Travel Medicine and Infectious Disease 39 (2021) 101955

Contents lists available at ScienceDirect

Travel Medicine and Infectious Disease

journal homepage: www.elsevier.com/locate/tmaid

Correspondence

An Ophthalmological update for air-travellers during COVID-19

ARTICLE INFO

Keywords
COVID-19
SARS-CoV-2
Air-travel
Ocular transmission
Systemic comorbidities

Considering the Coronavirus disease 2019 (COVID-19) pandemic, we wish to update the increased risk of ocular transmission of Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) in air-travellers. Evidences of inflight transmission of SARS-CoV-2 have been reported [1]. Air-travelling has been considered as a major conduit of in-flight transmission of various respiratory viruses. SARS-CoV-2 is primarily transmitted via close contact with infected individuals producing respiratory droplets while sneezing, coughing or contact transmission via fomites. Besides conventional routes of transmission, eyes represent potential routes and source of SARS-CoV-2 infection. SARS-CoV-2 exhibits tropism for ocular tissues including conjunctiva, cornea, lacrimal sac, and tears [2,3]. Ophthalmic manifestations during SARS-CoV-2 infection have been reported as follicular conjunctivitis, epiphora, dry eyes and blurred vision [4]. We have observed similar ophthalmic manifestations in India with the presence of SARS-CoV-2 RNA in ocular secretions [5]. There is an increased risk of ocular transmission via ocular surface and recently, evidence of ocular manifestation in COVID-19 patients has been reported [6]. Therefore, even in the absence of ophthalmic manifestations, risk of ocular transmission of SARS-CoV-2 should not be ignored by air-travellers.

Besides the increased proximity of occupants, the closed chamber of an aircraft adversely affects the ocular surface. In addition, relatively low humidity conditions while travelling at high altitude in flights increases the tear film evaporation that may disrupt the apical corneal and conjunctival epithelial barrier making eyes susceptible for SARS-CoV-2 infection. Systemic comorbidities like thyroid disorders and diabetes mellitus may result in compromised ocular surfaces. Air-travellers must, therefore, refrain from touching any mucous membrane of eyes, nose and mouth prior to hand sanitization to prevent contact transmission of SARS-CoV-2.

SARS-CoV-2 containing droplets generated from a COVID-19 patient may fall on the ocular surface of a susceptible fellow passenger or the passenger may rub- their itchy eyes with contaminated hands, that may result- in the priming of S-glycoprotein of SARS-CoV-2 due to presence of transmembrane serine protease 2 (TMPRSS2) in cornea, or conjunctival epithelial cells leading to binding with Angiotensin-converting enzyme 2 (ACE2) receptor and subsequent internalization via the ocular surface epithelium. SARS-CoV-2 may further shed into the tear and be transmitted to the nasal cavity via nasolacrimal duct. Unlike previous coronaviruses, respiratory droplets generated by COVID-19 patients contain higher viral load due to higher shedding in the upper respiratory tract. This may further increase the risk of in-flight ocular transmission of SARS-CoV-2.

It is advisable that air-travellers avoid using contact lenses and use sleep masks, protective goggles and face shields besides the use of preservative free ocular lubricants to keep their eyes moist thereby reducing the risk of infection. Frequent sanitization, hand hygiene, maintenance of adequate hydration and avoidance of caffeine or alcohol is advised. A pre-travel ocular evaluation will help guide the traveller regarding additional precautions, if any. Self medication is discouraged in case any individual develops ocular symptoms post travel. Additionally, considering the contagious nature of SARS-CoV-2, an average safe distance needs to be maintained within two rows and two seats apart while air travelling.

Authors' contribution

SKS and AK conceived the idea and collected the data. NP, SK, and SKS devised the initial draft, reviewed the final draft and contributed equally as first author. NP, SK, SDK, HRD, A, VKM, AK, and SKS finalized the draft for submission.

Funding

The author(s) receive no specific funding for this work.

Abbreviations: Coronavirus disease 2019 (COVID-19), Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2); Angiotensin-converting enzyme 2 (ACE2), transmembrane serine protease 2 (TMPRSS2).

https://doi.org/10.1016/j.tmaid.2020.101955
Received 22 June 2020; Received in revised form 17 November 2020; Accepted 10 December 2020
Available online 13 December 2020

Declaration of competing interest

Authors have no conflict of interest.

References

[1] Pavli A, Smeti P, Hadjianastasiou S, Theodoridou K, Spilioti A, Papadima K, et al. In-flight transmission of COVID-19 on flights to Greece: an epidemiological analysis. Trav Med Infect Dis 2020;38:101882. https://doi.org/10.1016/j.tmaid.2020.101882.

[2] Arora R, Goel R, Kumar S, Chhabra M, Saxena S, Manchanda V, et al. Evaluation of SARS-CoV-2 in tears of patients with moderate to severe COVID-19. Ophthalmology 2020;S0161–6420(20):2–30847. https://doi.org/10.1016/j.ophtha.2020.08.029.

[3] Aiello F, Gallo Afflitto G, Mancino R, Li JO, Cesareo M, Giannini C, et al. Coronavirus disease 2019 (SARS-CoV-2) and colonization of ocular tissues and secretions: a systematic review. Eye 2020:1–6. https://doi.org/10.1038/s41433-020-0926-9.

[4] Wu P, Duan F, Luo C, Liu Q, Qu X, Liang L, et al. Characteristics of ocular findings of patients with coronavirus disease 2019 (COVID-19) in Hubei Province, China. JAMA Ophthalmol 2020;138(5):575–8. https://doi.org/10.1001/jamaophthalmol.2020.1291.

[5] Ankita, Kaur A, Saxena SK. COVID-19: an ophthalmological update. Coronavirus Disease 2019:81–93. https://doi.org/10.1007/978-981-15-4814-7_8. 2020.

[6] Zhang X, Chen X, Chen L, Deng C, Zou X, Liu W, et al. The evidence of SARS-CoV-2 infection on ocular surface. Ocul Surf 2020;18(3):360–2. https://doi.org/10.1016/j.jtos.2020.03.010.

Nitika Pandey[1]
Department of Ophthalmology, King George's Medical University, Lucknow, 226003, India

Swatantra Kumar[1]
Centre for Advanced Research (CFAR), Faculty of Medicine, King George's Medical University, Lucknow, 226003, India

Sajan D. Kesar
Department of Ophthalmology, King George's Medical University, Lucknow, 226003, India

Himanshu R. Dandu
Department of Internal Medicine (Infectious Diseases Group), King George's Medical University, Lucknow, 226003, India

Ankita
Department of Ophthalmology, King George's Medical University, Lucknow, 226003, India

Vimal K. Maurya
Centre for Advanced Research (CFAR), Faculty of Medicine, King George's Medical University, Lucknow, 226003, India

Apjit Kaur[**]
Department of Ophthalmology, King George's Medical University, Lucknow, 226003, India

Shailendra K. Saxena[1,*]
Centre for Advanced Research (CFAR), Faculty of Medicine, King George's Medical University, Lucknow, 226003, India

[**] Corresponding author. Department of Ophthalmology, King George's Medical University, Lucknow, 226003, India.

[*] Corresponding author. Centre for Advanced Research (CFAR), Faculty of Medicine, King George's Medical University, Lucknow, 226003, India.
E-mail address: apjitkaur@kgmcindia.edu (A. Kaur).
E-mail address: shailen@kgmcindia.edu (S.K. Saxena).

[1] Contributed equally as first author.