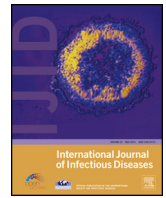




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Editorial

Middle East Respiratory Syndrome Corona virus, MERS-CoV. Conclusions from the 2nd Scientific Advisory Board Meeting of the WHO Collaborating Center for Mass Gathering Medicine, Riyadh



The 2nd Scientific Advisory Board Meeting of the Global Center for Mass Gathering Medicine, Ministry of Health, Riyadh, Kingdom of Saudi Arabia, met April 28 – 29 in Riyadh to discuss risk of infectious diseases and research and surveillance during Hajj. Due to the on-going outbreak of MERS-CoV and especially the recent increase in case detection in Jeddah, (138 MERS cases were reported from Jeddah between 11 to 26 April 2014), the agenda for the second day was focused on MERS-CoV, both in relation to the risk it presents for the forthcoming Umrah during Ramadan and the Hajj, but also in the Kingdom of Saudi Arabia and the Middle East in general. The Ministry of Health used the opportunity to ask the Scientific Advisory Board to review the MERS-CoV situation globally with specific attention to MERS in the country and review case definition, infection control guidelines and risk assessment to nationals, residents, health care workers, family contacts, camel owners, and travelers to KSA, and the future control.

1. Background

MERS-CoV is a new Coronavirus initially isolated from a patient from Saudi Arabia in 2012.¹ Phylogenetic analyses showed that the virus was close to the SARS Coronavirus, and the epidemiology and clinical presentation of infection with the two viruses has been compared.²

As of May 1st 2014, the total number of laboratory confirmed MERS-CoV infections reported were 371, including 107 deaths.³ Countries in the Middle East reporting cases are KSA, Qatar, Jordan, Oman, Kuwait and United Arab Emirates. Secondary cases has been reported in several European (United Kingdom, France, Germany, Italy, Greece), Asian (Malaysia and Phillipines) and Middle East Area (MEA) (Egypt) countries, and the potential for a pandemic as for SARS has been discussed.^{4,5} The cases outside the Arabian peninsula and Middle East have either been infected in the Middle East or been in close contact with a MERS-CoV cases. Only secondary cases linked to index cases infected in the Middle East have been reported and no further human to human transmission has occurred. The US Centers for Diseases Control and Prevention (CDC) announced on Friday May 2nd, 2014, the first case of MERS-CoV in a traveler to the United States from Riyadh, KSA.⁶

2. The Virus

Corona virus is found in all mammalian and avian species. The origin of the MERS-CoV has been much discussed and bats were

early mentioned due to close phylogeny between certain bat CoV's and MERS-CoV.¹ The phylogeny of Coronaviruses has been extensively reviewed.⁷ Recently three entire MERS-CoV genomes from Jeddah outbreak have been sequenced and the data was presented at the Scientific Advisory Board Meeting of the WHO Collaborating Center for Mass Gathering Medicine, Ministry of Health, Riyadh, Kingdom of Saudi Arabia, April 28 – 29 (Drosten C unpublished). The overall finding was announced the 26th April,⁸ and the conclusion is that overall the virus is stable and there is no sign of mutations indicating an adaptation to cause sustained human to human transmission.

3. Animal reservoirs

Dromedary camels have convincingly been shown to harbor the virus and be able to shed MERS CoV in high numbers in secretions from the upper respiratory tract.⁹ Studies of previous samples from 2005 found neutralizing antibodies to MERS-CoV in dromedars in Dubai, indicating that the virus is not new on the Arabian peninsula.¹⁰ It cannot be excluded that other animal reservoirs exist, but the fact that the MERS-CoV cases primarily is reported from the Middle East and in particular from the Arabian peninsula, suggest that dromedars and camels in general are the main animal reservoir and primary cases occur in areas where camels are an important part of life. Unpasteurized camel milk is a possible route of transmission, but so far there is no data on excreting of MERS-CoV into camel milk.

4. Human transmission

The Scientific Advisory Board Meeting of the Global Center for Mass Gatherings Medicine discussed the reported cases and the risk factors for infection. The questions addressed were: 1) what were the reasons for the increased case detection rates in March and April as reported from Jeddah? 2) Was this due to seasonality or increased virulence? 3) Had the human-to-human transmission pattern changed and the basic reproductive rate increased? 4) Were optimal infection control procedures followed? 5) Had the clinical presentation of MERS-CoV changed? 6) What changes were required in current recommendations for infection control practices in the community or in hospitals? 7) What precautions should those in contact with camels follow? 8) What advice should be given to parents and schools? 9) What advice should be given to travelers to the Middle East and should travel restrictions be in

place? 10) What options were available for treatment of MERS? 11) What were the research priorities?

It is clear from previous reports that nosocomial infection is important.^{11–14} Household transmission is another important risk.¹⁵

5. Management of inpatients with MERS

Once in hospital with proved MERS-CoV treatment options are limited and patients are most often in intensive care with respiratory failure and may have multi-organ impairment especially renal failure.¹⁶ It has been suggested looking at data from SARS-CoV that Ribavirin and Interferon beta or lopinavir combined with ritonavir may be used,¹⁷ but the experience so far is limited.¹⁸ The use of hyperimmune plasma from patients recovering from MERS-CoV may in theory also be an effective treatment as has been shown for influenza.¹⁹

6. Conclusions

1. Sequencing of MERS-CoV isolates from Jeddah patients the virus seems stable, showing no signs so far of mutations to indicate an adaption to humans with increased risk of human to human infections.
2. There is accumulating evidence for an animal reservoir in dromedary camels. Transmission is thought to be due to close physical contact or due to consumption of camel products.
3. The epidemiology since the virus was first found in 2012 is compatible with multiple introductions into humans from the animal reservoir, with no long-term sustained human-to-human transmission.
4. There is no human reservoir of cases with few or no symptoms.
5. The basic reproductive rate has been estimated to range below 1. Preliminary data from contact studies suggest a considerably lower rate below 0.5, suggesting that the virus has no pandemic potential. Special situations such as hospitalization with breaches in infection control practice can however cause local outbreaks with short transmission chains.
6. Nosocomial infection is an important risk factor for human to human transmission. Thus infection prevention and control measures are crucial to prevent the possible spread of MERS-CoV within health care facilities. Hospital infection control procedures needs to be emphasized and enforced. The Jeddah outbreak showed that it is not always possible to identify patients with MERS-CoV early because some have mild or unusual symptoms. It is important that health-care workers apply standard precautions consistently with all patients irrespective of the diagnosis. Droplet precautions should be undertaken when providing care to patients with symptoms of respiratory tract infection. Contact precautions including eye protection should be added when caring for suspected or confirmed cases of MERS-CoV infection. Airborne precautions should be taken when performing aerosol generating procedures
7. In asymptomatic cases RT-PCR testing is not recommended. Asymptomatic cases should be recorded and tested by serology after 3 weeks from exposure, unless symptoms develop.
8. Awareness of MERS-CoV is important in countries where camels and dromedars are a common livestock.
9. The importance of educational campaigns for educating health care workers, the general public, family contacts and travelers to the Middle East was emphasized. General hygiene measures such as regular hand washing, antiseptic before and after handling animals Owners of camels and dromedars should use gloves and mask when handling ill animals.

10. There is no evidence that camel's milk tested positive for MERS, however, milk has the potential of transmitting other infections. Camel milk should be boiled before consumption. Unpasteurised milk should not be consumed
11. There was no grounds for preventing children attending schools and closing schools

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