



HAIR DYE: A COSMETIC BLISS, AN OPHTHALMIC SCOURGE

Ophthalmology

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ABSTRACT

PURPOSE- prospective study of the effect of hair dye containing paraphenylenediamene and other aromatic amines on human eyes**BACKGROUND-** Irrespective of economic and education status, people dye their hair to emphasize the importance given to appearance. This paper provides a comprehensive study on various adverse effects of hair dying products containing para-phenylene-diamene and other aromatic amines**MATERIALS AND METHODS:** 32 patients attending the Department of Ophthalmology, with h/o hair dye usage were included and enquired for chief complaints, detailed history of the use of hair dye (name of dye, its active ingredients, duration of use, periodicity of use, amount of dye used, any side effect or any allergic manifestation) and detailed ophthalmic examination with more emphasis on slit lamp examination and refraction of the patient.**RESULT-** most common presentation was with ocular irritation accounting for about 80% patients. Allergic conjunctivitis was found in 15 patients (46.8%), posterior blepharitis in 11 (34.4%), periocular dermatitis in 4 (12.5%), corneal epithelial defects in 1 and angioneurotic edema in 1 constituting about 6% together. There were 26 females against 16 males and the mean age group is found to be 35-50 yrs**CONCLUSION-** Hair dye (paraphenylenediamene & other aromatic amines) is potentially toxic to ocular structures leading to posterior blepharitis, allergic conjunctivitis, periocular dermatitis, corneal erosions and angioneurotic edema in decreasing frequency affecting middle aged with females outnumbering males.

KEYWORDS

INTRODUCTION

- Irrespective of economical and educational status, people dye their hair to emphasize the importance given to appearance.
- This paper provides a comprehensive study on various adverse effects of hair dying products containing para-phenylenediamene and other aromatic amines
- p-phenylenediamine or p-diaminobenzene or urso-D ($C_6H_8N_2$) is commonly used product for cosmetic purposes in this modern age of beauty consciousness. It is readily soluble in water and darkens on exposure to air. By virtue of this property, it is being used as hair dye in humans¹.
- Toxic effects in the form of dermatitis, conjunctivitis corneal ulcers, cyclitis, secondary glaucoma, gangrene of lids, optic neuritis and proptosis have been recorded along with harmful effect on the lens¹.
- Hair dyes - classified into mainly five types²:
 - Type I - Permanent hair dyes : These are mixtures of colorless, aromatic compounds that act as primary intermediates and couplers. Primary intermediates include paraphenylenediamine (PPD), para-toluene diamine and para-amino phenol. Ammonia causes the hair to swell-up and increase penetration.
 - Type II - Semi-permanent hair dyes: These contain low molecular weight nitro phenylene diamine and anthraquinone dyes that penetrate hair cortex to some extent
 - Type III - Temporary rinses :These are mixtures of mild organic acids and certified dyes that coat the hair shaft.
 - Type IV- Vegetable dyes : They contain henna from leaves of *lawsonia indica*. Rarely type I & IV hypersensitivity reactions are attributed to henna.
 - Type V - Metallic dyes : Contain lead acetate and sulphur which on deposition as lead oxide sulfides impart yellow -brown to dark gray colour.

PURPOSE

It is a prospective observational study of the effect of hair dye containing para-phenylene-diamene and other aromatic amines on human eyes

MATERIALS & METHODS

- 32 patients attending Ophthalmology out patient department at Burla with h/o hair dye usage were included and enquired for:
- chief complaints,
- detailed history of the use of hair dye (name of dye, its active

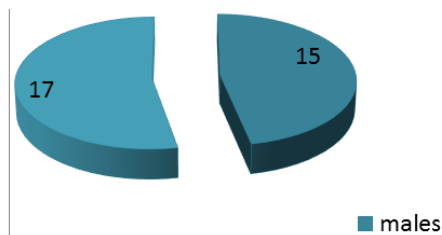
ingredients, duration of use, periodicity of use, amount of dye used, any side effect or any allergic manifestation) and

- detailed ophthalmic examination with more emphasis on slit lamp examination.

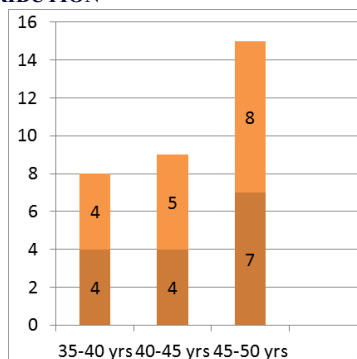
RESULT

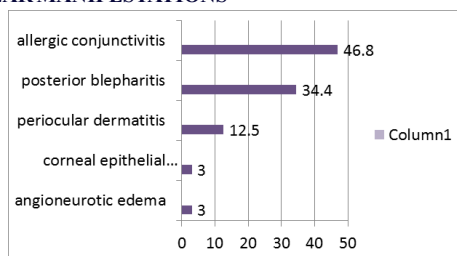
- Most common presentation was ocular irritation accounting for about 80% patients.
- allergic conjunctivitis was found in 15 patients (46.8%), Posterior blepharitis in 11 (34.4%), periocular dermatitis in 4 (12.5%), corneal epithelial defects in 1 and angioneurotic edema in 1 constituting about 6% together.
- There were 17 females against 15 males and the mean age group is found to be 35-50 yrs
- visual acuity was not affected in most of the cases

SEX DISTRIBUTION



AGE DISTRIBUTION



OCULAR MANIFESTATIONS**DISCUSSION**

- paraphenylenediamine is an aniline dye and its molecular weight is 108.14, boiling point 267°C, melting point 140°C, soluble in 100 part cold water. Maximum lethal dose in rabbits is 250 mg/kg body weight.
- In the literature two types of reactions³ have been described with paraphenylenediamine.
- Acute toxic reactions which include conjunctivitis, corneal ulcers, lid gangrene, proptosis and cyclitis.
- Allergic reactions which includes dermatitis, angioneurotic oedema, allergic conjunctivitis and retrobulbar neuritis.
- Both these reactions are of acute onset and so easily noticeable.
- Hair dye can reach the eye and lens in particular through systemic or local absorption. Para-phenylene-di-amine has got three important properties.
- Firstly it is an anion,
- secondly its aqueous solution rapidly absorbs oxygen and
- lastly it readily reacts with all carbohydrates and forms benzimidazoles
- Jain⁷ et al. reported cataractogenous effect of hair dyes in 1981.

CONCLUSION

- Hair dye (paraphenylene diamine & other aromatic amines) is potentially toxic to ocular structures leading to allergic conjunctivitis, posterior blepharitis, periocular- dermatitis, corneal erosions and angioneurotic edema in decreasing frequency affecting middle aged.
- Need for further extensive studies due to paucity of literature

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3. <http://www.ijo.in/article.asp?issn=0301-4738;year=1981;volume=29;issue=3;spage=283;epage=288;aulast=Jain>