

COVID-19: Ophthalmic prophylactic and therapeutic measures

The coronavirus disease 2019 (COVID-19), which originated from Wuhan in China, has spread to almost 200 countries across the globe. As the pandemic is ravaging across the world, the health workers are desperately trying to contain the spread, while trying to manage the existing cases. The disease, caused by a novel coronavirus (Severe acute respiratory syndrome [SARS]-CoV2), has a high rate of transmission mainly through fomites and aerosols.^[1] The virus gets released as an aerosol during coughing and sneezing settles on surfaces. Subsequently, it is transmitted from contaminated hands to mouth, nose, and eyes, these being the leading portals of entry and exit. SARS-CoV2 has been detected in tear secretions by a reverse transcriptase-polymerase chain reaction in a recent study.^[2] One of the earlier studies claimed a very low incidence of conjunctivitis in patients with COVID-19 infection. However, a recent study from China reports that almost 31.6% of patients with COVID-19 had ocular involvement. It was also interesting to note that 91.7% of the patients with COVID-19-related conjunctivitis tested positive on a nasopharyngeal swab.^[2] All suspected cases should be attended to with due precautions and should be referred to a COVID-19 designated clinic for further testing if indicated.^[3]

Eyes could act as a portal of entry or exit through direct aerosol inoculation as reported in a case in China. Further complicating the issue, the hands of a patient contaminated with tear secretions may also transmit the virus in the community.

Currently, the treatment for symptomatic COVID-19 infection is mainly supportive, and the medical fraternity is still struggling to find a suitable treatment. Though controlling the

systemic illness is the highest priority of healthcare at present, effective preventive measures to curb the transmission of this disease are equally important to reduce the overwhelming number of new cases.

Hand hygiene has been widely emphasized as a critical public health intervention. However, we need to consider ways and means to contain the transmission of the virus in cases of COVID-19 conjunctivitis and not let these cases go away without treatment like any other viral conjunctivitis.

Even though all COVID-19 cases do not have ocular manifestations, still the viral shedding may occur through tears in symptomatic patients as well as asymptomatic carriers. Hence, there is an urgent need to counter this mode of spread.

Large randomized, controlled trials have established the efficacy of various topical antiviral agents. At the moment, the data on the COVID-19 virus are limited, and we need to extrapolate the findings from these clinical trials to contain this pandemic.

Benzalkonium chloride (BAK) has been reported to have an inhibitory effect on various viruses, including coronavirus. It is a quaternary ammonium compound with cationic amphiphilic property, which is inhibitory to various bacteria and viruses.^[4] BAK is a critical chemical constituent in sanitizers and wipes. Incidentally, it is a commonly used preservative in many ophthalmic preparations. The concentration of BAK as a preservative in various ophthalmic preparations may vary ranging from 0.01% to 0.04%. BAK was found to be effective in the treatment of adenoviral conjunctivitis in a few studies. It is highly effective against a large number of viruses at concentrations as low as 0.02%.

With the current epidemic of COVID-19 related conjunctivitis, we need to consider interventions to reduce the viral load on the ocular surface. Frequent Instillation of antibiotic and lubricant

eye drops with at least 0.02% BAK in patients with suspected COVID-19 conjunctivitis will reduce the viral load and hamper further individual colonization and community spread.

The use of BAK containing lubricant eye drops could also act as the second layer of personal protective measures for the health care workers. The effect would be more pronounced if eyes are washed with 3–4 drops of BAK containing drops at the end of COVID-19-related duties. Marketing and manufacturer of BAK eye drop specifically for viral conjunctivitis is an unmet need to be considered by the pharma industry in times to come.

Betadine eye drop is another commonly used compound for viral conjunctivitis. Few well-designed studies have established the efficacy of Betadine eye drops in viral conjunctivitis.^[5] For a case of conjunctivitis with COVID-19, this preparation may help to reduce the viral load due to its action against a wide range of viruses. Burning and irritation is a significant side effect of the drug, which can be effectively reduced by diluting 1 mL of 5% Betadine with 4 mL of BAK containing lubricant drops. This formulation will not only ensure patient comfort but also it will have the advantage of dual antiviral action with BAK and Betadine.

Scientific data also support the use of saline to enhance the virucidal activity of epithelial cells by increasing intracellular hypochlorite.^[6] Rising levels of sodium chloride in the form of saline eye drops may help in reducing the colonization and shedding of the virus in tears. Hence, the use of commonly used hypertonic saline (5%) drops may also provide a therapeutic avenue to explore to avoid transmission through the ocular surface. Similar antiviral action may exist in the epithelium lining the nasal cavity. BAK containing saline nasal drops may have a dual-mode of action and may be considered for blocking viral entry and exit through the nose as a preventive measure for the individual as well as the community.

Chloroquine and hydroxychloroquine are the only drugs currently recommended for the prophylaxis and treatment of COVID-19-related disease. In a small study on patients with COVID-19 infection, oral chloroquine was found effective in reducing the systemic viral load. 0.03% chloroquine eye drops have been used for the treatment of dry eye disease in a few studies.^[7] This drug may also have therapeutic potential for use in COVID-19-related conjunctivitis, and further studies may be required for validation.

Although COVID-19-related conjunctivitis is a self-limiting disease, efforts to reduce transmission in the community are equally vital. Well-structured, randomized, controlled trials are required to validate the use of the abovementioned drugs for containment of the current pandemic and future epidemics if any. Pending these trials, the use of commonly available BAK containing medications such as antibiotic and tears substitutes with minimal side effects may be advocated to suspected conjunctivitis cases, considering the mammoth task of controlling the ongoing pandemic.

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Conflicts of interest

There are no conflicts of interest.

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