

REVIEW ARTICLE

MERS-CoV (Middle East Respiratory Syndrome Corona virus): A Dental Surgeon Perspective

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ABSTRACT

Different viruses have been posing threat to world from time to time and recently in this category in April 2012 a novel coronavirus called Middle East Respiratory Syndrome Coronavirus (MERS-CoV) was detected and is causing havoc all over the world. It is a global health emergency with implications to all people who are constantly getting infected. As for all healthcare professionals including Dental Surgeons should help to prevent transmission of the deadly virus. It's a virus affecting both human and non human primates and human-to-human transmission is associated with direct contact with body fluids or tissues or from an infected subject or contaminated objects. This review article highlights the clinical features, aetiology, transmission and management of MERS-CoV in humans and addresses the implications of MERS-CoV from the Dental Surgeons perspective and discusses the various methods to control the spread of infection and necessary preventive precautions in Dental setups and hospitals.

Keywords: MERS-CoV, MERS, Prevention, Dental Surgeon

How to cite this article: Rajan Rajput, Zakariya Chouhan, Pankaj Suthar, Ravi Raj Singh Chouhan, Sourabh Mathur, Poonam Purohit. MERS-CoV (middle east respiratory syndrome corona virus): a dental surgeon perspective. *International Journal of Contemporary Medical Research* 2015;2(5):1228-1230.

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Source of Support: Nil

Conflict of Interest: None

INTRODUCTION

Middle East Respiratory Syndrome (MERS) is a respiratory disease caused by a corona virus called Middle East Res-

piratory Syndrome Coronavirus (MERS-CoV). MERS-CoV was first detected in April 2012 and this particular virus had not been seen in humans before then. MERS-CoV used to be called novel corona virus (Corona virus got its named from the crown like spikes on the surface of the virus

The recent study by Wang Q, et al supported a bat origin for MERS-CoV and showed that a bat coronavirus has a similar hCD26-binding mode to MERS-CoV. The hCD26 are the human binding site that initiates the processes of viral entry into human cells.¹

Coronaviruses (CoVs) are large, enveloped, positive sense RNA viruses that are composed of a few structural proteins that hold a relatively long (around 30 kb) positive-stranded genome that infect birds and a wide range of mammals, including humans. They occur worldwide and can cause diseases of medical and veterinary significance. Generally, infections are localized to the respiratory, enteric and/or nervous systems, although systemic disease has been observed in a number of host species. At present, six CoVs have been identified that infect human¹⁻⁴

Till 5 february 2015, the affected countries in the almost all countries Middle East, Europe Asia the United States of America (USA). The majority of cases (>85%) have been reported from SAU. Since June 2014, two new countries (Austria and Turkey) have been affected and later in this list On 20 May 2015, the Korea Centres for Disease Control and Prevention notified WHO of the first laboratory confirmed case of MERS in a 68-year-old man with recent travel history to the Middle East.⁵

TRANSMISSION OF VIRUS

Animal reservoirs are the main source of all human CoVs, emerging from bats via masked palm civet cats and camels in the Middle East. Given the fact that MERS-CoV seem to be widely present in dromedary camels in the Middle East and some parts of Africa²

Human-to-human spread of MERS-CoV does not seem to be efficient but is reported in hospital outbreaks and travellers returning from the Middle East and their close contacts.⁷

HISTOPATHOLOGY

Histopathology shows infiltration of a few neutrophils and monocytes. There are also increased numbers of intraluminal alveolar macrophages in macaques after intratracheal inoc-

ulation with MERS-CoV. RNA is present predominantly in type II alveolar epithelial cells, with less in type I epithelial cells.⁸

MANAGEMENT OF MERS

No specific therapy has been accepted for treatment but various symptomatic relief options have been advocated for the treatment of MERS. Many agents have shown inhibitory effects against MERS-CoV in cell culture including interferon +/- ribavirin, cyclosporine A, mycophenolic acid, chloroquine and lopinavir.⁸ Thus, the early use of virus-specific neutralising antibodies in the form of convalescent plasma and monoclonal or polyclonal neutralizing antibodies for treatment of MERS-CoV has the highest likelihood of clinical benefit.⁹ Modalities with risks likely to exceed benefits include ribavirin and monotherapy.

