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Review Article

Oral findings in SARS-CoV-2 infection- A comprehensive review

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ABSTRACT

The COVID-19 has presented as a worldwide threat to global health. It is highly necessary to study signs and symptoms associated with this infection. This review highlights the role of dental practitioners to diagnose the early signs of oral lesions in COVID-19 infection. They can play an important role in managing pain, giving support to patient and improving the quality of life, by becoming a part of multi-disciplinary team to fight against this global pandemic.

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1. Introduction

The COVID-19 or novel coronavirus disease 2019 has presented as a worldwide threat to global health.¹ Till date seven different types of coronaviruses have been found that can infect human beings. Four of these including hCoV-229E, hCoV-NL63, hCoV-OC43, and hCoV-HKU1 are observed to cause cold, whereas the other three types can lead to mild to severe respiratory diseases, severe acute respiratory syndrome coronavirus (SARS-CoV); Middle East respiratory syndrome coronavirus (MERS-CoV); and SARS-CoV-2.²

SARS-CoV-2 shows a greater adaptation to the human host as compared with to other types of coronaviruses and the other reference hosts. WHO has named coronavirus as Severe Acute Respiratory Syndrome Coronavirus 2 (SARS- CoV-2).¹ It's a zoonotic origin respiratory disease with a possible origin from bats and pangolins being the intermediate host.³ Till now it has been proved that this virus got transmitted directly from infected person to a

healthy individual from a distance of about 2m on coughing, sneezing, or speaking through droplets. Indirectly, it spread via infected surfaces that come in contact with infected individuals.⁴

The infected patients usually present with affect on lungs, showing symptoms ranging from mild flu-like to fulminant pneumonia and even presents lethal respiratory distress.⁵

It has been revealed by various studies that virus is resistant to standard defence mechanism of body. It has been reported that humoral/cellular immune response got reduced in infective patients with lymphocytopenia and T-cell over-activation.⁶⁻⁸ Thus mortality of patients is independent of their immune status.⁹

The inflammation-induced symptoms of COVID-19 like anosmia, ageusia have been found in study by Petrescu et al., 2020.¹⁰ Various immune inflammatory processes are responsible for affecting oral mucosa in COVID-19 infected individuals. Many researchers have reported effect on saliva and oral cavity due to intensified use of drugs as prophylactic measures and treatment of COVID-19 infections.¹¹

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It has been observed in various studies that many COVID-19 infected patients suffered from problems related to oral health. But still there is doubt related to the fact that whether these oral findings are typical patterns of COVID-19 infection. Thus, the present review was conducted to reveal various oral manifestations related with COVID-19 pandemic.

1.1. Etiology of Oral Manifestations Related with COVID-19

Only limited number of cases has been reported in literature till date with oral findings in COVID-19 infected patients. Thus, the exact etiological factors leading to oral symptoms are still not clear. Few studies advocated that oral lesions may occur because of systemic deterioration that cause and increase the probability of opportunistic infections.^{12,13} Few mention that oral symptoms can be related to the adverse reactions to various medicinal treatments given against COVID-19 infection.¹²

2. Various Oral Manifestations Reported by Authors till Date

Due to intensive medicinal treatment in COVID-19, many patients have been reported with oral and dental problems, lesions on oral mucosa, xerostomia, oropharyngeal symptoms etc. These symptoms persist in patients even getting recovered from COVID-19 infection.¹¹

In a study by Picciani BLS et al.¹², patient was observed to have white lesions in oral cavity, that was found to be candidiasis. The cause of candidal infection could be persistent medicinal therapy for treatment of COVID-19 infection, that inturn leads to this fungal infection.

