

## Suicidal Ingestion of Henna Mixed With Para-Phenylenediamine: A Case Report

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### Abstract

Henna, an extract of the plant *Lawsonia*, has been used for centuries in many cultures, mainly as a dye for hair and nails as well as for decorative body painting. Para Phenylenediamine (PPD), a derivative of para-nitroaniline is widely used in hair dye formulations, in dyeing furs and in photochemical industries. It has also been used to intensify the color of henna and to accelerate the dyeing process. Accidental or deliberate ingestion of henna containing PPD has a high mortality rate (up to 31%) owing to rhabdomyolysis and renal failure. We report a case of systemic poisoning with henna for suicidal intent. The characteristic features of intoxication are eczematous dermatitis, erythema multiforme eruptions, angioneurotic edema, rhabdomyolysis and acute renal failure.

**Keywords:** Para-phenylenediamine poisoning, Angioneurotic edema, Rhabdomyolysis, Henna

### Introduction

Henna, an extract of the plant *Lawsonia*, has been used for centuries in many cultures, mainly as a dye for hair and nails as well as for decorative body painting [1]. Applying to stain the soles and palms and using it as a red hair dye is a popular costum in some of the east African countries, Middle East and in the Indian subcontinent. Para-Phenylenediamine (PPD), a derivative of para-nitroaniline is widely used in hair dye formulations, in dyeing furs and in photochemical industries [2]. It has also been used to intensify the color of henna and to accelerate the dyeing process. Local application of PPD in susceptible individuals may result in dermatitis, asthma, arthritis, lacrimation, exophthalmos or even permanent blindness when applied to the eyes [3]. Oral ingestion of PPD results in severe edema of face, tongue, neck and laryngeal edema with respiratory distress often requiring emergency tracheostomy [4]. Ingestion of lawsonia containing PPD has a high mortality rate (up to 31%) owing to rhabdomyolysis and renal failure [5]. We present a patient of systemic PPD poisoning with suicidal intent.

### Case Presentation

A healthy 29 year old female was brought to the emergency department 20 hours after ingestion of henna. She ingested four spoonfuls of henna for suicidal intent. In the patient's history, there was nothing remarkable. On admission she presented with nausea, dizziness, lightheadness, blurred vision, retrosternal pain but no vomiting. On examination, she was conscious, oriented and with pulse 68/min and blood pressure 134/91 mmHg, respiratory rate 12/min and with electrogram within normal limits. She did not have any cyanosis nor respiratory problems. She had metoprolol and ulcurane for gastric protection. As 20 hours passed after ingestion of henna activated charcoal was not applied nor gastric lavage. After forced diuresis and alkalization of the urine the patient was referred to intensive care unit. In intensive care unit hydration and alkaline diuresis were continued and laboratory data was investigated four times a day to detect and signs of renal failure but routine laboratory data were within normal limits with no signs of hemolysis, renal failure or cardiac ischemia and she also did not develop oliguria. Investigation revealed hemoglobin of 13.1 gr/dL, and a platelet count of 212K/uL. Other biochemical investigations were: blood sugar was 101 Mg/dL, urea 19 mg/dL, serum creatinine 0.7 mg/dL, serum

sodium 143 meq/L, potassium 4.8 mEq/L. Her prothrombin time (PT) and partial thromboplastin time were normal. She had no signs of pulmonary congestion, and no enlargement of liver or spleen also her cardiovascular, respiratory and rest of the nervous system examination was normal. After 72 hours of follow up she was discharged from the hospital with an appointment at the psychiatry department.

### Discussion

Para-phenylenediamine is an aromatic diamine and is structurally related to para aminobenzene, a coal tar product. For dyeing purposes, PPD is added with hydrogen peroxide resulting in the formation of Bandrowski's base, which is highly allergic and toxic [2]. The first systemic toxicity with PPD was described by Nott in a hairdresser who suffered from handling of the dye [6]. Studies have shown that female population (77%) is more affected than the male (23%) population as PPD is a product used in traditional cosmetology [7]. Accidental or deliberate ingestion (as a suicide attempt) of Lawsonia has a high mortality rate up to 31% in reported series [8]. This is due to severe circulatory and systemic toxicity including rhabdomyolysis and renal failure, requiring vigorous supportive care including dialysis [9]. In 1982 Chugh et al reported for the first time two patients who developed acute oliguric renal failure following PPD intoxication [10]. This was also with angioneurotic edema and respiratory distress, rhabdomyolysis and acute renal failure [4]. Ingestion of PPD has two types of effects. First one appears shortly after ingestion and consists of vomiting, edema of face, larynx and upper airways that may be requiring tracheostomy [4]. The second one appears later in which patients consumed 3 grams of PPD, it includes stiffness and pain in the limbs, rhabdomyolysis and passage of chocolate brown colored urine culminating in acute oliguric renal failure. In Hashim et al's study 5 children required peritoneal

