

Novel Corona Virus (Covid-19) and its Impact on Dentistry

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ABSTRACT

In December 2019, new virus detected named as 2019 Novel Coronavirus (Covid 19 Virus) at Wuhan province, China. Covid19 virus infection becomes pandemic and most of country community spread is going to become common day by day. Such type of unprecedented medical situation never occurred in the history of mankind. This divided things into precorona and corona period. Since it is a highly contagious viral disease, we have to take precautions accordingly. The Corona virus is RNA virus that is why it is highly mutative in nature. More than 30 strains of it available till date which affecting humans. It affected dental profession badly and dental treatment must be done with precautions. Present article introduces the corona virus and highlights what precautions must be followed while practicing dentistry during this era.

Introduction:

Coronaviruses (RNA Viruses) are enveloped carrying petal or club shaped or crown like peplomer spike giving appearance of solar corona (Fig 1). The spike protein on the surface helps the virus to attach to human cells. Investigations have found that the Covid 19 virus causes a wide range of respiratory disorders ranging from mild common cold to severe pneumonia and sometimes gastrointestinal problems. These are mainly due to release of excessive cytokines through body response which ultimately leads to acute respiratory distress syndrome and multi organ failure. Most people have mild symptoms. However, some types of Coronavirus could Cause Severe disease.

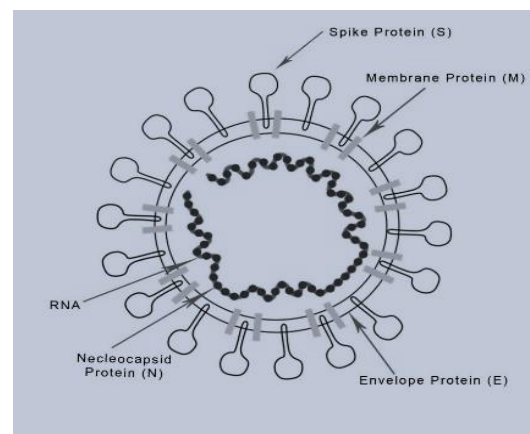


Fig 1; Schematic presentation of structure of Covid 19 Virus

Type of Corona Virus

Before discovery of Covid 19 virus six recognised coronavirus was known for human infection. Till date types of corona virus is as follows;

1. Human Corona virus 229E,
2. New Haven Corona virus,
3. Human Corona virus OC43,
4. Human Corona virus HKUI,
5. SARS –CoV (Severe Acute Respiratory Syndrome corona virus first identified in China in 2003),
6. MERS-CoV (Middle East Respiratory Syndrome virus identified in Saudi Arabia in 2012).
7. Covid 19 Virus (Detected in December 2019 at China)

The origin of the virus is typically from animals. The spread of the virus from the animals to humans is usually called 'spillover' also called Zoonotic disease. It could be due to a range of factors such as mutations in the virus or increased contact between humans and animals. Once the virus reached the human, it mutates and spreads from human to human. The disease spread from the sick to the victim's family and health care workers. From that point, the exponential growth curve of the coronavirus is seen.

Nature and spread of Covid 19 Virus;

Corona virus is RNA virus that is why it is more mutative in nature. Now, the virus spread is almost worldwide (pandemic) around 216 countries with millions cases with millions death. Most of virus will have two characters, contagious and infectious. The corona is highly contagious and less infectious. The coronaviruses use ACE-2

(angiotensin-converting enzyme) to attach to the human cell. The levels of ACE-2 will be higher in cardiac and other systemic disease patients, for this reason, they are at more risk of virus infection. The transmission of the virus is usually through coughing, sneezing, close personal contact like touching mouth, nose, eyes, or shaking hands. It spreads through droplets, produced when affected persons coughs or sneezes or it may spread through something that is contaminated from the virus. The groups at most risk of transmission are family members and health care workers.

Diagnosis of virus:

The diagnosis of corona virus could be done by two basic methods. One is detection of virus in the body or immune reaction to the virus in the blood. The detection of virus/viral genome is through the RT-PCR (reverse transcriptase polymerase chain reaction) from the nasal swab. The rapid test kit is based on the immune reaction using immunochromatographic assay from the blood (Table 1).

Table: 1 Type of test for corona virus.

Test	RT-PCR	Rapid test
Sample	Nasal/throat swab	Blood
Physiology behind the test	Detect the virus nuclear material	Color changing Immune reaction between the antibody and virus
Sensitivity	Very accurate due to particular nuclear material	Might give false positive if other viral infection is present
Advantages	Accurate and confirmatory	Results within 10 minutes
Disadvantage	<ul style="list-style-type: none"> • Time taking • Comparatively costly 	<ul style="list-style-type: none"> • Inaccurate • If rapid test become positive, requires RT-PCR to confirm the infection • Requires double test.

Prevention of Covid 19 Virus include control measures as follows,

1. Isolation and quarantine the exposed patient,
2. Thorough and frequent hand washing with soap,
3. Make a distance of 1 meter to each other,
4. Use of gloves, goggles, gowns, facemask, PPE kit by health care workers.
5. Avoid personal contacts,
6. Avoid travels.

