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Covid 19 Pandemic: A Review for Dental Health Care Professional

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Abstract

Introduction: CoVs are positive-stranded RNA viruses with crown-like structure from an electron microscope owing to the presence of spike glycoprotein's (coronam is the Latin word for crown) on the shell. Genomic characteristic has shown that bats and mice can be the gene sources of alpha CoVs and beta CoVs. On the opposite, avian species appear to represent the genes derived from delta CoV and gamma CoV. Member of this large group of viruses in many animal organisms, including camels, goats, cats, and bats, can cause respiratory, enteric, hepatic, and neurological diseases. Through date, seven CoVs (HCoVs) have been identified-capable of causing disease. Some of the HCoVs were discovered in the mid-1960s, but some were only established in the modern era.

Pathophysiology: The entrance of corona virus into host cells is regulated by a spike protein found on the virus surface. The spike protein on SARS-CoV has an RBD which acknowledges ACE2 as its receptor.

Conclusion: The best way to win over the Corona virus before a vaccination is launched is avoidance is easier than treatment. Corona virus epidemic has threatened the system for fiscal, medical, and public safety.

Keyword: COVID 19, Dental Professional, Preventive measures

Introduction

Characteristics of Corona virus: CoVs are positive-stranded RNA viruses with crown-like structure from an electron microscope owing to the presence of spike glycoproteins (coronam is the Latin word for crown) on the shell. The Orthocoronavirinae (order Nidovirales) subfamily of Coronaviridae classifies into four genera of CoV: Alphacoronavirus (alphaCoV), Betacoronavirus (betaCoV), Deltacoronavirus (deltaCoV), and Gammacoronavirus (gammaCoV). By contrast, the betaCoV genus breaks down into five subgenera or lineages. [1]

Genomic characteristic has shown that bats and mice can be the gene sources of alphaCoVs and betaCoVs. On the opposite, avian species appear to represent the genes derived from deltaCoV and gammaCoV. Member of this large group of viruses in many animal organisms, including camels, goats, cats, and bats, can cause respiratory, enteric, hepatic, and neurological diseases. Through date, seven CoVs (HCoVs) have been identified-capable of causing disease. Some of the HCoVs were discovered in the mid-1960s, but some were only established in the modern era.[2]

Certain individual covets such as SARS-CoV, SARS-CoV-2, and MERS-CoV (B and C family betaCoVs, respectively) which triggers complex health frequency epidemics that include respiratory and additional amount-respiratory occurrences. For immunosuppressed people and the aged there can be smaller diseases in the respiratory tract. These covets triggers complex outbreaks of health frequencies to include cardiac and external types of respiratory number. Of SARS-CoV, MERS-CoV, the mortality statistics are rising to 10 per cent and 35 per cent compared.

Thus SARS-CoV-2 belongs to the group BetaCoV. It has a oval or elliptic form, which is mostly pleomorphic and has a diameter of around 60–140 nm. As compared to other CoVs it is sensitive to heat and ultraviolet rays. In this way, since the high temperature inhibits the reproduction of some virus type. The SARS-CoV-2 inactivation temperature actually remains to be thoroughly elucidated. It suggests this virus may be excreted at almost 27 ° C. Alternatively, The cold is expected to remain just below 0 ° C. These viruses can often be easily detoxified by lipid solvents, including ethanol (75%), diesel, chlorine-containing disinfectant, peroxyacetic acid & chloroform, with the exception of chlorhexidine. [3] In terms of evolution, Chan et al. Demonstrated that the new HCoV genetic content, originating from an atypical cluster of pneumonia after visiting Wuhan, had 89% SARS-like-CoVZXC21 nucleotide recognition and 82% SARS-CoV nucleotide identity. [4] To this end, the new virus was named SARS-CoV-2. RNA's single-strand genome comprises 29891 nucleotides that represent 9860 amino acids. While the origins of SARS-CoV-2 have not been thoroughly known, genetic research indicates that SARS-CoV-2 is likely the product of a mutation occurring in bats. In addition, the molecular similarity with the human SARS-CoV2 sequence and recognized animal coronaviruses showed a strong correlation (96 per cent) between bats' SARS-CoV2 and betaCoV RaTG13 (Rhinolophus affinis).[5]

Even then, there is no information yet regarding the possible amplifying mammalian host, intermediate between bats and humans. While the mutation may have specifically caused virulence against humans in the initial strain, it is not clear whether this intermediate occurs.

