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Review Article

Dental considerations in Corona Virus Infections: First review in literature

Mohammed Samiuddin Ahmed[1], Diplina Barman[2], Girish B[3], Rajkumari Eliza Devi[4], Shazia Kazi[5], Sagar Bhure[6], Rahul Vinay Chandra Tiwari[7]

[1]PG student, Prosthodontics and Implantology, Sri Sai College of Dental Surgery, Vikarabad, Telangana;
[2]Post Graduate, Department of Public Health Dentistry, Kalinga Institute of Dental Science, KIIT University, BBSR;
[3]Post Graduate, Department of Prosthodontics and crown and bridge, Kalinga Institute of Dental Sciences, KIIT University, BBSR;
[4]Post Graduate, Department of Oral medicine and Radiology, Saraswati Dental College, Lucknow, U.P.;
[5]B.D.S, Cosmetic dental surgeon, Paramount dental care, Paramount hills, Tolichowki, Hyderabad;
[6]Junior resident, Dept of oral & maxillofacial surgery, Chhattisgarh Dental College & Research Institute, Rajnadgaon CG;
[7]FOGS, MDS, Consultant Oral & Maxillofacial Surgeon, CLOVE Dental & OMNI Hospitals, Visakhapatnam, Andhra Pradesh, India

***ABSTRACT*:**
Coronavirus (nCoV) is a novel virus that is considered to be a new strain that has not been previously identified in humans. Coronavirus predominantly causes illness that ranges from the common cold to more Severe Acute Respiratory Syndrome. Coronaviruses are typically transmitted between animals and people. Common clinical signs of the infection comprises of respiratory symptoms in the form of fever, cough, shortness of breath and breathing difficulties. In more severe cases, infection results in pneumonia, severe acute respiratory syndrome, kidney failure and even death. Standard recommendations advocated to prevent spread of infection consist of frequent hand washing, covering mouth and nose when coughing and sneezing, thoroughly cooking meat and eggs. Avoid close contact with anyone showing symptoms of respiratory illness such as coughing and sneezing. This review puts forth the dental considerations in corona virus.
Key words: Corona virus, dentists, respiratory infection.

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Corresponding author: Dr. Mohammed Samiuddin Ahmed, PG student, Prosthodontics and Implantology, Sri Sai College of Dental Surgery, Vikarabad, Telangana, India

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INTRODUCTION:

The coronavirus (nCoV) has been detected in several other countries so far. A coronavirus is characteristic of crown morphology on electron microscopy. The genome sequences of the emerging betacoronaviruses are crucial to design and evaluate diagnostic tests, to track and trace the ongoing outbreak and to identify potential intervention options. Since extensive evaluation is still required to confirm the coronavirus in addition to verifying the role of mixed infection, multiple tests may need to be performed and sampling sufficient clinical material is recommended.

Corona virus was initially isolated from an elderly person in 2012.[1] Memish et al reported the

clinical presentation and outcome of Middle East Respiratory Syndrome Coronavirus (MERS-CoV) infection in pediatric patients.[2] Coronavirus is a novel beta coronavirus of the Coronaviridae family that causes a severe respiratory disease with a high fatality rate.[3]As per the WHO, this virus was responsible for many deaths globally. The male-to-female ratio of the affected patients was 2:1, with a median age of 49 years.[4] The incubation period for human-to-human transmission ranges from 2-15 days.[5]

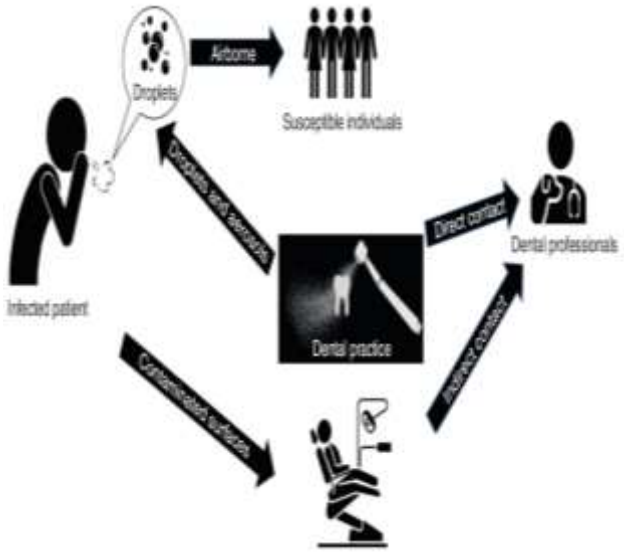
Clinically the affected individuals may be asymptomatic or suffering from evere pneumonia, acute respiratory distress syndrome, septic shock, and multi-organ failure, leading to death. Clinical symptoms of the affected individuals include fever, cough, chills, throat soreness, myalgia, arthralgia, vomiting, or diarrhea.[6]

The virus is believed to spread via airborne transmission. Hence, healthcare workers particularly the dental professionals are at more risk since the virus may be transmitted to operators from infected patients through aerosols. Considering that numerous kinds of dental equipments that are used in the clinical practice in the form of handpieces, air-water syringes and ultrasonic scalers considerable amounts of aerosols are produced. Hence, the potential for the spread of infections from patients to dentists or dental assistants is high.[7]

This review is aimed at put forth the basis information pertaining to MERS-CoV infection and dental considerations in coronavirus infections.

