Content available at: https://www.ipinnovative.com/open-access-journals

Indian Journal of Obstetrics and Gynecology Research

Journal homepage: www.ijogr.org

Original Research Article

The effect of COVID-19 on maternal and neonatal outcome - A retrospective study

Swati Rai[1], M Ahuja[1], N Goel[1], R Srivastava[1], S Agrawal[1], H Garg[1,*]

[1] *Dept. of Obstetrics and Gynaecology, SMSR & Sharda Hospital, Greater Noida, Uttar Pradesh, India*

ARTICLE INFO

Article history:
Received 01-07-2021
Accepted 24-07-2021
Available online 26-11-2021

Keywords:
COVID- 19
Pregnancy
Maternal
Neonatal outcome

ABSTRACT

Introduction: The pandemic of coronavirus disease (COVID-19) has caused serious adverse effects on the human race. There are limited data on maternal and neonatal outcomes of pregnant women with COVID-19.

Materials and Methods: An observational descriptive study was conducted in the department of obstetrics & gynaecology at SMSR and Sharda hospital located in Greater Noida, Uttar Pradesh. This medical college drains patients from entire Greater Noida and as well as from far-away places as referrals. All pregnant patients were included that came to this hospital from 1^{st} April to 31^{st} May 2021. These were the two dreadful months for the entire country in which so many lives were lost. All pregnant patients were labelled COVID-19 positive after undergoing either Rapid antigen test/RTPCR test taken from nasopharyngeal and oral swab.

Aims & Objectives: This included assessment of the maternal morbidity and mortality, comorbidities & worsening of outcome due to COVID-19 infection in pregnant patients as well assessment of the effect of COVID-19 infection on fetus and newborn.

This is an Open Access (OA) journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: reprint@ipinnovative.com

1. Introduction

The coronal virus infection (COVID-19) is an unsolved public health emergency till date. It all started in Wuhan, Hubei province of China when the first case of coronavirus infection was identified & notified to the WHO on 31^{st} December 2019.[1] It was declared as a (PHEIC) Public Health Emergency of International Concern by 30^{th} January 2020.[2]

According to the current evidence, COVID-19 virus is primarily transmitted through respiratory droplets & contact routes. In an analytical report of 75,465 COVID-19 cases in China, air borne transmission was not reported.[3] Transmission can occur through droplet when a person is in close contact within 1 meter or may also occur through fomites in the immediate environment around the infected person.[4] In respect to COVID 19 air borne transmission may be possible in special circumstances in which procedures that generate aerosols are performed, for example – endotracheal intubation, turning patient prone, tracheostomy. The health care fraternity was more concerned as there were several reports on suspected vertical transmission of virus.

The incubation period is estimated to be 2-14 days. However, a case of incubation period of upto 27 days has been reported in Hubei, China.[5]

One important thing to remember is that Incubation period may vary from person to person. In a study conducted in Wuhan in 181 patients the period from onset of symptoms to death ranged from 6 to 41 days with a median of 14 days and case fatality rate of 2.3%.[6]

The most common classic presenting symptoms are fever, cough, sore throat, malaise, headache and itching

* *Corresponding author.*
E-mail address: drswatirai09@gmail.com (H. Garg).

https://doi.org/10.18231/j.ijogr.2021.103
2394-2746/© 2021 Innovative Publication, All rights reserved.

of eyes. Experts are still learning the symptoms of this new infection with the new upcoming atypical symptoms in 2021. The list included loss of smell, taste, delirium, dizziness, nausea, vomiting, diarrhoea, rash, hives, chickenpox like lesions and cardiovascular, renal and neurological complications.[7]

Presently, as recommended by ICMR the standard test is detection of viral RNA by RTPCR from nasopharyngeal mucosa. For past infections confirmation antibody test on blood are recommended but the effectiveness needs further validation and research.

This year, the corona virus disease has affected so many pregnant women and in such a dreadful way. Pregnancy is a known immune compromised state. But this year compared to last year 2020, the virus took so many lives and left so many children motherless.

