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A Raising Alarm on Clinical Recommendations in the Diagnosis and Management of Novel Corona Virus in Pregnancy and Newborn

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ABSTRACT

World Health Organization has declared corona virus as pandemic as it has spread worldwide after its first outbreak in Wuhan, China in 2019. However, there is a lack of literature on corona virus disease in pregnancy. Hence this article focuses on the clinical manifestations, effects of COVID-19 in pregnancy, neonate, preventive measures, treatment options, plan of delivery and breastfeeding in infected mothers. COVID-19 is also known as SARS-CoV2. The symptoms may vary from mild to severe. Mild symptoms include cough, cold, sore throat, fever, myalgia, etc., Severe symptoms such as pneumonia, shortness of breath and even death can occur. At present, there is no recommended drug or vaccine for the virus approved by FDA. However, early isolation, oxygen therapy, antibiotics, antipyretics, avoidance of fluid overload, aggressive infection control measures, testing for other co-infections and involvement of multidisciplinary team remains the mainstay of treatment for outbreak control. Corona virus itself is not an indication for delivery or caesarean. Individualized decision should be made based on the history, clinical findings and laboratory results. Instrumental birth can be preferred if the mother is exhausted or hypoxic in the second stage of labour. Routine precautionary separation of newborn is not recommended as this may affect breastfeeding and bonding between mother and baby. As the knowledge evolves, much new information regarding COVID-19 keeps updating and all existing guidelines subjected to change. All corona virus positive cases should be notified as per Government guidelines in order to trace the contacts, isolate and break the chain of transmission.

Key Words: Corona virus, Delivery, Newborn, Pregnancy

INTRODUCTION

Corona virus (CoV) belongs to the family of viruses that cause mild to severe symptoms such as common cold, pneumonia, severe respiratory illness and death. Its pathogenic potential is similar to severe acute respiratory syndrome (SARS-CoV) and Middle-East respiratory syndrome (MERS-CoV). The virus is also known as severe acute respiratory syndrome corona virus-2 (SARS-CoV-2). In 2019, corona virus outbreak was first reported in Wuhan, China.¹

The novel corona virus 2019 (COVID-19) is considered as public health emergency as the virus has spread worldwide to more than 180 countries with 41, 77,504 infected cases and 2,

86,330 deaths globally. Men are more affected than women in this outbreak. In India, there were 70,756 infected cases and 2,293 deaths due to corona virus. Hence WHO has declared corona virus disease 2019 (COVID-19) as pandemic.²

Epidemiology

Corona virus was initially considered to be zoonotic which spreads from animals to human. But later it was noticed to spread from human to human through respiratory droplets. It may also spread by touching a surface or object with virus on it and keeping it on eyes, nose or mouth without hand wash. Currently, there is no evidence of transmission of the virus through genital fluids.

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The primary epidemiological risk factor for the novel corona virus (COVID-19) includes history of travel from mainland China or history of close contact with the infected individuals. The incubation period of the disease range from 1 to 14 days. The clinical manifestations may vary from common cold, cough, fever, sore throat, myalgia, shortness of breath or difficult breathing. In severe cases, it can cause pneumonia, acute respiratory disease syndrome and even death. People with older age or with pre-existing medical conditions such as heart disease, diabetes, cancer are at high risk of serious illness.³

DISCUSSION

A literature review shows that 12 pregnant women were infected with SARS-CoV during 2002-2003 pandemic. In the first trimester, out of seven women, four (57%) had miscarriage. In the second and third trimester, out of five women, two (40%) had fetal growth restriction and four (80%) had a preterm birth.^{4,5} The maternal mortality was 25% with SARS-CoV. In 2012-2015, MERS-CoV pandemic, 11 pregnant women were infected. Out of these two (20%) had preterm delivery. Ten (91%) had adverse outcomes. Six (55%) neonates required admission to neonatal intensive care unit and three (27%) died.⁵⁻⁷

Corona viruses are single stranded RNA, non-segmented enveloped virus. SARS CoV-2 is a beta corona virus similar to SARS-CoV and MERS-CoV. It has 79% nucleotide identity to SARS-CoV and 50% to MERS-CoV.^{4,6} Considering these, the novel corona virus 2019 seems to have adverse effects on pregnant women and neonates.

