

The Middle East Respiratory Syndrome Coronavirus (MERS-COV)

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Abstract

Introduction: Middle East Respiratory Syndrome coronavirus (MERS-CoV) , was first identified in 2012 in Saudi Arabia. Coronaviruses are a large family of enveloped, single-stranded RNA viruses that infect a number of different species, including humans. They predominantly cause mild self-limiting upper respiratory tract infections, but can cause pneumonia and serious illness in older people, people with heart disease, diabetes or immune compromised patients. Pneumonia has been the most common clinical presentation and appears to be the result of repeated introductions of the virus.

WHO has been informed of an additional laboratory-confirmed case of Middle East Respiratory Syndrome coronavirus (MERS-CoV) in Oman.

Case presentation: A 59 year old chronic smoker admitted with fever cough and dyspnea. With rapidly progressing symptoms and right sided pneumonia he was shifted to intensive care where he died. The diagnosis of corona virus infection was made after his death when endotracheal aspirate transcriptase polymerase chain reaction (RT-PCR) became positive.

Conclusion: This infection is a rapidly progressing disease which requires up to date awareness and information regarding its spread and precaution. Urgent epidemiologic investigations are required to better understand the transmission patterns of this virus.

Key words: Middle East Respiratory Syndrome coronavirus, Oman

Introduction and Background

Coronaviruses are a large family of viruses that cause a range of illnesses in humans, from the common cold to the Severe Acute Respiratory Syndrome (SARS); it can infect both animals and humans[1-2].

In September 2012, a novel coronavirus was isolated from a patient in Saudi Arabia who had died of an acute respiratory illness and renal failure[3]. February 2013, 12 laboratory-confirmed cases had been reported with 6 fatalities. This new virus strain is causing sporadic infection in the Middle East. Coronaviruses are a large family of enveloped, single-stranded RNA viruses that infect a number of different species, including humans. They are usually species specific, however interspecies transmission of coronaviruses can occur [4].

The most common initial symptoms reported are fever, cough and shortness of breath. Patients may rapidly progress to severe pneumonia and renal failure[5]. Diagnosis is done by confirmation using reverse transcription PCR (RT-PCR) on Broncho alveolar lavage, sputum and tracheal aspirates [6-7].

A possible case was defined as follows[8]: (i) any patient with a history of travel in an at-risk country, who presented with clinical signs and/or imaging consistent with acute respiratory distress syndrome (ARDS) or pulmonary infection, encompassing fever $\geq 38^{\circ}\text{C}$ and cough within 10 days after return; (ii) any contact of a symptomatic possible or confirmed case, presenting with acute respiratory infection, whatever the severity, with an onset of symptoms within 10 days of the last contact with a possible/confirmed case while symptomatic.

The list of at-risk countries, as defined in European Centre for Disease Prevention and Control (ECDC) rapid risk assessment dated 7 December 2012, included, Bahrain, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Palestine, Oman, Qatar, Saudi Arabia, Syria, United Arab Emirates, and Yemen. A confirmed case is defined as a possible case with a positive MERS-CoV RT-PCR on respiratory samples.

Droplet precautions should be added to the standard precautions when providing care to all patients with symptoms of acute respiratory infection. Contact precautions and eye protection should be added when caring for probable or confirmed cases of MERS-CoV infection. Airborne precautions should be applied when performing aerosol generating procedures.

Patients should be managed as potentially infected when the clinical and epidemiological clues strongly suggest MERS-CoV, even if an initial test on a nasopharyngeal swab is negative. Repeat testing should be done when the initial testing is negative, preferably on specimens from the lower respiratory tract.

Ministry of Health Oman has published a comprehensive assessment of clinical cases as well as infection prevention and control awareness and implementation measures to prevent the possible spread of MERS-CoV

in health care facilities. It is important that health care workers apply standard precautions consistently with all patients, regardless of their diagnosis, in all work practices, all of the time. Droplet precautions should be added to the standard precautions when providing care to any patient with symptoms of acute respiratory infection [9].

Case Report

Detected confirmed case in Oman

A 59 years old Omani male who became sick with fever, cough and shortness of breath on 20th December 2013 was admitted to hospital in North Batinha Governorate on 24th December 2014.

There is no history of weight loss or any chronic disease. He was a heavy smoker for more than 40 years. The patient had a history of daily exposure to camels and other farm animals with participation in camel race events. There was no history of similar illness within the family or visitors with the same complaint. There was no history of any animal sickness or death within their animals or in the area.

On 28th December 2014 the patient became very sick, febrile and distressed (BP = 136/70, Temp. = 39.6, Pulse = 109, SPO₂: 92%, chest examination revealed crepitation and crackles. Chest X ray showed right upper lobe opacity (attached). He was admitted to an intensive care unit with diagnoses of pneumonia.

During his hospitalization, the patient was managed with supportive care. Hydration, empirical antibiotic and antiviral were started. Swabs were taken and culture was done for blood, urine and secretion; endotracheal secretion sample was taken on 29th December. Patient was ventilated with all measurements of supporting life. He was fully isolated in the ICU and full infectious control was emphasized from the admission. Patient died on 30th December.



(Chest X-ray of the patient taken on 24th December 2013)

The laboratory confirmation of MERS-CoV was made on 1st January 2014 by real-time reverse transcriptase polymerase chain reaction (RT-PCR).

Discussion

The original source of infection and mode of transmission to humans is unclear. Cases were reported to have visited farms and may have had contact with animals, thus a zoonotic infection is a possibility [10]. People handling or working with camels are at increased risk of infection with MERS-CoV compared with people who do not have contact with camels. Some studies provide evidence that camels are a likely primary source of the MERS-CoV that is infecting humans. Studies showing that SARS-CoV was most likely to have derived from bats and camels also supports a zoonotic origin for this new coronavirus [11]. Our unfortunate patient was a farm worker and had close contact with animals, specially camels. Human to human and nosocomial transmission is another possibility as reported in the literature [12-13].

Clinical features are reported as rapidly progressing respiratory symptoms with fever. The largest, most complete clinical case series published included 47 patients; most had fever (98%), cough (83%), and shortness of breath (72%). Many also had gastrointestinal symptoms (26% had diarrhea, and 21% had vomiting). All but two patients (96%) had one or more chronic medical conditions, including diabetes (68%), hypertension (34%), heart disease (28%), and kidney disease (49%). Thirty-four (72%) had more than one chronic condition[14].

Ministry of Health Oman continues to recommend that patients with severe acute respiratory illness (e.g., fever and pneumonia requiring hospitalization) be evaluated and reported to local and state public health departments. If the illnesses remain unexplained, particularly if the cluster includes health-care providers, testing for MERS-CoV should be considered as mentioned in guidelines published by the health department.

Confirmation of diagnosis of MERS-CoV with real-time polymerase chain reaction (RT-PCR), is done by using the recommended sampling technique (nasopharyngeal swab and tracheal aspirates or bronchoalveolar lavage in intubated patients). In suspected cases with negative RT-PCR results, the test should be repeated. The literature supports the screening of patients and family members who were potentially exposed to MERS-CoV [15].

As a general precaution everyone should practice general hygiene measures, including regular hand washing after touching animals, avoiding touching eyes, nose or mouth with hands, and avoiding contact with sick animals. The consumption of raw or undercooked animal products, including milk and meat, carries a high risk of infection from a variety of organisms that might cause disease in humans.

Conclusion

This emerging public health problem needs more investigation identifying the possible zoonotic hosts or environmental sources which may act as modes of transmission between camels and humans. So far only one confirmed case has been reported from Oman.

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