

Impact of COVID-19 On the Development of Premature Labor

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Abstract

Background: According to the literature described, the perinatal results of maternal viral infections during pregnancy could lead to different obstetric complications; pregnant women have a higher risk of morbidity and mortality due to physiological changes in their immune system and cardiopulmonary system. has associated pneumonia in pregnant women with premature rupture of membranes before labor, preterm labor, fetal growth restriction, fetal death, and neonatal death.

Methodology: A narrative review was carried out in which databases such as pubmed, science direct, scielo, academic google, among others, were used to search for articles, these were taken from indexed journals in first and second languages. The keywords DECS and MeSH, COVID-19, SARS-CoV-2, preterm birth and complications were used.

Results: It's no secret that women who are pregnant due to the same condition are at higher risk of severe illness and death from COVID-19 compared to non-pregnant women of reproductive age, and are at risk of adverse pregnancy outcomes, such as preterm delivery. Studies report that most cases of prematurity are secondary to respiratory complications and are done in order to preserve maternal health.

Keywords: COVID-19, SARS-CoV-2, preterm labor, complications.

Introduction

In the last two decades, the coronavirus has been the cause of two major epidemics around the world, such as: acute respiratory syndrome (SARS) with a fatality rate of approximately 10.5% and the Middle East respiratory syndrome (MERS).) with a fatality rate of 34.4%, towards the end of 2019 the new mutation of the virus called COVID-19 causing the disease and the pandemic, this new severe acute respiratory syndrome coronavirus 2 (SARS- CoV-2) can affect pregnant women at any stage of pregnancy and can have

negative effects on both the mother and the developing child [1]. According to the literature described, the perinatal results of maternal viral infections during pregnancy could present with different Obstetric complications ranging from no effect known as asymptomatic to pregnancy loss and fetal infection with the resulting congenital viral syndromes [2].

Pregnant women have an increased risk of morbidity and mortality due to physiological changes in their immune system and

cardiopulmonary system from previous coronavirus pandemics, the susceptibility of pregnant women to develop sepsis, syndrome of acute respiratory distress, admission to the intensive care unit, kidney failure, death and pneumonia [3]. Furthermore, it has been observed that pneumonia is one of the most prevalent infections present in pregnancy and is among the main causes of indirect maternal death. Pneumonia in pregnant women has been associated with premature rupture of membranes before labor, preterm labor, fetal growth restriction, fetal death, and neonatal death [3-4].

Preterm birth (PTB) remains the leading cause of neonatal morbidity and mortality in the United States, with preterm birth has been reported among infants born to women with SARS-CoV-2 infection during pregnancy. Furthermore, many of the reported early deliveries appear to have been indicated rather than due to spontaneous preterm labor [5].

Methodology

A narrative review was carried out in which databases such as pubmed, science direct, scielo, academic google, among others, were used to search for articles, these were taken from indexed journals in first and second languages. The keywords DECS and MeSH, COVID-19, SARS-CoV-2, preterm birth and complications were used. With the aforementioned terms, a total of 30 related articles were found, of which 17 were used for the development of this writing. The inclusion criteria used were that they allow the reading of the full text, were related to the subject studied and that they were not less than the year 2017; As exclusion criteria, it was found that it did not allow a complete reading and that its theme was not in accordance with what was needed.

Results

COVID-19 and pregnancy

According to WHO, pregnancy is the period that begins when implantation ends (the process that begins when the blastocyst adheres to the wall of the uterus) and ends with delivery. Pregnancy is considered a stage of vulnerability in a woman's life, due to the various complications that can occur in it.

Currently, the COVID-19 pandemic has generated multiple challenges for health personnel, due to its complexity and on certain occasions ignorance of what it can cause, in turn it has implied important adjustments in clinical practice in maternal medicine -fetal. Since its inception, health services have been affected and forced to adapt in different areas in order to achieve greater security and avoid contagion, especially in these populations that are considered vulnerable groups [6].

Physiological changes during pregnancy have a significant impact on the immune system, respiratory system, cardiovascular function, and clotting [7]. It is no secret that pregnant women due to the same condition have a higher risk of serious illness and death from COVID-19 compared to non-pregnant women of reproductive age, and are at risk of adverse pregnancy outcomes, such as childbirth. Premature [8].

Past experiences with other coronaviruses such as severe acute respiratory syndrome (SARS) and Middle East respiratory syndrome

(MERS), have revealed that this specific population has a higher risk of suffering complications and serious illnesses from the infection, therefore which were identified as a vulnerable group and recommended to take additional precautions as the COVID-19 pandemic developed [7].

Clinic And Maternal Prognosis

The symptoms that occur in this risk group are the same as in the general population, ranging from mild, severe and critical table 1. It is important to classify the clinical status of the pregnant woman if she is symptomatic or asymptomatic.

Table 1: Clinical Manifestations Of Covid-19 In Pregnant

CLINICAL MANIFESTATIONS OF COVID-19 IN PREGNANT		
MILD	SERIOUS	CRITICAL
Fever, dry cough, diarrhea, nausea, vomiting, sore throat, general weakness, loss of taste and smell (9).	Dyspnoea, respiratory rate of 30 breaths per minute or more, oxygen saturation of 93% or less in ambient air, or findings consistent with pneumonia on chest radiograph (4)	severe respiratory failure (need for intubation and invasive ventilation), disseminated intravascular coagulation, kidney failure, bacterial pneumonia, sepsis (10).

