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Review Article

COVID-19 (SARS COV-2): Current and Future Implications In Dentistry

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ABSTRACT

The outbreak and rapid community spread of SARS -CoV-2 (COVID-19) has created an international emergency in the health care system and worldwide economic crisis. Novel coronaviruses are a group of virus belong to coronaviridae family which will cause zoonotic infections (transmitted from animals to humans) similar to as SARS and MERS. COVID-19 initially originated in Wuhan seafood wet market in mid-December and then transformed into major public health concern across the 214 countries and territories around the entire world. On 30th January 2020, WHO declared this outbreak as "Public Health Emergency of International Concern" (PHEIC). Despite of every effort taken across the entire world; it is still spreading quickly due to community pattern of spreading infection. Primary route of transmission occurs through droplets, aerosols and contact routes. The risk of cross infection is more between dental health care personnel (DHCP) and patients. So, providing an emergency and urgent dental care to patients is necessary in this pandemic situation with utmost care by an effective infection control guidelines and protocols. Due to characteristics of dental settings, the risk of cross infection can be very high. This article aims to discuss the risk involved in dental practice and recommendations to provide optimum dental care and simultaneously to prevent nosocomial infection.

KEYWORDS: Covid 19, Dental Management, Infection Control Protocol.

Introduction:

Coronavirus is an enveloped single stranded RNA beta type of coronavirus with a diameter of 60–140nm, elliptical or spherical in shape with a crown-like appearance posing higher risk to all countries and constantly spreading mortality rate as high as 3.4%. The zoonotic nature and genomic sequence of this novel coronavirus is similar to coronavirus found in

and pangolins which bats has close resemblance to Severe Acute Respiratory Syndrome Coronavirus (SARS-CoV) occurred in 2002 and Middle East Respiratory Syndrome Coronavirus (MERS-CoV) in 2012 [1]. Structurally, the SARS coronavirus (SARS-CoV) consists of well-defined 14 amino acid binding residues which will interact directly with human Angiotensin-Converting Enzyme 2 present in lungs. Out of these amino acids, 8 have been conserved in SARS-CoV-2. The route of entry into the human cell for SARS-CoV-2 is Angiotensin Converting Enzyme (ACE2 receptor) mainly affecting the lower respiratory tract.

The average incubation period for Covid 19 ranges from 2 to 14 days having a mean incubation time of 5.5 days. The main routes for transmission of Covid 19 virus are direct contact from person-to-person. through sneezing, coughing, inhaling droplets and indirect close contact with less than 6 feet distance, aerosols, inhaled droplets and through fecal-oral routes [2,3]. The entry of infection sites are nose, mouth, and eyes. Moreover, Covid 19 coronavirus can bind to human angiotensin converting enzyme 2 (ACE-2) cells, apart from lung epithelial cells, it is also highly concentrated in salivary glands. Due to presence of SARS-CoV-2 in saliva poses a high risk for dentist to perform dental procedures. Dentists are one among the very high-risk categories for transmission of the virus, because most of the dental treatment having use of aerosol-based procedures. Contamination can happen directly between operators and patients due to droplets during pre-clinical assessment or conversation with the asymptomatic patients present in the outpatient departments (OPD) [3]. It is important to perform only urgent and emergency dental procedures with proper care. Due to high risk of transmission and the nature of the virus, the treatment protocols and modifications in patient management is very important to prevent cross infection among dental health care personnel and patients. Due to nature of SARS-Cov-2 and its routes of

transmission, dentists, dental auxiliary staff, assistants and patients are at higher risk of infection during dental treatments.

Symptoms of COVID-19:

The most common symptoms are

- o Fever
- Dry cough
- Shortness of breath
- The primary nonspecific symptoms include
- o Myalgia
- o Nausea
- o Diarrhea
- Reduced sense of smell (hyposmia)
- Abnormal taste sensation (dysgeusia)
- Abnormal chest X-ray and computed tomographic (ground-glass opacities are typically found in the chest)

Usually 80% of infected patients have only mild symptoms resembling flulike symptoms and seasonal allergies, but these patients can act as asymptomatic "carriers" and also serve as reservoir for virus [4]. Severe forms of this disease have a predilection for men with a mean age of 56 years with preexisting chronic illnesses such as cardiovascular disease or immunosuppression. The majority of cases have spontaneously resolved. However, some people especially elderly and patients with chronic systemic disorders developed various fatal complications, including organ failure, septic shock, pulmonary edema, severe pneumonia, and acute respiratory distress syndrome.

