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Original Research Paper

Periodontology

IS COVID INTENSITY INCREASED BY PERIODONTITIS ?

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ABSTRACT There is sufficient evidence of a link between periodontitis and non-oral systemic diseases. Periodontal disease (PD) is a category of diseases that include inflammatory features of the host and dysbiotic activities that impact periodontal tissue and can have systemic consequences. In addition to mortality owing to pneumonia, the virus COVID-19 has been shown to cause a hyperinflammatory disease with the release of immune modulators and mediators.1 This has been identified as a "cytokine storm" that has been shown to trigger cardiomyopathy, diseminated blood clots, stroke through broad vascular occlusion, neurological complications, thrombosis, and multi-organ failure, including heart , kidney, and brain.2 The oral cavity is also a source for respiratory infections, and patients of periodontal infection are more prone to experience hospital-acquired pneumonia than healthy individuals. We also conclude that enhancing oral health may reduce the frequency of COVID-19 symptoms and reduce the related morbidity.

KEYWORDS :

INTRODUCTION

COVID-19 is a disease caused by a novel coronavirus called SARSCoV-2 that causes lung and other organ damage[3]. Most COVID-19 patients have mild symptoms, but some may develop severe pneumonia, pulmonary edema, acute respiratory distress syndrome (ARDS), multiple organ dysfunction syndrome, or even die[4].The mortality rate from COVID-19 ARDS can approach 40%–50%.[5]

The mortality rate of COVID-19 ARDS may be between 40% and 50%[5].

The World Health Organization (WHO) declared COVID19 a global emergency on 30 January 2020 and declared it a pandemic on 11 March 2020 when the highly contagious virus infects populations around the world.

As of today, 19,926,731 individuals have been diagnosed and 731,821 deaths have been linked to the virus worldwide owing to this outbreak.

Bacteria found in patients with extreme COVID-19 are synonymous with Oral cavity and better oral hygiene will reduce the likelihood of complications. Although COVID-19 has a viral cause, It is believed that bacteria play a part in severe cases of infection, raising the risk of infections such as pneumonia, acute respiratory distress syndrome, sepsis, septic shock and death9.

Oral hygiene should be enhanced during infection with COVID-19 in order to reduce the bacterial load in the mouth and the possibility of bacterial superinfection.

Poor oral hygiene is considered a risk to complications of COVID-19, especially in patients predisposed to altered biofilms related to diabetes , hypertension or cardiovascular disease. Periodontal disorder is a category of chronic inflammatory disorders, including gingivitis and periodontitis [6-8]. Such diseases are caused by a variety of microbial agents that induce inflammation and destruction of tooth supporting tissues[9]. According to the World Health Organization (WHO), 10% of the world's population were impaired by PD[10]. Poor oral hygiene, smoking , diabetes medications, age, genetic and obesity have been linked with an rise in the incidence of periodontal disease [11-13]. Bacteria found in the mouth that may cause these infections are "Porphyromonas gingivalis." Such bacteria contribute to the production of cytokines such as Interleukin 1 (IL1) and Tumor Necrosis Factor (TNF) which can be found in the saliva and can enter the lungs. As a consequence, poor oral hygiene will raise the likelihood of respiratory infections and possibly postviral bacterial complications.

DISCUSSION

it has become evident that oral wellbeing has had a huge effect on general well being. Some research show that cytokines or microbial products produced systemically in reaction to oral infection induce inflammation in distant tissues, which promotes the progression of systemic diseases such as Alzheimer's disease, asthma, atherosclerotic heart disease and cerebrovascular disease. [14-17].