Maternal and perinatal effects of corona virus

With limited data available, it was found that the pregnant woman is not susceptible to severe corona virus infection. The pregnant women can be asymptomatic or symptomatic. If symptomatic their symptoms are similar to that of non-pregnant such as cough, fever, sore throat, myalgia and shortness of breath. The severe symptoms such as pneumonia, marked hypoxia are common in older women and those with pre-existing medical conditions.⁸⁻¹⁰ In a case series by Chen et al,¹¹ nine women were diagnosed with COVID-19 in third trimester. The clinical manifestations of these nine women were similar to that of non-pregnant. Of these five had lymphopenia. Pneumonia was diagnosed in all, but none required mechanical ventilation. No deaths reported. The mode of delivery was caesarean in all. Apgar scores of these neonates were good. There are also case reports of preterm birth, prelabour rupture of membrane and fetal compromise with COVID-19. There is no evidence that steroids for fetal lung maturity can cause harm in COVID-19. Hence it can be given if indicated.

In Zhu et al study,¹² of the nine pregnancies, six had intrauterine fetal distress and preterm delivery. The mode of delivery was caesarean in seven patients. Wang et al reported one case of COVID-19 mother who required mechanical ventilation at 30 weeks. She had an emergency caesarean with good recovery.⁸

Vertical transmission of COVID-19 is rare. Chen et al study found there is no evidence of COVID-19 in amniotic fluid, cord blood, placenta or breast milk of infected mothers.¹³ There is inadequate data on COVID-19 and risk of miscarriage and congenital anomalies. In studies from SARS and MERS infection, it was reassuring that there was no convincing relationship between the infection and risk of miscarriage. However, in general the risk of congenital malformations with high-grade fever during pregnancy should be considered.

Diagnosis and Testing:

Currently Centre for Disease Control recommends nasopharyngeal polymerase chain reaction (PCR) swab testing for an individual with symptoms of corona virus, those with close contact with confirmed COVID-19 within 14 days of symptom onset or those with history of travel from geographically affected areas within 14 days of symptom onset.^{14, 15} Person under investigation (PUI) should be notified to local or state health authority. If PCR availability is limited, then the presence of ground-glass opacities in chest CT with abdomen shielding is considered as pathognomonic finding for COVID-19.¹⁶

The diagnosis of COVID-19 pneumonia is based on the combination of patient history, epidemiological exposure, clinical findings, laboratory results, chest CT findings and positive COVID-19 positive result as qRT-PCR test alone has a false-negative of at least 30%.⁸

The government of India has made mandatory to notify all corona virus cases. The affected patients along with their contacts are traced, isolated and treated in order to break the chain of transmission.¹⁷

Prevention

World Health Organization and centre for Disease control has recommended preventive measures against the new corona virus which includes frequent hand washing with alcohol-based hand rub or soap and water, maintaining social distance of at least 1 meter from those who cough or sneeze, avoid touching eyes, nose and mouth, practicing respiratory hygiene, staying home if unwell and seeking medical attention if fever, cough or difficult breathing.^{2, 15} Avoidance of Ibuprofen and Angiotensin converting enzyme inhibitor drugs appear to prevent virus amplification as COVID-19 acts through ACE2.

Treatment

Currently, there is no specific antiviral drug or vaccine approved by US Food and Drug Administration (FDA) for corona virus infection. However, the first human trial of vaccine was started in US. Hydroxychloroquine is currently in use for both prophylactic and treatment for covid19 as recommended by the Federation of Obstetrics and Gynaecology of India (FOGSI).¹⁸ Hydroxychloroquine is considered to be safe in pregnancy and breastfeeding. Azithromycin can be used if there is suspicion of bacterial infection.

The principles of management include early isolation, oxygen therapy, antibiotics, antipyretics, avoidance of fluid overload, aggressive infection control measures, testing for other co-infections and involvement of multidisciplinary team. Early mechanical ventilation should be initiated for progressive respiratory failure. Maternal uterine contractions and fetal heart rate monitoring should be done.

Royal College of Obstetrician and Gynaecologists (RCOG) recommends that pregnant women with confirmed COVID-19 infection but asymptomatic is advised to be self-monitored at home for 14 days.^{19,20} Those recovered from mild illness in first trimester should undergo a detailed mid trimester anatomy ultrasound. Those in third trimester should be monitored with fetal growth scan and doppler because of the risk of fetal growth restriction. Pregnant women with COVID-19 pneumonia should be managed in a tertiary care center. When sepsis or organ failure criteria set in, the patient should be transferred to intensive care unit.