This study is amongst one of the few studies conducted till date in India, that assesses the impact of COVID-19 infection on maternal morbidity and mortality as well as neonatal outcome among pregnant females.

2. Materials and Methods

This is a retrospective observational study done in the Department of obstetrics and gynaecology SMSR a tertiary healthcare Hospital and medical College located in greater Noida, UP.

A total of 40 patients were included in the study who were either post abortion, early pregnancy, late pregnancy, laboring and delivered from 1 April 2021 to 31 May 2021. Out of total 40 admissions in this period 20 for Covid positive and 20 for Covid negative.

3. Aims and Objectives

Aims and objectives of the study were to assess the Incidence of positivity in pregnant females, maternal morbidity and mortality due to Covid infection, assessment of comorbidities and association to worsening of outcome and unity outcome also.

All the details and particulars of the patient including age, parity, gestational age, type of conception, history of contact, comorbid conditions, signs and symptoms, investigations, laboratory parameters, mode of delivery/ outcome, baby details, APGAR score and treatment given were noted. All the pregnant women who came to labour room were tested according to ICMR guidelines by both rapid antigen and RTPCR test respectively.

Social distancing, compulsory mask with proper hand hygiene. Covid positive patients were shifted to the respective Covid Wards. Cleaning and disinfection of labour room and OT complex was done on regular intervals. All the maternal and neonatal parameters were analysed using descriptive statistics that is percentage and proportions calculated and compared.

4. Results

4.1. Demographic characteristics

These includes the cases in study as shown in Table 1. The age of confirmed COVID 19 cases ranged from 23-44 years with the most common age group being 30-39 years(35%). The gestational age on admission ranged from 19 weeks 6 days to 38 weeks with 40% of patients in late third trimester.

Sixty five percent of patients had spontaneous conception. Thirty five percent patients underwent artificial reproductive technique procedure like (IVF/ IVF+ ICSI) had more complications and mortality rate as well. Of all patients 45% were undelivered and from the remaining delivered, 80% underwent caesarean section and 20% delivered vaginally.

In addition to complications associated with COVID infection 55% cases had gestational complications also like anemia, hypertension and gestational diabetes mellitus as depicted in Figure 1. Only 30% had more than one complication.

4.2. Clinical examination and laboratory investigations

Among all patients the most common symptom at the time of admission was fever and cough. High total leucocyte count (>20,000/ l) was present in 55% of patients. A very common finding of tachycardia (high pulse rate) was present in good number of 75% patients at the time of admission. Coagulation parameter like D-dimer was severely (>1 mcg/ml) deranged in 55% patients and mildly (<1 mcg/ml) deranged in 30%. A very significant biomarker serum ferritin (>464 ng/ml) was raised in 70% of patients. Another biomarker CRP(C reactive protein) was mildly (<26 mg/dl) raised in 15%, moderately (26-100 mg/dl) raised in 50% and severely (>100 mg/dl) raised in 25% respectively. These parameters are represented in Figure 2. IL 6 was tested in a subset of patients and among them it was raised in 66%.

4.3. Treatment

All COVID-19 infection affected patients received antibiotics, steroids and other supportive medications. Only 60% patients received antiviral (Remdesivir) during hospital stay.

Around 70% of patients were either transferred/ admitted in ICU (intensive care unit) because of COVID 19 pneumonia and its associated complications. Statistics of maternal mortality were shocking, sadly 65% of patients had maternal mortality during this study period. All the patients who were admitted in ICU couldn't be saved, probably because they were already in very sick condition at the time of admission.

4.4. Neonatal outcomes

Among all the confirmed COVID 19 pregnant females 50% delivered and gave birth to 11 babies (8 singleton and 2 twins). Low birth weight was commonly seen in 35% of newborns. Of 11 babies 3 were intrauterine deaths.

All the newborns who were delivered by caesarean section/ vaginal delivery underwent testing for COVID 19 through throat swab. All of them tested negative for SARS-COV-2.