SPREAD:

Fig. 1: Transmission routes of corona virus in healthcare



SUSPECT:

A patient suffering from severe acute respiratory infection with no other etiology that fully explains the clinical presentation in addition to a history of travelling to or residing in China 14 days prior to the onset of symptoms can be a suspect. A patient with any acute respiratory illness who came in contact with a confirmed or probable case of coronavirus infection or attended a health care facility where patients with confirmed or probable coronavirus infection are present can be a suspect.

PROBABILITY:

A patient in whom testing for a coronavirus infection is inconclusive or is tested positive using a pan-coronavirus assay and without laboratory evidence of other respiratory pathogens.

CONFIRMED:

A person with laboratory confirmation of coronavirus infection, irrespective of clinical signs and symptoms is considered to be a confirmed case of coronavirus infection.

LABORATORY TESTS

Laboratory tests for MERS-CoV still remain a challenge. It is not yet clear whether sputum or nasopharyngeal samples might be superior to throat samples or whether virus is shed more abundantly in the course later of the illness or in more severe illness, as it is in SARS.[8]It seems prudent to conclude that one cannot reliably rule out MERS-CoV disease on the basis of a single negative test when a patient presents with the appropriate clinical syndrome and epidemiologic exposure. There is evidence that repeat testing and tests on sputum or bronchoalveolar-lavage fluid are of value in improving diagnostic accuracy.[3]

DENTAL CONSIDERATIONS

Bioaerosols are biological particles suspended in gaseous media.[9] Subgingival scaling for treating periodontally compromised teeth with the aid of an ultrasonic scalers will produce aerosols containing blood.[10] A recent study proved that the ultrasonic scalers and tips produced significantly more aerosol compared to a handheld curette, regardless of the scaler type employed.[11] The frequent and chronic exposure to bioaerosols generated during such dental procedures in addition to the relatively small particle size of the bioaerosols contribute to an increased risk of infection among dental professionals.[12] It is still questionable whether the protection provided by surgical masks worn by dental professionals act as a protective barriers for such small particles in addition to the fact that these masks may not fit perfectly in clinical practice. At the

same time it is noteworthy that the likelihood of detecting, reporting and documenting dental profession associated infections is relatively less.[13]

INFECTION CONTROL IN DENTAL PRACTICE

Scully and Samaranayake emphasized on the fact that equal importance should be given to infection control in dental as with the understanding of oral manifestations and the diagnosis and management of viral infections.[14] Effective infection control measures for the prevention or minimization of viral infection transmission should be implemented in clinical practice. Orthopantomographs or oblique lateral views may be considered instead of intraoral radiographs for screening, whereas oral mucosa in very sensitive patients may be anesthetized before taking impressions. Sedation may also be considered to control gag reflex.[15,16]

The use of rubber dams can significantly minimize the production of saliva and blood-contaminated aerosol or spatter, particularly in clinical situations where high-speed handpieces and dental ultrasonic devices are used.[17] When rubber dam is applied, extra high-volume suction for aerosol and spatter should be used during the procedures along with regular suction. A preoperational antimicrobial mouthrinse is generallyusedby many practitioners to reduce the number of oral microbes. However, the National Health Commission of the People's Republic of China, advocated that chlorhexidine, which is commonly used as mouthrinse in dental practice, may not be effective to kill corona virus. Since corona virus is vulnerable to oxidation, preprocedural mouthrinse containing oxidative agents such as 1% hydrogen peroxide or 0.2% povidone is recommended, for the purpose of reducing the salivary load of oral microbes.[18]

High-speed dental handpiece without anti-retraction valves generally aspirate and expel the debris and fluids during the dental procedures. The microbes, including bacteria and virus, may further contaminate the air and water tubes within the dental unit, and thus can potentially cause cross-infection.[18] A study showed that the anti-retraction high-speed dental handpiece can significantly reduce the backflow of oral bacteria and HBV into the tubes of the handpiece and dental unit as compared with the handpiece without anti-retraction function.[19] Hence, it is advocated that the use of dental handpieces without anti-retraction function should be prohibited during the epidemic period of

PREVENTION:

Contaminated air can be managed by improving ventilation of the dental clinic and/or by disinfecting the air.[20] Necessary measures for enhancing personal protection comprises of washing hands frequently before and after treatment, using disposable barriers, dispensing instruments and materials just before treatment which prevents particles from settling on the surfaces, and sterilizing soiled instruments.[21] After each patient visit, surfaces may be disinfected using hospital-grade disinfectants, which are effective against coronavirus.[22] Personal protective equipment, such as gowns, hair covers, masks, gloves, shielded face masks and shoe covers, should be used as appropriate.

High volume evacuation is essential to remove infectious droplets at the source as soon as they are emitted; thereby, minimizing, or preventing their dispersion in the air. To maintain their efficacy, the filters in the suction apparatus should be cleaned every day, and the exhaust air should be vented outside to prevent the recirculation of contaminated air.[23]

MANAGEMENT OF MEDICAL WASTE

The medical and domestic wastes produced following the treatment of patients with suspected or confirmed coronavirus infection are regarded as infectious medical waste.[18] Double-layer yellow color medical waste package bags and "gooseneck" ligation should be used. The surface of the package bags should be marked and disposed according to the requirement for the management of medical waste.

CONCLUSION:

Considering the fact that the working environment of a dental professional is unique in a way that it requires a close operator and patient contact in addition to the amount of bioaerosol production, the risk of MERS-CoV transmission from an infected patient is high. Since the number of MERS-CoV cases may increase in future, dental professionals should be well informed and educated about not only the signs and symptoms of the condition but also how to follow stringent infection control measures in such clinical scenarios. Without the ability to prevent community infection, prevention of health care transmission will remain a challenge.

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