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DENTAL PRACTICE MANAGEMENT IN COVID-19 EMERGENCY.

Dental Science

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ABSTRACT

As COVID -19 is declared as pandemic emergency around the world has affected huge number of living individuals. It is now believed that its person to person transmission occurs mainly via respiratory droplets/ aerosol and direct contact. Dental set up/hospital settings invariably carry the risk of infection due to the their procedural specificity involving face-to-face communication or direct transmission (cough, sneeze, and droplet inhalation transmission) and contact transmission (contact with oral, nasal, and eye mucous membranes) Due to the high risk involved of cross contamination in the dental practitioners and patients it is important to consider this outbreak as a lethal condition of dental practice. Awareness about how to manage practice and clinics under given circumstances is of great concern. Thus, the aim of this article is to provide a brief overview of the epidemiology, sign and symptoms, and routes of transmission of this viral infection while suggesting recommendations for patient screening, infection control strategies, and patient management protocol in dental practice.

KEYWORDS

Coronavirus, Covid-19, Virus Transmission, Dental Practice Management, Disinfection

Introduction

As COVID -19 is declared as pandemic emergency around the world has affected huge number of living individuals.[1]. first reported incident started on 31st December 2019, when 27 cases of pneumonia of unknown aetiology were identified in Wuhan City of Hubei province in China. These patients presented mostly with clinical symptoms of dry cough, dyspnoea, fever, and bilateral lung infiltrates on imaging. All these cases were all traced to Wuhan's Huanan Seafood Wholesale Market, which trades in fish and a variety of live animal species including poultry, bats, marmots, and snakes[2]. The responsible agent was isolated and identified from the throat swab sample conducted by the Chinese Centre for Disease Control and Prevention (CCDC) on 7th January 2020, and was called as Severe Acute Respiratory Syndrome Coronavirus 2(SARS-CoV-2). The disease was named COVID-19 by the World Health Organization (WHO) on 11 February 2020.

Due to the high risk involved of cross infection in the dentists and patients it is important to consider this outbreak as a fatal emergency of dental practice. Awareness about how to manage practice under given circumstances is of great concern. For dental clinics and hospitals in countries/regions strict and effective infection control protocols are urgently needed, esp. in the ones that are potentially affected/affected with COVID-19.

About Novel Coronavirus COVID 19

Coronaviruses belong to the Coronaviridae family in the Nidovirales order. Corona represents crown-like spikes on the outer surface of the concerned virus; thus, it was named as a coronavirus. Coronaviruses are minute in size (65-125nm in diameter) and contain a single-stranded RNA as a nucleic material, size ranging from 26 to 32kbs in length (Fig. 1). The subgroups of coronaviruses family are alpha (α), beta (β), gamma (γ) and delta (δ) coronavirus[3].

This virus belongs to β group of coronaviruses. These virus particles are large pleomorphic spherical particles with bulbous projections on its surface. It has a distinct pair of electron dense shell envelope and lipid bilayer. On to this lipid bilayer, spike structural proteins are anchored (S). It also has a shorter spike-like surface protein called hemagglutinin esterase (HE).

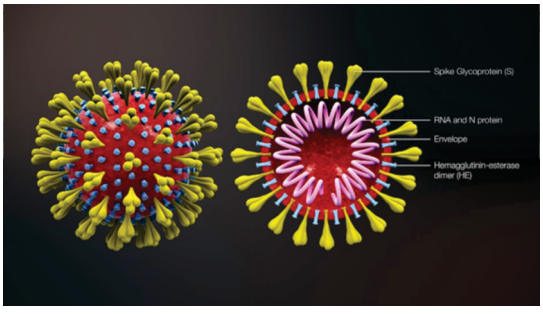

Figure 1: Structure of human coronavirus.

The transmission rate of SARS-CoV-2 is higher than SRAS-CoV and the reason could be genetic recombination event at S protein in the RBD (receptor-binding domain) region of SARS-CoV-2 may have enhanced its transmission ability[3].

Mode of Transmission

On the base of different researches, it is believed that the transmission occurs mainly via respiratory droplets and contact transmission[4]. Also, recently WHO stated the chances of transmission through aerosol generation through various procedures like endotracheal intubation, bronchoscopy and open suctioning may be possible.

