Republic of Iraq
Ministry of higher education
& Scientific Research
Diyala University /college of
Medicine

جمهورية العراق
وزارة التعليم العالي
والبحث العلمي
كلية الطب /جامعة ديالى

Title

The mode of delivery with Covid-19 Infection during pregnancy

This research is presented to Diyala medical college council as part of graduation requirements for 6th year medical students

Submitted by:

Saif Waleed Mohammed

Supervised by

Dr.Azal Sadiq

2022 **١٤٤٣**

بسم الله الرحمن الرحيم

(فَتَعَالَى اللَّهُ الْمَلِكُ الْحَقُّ ۗ وَلَا تَعْجَلْ بِالْقُرْآنِ مِن قَبْلِ أَن يُقْضَىٰ إِلَيْكَ وَحْيُهُ ۖ وَقُل رَّبِّ زِدْنِي عِلْمًا)

سورة طه- ١١٤

إهداء

.إلى من أشتاق إليه بكل جوارحي.... وطني الغالي

.إلى من رحل عن عالمنا،وما زال دويُّ نصائحه توجهني..... أبى الحبيب(رحمه الله)

.إلى من قدَّمت سعادتي وراحتي على سعادتها... أمي الفاضلة

.إلى من لم يبخلوا بمساعدتي يوما.....أخوتي واصدقائي

.إلى من أمدوني بالنصح والإرشاد.....أساتذتي الأفاضل

إلى كل من دعا لي بالخير

.....أهديكم ذلك العمل المتواضع

شكر وتقدير.

''كن عالما ..فإن لم تستطع فكن متعلما،فإن لم تستطع فأحب العلماء ،فإن لم تستطع فلا تبغضهم''

بعد رحلة بحث وجهد واجتهاد تكللت بانجاز هذا البحث ، نحمد الله عز وجل

على نعمه التي منَّ بها علينا فهو العلي القدير ، كما لا يسعني الا أن أخص بأسمى

.عبارات الشكر والتقدير للدكتورة '' ازل صادق داود'' لما قدمته لي من جهد ونصح ومعرفه طيلة إنجاز هذا البحث

.والى إخوتي وأصدقائي الذين زرعوا التفاؤل في دربي ومدوا لي يد العون والمساعدة فلهم مني كل الشكر والتقدير

وفي النهاية أحمد الله سبحانه وتعالى الذي منَّ علينا بنعمة العقل والدين، وهو القائل في محكم التنزيل: ''فَٱذْكُرُونِىٓ أَذْكُرْكُمْ وَٱشْكُرُواْ لِى وَلَا تَكْفُرُونِ''،البقرة(١٥٢)

Contents

Abstract

COVID-19 is a growing pandemic with initial cases identified in Wuhan, Hubei province, China toward the end of December 2019. Labeled as Novel Coronavirus 2019 (2019-nCoV) initially by the Chinese Center for Disease Control and Prevention (CDC) which was subsequently renamed as severe acute respiratory syndrome-Coronavirus-2 (SARS-CoV-2) due to its homology with SARS-CoV by the International Committee on Taxonomy of Viruses (ICTV).

Several physiological and immunological changes occur in a woman's body during pregnancy. These changes may predispose pregnant women towards significant health complications from respiratory infections, such as an increased risk of miscarriage, preterm birth, or even fetal mortality and morbidity

Pregnant women do not seem to be at higher risk of getting SARS-CoV-2, the virus that causes COVID-19. However, studies have shown an increased risk of developing severe COVID-19 if they are infected, compared with non-pregnant women of a similar age.

In summary, the current opinion of obstetric experts is that timing of delivery should be determined By the maternal disease status. Maternal safety is the priority; multidisciplinary consultation and the Opinions of critical care medical experts should be considered carefully.

The determination of mode of delivery should be based on obstetric indications. However, the safety Of vaginal birth, cesarean section or other methods in the context of COVID-19 infection has yet been Confirmed.

Conclusions:

There is no increased of the cesarean section rate among women who infected with COVID 19,

More extensive studies including multiple hospitals from the same region are needed to avoid sampling bias.The mode of birth should be individualized and based on disease severity and obstetric indications and complications of the surgery.