Intrapartum care and mode of delivery

International Society of Infectious Disease in Obstetrics and Gynaecology (ISIDOG) recommends that an individualized assessment should be made to delay the scheduled induction of labour and elective caesarean birth if there is no urgency in order to minimize the risk of infection transmission.²¹ However, in case of medical or obstetric indications, induction should not be postponed. Foley catheters and prostaglandins can be used. Oxytocin has to be used with care because of the risk of fluid overload.

When woman with suspected or confirmed COVID-19 present in labour, she should be kept in an isolation room with multi-disciplinary team approach involving the consultant obstetrician, consultant anaesthetist, consultant neonatologist, consultant physician, midwife and neonatal nurse in charge. Efforts should be made to minimize the number of staff members entering the room.²² Efforts should be made to follow the infection control guidelines strictly. Full maternal and fetal assessment should be done. Maternal observations include pulse rate, blood pressure, temperature, respiratory rate and oxygen saturation. Electronic fetal heart rate monitoring with cardiotocograph is recommended for all women with COVID-19 in labour.¹⁸ The onset of labour should be

confirmed according to the standard care. Oxygen saturation should be aimed to maintain more than 94%.

Corona virus infection itself is not an indication for caesarean delivery. Hence the mode of delivery should be discussed with the woman. If the symptoms deteriorate during labour, then an individual assessment should be made regarding the risk and benefit of continuing the labour versus emergency caesarean in view of maternal resuscitation. An individualized decision should be made regarding shortening the duration of second stage of labour with instrumental birth if the woman becomes exhausted or hypoxic.¹⁹

Currently, there is no evidence to suggest that epidural or spinal anaesthesia is contraindicated in a woman with corona virus infection. Use of entonox in general anaesthesia may be done with filter.¹⁹ Effective implementation of negative-pressure delivery room may prevent the infant from acquiring the virus.

Tranexamic acid and prostaglandins are safe, oxytocin can be used with care in third stage of labour and postpartum. However, methyl ergometrine should not be used because of its risk of acute respiratory failure reported after its administration.²¹

Deep venous thromboembolism prophylaxis with low molecular weight heparin can be given if indicated.^{19,21}

Neonatal care and breastfeeding

At present, there is limited data available in this context. Studies from China have advised isolation of the infected mother and baby for 14 days.¹² However, routine precautionary separation should not be done because of the detrimental effects on breastfeeding and bonding. Chen et al found no evidence of COVID-19 in breast milk of the infected mothers.¹³ Hence breastfeeding can be encouraged with use of face mask and infection control measures by the mother.

Recently COVID-19 positive case was found in a neonate 36 hours after birth. Hence FOGSI recommends COVID testing for all neonates born to mothers with confirmed corona virus infection within 14 days of delivery or up to 28 days of birth and symptomatic neonates exposed to close contacts with corona virus infection.¹⁸ An individualized decision should be made by the neonatologists after discussing the risk and benefits with the mother and family members. Women wishing to breastfeed should be advised regarding the use of facemask and hand wash before touching the baby, breast pump or bottles to limit the viral spread to the baby. For neonates who are isolated, formula or expressed milk can be given. Babies born to COVID-19 positive mothers may need close monitoring, early neonatal care and follow-up even after discharge.¹⁹

Implications

Currently, there are limited studies on the exact management of corona virus disease in pregnancy. Hence the present article has

been written combining various recommendations published and peer-reviewed so far in recent studies. This is based on the recommendations by Centre for Disease Control and Prevention (CDC), World Health Organization (WHO), Royal College of Obstetrics and Gynaecology (RCOG), Federation of Obstetrics and Gynaecology of India (FOGSI) and International Society of Infectious Disease in Obstetrics and Gynaecology (ISIDOG). This article aims to provide a holistic approach for both readers and healthcare professionals to provide the best care for pregnant women in this panic era of corona virus pandemic.

CONCLUSION

As COVID-19 outbreak is marching towards its peak we recommend many prospective studies in the upcoming future regarding COVID-19 in pregnancy for better understanding and outbreak control. However increased awareness, following preventive measures, vigilant knowledge about infection control measures is essential for reducing the disease burden. There is on-going research by multiple organizations on developing safe and effective vaccine for COVID-19. However, it is not known how quickly it may be available. As the knowledge evolves, much new information regarding COVID-19 keeps updating and the existing guidelines so far are subjected to change. Further, we recommend researchers to collect complete data on corona virus disease in pregnancy to gain more knowledge about the disease course, outcome and to throw light on the dark areas.

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