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COVID 19-A DENTAL OUTLOOK

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ABSTRACT
A mysterious outbreak of respiratory viruses and infections were identified in Wuhan city, China during late December 2019 causing a new public health crisis threatening the world. On 11th February 2020, WHO named this novel viral pneumonia as "Corona Virus Disease (COVID 19)". The International Committee on Taxonomy of Viruses (ICTV) suggested the name SARS CoV-2 due to the phylogenetic and taxonomic analysis of this novel corona virus.[1,6] Although zoonotic in origin COVID-19 is spread by contacting respiratory droplets when an infected individual coughs, sneezes or talks. It primarily targets the pulmonary epithelial cells. People with COVID-19 have had a wide range of symptoms been reported. Chances of cross infection is highly severe among patients and healthcare professionals including dentists. Dental community is no longer stranger to highly infectious disease management, with careful planning it is certainly possible to provide treatment during the pandemic and serve the country. As the outbreak continues to evolve dental setting should balance the need to give services.

KEYWORDS: SARS-CoV-2, Health crisis, Dentists, Aerosols, Cross infection, screening, Management.

INTRODUCTION[1,4,6]
WHO declared COVID-19 a pandemic on 11th March 2020, pinpoints to alarming levels of spread and its severity all throughout the world.[1] Coronaviruses belong to the family of Coronoviridae, of the order Nidovirales, comprising large, single, plus-stranded RNA as their genome.[6] Although the infection in humans presents with mild severity, the beta corona virus infection of either SARS-CoV or MERS-CoV has resulted in high mortality rates.[4] In a dental set up where there is aerosol production, usage of sharps, and close proximity with patients oropharyngeal region the chances of cross infection is higher among dentists and patients. Universal precautionary measures are not sufficient to prevent the transmission of this highly contagious disease. Therefore, it is important for dentists to focus on dealing with patient, hand hygiene, personal protection like PPE, and caution on aerosol-generating procedures.

SIGNS AND SYMPTOMS[2,3,5]
Some infected presents typical respiratory manifestation and others maybe asymptomatic and can act as carriers.
COMMON
Fever, Cough, Sputum production, Fatigue, Shortness of breath
LESS COMMON
Myalgia/arthralgia, Sore throat, Headaches.

Patients also manifested bilateral pneumonia, with ground glass opacity and bilateral patchy shadows as the most common CT finding. Importantly about 80% of the patients presents only mild flu like symptoms and seasonal allergies, which leads to an accrued range of number of unknown cases. These asymptomatic patients may act as carriers and additionally serve as a reservoir for re-emergence of infection. Severe forms have a male predilection of mean age 56 years with pre-existing chronic disorders such as cardiovascular disorder or immunosuppression. The higher risk patient population may manifests symptoms typical of pneumonia or acute respiratory distress syndrome.[5] The incubation period is

estimated to be 5 to 6 days on an average but it can be even 14 das which is the reason adopted for quarantine of exposed person.[2]

ROUTE OF TRANSMISSION[5,9]

SARS-CoV-2 enters the body and the cells via the angiotensin-converting enzyme 2(ACE2) receptors found in most cells of the respiratory system and salivary glands. Salivary gland cells are the primary site where the virus can be identified. Like other viruses, it's also not a living organism and solely depends on host cells to multiply and replicate. It contains protein molecules coated by a protective layer of lipid that binds to the receptors and combines with the membrane of the host cell. Therefore, it is prudent to notice that it cannot be destroyed and can solely disintegrate under bound conditions. The danger is expounded to its long incubation period and extremely infectious nature.[9] SARS-CoV-2 infections typically spread through respiratory droplets or by contact. 8Coughing or sneezing by an infected individual potentially spread and infect people in shut contact (within a radius of 6 ft). This led to the strategy of social distancing to reduce community unfold of the infection. Another important mode of spread is droplets of SARS-CoV-2 when land on inanimate objects situated near associate degree infected person and are subsequently exposed to others. Thus, disinfection and sterilisation of objects and hand hygiene are crucial for halting the spread of this infection. This recommendation is reinforced considering the fact that generally people touch their face 23 times per hour, with 44% of these incidents involving the mucous membrane of the mouth and/nose. SARS-CoV-2 bind to human angiotensin-converting enzyme 2 receptors, highly concentrated in salivary glands; this maybe a possible explanation for the presence of SARS-CoV-2 in secretory saliva. Therefore, there is a potential for transmission via aerosol, fomites, or the fecal-oral route that may contribute to nosocomial spread in a dental clinical setting.[5] In March 2020, Occupational Safety and Health Administration (OSHA) categorized dentists/dental providers in the very high-risk group for COVID-19.[9]

LABORATORY DIAGNOSIS[4,10,11]