Keywords: coronavirus disease 2019, COVID-19, SARS-CoV-2, pregnancy, mode of delivery, vertical transmission

INTRODUCTION

COVID-19 is a growing pandemic with initial cases identified in Wuhan, Hubei province, China toward the end of December 2019. Labeled as Novel Coronavirus 2019 (2019-nCoV) initially by the Chinese Center for Disease Control and Prevention (CDC) which was subsequently renamed as Severe Acute Respiratory Syndrome-Coronavirus-2 (SARS-CoV-2) due to its homology with SARS-CoV by the International Committee on Taxonomy of Viruses (ICTV) **(1,2)**. The World Health Organization (WHO) later renamed the disease caused by SARS-CoV-2 as Coronavirus Disease-2019 (COVID-19) **(3)**. COVID-19 is primarily a disease of the respiratory system affecting lung parenchyma with fever, cough, and shortness of breath as the predominant symptoms. Recent studies have shown that it can affect multiple organ systems and cause development of extra-pulmonary symptoms. Presence of extra-pulmonary symptoms can often lead to late diagnosis and sometimes even mis-diagnosis of COVID-19 which can be detrimental to patients. As researchers globally continue to understand COVID-19 and its implications on the human body, knowledge about the various clinical presentations of COVID-19 is paramount in early diagnosing and treatment in order to decrease the morbidity and mortality caused by the disease.

The Chinese government identified an extreme pathogenic coronavirus on January 9, 2020 when WHO named such novel SARS-CoV. People also called this disease of SARS-CoV-2 as COVID-19 or Wuhan pneumonia.**(4)** The number of cases increased significantly in January 2020, and the global statistics as of August 4 had 18 166 298 confirmed cases, and the death toll had reached 690 953 all of which exceeded the SARS record of that year. Although COVID-19 was initially limited to China, it has rapidly spread to >180 countries because of its highly contagious pathogen. This pandemic infection is continuously spreading across the world with exponentially increasing death toll.

COVID-19 AND PREGNANCY.

Several physiological and immunological changes occur in a woman's body during pregnancy. These changes may predispose pregnant women towards significant health complications from respiratory infections, such as an increased risk of miscarriage, preterm birth, or even fetal mortality and morbidity**(5,6,7)**. Worldwide concerns were raised following the first reported cases of COVID-19, as previous similar diseases such as the severe acute respiratory syndrome-related coronavirus (SARS- CoV) and the Middle East respiratory syndrome-related coronavirus (MERS- CoV) were known to lead to adverse outcomes for pregnant women. Namely, pregnant women who contracted these diseases had greater mortality rates than non-pregnant individuals**(8,9,10)**. On March 11th, 2020, WHO characterized COVID-19 as a global pandemic. This decision was based on the previous coronavirus outbreaks that led to the loss of millions of lives, such as the Spanish flu (H1N1), which resulted in the highest number of deaths (approximately 50 million worldwide) and the Asian flu (H2N2), which resulted in between 1 – 4 million

deaths**(11,12)**. Fortunately, most international studies have proven that pregnant women are not more prone to develop COVID-19 than the general populatio.

Anatomical changes during pregnancy, such as diaphragm elevation, increased thoracic cage transverse diameter, decreased maternal tolerance to hypoxia, put pregnant women at a higher risk from respiratory infections**(13)**. Baud *et al***.(14)** observed contractive abdominal pain and fever among pregnant women suffering from COVID-19. Fetal distress has also been reported in pregnant women; however, it remains unclear whether it is caused by the COVID-19 infection or pneumonia**(9).**

Are pregnant women at higher risk from COVID-19؟

Pregnant women do not seem to be at higher risk of getting SARS-CoV-2, the virus that causes COVID-19. However, studies have shown an increased risk of developing severe COVID-19 if they are infected, compared with non-pregnant women of a similar age. COVID-19 during pregnancy has also been associated with an increased likelihood of preterm birth.

