HAIR DYE POISONING IN GEZIRA STATE-SUDAN

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Abstract

Objective: To study the clinical presentation, management and outcome of hair dye poisoning (HDP) in the Gezira state and to compare the results with a previous study conducted at the same setting10 years before.

Methods: A retrospective study review of all cases of HDP hospitalized during the period (January2006-February2008) at Wad Medani General Hospital.

Results: Total number of patients was 97. Females were 76 (78.4%), adult males were 6 (6.2%), children were 15 (15.4%). In 87 patients (89.7%), there was suicidal attempts. where Seven patients (7.2%) presented with accidental poisoning and 3 patients (3.0%) presented with homicidal poisoning. Clinical presentation of these patients were angioneurotic edema with mild or moderate stridor and inability to talk in (24.7%), neurological manifestations e.g. flaccid paraplegia, cranial nerves palsies and convulsions were noticed in (37.1%) of patients abdominal pain in (31%). The mortality rate was (10.3%).

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Conclusions and Recommendations: Hair dye containing paraphenylenediamine is widely used by Sudanese for henna purposes with resulting severe morbidity and mortality. In this study the desensitization phenomenon was noticed evidenced by decreased number of patients presenting with angioneurotic edema and stridor. Mortality rate regressed possibly due to the awareness of the public and medical staff. Measures to increase the public awareness and to legislate for eradication and abolishing use of this lethal substance are recommended.

Introduction

Hair dye containing paraphenylenediamine (PPD) is the responsible agent for this kind of poisoning. PPD also known as diaminobenzene is an aromatic amine with many industrial and cosmetic applications. The chemical is a common ingredient in permanent hair dye products. One of the most dangerous applications of PPD is when it is added to henna.[1, 2] Henna tattoos often result in a skin reaction similar to a chemical burn, which in turn results in a scar where the skin was tattooed.[1]PPD has an allergic reaction, in most of subjects exposed to it. They may suffer a lifelong sensitivity to the chemical.[1,3] Hair dye containing paraphenylenediamine is widely used among Sudanese females, either for making the henna easy and quickly getting dark or for painting the hair.[2,4]After oral administration, PPD is readily absorbed from the gastrointestinal tract, metabolized, and excreted by male and female rats, indicating little potential for bioaccumulation in animal tissues.[2,5] (PPD) has severe toxicity, lethal effects in humans and serious systemic complications such as: upper airway obstruction, due to angioneurotic edema, asthma, skin allergy, cardiac toxicity and a variety of neurological signs and deficits .[4, 6, 7] Other reported features are rigidity and tenderness of limbs secondary to rhabdomyolysis and acute renal failure (ARF), leukocytosis, anemia secondary to haemolysis, haemoglobinemia and haemoglobinuria. Sudden death appears to be due to myocarditis and arrhythmia.[8]Myocardial rhabdomyolysis and shock have also been described. [9, 10] Hypotensive shock is a recognized feature and is associated with poor prognosis.[11] Chocolate brown color of the urine could be a confirmative evidence of PPD poisoning in the absence of laboratory facilities and when history is lacking in case of emergency [6, 11]. Acute renal failure is one of the major effects of hair dye poisoning (HDP) in Sudan. [6, 7, 12]

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Acute Renal failure signifies the severity of intoxication. [6, 12]There is no specific antidote available. Initially gastric lavage should be performed. Mild cases can be successfully treated with intravenous (IV) fluid infusion, hydrocortisone and chlorpheniramine maleate. [13] But in the event of presentation with cervicofacial edema, upper airway tract edema, oliguria, renal failure or shock aggressive therapy with gastric lavage, IV fluid infusion, mechanical ventilation, alkalinization of urine, corticosteroids, vasopressors and renal replacement therapy should be started as early as possible. [6, 14, 15] Death is mainly due to acute respiratory distress and tracheotomy at presentation is recommended. [9] The major challenge to life in later stages is renal failure [11] and myocarditis. [8]

Patients and Methods

This study was carried out in Wad Medani Teaching Hospital. The study included 97 patients who presented to the E.N.T. department, with history of ingestion of hair dye containing paraphenylenediamine. Wad Medani Teaching Hospital has a large catchments area from Central and Eastern States of Sudan, with a population approximately 13.2 Millions which accounts for (33%) of the Sudan total population. The study covered patients with (HDP) who were treated in the period (January2006-February2008).

All records of (HDP) patients were reviewed for age, sex, residence, clinical presentation, management and outcome. The results were compared with a previously published study conducted at the same setting.

All patients treated for (HDP) during the study period were included. Windows-XP and Excel soft wares were used for data entry and analysis. Results were tabulated and presented in percentage form and compared with the previous study.

Results

Total number of patients studied (n=97). Male to female ratio was 1:12.7. Patients' age ranged between 9 months -65 years, with a median age of 20 years. The peak age group affected was 17-33 years (71.8%), Figure (1). Adult females were 76 (78.4%), adult males were 6 (6.2%) and children were 12 (15.4%).

