*Case Report*

# To Die by A Dye – A Case Report

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**Abstract**

A 35-year-old man with a history of alcoholism and domestic conflicts consumed a bottle of hair dye; He was brought to the hospital with symptoms including difficulty in breathing, oral cavity gum swelling, profuse sweating, and generalized weakness. Despite all resuscitative efforts, he could not be revived and was declared dead.

Paraphenylenediamine (PPD) is the main component of hair dye. It is known for its highly toxic and allergenic properties. The primary toxic effect of paraphenylenediamine is severe edema in the cervicofacial region, as observed in this patient.

***Keywords**:* Paraphenylenediamine; Cervicofacial edema; hair dye poisoning; Suicide; Autopsy



## Introduction:

Poisoning is a frequently preferred method of suicide after hanging. Hair dye ingestion has emerged as a major cause of intentional poisoning after pesticides, due to its low cost and easy accessibility. It is an emulsion-based hair dye and is commonly implicated in these incidents.[1] Its main component is paraphenylenediamine (PPD) in concentration ranging from 2 to 10%. A typical clinical symptom of hair dye poisoning includes cervicofacial edema, respiratory distress and chocolate brown coloured urine. This type of poisoning can affect multiple organ systems and may result in rhabdomyolysis, acute tubular necrosis, shock and in extreme cases it leads to death. Lethal dose of PPD is not known; estimate varies from 7 to 10 grams. If the poisoning is not recognized immediately and treatment not started soon, it has a very high mortality rate.[2]

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Received on 13.10.2024 | Accepted on 05.11.2024

## Case Report:

A 35-year-old male with a history of alcoholism and domestic conflicts consumed a bottle of hair dye consisting of 200ml late at night. He was brought to the hospital next day early in the morning, with the complaints of difficulty in breathing, oral cavity gum swelling, profuse sweating and generalized weakness.

Patient was shifted to the intensive care unit (ICU) in view of cervicofacial swelling along with difficulty in breathing. He was intubated and ventilator support was given. His vital parameters were: Heart rate of 136/min, blood pressure 90/50mmhg, and normal temperature. His GCS was 3/15, ABG shows severe metabolic acidosis. Lab results showed CKMB 3207ng/ml, serum creatinine 1.6, serum glutamate- oxaloacetate transaminase (SGOT) 145U/L, serum glutamate pyruvate transaminase (SGPT) 187U/L.

IV Fluids were started, IV antibiotic, steroid, inotrope support, oxygen and other supportive medications was given. Despite all resuscitative efforts, patient could not be revived and was declared dead the following afternoon.

On autopsy, external examination noted a moderately built, moderately nourished man with dark brown complexion. Post-mortem staining was present over the back of chest and abdomen and not fixed. Rigor mortis was setting in. Cervicofacial edema was noted (Figure 1).

**Figure 1: Cervicofacial edema**

**Figure 2: Stomach contains dark brownish grey coloured fluid**

Internal Examination:

Lungs were edematous and intensely congested. Stomach contained about 200ml of dark brownish grey coloured fluid with peculiar smell; mucosa was congested and hemorrhagic at places (Figure 2). Kidneys were intact and congested, cut section showed loss of corticomedullary differentiation at places.

FSL report revealed that colour test, thin layer chromatography and high-performance thin layer chromatography methods responded for Paraphenylenediamine and resorcinol.

On perusal of history, autopsy findings, hospital case records and FSL report, cause of death was reported as due to multiorgan failure as a result of consumption of substance containing paraphenylenediamine and resorcinol.

**Discussion:**

Hair dye ingestion has risen as a major cause of intentional poisoning due to its affordability and easy accessibility.[2] Hair dye consists of paraphenylenediamine (PPD), resorcinol, ethyelnediaminetetraacetic acid (EDTA), liquid paraffin etc.[1] PPD is present in most of the hair dye brands. This brand has 4g of PPD per 100 ml. The lethal dose of PPD is not known; estimate varies from 7 to 10grams[2]. If the poisoning is not recognized immediately and treatment not started soon, it has a very high mortality rate.[2]

Local effects of PPD are skin irritation, contact dermatitis, permanent blindness and chemosis. The ingestion of PPD produces toxic effects including Cervicofacial edema, anaphylactic shock, rhabdomyolysis leading to chocolate brown coloured urine, acute tubular necrosis, convulsions, liver failure, myocardial infarction and motor neuropathy. As there is no specific antidote present for Paraphenylenediamine (PPD) poisoning.[2] Hair dye ingestion is a medical emergency. Emergency measures should include gastric lavage. Gastric lavage should be done within 1 to 2 hours of hair dye ingestion. Patients should be monitored for respiratory distress and endotracheal intubation to be performed early if laryngeal edema develops. When

intubation is not feasible, tracheostomy can be performed. Metabolic acidosis to be corrected. Early intervention with half normal saline and sodium bicarbonate infusion has been shown to be beneficial in Rhabdomyolysis.[3-4] All modalities of dialysis – hemodialysis, peritoneal dialysis and continuous renal replacement therapy have been tried and have been found to be useful in acute renal failure.[3-4]

Our patient presented with cervicofacial edema causing respiratory distress and hypoxia which required intubation. Rhabdomyolysis, acute tubular necrosis was present. Liver failure characterized by raised liver enzymes. CKMB levels were significantly raised.

Whenever the characteristic triad of stridor due to upper airway edema, rhabdomyolysis and acute renal failure develops in a poisoning, hair dye should be considered.[3] Early diagnosis and supportive management will have a better outcome in hair dye poisoning.[1]

**Conclusion:**

Healthcare personnel should be aware of dangers of hair dye poisoning and PPD in particular, as it is commonly used and very easily available. Public awareness has to be increased regarding these hair dyes to ensure that "**these dyes are not used for dying"**.

**IEC Approval:** obtained as per institutional Ethics committee guidelines

**Competing interests:** There are no competing interests.

**Funding:** No funding from any external agency received.

**Authors' contributions:**

All the authors have contributed in the case presentation and helped in the drafting the case report. All authors have read and approved the manuscript.

**Acknowledgements:**

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