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1 INTRODUCTION

In December 2019, the global spread of a new virus known as SARS-CoV-2, which is responsible for the disease called COVID-19, occurred, triggering an unprecedented crisis around the world. On March 11, 2020, the World Health Organization (WHO) declared the situation a pandemic. As of June 16, 2020, there have been more than 7.9 million confirmed cases and 434,796 deaths in more than 200 countries. Brazil was the second most affected country, with more than 900,000 confirmed cases and 43,332 deaths.

As a measure to contain the rapid spread of COVID-19, isolation and social distancing measures have been implemented around the world. This resulted in the temporary closure of dental clinics, both public and private, and the suspension of elective dental care. In addition, the dental school clinics were closed due to the interruption of face-to-face activities and clinical teaching.

Considering the current knowledge about the biological behavior of COVID-19, it is important to note that many viral infections can cause oral manifestations. Therefore, it is valid to know the oral manifestations that may be a direct consequence of SARS-CoV-2 infection.

There are several oral manifestations related to COVID-19, which can occur due to the side effects of the medications used in the treatment of the disease, as well as conditions arising from mechanical ventilation therapy and hospitalization in intensive care units (ICU). These manifestations include changes in the characteristics of the mucous membranes, changes in the production and quality of saliva, stomatitis, ulcers, sensory changes, pigmentation, among others. The advanced age and severity of COVID-19 can aggravate these injuries. Other factors, such as lack or reduction of oral hygiene, stress, systemic diseases (such as diabetes mellitus and immunosuppression), trauma from intubation, vascular impairment, and hyperinflammatory response secondary to COVID-19, may also contribute to the development of these lesions.

2 ORAL MANIFESTATIONS ASSOCIATED WITH COVID-19

2.1 CHANGES IN TASTE

Dysgeusia is a persistent distortion of taste, whether transient or permanent. Dysgeusia is also often associated with ageusia, which is the complete lack of taste, and hypogeusia, which is a decreased sensitivity to taste. The oral symptoms of COVID-19 are characterized by disturbances in taste and smell, without the simultaneous presence of nasal congestion. SARS-CoV-2 has been found to bind to the epithelial cells of the tongue via the converting enzyme receptor, which is widely expressed in these cells. Based on this finding, dysgeusia is considered the first direct oral manifestation of the infection.

2.2 HYPOSALIVATION

Additionally, decreased saliva production (hyposalivation) or changes in saliva composition can lead to dysgeusia and even ageusia. A recent study demonstrated that more than 50% of COVID-19 patients had symptoms of dry mouth (xerostomia) and dysgeusia, and there was a significant correlation between these two symptoms. However, more research is needed to determine if taste dysfunction is a direct consequence of SARS-CoV-2 infection or if the virus causes hyposalivation, resulting in dysgeusia. Either way, one symptom aggravates the other. Reducing saliva production also increases the risk of caries injuries and aggravating the process of tooth decay. In addition, the decrease in saliva implies a lower amount of immunoglobulins, which can pose a great risk for the development of periodontal diseases

2.3 OPPORTUNISTIC INFECTIONS

It is essential to highlight that the acute condition caused by COVID-19 can increase susceptibility to opportunistic infections, such as herpes simplex and candidiasis, which may present similar clinical characteristics. Since there is no standard treatment for COVID-19, different medications are given to patients, and it is important to consider that other endemic infectious diseases may arise as a consequence of COVID-19.

Studies indicate that prolonged use of antibiotics may aggravate oral manifestations and warn of the risk of potentially fatal opportunistic oral infections resulting from the indiscriminate prescription of broad-spectrum antibiotics. Mucus skin complications in the oral cavity can arise due to several factors, such as prolonged positioning of mechanical ventilation devices in intensive care units (ICU), previous antibiotic treatments that can lead to immune dysregulation, and, in general, injuries are indicative of side effects related to deteriorating systemic health or the use of medications in the treatment of COVID-19.



Source: Internet - Opportunistic Infection: Herpes Simplex



Source: Internet - Opportunistic Infection: Oral Candidiasis

2.4 MUCOSAL LESIONS

Several isolated case reports or case series have documented oral manifestations of COVID-19. However, questions arise as to whether these lesions are a direct consequence of SARS-CoV-2 infection or whether they are secondary manifestations of the disease. These manifestations include oral ulcers, petechiae, and reddish macules, mainly on the tongue and palate.

The discussion about the origin is inconclusive, since it may be the virus as to the pharmacological treatment employed. According to recent studies, the most frequent oral lesions were aphthous ulcerations (65%), vesicular-bullous lesions (11%), macules (16%), petechiae (6%) and plaques (6%), most of which were symptomatic, located on the tongue (53%), palate (30%), lip (23%) and gums (5%). Other oral changes reported were ageusia/dysgeusia (21%), burning in the mouth (20%) and xerostomia/hyposalivation (7%).



Source: Internet - Mucosal Lesions: Canker sores



Source: Internet - Mucosal Lesions: Petechiae

3 CONCLUSION

It cannot be stated with certainty that the oral manifestations are directly related to the SARS-CoV-2 virus or if they are side effects of the treatment of the disease. While it is common for COVID-19 patients to experience oral signs and symptoms, such as traumatic ulcers, changes in taste, opportunistic infections, and reduced salivary flow, these manifestations are not mandatory. Understanding the mechanism of action of COVID-19 requires more scientific research to determine the origin of these lesions and oral manifestations, as well as find ways to minimize them. It is important to make dentists aware of the proper management of the patient in this context.

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