

Detection of MERS Circulation in Kuwait

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Introduction

In June 2012, a previously unknown human coronavirus was isolated from a 60 year-old Saudi-Arabian patient who died from acute respiratory distress syndrome and multiple organ failure [1]. Subsequently, the novel virus was detected from several additional residents and visitors of the Arabian Peninsula countries including Saudi Arabia, Jordan, Qatar, and the United Arab Emirates (UAE). This virus is currently called Middle East Respiratory Syndrome virus (MERS-CoV). It is the first virus belonging to betacoronavirus lineage C that has been associated with human disease. Globally, from September 2012 to date, WHO has been informed of a total of 157 laboratory-confirmed cases of infection with MERS-CoV, including 66 deaths [2]. It is recommended for physicians to be vigilant toward testing for MERS-CoV. Other potential causes of respiratory infections should be ruled out using routinely available laboratory tests. Lower respiratory tract samples such as bronchoalveolar lavage are recommended better than upper respiratory tract samples to test for MERS-CoV. A number of RT-PCR assays that are specific for the novel coronavirus have been developed. These include an assay targeting upstream the E protein gene (*upE*), an assay targeting the open reading frame 1b (*ORF 1b*) gene and an assay targeting the open reading frame 1a (*ORF 1a*) gene [3]. The assay for the *upE* target is considered highly sensitive, with the *ORF 1a* assay believed to be of equal sensitivity. The *ORF 1b* assay is considered less sensitive than the *ORF 1a* assay but may be more specific [3]. By November of 2012, the virus had already been discovered in multiple countries in the Arabian peninsula including Qatar, Jordan and Saudi Arabia. In that time it was also feared that the virus also circulated in Kuwait. The situation was made worse by the arrival of the Hajj season when several thousands of KUWAITI people traveled to Saudi Arabia in the presence of the virus which behavior was unknown. Therefore, MERS-CoV PCR was established targeting *ORF-1b* in the virology unit in Mubarak Alkabeer Hospital Faculty of Medicine, Kuwait in December of 2012 to screen for the presence of the virus in the country as a cause of severe respiratory tract infection and to detect any imported cases. On November, 2013 another method was replaced to test for MERS-CoV after screening with *upE* is ModularDx Kit corona Orf1a by TIB and the previous method is now used as secondary test. Almost one year after the identification of the new virus we would like to report our experience.

Methods

In our units in Mubarak Al-Kabeer Hospital, Faculty Of Medicine we receive different samples sent to us from all hospitals in Kuwait especially the intensive care units (ICUs) and pediatric intensive care units (PICU). Patients screened for MERS-CoV are patients with severe acute respiratory tract infection who were either suspected to have the MERS-CoV infection by the treating physician i.e who had sudden onset of fever >38C and cough or sore throat with onset within last 14 days and in absence of other diagnosis and require hospitalization. A total of 168 patients with severe acute respiratory illnesses were investigated. These were received from December 2012 to November 2013. Ninety eight were Kuwaitis and 70 were non Kuwaitis. Among these patients, 103 were males and 65 were female. The oldest age was 90 years and the youngest was 45 days with a median age of 6 years. The patients were admitted to different hospitals in Kuwait with severe acute respiratory illness. These samples were

tested for respiratory viruses including influenza A, B, parainfluenza, Adenovirus, Rhinovirus, Respiratory syncytial virus, coronavirus 229E and coronavirus OC43 by PCR but were not tested for NL63 and HKU1 because it was not available. Bacterial causes were negative in all these patients. Moreover, Samples were tested for MERS-CoV by Real-Time PCR targeting ORF 1b gene. Primer and probe sequences used were ORF1b-Forward (TTCGATGTTGAGGGTGCTCAT), (primer ORF1b- Reverse probe (TCACACCAGTTGAAAATCCTAATTG), and probe ORF- 1b-Prb (6-carboxyfluorescein [FAM])-CCCGTAATGCATGTGGCACCAATGT-6-carboxy- N, N, N, N' - tetramethylrhodamine [TAMRA]. Thermal cycling was similar to that recommended by the original paper [4]. On November, 2013 another method was replaced to test for MERS-CoV after screening with *upE* is ModularDx Kit corona Orf1a by TIB and the previous method is now used as secondary.

Results

The results showed that two patients were positive for MERS-CoV and that until the date of this paper.

Discussion

The 168 samples which represented the suspected cases from ICU and PICU from Kuwait two were positive for MERS-CoV and these two positive cases were expected due to the close proximity to areas with reported cases and the frequent travel to and from these area. Active surveillance has great role in detecting early cases and ruling out the suspected one which may have great impact on controlling the spread of the virus and preventing the transmission. Since Kuwait is located within the Arabian Peninsula and since the MERS-CoV was reported from neighboring countries, the introduction of a screening test for the virus in the country allowing for the targeted surveillance was quite important.

Recommendation

Although the way of transmission is still unknown, adherence to the infection control procedures is a must in controlling the spread MERS-CoV. The New England journal of Medicine published a brief report about a family cluster in KSA where three young men who became ill with MERS-CoV infection after the hospitalization of an elderly male relative, who died of the disease [5,6]. The transmission between the three relatives who were caring for the index case in hospital was very likely due hospital settings such as irrigation or nasal suction which may explain the clearance of the virus in other family members. Transmission by aerosols is highly suspected and according to these respiratory precautions such as wearing fit mask, gloves, aprons

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and gowns with goggles is a must. Enteric Isolation of suspected cases is mandatory to prevent the fastidious spread of the virus especially in the ICU in immunocompromised patients or patient with co-morbidities. Moreover restriction of visitors into high risk areas is recommended and it should be under supervision. Travelers from and to Arabian Peninsula may import infection to Kuwait so educating them about the symptoms, signs of the disease and the way of prevention will lower the risk of infection and transmission.

In conclusion there were two cases identified in Kuwait despite the active surveillance on patients with severe acute respiratory tract infection.

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