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Mode of poisoning: The mode of poisoning is shown in Table (1). Most of the patients had suicidal attempt (89.7%). Forty-nine patients were from urban areas and 48patients were from rural side.

Clinical presentation: the clinical presentation of these patients were angioneurotic edema with mild or moderate stridor and inability to talk in (24.7%), abdominal pain in (31%) and neurological manifestations e.g. flaccid paraplegia, cranial nerves palsies and convulsions were noticed in (37.1%) of patients Table (2). All patients had dark discoloration of urine. The mortality rate was (10.3%) table (1).

Discussion

Patients presenting with hair dye poisoning are usually treated as emergency [6]. The E.N.T. department at Wad Medani Teaching Hospital- established guide lines based on previous published studies. These include: gastric lavage with saline using a wide bore nasogastric tube for all patients who present 4 hours or less fallowing ingestion of the dye. Subcutaneous injection of (10,000) epinephrine was used only for patients who were beginning to develop angioneurotic edema. This measure does not help patients with florid angioneurotic edema. Hydrocortisone and antihistamine were administered intravenously, every 4-6 hours in order to control the hypersensitivity reaction.[6]

When these results we compared with the previous results obtained 10 years before, it was found that cases increased by 4 fold Table (1). Male: female ratio remained but the same with female predominate. Children in this study have increased in number. Clinical presentations of paraphenylenediamine (hair dye) intoxication in this study were similar to the international, national and the pervious study.[1, 2, 3, 5, 7, 11]In both studies conducted at Wad Medani Teaching Hospital, the percentages were almost the same except for the marked reduction in angioneurotic edema and stridor in the later study. This regression supports the phenomenon of desensitization noticed in the previous study. [2, 4, 6] The decrease in the number of patients presenting with angioneurotic edema and stridor was reflected in the reduction of tracheotomy operations (24.7%), which is comparable to the results obtained by Kallel et al (15.8%).[13]In these two studies at Wad Medani Teaching Hospital we never used endo-tracheal intubations in HDP, but Kallel et al they used this procedure in 68.4% of patients.

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In this study the mortality rate regressed significantly, possibly due to the awareness of the public and medical staff and adoption of a protocol for the management these patients. Table (1).

Conclusions and Recommendations: Hair dyes containing PPD are widely used by Sudanese for henna purposes with resulting severe morbidity and mortality. In this study the desensitization phenomenon was confirmed and more cases of dye poisoning are presenting without the development of angioneurotic edema and airway obstruction. Mortality rate regressed possibly due to the awareness of the public and medical staff. Measures to increase the public awareness and legislate for eradication and abolishing the use of this lethal substance should be activated.

Table (1): The mode of hair dye poisoning; and the mortality rate.

Mode	Number of patients			Outcome
	Children	Adult males	Adult females	
Accidental	7 2	0 2	0 0	No death 0
Homicidal	2 1	1 3	0 0	3 deaths 4
Suicidal	6 0	5 4	76 110	7 deaths 23
Total	15 3	6 9	76 110	10 27

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%	**15.4** **2.6**	**6.2** **7.4**	**78.4** **90**	**10 .3** **(22.1)**

NB: The numbers in the bottom (in red color) are the No. of patient in the ten year comparative study.

Table (2): Clinical presentation of hair dye poisoning.

Presenting signs and symptoms	No. of patients	%
Angioneurotic edema and stridor	24 50	24.7 61
Dark discoloration of urine	97 122	100 100
Flaccid paraplegia	17 51	17.5 62.2
Convulsions	07 05	07.2 6.1
Cranial nerves palsies	12 10	12.4 12.2
Abdominal pain	30 20	31 24.4

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NB: The numbers in the bottom are the No. of patient in the ten year comparative study.

