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Editorial

The Struggle Against MERS-CoV (The Novel Coronavirus)

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The emergence of novel viruses is arguably viewed as a potential threat to human health. The past decade has seen the emergence of SARS-coronavirus, H5N1 (bird flu) and the H1N1 which caused a global pandemic. Furthermore, the last few months have witnessed the emergence of two novel respiratory viruses: the Middle East Respiratory Syndrome-Coronavirus (MERS-CoV) in June 2012 in Saudi Arabia and the influenza A virus H7N9 in March 2013 in China.

The basis for this noticeable increase in the number of novel viruses remains elusive and is uncertain at best. Proposed explanations for this observation include the increased mixing between different animal species and humans, climate changes, intense international travel, expansion of the immune suppressed population, and changes in the virus itself to adapt to other species.

MERS-CoV was first isolated from a 60 year old Saudi male who died of severe pneumonia and renal failure in June 2012.[1] The second confirmed case was soon reported from a 49 year old Qatari citizen who had travelled to Saudi Arabia prior to his illness.[2] He subsequently succumbed to severe pneumonia. Fortunately, the conclusion at that time was that the virus did not exhibit human to human transmission. Since September 2012, the number of cases reported to the World Health Organization (WHO) has sharply increased.[3,4] This triggered a global response and raised the fear of a possible recurrence of another version of 2002-2003 SARS outbreak.

The first clusters were reported retrospectively from Jordan which occurred in one of the tertiary hospitals in April 2012.[5] It involved 13 cases (with 2 laboratory confirmed). Subsequently, multiple clusters were reported from the Eastern part of Saudi Arabia, United Kingdom (UK), France, Tunisia and Italy. Cases have also been reported from United Arab Emirates (UAE) and Germany. All of the European and Tunisian cases had direct or indirect connection with the Arabian Peninsula. These cases all occurred either in a healthcare facility or among close family members. Hence, the conclusion at the present time alludes to the fact that the virus does exhibit potential human to human transmission. However, we still believe that the infectivity of this virus is limited and the transmissibility rate is low based on the high number of close contacts who tested negative for MERS-CoV. However, the sudden increase in the number of cases over the last month[3] and the emergence of a number of clusters has clearly demonstarted to the scientific communities that something has happened to the MERS-CoV which has caused it to alter its behavior.

According to the WHO, the total laboratory confirmed human infections with MERS-CoV globally is 81 cases with 45 deaths as of 11 July 2013.[6] Saudi Arabia is heavily impacted by this virus (64 cases and 38 deaths).[3] It is important to note that there has not been a single case of MERS-CoV in Oman to date. All suspected cases in Oman thus far tested negative (personal communication).

To date, most infections with MERS-CoV resulted in unusually severe pneumonia and severe acute respiratory illness requiring ventilation and intensive care.[7] Many patients developed severe organ dysfunction particularly renal failure. It has also been observed that most severe infections occur among the elderly, immune suppressed individuals and those with co-morbidities. A milder form of the illness is also seen but in a minority of cases. Most affected individuals have been adults with a median age of 56 years. Only two pediatric cases have been reported and the current case fatality rate stands at 58%.

The exceptionally high fatality rate (>50%) thus far emanating from MERS-CoV infection coupled with the behavioural uncertainties of this novel virus have understandably caused major public and international concerns. After the emergence of the initial cases in the Arabian Peninsula, there have been extensive international efforts and preparations to halt further spread of this lethal virus incurring substantial costs on the healthcare systems, particularly of neighboring countries.

A wide range of animals are considered reservoirs for coronaviruses. Interspecies transmissibility is well recognized in coronaviruses with SARS coronavirus being a prototype for this phenomenon. However, the origin of the MERS-CoV is still unknown, and less so whether it has an animal reservoir. Scientists however, currently believe that bats are the most likely reservoir,[8] in addition to a high possibility of an intermediate animal host(s) probably of a domestic nature.

Immediate development of diagnostic tests for rapid identification of infected patients is essential. Real-time reverse transcription-polymerase chain reaction (RT-PCR) assays have been developed to detect MERS-CoV in respiratory, blood and

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stool samples.[9] So far, the virus has mainly been detected in lower respiratory samples.

There is currently no specific treatment for patients with MERS-CoV infection, no specific antiviral therapy is yet available, and no vaccination is currently on hand. The basis of the current management strategy is mainly supportive with emphasis on good critical and supportive care. In the absence of effective drugs or a vaccine, control of MERS-CoV infection in hospital settings relies heavily on the practice of appropriate infection control precautions including prompt isolation of suspicious cases. Personal protective equipment and good infection control practices are extremely useful to prevent further transmission.

This novel virus is largely unknown to the scientific community. Very little is known about its behavior, however, it is generally accepted that it has a wide genetic diversity and thus can mutate, change its virulence and even tissues tropism.

The risk MERS-CoV poses on public health is not yet entirely understood, however the continued outbreak of new cases, the ongoing risk of transmission to humans, the recent reports of nosocomial outbreaks with transmission to healthcare personnel,[10] and the increasing reports of cases imported outside Saudi Arabia justifiably raise public concern.

As is typically the case with any newly discovered virus, today there questions prevail over this seemingly lethal virus. Most pressing questions incline towards its origin, its main risk factors for infection and whether it has an epidemic potential. What is truly reassuring, however, is the swiftness at which the scientific community is learning about this presently mysterious virus. Over the past few weeks, observations allude to the fact that mild respiratory illness might be part of the clinical spectrum, the incubation period might be longer than previously estimated, presentations may not initially include respiratory symptoms and lower respiratory tract is the preferable site for virus proliferation and hence for sampling.[4]

The fact that our current knowledge on this virus is sparse should not induce unnecessary panic or fear, instead it should promote vigilance and a state of preparedness. Over reaction to the current situation may lead to significant clinical, economic and epidemiological impacts among others.

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