



An Analysis of Ocular Manifestations in Chemical Injuries Treated in A Tertiary Hospital

KEYWORDS

Ocular chemical injuries, alkali, acids.

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ABSTRACT *Ocular chemical injuries are widely prevalent and have a potential for severe visual disability. Aims and objectives: To determine which chemical agent is mostly involved in chemical injury, describe the pattern of presentation and grade the injury , and to evaluate the visual acuity after one month follow up with medical treatment. Material and methods:It is a prospective study of 50 patients who presented with ocular chemical injuries between october 2015 and march 2016 at a tertiary eye care hospital. Results: There was male prominence with male female ratio of 2.5:1 (male -36, female – 14). Those patients who presented early had better visual prognosis. The causative agent was alkali in 38 patients. The grade of injury was grade 1 and 2 in 38 patients (75%), suggesting conjunctiva and cornea are the most frequently affected structures. Conclusion: Acute ocular chemical injuries require urgent recognition and management*

Introduction:

Ocular chemical injuries are widely prevalent and have a potential for severe visual disability. Most victims are young males and exposure to chemical agents occurs in industrial accidents, at home, and in association with criminal assaults. Alkali injuries are more commonly encountered as they are commonly used in industries and in various domestic purposes. Chemical injuries produce extensive damage to ocular surface epithelium, cornea and anterior segment resulting in permanent unilateral or bilateral visual impairment. In this study, we analysed all the cases of ocular chemical injuries presented to our hospital during the last six months, and described the aetiology, pattern of presentation and visual outcome. The findings will help to suggest preventive measures as well as suggest ways of improving management.

Aim and objectives:

- 1) To determine which chemical agent is mostly involved in ocular chemical injury
- 2) To describe the pattern of presentation and grade the injury according to Hughes-Roper-Hall classification
- 3) To determine whether the time of presentation had any effect on visual prognosis
- 4) To evaluate the visual acuity after one month follow up with medical treatment.

Materials and methods:

It is a prospective study of all patients who presented with ocular chemical injuries between october 2015 and march 2016 at a tertiary eye care hospital.

Inclusive criteria:

- Patients of all age groups
- Patients of both sexes
- Patients with definite history of chemical agent fallen into eyes
- Minimal follow up of 3 months period

Exclusion criteria:

- Patients with ocular trauma not caused by chemical agents
- Doubtful history of chemical agents fallen in eyes
- Patients with poor follow up

Visual acuity at the time of presentation was recorded whenever possible with reference to patient's age and co-operation during the examination. A thorough examination was done under slit-lamp and amount of conjunctival damage, corneal involvement, limbal ischemia were precisely noted. The type of injury was recorded and graded according to modified Roper-Hall classification of ocular chemical injury. Final visual acuity was defined as the most recently recorded, best corrected visual acuity (Snellen equivalent) of patients either discharged or the most recent follow-up.

Results:

There were total of 50 patients during the study period. The age range was between 10 and 60 years, with mean age of 29.5 years. There was male prominence with male female ratio of 2.5:1 (male -36, female – 14). The age distribution and occupation are shown in table 1 and 2.

Time of presentation after chemical injury ranged between within one hour and one month; shown in table 3. Most of the patients (44%) presented with in 1 to 10 hours of injury. Those who presented early had better visual prognosis.

The ocular chemical injury was unilateral in 40 patients (right eye – 25; left eye -15) and bilateral in 10 patients.

The causative agent was alkali in 38 patients and 12 patients had acid as the causative factor. Acidic substances like sulfuric acid, sulphurous acid, hydrofluoric acid , acid acid tend to remain confined to ocular surface, whereas alkalis like ammonia, sodium hydroxide, potassium hydroxide, lime readily penetrate into the eye damaging the corneal stroma and endothelium as well as other anterior segment structures such lens, iris, ciliary body.

The grade of injury was grade 1 and 2 in 38 patients

(75%), suggesting conjunctiva and cornea are the most frequently affected structures. Grading is shown in table 4.

After one month of follow-up, 35 patients recovered with reasonably good vision (better than 6/18) (shown in table 5 and 6).

Discussion

Our study has a total of 50 patients out of which male patients are 36 and female patients are 14 in number. Most of the patients who sustained ocular chemical injuries were young (mean age- 29.5 years), similar to studies done by Saini JS and Sharma A [1] and Merle H [2]. This might be because most of the people who work in factories, industries and household chores are younger individuals. Majority of the people who suffered ocular chemical injuries are male patients (36/50), similar to a Norwegian study done by Midelfart A et al [3], who reported twice as incidence in males as females. This is probably due to the fact that males are more involved in works such as mechanics, automobile battery charging and welding.

In our study, alkalis (76%,38/50) form the major chemical agent causing ocular injuries compared to the acids (24%, 12/50). This was similar to Norwegian study done by Midelfart A et al [3]. Perhaps using lye as a bleaching agent for wooden materials working with cement and plaster of paris, white washing of houses, using caustic potash in cleaning clothes etc, may be better explanation for using alkalis more than acids in our small scale industries and domestic work leading to more alkali induced chemical burns.

Patients presenting within 1 to 10 hours of chemical assault to the eyes, had better visual outcome may be because of immediate irrigation with normal saline/ water and receiving prompt medical treatment. Bilateral chemical injuries were more severe.

Conclusion

Final visual outcome is good in most patients possibly due to early presentation and prompt treatment. Alkali injury tends to cause more morbidity. Public & industrial workers should be made aware of precautions to be taken & avail treatment at earliest possible time.

Acute ocular chemical injuries require urgent recognition and management. Copious irrigation of the eye done immediately at the scene is the most important factor in the management of ocular chemical burns.

Tables

Table 1: age distribution

Age distribution numbers	
10 -20 years	10
20-40 years	29
40-60 years	11

Table 2: occupation

Occupation numbers	
Factory workers	19
Quarry workers	3
Mechanic	9
Professional	10
Others	9

Table 3: time of presentation

Time of presentation	
1 hour to 10 hours	22 (44%)
1 0 hours to 24 hours	10 (20%)
1 day to 1 week	12(24%)
1 week to 1 month	6 (12%)

Table 4: grading of chemical injury according to Hughes-Roper-Hall classification

	Unilateral		Bilateral		to- tal
	Right eye	Left eye	Right eye	Left eye	
Grade 1 Corneal epithelial damage. No limbal ischemia	10	6	2	2	18
Grade 2 Cornea hazy, but iris details seen. Ischemia <1/3 rd limbus	10	8	4	4	22
Grade 3 Total loss of corneal epithelium stromal haze, blurring iris details, ischemia 1/3-1/2 limbus	4		3	3	7
Grade 4 Cornea opaque – obscuring view of iris/pupil. Ischemia > 1/2 limbus	1	1	1	1	3
Total	25	15	10		50

Table 5: Visual acuity at presentation

Visual acuity at presentation	
6/6 – 6/18	14
6/24 – 3/60	27
<3/60	9

Table 6: Visual acuity after 1 month follow-up

Visual acuity after 1 month follow-up	
6/6 – 6/18	35
6/24 – 3/60	11
<3/60	4

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