Middle East Respiratory Syndrome Coronavirus Infection During Pregnancy: A Report of 5 Cases From Saudi Arabia

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Little is known about the effects of Middle East respiratory syndrome coronavirus (MERS-CoV) during pregnancy. In Saudi Arabia, 5 cases of MERS-CoV infection among pregnant women were reviewed, and all cases resulted in adverse outcomes. MERS-CoV infection during pregnancy may be associated with maternal and perinatal disease and death.

Keywords. Middle East Respiratory Syndrome coronavirus; pregnancy; perinatal mortality; infectious disease transmission; Saudi Arabia.

Middle East respiratory syndrome coronavirus (MERS-CoV) is known to cause severe respiratory illness and large nosocomial outbreaks in humans with death recorded in 35%–40% of reported cases [1]. Approximately 80% of confirmed cases worldwide have been reported from Saudi Arabia [1–3].

Case reports documenting outcomes among pregnant women infected with MERS-CoV have been previously published, including reports of a stillbirth in Jordan [4], a maternal death in the United Arab Emirates [5], and severe maternal disease with survival of mother and infant reported from Saudi Arabia [6]. To further understand the impact of MERS-CoV infection during pregnancy, we describe 5 additional cases from Saudi Arabia.

METHODS

In Saudi Arabia, reporting is required for all patients with clinical or radiologic evidence of respiratory infections and a positive real-time reverse-transcription polymerase chain reaction test result for MERS-CoV [7]. All positive cases so identified at facilities outside the Saudi Arabia Ministry of Health (MoH) require confirmation at MoH laboratories. To identify patients for inclusion in this study, we reviewed available line lists of laboratory-confirmed MERS-CoV cases reported by the MoH to the World Health Organization (WHO) from November 2012 to February 2016. Records meeting these criteria were reviewed, and information was collected regarding patient demographics, medical history, prenatal course, maternal and newborn hospital course, and outcome. When necessary, we attempted to contact patients or proxies by telephone to supply missing information, such as infant outcomes. This investigation was part of an emergency public health response and was determined to be nonresearch by the MoH and the US Centers for Disease Control and Prevention and therefore not subject to institutional review board review.

RESULTS

From November 2012 to February 2016, a total of 1308 laboratory-confirmed MERS-CoV cases were reported by Saudi Arabia to WHO, including 449 with patients listed as female. Age information was available for 400 of the 449 female patients; 179 were of reproductive age (15–45 years), and death was documented in 16 (8.9%) of the 179.

Among 1308 reported cases of MERS-CoV, 5 were documented by the MoH to have occurred in pregnant women (Table 1). Three cases were from the city of Riyadh, and the other 2 were from the cities of Makkah and Unayzah (Qasim Region). The patient’s ages ranged from 27 to 34 years, all pregnancies were in the second or third trimester, and 2 patients were healthcare workers. Two of the 5 patients (40%) died during their illnesses. Among the 5 pregnancies, 2 (40%) resulted in perinatal death: 1 pregnancy resulted in intrauterine fetal demise, and 1 infant died 4 hours after emergency cesarean delivery.

Patient 1 was a 34-year-old woman (gravid 7, para 6) at 34 weeks gestation and with no history of underlying medical conditions. She reported the initial onset of shortness of breath 2–3 days before presentation to a maternity hospital on 7 May 2014. On admission she was noted to have elevated blood pressure and 3+ proteinuria consistent with preeclampsia, and pneumonia was diagnosed by means of chest radiography. Fetal heart tones were absent, and intrauterine fetal demise was suspected. A stillborn infant was delivered the same day. A nasopharyngeal specimen collected on admission tested positive for MERS-CoV by polymerase chain reaction. Although the patient was admitted to intensive care unit (ICU), she did not require ventilator support and was discharged to home on 20 May 2014. No likely exposure to MERS-CoV was identified.
We identified 5 pregnant MERS-CoV patients reported to WHO from Saudi Arabia between November 2012 and February 2016. All 5 pregnant MERS patients required ICU care. The birth outcomes were also notable: 1 infant was stillborn at 34 weeks, and 1 was surgically delivered at 24 weeks and died after 4 hours of life.

Our findings of severe disease and death are similar to previous reports of pregnant women with MERS-CoV [4–6]. Other respiratory pathogens, including severe acute respiratory syndrome coronavirus [8] and influenza [9], have also been associated with severe maternal and perinatal outcomes.
Physiologic changes occur during pregnancy to reduce inflammatory immune responses that otherwise might lead to fetal rejection [10]. Disease pathogenesis is also affected, secondary to the reduced activity of natural killer cells, inflammatory macrophages, and helper T cells [10]. In addition, mechanical and biochemical factors affect gas exchange and pulmonary function during pregnancy; functional residual capacity and residual volume are both decreased in pregnancy [11].

Understanding the association of pregnancy with adverse maternal and perinatal outcomes among MERS-CoV infected patients should be accompanied by efforts to prevent high-risk exposures. Since 2013, the Saudi Arabia MoH has requested that pregnant women postpone travel to Saudi Arabia for Hajj and Umrah [12]. Additional measures to decrease risk of exposure may be warranted for pregnant women in areas where MERS-CoV has been reported, such as avoiding camel contact, minimizing contact with sick persons, particularly in hospitals, and avoiding occupational healthcare exposures where feasible.

Our investigation has limitations. We retrospectively evaluated data collected as part of the public health response to MERS-CoV in Saudi Arabia. Since the identification of MERS-CoV in 2012, case definitions, testing practices, and testing locations have changed as the response evolved, and practices might not have been uniformly conducted or exhaustively reported to MoH, potentially limiting the scope of our investigation. Although we systematically assessed records of all confirmed cases during the study period to identify women reportedly pregnant, pregnancy testing was not routinely offered to women of reproductive age with MERS, leaving the possibility of missed cases. Moreover, we were not able to evaluate the MERS-CoV infection status of infants born to these mothers.

Although the overall impact of MERS-CoV on maternal and birth outcomes requires further evaluation, we conclude that MERS-CoV may pose serious health risks to both mothers and infants during pregnancy. Additional data are needed to further define this apparent association. Pregnancy testing for women of reproductive age infected with MERS-CoV should be considered to inform clinical management and contribute to a better understanding of epidemiologic risk. Efforts to limit exposure of pregnant women to MERS-CoV should be strengthened, and extended where possible.

Notes

Disclaimer. The conclusions, findings, and opinions expressed by the authors do not necessarily reflect the official position of the Centers for Disease Control and Prevention.

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