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Review Article

A review of dental treatment protocols in the second wave of COVID 19: Vigilance the need of the hour

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ABSTRACT

The epidemic of coronavirus disease 2019 (COVID-19) emanated from Wuhan, China, in December 2019 and has become a major public health challenge for countries around the world including India. This new virus seems to be very contagious and has quickly spread globally. Due to the characteristics of dental practice the risk of cross infection is high. The emphasis of dental practice during the pandemic and the second wave of infections has changed from cessation/reduction of elective cases requiring dental treatment and according to priority to emergency cases.

Although patients with symptomatic COVID-19 have been the main source of transmission, recent observations suggest that asymptomatic patients and patients in their incubation period are also carriers of SARS-CoV-2. Most patients experienced fever and dry cough, while some also had shortness of breath, fatigue, and other atypical symptoms, such as muscle pain, confusion, headache, sore throat, diarrhoea, and vomiting.

The dental chair and all equipment to be used must be wiped with isopropyl alcohol prior to seating of the patient. Preoperative antimicrobial mouth rinse could reduce the number of microbes in the oral cavity Therefore, extraoral dental radiographies, such as panoramic radiography and cone beam CT, are appropriate alternatives during the outbreak of COVID-19. Adherence to protocol and being vigilant will help other dental colleges /centres/clinics across India and the world to carry out routine emergency treatment in such trying times where utmost importance must be given to personal protection at all costs at the same time deliver quality oral health care.

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1. Introduction

On January 8, 2020, a novel coronavirus was officially announced as the causative pathogen of COVID-19 by the Chinese Centre for Disease Control and Prevention.[1] The epidemic of coronavirus disease 2019 (COVID-19) emanated from Wuhan, China, in December 2019 and has become a major public health challenge for countries around the world[2] including India. This new virus seems to be very contagious and has quickly spread globally. In a meeting on January 30, 2020, as per the International Health Regulations (IHR, 2005), the outbreak was declared by the WHO as a Public Health Emergency of International Concern (PHEIC) as it had spread to 18 countries with four countries reporting human-to-human transmission. An additional landmark occurred on February 26, 2020, as the first case of the disease, not imported from China, was recorded in the United States.[3] Initially, the new virus was called 2019-nCoV. Subsequently, the team of experts of the International Committee on Taxonomy of Viruses (ICTV) termed it the SARS-CoV-2 virus as it is remarkably similar to the one that caused the SARS outbreak (SARS-CoVs). India has seen the first wave of Covid 19 which lasted from March 2020 to Dec 2020. The lull period between

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Jan 2021 and March 2021 saw the resumption of dental services to include ie routine /elective cases. In the current second wave of COVID 19 the country is currently facing a massive surge in cases brought about by the mutation in the virus which is highly infectious and communicable which has posed a challenge to routine practice and dental OPD services. As of 20 April 2021, COVID-19, with a total of 14,10,00,000 laboratory-confirmed cases, with 3,010,000 deaths and 80,400,000 recovered cases. India has on date 15,300,000 confirmed cases with 181000 deaths and13,100,000 recovered cases.

Due to the characteristics of dental practice the risk of cross infection is high. The emphasis of dental practice during the pandemic and the second wave of infections has changed from cessation/reduction of elective cases requiring dental treatment and according to priority to emergency cases i.e maxillofacial trauma, swellings, severe pain due to caries or abscess and dentoalveolar injuries. For dental practices and hospitals in countries/regions that are(potentially) affected with COVID-19, strict and effective infection control protocols are urgently needed to be adhered to manage routine and emergency cases to safeguard the patient and the practitioner alike. This article reviews the essential knowledge gained about COVID-19 and the recommended management protocols which are being followed by a Govt of India Dental Hospital during the second wave COVID 19 in India.

2. Aetiology

CoVs are positive-stranded RNA viruses with a crown-like appearance under an electron microscope (coronam is the Latin term for crown) due to the presence of spike glycoproteins on the envelope (Figure 1).

