

Types of Ocular Surface Foreign Bodies and Their Correlation with Location in the Eye

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Purpose: To find the aetiology of ocular surface foreign bodies and correlation with their location in the eye.

Study Design: Cross sectional study.

Place and Duration of Study: This study was conducted at Shahida Islam Teaching Hospital affiliated with Shahida Islam Medical College, Lodhran from November 2016 to October 2017.

Material and Methods: Age and gender were recorded for all patients. Detailed slit lamp examination was performed. Location of the foreign body was noted. Superficial foreign bodies were removed with the help of forceps. In case of impaction in the ocular surface foreign bodies were removed with the help of sterile 27/26 gauge needle.

Results: There were 796 patients with ocular surface foreign bodies included in this study. Corneal injuries were most common. Most common location for different foreign bodies included metallic particle on cornea in 104 eyes (13.1%), insect wing in upper lid sub tarsal space in 75 eyes (9.3%), straw particles on cornea in 60 eyes (7.5%), piece of plastic on cornea in 24 eyes (3.0%), whole insect or fly in inferior fornix in 12 eyes (1.5%), thread/cloth particle in upper lid sub tarsal space in 17 eyes (2.1%), dust particles on cornea in 54 eyes (6.8%) and contact lens in the superior fornix in 2 eyes (0.3%). No statistically significant correlation was found between the aetiology of ocular surface foreign body and their location in the eye.

Conclusion: Most common aetiology of ocular surface injury was metallic particle and most common location was cornea.

Key words: Foreign bodies, Ocular, Metallic, Corneal injuries.

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Trauma to the eye is a preventable cause of ocular injury. It is one of the leading causes of ocular morbidity^{1,2,3}. A large number of hospital visits are due to eye injury⁴. Superficial ocular surface foreign body injury is the most common form of ocular trauma. It causes significant discomfort and if not properly managed can lead to permanent visual impairment. A patient may encounter this type of injury in a variety of settings for example at home, while playing, at work or as a result of accident or

assault⁵.

Usually ocular surface foreign bodies are small in size⁶. They are particles of iron, dust, insect wings, straw of vegetable matter, animal or human hair and threads of cotton or plastic. In most of the cases ocular surface foreign bodies are found on cornea and palpebral conjunctival surfaces. They may also be found in fornices, sub tarsal space and caruncle. Patients experience pain, foreign body sensation,

watering and redness. If left untreated and not properly managed they can lead to erosion of underlying surface, establishment of infection, spread of infection leading to infective keratitis, conjunctivitis and endophthalmitis⁷.

Thorough eye examination including upper lid eversion is necessary in patients with history of foreign body. Insects recovered from the eyes need to be examined by entomologist to identify its nature, species and toxic effects if any. This may help in planning proper and targeted spray to seasonal crops to decrease the number of insects. This is useful in rural and semi-urban areas in term of economics, by reducing damage to the crops. Identification of the type of foreign bodies and their location of impaction into the eye will help in creating awareness and use of appropriate eye protective devices. This study was done to find the causes of ocular surface foreign bodies in a rural setting.

MATERIAL AND METHODS

This prospective study was conducted in Ophthalmology department of Shahida Islam Medical College Lodhran. Duration of the study was from November 2016 to October 2017. The study was approved by the ethical committee of the institution. Consent was obtained from all patients who were included in the study. All patients coming in eye outpatient department with foreign body in eye were included in the study. This was a cross sectional study and sampling technique was purposive sampling.

Age and gender were recorded for all patients. Detailed slit lamp examination was performed. Fluorescein dye was instilled in the eye to delineate the location of the foreign body. Topical anaesthesia was given by instilling proparacaine 0.5%. Superficial foreign bodies were removed with the help of forceps. In case of impaction, the ocular surface foreign bodies were removed with the help of sterile 27/26 gauge needle. After removal of the foreign body topical antibiotic drops was instilled into the eye. Postoperatively topical antibiotic eye drops were prescribed for seven days. Statistical analysis was performed using statistical programme for social sciences (SPSS version 21).

Nominal variables like gender, type and location of foreign body were presented as percentages. Continuous variable like age was presented as mean and standard deviation. Correlation of the type of foreign body with their location in the eye was calculated using Pearson's R correlation.

RESULTS

Total of 796 patients with ocular foreign bodies were included in the study. On average 2.18 patients with ocular surface foreign bodies presented per day. There were 378 (47.5%) right eyes and 411 (51.6%) left eyes. There were 7 (0.9%) bilateral cases. There were 568 (71.4%) males and 228 (28.6%) females. Male to female ratio was 2.5:1. Frequency and percentages of the type of foreign body are shown in table 1.

Table 1: Aetiology of ocular surface foreign bodies.

