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Ocular Allergy: A Review on Ocular Effects of Cosmetic Products

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ABSTRACT

The eyes are the windows to the body, healthy brain function needs healthy eyesight. Recently so many problems arise due to the unsafe use of ocular cosmetics. Eye cosmetics can cause ocular allergy or toxicity. It produces mild discomfort to serious vision threatening problems. This review focus on the reason as well as problems associated with ocular cosmetics. Based on the data from various reviews and research shows that preservatives, metals & fragrances include in the products are the main causative agents for ocular allergy. The main adverse reactions were found to be allergic blepharo conjunctivitis, disruption of the tear film and other inflammatory reactions. The purpose of this article is to give a general awareness about the safe use of ocular cosmetics to get rid of ocular allergy.

Keywords: Ocular cosmetics; Ocular Allergy; Allergic contact blepharo conjunctivitis; inflammatory reactions.

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INTRODUCTION

Nowadays lots of ocular adverse effects are produced by cosmetic products. It can be graded as mild discomfort to vision threatening condition. Most of the eye cosmetics are causing allergy or toxicity.[1] Adverse reactions due to cosmetics are mainly as the result of sensitization to preservatives, fragrances and dyes used in these products. Metals such as nickel, cobalt, chromium and lead are used in products like eye shadow & eye liner in amount greater than the recommended amount of 1ppm.[2] Fragrances and other additives can also causes ocular allergy and other discomforts.

OCULAR COSMETICS

1. Mascara

These are eyelash enhancement products. It causing simple pigmentation & it used to darken, thicken or lengthen and also it define the eyelashes. Allergic responses to mascara include an asymptomatic follicular response of the tarsal conjunctiva. Contact dermatitis of the eyelid can also results from mascara use, as well as mascara applicator can cause mechanical corneal abrasion.[3] When we use mascara contaminated with *Pseudomonas aeruginosa* like organism it may further cause secondary infections on the abraded cornea. These all occurs due to the presence of various components of mascara like black iron oxide,[4] colophony [5] nickel, prime yellow carnauba wax [6], coathylene and shellac.

2. Coloured contact lenses

Coloured and decorative contact lenses change the appearance of eyes & they can also work to correct vision. Sometimes it is dispensed by unauthorized personal; they do not provide patient education regarding correct and effective use of contact lenses. [7] It is not for coloured only, it can be occurs with general contact lens wear. Mainly the complications associated with contact lens wear include limbic kerato conjunctivitis, allergic conjunctivitis, giant papillary conjunctivitis, peripheral infiltrate, microbial keratitis and neovascularization.[8] In addition iridocyclitis contact lens overwear syndrome, tight lens syndrome can occur.

3. Eye shadows and eyebrow enhancers

Toluene diamie and paraphenylene diamine are the traditionally using dyes in eyelashes and brows, which provides a dark pigment. These can be cause

hypersensitivity in some users and causes eye contact dermatitis, kerato conjunctivitis and blephiritis. Parphenylene diamine can cause eye contact dermatitis with lid edema chemosis and exophthalmous due to orbital edema.[9]

EXAMPLE OF COSMETIC –INDUCED ALLERGY

Nowadays the adverse events associated with eye cosmetics are increasing and reported to a large extend. Based on a study conducted in Belgium with 14911 patients during a specific period the determining factor for allergic contact dermatitis found that incidence of cosmetic ocular allergy was increasing 19.4% from 1990 to 1994 -25.1% from 2010 to 2014.[10] This study shows that raised use of cosmetics and influence of fashion sensation.