Diagnosis:

The recommended test for SARS CoV 2 is Conventional or Real Time RT-PCR. Sample should be taken from throat and nasal swab, bronchoalveolar lavage, sputum and tracheal aspirate which is collected in Viral Transport Medium and transported in cold chain. Antibody based tests for detection of antibody (IgM and IgG) against SARS COV 2 can be used as a diagnostic test, which is rapid and cost effective.

Risks in Dentistry

Dentists are among the highest risk categories for transmission and contamination of the coronavirus, with many routine dental procedures having the potential to transmit the virus through aerosols.

In response to this challenging pandemic, the Centre for Disease Control and Prevention (CDC), American Dental association (ADA), the National Health Services (NHS), as well as other health regulatory bodies have provided advice to dentists to regulate dental services and provide them guidance in order to protect themselves, their co-workers, and their patients from this infection [6].

Asymptomatic (carrier) patients as well as patients with an acute respiratory illness may come for dental treatment at outpatient dental settings. It is important to provide treatment to patients with urgent need of emergency dental procedures, the primary goal should be to prevent transmission of infection to patients and dental healthcare personnel [7]. The growing fear of cross-infection, and the possible role of dental practice in spreading the infection, authorities have obliged dentists to step aside and to confine themselves in home quarantine like other non-healthcare sectors of the population.

Dental drills cause the formation of aerosol and splatter commonly contaminated with bacteria, viruses, fungi and blood.[1] Oral surgery drills also cause aerosol in addition to splatter. Aerosols are liquid and solid particles (<50 µm diameter) suspended in air for protracted periods. Splatter is a mixture of air, water and/or solid substances (50 µm to several millimetres diameter), may cause health risk for the dental team.

Dentists are asked to provide emergency dental procedures only, during which they must follow the recommended cross-infection control protocols. Therefore, the main bulk of published research directed to dentists, has mainly focused on giving a background on the pandemic and recommendations of crossinfection control measures. Many other aspects of dental practice are also important in addition to infection control, including prevention and minimal treatment during this pandemic.

Prevention: Provision of Dental Healthcare during the COVID-19 Pandemic

The ADA has maintained a consistent stand since the pandemic was started. They called dentists to postpone elective dental procedures for all dental patients, and to provide dental treatment only for urgent or emergency cases [6]. The main aim was to minimize potential for healthcare transmission of COVID-19, and to avoid shortage of PPE for healthcare personnel caring for those with COVID-19, or dental healthcare personnel providing urgent dental care in emergency cases. They further clarified the meaning of dental emergencies as "potentially lifethreatening conditions that require immediate treatment to stop ongoing tissue bleeding, alleviate severe pain, or infection"; therefore, the emergency conditions indicated for treatment include cellulitis. uncontrolled bleeding, or trauma [7]. Within this context, provision of urgent dental treatment is to be done in regular dental clinics, and not to direct patients to emergency rooms even afterhours unless а life-threatening emergency is encountered. Types of urgent dental care was also clarified in detail to include severe dental pain; certain infections such as pericoronitis, postoperative osteitis, dry socket. or abscess/cellulitis: trauma such as symptomatic fractured tooth or avulsion/luxation: as well as certain urgent restorative procedures [7,8].

Patient Triage.