Pregnant women who are older, overweight or have pre-existing medical conditions such as hypertension (high blood pressure) and diabetes are at particular risk of serious outcomes of COVID-19.

It is important that pregnant women – and those around them – take precautions to protect themselves against COVID-19. If they become unwell (including with fever, cough or difficulty breathing), they should seek urgent medical advice from a health worker**(15)**.

According to the Expert Advice on Novel Coronavirus Infection in Pregnancy and Puerperium**(16,17,18)**.Issued by Chinese Medical Association (CMA), the current consensus is that COVID-19 infection is Not an absolute indication for ending pregnancy, but that expedition of delivery should be evaluated On a case-by-case basis. Maternal disease progression, gestational age and fetal intrauterine status are Primary concerns. If maternal safety is assured, the timing of delivery should primarily be determined By the gestational age.

After consulting with several obstetric experts in Wuhan city, who have each dealt with COVID-19 Infected pregnancies, we suggest that the timing of delivery for COVID-19 infection complicated Pregnancies should be based on the following four principles:

1. If the infected pregnant women demonstrate obstetric indications for early delivery, such as Placenta previa, preeclampsia, malpresentation etc., the timing of delivery should be based on the Specific obstetric circumstances;

2. If the infection of COVID-19 is not improved by treatment, early delivery should be considered, Even in the absence of obstetric indications;

3. If the maternal COVID-19 infection is assessed as severe or critical, according to the diagnostic Criteria in the National Health and Medical Commission's New Coronavirus Infection Pneumonia Diagnosis and Treatment Program (the fifth edition), early delivery needs to be considered to ensure Maternal safety, regardless of gestational age**(19)**, as emerging evidence did show that maternal Oxygenation can be quickly restored by delivery under these circumstances;

(a) Severe: Respiratory distress (RR≥30 beats / min), or mean oxygen saturation ≤93% at rest, or Arterial blood oxygen partial pressure (PaO2) / oxygen concentration (FiO2) ≤300mmHg;

(b) Critical: Respiratory failure and mechanical ventilation required, or shock, or combined with other Organ failure and requires ICU monitoring and treatment.

4. Whether mild or common COVID-19 infection is an indication for delivery in the third trimester Remains to be determined. During severe epidemics, delivery after 32-34 gestational weeks may be Beneficial to the subsequent treatment and safety of these patients**(20)**.

In summary, the current opinion of obstetric experts is that timing of delivery should be determined By the maternal disease status. Maternal safety is the priority; multidisciplinary consultation and the Opinions of critical care medical experts should be considered carefully.

Indications for caesarean section.

The determination of mode of delivery should be based on obstetric indications. However, the safety Of vaginal birth, cesarean section or other methods in the context of COVID-19 infection has yet been Confirmed**(21)**. Nevertheless, senior obstetricians in Wuhan suggest two recommendations:

1. During the current period of emergency**(22)**, the indications for caesarean section for women with COVID-19 infection should be applied flexibly and the threshold for Caesarean section lowered;

2. In particular, the threshold for caesarean section on the basis of delay in the first stage of labour Should be lowered.

These suggestions are aimed at reducing maternal in-patient stays, minimizing the chance of crossinfection, reducing maternal physical exertion during delivery and ensuring the safety of other Postnatal women, newborns and health care workers. There are currently very few COVID-19 Infected pregnant women, thus a lowered threshold for caesarean section will not significantly Increase the overall caesarean section rate.

Studies that supports that there is effect of COVID 19 infection on the mode of the delivery.

1. **Siddika et al (2022), found that;**

CS rates were increased and maternity care service utilization shifted to private facilities. It is necessary to evaluate changes in perinatal outcomes with further studies after the pandemic**(23).**

2. **Margot L et al(2022) found that;**

COVID-19 status alone became a common indication for cesarean delivery early in the pandemic, despite lack of evidence for vertical transmission. The increase in cesarean rate in this data may reflect obstetricians attempting to serve their patients in the best way possible given the current climate of constantly evolving guidelines on safest mode of delivery for the mother, infant, and pprovide.**(24)**