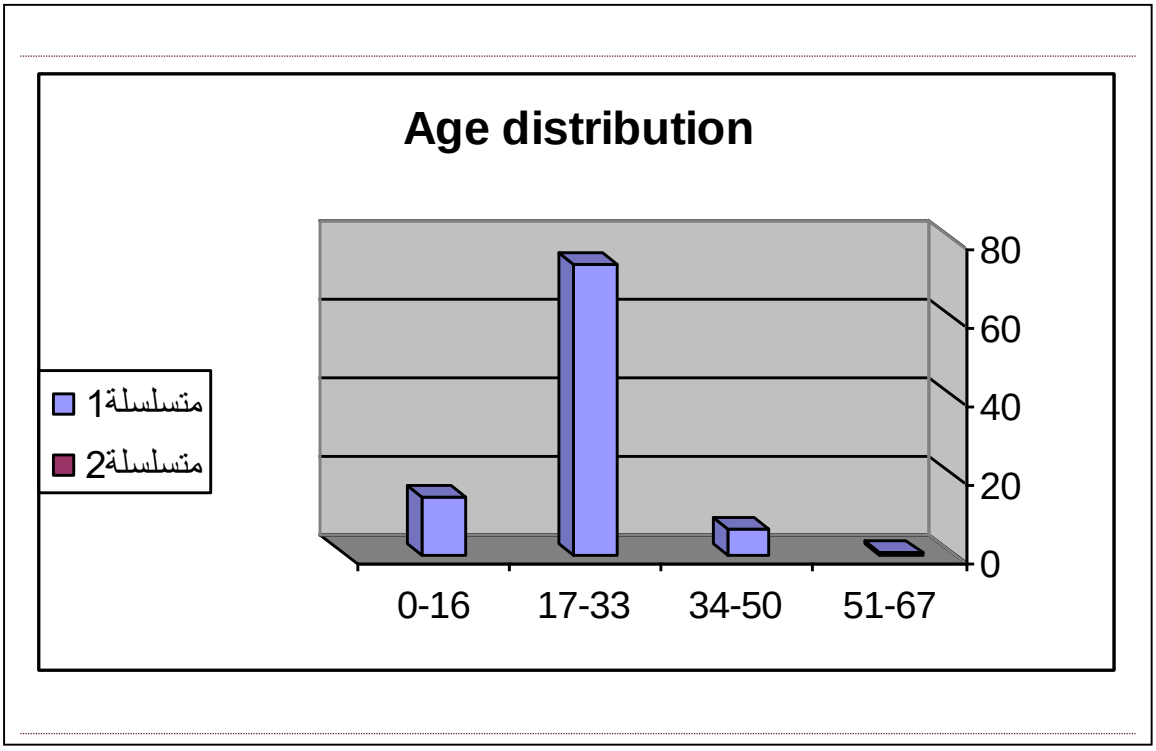

Figure (1) Age distribution of the studied population

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References

1. Vanessa Ngan, staff writerFisher's Contact Dermatitis. Ed Rietschel RL, Fowler JF. Lippincott Williams & Wilkins 2001Last updated 17 Mar 2008. © 2008 NZDS. Disclaimer.

2. Suliman SM, Fadlalla M,Nasr ME et al. Poisoning with hair dye containing paraphenylene diamine.Sudia J Kid Dis Transplant 1995; 6 (3):286-289.

3. American Conference of Governmental Industrial Hygienists, Inc. Documentation of the threshold limits values and biological exposure indices. 6th ed. Volumes I, II, III. Cincinnati (OH) 1991: 1335.

4. Yagi H, Hind AM, Khalil SI. Acute poisoning from hair dye. East Afr. Med J. 1991 Jun; 68(6):404-11.

5. Judith KL. Cosmetics and Toilet Articles. In: Haddad LM, Shannon MW and Winchester JF, editors. Clinical management of poisoning. WB Saunders Company; 1998. P.1169-74.

6. 6. El Mustafa O.M. Hair dye poisoning Gezira experience. J ABM S 2001 vol 3no 2 :99-102.

7. El Giali D A, El Mustafa OM. Psychiatric manifestations in hair dye poisoning.Jour J ABM S 2001; 3, 2:96-98.

8. Zeggwagh AA, Abouqal R, Abidi K, Madani N, Zekraoui A, Kerkeb O. Left ventricular thrombus and myocarditis induced by paraphenylenediamine poisoning. Ann Fr Anesth Reanim 2003;22:639-41.

9. Ababou A, Ababou K, Mosadik A, Lazreq C, Sbihi A. Myocardial rhabdomyolysis following paraphenylene diamine poisoning. Ann Fr Anesth Reanim 2000;19:105-7.

10. Abdulla KA, Davidson NM. A woman who collapsed after painting her soles. Lancet 1996;348:658.

 online ISSN 1858-6279 ISSN 1858-6155

11. Ashar A. Acute Angioedema in paraphenylenediamine poisoning. J Pak Med Assoc 2003; 53:120-2.

12. Rudzi E, Kleniewska D. The epidemiology of contact dermatitis in Poland Br J Dermatol 1970; 83:543-5**.**

13. Kallei H, Chelly H, Dammak H, Bahloul M, Ksibi H, Hamida CB et al. Clinical manifestation of systemic paraphenylene diamine intoxication. J Nephrol 2005 May-Jun; 18(3):308-11.

14. Bourquia A, Jabrane AJ, Ramdani B, Zaid D. [Systemic toxicity of paraphenylenediamine. 4 cases] [Article in French]. Presser Med. 1988 Oct 15; 17(35):1798-800.

15. Gosselin Re, Hodge HD, Smith RP el al: Clinical toxicology of commercial products, 4th Ed, Baltomore, Wiliams and Wilkins, 1976.

 online ISSN 1858-6279 ISSN 1858-6155