

Letter to the Editor

Could the SARS-CoV-2 infection be acquired via the eye?

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Dear Editor,

The coronavirus disease 2019 (COVID-19) outbreak was first identified in the Hubei Province of Wuhan, China in December 2019. It is caused by acute respiratory syndrome coronavirus-2 (SARS-CoV-2). The proposed transmission of SARS-CoV-2 is respiratory droplets smaller than 5 µm in diameter or by indirect or direct human-to-human contact. ^[1] SARS-CoV-2 may also be transmitted through the eyes. The receptor for SARS-CoV-2 is angiotensin converting-enzyme-2 (ACE-2). SARS-CoV-2 replicates at the binding site on the surface of target cells, such as ocular tissues, leading to the cleavage of the ACE-2 receptor, activation of the spike protein, and inflammation in the form of ocular manifestations such as conjunctivitis, anterior uveitis, retinitis, and optic neuritis. SARS-CoV-2 can cause eye manifestation. ^[2] Meanwhile, the SARS-CoV-2

receptor, angiotensin converting-enzyme-2 (ACE-2), is expressed by conjunctival epithelial cells, and the presence of ACE-2 was significantly elevated in conjunctival cells in patients with conjunctivitis, conjunctival nevi, conjunctival papilloma, conjunctival cysts, and conjunctival polyps' epithelial cells compared to control subjects. ^[3]

Besides, Zhou L. et al. reported that ocular surface cells are potential infection sites of SARS-CoV-2. The proteases of ocular surface cells facilitate the binding of SARS-CoV-2 on the viral spike protein to the ACE-2 receptor in the conjunctiva, limbus, and cornea. It has been discovered that SARS-CoV-2 exists in tears when an expression of the cellular surface protein angiotensin-converting enzyme 2 (ACE-2) and the cellular transmembrane serine protease 2 (TMPRSS2). ^[4] Another study found that SARS-CoV-2 was present on conjunctiva swabs from 2 out of 11 (18%) patients tested for SARS-CoV-2 via nasopharyngeal swabs. A common symptom is conjunctivitis, and SARS-CoV-2 could be transmitted by aerosol contact with the conjunctiva. ^[5]

However, the risk of SARS-CoV-2 transmission through tears is low. In a study of 17 patients, none of the 32 patient tear samples was positive for SARS-CoV-2. ^[6] The replication of SARS-CoV-2 is much more efficient than that of SARS-CoV in human conjunctiva and the upper respiratory airways. Thus, eyes could be a potential route of SARS-CoV-2 transmission. ^[7]

All of the above information demonstrates that SARS-CoV-2 might be acquired through the eyes; wearing a face shield could be of benefit, especially during aerosol-generating procedures.

Conflict of Interests

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