

Dental infection as a predisposition to RCOM in covid patients- original research

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Abstract

The pathogenic mechanism of SARS-CoV-2 infection is unclear, and its symptoms vary in different patients. Initial reports of COVID-19 concentrated on pulmonary issues, but with time, others signs like anosmia, dysgeusia, and skin lesions were added to the list of COVID-19 symptoms. There have been an increasing number of reports on oral cavity lesions in individuals with COVID-19, which might be relevant considering that this location is one of the first sites coming into contact with the virus and that it contains the SARS-CoV-2 receptor. We hereby aim to familiarize practicing head and neck clinicians with the range of oral lesions reported in COVID-19 patients and to critically appraise the most recent data on the role of SARS-CoV-2 in these lesions. We also discuss the ongoing debate on the direct/indirect association of oral symptoms with the disease. COVID-19 cases with simultaneous oral symptoms were extracted from the literature, and articles discussing the role of SARS-CoV-2 in oral lesions were compiled and methodically analyzed. Based on current evidence, the exact role of SARS-CoV-2 in the development of oral lesions remains unclear. Oral examination of patients is needed to provide adequate cases for analysis to clarify unknown problems related to COVID-19. There is evidence to support both the direct and indirect roles of SARS-CoV-2 in the development of oral lesions. Awareness of the possibility of oral manifestations in COVID-19 is important to clarify the range of disease signs and symptoms.

Keywords: mucormycosis, fungal infections, orbit

INTRODUCTION

The coronavirus disease 2019 (COVID-19) infection caused by the novel severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) may be associated with a wide range of disease patterns, ranging from mild to life-threatening pneumonia. A wide range of bacterial and fungal co-infections may exist and may be associated with preexisting morbidity (diabetes mellitus, lung disease) or may develop as a hospital-acquired infection such as ventilator-associated pneumonia. India has a high prevalence rate of type 2 diabetes mellitus (8.9% of adults, 77 million patients), which is a well-known risk factor [1]. Disease transmission seems to occur mainly via inhalation of spores from environmental sources.¹³ Mucormycosis usually presents a worse outcome compared to other invasive fungal infections. The most common clinical presentation of mucormycosis is sinusitis

(rhinocerebral infection), followed by pulmonary, cutaneous/subcutaneous, and disseminated diseases.¹³ Tissue necrosis is the hallmark of mucormycosis, resulting from angioinvasion and subsequent vascular thrombosis.^{13, 14} Oral manifestations of mucormycosis usually include bone exposure and necrosis, which demands histopathological examination to confirm the diagnosis because of its nonspecific features and possible similarities to bacterial osteomyelitis, trauma, and iatrogenic infections

Pathogenesis-Mucormycosis is a rare and potentially lethal invasive fungal infection caused by saprophytic aerobic fungi *Rhizopus*, *Rhizomucor*, and *Cunninghamella* genera of the order Mucorales, now called Rhizophoraceae, which

colonize the oral and nasal mucosa and paranasal sinuses. The disease usually evolves rapidly in immunocompromised or debilitated patients; that is, those with uncontrolled diabetes, uncontrolled human immunodeficiency virus infection, malignant hematological diseases, and solid organ transplantation. This disease rarely affects patients with no underlying condition. The epidemiology of mucormycosis is difficult to determine, mostly because of its rarity. However, owing to the increasing number of immunocompromised patients, aging of the population, and better health care with higher overall survival rates, there has been an increase in the incidence of this disease in the last decades.

Discussion-A complex interplay of factors, including pre-existing diseases, such as diabetes mellitus, previous respiratory pathology, use of immunosuppressive therapy, the risk of hospital-acquired infections, and systemic immune alterations of COVID-19 infection itself may lead to secondary infections, which are increasingly being recognized in view of their impact on morbidity and mortality. In a recent review, 62/806 (8%) patients had secondary bacterial or fungal infections during hospital admission. There was widespread use of broad-spectrum antibiotics, with as many 1450/2010 (72%) of patients receiving these drugs, often with no underlying evidence of infection. Current guidelines in India recommend intravenous methylprednisolone 0.5-1 mg/kg/day for three days in moderate cases and 1-2 mg/kg/day in severe cases. The National Institute of Health recommends the use of dexamethasone (6 mg per day for a maximum of 10 days) in patients who are ventilated or require supplemental oxygen but not in milder cases. The guidelines specifically mention the risk of developing a secondary infection. There are specific pathophysiologic features of COVID-19 that may permit secondary fungal infections, including a propensity to cause extensive pulmonary disease and the subsequent alveolo-interstitial pathology that may enhance the risk of invasive fungal infections. Second, the immune dysregulation associated with COVID-19, with reduced numbers of T lymphocytes, CD4+T, and CD8+T cells, may alter innate immunity. Werthman-Ehrenreich reported the case of a 33-year-old female who presented with left-sided ptosis and proptosis with altered sensorium. Investigations revealed diabetic ketoacidosis with COVID-19 infection. Facial imaging was significant for maxillary and ethmoidal

sinus mucosal thickening. An MRI of the brain showed multiple areas of infarction and ischemia indicating invasive fungal disease. Mucor was demonstrated via a nasal biopsy and subsequent culture. The author suggests that early identification of fungal co-infections may significantly reduce morbidity and mortality.

Conclusions-COVID-19 is associated with a significant incidence of secondary infections, both bacterial and fungal probably due to immune dysregulation. Additionally, the widespread use of steroids/monoclonal antibodies/broad-spectrum antibiotics as part of the armamentarium against COVID-19 may lead to the development/exacerbation of pre-existing fungal diseases. Physicians should be aware of the possibility of invasive secondary fungal infections in patients with COVID-19 infection especially in patients with pre-existing risk factors and should enable early diagnosis and treatment with the subsequent reduction of mortality and morbidity. The use of therapeutic agents should be monitored to achieve a therapeutic effect at the lowest dose and shortest durations. The use of broad-spectrum antibiotics, especially in the absence of infection, should be re-evaluated.

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