

Case Report

Autopsy of Hair Dye Poisoning –Revisited

D. Balasubramanian^{1*}, M. Chellasamy², S. Subramanian³ and K. Shanmugam⁴

¹Student, School of Public Health, PGIMER, Chandigarh, India

²Associate Professor, Department of Forensic Medicine, ³Senior Assistant Professor, ⁴Professor & HOD, Department of Medicine, Thoothukudi Government Medical College, Thoothukudi, Tamil Nadu, India

*Corresponding author e-mail id: deep19882000@gmail.com

ABSTRACT

With hair dyes gaining in popularity as an easy method of poisoning, either by suicide or homicide, its incidence has been rising in many regions of the country. Due to the various toxins present, the poisoning presents itself in a variety of ways. Some findings go unnoticed during hospitalisation and are apparent only after the death of the patient, during autopsy. Hence, autopsy of the cases will help to reveal these findings and will help us to better manage the patients in future, by keeping an eye out for these manifestations. Here, we present a case report along with a review of literature on the same topic.

Keywords: Hair dye, Poisoning, PPD, Oedema, Rhabdomyolysis, Death, Autopsy

INTRODUCTION

Hair dyes are freely available in the society, with very few regulations governing their sale. With growing knowledge among the people about the harmful effects of its ingestion, its incidence has been on the rise in many areas of the country. Hair dyes contain a myriad of toxins, each with its own array of toxicities. Here we present a case of hair dye poisoning along with its autopsy findings.

CASE DESCRIPTION

A 20-year-old female was brought to the emergency two and a half hours after consuming 50 ml of the hair dye with complaints of vomiting and difficulty in breathing. On examination, there was oedema of the tongue, sublingual and submandibular regions. The pulse rate was 114/minute, with the blood pressure of 110/70 mmHg and the respiratory rate 26/minute. Examination of the other systems was normal. Anti-oedema measures were initiated and forced alkaline diuresis was started. As the patient developed stridor, she was taken up for emergency tracheostomy 2 hours after admission. Electrocardiogram

(ECG) taken at the time of admission showed sinus tachycardia. Blood investigations revealed elevated creatine phosphokinase (CPK) and serum glutamate-pyruvate transaminase (SGPT) levels (Table 1). The patient had severe muscle tenderness and her urine was dark in colour. The patient remained tachypneic and expired 6 hours following tracheostomy due to cardiac arrest. The autopsy of the patient was done on the next day. External examination revealed ecchymosis of the conjunctiva (Figure 1), facial puffiness, oedematous and protruding tongue, oedema of the submandibular region and the tracheostomy wound (Figure 2). There were no external injuries or ligature marks. Internal examination revealed congestion of the stomach mucosa, liver, kidneys, lungs, heart and brain. The stomach did not contain much material as the patient had vomited prior to admission. The urine in the urinary bladder was dark coloured. Cross section of the lungs showed frothy exudate, suggestive of pulmonary oedema (Figure 3). Examination of the larynx revealed oedema of the vocal cords and epiglottis (Figure 4), completely obstructing the airway. All the viscerae were subjected to histopathological examination.

Table 1: Blood and urine investigations

Blood investigations	
Haemoglobin (13.0–16.2 g/dL)	10
TC (4100–10,900 cells/mm ³)	9900
DC (45–62%, 16–33%, 1–3%)	61,31,8
ESR (0-8)	12
CPG (70–110 mg/dL)	97
Urea (7–18 mg/dL)	27
Creatinine (0.7–1. mg/dL)	0.7
Bicarbonate (22–28 mEq/L)	20
CPK (25–192 U/L)	33100
Na ⁺ (137–147 mEq/L)	142
K ⁺ (3.6–5.1 mEq/L)	4.2
Ca ⁺ (8.4–10.2 mg/dL)	9.2
SGOT (8–40 IU/L)	23
SGPT (5–20 IU/L)	207
ALP (53–128 U/L)	43
Urine investigations	
Volume (mL)	400
Colour	Black
Albumin	Traces
Sugar	Nil
Deposit	3–5 Pus cells, 6–8 RBC