Pathophysiology

The entrance of corona virus into host cells is regulated by a spike protein found on the virus surface. The spike protein on SARS-CoV has an RBD which acknowledges ACE2 as its receptor. Such structures showed that there is a nucleus and a receptor-binding motif (RBM) in SARS-CoV RBD; RBM is the mediator of ACE2 interactions. The surface of the ACE2 contains two bacterium-binding hotspots needed to attach SARS-CoV. Therefore, several naturally selected mutations in the SARS-CoV RBM protect these hot spots and monitor the risk of infection with SARS-CoV, cell proliferation, cross-species and human-to - human spread. [6]

Routes of Transmission

Through routes of novel corona virus transmission include

- Clear delivery (inhalation of the cough, sneeze, and droplet) &
- Visual transfer (visual to mucous membranes of the dental, nasal and eye)[7]

Though that clinical manifestations of a novel corona virus infection do not involve eye symptoms, analyzes of conjunctival samples from reported and suspected cases of 2019-nCoV suggests that the transmission of 2019-nCoV is not limited to the respiratory tract, [8] and that eye exposure may provide an effective way for the virus to enter the body. [9]

Additionally, Studies have also demonstrated that airborne vaccines can be transmitted either directly or indirectly to humans, or via coarse or tiny droplets, but that 2019-nCoV can also be transmitted specifically or implicitly through saliva.[10] In fact, a review of one incidence of 2019-nCoV infection in Germany indicates that the virus may also be spread via contact with patients with symptoms.[11]

Studies have demonstrated airborne 2019-nCoV by aerosols produced during medical treatments. [6] It is interesting that rRT-PCR imaging may also identify 2019-nCoV RNA in a stool samples obtained on day 7 of the patient's illness. [12] Furthermore, more research and clarification is also required of the aerosol transmission route and the fecal – oral transmission route addressed by the public.

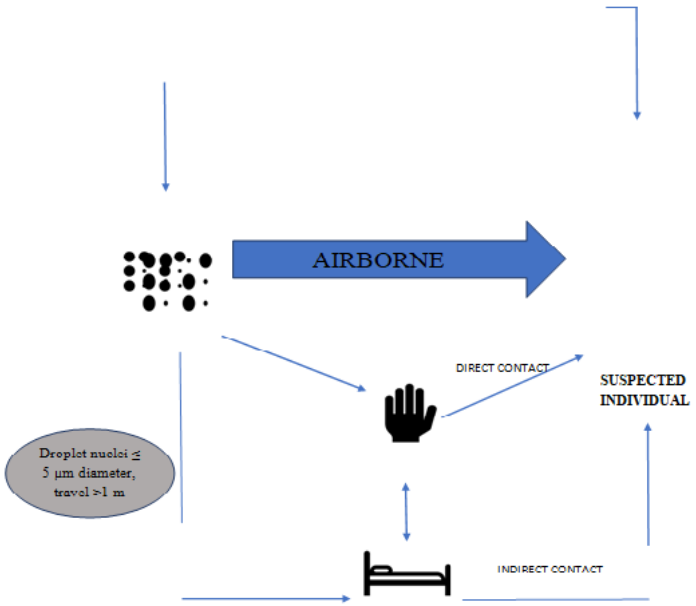

Figure 1

- Transmission Routes through Dental Clinics

Since then it was shown that novel corona virus has transmitted by traditional means of novel corona virus, namely direct transmission (cough, burp, and droplet inhalation) and contact delivery (gastro - intestinal, respiratory, and eye mucosal communication).It may also be transferred by respiratory droplets directly from one individual to another, and evolving research indicates that it can also be spread by touch and enteric bacteria [1].

