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CASE REPORT

A 14-year-old girl who regained normal vision after bilateral visual impairment following hot water injury to the eyes

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Abstract A 14-year-old girl presented with bilateral visual impairment following hot water injury to the eyes. The patient was admitted for a week and managed with guttae tropicamide 0.5% 8 h, diclofenac sodium 0.1% 4 h, and fluoroquinolone 0.3% 6 h and ointment chloramphenicol 8 h. Also, the patient was managed with capsule doxycycline 100 mg 12 h for 10 days, tablet cataflam 50 mg 12 h for 7 days and intramuscular tetanus toxoid 0.5 mg stat and dermacine cream for facial scald.

The visual acuities improved from 3/60 (right eye) and 6/24 (left eye) to 6/6 in both eyes. There were resolutions of facial/eye pain, tearing, photophobia, lid edema, blepharospasm, and conjunctival hyperemia. There was complete healing of facial wounds and corneal ulcers. She was discharged from hospital on the 7th day of admission.

Prompt presentation, degree of scald sustained, and appropriate medical intervention enhanced visual recovery and wound healing in the patient.

1. Introduction

Hot water burn referred to as scald is a form of thermal injury. Direct contact of hot water to the eye can cause severe eye injury and lead to blindness, especially when not properly managed. Thermal burns produce superficial epithelium cell death; however, thermal necrosis and penetration can occur (Melsaether and Rosen, 2009). Thermal eye injury triggers an inflammatory response. A variety of local cytokines (de Bandt et al., 1994) cause a rapid accumulation of extravascular fluid, which may cause total loss of vision in severe ocular burn. The profound metabolic response to a severe thermal burn is aborted by early removal of eschar (Monafo and Bessey, 1992).

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The type and severity of the ocular scald depend on the temperature of the water. Recovery of ocular surface burns depends on the extent of damage to corneal, limbal and conjunctival tissues at the time of injury. Limbal ischaemia essentially compromises stem cells for renewing corneal epithelium leading to recurrent epithelial defects, and conjunctival invasion onto the cornea (Melsaether and Rosen, 2009; Merle et al., 2008). Damage to intraocular structures would adversely affect the final visual outcome.

Children are more at risk of scald burn because of their curiosity and inexperience in precautions while carrying out dangerous tasks (Lindblad and Terkelsen, 1990). For obvious reason especially, due to their restless nature adolescents appear more susceptible to the accidental ocular scald/burn injuries. Most household scald and thermal burn injuries occur in the kitchen (Lindblad and Terkelsen, 1990; Jay et al., 1977; Sheller and Thuesen, 1998) and involve kettles, pots, and pans. Many important factors influence the incidence of thermal injury including age, sex, home environment, and economic status.

The management of ocular burns can be challenging and rewarding as the duration before presentation after injury and the type of care received do influence visual outcome. Nevertheless, the goal of treating ocular burns is to promote ocular surface epithelial recovery, augmenting corneal repair and controlling inflammation (Wagoner, 1997). A number of medications are invaluable in the treatment of acute ocular burns including topical and systemic ascorbate (Pfister et al., 1988; Pfister and Paterson, 1980), citrate (Pfister et al., 1982), tetracycline (Seedor et al., 1987), and steroids (Donshik et al., 1978). Moreover, topical mydriatics such as atropine and mydriacyl can reduce ocular pain.

The management of severe ocular scald/burns could be more complex as there may be also associated lid scald/burns and anterior segment ischaemia, which will invariably require surgical intervention, in spite of which the final visual prognosis is poor (Kuckelkorn et al., 1993). On the other hand, mild to moderate ocular scald/burns often show good response with medical therapy alone. This paper documented the regained normal vision in a 14-year-old girl who sustained moderate facial/ocular scald with associated bilateral visual impairment.

2. Case report

A 14-year-old secondary school girl presented in the eye clinic of a tertiary health facility on 11 January 2010 on account of bilateral facial/eyes' pain and blurred vision of 2 h duration. A cup of hot water accidentally dropped while fetching boiling water from a pot into a bucket and the hot water splashed onto her face and eyes. There were immediate facial/ocular pain, reduction in vision, tearing, photophobia, and redness in both eyes. Prior to the incident, she enjoyed normal bilateral vision and was not on any corrective eyeglasses. She denied history of systemic illnesses and no family history of ocular diseases.

The face/eyes were immediately copiously irrigated with cold water and Vaseline cream also was applied to the face. She was thereafter rushed to the hospital.

Clinical examination of the eye at presentation revealed an otherwise clinically stable girl but in painful distress. She had facial scald nearly covering the entire face but worse on the right hemifacial region (Fig. 1). The visual acuities (VA) were

Figure 1 Facial wound and eyes ulcers, 2 h after burn.

