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Ocular Detergent Injury and its Management: Case Report

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Abstract: Chemical eye injury is a true ocular emergency that necessitates prompt evaluation and treatment. This is a case report of a young female who presented with detergent injury and a distinctive ocular manifestation. After appropriate medical treatment, she was taken up for exploration and conformer placement with topical vitamin C eye drops, following which her ocular manifestations dramatically improved. Alkali substances being lipophilic, penetrate the eye more rapidly than acids. As part of the inflammatory response, the damaged tissues release proteolytic enzymes, causing additional harm. Early and effective treatment is critical in determining the clinical course and outcome.

Index Terms -Detergent injury, ocular burn, conformer, Vitamin C eye drop

INTRODUCTION

Ocular Chemical burns are known to possess high pathological potential because of their inherent ability to lyse cell membranes and penetrate intraocular structures with devastating results. Chemical injuries of the eye are frequently encountered in ocular emergencies in routine ophthalmic practice. From an epidemiological point of view, ocular chemical burns comprise up to 22% of all ocular injuries[1,2]. Whether ocular insult occurs inadvertently (following unnoticed exposure or accidental contact at home or workplace) or as a result of a purposeful crime,[3-5] at least 90% of these injuries occur as accidental exposures typically in domestic settings. Alkali injuries are more common than acid injuries and are more severe in nature[6].

In general, two-thirds of chemical burns result from alkali and the remainder from acids and alcohols[7]. Though most of these chemical injuries are minor and heal without any sequelae, some can produce extensive damage to the ocular surface and anterior segment leading to visual impairment, loss of structural integrity, and a rise in intraocular pressure as a long-term sequelae. Effective diagnosis and treatment in minutes and days following the initial injury dictate the clinical course and long-term outcome of this potentially blinding condition. Ultimately treatment aims to restore corneal clarity, normalize the ocular surface, and prevent glaucomatous optic nerve damage.

Case report:18-year-old, female from Farrukhabad, Uttar Pradesh, presented with chief complaints of watering, photophobia, redness, itching, and blurring of vision in her right eye. The patient had a history of accidental entry of detergent in the right eye while washing clothes in her house 1.5 months back.
On examination, the best corrected visual acuity was 6/6 in both eyes, mild periorbital edema, mild conjunctival congestion with crusted deposits of detergent on the underlying necrotic tissue in the inferior cul de sac with fibrosis in the right eye (fig. 1a) with no abnormality noted in the left eye.

Treatment/Management

Medical Management: The patient was initially managed conservatively with topical antibiotics, lubricants, and cycloplegic. Moxifloxacin eye drop was given QID along with azithromycin eye ointment for broad-spectrum coverage. Vitamin C 500mg tablet TDS was also added.

Surgical management: After undergoing routine pre-operative investigations, the patient was taken up for conjunctival growth excision and removal of dried detergent particles (fig. b, c, d). with conformer placement under local anesthesia. Intraoperatively, grade II ocular burn (according to Dua's classification)[8] was noted. The patient was kept under observation for 5 days during this period the conformer was removed 4 hours each day and advised for lower lid stretching to prevent symblepharon formation. After exploration patient was advised of vitamin C (10%) eye drops three times a day for rapid healing(fig.2).

Discussion

Alkali burns cause corneal and conjunctival damage by pH change, ulceration, saponification reaction, and collagen synthesis defects. Chemicals commonly responsible for detergent injuries of the eye include potassium or sodium salts of long-chain sulphonic acid. The main active ingredients are sodium stearate, sodium carbonate, sodium aluminosilicate, sodium perborate, and sodium sulfate. Alkali substances are lipophilic and penetrate the eye more rapidly than acids by inducing saponification of membrane lipids. Hydroxyl ions generated denature the collagen matrix of the cornea, conjunctiva and facilitate further penetration. The damaged tissue continues to secrete proteolytic enzymes as part of the inflammatory response, leading to further damage. The chemicals can reach the anterior chamber and cause damage to the trabecular meshwork, lens, and ciliary body, and consequently, long-term complications can arise.

The clinical course of ocular chemical injury can be divided into four phases: Immediate, acute, early reparative, and late reparative. This patient came to us in the late reparative phase which is characterized by completion of healing with good visual prognosis (Grade I and II Roper Hall) and complications in those with guarded visual prognosis (Grade III and IV Roper Hall)[9]. The late complications of chemical burns include poor vision, corneal scarring, dry eyes, symblepharon, ankyloblepharon, glaucoma, uveitis, cataracts, and adnexal abnormalities. Because of these complications, we assume a poor prognosis in higher grades.

Newer surgical modalities such as amniotic membrane transplantation with bandage contact lenses or conformer placement are now available to us. Timely conformer placement after meticulous cleaning of detergent particles leads to rapid recovery and prevents symblepharon formation.

Other modalities such as limbal stem cell transplantation can also be carried out in severe cases where limbal stem cells can be donated from the patient's un-injured fellow eye, a blood relative, or a post-mortem globe. Penetrating keratoplasty or keratoprosthesis may be considered as a last resort in cases where other treatment modalities have failed.

Conclusion

There is a need to ensure adequate public awareness of the danger of alkali burns to the eye. Besides primary prevention, adequate first aid with immediate and continuous irrigation is of paramount importance. A uniform concept for the management of these severe cases is necessary including an anti-inflammatory medical and surgical treatment. This patient came to us in the late reparative stage with sequelae of ocular burn and neglected treatment from a local doctor. With the help of modern surgical management, her ocular symptoms and overall prognosis were improved. Emergency treatment if initiated early may make all the difference between saving the eye and early eradication of ocular manifestation. Modern methods such as conformer placement and vitamin C eye drops have considerably improved overall prognosis in these unfortunate patients.

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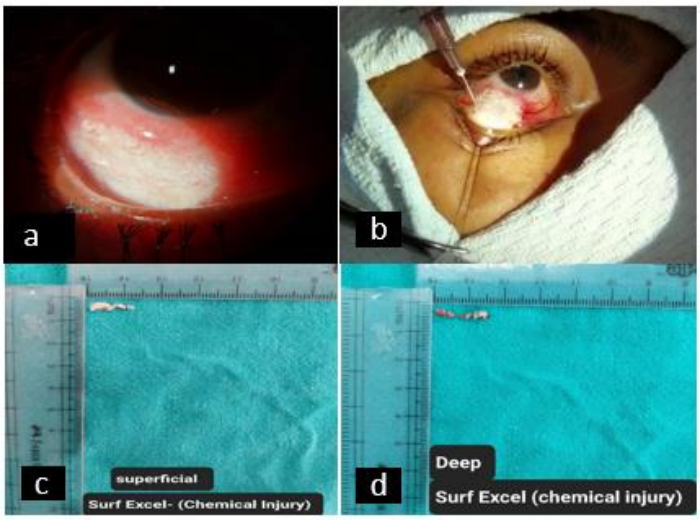

Fig1: (a) Grade II ocular burn according to Dua classification at presentation (b) Exploration of Conjunctival deposition (c), (d) Removal of Superficial, deep Conjunctival deposition for HPE

Fig 2: Post-op. Day 6