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Occupational anterior segment foreign bodies: Epidemiology and management

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Abstract:
Ocular trauma is considered a major cause for visual impairment. The intra ocular foreign bodies represent an important cause of visual morbidity especially amongst the working population.
A retrospective cross-sectional study was conducted in the emergency ophthalmology department of 20 Aout 1953 teaching hospital in Casablanca. All medical and surgical records of adult patients admitted between October 2018 and March 2019 for work related eye injuries were reviewed . 130 patients were included in the study. The mean age of the patients was 32.20 (±7.5) years. Only 29.75% (n=36) of patients were wearing protecting devices during work accidents. 42.31% (n=55) patients were medically insured. The mean time between ocular trauma and consultation was 1.5(±1.22) days. Corneal opacities were the most frequent complication noted in 34.61% (n=45) of patients. 15.38% (n=20) of patients presented a bacterial keratitis. In 7.69 % cases (n=10), patients developed endophtalmitis. Educating the employees regarding the visual impact of intraocular foreign bodies is necessary

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I. Introduction:

Ocular trauma is considered a major cause for visual impairment. The intra ocular foreign bodies represent an important cause of visual morbidity especially amongst the working population. Ocular injuries, may result in significant economic burdens due to work absenteeism, expensive hospitalization and prolonged follow-up. The management of intraocular foreign bodies is a challenge to the ophthalmologist, due to their frequency, the diversity of associated changes, the severity of complications, and the specificity of diagnosis and treatment.

Purpose:

To describe the profile of patients who presented with anterior segment intraocular foreign bodies (AS-IOFB) and to analyze their attitude and its correlation to the prognosis.

II. Patients and methods:

A retrospective cross-sectional study was conducted in the emergency ophthalmology department of 20 Aout 1953 teaching hospital in Casablanca.

All medical and surgical records of adult patients admitted between October 2018 and March 2019 for work related eye injuries were reviewed on condition of anonymity.

Demographic data included age, sex, profession, health insurance status, and time between injury and repair.

The clinical variables included detailed information about foreign bodies, such as the size, number, type, and location, and the time before IOFBs removal were obtained from the patients' records. Complications such as keratitis, corneal opacities, cataract and endophthalmitis were also noted.

Patients presenting with superficial corneal foreign bodies didn't require further exams. In case, of more profound localization, an anterior segment optical coherence tomography or ultrasound biomicroscopy was performed.

All data were collected and entered into an electronic database. Statistical analyses were performed with. A value of <0.05 was considered statistically significant.

III. Results:

130 patients were included in the study. The mean age of the patients was 32.20 (±7.5) years. Only 29.75% (n=36) of patients were wearing protecting devices during work accidents. 42.31% (n=55) patients were medically insured. The mean time between ocular trauma and consultation was 1.5(±1.22) days. The demographic data was as below:

Table 1. Demographic characteristics of patients

Demographic characteristics of the patients		
Age mean (SD) years	32.20 (±7.5)	
Sex(number)	Male	92.31 % (n=120)
	Female	7.69% (n=10)
Affected eyes	Right	66.92% (n=87)
	Left	33.08 %(n=43)
Professional activity (number)	Hammering	46.92% (n=61)
	Cutting	36.15% (n=47)
	Explosion	15.38% (n=20)
	Car accident	1.54% (n=2)
Previous anterior segment foreign bodies	30.80%(n=40)	

When the patients were inquired about health education on safety from occupational hazards, 36.92% (n=48) reported having received adequate education while the rest didn't receive any education. 61.54% (n=80) patients were aware of their occupation holding a risk for eye injury.

The material of the foreign bodies varied as follows: metal in 57.69% (n=75) cases, stone in 26.15% (n=34) of patients , plastic in 12.31% (n=16) cases and vegetable in 3.85% (n=5) cases. The size of foreign bodies varied from 0.05 to 4.00 mm (average: 0.93 mm).The localization of the foreign bodies was a as presented in figure 1

