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Case Report

Contact corneal thermal burn from domestic electric clothes iron in a female teenager: A case report

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ABSTRACT

Corneal thermal burn from domestic electric clothes pressing iron is a very rare occurrence among teenagers in Nigeria. We report the case of thermal burn to the ocular surface of a 16-year-old female, at home, from the sole plate of an electric clothes pressing iron. She presented with superficial eyelids and corneal burns (Roper-Hall Classification Grade II; Dua Classification Grade II). The patient was successfully managed with topical cyclopentolate 2%, topical moxifloxacin 0.5%, and tetracycline ointment. Well-documented causative agents of domestic eye injuries in the young in Nigeria are usually flying missiles. Thermal ocular injuries are quite uncommon, and when they occur, are likely due to steam burns. This report highlights the electric clothes pressing iron as a domestic hazard that caregivers must be mindful of.

Keywords: Contact, Thermal burns, Clothes irons, Cornea, domestic

INTRODUCTION

Ocular burns, which could be thermal, chemical, radiational, or electrical, constitute potentially blinding ocular injuries.[1-3] Thermal ocular burns most commonly result from accidents associated with firework explosions, gasoline explosions, flames, steam, boiling water/liquid, hot tar, or molten metal (commonly aluminum).[1,2,4] Ocular thermal burns are among the most severe ocular surface injuries and may lead to limbal stem cell deficiency.[1,3] The severity of tissue destruction and impact on vision in ocular thermal injury depends on at least five factors: Temperature of the agent, heat-retaining capacity of the material, duration of contact, area over which the heat is applied, and conductance of the tissue.[2,5]

Thermal ocular burns, which could be by flash, flame/steam, or contact burns, account for few cases when compared with chemical burns. Sarabahi and Kanchana[6] had reported 84% of ocular burns due to chemicals and 16% due to thermal injury. A myriad of objects has been reported to cause contact thermal ocular burns. Vajpayee *et al.*[7] had from a retrospective review of hospital records of 66 eyes with contact thermal burns of the cornea, reported that the most common causes were splashing of boiling fluids (42% of cases), followed by contact with red hot firecracker particles (18%) and lit match heads (17%). Mannis *et al.*,[8] Awan,[9] and Carr *et al.*[10] had, respectively, reported on cases of contact thermal burns of the cornea from electric curling irons.

In children, ocular injuries are more frequently reported in males. They commonly occur at home and usually from flying missiles such as sticks, twigs, and stones; thermal ocular is quite

uncommon.[11-13] Herein, we report a rare case of contact thermal burn to the cornea from domestic electric clothes pressing iron in a 16-year-old girl.

CASE REPORT

A 16-year-old female presented, in company of her mother, to the eye clinic with a 4 h history of pains, redness, tearing, photophobia, and a marked reduction in vision in the left eye. These complaints were preceded by a hot electric pressing iron touching the left eye, when her younger swiftly turned to respond to her call. She has being on spectacle lenses for over 8 years for refractive error (hypermetropia) with alternating exotropia (which has reduced from 30° to 15° since she commenced the spectacle lenses).

Examination showed an anxious young lady in moderate painful distress. The unaided visual acuity was 6/9 and 6/36 in the right eye and left eye, respectively. Her visual acuity with her spectacle lenses was 6/5 and 6/36 in the right eye and left eye, respectively. The right eye was essentially normal. The left eye showed the presence of superficial skin scald at the medial half of the upper and lower eyelids, mild lacrimation, mild blepharospasm, and an opacified, irregular corneal epithelium at the medial one-third portion of the cornea, fairly triangular in outline with its base extending from about 8 O' clock position to 11 O' clock position and its apex encroaching into the medial one-third of the pupillary area. The adjoining clock hours of perilimbal conjunctiva were blanched; however, the remaining bulbar conjunctiva was mildly injected (Roper-Hall Classification Grade II; Dua Classification Grade II). The anterior chamber was formed and no demonstrable flare or cells [Figure 1]. The pupil was round and briskly reactive to light. On dilated fundoscopy, the fundus was essentially normal. A diagnosis of corneal contact thermal injury was made.