The incubation period of COVID-19 has been estimated to be 5 to 6 days on average, but there is evidence that it can last as long as 14 days, which is now the commonly adopted duration for medical observation and quarantine of potentially, exposed persons as said by WHO.

Diagnosis and risk factors?

The clinical manifestation includes dry cough, fever, diarrhoea, vomiting, dyspnoea, pneumonia and myalgia. Individuals with multiple comorbidities are prone to severe infection and may also present with acute kidney injury (AKI) and features of ARDS

[5,6].Patients may present with an elevated C-reactive protein, erythrocyte sedimentation rate, lactate dehydrogenase, creatinine, and a prolonged prothrombin time[7]. Full genome sequencing and phylogenetic analysis on fluid from bronchoalveolar lavage can confirm COVID-2019 infection[8]. Current observations suggest that people of all ages are generally susceptible to this new infectious disease. However, those who are in close contact with patients with symptomatic and asymptomatic COVID-19, including health care workers and other patients in the hospital and patients with underlying disease, are at higher risk of SARS-CoV-2 infection[4].

Treatment and prognosis

There has been no evidence from randomized controlled trials to recommend any specific anti-novelCoV-19 treatment, so the management of COVID-19 has been largely supportive as stated by WHO till date. Currently, the approach to COVID-19 is to control the source of infection by maintaining safe distance, using infection prevention and control measures to lower the risk of transmission; and provide early diagnosis, isolation, and supportive care for affected patients. Few researches suggested even suggested use of hydroxychloroquine with azithromycin for the same[9,10].

It has been suggested to maintain social distancing and safe distance till the pandemic prevails. the purpose of all this will serve to flatten the coronavirus covid-19 spread curve (Figure 2), which means while maintaining safe distance number of active cases will be decreased and quarantine of all the active and suspected cases during the time period the spread of the virus can be controlled and will be in the capacity of the health care system to deal with.

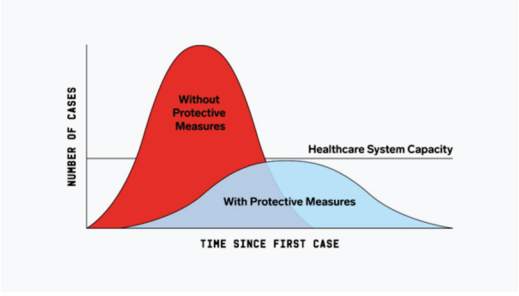

Figure 2: Flattening the Coronavirus COVID-19 curve.

Infection Control in Dental Set Up

Dental clinic/hospital environment invariably carry the risk of infection due to their procedural specificity involving face-to-face communication or direct transmission (cough, sneeze, and droplet inhalation transmission) and contact transmission (contact with oral, nasal, and eye mucous membranes). Also, the procedures involve the use of rotary dental and surgical instruments (e.g., handpieces or ultrasonic scalers) and air-water syringes. They generate a visible spray of water and air particles that contains saliva, blood, microorganisms. This spatter travels only a short distance and settles out quickly, landing on the floor, nearby operatory surfaces, dental health care personnel, or the patient. The standard protective measures in daily clinical work are not effective enough to prevent the spread of COVID-19, especially when patients are in the incubation period, and are unaware they are infected, or choose to conceal their infection.

I. Disinfection Procedures for COVID-19

SARS-CoV-2 can persist on various surfaces ranging from a few hours or up to several days, depending on the type of surface, the temperature, or the humidity of the environment (WHO 2020c). This reinforces the need for good hand hygiene and the importance of thorough disinfection of all surfaces within the dental clinic.

Ia. Disinfection for Floor and Walls - Disinfect the floor and walls with 1000 mg/L chlorine-containing disinfectant through floor mopping, spraying or wiping. Make sure that disinfection is conducted for at least 30 minutes. Carry out disinfection three times a day and repeat the procedure at any time when there is contamination[11].

Ib. Disinfection of Object Surfaces - Wipe cleaner regions first, then more contaminated regions: first wipe the object surfaces that are not frequently touched, and then wipe the object surfaces that are frequently touched. (Once an object surface is wiped clean, replace the used wipe with a new one)[11].

Ic. Air Disinfection - Plasma air sterilizers or ultraviolet lamps can be used. Perform this operation three times a day[11].

