Case Report

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When your breath dyes away Need for Surgical Airway in a Case of Hair dye Poisoning

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Abstract

Introduction: The use of hair dye for deliberate self-harm is seen in many parts of the world. Paraphenylenediamine (PPD) is the main constituent of hair dye formulations and is found to be highly toxic. The other constituents are resorcinol, propylene glycol, sodium ethylene diamine tetra acetic acid, preservatives and perfume. Clinical features of PPD poisoning include severe cervicofacial odema, chocolate colored urine, oliguria and shock. Management is mainly supportive and there are no specific antidotes.

Case Report: A young lady was brought to ED with complains of sudden onset swelling of chin, neck and tongue. She was sitting upright with hoarseness of voice. She had edema over her chin and lower half of face extending to the neck. The tongue was hard and edematous. As her symptoms worsened she asked for a piece of paper to write and wrote "VASOMOL", which is a brand name for the hair dye containing paraphenelyenediamine.

Conclusion: The difficult airway management is an essential skill needed for the emergency physician. Hair dye poisoning has been known to cause severe angioneurotic odema. Ours is a case of PPD poisoning which presented with life threatening airway odema. We followed the ABCD assessment and on determining the need for airway control, we planned a surgical airway immediately.

Keywords: Paraphenylenediamine, Angioneurotic odema, Rhabdomyolysis, Acute tubular necrosis

Introduction

The use of hair dye for deliberate self-harm has been seen in parts of Africa, the Middle- east and the Indian subcontinent[1]. Paraphenylenediamine (PPD) is the main constituent of hair dye formulations and is found to be highly toxic [2]. In India, Super Vasmol 33™ is a brand of hair dye containing PPD. The other constituents are resorcinol, propylene glycol, sodium ethylene diamine tetra acetic acid, preservatives and perfume. PPD is a synthetic aromatic amine and its main oxidation product is Bondrowskis base which is allergenic, mutagenic and highly toxic[3]. Clinical features of PPD poisoning include severe cervicofacial odema, chocolate colored urine, oliguria and shock[4]. The triad of angioneurotic odema, rhabdomyolysis and acute tubular necrosis is seen in cases of PPD poisoning[5]. Management is supportive and there are no specific antidotes. The angioneurotic odema of the airways in PPD poisoning is life threatening and if not managed promptly can be fatal[6].

Case Report

A 21 year old lady was brought to our emergency department with complains of sudden onset swelling of chin, neck and tongue which was noticed by her relatives 2 hours back. She was sitting upright on a stretcher with hoarseness of voice. Her chest was clear on auscultation. She was normotensive with a room air saturation of 89% and respiratory rate of 25. She had edema over her chin and lower half of face extending to the neck. The tongue was hard and edematous (Figure 1). There was no history of fever, throat pain, dental infections or allergies. Once shifted to the priority area, she was under continuous monitoring. We noticed her respiratory rate increasing and she also started drooling and had nausea. She was given intramuscular adrenaline, intravenous antihistamines, corticosteroids and fluids but her symptoms did not show any resolution. As her symptoms worsened she asked for a piece of paper to write and wrote "VASOMOL", which is a brand name for the hair dye containing para-

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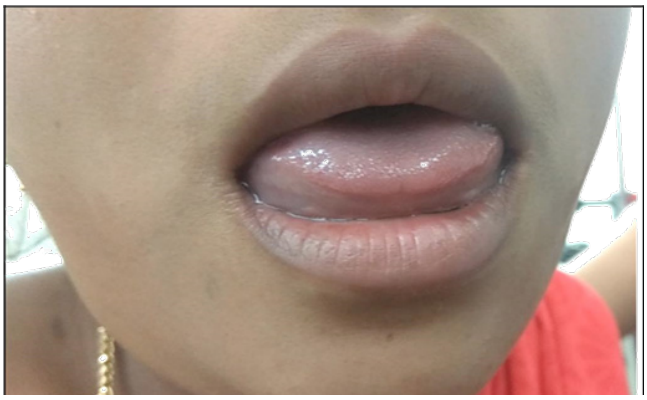

Figure 1: Clinical picture showing swollen tongue.

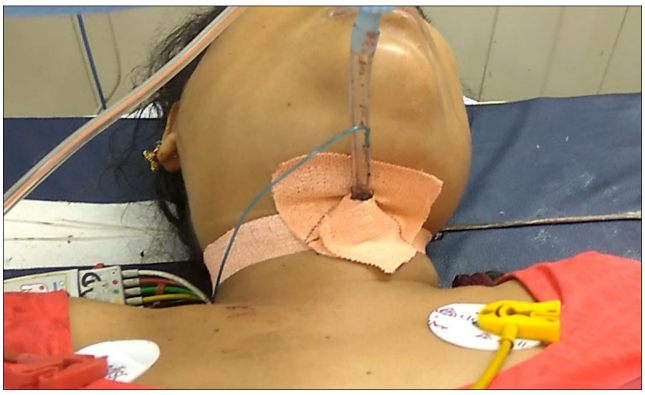

Figure 2: Emergency tracheostomy after failed intubation.