She was commenced on Gutt cyclopentolate 2% 3 times daily for 5 days, Gutt moxifloxacin 0.5% eye drop 3 hourly, and ointment tetracycline at night for 2 weeks. We reassured the patient and her mother, and scheduled her for follow-up visit in 2 days' time. At follow-up 2 days after, remarkable healing of the cornea and improvement in visual acuity were noted, with unaided visual acuity of 6/9 and 6/18 in the right eye and left eye, respectively, and visual acuity with her spectacle lenses was 6/5 and 6/12 in the right eye and left eye, respectively [Figure 2].

Figure 1: Clinical photograph at presentation showing superficial eyelids skin scald and 1/4th opacified cornea.

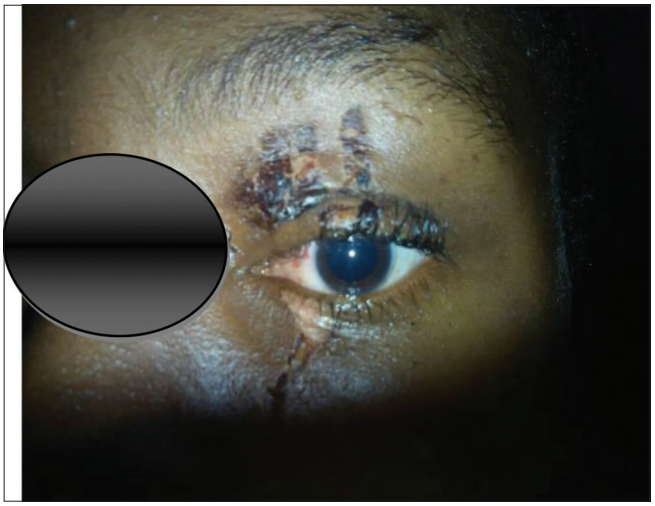

Figure 2: Clinical photograph on the 3rd day after injury showing healing eyelid skin and completely healed cornea.

DISCUSSION

Domestic ocular injuries in children in Nigeria are commonly from flying missiles.[11-13] In general, contact corneal burns from domestic electric clothes pressing iron are rare. Reported causative agents of contact thermal ocular surface burns are splashing of boiling fluids, red hot firecracker particles, lit match heads, and electric curling irons.[7-10] However, our index case was a 16-year-old female who at home sustained accidental contact corneal burns from electric clothes pressing iron, with involvement of the eyelids.

Vajpayee *et al.*[7] had reported in their series that 89% of the corneal contact burn was limited to the corneal epithelium. Our patient had coagulative necrosis limited to the corneal epithelium. The limitation of injury to the corneal epithelium has largely been reported to be due to coordinated ocular protective reflexes: Eyelids blink reflexes and the Bell's phenomenon.[2,14-16] This may also explain the involvement of the eyelids.

Furthermore, the temperature of the offending object plays a pivotal role in the extent of the tissue damage. Goldblatt *et al.*[17] examined the heat sensitivity of rabbit corneas with a heat conductor. Rabbit corneas were exposed to a

temperature of 45°C for 15 min, but no damage was observed on light microscopy. After raising the temperature to 59°C for 15 min, diffuse corneal stromal edema and endothelial cell loss were observed. Arici *et al*.[4] had in a case series reported two cases of severe thermal burns on the ocular surface and its adnexal appendages that developed secondary to exposure to molten heavy metal with a melting temperature of near 1000°C (893°C and 1045°C). Despite aggressive intervention and strict monitoring, the outcomes were unfavorable, as both patients developed extensive symblepharon, corneal conjunctivalization, and phthisis bulbi. In clinical practice, molten metal or glass-like agents with high melting temperatures (1000°C) and significant heat-retaining capacity have been reported to cause severe burns and tissue opacification due to deep penetration in the cornea.[18] The index case was exposed to the sole plate of a domestic electric clothes iron with the operating temperature of 180–220°C,[19] which may also have accounted for the superficial extent of the resultant tissue disruptions.

CONCLUSION

Contact thermal corneal burns from domestic clothes irons are characteristically of partial thickness, largely due to the ocular protective mechanisms and the corneal tolerance threshold for the operating temperature of the clothes pressing iron. With prompt, appropriate treatment, uneventful clinical outcome is most likely for uncomplicated mild-to-moderate corneal thermal burns.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms.

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Conflicts of interest

There are no conflicts of interest.

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