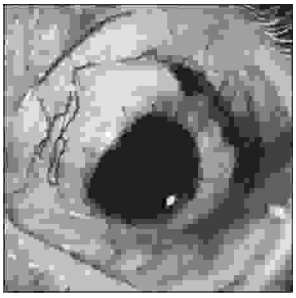
ORIGINAL PROF-1078

CHEMICAL INJURIES TO EYES;
A TWO YEAR CLINICAL EXPERIENCE AT CMH HYDERABAD.



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ABSTRACT... nomannazir1365@gmail.com **Objective:** To find out the chemical agents responsible for eye injuries, assess magnitude of the problem and resultant visual outcomes in our dependent population. **Design:** Observational study. **Place and Duration of Study:** Eye department, CMH, Hyderabad from Jan 2004 to Dec 2005. **Patients and Methods:** Thirty five patients of all ages who presented with history of chemical injury to eyes during a period of two years were included in this study. Patients with co-morbidity of eyes were not included. Cases were studied to find out causative chemical agents and their nature, sex distribution, cause and place of the incident, duration of exposure (time elapsed between chemical injury and copious irrigation at the time of presentation) and effect on visual function. **Results:** Chemical injuries sustained by 47 eyes of 35 patients were analyzed. All of them were accidental and mostly males were affected at their workplace. Nearly one third of the times 12(34.29%) both eyes were affected and 23(65.71%) cases were unilaterally affected. 30(85.72%) patients presented within first two hours of the injury. 3(8.57%) presented within 12 hours and 2(5.72%) presented within 24 hours. Severity of injury was grade I in most eyes i.e. 37(78.73%) and grade II in 10(21.27%). None was found to have grade III or IV injury. Immediate irrigation was reported in 29(82.86%) cases. The visual prognosis for eyes that received immediate irrigation was significantly improved. 27(77.14%) cases were caused by alkalis and 8(22.86%) were due to acids. 26(74.28%) of the cases were due to lime. A visual acuity of 6/6 was achieved in 40(85.10%) eyes at follow up after 01 week. 7(14.89%) eyes developed corneal haze of varying degree resulting in BCVA of 6/9 to 6/18. Eye protection was not used in any of the 35(100%) cases. 1(2.13%) eye developed cataract during follow up period and needed to be operated upon for visual rehabilitation. **Conclusion:** All ocular chemical injuries resulted from accidents; at work or at home and none resulted from assault. Most of the injured persons needed to be hospitalized on an average for 03 days. Lime was found to be the major culprit and was found to be used extensively for painting purposes. Visual outcome correlated with severity of injury at initial presentation.

Key words: Chemical injury eye, acid burn, alkali burn, lime,

INTRODUCTION

Chemical injuries of the eyes can range from mild to severe and at times they can be potentially blinding[1]. If inadequately managed its sequelae can leave the

individual with permanent visual impairment[2]. In our hospital; bulk of patients are from army. These patients can come in contact with various chemicals in their working environment e.g. workshop; where they deal with cars and trucks batteries, in hospital environments like laboratory, operation theatre etc. and during construction and maintenance work where cement, paints and associated chemicals are frequently used. Lime is one of the extensively used chemicals due to its easy availability and cost effectiveness . Most people handling these chemicals are unaware of their hazards; and do not use any protective glasses resulting in accidental injuries.

In such cases copious irrigation of eyes should be done at the site to wash out the chemical from eyes and then patient should be evacuated to nearest medical facility where ophthalmologist is available[3]. Once the patient is received at the hospital, immediate copious irrigation of conjunctival sac with sterile irrigating solution should be started even before taking a detailed history. Usually the examination of the affected area is difficult due to accompanying blepharospasm. Therefore pain management is an important part of the care process which will not only facilitate the detailed ocular examination and adnexa but also removal of residual chemical particles in the eyes. All particulate matter which is mostly lodged in the conjunctival sacs and sulci has to be removed meticulously and upper lids should be double everted to achieve a satisfactory approach to particulate matter in superior fornix This may prove difficult at times due to accompanying chemosis of conjunctiva and extreme swelling of the lids. Visual function should then be assessed and documented at the time of presentation. Extent of injury to eyes and adnexa should be graded and management started accordingly.