The subfamily Orthocoronavirinae of the Coronaviridae family (order Nidovirales) classifies into four genera of CoVs: Alphacoronavirus (alphaCoV), Betacoronavirus (betaCoV), Deltacoronavirus (deltaCoV), and Gammacoronavirus (gammaCoV). Furthermore, the betaCoV genus divides into five sub-genera or lineages.[4] Genomic characterization has shown that probably bats and rodents are the gene sources of alphaCoVs and betaCoVs. On the contrary, avian species seem to represent the gene sources of deltaCoVs and gammaCoVs. In general, estimates suggest that 2% of the population are healthy carriers of a CoV and that these viruses are responsible for about 5% to 10% of acute respiratory infections.[5] In genetic terms, Chan et al. have proven that the genome of the new HCoV, isolated from a cluster-patient with atypical pneumonia after visiting Wuhan, had 89% nucleotide identity with bat SARS-like-CoVZXC21 and 82% with that of human SARS-CoV.

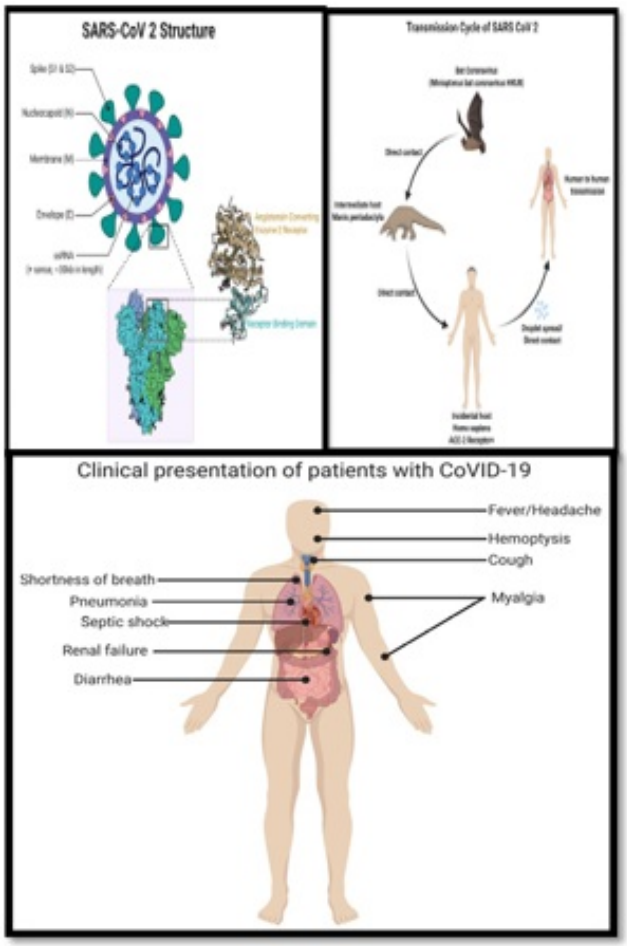

Fig. 1:

3. Epidemiologic Characteristics

3.1. Mode of transmission

Based on findings of genetic and epidemiologic research, it appears that the COVID-19 outbreak started with a single animal-to-human transmission, followed by sustained human-to-human spread (Figure 1).[6]

It is now believed that its interpersonal transmission occurs mainly via respiratory droplets and contact transmission. In addition, there may be risk of air borne / faecal-oral transmission, as researchers have identified SARS-CoV-2 in the stool of patients from China and the United States.[7]

3.2. Source of transmission

Although patients with symptomatic COVID-19 have been the main source of transmission, recent observations suggest that asymptomatic patients and patients in their incubation period are also carriers of SARS-CoV-2.[6,8] This epidemiologic feature of COVID-19 has made its control

extremely challenging, as it is difficult to identify and quarantine these patients in time, which can result in an accumulation of SARS-CoV-2 in communities. In addition, it remains to be proved whether patients in the recovering phase are a potential source of transmission.[8]

3.3. Incubation period

The incubation period of COVID-19 has been estimated at 5 to 6 d on average, but there is evidence that it could be if 14 d, which is now the commonly adopted duration for medical observation and quarantine of (potentially)exposed persons.[9]

3.4. Fatality rate

According to current data, the fatality rate (cumulative deaths divided by cumulative cases) of COVID-19 is 6.1 ± 2.9%, depending on different regions of China,[10] which is lower than that of SARS (severe acute respiratory syndrome; ≈10%) and MERS (Middle East respiratory syndrome; ≈34%)[11] and higher than that of seasonal influenza (0.01% to 0.17%) according to data for 2010 to 2017 from the US Centers for Disease Control and Prevention (2020).

3.5. People at high risk of infection

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, are at higher risk of SARS-CoV-2 infection.

