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## Visual Case Discussion

## Corneal abrasion due to face mask in children: A novel and potential mechanism of injury related to COVID 19 pandemic

M. Shoaib<sup>a,\*</sup>, Y. Chomayil<sup>a</sup>, M. Zafar<sup>a</sup><sup>a</sup> Emergency medicine department, King Hamad University Hospital, Bahrain

## ARTICLE INFO

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## 1. Overview

<sup>1</sup> <sup>2</sup> Case series of 2 patients with superficial corneal abrasions with face mask use in children.

## 2. Visual case discussion

An 8-year-old boy presented to the emergency department accompanied by his mother with complaints of left eye pain which started the previous day. The patient stated that he was wearing an adult-size face mask while he was in school, and due to the edges being raised and it hit his left eye which resulted in the pain. Initially, the pain was mild but progressively increased with accompanying watering and photophobia. There was no history of any previous eye problems.

Initial examination revealed injected conjunctiva with no discharge of left eye with a dot-like uptake of fluorescence in the cornea with Seidel test negative, pupils bilaterally equal and reactive with no collapse of the eyeball. Topical anesthetic drops were used and examined by the on-call ophthalmologist to reveal the superficial uptake of fluorescence in the cornea with no stromal involvement and normal deep anterior chamber with normal visual acuity. Fundus examination was unremarkable.

The patient was discharged home with lubricating eye drops (polyethylene glycol) and chloramphenicol eye ointment. The abrasion healed in 1 day and a follow-up visit did not show any signs of infection or vision disturbances.

Another case involved the presentation of a 9-year-old boy to the emergency with complaints of left eye pain, after accidentally being scratched by the middle part of the upper margin of the face mask. There was watering with mild photophobia and pain. He did not have any past history of eye problems. He was found to have a normal conjunctival examination with intact eyeball and pupil, but there was fluorescence uptake in the cornea at the 4 o'clock position. An on-call ophthalmologist was present, and they reported that the patient had normal visual acuity with no conjunctival hyperemia. The anterior chamber was deep and quiet with a normal red glow of the fundus. A superficial corneal abrasion of 0.1–0.2 mm size was noted at the 5 o'clock position.

The patient was prescribed a topical antibiotic with topical lubricant and follow-up was given.

## 3. Conclusion

With the continuation of the Covid 19 pandemic, the use of face masks is now a norm, and it is supported by various studies that it is protective against the transmission of various droplet infections such as the coronavirus<sup>1</sup>. As the schools are gradually opening and wearing a facemask remains compulsory, there is an increasing number of kids wearing adult-sized masks. With more frequent use of oversized face masks, there are increasingly higher chances of direct trauma to the eyes as these masks are loose and the hard ends of the upper margin are raised to eye level. Direct trauma with a face mask to eyes is rarely reported for adults in literature, but for the children age group that number is lower

\* Corresponding author at: Pediatric Emergency Department, King Hamad University Hospital, Flat 85, Building 2324 Street 2834 block 228, Bussaiten, Muharraq 228, Bahrain.

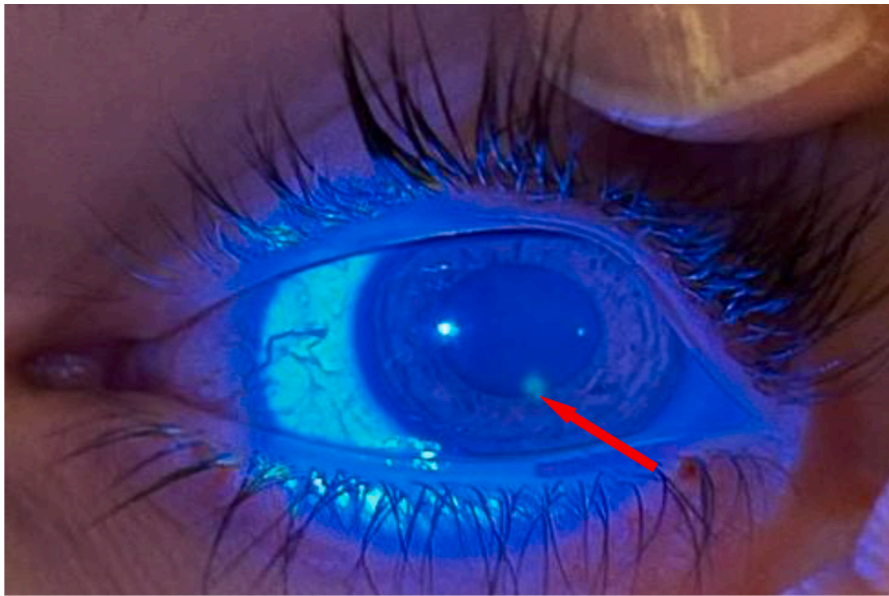
E-mail address: [zaromizshb6225@gmail.com](mailto:zaromizshb6225@gmail.com) (M. Shoaib).

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**Fig. 1.** Mild conjunctival hyperemia with a dot like uptake of fluorescence just beneath the mid of the cornea.

2.

The reported cases point towards the potential of the face masks causing ocular surface injury, especially in children due to the following reasons: use of adult size face masks which are loose when worn which leaves more chances for injury. Generally, to fix the large-sized masks, the center of the upper margin is squeezed to make it stable over the nose; but as a result, the lateral ends get raised making it more probable to cause eye injury and the upper margin is harder than the rest of the mask, leading to more trauma.