POSSIBLE SOURCES OF SENSITIZATION IN COSMETICS

Preservatives

Preservatives in cosmetics are mainly used to prevent contamination by microorganism. Preservatives which are mainly used in eye cosmetics are Thiomersal, benzalkonium chloride, chlorhexidine, chlorobutanol, methylchloro-isothiazolinone or methylisothiazolinone and parabens.[11] These chemicals can cause allergic reactions on the ocular surface as well as in periocular area.[12] Among this 10% can contribute allergic reactions. In addition to this some of them cause ocular irritation and discomfort due to chemical reactions.eg: Kathon CG. [13]

Metals

It is recommended that eye cosmetics should contain amount of metal should be less than 1ppm. Most of the eye cosmetics contain nickel, cobalt and chromium like metal allergens.[14] These may cause eyelid dermatitis and ocular allergy. A Korean study conducted in 2016 showed that eye shadow and brows contained nickel, cobalt and chromium.[16] Chemical such as titanium dioxide can also cause eye lid edema and dermatitis.[17]

Fragrances

Around thousands of fragrance exists in our world among this 26 of them identified as allergens to human. Most commonly using fragrances that include eugenol, cinnamal, cinnamyl alcohol& balsm of Peru etc. in a retrospective study conducted on 115 individuals with contact dermatitis, among 95.8% were due to fragrances used in eye cosmetics.[18] In eye shadows, the cause of allergic reaction was due to fragrances like oak moss, isoeugenol, hydroxycitronellal, balsm of Peru and colophonium.

PROBLEMS ASSOCIATED WITH OCULAR COSMETICS

Allergic contact blepharoconjunctivitis

Allergic contact blepharoconjunctivitis (ABC) is a disease mainly caused by ocular cosmetics. It is a lymphocyte mediated hypersensivity reaction with symptoms like conjunctival hyperaemia, pruritis, redness, scales on eye lashes and eyelid edema. 4779 patch test population were studied in Germany among them 5% showed contact allergy in the periorbital area and allergic conjunctivitis.[19] In a Korean study of 983 individual 6.8% of them suspected of having contact dermatitis in eyelids. Based on literature report female population are more prone to ocular allergy than male due to over use of cosmetics. [16]

Inflammation and irritation

Inflammatory conditions induced by eye cosmetics mainly affecting the eyelid, conjunctiva tear film and cornea. It is mainly cause by the chemicals used in the eye cosmetics. Movement of these chemicals from eyelid margin to tear film, conjunctiva causes irritation and ocular discomfort. [20]

Mechanical trauma

Mascara applicators can cause mechanical corneal abrasion. So there is a chance of secondary infection, if mascara previously contaminated with *Pseudomonas aeruginosa*.[21]

Disruption of tear film

Tear film consist of three layers. They are outer lipid layer, middle water layer and inner muscle layer. Lipid layer help in decreasing the rate of evaporation of tear and maintain tear stability. Hyper osmolarity of tear film occur when the layer is thinner due to excess evaporation. This leads to irritation and inflammation. [22] It is not treated properly can damage the ocular surface. Application of thick eyeliner and mascara can leads to impaired lipid secretion. Cosmetics such as eye shadow mascara and others like anti aging under eye cream, anti acne creams and rejuvenating cream many of them containing vitamin A and retinoic acid derivatives. Vitamin A is recommended for corneal and conjunctival maintenance and it can be obtained for anyone consuming a normal diet. So that an external supply of vitamin A is probably not at all required. Retinoic acid derivatives have profibrotic activity.[23] These types of creams and other cosmetics can cause development of conjunctivitis and dry eye diseases.

PRECAUTIONS TO AVOID OCULAR ALLERGY DUE TO EYE MAKEUP PRODUCTS

- Avoid sharing of cosmetic products
- Never use eye cosmetics if you have an eye infection
- Do not moisten cosmetic products
- Do not use old eye cosmetics
- Discard make up after colour, odour and texture alteration
- Store all the cosmetics at temperature below 85°F and keep away from moist places
- Does not use make up products which contain heavy metal salts such as lead.
- Avoid use of old applicator in new products
- Replace make up after bacterial infection

CONCLUSION

The trends of cosmetic utilization have increased globally. Cosmetics that are used on the eyes are imperative. Substances used to increase beauty may results in adverse effects on the ocular surface. Cosmetics should be easy for application, secure and effective. Ocular cosmetics may aggravate a number of inflammatory and ocular infections. Main adverse events include allergic contact blepharo conjunctivitis, disruption of tear layer and other inflammatory reactions.

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