3. **Jian zhang et al (2020) found that;**

A high cesarean delivery rate was found i uninfected women who experienced lockdown in their third trimester. During the COVID 19 pandemic, more medical support should be provided in severely affected regions to ensure and promote health in pregnancy. **(25)**

Studies that don't supports that there is effect **of COVID 19 infection on the mode of the delivery.**

1. **Jianghui et al(2021) found that;**

There is no sufficient evidence supporting that the cesarean section is better than vaginal delivery in preventing possible vertical transmission from a pregnant mother confirmed with COVID-19 to a neonate. The mode of birth should be individualized and based on disease severity and obstetric indications. Additional good-quality studies with comprehensive serial tests from multiple specimens are urgently needed. **(26)**

2. **George et al(2022), found that;**

The overall C-section rate during the first wave of COVID-19 was significantly lower than the prepandemic period**.(27)**

3. **Kristjana et al(2021), found that;**

A reduction in elective cesarean section during COVID-19 lockdown, possibly reflecting changes in prioritization of non-urgent health care during lockdown.**(28)**

Conclusions

There is no increased of the cesarean section rate among women who infected with COVID 19,

More extensive studies including multiple hospitals from the same region are needed to avoid sampling bias.my study provides that the pregnant women need more medical attention in the pandemic area to avoid infection to not deteriorate their condition especially if there is risk factors (age, obesity, medical disease).

The mode of birth should be individualized and based on disease severity and obstetric indications and complications of the surgery.

References

1. **Who-China-Joint-Mission-on-Covid-19. (accessed June 1, 2020).**

2. **Jin Y, Yang H, Ji W, Wu W, Chen S, Zhang W, et al. Virology, epidemiology, pathogenesis, and control of COVID-19. Viruses. (2020) 12:372. Doi: 10.3390/v12040372**

3. **Naming the Coronavirus Disease (COVID-19) and the Virus That Causes it. (2020). (accessed June 7, 2020).**

4. **Luo YH, Chiu HY, Weng CS, Chen YM. Overview of coronavirus disease 2019: treatment updates and advances. J Chin Med Assoc. 2020; 83:805–8**

5. **Karadag E., Increase in COVID-19 cases and case-fatality and case-recovery rates in Europe: A cross-temporal meta-analysis. J Med Virol. 2020; 92 (9) : 1511-7 .**

6. **Schwartz D.A., An analysis of 38 pregnant women with COVID-19, their newborn infants, and maternal-fetal transmission of SARS-CoV-2: maternal coronavirus infections and pregnancy outcomes. Arch Pathol Lab Med. 2020; 144 (7) : 799-805 .**

7. **Qiao J., What are the risks of COVID-19 infection in pregnant women?. Lancet. 2020; 395 (10226) : 760-2 .**

8. **Breslin N., Baptiste C., Gyamfi-Bannerman C., Miller R., Martinez R., Bernstein K., Coronavirus disease 2019 infection among asymptomatic and symptomatic pregnant women: two weeks of confirmed presentations to an affiliated pair of New York City hospitals. Am J Obstet Gynecol MFM. 2020; 2 (2) : 100118 .**

9. **Gatta A.N. Della, Rizzo R., Pilu G., Simonazzi G., COVID19 during pregnancy: a systematic review of reported cases. Am J Obstet Gynecol. 2020; 223 (1) : 36-41 .**

10. **Yahya E.B., A.M. Alqadhi, M.A. Abdulsamad, A.A. Allaq, Asian Nipah virus and the potential of new pandemic. Pakistan Journal of Biotechnology. 2021; 18 (1) : 17-22 .**

11. **Kain T., Fowler R., Preparing intensive care for the next pandemic influenza. Crit Care. 2019; 23 (1) : 337 .**

12. **Liu Y.C., Kuo R.L., Shih S.R., COVID-19: the first documented coronavirus pandemic in history. Biomed J. 2020; 43 (4) : 328-33 .**

13. **Allotey J., E. Stallings, M. Bonet, M. Yap, S. Chatterjee, T. Kew, Clinical manifestations, risk factors, and maternal and perinatal outcomes of coronavirus disease 2019 in pregnancy: living systematic review and meta-analysis. Bmj. 2020; (370) : m3320 .**

