

CASE REPORT

Permanent Complete heart block following hair dye (Paraphenylene Diamine) poisoning

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Introduction

Paraphenylene diamine (PPD) is the most common constituent of hair dye formulations and is commonly used in its raw form for cosmetic purposes in Africa, Middle East and Indian subcontinent while it is rarely used in the West (1,2). Hair dye poisoning is an emerging important cause of deliberate self-harm in the developing world especially in countries where it is widely used for cosmetic purposes (3). We are reporting a case of complete (third degree) heart block following hair dye poisoning.

Case presentation

A 26 year old female from Aljazeera State in central Sudan was brought to the local health center complaining of dizzy spells and severe fatigue several hours following intentional swallowing of hair dye. She was referred to our hospital after she was found to be bradycardic on examination with a heart rate of about 40 beats per minute (bpm).

She arrived to our hospital, 24 hours from ingestion, looking fatigued but fully conscious with a clear airway. Blood pressure was 110/50, heart rate of 40 bpm and her systemic examination was unremarkable. ECG showed complete heart block with wide complex escape rhythm (QRS = 120 msec) of 37 bpm (Fig 1, 2). Her blood tests were significant for serum creatinine of 2.5 mg/dl (0.4-0.9 mg/dl), urea of 70 mg/dl (15-45 mg/dl), K 5.1 mmol/l (3.5-5.0 mmol/l), and total CK was mildly

elevated at 180 U/l (24-98 U/l). Cardiac troponin initially and at three consecutive

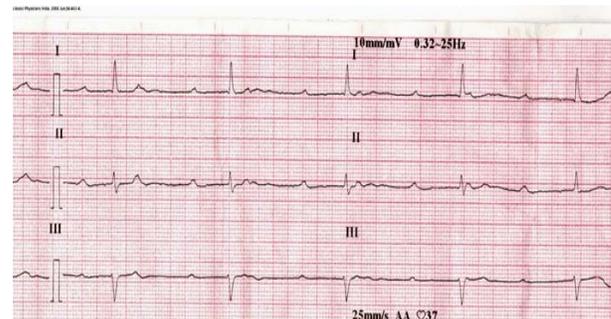


Figure 1: limb leads

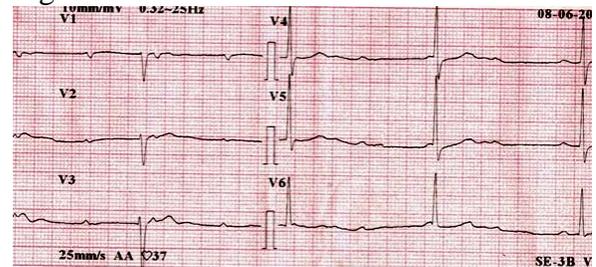


Figure 2: unipolar chest leads

samples each eight hour apart < 0.03 ng/ml. Liver enzymes were within normal range.

Temporary pacemaker wire was inserted and intravenous fluid hydration initiated. Over the next two weeks she remained in complete heart block requiring pacing with her native rhythm remaining in low 40s with normalization of her renal profile.

Her echocardiogram on second day of admission showed normal LV dimensions and systolic function with ejection fraction of 60%. Subsequently a dual chamber pacemaker was inserted and the patient remains pacemaker dependent three years after implantation. She required pacing >

90% of the time without intrinsic rate detected with pacemaker basic rate reduced to 40 bpm.

Discussion

Paraphenylene diamine [C₆H₄ (NH₂)₂] is an aromatic amine produced commercially. It is a derivative of paranitroaniline that is available in the form of white crystals when pure and rapidly turns to brown when exposed to air [1]. It is widely used in industrial products such as textile or fur dyes, dark colored cosmetics, photocopying and printing ink (4). In Sudan, PPD is mixed with henna, leaves of Lawsonia Alba, which is a nontoxic herb used to decorate the hands and feet in special social events, such as wedding ceremonies (2).

Hair dye poisoning can be life threatening with multisystem involvement. Non cardiac systemic complications of PPD ingestion especially laryngeal edema, kidney injury and rhabdomyolysis have been well reported elsewhere (5-10). The study by Suliman et al of 150 cases of PPD poisoning admitted to Khartoum Teaching hospital from 1983 to 1993, reported 100% incidence of angioneurotic edema that required tracheostomy in a certain percentage of patients and 40% incidence of severe acute renal failure requiring dialysis attributed to direct toxic effect of PPD and rhabdomyolysis (5).

PPD is a cardiotoxin which can cause myocarditis with electrocardiographic changes, release of cardiac biomarkers, left ventricular damage and arrhythmias. It appears to be dose related with ingestions of 10 grams or more of PPD being highly toxic to the heart. In a prospective study reported by Jain et al of 1595 cases of PPD intoxication, myocarditis was reported in 15% of cases with mortality rate of 29%. In patients affected from myocarditis 9% develop life threatening Ventricular tachycardia/ventricular fibrillation (11).

Shalaby et al in a retrospective study of over 7 years on 25 cases with acute paraphenylenediamine intoxication admitted to the poison control centre, Ain Shams University Hospitals, Cairo, Egypt, reported that 16% of the patients died due to ventricular arrhythmia (12). A prospective study of 50 patients with PPD toxicity from India showed that 90% of cases had ECG changes mostly ST segment and T wave changes. Only 3 patients were reported to have AV blocks; however the grade of the block, duration or need for pacing were not reported.

Right bundle branch block also has been reported (14, 15). Complete heart block has been reported with organophosphate poisoning (16), however there is no report of permanent third degree heart block requiring implantation of a permanent pacemaker has been reported in the literature.

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