Table 1: Demographic profile of the patients

Age (in years)	
21-25	2(10%)
26-29	6(30%)
30-39	7(35%)
>40	5(25%)
Parity	
Primigravida	10(50%)
Multigravida	10(50%)
Conception	
Spontaneous	13(65%)
IVF	6(30%)
IVF+ICSI	1(5%)
Gestational Age (weeks)	
<34	12(60%)
34-36.6	2(10%)
>37	5(25%)
Post abortion	1(5%)

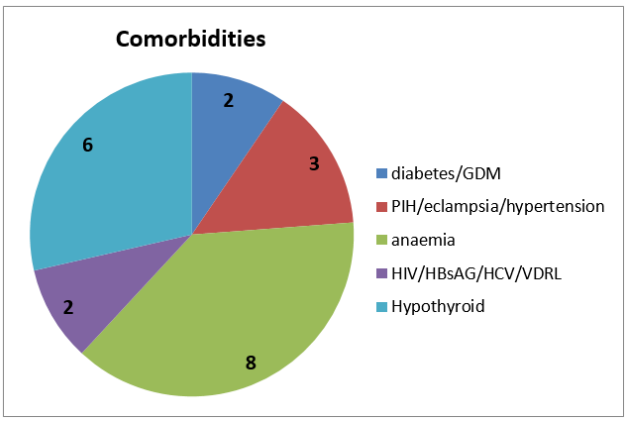

Fig. 1: Comorbidities

5. Discussion

Till date, this is among the very few comprehensive studies conducted in India assessing the impact of COVID 19 infection on maternal and neonatal outcome.

Human corona virus is one of the most common pathogen that causes respiratory infection. SARS- COV-2 is an enveloped virion that measure about 50-200 nm in diameter with a single positive sense RNA genome. [8]

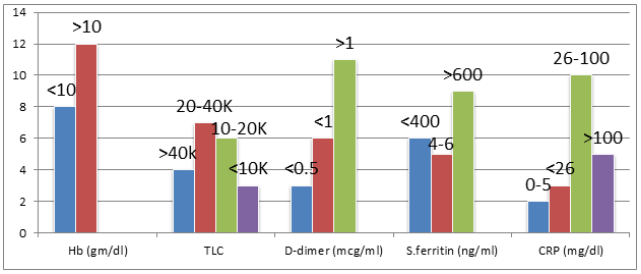

Fig. 2: Laboratory investigations

In terms of clinical manifestations the most common symptom of these pregnant patients were fever and cough and less common symptom were diarrhea, headache and bodyache.

Laboratory investigations on admission showed that total leucocyte count, C reactive protein, D dimer were increased and absolute lymphocyte count were reduced in most of the pregnant patients. These findings were consistent with other studies also. [9,10]

Recent literature reflects higher incidence of caesarean section as compared to normal vaginal delivery among COVID positive pregnant females. [11]

In this study also the caesarean section rate among delivered patients was as high as 80%.

Zhu et al. reported 10 newborns born to COVID 19 mothers with pneumonia in Wuhan among them one developed DIC and multi organ dysfunction. However, none of them tested positive for COVID 19 infection. [12] Similar to current study as no new born was tested positive.

A previous study conducted by Lam et al. regarding SARS infection reported that it could increase the risk of preterm delivery in second trimester and spontaneous abortion in third trimester. [13] In recent study most of the patients were in third trimester so the potential adverse effects in first and second trimester remains to be investigated.

No transmission event occurred to any doctor or nursing staff handling COVID positive patients in our department. All the necessary precautions and protective measures were practiced.

There was no evidence of vertical transmission of SARS-COV-2 from mother to fetus via placenta or caesarean section delivery or vaginal delivery in this study similar to other studies reported. [13,14] None of the literature has detected virus in cord blood, placenta or breast milk. [14]

Till date no complication related to steroid use have been reported in mother or infant, but their safety still needs more data to draw conclusion.

6. Conclusion

COVID-19 infection in pregnancy is a very complicated clinical scenario, hence a multidisciplinary proactive approach is required for proper treatment and good outcome. Although the sample size is relatively small in this study but seeming the ongoing global pandemic caused by SARS-COV-2, we still believe that our study can be used as an important clinical guiding tool that can help us to outreach other vulnerable pregnant group.