DENTAL PERSPECTIVE

Health professions which include Doctors, Dental Surgeons and specialists are at greater risk of transmission from patients and infection control is vital. It is not always possible to identify patients with MERS-CoV early or without testing because symptoms and other clinical features may be non-specific; thus it is important for health-care workers to apply standard precautions consistently with all patients.^{9,10} The CDC gives standards for all of us to follow to help prevent exposure:

It is also possible that the dental team may encounter patients who have recently travelled from areas affected by MERS-CoV. Individuals who have visited an affected area but have had no direct contact with the disease are considered very low risk and no restrictions to medical or dental care are required. However, individuals who may have had contact with MERS-CoV should have any non-essential treatment be deferred.¹¹ If the patient's treatment cannot be delayed or managed with pharmaceutical methods, then the regional Health Service Executive (HSE) Department of Public Health should be contacted. The Health Protection Surveillance Centre (HPSC) advises the following risk assessment for general medical practice, which is also applicable to dental practice.¹² MERS-CoV should be suspected in patients who have a fever $\geq 38.6^{\circ}\text{C}$ or a history of fever in the past 24 hours and have recently visited an MERS-CoV -affected area.

Patient Evaluation

The vigilant surveillance, quick diagnosis, and isolation will help to prevent the spread of the disease. The dental surgeons should be alert for and should evaluate patients for MERS-CoV infection who:

- upon traveling from countries in or near the Arabian Peninsula develop severe acute lower respiratory illness within 14 days
- Are close contacts of a symptomatic recent traveler from the area who has fever and acute respiratory illness; or

- Are close contacts of a confirmed case. For these patients, testing for MERS-CoV and other respiratory pathogens can be done simultaneously. Positive results for another respiratory pathogen (e.g., H1N1 influenza) should not necessarily preclude testing for MERS-CoV because co-infection can occur.

INFECTION CONTROL IN DENTAL CLINICS

As Recommended by CDC that all confirmed or probable case of MERS should be evaluated in discussion with district and community hospitals. Other suspected persons of the ill person, such as community contacts or contacts on conveyances (e.g., airplane, bus) should also be evaluated in consultation health departments. The suspected cases who are being evaluated for MERS-CoV infection and do not require hospitalization may be isolated and cared for in their homes and kept away from other people.¹³

The Dental Surgeons should adhere to recommended infection-control measures, including standard, contact, and airborne precautions, while managing symptomatic contacts and patients who are under investigation or who have probable or confirmed cases.

The dental treatment should be postponed if possible. If patients are suspected of any sign and symptoms of MERS virus infection. Emergency dental treatment must be delivered in an environment with proper air exchange, proper mask filtration etc. It is important to note that droplet protection should be added to standard precautions when providing care to all dental patients with symptoms of acute respiratory infection.¹⁰ Eye protection and contact preventative measure should be added in the dental clinic setups. Airborne precautions should be applied when performing aerosol-generating procedures.

The protocols Dental clinics should include following preventive measures:

Safety measures for Emergency Dental Treatment

Treatment should be postponed if patients are exhibiting symptoms of this disease. If there is an emergency and aerosols are anticipated the particulate respirator should be worn while dealing with patients. Always check the seal before putting on a disposable particulate respirator.

Wear eye protection (i.e., goggles or a face shield).

Wear a clean, sterile, long-sleeved gown and gloves and impermeable apron for some procedures with expected high fluid volumes that might penetrate the gown.

Perform procedures in an adequately ventilated room, i.e., minimum of six to 12 air changes per hour in facilities with a mechanically ventilated room, and at least 60 liters/second/patient in facilities with natural ventilation.

Persons present in the room should be limited to the absolute minimum required for the patient's care and support.

- Proper hand wash technique and hygiene instructions should be performed before and after contact with the patient.¹³⁻¹⁸

CONCLUSION

MERS is an alarming disease with a high mortality rate, it is unlikely that the dental team will encounter an case MERS-CoV but possess a significant transmission risk if any undetected case visit the clinic. The dental team should be aware of the Health Protection against the virus and follow strict infection controls in dental setup

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