- ii) Umfenovir which is also used in influenza virus, prevent entry of corona virus.
- iii) Camostat/Nafamostat used in pancreatitis also prevent entry of corona virus.
- iv) Remdesivir (used for Ebola virus), favipiravir, rebapirin are polymerase inhibitor.
- v) Importin
- vi) Ivermectin (used as anthelmintic and scabies) act as immunomodulator.
- vii) Tocilizumab is IL-6 antagonist.
- viii) Plasma therapy

Advancement related to vaccine and drugs;

Although some country are trying to develop vaccine, but since it is RNA virus and highly mutative in nature, it is relatively difficult to develop vaccine for it, although trial of it is going on. Still we are optimistic to see the vaccine in future. A lot of drugs are used nowadays for Covid 19 Virus. None of the drugs are approved by FDA and WHO, however it has been claimed that it is useful for the virus infection. These drugs are:

- i) Hydroxy chloroquine: It is an antimalarial drug. Act as entry inhibitor by changing surface protein of virus and human cells, immune-modulator, and changing the endosomal pH, inside the human cells. It should be avoided in patients having cardiac problems, neurological problems, diabetes, kidney, eye related problems.

Dental profession and Corona Virus;

As a dentist, we are more prone to infection and cross-contamination. Some Dental procedures involved aerosol generation, hence it should be avoided. This exposes dental healthcare personnel to the risk of infection via direct exposure of conjunctiva (eyes) to droplets from patients during dental treatment. Considering that the facts related to treatment of virus and vaccination is not available for COVID-19 virus infection, it would be sensible for dentists to do more on non-aerosol generating procedures for the treatment of their patients. We have to take precaution and care of many asymptomatic COVID-19 patients visiting for dental treatment.

A general recommendation for the dentist

Waiting area and clinic must be sanitized with 0.1 to 0.5 % sodium hypochlorite solution or 70% isopropyl alcohol.

Patient Evaluation in the Waiting Room

- The waiting room in the dental practice/centre should be sufficiently ventilated.
- Their temperature should be measured using a sterile or contact-free forehead thermometer.
- A thorough travel history, medical history obtained from the patients.
- For major dental procedures sometimes, Covid 19 virus test should be done.
- If a patient is suspected for COVID-19 infection, he/she should be identified, quarantined, and referred to the concern health department.
- Proper ventilated room should be there. Air condition is minimally used.
- Fumigation of waiting and working area is required.

Hand hygiene

Dental professionals and dental assistance should prevent their hands from direct contact with his/her body parts e.g. eyes, nose, and mouth. Use of hand sanitizer or hand wash with soap is mandatory before the beginning of any dental procedures.

Personal Protection Measures

Self-protective measures is highly advised for dental procedures, i.e. Protective goggles and face shields, Face masks (N 95 mask), Protective water resistant outwear (gown), gloves, personal protection kit etc. It should be properly disposed with .01 to .25 % sodium hypochlorite solution.

Surface disinfection

Dental chair-side surfaces, i.e., dental light handle, dental chair keyboard keys, connected computers and so on- should

be disinfected in the intervals between patients using ethanol 70%.

Mouth-Rinsing Before Dental Treatment

Using a mouth rinse or mouthwash solution containing hydrogen peroxide or povidone iodine is recommended (Chlorhexidine should not be used).

Use of Other Materials/Instruments/Equipment

Aerosol generating procedure should be avoided. Mostly micro motor or contra-angle hand piece should be used. During using of these instruments, simple saline is used as irrigant for heat dissipation. After every 4 to 5 minutes it should be stopped then again start work after 1 to 2 minutes with these instruments. Rubber dam, can minimize the dispersion of droplets, secretions, and aerosols.

Instrument must be cold sterilized with 0.1 % sodium hypochlorite solution (> 0.5 % will corrode the surface), gluteraldehyde, quaternary ammonium chloride or It should be autoclaved properly.

Procedure:

1. Consent of patient is required,
2. Hand scaling is preferred,
3. Long duration of treatment should be avoided,
4. Aerosol generating procedure should be avoided,
5. Preferred root canal treatment is single sitting, if otherwise indicated should be done,
6. Orthodontic treatment with proper personal care can be done.
7. Crown cutting, preparation of cavity etc. should be done with micro motor or contra-angle hand piece.
8. Oral surgical procedure can be done with precautions, however

major surgical procedure should be done after testing of Covid 19 virus.

Removal of Medical/Dental Waste

Disposable protective equipment should be transferred to a temporary storage area. The medical waste-from the treatment of patients suspicious to COVID-19-should be considered as infectious residue. These wastes should be packed in two-layered packages and sealed properly and disposed properly.

Conclusion:

The Covid 19 problem has neither medicine nor vaccine, and mainly patient care depends on supportive therapy like vitamin C, A and D and other general measures to bring innate immunity to check the virus spread. It has been reported that virulence of the virus is reduced and become milder than before. The corona virus is highly contagious but less infective with mortality rate of average 3.3% comparatively less than SARS and MERS. The patient with co-morbidities, old age person and children below 10 years are to be taken care with social distancing and public and personal hygiene etiquette. The drug and vaccine are on the pre-trial basis. Beside medical effects, corona indeed has psychological impact on the life, so treat the patient with care and love. We have to treat the patient of dental and oral diseases with precaution.

References:

Based on various available resources about Corona Virus from the internet.