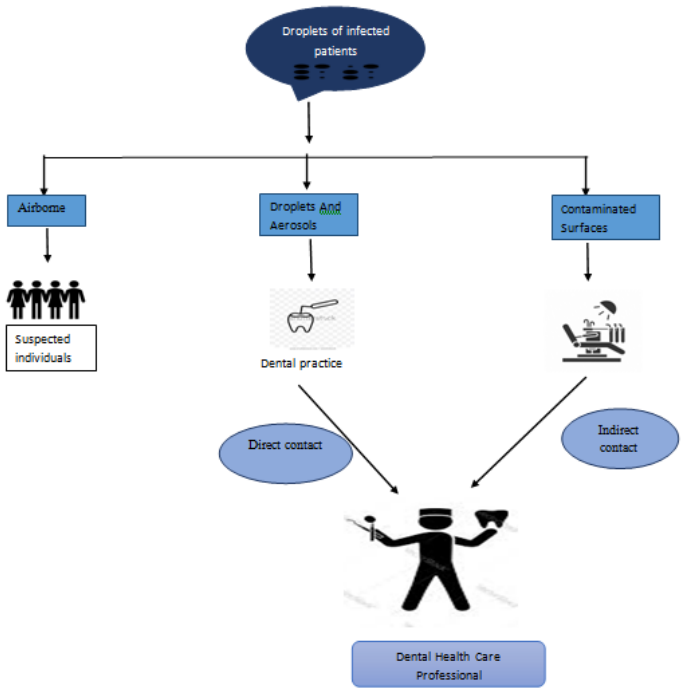

Figure 2

Bacterial infections, including bacteria or viruses that trigger oral cavity and respiratory illness, may affect dental practitioners and physicians. Dental care environments usually carry the possibility of contamination in 2019-nCoV due to the complexity of the operations including face-to - face patient contact, repeated blood distribution, saliva as well as other body fluids, as well as the usage of sharp tools. Pathogenic microorganisms may be spread in dental conditions by inhaling microorganisms that can stay trapped in the atmosphere for lengthy periods of time, close to interaction with saliva, oral fluids or other patient products, entering the conjunctival, nasal or nasal cavity with droplets of an contaminated individual's aerosol microorganisms that trigger a fleeting absence.[14-18] Infections may also be detected by one of these situations in dental clinics and hospitals, particularly during the 2019-nCoV outbreak-involving an infected individual.

Infection control [19]

To help prevent the transmission, various infection control measures should be followed:

1. Hair washing is mostly achieved by rubbing the hands with alcohol, or soap and vinegar.
2. Upon coughing or sneezing, wash hands before & upon cooking food and before consuming the meal.
3. Inhalation 3 may cause the spread of pathogenic microorganisms in dental settings. Cover mouth & nose whilst coughing or sneezing occurs with flexed elbow and tissue. Immediately after the usage of dump tissue into closed tub.
4. If you develop cough & fever stop direct touch.
5. Should not spit in crowd
6. If you already have fatigue, cough & breathing trouble seek medical help early and discuss with your health care professional your travel experience.
7. Stop rubbing the head, mouth and nose.
8. When you have nausea and cough, stop flying.
9. Stop close communication with persons with fever and cough
10. When you want to wear a face mask, stop removing the mouth mask until it's on, make sure to shield the ears and nose.
11. When you get sick whilst traveling, alert the crew and receive primary sources.
12. While travelling eat only well-cooked food.

Infection control in dental clinics

Telephonic Pre-screening Protocol

Instructions to the Patient before Entering the Clinic

- If you have any cough, cold, fever, please reschedule your appointment.
- Once you reach the clinic, please call the doctor before you enter for screening protocols.
- Arogya Setu App should be installed in your phone.
- All payments will be accepted only through digital payment podiums.

- Attenders will not be allowed inside except for pediatric/ geriatric/ medically compromised patients.
- Eradicate wearing jewellery and carrying of accessories, bags etc.
- Wear a facemask during transport and while in the waiting room

Outpatient Service

Event prioritisation

- When restrictions on professional practice are gradually relaxed, physicians will use techniques of prioritization in arranging appointments according to the urgent needs of patients. The following cases can allow for easier appointment scheduling.
- Person to existing medical problems that placed them at a higher risk of complications leading to any resulting infection unless the dental is treated.
- Patient with regular oral, abscess or facial injury incidents Patient with orofacial disease involving vital examination or treatment (e.g. biopsy).
- Appointments for regular oral health tests, dental growth evaluations or regular examination following GA diagnosis can be postponed or properly arranged to minimize the amount of patients visiting clinics.