According to the recent publications, triage was performed when patients entered into the clinics. telephonic No pre-triage was recommended. Performina triage to investigate current health status and/or the presence of risk factors for COVID-19 development is strongly suggested when receiving patients [9]. Patients should be asked for any contact with infected people occurred or whether they have travelled in highly epidemic areas.[9]

If a patient had a positive history of contact and/or symptoms, no treatment should be performed, and the patient should be reported to the sanitary authorities, to quickly impose quarantine and/or hospitalization depending on the severity of the situation [10]. Meng et al. recommended postponing dental treatments up to 14 days after the exposure [9,10]

In case of absence of contacts and/or symptoms, dental procedures can be performed, provided that full precautions should be implemented. Body temperature should be registered, possibly with a noncontact forehead thermometer, and presence of suspected symptoms (coughing, sneezing, respiratory difficulty) should be excluded [9]. It is also important to apply the same safety measures to people accompanying the patient.

Prescription of Mouth Rinses prior to Dental Treatment.

The studies suggested use of antimicrobial mouth rinses containing oxidative agents to control SARS-CoV-2, prior to dental procedures [8,9]. Mouth rinses containing 1% hydrogen peroxide, or 0.2% povidone can be used to reduce microbial load in saliva and its potential effect on SARS-CoV-2 [10] Mouth rinses are strongly recommended in cases where the rubber dam is not possible for dental procedures.

Hand Hygiene.

Hand hygiene is a critical measure for reducing SARS-CoV-2 transmission [10] It is crucial to perform thorough hand washing when meeting patients and nondisinfected surfaces or equipment's, and it is recommended to avoid touching eyes, mouth, and nose without having hands carefully washed. A protocol involving 5 hand washings (2 before and 3 after treatment) was proposed to reinforce professionals' compliance [10].

Personal Protective Equipment for Dental Practitioners.

SARS-CoV-2 transmission predominantly occurs through airborne droplets. In this sense, the use of standard PPE consists of gloves, mask, and gown. Additional equipment should be utilized including face protection, goggles, mask, face shield, gloves, gown or coverall, head cover, and rubber boots protective equipment, is strongly recommended to protect eye, oral, and nasal mucosa [9,10]

As respiratory droplets are main source of SARS-CoV-2 transmission, particulate respirators (e.g., N-95 masks authenticated by the National Institute for Occupational Safety and Health or FFP2-standard masks set by the European Union) are recommended for routine dental practice. [10]

Limitation of Aerosol-Producing Procedures.

Peng et al. highlighted the risk related to the performance of dental procedures, when handpieces and ultrasonic devices are employed [10]. As reported by Meng et al., it is advisable to minimize the operations involving the generation of aerosol and droplets while employing use of personal protective equipment [8,9]. It is advised to use hand instruments for scaling, which is equally effective as ultrasonic scaling. In selective cases chemical caries removal or atraumatic restorative techniques can be considered. If rotary instrumentation must be performed, rubber dam isolation should be applied [9,10, 11].

Cleaning of Potentially Contaminated Surfaces.

Careful disinfection of surfaces, with attention to door handles, chairs, and desks are strongly suggested. Moreover, a dry environment in the dental office was recommended to control diffusion [12, 13]

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Disinfection

Recommendations have been provided regarding the management of operating rooms to attenuate the environmental contamination optimize infection and control through quatemary ammonium compounds or isopropyl alcohol. Alcohol or sodium hypochlorite-based disinfectants are active against coronaviruses and they should be used to disinfect every component of the dental chair and the surfaces that are in contact with aerosol spray as well. 0.1% sodium hypochlorite and 70% isopropyl alcohol have been suggested for surface disinfection. Removing equipment's and instruments from the room is not necessary and covering all possible surfaces with disposable covers may help in improving the contact infection control [14, 15].

Conclusion:

Sars-CoV-2 is a very infective virus that causes COVID-19, a disease with a very broad range of manifestations, from lack of symptoms to ARDS and eventually death. Because of the oral route of transmission of this pathogen dentists are among the health professionals who are exposed to high risk of infection. When the disease is at community level, it is paramount that dental care professionals protect themselves, their staff and patients, avoiding any risk of spreading the virus. It is important to remember that completely asymptomatic patients are carriers of the infection. In view of this, it is mandatory to postpone any elective treatments and dentists should treat only emergencies or provide care to those who required essentially either in dental clinic or in hospital care.

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