Type of Foreign Body	Frequency	Percent
Insect wing	204	25.6
Metallic ring	216	27.1
Straw particle	156	19.6
Plastic	48	6.0
Insect/fly	24	3.0
Thread/cloth particle	34	4.3
Dust particles	112	14.1
Contact lens	2	0.3
Total	796	100.0

Frequency and percentage of location of foreign bodies is shown in table 2. Frequencies of location of at Different locations of foreign bodies in the eye are shown in table 2. Mean age of patients was 38.58 ± 21.49 years and the mode age was 45 years.

The correlation between the aetiology of foreign body and their location in the eye was found to be 0.088 (Pearson's R correlation; Chi-square test). Correlation line between aetiology of ocular surface foreign body and location in the eye is shown in figure 1. Results showed there was no statistically significant correlation between the aetiology of ocular surface foreign body and its location in the eye. Pictures of different foreign bodies seen in the study are shown in figures 2-4.

Table 2: Distribution of location of foreign bodies.

Location of Foreign Body	Frequency	Percent
Corneal	320	40.2
Palpebral conjunctival	147	18.5
Upper lid sub tarsal	222	27.9
Inferior fornix	51	6.4
Superior fornix	14	1.8
Caruncle	42	5.3
Total	796	100.0



Figure 2: Straw Particle at Cornea.

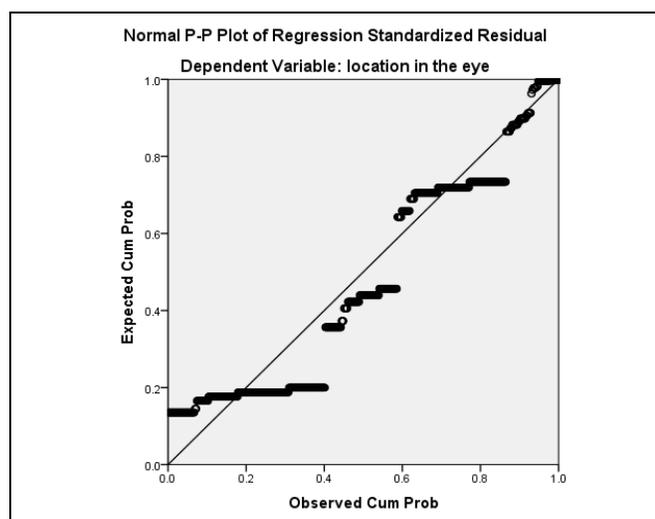


Figure 1: Regression line for aetiology of ocular surface foreign body and their location in eye.

Key:

X axis = Type of foreign body.

Y axis = Location in the eye.

DISCUSSION

On an average 2.18 patients with ocular surface foreign bodies presented per day. Ocular injury with ocular surface foreign bodies was more common in males than females. Male to female ratio was 2.5:1. This is in close approximation to that presented by Reddy et al⁸. Males are at greater risk to trauma due to their exposure in occupation, travelling and assaults⁹. Mean age in our study was 38.58 ± 21.49 years. Jahangir T and co-authors reported mean age of 28.6 ± 17.6 years¹⁰. In another study the mean



Figure 3: Insect in Inferior Fornix.



Figure 4: Metallic Particle at Cornea.

age of the patients was reported to be 35 years.

In 40.2% cases cornea was involved, in 18.5% cases palpebral conjunctiva, in 27.9% cases upper lid sub tarsal conjunctiva, in 6.4 % cases inferior fornix, in 1.8% cases superior fornix and in 5.3% cases caruncle was involved. This is in contrast to study conducted by Reddy et al where cornea was involved in 71.9% cases and in 28.03% cases conjunctiva and fornices were involved. In another study¹¹ conducted by Ozlem et al cornea was involved in 72.6% cases. This difference may be due to occupational variations^{12,13}. Our study was conducted in a rural and semi urban area where most of the population is involved in agriculture and fields works. Corneal injuries most commonly occur due to metallic foreign bodies¹⁴. This sort of injury is commonly seen in occupations associated with engineering and industry^{15,16}.

Ocular surface foreign bodies are found in different locations in the eye. This emphasizes the importance of thorough eye examination in case with history of foreign body in the eye.

In our study metallic particle was seen in 27.1% cases. This is less than the injury by metallic particles in other studies. While in other studies similar percentage of metallic particle injuries is reported¹⁷. In 25.6% cases part of insect body was recovered from the eye. It may be due to driving practices of people. Most of the people riding a bike and cycle do not use helmets and eye wear to protect them from foreign bodies¹⁸. In 19.6% cases straw particles were found. This is due to agricultural background of the region¹⁹.

In our study left eye was more commonly injured in contrast to the study done by Reddy et al where right eye was more commonly involved.

Ocular surface foreign bodies are found in all parts of the ocular surface. More exposed parts like cornea and palpebral conjunctiva are more prone to get such sort of injuries. Sub tarsal space gets foreign bodies due to its anatomical configuration^{20,21}. In our study there was no statistically significant correlation of type of ocular surface foreign bodies with their location of placement in the eye. Search of literature could not reveal such type of correlation study. So we could not compare our results with the work of others.