The diagnosis can be done using salivary diagnosis platforms. Some strains are detected in salivary secretion as long as 29 days after infection, indicating that a non-invasive platform to rapidly differentiate the biomarkers using saliva would enhance viral detection. The three pathways for COVID -19 to be detected in saliva are: firstly, from the lower and upper respiratory tract that reaches the oral cavity along with the droplets frequently exchanged by these organs. Secondly, within the blood the virus access the mouth via crevicular fluid (GCF), an inflammatory exudate that contains locally generated proteins. Finally, another way is by salivary gland infection, with consequent unleash of particles in saliva via gland ducts. 9Salivary gland epithelial cells can be infected by SARS-CoV a brief term after exposure in rhesus macaques, indicating that salivary gland cells can be a significant source of this virus in saliva. SARS-CoV –specific secretory immunoglobulin A (sIgA) was produced in the saliva of animal models intranasally immunized. Considering the similarities of both strains, the salivary diagnosis of COVID-19 could also be done using specific antibodies against the virus. The WHO recommends rapid collection and NAAT of respiratory samples including nasopharyngeal and oropharyngeal swabs as well as sputum and/or endotracheal aspirate or bronchoalveolar lavage.[11]

INITIAL RESPIRATORY TRACT SPECIMEN COLLECTION OF PATIENTS WITH COVID-19 PNEUMONIA: Within 5 to 6 days of the onset of symptoms, viral load is high in upper and lower respiratory tract. A nasopharyngeal swab and/or an oropharyngeal swab are often recommended for screening or diagnosis of early infection. A single nasopharyngeal swab is better tolerated by the patient and is safer to the operator, the swab must be inserted deeply into the nasal cavity. Patient will likely flinch, but that means the swab has hit the target. Swab should be kept in place for 10 seconds while being twirled three times. Swabs should have flocked nontoxic synthetic fibres, such as polyester, as well as synthetic nylon handles. One alternative to this is self-collected saliva specimen.

LATE DETECTION AND MONITORING OF PATIENTS WITH SEVERE COVID-19 PNEUMONIA: Sputum sampling or bronchoalveolar lavage yielded the highest viral loads in COVID-19. Patients who manifest severe pneumonia and ARDS should be intubated as well as provide respiratory isolation in a negative-pressure room. Lower respiratory tract sputum sample should be collected throughout the intubation procedure. On the other hand, sputum and/or bronchoalveolar lavage fluid samples can be collected after intubation.[10] However, some patients have shown high viral RNA loads of SARS-CoV-2 in fecal material as well as delayed shedding from the respiratory tract late in their clinical course. In another study, SARS coronavirus was detected within enterocytes by electron microscopy. Thus apart from direct respiratory sampling, rectal swab and real-time RT-PCR may also be preferred for detecting SARS-CoV-2 in advanced COVID-19 cases.[10]

IMMUNOASSAYS: Rapid detection of SARS-CoV-2 antigens or antibodies (IgM or IgG) against COVID-19 is possible through immunoassays; these are usually lateral flow assays. Rapid antigen lateral flow assays would theoretically provide the advantage of a fast result and low cost detection of SARS-CoV-2 but have poor sensitivity early in infection, based on experience with this method for influenza (flu) viruses. Monoclonal antibodies targeted against SARS-CoV-2 have been under progress, and several rapid antigen assays are being developed.[10]

PATIENT MANAGEMENT IN A DENTAL SETUP[3,9,11,12]

Dental healthcare professionals are at high risk of this disease and can become potential carriers. Various preventive strategies are to be followed in a dental clinic during this epidemic such as: SCREENING Initial screening over telephone can be done before scheduling any emergency cases where in the travel history, contact with infected person and presence of any symptoms like fever, cough should be recorded .Patient marked in any of these criterion should postpone treatment unless it's an emergency.[3] Emergent dental care should be met at an outpatient dental setting where there is at least six air changes per hour, such as a hospital with dental care services or special clinics equipped for COVID-19 medical care. Any splatter or aerosol generating procedures has to be avoided.[11]

EVALUATING THE PATIENT

Patient should wear a surgical mask and follow hand hygiene protocols while visiting the hospital. Elaborated medical and dental history should be taken, to evaluate if in the least the patient may be a suspect of COVID-19. Even in the waiting area patient should maintain a safe distance of minimum 6 feet from each other. A non-contact forehead thermometer or with cameras having infrared thermal sensors should be used to detect patients body temperature. Patients who present with fever (>100.4oF=38oC) and/or respiratory symptoms, should postpone elective dental care for at least 2-3 weeks.[3] Soap and detergent cut the virus's fatty outer layer and is more effective than sanitizer alone. Due to the fragility of the virus, washing hands for at least 20 seconds generating foam will disintegrate the fat layer and the remaining protein molecule will dissolve on its own. It is also important to moisturize after continuously washing, to boost the barrier protection function of skin. Patient ought to perform hand hygiene with alcohol based hand sanitizers on entry into the office, entry into the operatory and after the dental procedure at dismissal.[9]

The ADA reports regarding the treatments that can be practiced during COVID-19 epidemic are divided into 4 categories:[12]

CATEGORY 1-Dental emergencies that are life threatening that need immediate treatment (within 1 hour) Uncontrollable bleeding, Diffused soft tissue infection with intraoral or extraoral swelling that can potentially compromise patient's airway.