Id. Disinfecting The Equipment - Dental chair and operating light chair handles, clean suction tube, instrument tubes and spittoon, change covers. Daily fumigation should be carried out using quaternary ammonium compounds or chlorine dioxide gas under relative humidity

II. Adhere to protocols standard

Wearing PPE should be must which includes protective disposable covering, gloves, face shield/goggles, masks/respirator/N95 mask, shoe cover, head cap Proper protocol for donning and removing PPE should be followed.

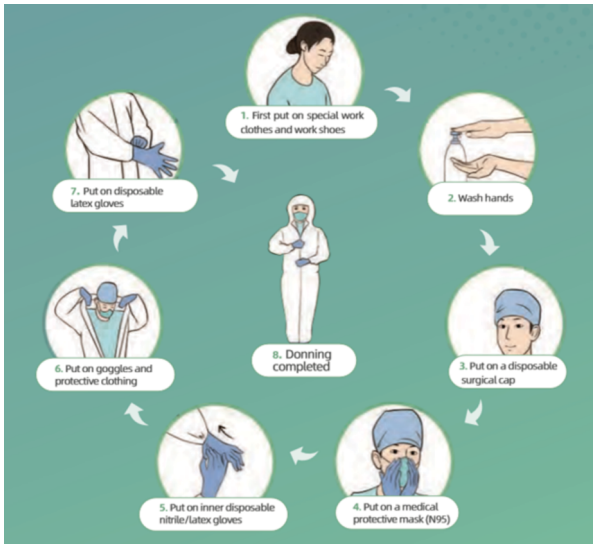

Figure-3: Protocol for donning PPE

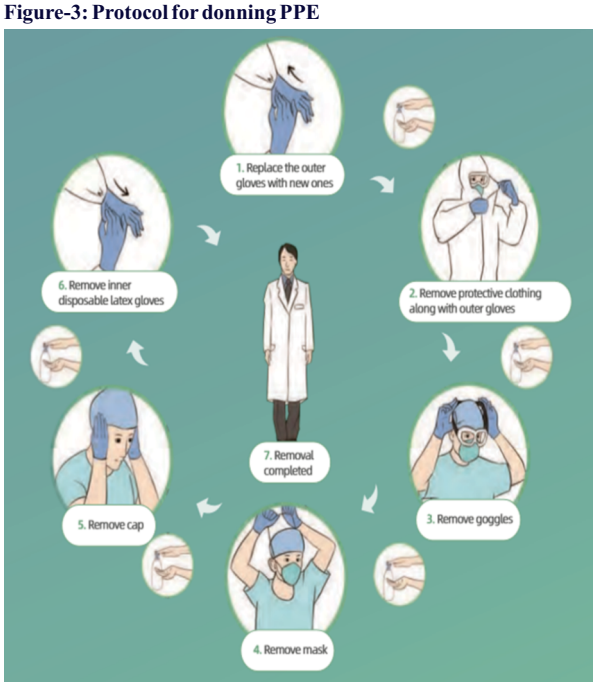

Figure-4: Protocol for doffing PPE

III. General evaluation of the patients

- Precheck triages at dental clinic/hospitals to measure and record the temperature of every staff and patient should be made as a routine procedure through contact free forehead thermometer.
- Precheck staff should ask patients questions about the health status and history of contact or travel (WHO 2020) and should be made to sign a self-declaration form regarding the same.
- Patients and their accompanying persons should also be provided with medical masks and should be ask to sanitize their hands.
- Patients with fever should be registered and referred to designated

hospitals. If a patient has been to epidemic regions within the past 14 days, quarantine for at least 14 days should be suggested.

- For emergency treatment of suspected cases, appointment should be kept as such that the patient does not come in contact with any other patient, should be treated in a private room, and should be allowed to move out quickly.

