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Xerostomia: What to Do in COVID-19 Patients

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Dear Editor,

Besides the common symptoms such as fever, cough, and dyspnea, oral manifestations including taste loss, dry mouth as well as oral lesions have also been reported in COVID-19 cases.[1,2]

Gustatory dysfunction (hypogeusia, ageusia, and parageusia) has been reported in up to 93% of the patients with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2)-associated oral symptoms. Gustatory dysfunction can take place with the concomitant olfactory disorder or occur independently. However, even in the cases of olfactory dysfunction, the perception of the basic taste is intact as a result of direct brain stimulation from taste stems located on the tongue. A subjective sense of "dry mouth" is known as xerostomia which affects oral health and dental hygiene significantly.[3,4]

To assess the prevalence of xerostomia and other related symptoms in patients with COVID-19, we used the Fox et al questionnaire in 66 cases (includes 44 men) of hospitalized moderate COVID-19 patients and found that 7.9% of patients had both xerostomia and gustatory dysfunction. 95.2% of patients had xerostomia and difficulty swallowing. The Fox et al questionnaire was designed to determine dry mouth and predict hyposalivation. This questionnaire examines items such as saliva, swallowing problems, dry mouth when eating, and drinking fluids to help swallow dry food.[5]

The oral cavity has a critical role in the transmission, viral load, and severity of COVID-19. Saliva contains a mixture of macromolecules and electrolytes secreted from major and minor salivary glands and is regulated by various factors which play critical roles in oral health, digestion, swallowing, hormone-like and metabolically active compounds production, antibacterial activity, and teste sensation.[6]

Complex hormonal and neuronal networks control the Saliva secretion via an active transport process by salivary glands. The stimulated saliva composed the majority of daily salivary production with the maximum rate of about 1 mL/min/g of glandular tissue. The submandibular gland produces 70% of unstimulated saliva in contrast to the parotid gland which contributes to two-thirds of stimulated salivary flow.[7,8] Salivary gland hypofunction is defined as about 50% diminution in the basal salivary flow rate. The salivary flow rate is a considerable variable among individuals and is supposed to be stabilizing after the age of fifteen.[9] About 30% of the population claimed some degree of xerostomia. As saliva plays an important role in defense against pathogens, salivary flow reduction leads to various complications such as dental caries, halitosis, and periodontal problems.

The salivary control center is located within the medulla that can be triggered by chewing, olfactory and gustatory stimuli. Gustatory stimulation can induce the salivary flow as much as 10-fold. Other local or systemic diseases as well as medication (e.g. anticholinergic properties) can alter the salivary flow.[10]

We hypothesized various mechanisms for xerostomia and reduction in salivary flow production in COVID-19 cases including:

- Impaired neural function in the salivary control center within the medulla oblongata due to probable neuroinvasive mechanism of SARS-CoV-2 that leads to salivary flow reduction as a result of decreased stimuli.
- Expression of ACE2 receptors on salivary glands ducts epithelium with even higher than that in the lung as a viral reservoir and responsible for viral entry that can indicate the potential site of invasion by the coronavirus. Some studies detected SARS-CoV-2 in saliva which emphasized the hypothesis of inflammation of salivary glands (sialoadenitis) in the acute phase of infection.
- Direct inflammatory changes of salivary glands

(sialoadenitis) as a consequence of target organ damage by 2019-nCoV infection especially in the acute phase of the disease.
- Concurrent olfactory dysfunction among COVID-19 cases.
- SARS-CoV-2 neurotropism and probable neuroinvasive mechanism lead to direct invasion of the taste stem on the tongue.
- Manifestation of autoimmune mechanisms destructing the salivary epithelium and decreasing the salivary flow rate as well as glossitis.
- Use of supplemental oxygen for several hours as a part of treatment in COVID-19 cases and medication especially with anticholinergic effects.

We recommend chewing gum (in stable COVID-19 cases), drinking plenty of water, maintenance of oral hygiene, reducing the usage of anticholinergic medication, and decreasing the rate of supplementary oxygen when possible as well as artificial saliva and saliva stimulatory medications. These can help the patients suffering from xerostomia significantly and prevent the occurrence of subsequent dental problems.

Authors' Contribution

HA presented the idea. MM and HA performed the literature search and developed an initial draft. PT carried out formatting and editing, and AF reviewed and approved the final version.

Competing Interests

None.

Ethical Approval

Not applicable.

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