Before Dental Care Starts

(A) Clinician and team preparation

- Patient with recurrent dental discomfort, abscess or facial pain Patient with orofacial disease involving vital examination or treatment (e.g.: biopsy).
- Appointments for regular oral health examination, dental growth evaluation or regular review after GA dental care can be postponed or properly arranged to minimize the amount of cases visiting clinics.
- Safeguard personnel have a clear understanding of Personal Protective Equipment (PPE) and doffing and specifications. A refresher course on infection prevention for the workers is suggested for organization or particular department prior to restarting operations.
- Check the PPE is in adequate quality.

Contact doctors to ask at the moment of visit about any history of fatigue, cough, sore throat or trouble breathing, any suspect individual COVID-19 positive contact and travel records.

Cancel position if the past has been successful. Please advice patient to wear dust masks on consultation day and to restrict the number of people accompanied you.

(B) Triage-

Ask the following queries to the individual and accompanying individuals (fever background, cough, sore throat and respiratory problems, some possible sensitivity to COVID-19 positive persons and travel records) as they visit the clinic. On arrival into the waiting room taking temperature.

(C) Social distancing in waiting area

- Clinicians will assess their doctor's office capability and plan visits accordingly so as to insure that emotional space can be maintained.]
- Make clinic clutter free (no toys and magazines)
- Posters on hygiene and social distancing
- Single receptionist / staff
- Seating arrangement should be done with minimum 2 meters social distancing.

Protocols to Be Followed By The Patient In The Waiting Area

- Ask the patient to remove footwear outside the clinic
- Only one accompanying person to be allowed if patient is geriatric, pediatric or medically compromised
- Patient and accompanying person should mandatorily wear surgical masks

Duties of the Receptionist

- Check and verify the soft copies of details provided by the patient over What Sapp
- Record the patient's forehead temperature using a Digital Noncontact Infrared Thermometer
- Check oxygen saturation level of the patient by Pulse Oximetry (If it is less than 95%, we should immediately refer that patient to physician)
- Take the consent of the patient. (use disposable pen or it must be sanitized with 70% ethanol (spirit).
- Assist patient to sanitize his/her hands

During Dental Treatment

- The mouth rinse will reduce the amount of oral microbes before the operation. Since SARS-CoV-2 virus is susceptible to oxidation, pre-procedural mouth rinse is administered with an oxidative agent such as 0.5-1 percent hydrogen peroxide4 or 0.2 percent povidone5 as soon as the child may rinse.
- The workers must hold the right PPE and limit the amount of workers in the operational room. Practices that are prone to happen coughing (e.g., impression-taking) will be avoided (if possible) or enforced with care. [6]
- Tools and instruments not interchangeable and single-use should be cast off wherever necessary to reduce the chance of cross-infection. [7]
- The high-speed anti-retraction handpiece will be considered, because it would reduce the leakage of pathogenic microorganisms into the handpiece tubes and dental structures compared to hand pieces through retraction.[8,9]
- The intraoral x-rays induce sneezing as well as secretion of saliva10. Many suitable options include extra oral radiographs such as panoramic X-ray and cone beam CT.[3] Patients require clarification of the risk and benefits.
- High-volume suction and rubber dams will mitigate aerosol or splatter during dental procedures.[3,8]
- When using a hand piece, consider using a slow-speed hand piece because it produces less aerosol than a high-speed hand piece [1].
- Where suturing is needed, resorbable suture is favored to decrease the patient's demand for suture remova[3,8] in the dental clinic. The 4-handed dentistry helps to manage infection. 8
- High pressure three-way syringe should not be used to stop spraying8.
- Health professionals should exercise their professional judgment and accept minimally intrusive Aerosol required to generate Process techniques. It is best to maintain a list of names and phone percentage of customers, nurses and workers to keep details mostly on usage on surgeries rooms to enable communication recording if necessary. [11]

Being paid for during dental care

- The following follow-up consultation as legally appropriate would be scheduled as farther out.
- The hospital supervisor shall wash the waterlines of the dental unit for 30 seconds to 1 minute, remove all the equipment used (handpieces, trays, etc.) and position it in the scrubbing / washing field.[12]
- Both the membrane sheets and the soiled gloves will be stripped and disposed of. The space will not be used for 30 minutes to prepare for settling of all aerosols. [13]
- Scrub and sterilize areas that are known to be infected with bacteria and frequently accessed areas in the health care setting within 30 minutes.
- Both cross-infection prevention procedures and basic measures as set out in Dental Practice Infection Control Guidelines 2017 must be practiced.

