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Letter to the Editor

Could nasal irrigation and oral rinse reduce the risk for COVID-19 infection?

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Abstract

Public health measures are essential to protect against COronaVIrus Disease 2019 (COVID-19). The nose and the mouth represent entry portals for the COVID 19. Saline Nasal Irrigations (SNIs) can reduce the viral load in the nasal cavities. Oral rinse with antimicrobial agents is efficacious in reducing the viral load in oral fluids. We advocate the inclusion of SNIs and ethanol oral rinses as additional measures to the current public health measures, to prevent and control the transmission of any respiratory infectious disease, including COVID-19.

Keywords

COVID-19 infection, oral rinses, prevention, saline nasal irrigations

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Dear Editor,

The World Health Organization (WHO) recently declared as pandemic the infection caused by COronaVIrus Disease 2019 (COVID-19).[1] Recently, the virus has spread to the Europe, and in particular to Italy, resulting in high morbidity and mortality. The Italian Healthcare System is overloaded, and the epidemic curve is rising during these first months.[2] Public health measures, including hand hygiene, respiratory etiquette, respirator masks and environmental cleaning are essential to protect individuals, their families and others against COVID-19. The nose and the mouth represent entry portals for the COVID-19 because the infection is mainly transmitted by inhalation of or contact with infected droplets.[3] The Centers for Disease Control recommends, as diagnostic testing for COVID-19, collecting upper respiratory nasopharyngeal and oropharyngeal swabs.

Guidelines from the Stanford University School of Medicine and Recommendations from the Australian Society of Otolaryngology Head and Neck Surgery suggests to avoid powered atomisation, spray anesthetic/decongestants, to prevent spread of the virus.[4]

Nasal mucosa represents a vulnerable area for coronavirus to colonize for its abundant blood vessels, mucinous glands and serous glands which create a humid environment. Angiotensin converting enzyme-2 (ACE2) expression was found in the basal layer of the nonkeratinizing squamous epithelium in nasal mucosa, indicating that coronavirus may infect nasal mucosa cells if basal layer is exposed due to nasal mucosa barrier breakdown.[5] Typically, human coronavirus caused disruption of the ciliated epithelium and ciliary dyskinesia. This is likely to impair mucociliary clearance. Damage to the respiratory epithelium, due to coronavirus infection, may occur without overt

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clinical symptoms.[6] Therefore, it is mandatory to pay attention to the protection of upper respiratory tract and mucosa.

Saline Nasal Irrigations (SNIs) are often recommended as an additional non-pharmacological preventive strategy to clean the nasal cavities by removing antigens, inflammatory mediators, and microorganisms such as bacteria and viruses; in particular, SNIs can reduce the viral load in the nasal cavities. Currently, in the scientific literature, there are few studies on the use of SNI as preventive strategy of upper respiratory tract infections (URTIs). Slapak et al.[7] showed that the use of seawater SNIs, three times daily for 8 weeks, reduced URTI episodes than control group without treatment, with a consistent improvement in rhinologic symptoms, medication consumption, reported illness, school absence, and complication rate. Moreover, Tano and Tano[8] suggested that a daily nasal spray with saline can prevent nasal symptoms of common cold in a population of otherwise healthy adults. Recently, Ramalingam et al.[9] conducted a pilot, randomized controlled trial of hypertonic SNI and gargling (HSNIG) versus standard care on healthy adults within 48 hours of URTI onset to assess recruitment, acceptability, symptom duration, and viral shedding of a large number of viruses such as rhinovirus, enterovirus, influenza A virus, and coronavirus. At the end of the study, the authors showed that in the intervention arm, duration of illness was lower by 1.9 days ($P=0.01$), over-the-counter medications use by 36% ($p=0.004$), transmission within household contacts by 35% ($P=0.006$) and viral shedding by $\geqslant 0.5$ log10/day ($P=0.04$). When individuals infected with similar viruses (rhinovirus, coronavirus, enterovirus, and influenza virus) were compared, 30% more individuals had reduction in viral shedding by $\geqslant 0.5$ log10 per day in the intervention arm. However, regarding the viral load, though the difference between the baseline and end-point samples was larger in the intervention arm than the control arm, the difference was not significant (although this study was not powered to detect differences in these measures).

Moreover, SNIs play a defensing role in improving the innate antiviral immunity of the nasal mucosa cells. In particular, Ramalingam et al.[10] suggested that epithelial, fibroblast, and hepatic cells have enhanced antiviral activity in the presence of increasing concentrations of sodium chloride even in the case of coronavirus family infection. However, the authors did not use nasal mucosa cells in their testing. To date, there are not any studies which specifically investigated the antiviral activity of chloride salts against coronavirus family in the nasal mucosa cells. Moreover, Ramalingam et al.[9] offered an indirect evidence of this aspect with the reduction of coronavirus shedding in the nasal swabs.

SNI is inexpensive, can be performed at home. It is rarely accompanied by adverse effects, although the use of hypertonic solutions can lead to the irritation of nasal mucosa and a greater sensation of burning.[11]

The other main entrance to the body for the COVID-19 is the mouth. It is known that an oral rinse with antimicrobial agents is efficacious in reducing the viral load in oral fluids.

Meiller et al.[12] investigated the clinical efficacy in utilizing an oral rinse with the antimicrobial agent Listerine antiseptic (alcohol-based mouthwash) in reducing the presence of viral contamination (Herpes Virus) in oral fluids for at least 30 min after oral rinse. The authors concluded that risk of viral cross contamination generated from these oral fluids in person-to-person contact may be reduced. There are not studies on the prevention of coronavirus infection with the use of oral rinse with alcohol solution. However, it is well known that the modified WHO-recommended alcohol-based formulations specifically inactivate different enveloped viruses, including SARS-CoV.[13]

Evidences supported the efficacy role of antimicrobial rinses against the enveloped viruses including the human coronavirus recently identified. Chlorhexidine and alcohol-based mouthwash might cause staining of tooth surfaces, restorations, and the tongue, alteration in taste, an increase in tartar formation, irritation, and mucosal damage with long-term daily use.[12] Until a vaccine becomes available, which is not expected for another 12–18 months from now if everything works well, we should implement quickly and effectively non-pharmaceutical interventions including nasal irrigation and oral rinse to reduce the burden of COVID-19. Randomized clinical trials on large population are needed to verify the efficacy of SNIs and oral rinses in preventing spread of COVID-19 evaluating the number of episodes, viral load in the nasal cavities, transmission within household contacts, medication

consumption, reported illness, school and work absence, and complication rate.

Declaration of conflicting interests

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