



Addressing post-operative Mask-Associated Dry Eye (MADE)

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COVID-19 has resulted in public health legislation in the UK mandating the wearing of facemasks in all healthcare settings by both patients and hospital staff to try and reduce viral spread [1]. This recommendation has particular relevance to a ‘close proximity’ specialty like ophthalmology [1–3]. Previous publications have discussed the uncertain clinical significance from the potential reduction in microbiological particles onto the surgical field when ophthalmic surgeons wear surgical masks intraoperatively, yet COVID-19 advice has now extended those principles to patients [3]. As the general population adjusts to widespread facemask use, there is an increasing awareness of Mask-Associated Dry Eye (MADE), due in part to ill-fitting designs and leakage of air [4]. We wish to report a recent case of acute post-operative MADE and discuss the implications of this public health recommendation on ocular surgery.

A 66-year-old female with previous LASIK for high myopia attended for cataract surgery under topical anaesthesia. Following application of topical proxymetacaine and 5% povidone-iodine to the ocular surface, she underwent routine left phaco-emulsification surgery which lasted less than 10 min in total. At the end of the operation, the cornea looked clear and a clear plastic shield was placed as standard and her facemask replaced. On leaving the theatre environment, she expressed delight at her “clear vision”. A few hours later, she returned with distress, reporting increasingly blurred vision and discomfort. Unaided visual acuity was Counting Fingers, which improved to 6/9 Snellen with pinhole. She had widespread corneal haze and superficial staining with topical fluorescein but no epithelial defect or wound leak, normal IOP and no evidence of intra-ocular inflammation (Toxic Anterior Segment Syndrome; TASS). The LASIK flap was undisturbed. It was notable

that the operated left eye was extremely dry compared to the right, and the patient’s facemask was very loose around her nose (Fig. 1). The clear shield was exchanged for a paraffin gauze dressing and pad for 24 h; she was advised to use her post-operative steroid and antibiotic drops as planned, and minimise facemask use where possible. She reported complete restoration of good vision within 2 days, confirmed as 6/7.5 Unaided Snellen at clinic review 1 week later with clear cornea and no evidence of dry eye (Fig. 2).

Painful visual loss within a few hours following routine cataract surgery is concerning, and the ophthalmologist must rule out intra-ocular conditions such as TASS or raised pressure (due to retained viscoelastic, capsule distension syndrome or aqueous misdirection). Surface problems such as traumatic corneal abrasions can present in a similar way. We believe this to be the first reported case of visual loss due to acute post-operative MADE following routine topical cataract surgery. It is likely that the poorly fitting facemask was causing the patient’s breath to be directed onto the anaesthetised post-operative ocular surface and causing a variant of exposure keratopathy. Exposure keratopathy due to inappropriate airflow has been reported in the Intensive Care Unit and in patients using ventilation machines for sleep apnoea [5, 6]. Forced airflow has also been associated with dry eye, bacterial conjunctivitis and even



Fig. 1 Photograph showing a patient 3 h post-routine topical cataract surgery wearing a poorly fitted facemask. This mask configuration has reversed normal airflow of breathing and redirected it over the vulnerable anaesthetised ocular surface.

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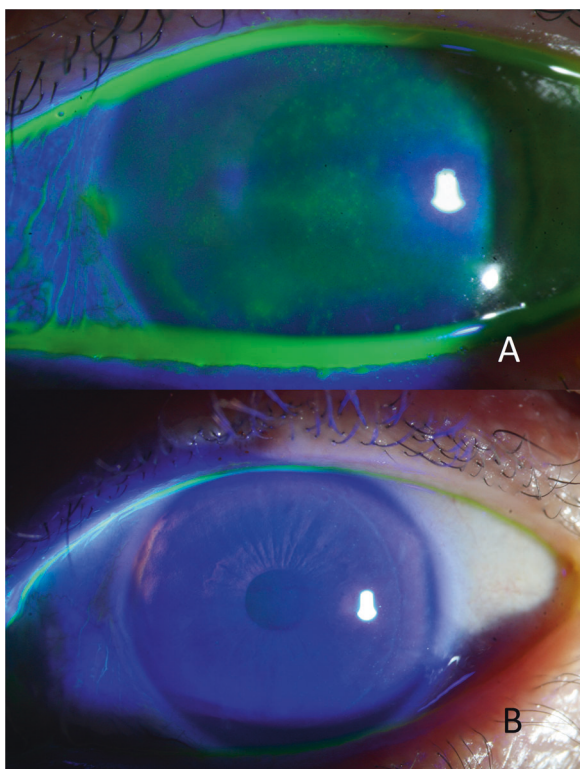


Fig. 2 Clinical photograph of the postoperative cornea and ocular surface, showing **A** new corneal staining due to a poorly fitted facemask at 3 h following routine topical cataract surgery, and **B** a clear cornea without staining 1 week later following minimal postoperative facemask use.

endophthalmitis in glaucoma patients, and this risk was our major concern in this case [6, 7]. Poorly fitting facemasks reverse the normal direction of nasal (and mouth) breathing. Rather than diverting inspiration and expiration airflow away from the eyes, such facemasks inadvertently expose the vulnerable ocular surface to mechanical desiccation and nasopharyngeal pathogens.

We raise concern that ill-fitting facemasks can cause exposure keratopathy in the setting of the anaesthetised cornea, increasing the potential for post-operative infection. This situation could have been avoided by using a 24 h post-operative dressing (our new practice despite routine topical anaesthetic surgery) and minimising facemask usage in the immediate post-operative period. We recommend that preventative measures such as applying surgical tape to the top of the facemask prior to the operation are adopted, to seal the upper mask edge onto the nose and midface and so restrict any redirected exhaled airflow [8]. Similarly, appropriate use of tape to

improve facemask adherence postoperatively may minimise the risk of aero-pharyngeal droplets inoculating the corneal surface and causing a secondary infection (particularly in eyes with pre-existing ocular surface disease). Greater early use of ocular lubricants as a preventative measure has been recommended for MADE, mirroring the advice to reduce dry eye symptoms following refractive laser eye surgery [4, 9].

This case illustrates an additional risk in the context of recent ocular surgery from post-operative MADE. Ophthalmologists should ensure patients are not put at risk of unintended ocular surface exposure leading to secondary infection by addressing inadequately fitted facemasks in the immediate post-operative period.

Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

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