Figure 1: Conjunctival ecchymosis



Figure 2: Facial features

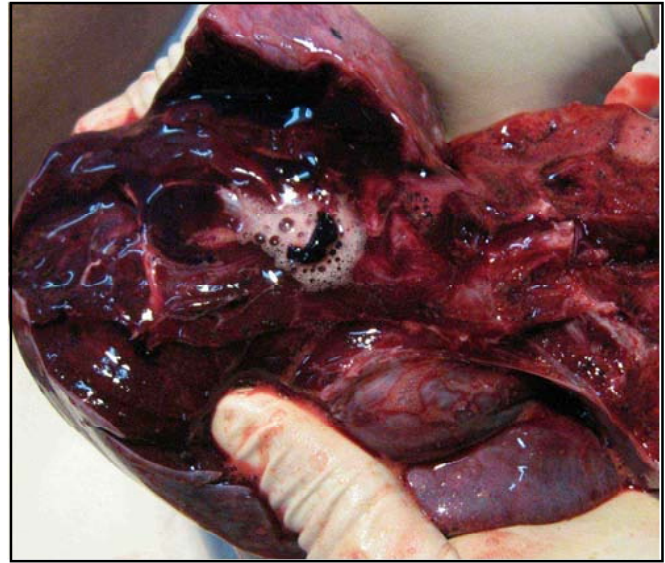


Figure 3: Pulmonary oedema

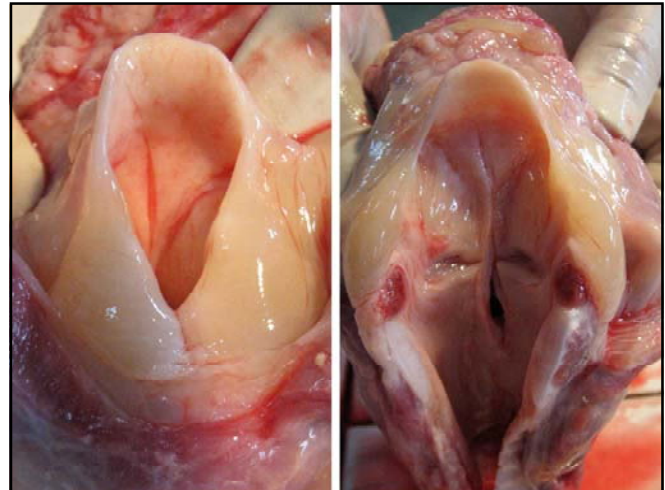


Figure 4: Laryngeal oedema

Lungs showed congestion and minimal inflammation. The liver, kidney and heart showed congestion. Analysis of the stomach contents was positive for paraphenylenediamine (PPD).

DISCUSSION

Our case had a delayed presentation and even with proper management, could not be saved. Autopsy revealed findings of hair dye poisoning. Majority of the cases of hair dye poisoning are females^[1, 2] and belong to the younger age groups^[1,3]. The time of presentation varies

depending on whether the patient came directly or was referred from another hospital, which has an impact on mortality^[3,4]. Several studies report elevated liver enzymes and CPK levels with hair dye ingestion^[4-6], with patients consuming more dye reporting higher levels². CPK levels also had an impact on mortality^[4]. Mortality rates varied from 4% to 60% in various studies^[2,3,6].

The major constituents of hair dye include PPD, sodium ethylene diamine tetra acetic acid (EDTA), resorcinol, apart from propylene glycol, acetostearyl alcohol, sodium lauryl sulfate and liquid paraffin^[5]. Clinical presentations include allergic symptoms (upper airway oedema and itching), rhabdomyolysis (dark coloured urine, muscle pain and acute renal failure), cardiac (myocarditis, arrhythmias and sudden death) and seizures^[6].

Belton presented a case of anaphylaxis following PPD hair dye administration. Autopsy revealed laryngeal mucosal swelling and hyperaerated lungs on internal examination. Histology showed infiltrates of lymphocytes and mononuclear cell in lung parenchyma, congestion in the pulmonary vasculature, mucosal and submucosal oedema in the laryngeal region along with infiltrates of mast cells, mononuclear cells and lymphocytes^[7].

Others report coagulation necrosis of the skeletal muscle following PPD ingestion^[8-10]. Verma reports diffuse pulmonary oedema, congestion of the kidneys with renal cortical tubular lumen containing an eosinophilic substance and hyperaemia of all intra-abdominal organs and necrosis of the renal collecting tubule and distal tubule epithelium along with blood analysis revealing methaemoglobinemia¹¹. Girish reported all the organs to be green coloured during autopsy^[12].

Study from south India reported swelling of the neck region, blood mixed froth oozing from mouth, swollen tongue, congestion of all the organs including conjunctiva, internal viscera. There was bluish purple discoloration of the extremities. Pulmonary oedema and petechial haemorrhages on myocardial surface were also seen. Histology showed renal tubular necrosis and rhabdomyolysis^[13]. Kumar presents similar findings with kidneys showing acute tubular necrosis^[14]. An autopsy

series by Senthilkumaran *et al.* found Pneumothorax in two of the eight cases^[15]. Thus, while performing an autopsy, all these findings may be borne in mind.

There has been a rise in the number of poisoning cases due to hair dye. As various toxins are present, the poisoning presents itself in a variety of ways. Some findings go unnoticed during hospitalisation and are apparent only after the death of the patient, during autopsy. Hence, autopsy of the cases will help to reveal these findings and will help us to better manage the patients in future, by keeping an eye out for these manifestations. There is also a need to create awareness among the medical professionals about the effects of hair dye poisoning as it is not prevalent in all areas of the country, which we hope this paper would serve to do.

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