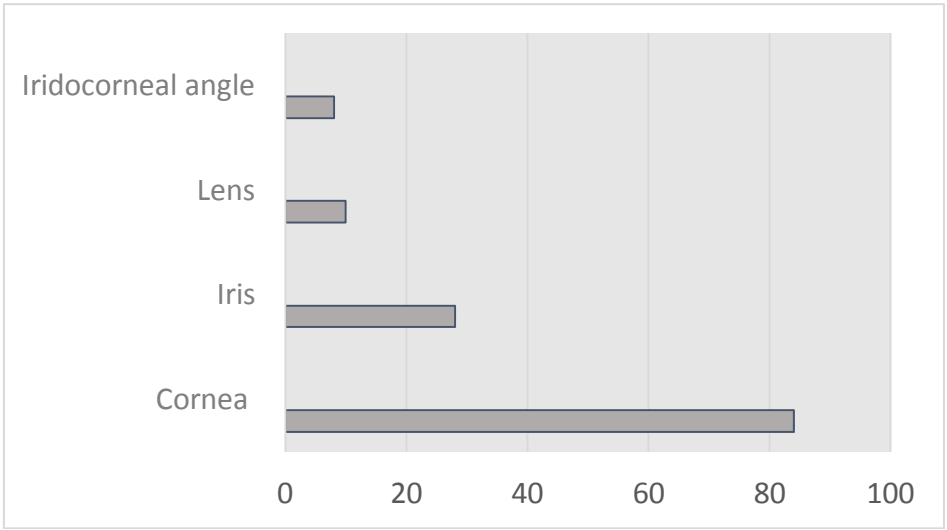

Figure 1; Localization of anterior segment intraocular foreign bodies

The ocular manifestations associated with anterior segments intra ocular foreign bodies were: corneal abrasions in 43.08% (n=56)cases , corneal lacerations in 30.77% cases (n=40), conjunctiva laceration in 16.92 % cases (n=22), hyphema in 23.85 cases (n=31), iridodyalisis in 16.15% (n=21) cases and cataract in 22.31% of patients (n=29). 8 patients presented with vitreous hemorrhage and 3 patients with an associated retinal detachment.

Corneal opacities were the most frequent complication noted in 34.61% (n=45) of patients. 15.38% (n=20) patients presented a bacterial keratitis. In 7.69 % cases (n=10), patients developed endophtalmitis. The factors associated with developing endophtalmitis are presented in table 2.

Table 2. Multivariate analysis of risk factors for endophtalmitis

Variable	p	OR	IC 95%
Age(>45ans)	0.025	1.24	1.00-2.45
Time before foreign body removal (>1day)	0.001	3.04	1.50-4.22
Nature of foreign body(metallic)	0.041	2.14	1.02-5.04
Size of foreign body(>2mm)	0.002	1.68	1.00-3.10
Localization of the foreign body(deep localization)	0.001	4.22	2.21-5.54

OR: odds ratio; 95% CI: 95% confidence interval.

The superficial corneal and foreign bodies were removed at slit lamp by using a gentle flicking motion with an **eye** spud. Surgical procedures included the following: corneal wound repair and foreign body removal in 29 cases, combined corneal wound repair associated to foreign body removal and cataract extraction in 11 case, foreign body removal associated with cataract surgery in cases in 18 cases.

IV. Discussion:

Occupational related ocular foreign bodies are one of the most commonly seen conditions in eye care practice. Besides causing mechanical damage to ocular tissues, intraocular foreign bodies retained in the eye can lead to persistent chemical damage and infection, thereby affecting visual function.

The characteristic features of the subjects presented with ocular foreign bodies in our study are in accordance with previous literature. A study led in a tertiary eye care center of Assam, India, showed that majority of the subjects were males (85.9%) and a mean age of 32 years. This study also found that 68.9% of injuries were workplace related injuries and corneal foreign bodies being the most common finding.(1) Charu et.al also conducted a study where a corneal foreign body was found to be present in 69% occupational related injuries. These findings concord with our study where the corneal foreign bodies where the most frequent(2).

Most of the subjects included were found to be engaged with activities with no usage of protection devices at the time of injury. This finding is in conjunction with the study results by S Ganesh et al. which aimed at assessing the awareness of utilization of safety measures at workplace. A lack of awareness in terms of safety measures among the workers was noted alongside the lack of institutional training(3). A study in Southwest China demonstrated that among a patient base of 453 patients, only 22.5% received safety training(4)

This can explain the rate of work related injuries. The tendency of the workers to underestimate the risk of eye injury while practicing their activity can also add to that. Charu et al. found that despite the low health education, 67% of patients that presented were aware that their occupation entailed the risk of eye injuries while ignoring the massive visual impairment these injuries can lead to(2). Performing unusual tasks is amongst the causes of work-related eye trauma. McGwin et al indicated that performing an unusual task and using an unusual tool were transient risk factors in various types of occupational injuries.(5)

In our study, corneal opacities were the most frequent complication noted in 34.61% patients. 15.38% patients presented a bacterial keratitis. The results were in accordance with Charu et al. findings with 24% patients developing corneal scars and 17% infectious keratitis.

Regarding the risk of endophtalmitis in the presence of IOFB , it was reported to increase with age(6). The reason was suggested to be the delay in trauma repair with age(7). Another study found that age was still significant even after adjusting for time of primary repair(8).In our study, the size of the foreign body, was correlated to endophtalmitis incidence. However literature findings suggest that it is more associated with the visual outcome(9,10). A higher risk in plant intraocular foreign bodies and a lower risk in glass/plastic compared to metallic intraocular foreign bodies was found(8). This can't compare to our study where the metallic nature was more associated with endophtalmitis, due to fact that plant foreign bodies were uncommon.

V. Conclusion:

Educating the employees regarding the visual impact of intraocular foreign bodies is necessary . Establishing regular educative workshops to raise awareness among employees for all business sectors especially the more affected metallic and construction industries and instituting vigorous laws regarding protection devices use might help prevent work related accident.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

Contribution of the authors:

All the authors participated in the care of the patient and the writing of the manuscript. All authors have read and approved the final version of the manuscript.

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