Corneal trauma is very common, causing corneal abrasion on one end to laceration and perforation of the cornea on the other extreme. It presents with the painful red eye with photophobia. Pain is due to the rich pain fibers in the stroma which are exposed as there is disruption of the corneal epithelium due to trauma. The mainstay of treatment for a superficial corneal abrasion is topical lubricants and topical antibiotics. Along with that, some authorities advocate for short-term topical anesthetics<sup>3</sup>. Eye patching was used before as treatment, but new studies find it not helpful in the healing.

Corneal trauma can complicate to cause corneal ulcers, bacterial keratitis, recurrent erosion syndrome, and traumatic iritis.

So as the covid 19 pandemic continues to have its impact, the face masks are going to be in public use for longer than anticipated. For children, there are more chances for getting the ocular injuries if the appropriate size masks are not used. Also, there is a need to modify the making of the masks to make them less likely to cause ocular injuries.

## 5. Questions and answers with brief rationale multiple-choice questions

### 5.1. Question 1

Which of the following can complicate the corneal abrasions?

- a) Corneal ulcers.
- b) Bacterial keratitis
- c) Recurrent corneal erosion syndrome
- d) Traumatic iritis
- e) All of the above

Correct Answer: e) All of the above.

Discussion & rationale: Corneal abrasions if neglected can lead to

superadded infections causing keratitis and extension into the anterior chamber of the eye with resultant iritis. Recurrent corneal abrasions especially due to incurved eyelashes can cause recurrent corneal erosion syndrome which may lead to blindness if neglected.

### 5.2. Question 2

What is the main cause of significant pain related to corneal injuries?

- a) Enriched blood supply of cornea
- b) Exposure of dense nerve fibers in the stroma of the cornea
- c) Hindrance in the visual axis of the eye
- d) Increased intraocular pressure
- e) Lens dislocation

Correct Answer: b) Exposure of dense nerve fibers in the stroma of the cornea.

Discussion & rationale: Cornea has the richest nerve supply in the body. Most of the nerve endings lie in the stroma of the cornea and whenever there are corneal abrasions, it would lead to the removal of the epithelium causing the exposure of stroma and resulting in the nerve endings. These exposed nerve fibers are the sole reason for pain which is the major presenting complaint of the cornea-related injury.

### 5.3. Question 3

Which one of the following treatments for a traumatic corneal abrasion is considered obsolete and no more recommended now?

- a) Patching of the eye.
- b) Topical lubricant drops
- c) Topical antibiotics
- d) Topical anesthetic drops
- e) Removal of superficial foreign body in cornea

Correct Answer: a) Patching of the eye.

Discussion & rationale: Corneal abrasion is one of the most common ophthalmological presentations in an emergency. The mainstay of treatment is to keep the cornea wet with lubricating eye drops which help in healing, topical antibiotics to prevent the superimposed bacterial infection and some authorities also recommend topical anesthetic drops

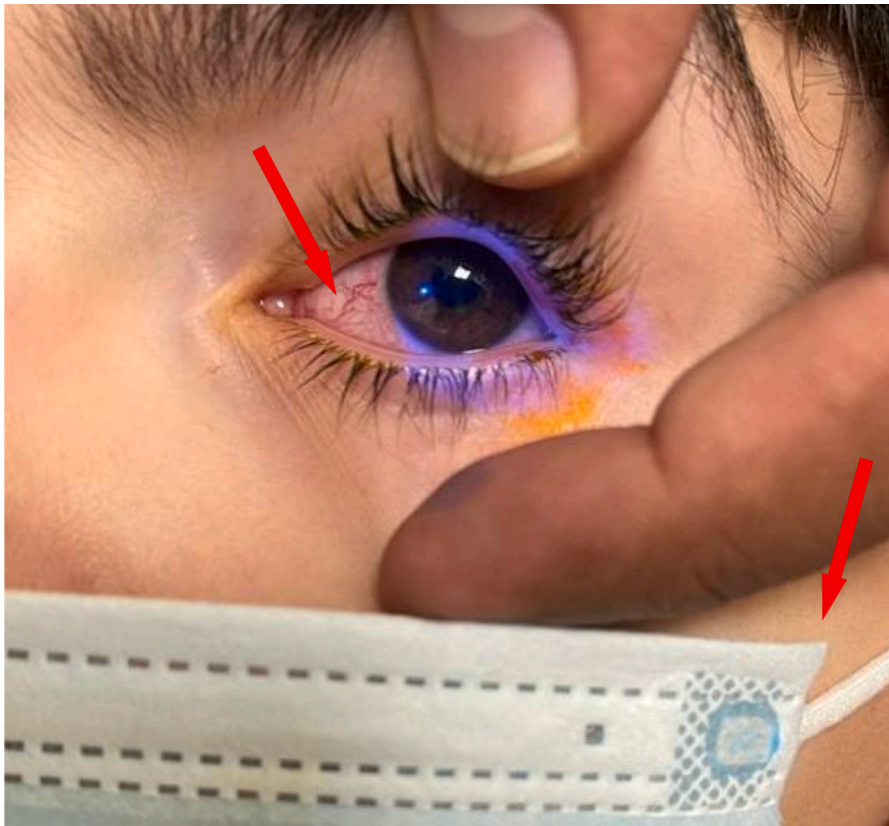


Fig. 2. Generalized conjunctival injection with sharp and hard upper margin of the face mask near the as a potential threat for corneal injury.

for a short period of time for pain relief. Patching of the affected eye was a routine once but now gradually becoming obsolete as it causes a delay in healing of the corneal epithelium.

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