CATEGORY 2-Urgent dental care (within 24 hours), conditions that need immediate attention to alleviate severe pain and/risk of infection and to alleviate the burden in hospital emergency departments. Severe pain due to pulpal inflammation, Pericoronitis or third molar pain, Post-operative osteitis, Abscess or localized bacterial infection, Tooth fracture leading to soft tissue trauma or pain, Avulsion/luxation Dental treatment required before essential medical procedures. Final cementation of crown/bridge if the temporary crown is lost, broken or if inflicting gum irritation.

CATEGORY 3-Undeferrable treatments (more than 24 hours) .Extensive dental caries or fractured restorations inflicting pain, Suture removal, Denture corrections on radiation/oncology patients. Denture repairs when function compromised, Replacement of temporary filling on access opening in patients experiencing pain, Snipping or adjustment of an orthodontic wire or appliance ulcerating the oral mucosa.

CATEGORY 4- Non-urgent treatments Initial visit, periodic oral examinations or review/recall visits, including radiological analysis. Routine scaling and preventive treatment, Orthodontic procedures, Extraction of asymptomatic teeth, Restoration of asymptomatic carious teeth.

MANAGEMENT[3,9,11,12]

Pharmacological management of infections with antibiotics and pain killers can give symptomatic relief until treated otherwise and will provide sufficient time to reschedule the visit and screen emergency cases.[3] Mouth rinse before commencing the procedure with 1%hydrogen peroxide or 0.2% povidone iodine might reduce the load of virus in saliva.SARS-CoV-2 appears to be sensitive to oxidation. Dentist should practice the standard precautions including appropriate use of PPE that is, gown, medical mask (aerosol-generating procedures require N95 masks), gloves, and protecting glasses, shoe covers, disposable caps in conjunction with proper hand hygiene practices.[3,11,12] Rubber dam helps to minimise the spread of aerosol. Dental hand pieces utilise high speed gas to rotate with running water and expel considerable amount of debris and fluids, which can contaminate the tubes in a dental unit.[9,11] Minimise the use of three-way syringes and ultrasonic instruments as they produce a lot of aerosols. Encourage use of disposable instruments.[3] Extraoral radiographs like panoramic radiographs and cone beam CT are preferred over intraoral radiographs to avoid the gag reflex or cough that can happen during radiation exposure. When intraoral radiograph is necessary, sensors should be double barriered to avoid cross contamination.[3] The ADA recommends the use of high- volume evacuation suction that is capable of removing upto 100 cubic feet of air per minute to remove droplets in mouth and reduce aerosolizaton of viral particles. Saliva ejectors may not be able to suction large volume of air and back flow during closed mouth and there is a possible cross-infection risk; however with introduction of saliva ejectors with one-way valve, the risk is reduced and edges outweigh the downsides. Without the use of suction there will be pooling of fluids that can cause the patient to cough or vomit and make both patient and operator at higher risk of exposure to droplets and aerosols. Furthermore, irrigation and suction are important during extraction of an infected/carious tooth, or incision and drainage. Use of gauze without

appropriate suction to collect debris can lead to cross-contamination, and displacement of contaminated gauze could acquaint pathogens into the air.[9] SARS CoV-2 can remain viable in aerosol and survive upto 3 days on inanimate surfaces at room temperature, with a greater tolerance to humid conditions.[3] Hospitals and dental clinic should be disinfected using (62-71) %ethanol, 0.5% hydrogen peroxide or 0.1% sodium hypochlorite.[8] Efficient ventilation system and enough wait time ought to be given after disinfection before treating the next patient. Auxiliary employees together with front desk personnel, is recommended to use N95 mask or similar respirators.[9] The CDC strongly recommends that all health care staffs, including dentists and personnel ,should receive the flu vaccine and that staff with influenza must not report to work.[11]

CONCLUSION

With a paradigm shift in dental environment in progress during the current pandemic situation, dental healthcare professionals should keep themselves updated with any new information regarding COVID-19. Teledentistry has modified the outlook of dentistry as it eliminates any chance of exposure without adding the risk of cross-infection. Even paying attention at home for daily oral hygiene will possess a good impact on health and lower the possibilities of spreading the infection. Across contexts, this pandemic made us to re-evaluate the infection control and sterilization protocols along with the economic analysis of practice management. At the end, what we learnt from this pandemic as individuals and dentists emerge us successful like in the past.

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