3.6. Clinical manifestations

Most patients experienced fever and dry cough, while some also had shortness of breath, fatigue, and other atypical symptoms, such as muscle pain, confusion, headache, sore throat, diarrhoea, and vomiting[12] (Figure 1). Among patients who underwent chest computed tomography (CT), most showed bilateral pneumonia, with ground-glass opacity and bilateral patchy shadows being the most common patterns.[12,13]

3.7. Diagnosis and treatment

The diagnosis of COVID-19 can be based on a combination of epidemiologic information (e.g., a history of travel to or residence in affected region 14 day prior to symptom onset), clinical symptoms, CT imaging findings, and laboratory tests (e.g., reverse transcriptase polymerase chain reaction [RT-PCR] tests on respiratory tract specimens) according to standards of the WHO.[14] Rapid antibody-based blood tests are also now available and reduce the time required to confirm cases which are positive. Clinically, we should be alert of patients with an epidemiologic history, COVID-19–related symptoms, and/or positive CT imaging results. Presently there is no definitive treatment for the viral infection, the treatment mainly aims to relieve symptoms.

3.8. Recommended measures and protocol during the COVID-19 outbreak

Due to the unique characteristics of dental procedures where aerosols generation is high, 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, are unaware they are infected, or choose to conceal their infection. Though the recommendation is there to restrict outpatient services at dental centres patients and examine patients who exhibit symptoms of pain or have had maxillofacial trauma. To this extent the dental services has formulated a protocol to examine these patients based on the guidelines by the WHO.[14]

The acceptance of any patient requiring routine/ emergency dental care should be done after proper screening of travel history, contact history and after presence at any COVID 19 hotspots is ruled out. This must be followed stringently to prevent possibility of cross infection and transmission.

3.9. Social distancing /Entry protocol

First and foremost, social and physical distancing should be maintained at all times when interacting with a patient. This would begin at the reception area where adequate physical distance of 2m should be maintained between patients and vice versa with the reception (Figure 2). The patients should also be seated apart preferably at 1m after registration to avoid infection (Figure 2). SOP (Standard operating procedure) as established should be followed as described in (Figure 3) in addition patients body temperature, SPO2 should be recorded (using contact-free forehead thermometer and digital pulse oximeter) at entry and he/she should also fill up the questionnaire as mentioned in (Figure 3) prior to treatment. In most cases it must be advised to the community at large to seek consultation via Tele Dentistry and be advised to visit the Dental centre only if necessary.

4. Effective Personal Protection Protocols for Examining NCov Infected patients

4.1. Hand hygiene

Hand hygiene has been considered the most critical measure for reducing the risk of transmitting microorganism to patients (Figure 4).[15] A per literature SARS-CoV-2 can persist on surfaces for a few hours or up to several days, depending on the type of surface, the temperature, or the humidity of the environment.[16] The oral professionals

Fig. 2:

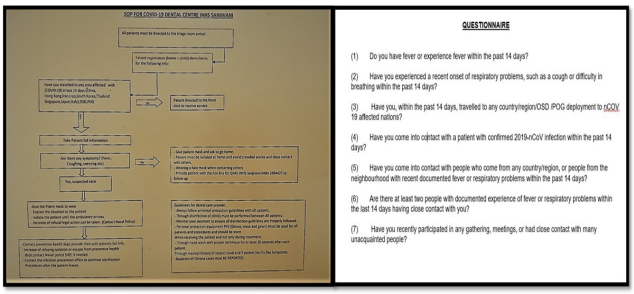

Fig. 3:

should wash their hands: -

1. Before
   (a) Patient examination
   (b) Dental procedures
2. After
   (a) Touching the patient
   (b) Touching the surroundings and equipment without disinfection, touching the oral mucosa, damaged skin or wound, blood, body fluid, secretion, and excreta.
   (c) More caution should be taken for the dental professionals to avoid touching their own eyes, mouth, and nose.

This reinforces the need for good hand hygiene and the importance of thorough disinfection of all surfaces within the dental clinic as per WHO guidelines (Figure 4).

5. Donning of PPE

The use / donning of personal protective equipment, including masks, gloves, gowns, and goggles or face shields, is recommended to protect skin and mucosa from (potentially) infected blood or secretions (Figure 5).

Protective measures for both the para dental and dental surgeon should include PPE consisting of:

Fig. 4:

Fig. 5:

1. Wearing disposable doctor cap, disposable surgical mask, protective goggles, face shield, with disposable isolation clothing or surgical gown outside, shoe cover and two pairs of disposable latex gloves or nitrile gloves.