Few studies revealed that there can be an association of immune-inflammatory processes with COVID-19 infection. These can cause hyperpigmentation of oral mucosa with increased melanin.¹³ The physiology behind this is the release of various factors leukotrienes, cytokines, inflammatory mediators and prostaglandins during inflammation, that can cause melanogenesis.¹⁴

Martín Carreras-Presas C et al.¹⁵ revealed that they observed three patients with lesions affecting the keratinised tissue similar as we observe in herpes simplex infection. They observed that lesions were quite similar to erythema multiforme, involving both keratinised and non-keratinised tissues. They advocated that there is a possibility that novel coronavirus leads to different kinds of oral lesions which are commonly went unreported due to a lack of intraoral examination in infected patients. The other common oral manifestation observed is palatal ulceration. It has been reported in case reports by Martín Carreras-Presas C et al.¹⁵ and Soares CD et al.¹⁶ They observed ulcerated lesions, multiple reddish macules of different sizes scattered along the hard palate. They revealed lesions resembling herpetic

recurrent stomatitis. Patients reported with pain in tongue, palate and sore throat. They also observed blisters on the labial mucosa and presence of desquamative gingivitis.

In a report by Sakaida et al.¹⁷ erythematous lesions and eruptions were observed in patient infected with COVID-19. They revealed that the reason was intake of drugs to combat infection. So the lesions were diagnosed as drug eruptions. Chaux-Bodard A et al.¹⁸ observed irregular ulcers on dorsal surface of tongue after 8days when report of infection got confirmed. They cited that reason could be vasculitis. Ansari R et al.¹⁹ observed multiple ulcers, painful in nature, on tongue and hard palate. They advocated that etiology behind this manifestation could be stress related or viral infection. Patel J et al.²⁰ found that patient infected with COVID-19, presented with necrotising lesions on interdental papilla with severe halitosis. She presented with generalized erythematous and edematous gingival. The reason advocated was superimposed bacterial infection in this viral infection.

Biadsee A et al.²¹ observed that considerable number of infected patients presented with olfactory and oral disorders, with symptoms differing in both genders. They found that smell and taste dysfunction was noticed among most of the patients. Sweet and salt taste perception was most altered. Patients reported to have dry mouth, burning sensations, swollen palate and plaque-like changes in the tongue, with intermittent bleeding from gums.

Although various case studies report that oral lesions occur in patients with COVID-19 infection. But exact etiology of these symptoms still remained hidden. Some studies advocate that it could be because of viral infection itself, or due to superimposed bacterial infection, underlying inflammatory responses, or as triggered herpetic lesions due to fear and stress caused by coronavirus infection. Oral lesions range from xerostomia, candidiasis, isolated painful oral ulcers, gingivitis, to blisters and generalised oral erythematous lesions. Loss of taste is usually preceded by the inability to perceive the odor of food due to olfactory dysfunction. Loss of taste perception causes xerostomia because taste is the main stimulant for saliva formation.

3. Histopathological Evidence: Soares CD et al.¹⁶

reported with histological evidence of lesion reported in infected patient. They observed that biopsied lesion showed epithelium with severe vacuolization and occasional exocytosis. The lamina propria has a diffuse chronic inflammatory infiltrate associated with focal areas of necrosis and haemorrhage. Obliteration of superficial as well as deep small vessels was observed with formation of thrombi. Small thrombi were lined with endothelial cells, while larger ones were having fibrin and endothelial cells. Related minor salivary glands to oral ulcers also showed an intense lymphocytic infiltration with CD3 and CD8 cells.

4. Treatment

In most of the cases, the lesions got resolved with time in 3-8 days. Antiviral drug like Valaciclovir and topical antiseptics (chlorhexidine and hyaluronic acid) were also found to be highly effective in managing oral lesions.¹⁵

5. Conclusion

In the present review, we found that a wide range of oral manifestations can occur in patients with COVID-19 infection. Various oral signs and symptoms like candidiasis, thrush-like ulcers, geographical tongue, petechiae, HSV-1 infection, traumatic ulcers and dysgeusia need to be observed in infected individuals. Thus, the presence of oral manifestations can be considered as important symptoms of Covid-19. But the need of time is to conduct more research studies on infected patients, so as the relation of oral lesions with COVID-19 infection could be established. Dentists should work as a team with medical doctors and dermatologists to do a thorough intraoral examination in suspected, infected and recovered patients. Dentists can play an important role in managing pain, giving support to patient and improving quality of life.

6. Source of Funding

None.

7. Conflict of Interest

The authors declare no conflict of interest.

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