3/60, right eye (RE) and 6/24, left eye (LE). There was bilateral periorbital edema, worse on the right, blepharospasms, and diffuse conjunctival hyperemia but no limbal ischaemia. The initial corneal haziness on pen light examination was corneal ulcers which stained with fluorescein, involving the whole right cornea and two-thirds of the left cornea on slit lamp examination (Fig. 1). The pupillary activity, the lenses and the fundi appeared normal.

The diagnosis of facial scald with bilateral eye involvement leading to visual impairment was made. She was admitted and managed with guttae tropicamide 0.5% 8 h, diclofenac sodium 4 h 0.1%, fluoroquinolone 0.3% 6 h and ointment chloramphenicol 8 h. The patient also was placed on capsule doxycycline 100 mg 12 h for 10 days, tablet cataflam 50 mg 12 h for 7 days and intramuscular tetanus toxoid 0.5 mg stat. The dermacine cream was applied to the scalded region of the face (Fig. 2).

The investigations carried out which included eye swab for microscopy culture and sensitivity, urinalysis, full blood count and fasting blood sugar revealed no abnormality.

The patient responded well to the treatment (Fig. 3). At discharge on the 7th day of admission, all the presenting complaints had been resolved, the facial wound had been healed and the visual acuities had improved to 6/6 in both eyes.

Figure 2 Healing facial wound and healed eyes ulcers, 4th day after burn.

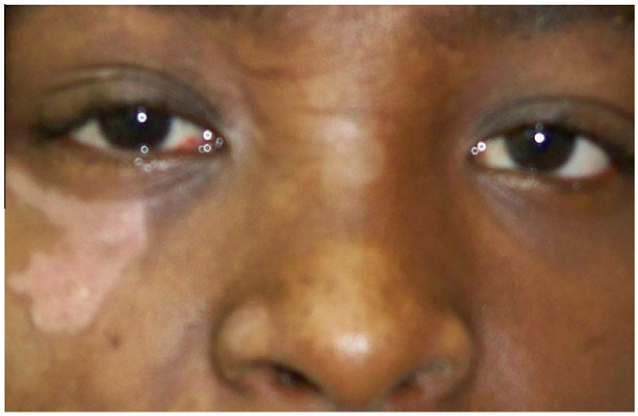

Figure 3 Healed facial wound and eyes, 7th day after burn.

3. Discussion

Corneal injury following facial scald burn is rare because of active lid closure reflex (blink reflex) and bell phenomenon. Obviously and to a large extent the blink reflex failed in this patient hence, the bilateral corneal ulcers. Nevertheless, the cornea and conjunctiva may suffer extensive damage secondary to exposure from severe facial thermal burn. The cornea burn can also occur when the fire victim keeps the eyes opened while escaping from the site of fire accident (Melsaether and Rosen, 2009). In a report of car radiator ocular scald/burn in Qatar by Al-Baker and associates, (Al-Baker et al., 1989) the victims were mostly drivers, passengers and bystanders. Ocular and facial injuries associated with the use of immersion heaters have been reported among an inmate population (Younger et al., 2006).

The initial management at home and later at the hospital (using cold water for the facial and ocular irrigation) limited the damage by removing or reducing heat energy below the critical temperature for injury hence relieved pain and reduced inflammation (Saranto et al., 1983). There was good visual outcome in this patient following treatment including cold water irrigation. Cold water irrigation is the preferred in first-line management cases of thermal/chemical burn. Aside temperature control, it dilutes toxic products and water can be easily accessed in many emergency situations. However, other buffered solutions which may not be readily available as water have been shown to have advantage over cold water (hypotonic to cornea tissue) in view of their higher osmolality/ionic contents and are recommended for eyes irrigation in ocular injuries (Rihawi et al., 2006; Schrage et al., 2004).

The non-use of harmful traditional medication/self-medication that can complicate existing eyes injuries (Ayanniyi, 2009) and prompt presentation at appropriate health facility is remarkable in this patient.

The antibiotics were used to prevent (prophylaxis) secondary microbial infection as the epithelia (facial skin and corneal) were breached and despite absent microbes from wound swab culture. Moreover, the mydriatic was used in this patient to prevent ciliary spasm and to stabilize vascular permeability. The analgesics used relieved associated pain by preventing release of pain chemicals (by inhibiting prostaglandin production), facilitated aqueous outflow and decreased vascular permeability (Melsaether and Rosen, 2009). Tetanus can complicate scald/burn injury hence the use of anti-tetanus toxoid in this patient is to either induce active immunity or as booster dose (Melsaether and Rosen, 2009).

The early visual recovery and wound healing were enhanced in this patient due to prompt presentation, moderate degree of scald sustained and appropriate medical intervention. However, this report underscores the need for child safety education at home and at school.

Consent

The informed consent was obtained from patient (verbal) and her mother (written) for the publication of this case report.

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