We did not include the profession and occupation of the patients in our study. This is limitation of our study. Moreover our study is limited to semi urban and rural area. Our results may not be applicable for other settings.

CONCLUSION

Ocular surface foreign bodies are common form of ocular trauma. More exposed parts of the ocular surface receive majority of trauma due to superficial foreign bodies. Most common aetiology of ocular surface injury was metallic particle and most common location was cornea. No statistically significant correlation has been found between the type of ocular surface foreign body with their location in the eye.

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Dr. Muhammad Luqman Ali Bahoo
Concept and design of study and interpretation of data

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Drafting of the article and critical revision for important intellectual content

REFERENCES

1. **Jan S, Khan S, Khan MT, et al.** Ocular emergencies. *J Coll Physicians Surg Pak.* 2004; 14: 333-6.
2. **Guerra Garcia RA, Garcia D, Martinez FE et al.** The Cuban ocular trauma registry. *J Clin Exp Ophthalmol.* 2013; 4 (2): 276.
3. **Negral AD, Thylefors B.** The global impact of eye injuries. *Ophthalmic Epidemiol.* 1998; 5: 143-69.
4. **Babar TF, Khan MN, Jan S, et al.** Frequency and causes of bilateral ocular trauma. *J Coll Physicians Surg Pak.* 2007; 17: 679-82.
5. **Khatri SK, Lewis AE, Schein OD, et al.** The epidemiology of ocular trauma in rural Nepal. *Br J Ophthalmol.* 2004; 88: 456-60.
6. **Injuries to the eye.** **Sihota and Tandon,** editors. *Parson's disease of the eye.* 20 Edition. New Delhi: Elsevier; 2007: 362-4.
7. **Abraham D, Vitale S, West S, et al.** Epidemiology of eye injuries in rural Tanzania. *Ophthalmic Epidemiol.* 1999; 6: 85-94.

8. **Subba Reddy, P., Nirmala, K., Radhika, S., Ravi, S., Paul, C.** Incidence of Ocular Surface Foreign Body and its Correlation with Specific Occupation and Preventive Measures. *Global journal for research analyses*, 2016; 5 (12): 56-8.
9. **Babar, T. F., Khan, M. T., Marwat, M. Z., Shah, S. A., Murad, Y., Khan, M. D.** Patterns of ocular trauma. *J Coll Physicians Surg Pak*. 2007; 17 (3): 148-153.
10. **Jahangir, T., Butt, N. H., Hamza, U., Tayyab, H., Jahangir, S.** Patterns of Presentation and Factors Leading to Ocular Trauma. *Pak J Ophthalmol*. 2011; 27 (2): 96-102.
11. **Güzel M, Erenler AK, Niyaz L, Baydın A.** Management of traumatic eye injuries in the emergency department. *OA Emergency Medicine*, 2014; 18 (1): 1-6.
12. **Fasih U, Shaikh A, Fehmi MS.** Occupational ocular trauma (Causes management and prevention). *Pak J Ophthalmol*. 2004; 20: 65-73.
13. **Mieler WF.** Ocular injuries: is it possible to further limit the occurrence rate? *Arch Ophthalmol*. 2001; 119: 1712-3.
14. **Rama Krishnan T, Constantinous M, Jhanjiv, et al.** corneal metallic foreign body injuries due to suboptimal ocular protection. *Arch Environ Occup Health*, 2012; 67 (1): 48-50.
15. **Voon, L. W., See, J., & Wong, T. Y.** The epidemiology of ocular trauma in Singapore: perspective from the emergency service of a large tertiary hospital. *Eye (Lond)*. 2001; 15 (Pt 1): 75-81.
16. **Gumus K, Karakucuk S, Mirza E.** Corneal injury from a metallic foreign body: an occupational hazard. *Eye & contact lens*, 2007; 33 (5): 259-60.
17. **Yigit O, Yuruktumen A, Arslan S.** Foreign body traumas of the eye managed in an emergency department of a single institution. *Turkish journal of trauma & emergency surgery*, 2012; 18 (1): 75-9.
18. **Tahira MN, Hawortha N, Kinga M, Washingtona S, editors.** Observations of Road Safety Behaviours and Practices of Motorcycle Rickshaw Drivers in Lahore, Pakistan *Australasian Road Safety Conference*, 2015; 14-16 October; Australia.
19. **Dass RI, Gohel DJ.** Ocular surface foreign body: its incidence and correlation with specific occupation. *GCSMC J Med Sci*. 2013; 2 (2): 42-5.
20. **Alastair Denniston, P. M.** *Oxford Handbook of Ophthalmology*, 2014; Oxford: OUP Oxford.
21. **Bowling, B.** *Kanski's clinical ophthalmology a systematic approach*, 2015; Sydney: Saunders.