Topical steroids, cycloplegics and antibiotics should be administered alongwith justified use of ascorbic acid , citric acid and tetracyclines. In severe injuries an anterior chamber tap (paracentesis) may be of benefit. A "bandage" contact lens can be placed to protect the corneal epithelium if eyelids are badly damaged. In severe damage of the cornea limbal stem cell transplant[4,5,6,7] and amniotic membrane transplantation[8,9,10] can be done to salvage the eye. If the eyelid is involved, care must be taken to protect the cornea and provide a moist local environment. Long-term care of a severely injured eye is fraught with difficulties like cataract, glaucoma, recurrent corneal ulcerations, conjunctival adhesions and lid deformities. Surgical intervention is frequently required for such complications. Despite improved possibilities of immuno-suppression after keratoplasty (cyclosporin A), keratoprostheses and new methods of surgery (Tenon plasty), the possibilities of an optical rehabilitation are still limited in severe cases.

PATIENTS AND METHODS

A total of 47 forty seven eyes of thirty five 35 patients, comprising of all ages who presented with history of chemical injury to eyes during Jan 2004 to Dec 2005 (period of two years) were included in this study. The parameters which were evaluated in this study were, age group, sex distribution, causative chemical agents and their nature, cause and place of the incident, time between injury and presentation to the hospital (duration of exposure), whether irrigation at site was done or not, previous visual status (patients with history of co-morbidity of eyes were not included), severity of damage to ocular tissue, nature of management required, length of hospital stay, requirement of surgical intervention and final visual outcome. To assess all these parameters, detailed history and complete eye examination were performed. Necessary investigations were done wherever indicated.

RESULTS

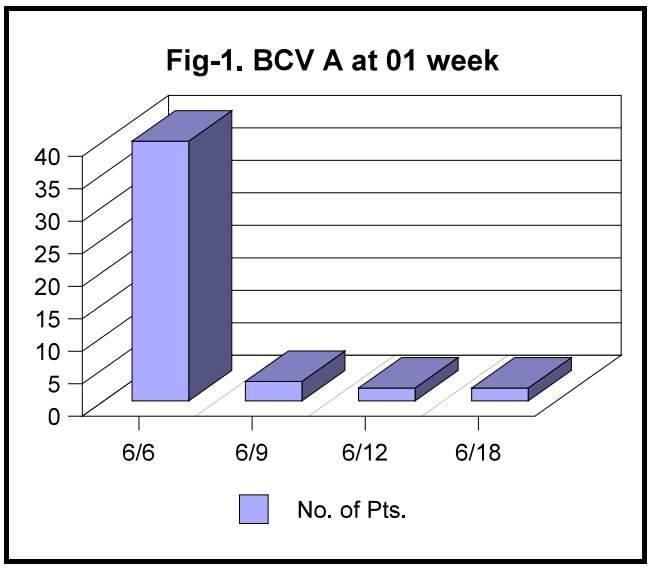
Ages of the patients ranged from 16-45 years. Chemical injuries sustained by 47 eyes of 35 patients were analyzed. 33(94.29%) of the injured were males and 2(5.71%) of them were females. All of them were accidental. These accidents mostly 33(94.29%) occurred at work and few 2(5.71%) at home. None of them resulted from assault. Nearly one third of the times 12(34.29%) both eyes were affected and 23(65.71%) cases were unilaterally affected. 27(77.14%) cases were

caused by alkalis and 8(22.86%) were due to acids.

Table-I. Grading of Severity[11]	
Grade I	Clear cornea with no limbal ischemia
Grade II	Hazy cornea with visible iris details and less than one third limbal ischemia
Grade III	Total loss of corneal epithelium, stromal haze which obscures iris details, between one third and one half limbal ischemia
Grade IV	Opaque cornea with more than half limbal ischemia

Table-II. Chemical agents			
Alkalis		Acids	
Chemical agent	**No. of pts**	**Chemical agent**	**No. of pts**
Lime	26	Sulphuric acid	2
Sodium hydroxide	1	Acetic acid	4
		Carbolic acid	2