The occurrence and extent of complications following infection with COVID-19 depends on a variety of host and viral factors that will influence the immune response of the patient. 80 per cent of patients with COVID-19 infection have moderate symptoms, 20 per cent have encountered serious infection along with elevated inflammatory marker levels (Interleukin 2, 6, 10) and bacteria[18,19] They often have a surprisingly higher neutrophil count and a lower lymphocyte count than in mild patients.[20] Increased neutrophil count is rare for viral infection, but typical for bacterial infection, indicating that in extreme cases of COVID-19,Bacterial super-infection is normal. Many mechanisms can explain the capacity of oral pathogens to intensify lung infections including the aspiration of oral pathogens into the lower respiratory tract, especially in high-risk individuals; the alteration of mucosal surfaces in the respiratory tract by salivary enzymes, which encourage

pathogen colonization; and the secretion of pro-inflammatory cytokines during periodontitis, which can promote adherence to the epithelium of the lungs and the colonization of the lungs by respiratory pathogens. [21,22].

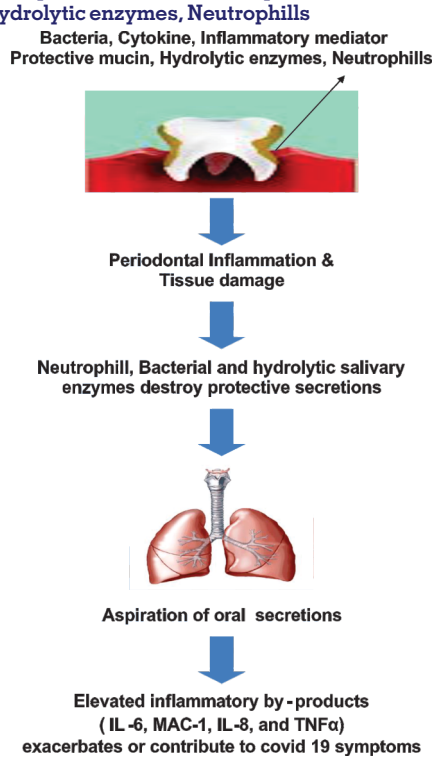
Improving oral hygiene can therefore reduce oropharyngeal colonization and the risk of respiratory complications.

Periodontal disease is an inflammatory disorder in which microbial etiological factors cause a sequence of host reactions that mediate inflammatory events, with cytokine development contributing to tissue damage in susceptible individuals[23]. There are important inflammatory mediators between periodontal disease and COVID-19, and they further indicate that periodontal disease could be a contributing factor and/or worsen the incidence of COVID-19. Cytokine storm was consistent with the development of COVID-19 illness. Cytokine storm is a hyperactive immune reaction marked by interferon release, interleukin release(IL), tumor-necrosis factors (TNF), chemokines, and many other mediators that contribute to disregulation of the immune system and the shutdown of the organ. Cytokine storm indicates that the amounts of cytokines produced are injurious to host cells.

Laboratory results from clinical studies and autopsies in patients with COVID-19 show elevated inflammatory markers, particularly with cytokines IL-6, IL-8 and TNF .Those same cytokines and chemokines are also implicated in both the biology and pathology of bone metabolism.[24] They are important triggers for the movement of osteoblast and osteoclast precursors and, thus, possible modulators of bone homeostasis. Compared to the exacerbation of COVID-19 by the deregulation of the immune system during the cytokine storm, the disruption of the equilibrium between osteoblast and osteoclast function by periodontal bacterial products and host inflammatory cytokines is the major underlying cause of inflammation-induced periodontal bone loss.[25]

Such same elevated inflammatory by-products observed during periodontal disease (i.e., IL-6, MAC-1, IL-8, and TNF) worsen or contribute to the intensity of symptoms associated with COVID-19.

Bacteria, Cytokine, Inflammatory mediator Protective mucin, Hydrolytic enzymes, Neutrophills



CONCLUSION

Oral pathogens such as SARS-CoV-2 enter systemic circulation and may induce enhanced development of inflammatory mediators contributing to a lethal cytokine storm. Patients of periodontitis are vulnerable to the development of certain proinflammatory cytokines. In addition , oral bacteria may predispose individuals to pneumonia, chronic obstructive pulmonary disease, and potentially COVID-19 pulmonary complications. Poor oral hygiene raises the likelihood of having the same complications. Thus, improving oral health in people of any age, by reducing their chances of acquiring non-oral systemic diseases, can reduce the morbidity of COVID-19.

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