doi:10.7759/cureus.8352

2. Hakim Ali Abro, S. A. C., Azizullah Jalbani, Sheeraz Ali Buriro, Aa a Saeed, Faizan Shaukat. (2020). Clinical Presentation, Complications and Outcome of Black Stone (Paraphenylene Diamine) Poisoning. [Clinical Presentation, Complications and Outcome of Black Stone (Paraphenylene Diamine) Poisoning]. *MedRxiv*. doi:https://doi.org/10.1101/2020.10.24.20218800
3. Umair, S. F., Amin, I., & Siddiqui, A. U. R. (2018). Hair Dye poisoning: "An early intervention." *Pakistan Journal of Medical Sciences*, 34(1). <https://doi.org/10.12669/pjms.341.14123>
4. Mehwish Haqdad, S. Q., Anam Ahmed. (2021). THE Management of Patients Presented with Black Stone Poisoning: An Experience of a Tertiary Care Hospital. *Pak Armed Forces Med J* 2021; 71 (Suppl-3): S569-572. doi:https://doi.org/10.51253/pafmj.v1i1.7942
5. De Souza, J. C., Avelino, E. R. a. F., Bessegato, G. G., Da Costa, R. D. C. G., Carneiro, P. A., De Oliveira, D. P., Beluomini, M. A., Brito, J. F., & Zanoni, M. V. B. (2025). Comprehensive review of hair dyes: physicochemical aspects, classification, toxicity, detection, and treatment methods. *ACS Omega*, 10(27), 28567–28586. <https://doi.org/10.1021/acsomega.5c01576>
6. Sheikh, M. S., , A. S., , M. H. N., , M. S. S., , S. M., & , M. S. (2022). ENT manifestations of Kala Pathar poisoning; An experience at Nishter Hospital, Multan, Pakistan. doi:https://doi.org/10.29309/TPMJ/2022.29.10.4196
7. Mazhar Abbas, M. N., Azhar Abbas Khan. (– DEC 2020). Hair Dyes (Black Stone) Toxicity and its Complications. Retrieved from https://pjmhsonline.com/2017/oct_dec/pdf/1327.pdf
8. Sayed, A. A., Abdelrahman, A. H., Sayed, Z. E. A., & Abdelhameid, M. A. (2024). Incidence and outcome of laryngeal edema and rhabdomyolysis after ingestion of black rock. *International Journal of Emergency Medicine*, 17(1), 2. doi:10.1186/s12245-023-00577-y

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