Lime was found to be the major alkali (Table:II) causing injury as 26(74.28%) of the cases were due to lime. Mostly 30(85.72%) patients presented within first two hours of the injury. 3(8.57%) presented within 12 hours and 2(5.72%) presented within 24 hours. Severity of injury in most eyes 37(78.73%) was grade I (Table:I) and grade II in 10(21.27%). This was due to the fact that more potent (industrial and agricultural) chemicals were not found to be used by our patients. None was found to have grade III or IV injury. A visual acuity of 6/6 was achieved in 40(85.10%) eyes at follow up after 01 week. 7(14.89%) eyes developed corneal haze of varying degree resulting in BCVA of 6/9 to 6/18 (Fig-1). Immediate irrigation was reported in 29(82.86%) cases. The visual prognosis for eyes that received immediate irrigation was significantly improved. Eye protection was not used in any of the 35(100%)cases. 1(2.13%) eye developed cataract during follow up period and needed to be operated upon for visual rehabilitation. Other surgical procedures like tenon-plasty, keratoplasty, keratoprostheses were not indicated in these cases.



DISCUSSION

Chemical burns to the eye are among the most urgent of ocular emergencies. The clinical outcome of the injury is directly related to the expediency with which treatment is begun. Copious irrigation is the most important emergency treatment of the chemically burnt eye[12]. This irrigation should begin immediately at the scene of the accident with any nontoxic liquid[13]. Removal of any particulate matter must be done to prevent further ocular damage. The subsequent therapy is directed at the treatment of secondary sequelae and at preserving the globe and to surgically[14] rehabilitate the eye. Many of the treatments, which are used in the intermediate and late phases of the injury, are used to prevent corneal ulceration and perforation. These are the most difficult sequelae to threat in alkali injuries; thus, preventing the progression to this stage is of the utmost importance. Again the immediate and continuous irrigation of the eye may help accomplish this goal.

Most of the patients 30(85.72%)reported to hospital within first two hours of the injury. Therefore maximizing chances of their successful recovery. Those who reported later than this were the ones who were

stationed at periphery and were evacuated from some distance to CMH Hyderabad; 3(8.57%) reported within 12 hours and 2(5.72%) reported within 24 hours of the injury. None reported later than 24 hours of injury.

Severity of injury encountered was mostly grade I i.e. 37(78.73%) eyes and 10(21.27%) eyes were grade II. None was grade III or grade IV. Damage was less severe because the majority of soldiers did not use more potent industrial and agricultural grade chemicals. This was fortunate and resulted in good visual outcomes. Although nearly all of them required admission and resulted in an average of 3 lost working days. Hospital stay was directly proportional to the extent of trauma.

Visual prognosis was good as visual acuity of 6/6 was achieved in 40(85.10%) eyes at follow up after 01 week. 7(14.89%) eyes developed corneal haze of varying degree resulting in BCVA of 6/9 to 6/18. Major factor in this outcome was immediate irrigation which was reported in 29(82.86%) cases. Good visual outcome correlated with better visual acuity at initial presentation. Another factor which correlated with better visual outcomes was that there were no cases which resulted from assault. Studies have shown greater extent of damage to cases resulting from assault and hence resulting in poor visual outcomes.

Eye protection was not being used in any case. Most of the patients were uneducated about the hazards of the chemicals, which they were using.

Our hospital receives patients mainly from army; which are stationed at Hyderabad and its vicinity. Therefore population in this study cannot represent the general population of Hyderabad. These patients were not found using any industrial or agricultural grade chemicals. Therefore we did not encounter severe injuries and hence resulted in better visual outcomes. On the other hand generally civilian population in Hyderabad are mainly agricultural and being a big city industry is also in its developing stages. A larger study is needed to find out the magnitude of problem in general population.

CONCLUSION

Chemical injuries of the eyes are a cause of significant ocular morbidity. In our study all ocular chemical injuries resulted from accidents; at work or at home and none resulted from assault. Most of the injured persons needed to be hospitalized on an average for 03 days. This resulted in lost working days because nearly all the patients were working males sustaining injury at work place. Lime was found to be the major culprit and was found to be used extensively for painting purposes. Visual outcome correlated with severity of injury at initial presentation. Spread of information is necessary for adequate emergency care in case of eye burns as well as for employment of protective glasses in high-risk situations.

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Man can learn nothing except
by going from the known to unknown.

Anonymous