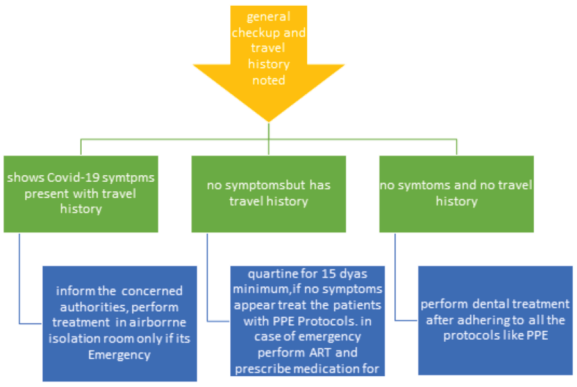

Figure-5: Flowchart Depicting Patient Triage and Treatment Protocols

IV. Dental Clinic considerations

- Patient waiting area should be should be fumigated by chlorine dioxide gas (CLO_2)
- Separate rooms to wear and removal of PPE should be made to prevent any chances carrying the Covid-19 from occurring.
- Disposable covers for chairs, work station and should be changed after every patient.
- Before and after each patient Dental Chair, hand rests, spittoon, trays, buttons, headlight switches, door handles to be disinfected with alcohol scrub.
- Dental chair water reservoir can have addition of NaOCl 2.5% or $H_2O_2$0.5%.

V. Instrument cleaning and sterilisation

CDC guidelines[12] recommend that surgical and other instruments that normally penetrate soft tissue or bone (e.g., extraction forceps, scalpel blades, and surgical burs) be classified as *critical* devices that should be sterilized after each use or discarded. Instruments not intended to penetrate oral soft tissues or bone (e.g., amalgam condensers, and air/water syringes) but that could contact oral tissues are classified as *semicritical*, but sterilization after each use is recommended if the instruments are heat-tolerant. If a semicritical item is heat–sensitive, it should, at a minimum, be processed with high-level disinfection. For *non-critical* instruments disposable covering or low-level disinfectant is recommended[12].

For coronavirus **Covid-19** pandemic suspected or confirmed cases, if there are no visible pollutants, soak the instruments in 1000 mg/L chlorine-containing disinfectant for at least 30 minutes. If there are any visible pollutants, soak in 5000 mg/L chlorine-containing disinfectant for at least 30 minutes[11], followed by wherever possible autoclaving of packaged instruments. Heat sensitive instruments should be sterilized by Ethelene oxide or hydrogen peroxide plasma.

V. Treatment considerations

- Oral Examination preoperative antimicrobial or betadine mouth rinse could reduce the number of microbes in the oral cavity [13].
- It is advisable to use disposable diagnostic set.
- Routine procedures like OPD, crown cementation and ART, can be carried out
- Aerosol-generating procedures, such as the use of a 3-way syringe, should be minimized as much as possible.
- Use a rubber dam when appropriate to decrease possible exposure to infectious agents is advocated.
- The use of saliva ejectors with low or high volume to reduce the production of droplets and aerosols
- Extraoral dental radiographies, such as OPG and cone beam CT, are appropriate alternatives during the outbreak of COVID-19.
- In the orthodontic office, bracket-related treatment is more likely to generate body fluid exposure and aerosols than aligner treatment. Thus, use of aligners can be advocated to the patient, it. also decrease patient to doctor contact. Simple malocclusions can be treated with removable appliances.
- Restrict using the air conditioner while performing procedures.
- Follow ups should be made telephonic or on videocall

VI. Disposal Procedures for COVID-19 Related Medical/Dental Waste[11]

- All waste generated from suspected or confirmed patients shall be disposed of as medical waste
- Put the medical waste into a double-layer medical waste bag, seal the bag with cable ties in a gooseneck fashion and spray the bag with 1000 mg/L chlorine- containing disinfectant
- Put sharp objects into a special plastic box, seal the box and spray the box with 1000 mg/L chlorine-containing disinfectant
- Put the bagged waste into a medical waste transfer box, attach a special infection label, fully enclose the box and transfer it
- The medical waste shall be collected and disposed of by an approved medical waste disposal provider.

CONCLUSION

With the present knowledge of viral features, epidemiologic and clinical characteristics, and treatment modalities being still under research, efficient strategies should be taken to prevent, control, and stop the spread of COVID-19. Nevertheless, as an Orthodontist's community, it is also our responsibility to be aware of the aforementioned signs and symptoms and take informed clinical decisions and educate the public to prevent panic while promoting the health and well-being of our patients during these challenging times. Every measure should be taken to prevent any cross-infection chances, while still be able to serve patients in need. The practitioner may use this review as a guide and continue to update themselves with useful online information given in real time on this global pandemic .

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