MODERN MEDICINE AND PRACTICE
https://www.innovatus.es/index.php/ejmmp
EUROPEAN JOURNAL OF MODERN MEDICINE AND PRACTICE
Vol. 2 No. 4 (2022) EJMMP ISSN: 2795-921X

Characteristics and Immunological Status of Chronic Jaundice in Infants Born to Mothers Who Passed Covid-19

Karomatova Fazolat Abdikaxhorovna
Bukhara State Medical Institute Assistant of the Department of Propaedeutics of Pediatrics

Abstract: *There are many unknowns for pregnant women during the coronavirus disease 2019 (COVID-19) pandemic. Clinical experience of pregnancies complicated with infection by other coronaviruses e.g., Severe Acute Respiratory Syndrome (SARS) and Middle Eastern Respiratory Syndrome, has led to pregnant woman being considered potentially vulnerable to severe SARS-CoV-2 infection. Physiological changes during pregnancy have a significant impact on the immune system, respiratory system, cardiovascular function, and coagulation.*

Keywords: *SARS-CoV-2, WHO, health services, chemoattractants for monocytes, maternal health, respiratory function.*

These may have positive or negative effects on COVID-19 disease progression. The impact of SARS-CoV-2 in pregnancy remains to be determined, and a concerted, global effort is required to determine the effects on implantation, fetal growth and development, labor, and neonatal health. Asymptomatic infection presents a further challenge regarding service provision, prevention, and management. Besides the direct impacts of the disease, a plethora of indirect consequences of the pandemic adversely affect maternal health, including reduced access to reproductive health services, increased mental health strain, and increased socioeconomic deprivation. In this review, we explore the current knowledge of COVID-19 in pregnancy and highlight areas for further research to minimize its impact for women and their children.In December 2019, a cluster of four cases of pneumonia of unknown etiology in Wuhan, China, were reported to the World Health Organization (WHO) (70). Since then, coronavirus disease 2019 (COVID-19) caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has spread rapidly across the world. On March 12, 2020 the WHO defined the outbreak as a pandemic (141). Many countries responded by restricting freedom of movement and limiting nonemergency health care to focus resources on COVID-19 care provision (139). As pregnant women are at greater risk of complications and severe disease from infection with other coronaviruses, including Severe Acute Respiratory Syndrome (SARS) and Middle Eastern Respiratory Syndrome (MERS), they were identified as a vulnerable group and were advised to take additional precautions as the COVID-19 pandemic unfolded (22, 33, 143). To reduce transmission risks for both pregnant women and health care workers, the International Federation of Gynecology and Obstetrics (FIGO) recommended the suspension of much routine antenatal care and replacement with video or telephone consultations whenever possible (12, 103, 109).

In this review, we evaluate the evidence of the effects of SARS-CoV-2 infection throughout pregnancy. We will examine the physiological adaptations to pregnancy and the implications for COVID-19, as well as COVID-19's impact on pregnancy outcomes, and consider areas of uncertainty where more research is needed. We conducted a literature search to identify all articles relating to COVID-19 in pregnancy until

August 17, 2020. Search terms included combinations of coronavirus, 2019-nCoV, COVID-19, SARS-CoV-2, and pregnancy and were input into Medline, Embase, Cochrane, Web of Science, and Cinahl. All case series and cohort studies describing maternal outcomes are summarized in, listed in order of study size. Single case studies and non-English language articles are not included.

COVID-19 is a capsulated single-stranded RNA virus (21). The immunological response to COVID-19, like other viruses, relies on a working immune system (21). COVID-19 infection can result in mild disease, in which the virus is cleared effectively by the immune system or severe disease with high mortality rates (21). The position for pregnant women on this spectrum is unclear. The immune system adapts during pregnancy to allow for the growth of a semiallogenic fetus (57), resulting in an altered immune response to infections during pregnancy (55, 115). To understand the COVID-19 phenotype during pregnancy, it is important to understand the pathophysiology and molecular mechanisms of COVID-19 and examine these in the context of the modulated maternal immune response.

SARS-CoV-2, which is transmitted by respiratory droplets, direct contact with fomites, close person-to-person contact and possibly by aerosols generated (27, 28, 39, 45, 111, 142), enters the body via the nasal passage and infects pulmonary cells via the SARS-CoV receptor angiotensin-converting enzyme 2 (ACE2) and uses transmembrane serine protease 2 (TMPRSS2) for S protein priming (21, 51, 121). Cells in which ACE-2 and TMPRSS2 are colocalized are likely to be most susceptible to entry by SARS-CoV-2 (104). Infection with SARS-CoV-2 is followed by viral replication and release of the virus, causing pyroptosis [inflammation-mediated programmed cell death occurring in response to a pathological stimulus (9)] of the host cell (134). This releases damage-associated molecular patterns (DAMPs), including ATP and nucleic acids, that trigger an inflammatory response from neighboring cells (121). This proinflammatory response includes production of IL-6, C-X-C motif chemokine 10 (CXCL10), and type 1 interferons, which act as chemoattractants for monocytes, macrophages, and T cells to the infection site (92, 121). This positive feedback loop may lead to excessive inflammation and damage the integrity of the lung (121), resulting in infection with other (host) microbes (21, 121). The inflammation caused by SARS-CoV-2 may also result in a “cytokine storm” that can lead to multisystem organ failure (121). This excessive inflammation is thought to be the cause of severe COVID-19 and is associated with high morbidity and mortality (21, 121). Among patients with mild symptoms, it is likely that the immune system reacts appropriately to viral infection. The inflammation caused by viral entry attracts T-helper 1 cluster differentiation 4 (Th1 CD4+) T cells that can clear infected cells before further spread and replications of the virus occurs (50, 121). The virus is blocked further by neutralizing antibodies, and macrophages clear the neutralized viruses and apoptotic cells by phagocytosis (121).