Waste management

- Ensure independent colour coded bins / bags / containers in wards and maintain adequate waste sorting in compliance with the 2016 Bio Medical Waste Management (BMWM) Regulations.
- Double lined bags (using 2 containers) can be used as a measure to capture waste in order to maintain enough power and no leakage.
- Store and analyse biomedical waste separately until the same Community Bio-medical Waste Treatment and Disposal Facilities (CBWTF) is handed in.
- CBWTF removes hazardous waste on a regular basis or, if not feasible, will indefinitely be deposited in the isolation region.

Pharmacological management for Covid 19

Agents identified historically for SARS and MERS are prime targets for COVID-19 diagnosis

Here is a study of the in vitro operation and reported clinical results with some of COVID-19's very successful recycled products.[33]

Chloroquine and Hydroxychloroquine[34]

Target: Blocking the viral entry by preventing host promoter glycosylation, proteolytic synthesis, and endosomal acidification. Specific immunomodulative effects in host cells by inhibition of cytokine development, autophagy and lysosomal behavior

Adult dose/administration: 500 mg by mouth every 12-24 h × 5-10 d

Contraindications: Insensitivity to chloroquine, to 4-aminoquinoline products, or to any formulation part. Presence of improvements in retinal or visual area in some pathology (unless benefits exceed risk)

Special populations: Can be considered during breastfeeding where advantages outweigh risks

Hydroxychloroquine sulfate (Plaquenil/ generic)[35]

Target: Hydroxychloroquine shares the same action mechanism as chloroquine

Adult dose / administration: 400 mg per mouth every 12 hours at 1 d, then 200 mg per mouth every 12 hours at 4 d; alternate dose: 400 mg per mouth per day at 5 d or 200 mg a mouth 3 times a day at 10 day

Contraindications: noted for hydroxychloroquine hypersensitivity, 4-aminoquinoline derivative or any part of the formulation

Different populations: benefit outweighs dangers of pregnancy

Lopinavir/ritonavir

Target: 3CL protease

Adult dose/administration: 400 mg/100 mg mouth to a maximum of 14 d every 12 h. Available as: lopinavir / ritonavir, 200-mg/50-mg tablets; lopinavir / ritonavir, 100-/50-mg tablets; lopinavir / ritonavir, 400-mg/100-mg by 5-mL oral solution (can be administered through ethanol and propylene glycol compatible feeding tubes, containing 42% alcohol)

Contraindications: Lopinavir / ritonavir hypersensitivity, or all of its components, like ritonavir; Co-administering of strongly based CYP4503A medications. Co-administration with strong inducer CYP450 3A

Unique populations: can be used during pregnancy; avoid oral solution due to ethanol material, if necessary

Umifenovir (Arbidol)[37]

Target: S protein/ACE2, membrane fusion inhibitor

Adult dose/administration: 200 mg 7-14 d per mouth every 8 h. Available as (not in USA): tablets, capsules and granules 50-mg and 100-mg

Contraindications: Known hypersensitivity to umifenovir

Special populations: Contraindicated in children <2 y of age (increased sensitivity)

Adjunctive Therapies

Today, the pillar of treatment for COVID-19 patients remains providing care in the absence of approved SARS-CoV-2 medication, spanning from symptomatic ambulatory control to complete intensive care support

Corticosteroids[38]

The justification for using corticosteroids is to decrease the bloodstream host inflammatory responses, which may lead to the bloodstream's acute respiratory distress syndrome (ARDS).

Anticytokine[39]

The reason for their usage is that severe lung and other organ damage underlying pathophysiology is induced by an intensified immune reaction and cytokine release, or "cytokine earthquake"

Immunoglobulin Therapy[40]

Another alternative adjunctive treatment for COVID-19 is the usage of convalescent plasma or hyper immune immunoglobulin's. The reason for this procedure is that both free virus and compromised cell immune clearance will support the antibodies from healed patients.

Conclusion

The best way to win over the Coronavirus before a vaccination is launched is avoidance is easier than treatment. Coronavirus epidemic has threatened the system for fiscal, medical, and public safety. It's growing at an unprecedented pace across the globe. General Dental practice gets seriously hampered due to the pandemic; this causes the alarming situation for all the Dental practitioner to fight against the COVID 19 pandemic.

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