There are physiological changes in pregnancy that are closely related to COVID-19, such as respiratory responses: in which there is a reduction in total lung capacity and there is an inability to eliminate secretions that can make pregnant women more prone to serious respiratory infections, in addition to this is the coagulation response: pregnancy is a state of hypercoagulability with increased thrombin production and increased intravascular inflammation. During pregnancy, there are higher levels of circulating coagulation and fibrinolytic factors, such as plasmin, and these may be involved in the pathogenesis of SARS-CoV-2 infection. Pregnant women are at increased risk of thromboembolic events with associated mortality. Therefore, pregnant women with COVID-19 may have additive or synergistic risk factors for thrombosis [1].

Transplacental Transmission

Variations in the maternal immune system during pregnancy can affect the response to infections, there are various factors by which the immune / inflammatory response to viruses can be affected, these include a change in the population of cells CD4 + T towards the Th2 over Th1 phenotype during pregnancy, a decrease in circulating natural killer (NK) cells during pregnancy, a decrease in circulating plasmacytoid dendritic cells (pDC), an increase in circulating progesterone levels and alterations in the innate immune system, including pattern recognition receptors, Toll-like receptors (TLRs) during pregnancy [11].

There are several studies that seek to define whether or not there is a transplacental transmission from mother to fetus in COVID-19 infection; Early neonatal infections from COVID-19 cases are rare

and it is unknown whether the maternal immune response to infection protects the fetus the placenta is often an effective barrier preventing maternal infection from spreading to the fetus (vertical transmission) [12]. Certain pathogens have the ability to cross this barrier and affect pregnancy to death [11].

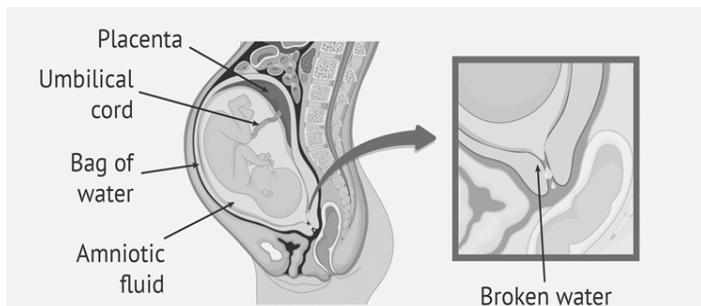
Compared with other infectious entities such as influenza or pertussis, it has been identified that in COVID-19 infection the transmission of SARS-CoV-2 specific antibodies appears to be ineffective through the placenta, despite reports of SARS-CoV-2 IgG Detected in Neonates with Negative IgM and Negative Polymerase Chain Reaction Results [12].

Discussion

Repercussions At The Fetal Level

One of the main concerns of COVID-19 in pregnancy are the repercussions at the fetal level, among the obstetric complications most described in the literature we find spontaneous abortion, preterm delivery, intrauterine growth restriction and admission to the intensive care unit [2, 9-10]. Among these perinatal complications, prematurity has been observed in 25% of cases primarily due to obstetric decision to terminate pregnancy prematurely, with a higher percentage in late preterm ones. It has also been associated as a cause of prematurity to the high percentage of premature rupture of membranes (PROM) found in 9% of cases graph 1 [13]. Regarding the complications of the newborn, no serious adverse outcomes have been observed in children with SARS-CoV-2 positive mothers [14].

Graph 1.



Premature Labor

The World Health Organization (WHO) defines preterm birth (PP) as a preterm delivery that occurs before 37 weeks of gestation and is considered an obstetric problem due to its prevalence [15]. Around the world, 1 in 10 live births is born prematurely. Preterm birth in Colombia reaches percentages between 7% and 12%, it is also a cause of morbidity and mortality in up to approximately 80% of cases [16].

Studies report that most cases of prematurity are secondary to respiratory complications and are done in order to preserve maternal health. However, extensive studies on other viral types of anemia in pregnant women have shown that the risk of premature birth is increased [17]. However, there is little evidence to associate it with SARS-CoV-2.

In an observational retrospective cohort study carried out at the Maternity Hospital of the San Juan de Dios Hospital (Chile) that included deliveries carried out between April 17 and June 30, 2020, it was observed that in patients who had COVID-19, 16.9% were premature births while 83.1% were term births, while in patients who did not present the disease, 10.2% were premature births and 89.8% were term births. Of all the premature deliveries of COVID-19 patients, 60% were iatrogenic and 40% spontaneous, in addition 50% had an indication of lung maturation [18].

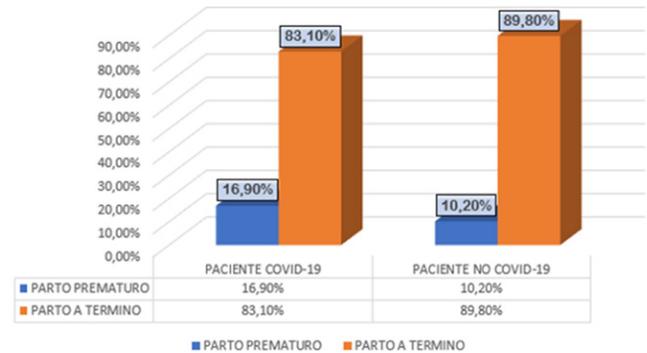


Figura 3: Vielma O. Sebastian, Lopez A. Marcia. Premature delivery in COVID-19 patients at Hospital San Juan de Dios. Rev. chil. obstet. gynecol. 2020 Sep

Conclusion

Complications around COVID-19 continue to be uncertain, especially in a population as specific as pregnant women; complications at the fetal level are the main concern, among the obstetric complications most described in the literature we find spontaneous abortion, preterm delivery, intrauterine growth restriction and admission to the intensive care unit, studies report that most cases of prematurity are secondary to respiratory complications and are done in order to preserve maternal health, however there is little evidence to associate it with SARS-CoV-2.

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