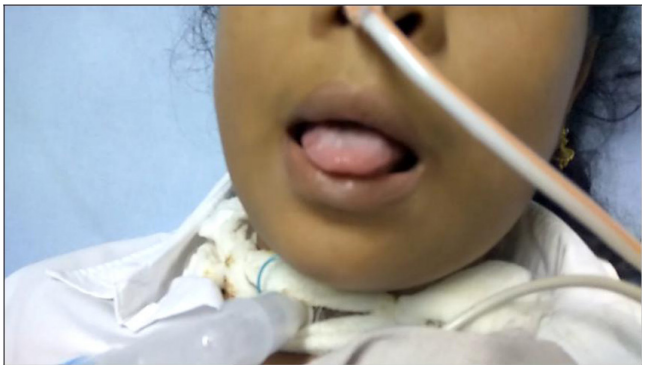

Figure 3: Clinical picture showing subsided neck and tongue edema.

phenelyenediamine. We immediately assessed her airway as she had begun to develop respiratory distress. She had narrow mouth opening due to the edema and the Mallampati grade was 4. Anesthetic backup was called in view of difficult airway prediction and decision to intubate was taken in view of impending life threatening airway edema. Prior to intubation, supraglottic devices and the equipment for surgical cricothyrotomy were arranged at the patient's bedside. Delayed sequence intubation was attempted using etomidate after 3 minutes of bag mask ventilation using two hand technique. Three attempts of laryngoscopy were made but could not visualize anything beyond the base of tongue. She was ventilated back to above 95% saturations after each attempt. She was also having increasing secretions. In view of pharyngeal odema, use of supraglottic device was deferred and we proceeded to attempt surgical cricothyrotomy (Figure 2).

The patient's neck was approached from the right hand side and vertical incision made over the cricothyroid membrane after raising a wheal of local anesthetic while stabilizing the trachea with the other hand. The skin was dissected and horizontal stab incision given after locating the cricothyroid membrane using a scalpel. The incision was then widened with the artery forceps and a bougie was passed downward which did not face any resistance. A 6 size endotracheal tube was then railroaded over the bougie and as soon as it entered the skin the cuff was inflated and bougie removed. Bilateral air entry was confirmed and patient's saturations were around 98%. She was then connected to a ventilator and shifted inside the ICU. She was given aggressive fluid hydration with isotonic crystalloids along with other symptomatic measures. The surgical team was notified and she was then taken up for a definitive tracheostomy. Her neck and tongue edema gradually subsided (Figure 3) and her renal and liver functions were within the normal limits. She was weaned off the ventilator and discharged home after 7 days of hospitalization.

Discussion

Hair dye poisoning has been known to cause severe angioneurotic odema. Ours was a case of PPD poisoning which presented with life threatening airway odema. We followed the ABCD assessment and on determining the need for airway control and difficult airway prediction we planned accordingly for the contingencies. Anesthetic backup was called and after 3 attempts at laryngoscopy with changes in operator and positioning, immediate realization of the 'cannot intubate' scenario was made. Due to unsuitability of the use of the laryngeal mask airway and unavailability of the higher airway devices like the video laryngoscope and fiberoptic devices, we went ahead with the surgical cricothyrotomy and were able to secure the airway. Our patient was also given fluid resuscitation and also bicarbonate therapy to prevent renal injury. PPD is one of the rare toxins where the toxin itself is responsible for airway distortion in the patient, hence requiring expert airway management with often front of neck access (FONA). The NEAR III study put the incidence of surgical airways in airway encounters at 0.45% [7]. In our case we used a scalpel –bougie-tube technique. Bleeding occurred into the field while making the incision and distorted the view, but we used palpation to find the membrane and once the endotracheal tube was placed used pressure to control the bleeding which was successful. The performance of surgical airways requires situational awareness with effective communication and resource management[8]. The advent of newer airway control devices like the fiber optic bronchoscope and the video laryngoscope has significantly decreased the incidence of surgical airways in the emergency department [9]. But in scenarios where such

equipment are not available the emergency medicine physician should be well aware of the alternatives.

Conclusion

The difficult airway management is an essential skill needed for the emergency physician. This case highlights two aspects, the need for airway management training in emergency medicine department and also the airway compromise in cases of PPD poisoning which if neglected, can be life threatening.

Conflict of Interest
None

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None

References

1. Verma R, Tewari N, Jaiswal S, Rastogi V, Singh D. Fatal poisoning caused by oral ingestion of a hair dye. Internet J Emerg Intensive Care Med. 2008;11(1):2.
2. Ashraf W, Dawling S, Farrow LJ. Systemic Paraphenylene-diamine (PPD) Poisoning: a case report and review. Hum Exp Toxicol. 1994;13(3):167-70.
3. Patra, Ambika P, Shaha KK, Rayamane AP, Dash SK, Mohanty MK et al. Paraphenylenediamine Containing Hair Dye: An Emerging Household Poisoning. The American journal of forensic medicine and pathology. 2015;3:167-71.
4. Bhargava P, Matthew P. Hair dye poisoning. J Assoc Physicians India 2007;55:871-2.
5. Beshir L, Kaballo B, Young D. Attempted suicide by ingestion of hair dye containing p-phenylenediamine: a case report. Ann Clin Biochem. 2017;54:507-10.
6. Anandhi D, Raju KP, Saya RP, Pandit VR. Difficult airway management in a case of hair dye poisoning. Int J Acad Med 2017;3:120-3.
7. Brown CA 3rd, Bair AE, Pallin DJ,Walls RM. Techniques, success,and adverse events of emergency department adult intubations. Ann Emerg. Med. 2015; 65: 363–70.
8) Begley, Jonathan & Butson, Ben & Kwa, Paul. (2017). The emergency surgical airway. Emergency Medicine Australasia. 29. 570-575. 10.1111/1742-6723.12850.
9) Hawkins ML, Shapiro MB, Cué JI, Wiggins SS. Emergency cricothyrotomy: a reassessment. The American Surgeon. 1995 Jan;61(1):52-55.