7. Source of Funding

None.

8. Conflict of Interest

The authors declare no conflict of interest.

References

1. Liu J, Liao X, Qian S, Yuan J, Wang F, Liu Y, et al. Community Transmission of Severe Acute Respiratory Syndrome Coronavirus 2, Shenzhen, China, 2020. *Emerg Infect Dis*. 2020;26(6):1320–3. doi:10.3201/eid2606.200239.
2. World Health Organization. Report of the WHO-China Joint Mission on Coronavirus Disease 2019 (COVID-19) 16-24 February 2020 (Internet). Geneva: World Health Organization; 2020 . Available from: https://www.who.int/docs/default-source/coronavirus/who-china-joint-mission-on-COVID-19-final-report.pdf.
3. Ong SW, Tan YK, Chia PY, Lee TH, Ng OT, Wong MS, et al. Air, surface environmental and personal protective equipment contamination by severe acute respiratory syndrome coronavirus 2 (SARS- COV-2) from a symptomatic patient. *JAMA* . 2020;323(16):1610–2. doi:10.1001/jama.2020.3227.
4. CDC. 2019 Novel Coronavirus, Wuhan, China: Symptoms. CDC. Available from: https://www.cdc.gov/coronavirus/2019-ncov/about/symptoms.html.26Jan2020.
5. Laurel SA, Grantz KH, Bi Q, Jones FK, Zheng Q, Meredith HR. The Incubation Period of Coronavirus Disease 2019(COVID-19) from publicly reported confirmed cases: estimation and application. *Ann Intern Med*. 2020;172(9):577–82.
6. Za ZLXBX, Zhi. The epidemiological characteristics of an outbreak of 2019 novel coronavirus diseases (COVID-19) in China. *Zhonghua Liu Xing Bing Xue Za Zhi* . 2020;41(2):145–51.
7. Hopkins C, Kumar N. Loss of sense of smell as marker of COVID 19 infection. pdf (internet). ENT UK.2020 (cited 2020 Apr 5). Available from: https://www.entuk.org/sites/default/files/loss%20.
8. Xu XT, Chen P, Wang JF. Evolution of the novel coronavirus from the ongoing Wuhan outbreak and modeling of its spoke protein for risk of human transmission. *Sci China Life Sci*. 2020;63:457–60.
9. Richardson S. Presenting characteristics, comorbidities and outcome among 5700 patients hospitalized with COVID 19 in the New York city area. *JAMA*. 2020;323:2052–9.
10. Rodriguez-Morales A. Clinical, laboratory and imaging features of COVID 19 : a systematic review and meta-analysis. *Travel Med Infect Dis*. 2020;34:101623–101623.
11. Yu N, Li W, Kang Q. Clinical features and obstetric and neonatal outcomes of pregnant patients with COVID 19 in Wuhan, China: a retrospective, single centre, descriptive study. *Lancet Infect Dis*. 2020;20(5):559–64.
12. Zhu H, Wang L, Fang C, Peng S, Zhang L, Chang G, et al. Clinical analysis of 10 neonates born to mothers with 2019-nCoV pneumonia. *Transl Pediatr*. 2020;9(1):51–60.
13. Chen H, Guo J, Wang C, Luo F, Yu X, Zhang W, 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;395:809–15.
14. Krishnamurthy G, Sahni R, Leone T, Kim F, Brooks MC, Morales SV, et al. Care of the COVID-19 exposed complex newborn infant. *Semin Perinatol*. 2020;44(7):151282. doi:10.1016/j.semperi.2020.151282.

Author biography

Swati Rai, Assistant Professor

M Ahuja, Assistant Professor

N Goel, Professor and HOD

R Srivastava, Professor

S Agrawal, Professor

H Garg, PG Student

Cite this article: Rai S, Ahuja M, Goel N, Srivastava R, Agrawal S, Garg H. The effect of COVID-19 on maternal and neonatal outcome - A retrospective study. *Indian J Obstet Gynecol Res* 2021;8(4):498-501.