14. **Baud D., Greub G., Favre G., Gengler C., Jaton K., Dubruc E., Second-trimester miscarriage in a pregnant woman with SARS-CoV-2 infection. JAMA. 2020; 323 (21) : 2198-200 .**

15. **WHO team.Coronavirus disease (COVID-19): Pregnancy, childbirth and the postnatal period 15 March 2022 | Q&A.**

16. **World Health Organization. Clinical management of severe acute respiratory infection when novel Coronavirus (nCoV) infection is suspected：Interim guidance [Internet]. 2020.when-novel-coronavirus-(ncov)-infection-is-suspected**

17. **Jamieson DJ, Honein MA, Rasmussen SA, Williams JL, Swerdlow DL, Biggerstaff MS, et al. H1N1 2009 influenza virus infection during pregnancy in the USA. Lancet. 2009;374(9688):451-458.**

18. **Maxwell C, McGeer A, Tai KFY, Sermer M. No. 225-Management guidelines for obstetric patients And neonates born to mothers with suspected or probable severe acute respiratory syndrome (SARS).J Obstet Gynaecol Can. 2017;39(8):e130-e137.**

19. **Huang C, Wang Y, Li X, Ren L, Zhao J, Hu Y, et al. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. Lancet. 2020;395(10223):497-506**

20. **Wang J, Qi H, Bao L, Li F, Shi Y.A contingency plan for the management of the 2019 novel Coronavirus outbreak in neonatal intensive care units. Lancet Child Adolesc Health. 2020; pii:S2352-4642(20)30040-7.**

21. **Julien R, Christian AL. Pattern of early human-to-human transmission of Wuhan 2019 novel Coronavirus (2019-nCoV). Euro Surveill. 2020;25(4). Doi: 10.2807/1560-7917.ES.2020.25.4.2000058.**

22. **The Lancet. Emerging understandings of 2019-nCoV. Lancet. 2020;395(10221):311.**

23. **Siddika Songül Yalçin,Perran Boran,Başak Tezel,Tuba Esra Şahlar,Pınar Özdemir,Bekir Keskinkiliç,Fatih Kara,BMC Pregnancy and Childbirth,Effects**

of the COVID-19 pandemic on perinatal outcomes: a retrospective cohort study from Turkey.BMC Pregnancy and Childbirth. (2022)

24. Margot L,Debrabandere, BA 1 Farabaugh, Dana C,Giordano, Carolyn،Phd 2020, A Review on Mode of Delivery during COVID-19 between December 2019 and April 2020.Am J Perinatology

25. Jian Zhang,1,2,yumei zgang 2,Ma, Yidi2,Ke, Yalei2,Huo, Shanshan2,He, Liping3,Luo, Wenjuan4,Li, Jing5,Zhao, Ai1,The associated factors of cesarean section during COVID-19 pandemic: a cross-sectional study in nine cities of China, Zgang et al. Environment health and preventive medicine,P1:7.

26. Jianghui Cai1*†, Mi Tang2†, Yu Gao1†, Hongxi Zhang1†, Yanfeng Yang3, Dan Zhang1, Han Wang1, Hua Liang1, Rui Zhang1 and Bo Wu1,2021.Cesarean Section or Vaginal Delivery to Prevent Possible Vertical Transmission From a Pregnant Mother Confirmed With COVID-19 to a Neonate: A Systematic Review.p2:12

27. George Uchenna Eleje 1 2, Emmanuel Onyebuchi Ugwu 3 4, Joseph Tochukwu Enebe 5, Chukwuemeka Chukwubuikem Okoro 2, Boniface Chukwuneme Okpala 1 2, ,Cesarean section rate and outcomes during and before the first wave of COVID-19 pandemic,SAGE Open medicine,P 9;11.

28. Kristjana Einarsdóttir 1, Emma Marie Swift 2 3, Helga Zoega 1 4,2021.Changes in obstetric interventions and preterm birth during COVID-19: A nationwide study from Iceland, EINARSDOTTIR ETAI, P1:7