In addition to the systemic immunological changes of pregnancy that have the potential to have an impact on lung function, anatomical changes also are present in the respiratory system. Physiological alterations to the chest shape and elevation of the diaphragm due to diaphragmatic splinting by the gravid uterus cause changes to the respiratory function. Although there is a 30–40% increase in tidal volume, the reduction in chest volume leads to a decrease in functional residual capacity, end-expiratory volumes, and residual volumes from early in pregnancy. The reduction in total lung capacity and inability to clear secretions can make pregnant women more susceptible to severe respiratory infections (41).

The placenta is usually an effective barrier that prevents maternal infection spreading to the fetus (vertical transmission). It is well recognized that certain pathogens can overcome this barrier, with sometimes devastating effects on the developing pregnancy (30). Cytomegalovirus (CMV), herpes simplex virus (HSV), varicella zoster virus, and Zika virus (ZIKV) can all cause congenital syndromes, with variable rates of transmission and severity of effects that depend, in part, on the stage of pregnancy that infection occurs. Of note, many of these infections may have only minor effects on the mother, and there is little recognized correlation between maternal symptomology and severity of fetal effects. Experience of viral

infections in pregnancy has led to three other key observations regarding congenital infection, in general. First, the presence of the virus on the placental surface does not necessarily indicate placental infection—vertical transmission of viruses depends on some kind of breach of the placental barrier. Second, viral infection of placental cells does not necessarily mean that there is transmission to the fetus. Third, even when fetal infection occurs, responses are heterogeneous; thus, fetal infection does not always mean fetal damage.

The human placenta is hemochorial, meaning that maternal blood is in direct contact with the placental chorionic villi. The placenta is formed predominantly of specialized, fetally derived, cells called trophoblasts, of which there are three main types. Terminally differentiated multinuclear syncytiotrophoblast cells line the villus tree and are in direct contact with maternal blood. Progenitor villous cytotrophoblast cells underlie the syncytiotrophoblast. Invasive extravilloustrophoblast cells anchor the chorionic villi to the uterus and modify its vasculature. A number of potential mechanisms may be involved in vertical transmission of viruses, including direct damage to the villous tree, with breaks in the protective syncytiotrophoblast layer; spread from virally infected maternal endothelium to extravilloustrophoblast; traffic of infected maternal immune cells across the syncytiotrophoblast or paracellular or transcellular transport (e.g., immunoglobulin-mediated transcytosis) into fetal capillaries; and/or ascending infection from the vagina (30).

References:

1. Centers for Disease Control and Prevention. Daily updates of totals by week and state: provisional death counts for coronavirus disease 2019 (COVID-19). National Vital Statistics System.Updated April 28, 2020.Accessed April 28, 2020. https://www.cdc.gov/nchs/nvss/vsrr/covid19/index.htm
2. Arora N, Sadovsky Y, Dermody TS, Coyne CB. Microbial vertical transmission during human pregnancy. *Cell Host Microbe*. 2017;21(5):561-567. doi:10.1016/j.chom.2017.04.007 Pub Med Google Scholar Crossref
3. Mor G, Cardenas I. The immune system in pregnancy: a unique complexity. *Am J ReprodImmunol*. 2010;63(6):425-433. doi:10.1111/j.1600-0897.2010.00836.x Pub Med Google Scholar Crossref
4. Silasi M, Cardenas I, Kwon JY, Racicot K, Aldo P, Mor G. Viral infections during pregnancy. *Am J ReprodImmunol*. 2015;73(3):199-213. doi:10.1111/aji.12355 PubMedGoogleScholarCrossref
5. Gilbert GL. 1: Infections in pregnant women. *Med J Aust*. 2002;176(5):229-236. doi:10.5694/j.1326-5377.2002.tb04381.x Pub Med Google Scholar Crossref
6. Chen H, Guo J, Wang C, et al. Clinical characteristics and intrauterine vertical transmission potential of COVID-19 infection in nine pregnant women: a retrospective review of medical records. *Lancet*. 2020;395(10226):809-815. doi:10.1016/S0140-6736(20)30360-3 Pub Med Google Scholar Crossref
7. Liu D, Li L, Wu X, et al. Pregnancy and perinatal outcomes of women with coronavirus disease (COVID-19) pneumonia: a preliminary analysis. *AJR Am J Roentgenol*. 2020; 215(1):127-132. doi:10.2214/AJR.20.23072 Pub Med Google Scholar Crossref
8. Chen R, Zhang Y, Huang L, Cheng BH, Xia ZY, Meng QT. Safety and efficacy of different anesthetic regimens for parturients with COVID-19 undergoing cesarean delivery: a case series of 17 patients. *Can J Anaesth*. 2020; 67(6):655-663. doi:10.1007/s12630-020-01630-7 PubMedGoogle Scholar Crossref

9. Yan J, Guo J, Fan C, et al. Coronavirus disease 2019 (COVID-19) in pregnant women: a report based on 116 cases. *Am J Obstet Gynecol*. 2020; 223(1):111.e1-111.e14. doi:10.1016/j.ajog.2020.04.014 Pub Med Google Scholar Crossref

10. Vintzileos WS, Muscat J, Hoffmann E, et al. Screening all pregnant women admitted to labor and delivery for the virus responsible for coronavirus disease 2019. *Am J ObstetGynecol*. 2020;223(2):284-286. doi:10.1016/j.ajog.2020.04.024Pub Med Google Scholar Crossref