When dealing with a confirmed 2019-nCoV infection tertiary protection /special protective outwear / working clothes (white coat) with extra disposable protective clothing outside. In addition, disposable doctor cap, protective goggles, face shield, disposable surgical mask, disposable latex gloves, and impermeable shoe cover should be worn. As respiratory droplets are the main route 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.

6. Oral Examination Protocols

The dental chair and all equipment to be used must be wiped with isopropyl alcohol (70%) prior to seating of the patient. Preoperative antimicrobial mouth rinse could reduce the number of microbes in the oral cavity.[17] Procedures that are likely to induce coughing should be avoided (if possible) or performed cautiously.[15] Patient should be draped (Figure 5) and aerosol-generating procedures, such as the use of a 3-way syringe, should be minimized as much as possible. The instrument layout should include sterile /disposable mouth mirror and probe placed on a sterile surface (Figure 5). Perioral scrub should be performed prior to beginning the procedure. Intraoral x-ray examination is the most common radiographic technique in dental imaging; however, it can stimulate saliva secretion and coughing. The RVG sensor if used for localised x-ray can be made sterile using isopropyl alcohol to wipe the sensor cover prior to development. Therefore, extraoral dental radiographies, such as panoramic radiography and cone beam CT, are appropriate alternatives during the outbreak of COVID-19.

Fig. 6:

6.1. Protocol for treatment of emergency cases

As per the MOFHW Govt of India, DCI, and IDA guidelines normal OPD services in a pandemic of such a nature /scale need to be ceased /scaled down till denotification of the pandemic but dental emergencies can occur and exacerbate in a short period and therefore need immediate treatment. In such an event entry protocols and donning/doffing of PPE by the treating dental surgeon should be followed. Rubber dams and high-volume saliva ejectors should be used to minimize aerosol or spatter in dental procedures. Furthermore, face shields and goggles are essential with use of high or low-speed drilling with water spray. After treatment, environmental cleaning and disinfection procedures were followed. Alternatively, patients could be treated in an isolated and well-ventilated room.

The treatment planning of tooth fracture, luxation, or avulsion is dependent on the age, the traumatic severity of dental tissue, the development of the apex, and the duration of tooth avulsion.[18] If the tooth needs to be extracted, absorbable suture is preferred. For patients with facial soft tissue contusion, debridement and suturing should be performed.

It is recommended to rinse the wound slowly and use the saliva ejector to avoid spraying. Life-threatening cases with oral and maxillofacial compound injuries should be admitted to the hospital immediately and referred to Medical Specialist / Pulmonologist. A CT chest should be prescribed if available to exclude suspected infection because the RT-PCR test, besides being time-consuming, needs a laboratory with pan-coronavirus or specific SARS-CoV-2 detection capacity. Antibody testing can be also done if rapid testing kits are available.

7. Completion Protocol: Doffing of PPE and sterilization of equipment /area

On completion of examination /treatment PPE should be doffed in accordance WHO guidelines i.e. each oral health care provider should help the other in removal of the PPE and disposal should as per laid down Bio medical waste guidelines. (Figure 5).

7.1. Disinfection of the clinic settings

Para dental staff to ensure that all surfaces with which the patient/aerosolised particles may have come in contact are sprayed with surface disinfectant (isopropyl alcohol 70%) and wiped clean (Figure 6).

The dental operatory /surgery should be fumigated post completion of cold sterilization and sterilization procedures which include autoclaving all used equipment including air rotors instruments.

8. Education of Patients and Paradental Staff

Patient education and updating the knowledge of the paradental staff is key to prevention and reduction of transmission of this viral disease. The health education material in the form of posters and presentations help in knowledge enhancement and improvement in preventive strategies (Figure 6).

9. Conclusion

With the increased knowledge of viral features, epidemiologic characteristics, clinical spectrum, and treatment, efficient strategies are to be taken to prevent, control, and stop the spread of COVID-19. The infection prevention and control strategies that have been adopted by the Dental Services at this Hospital are determined by the fact that we are in a hotspot even during the second wave of COVID 19. The Dental services in this Hospital and the country are providing emergency care as per evolving policy guidelines in force. Adherence to protocol and being vigilant will help other dental colleges /centres/clinics across India and the world to carry out routine emergency treatment in such trying times where utmost importance must be given to personal protection at all costs at the a same time deliver quality oral health care.

10. Source of Funding

None.

11. Conflict of Interest

None.

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