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dialysis [8]. Dosage is highly related with toxicity of PPD. Ingestion of 7-10 grams might be lethal while higher doses are related with rhabdomyolysis and acute renal failure [8]. Plasma exchange has been reported to be used to treat lawsone henna ingestion [5], as well as other drugs and toxins. Less reported features were liver failure, drowsiness, altered sensorium, gastrointestinal symptoms, neuropathy, chronic renal failure [2]. PPD is also a potent sensitizer causing eczematous dermatitis which may be severe as erythema multiforme like eruptions and there are also several reports mentioning the contact dermatitis of childhood from henna tattoo [1,11,12]. Probably our patient consumed low dose of PPD as it did not cause severe symptoms like angioneurotic edema, renal failure, respiratory distress and rhabdomyolysis so we treated our patient supportively.

Early treatment in PPD toxicity includes gastric lavage. Patients should be monitored for respiratory distress and endotracheal intubation has to be performed early if laryngeal edema develops. Metabolic acidosis has to be corrected, alkaline diuresis should be generated.

All modalities of dialysis hemodialysis, peritoneal dialysis and continuous renal replacement therapy have been found to be useful in acute renal failure. Lawsone should be added to the list of toxicities needing urgent treatment mostly in Middle East countries and India. Rhabdomyolysis developing acute renal failure and stridor due to upper airway edema should remind us PPD intoxication.

#### References

1. Läubli S, Lautenschlager S (2001) Contact dermatitis after temporary henna tattoos – an increasing phenomenon. *Swiss Med Wkly* 131: 199-202.
2. Anuradha S, Arora S, Mehrotra S, Arora A, Kar P (2004) Acute Renal Failure Following para-Phenylenediamine (PPD) Poisoning: A Case Report and Review. *Ren Fail* 26: 329-332.
3. Yagi H, El Hind AM, Khalil SI (1991) Acute poisoning from hair dye. *East Afr Med J* 68: 404-11.
4. Averbukh A, Modai D, Leonov Y (1989) Rhabdomyolysis and acute renal failure induced by paraphenylenediamine. *Hum Toxicol* 8: 345-358.
5. Rund D, Schaap T, Da'as N, Yehuda B, Kalish J (2007) Plasma Exchange as Treatment for Lawsone (Henna) Intoxication. *J Clin Apher* 22: 243-245.
6. Nott HW (1924) Systemic poisoning by hair dye. *Br Med J* 1: 421-422.
7. Filali A, Semlali I, Ottaviano V, Furnari C, Corradini D, et al. (2006) A retrospective study of acute systemic poisoning of paraphenylenediamine (occidental takawt) in Morocco. *Afr J* 3: 142-149.
8. Sir Hashim M, Hamza YO, Yahia B, Khogali FM, Sulieman GI (1992) Poisoning from henna dye and para-phenylenediamine mixtures in children in Khartoum. *Ann Trop Paediatr* 12: 3-6.
9. Kallel H, Chelly H, Dammak H, Bahloul M, Ksibi H, et al. (2005) Clinical manifestations of systemic paraphenylene diamine intoxication. *J Nephrol* 18: 308-311.
10. KS, Malik GH, Singhal PC (1982) Acute renal failure following paraphenylene diamine [hair dye] poisoning: report of two cases. *J Med* 13: 131-137.
11. Neri I, Guareschi E, Savoia F, Patrizi A (2002) Childhood allergic contact dermatitis from henna tattoo. *Ped Dermatol* 19: 503-505.
12. Sidwell RU, Francis N, Basarab T, Morar N (2008) Vesicular Erythema Multiforme-like Reaction to Para-Phenylenediamine in a Henna Tattoo. *Pediatr Dermatol* 25: 2201-2204.