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Research Article

Clinical Features and Risk of Intrauterine Transmission in 40 Covid-19 Positive Pregnant Women

Jai Shankar[1*], Khan MM[1], Qureshi K[1], Kumari K[1], Tariq R[1], Amir SU[1], Kumari C[1], Roy M[2], Aftab N[3], Khuhro A[4]

[1]Liaquat National Hospital & Medical College, Pakistan; [2]Khairpur Medical College, Khairpur Mir's, Pakistan; [3]Peoples University of Medical and Health Sciences for Women-Nawabshah; [4]Shaheed Mohtrama Benazir Bhutto Medical University Larkana, Pakistan

ABSTRACT

Objective: The aim of this study is to conclude the clinical manifestations of SARS-CoV-2 during pregnancy and the risk of vertical transmission in the newborn.

Material and methods: This is a prospective study conducted in 40 pregnant women with positive COVID-19, admitted to Liaquat National Hospital and Medical College Karachi, Pakistan from 2nd June 2020 to 18th June 2020. All 40 patients were tested positive for severe acute respiratory syndrome corona virus 2 (SARS-CoV-2) by use of quantitative RT-PCR (q RT-PCR) on sample from nasal and oral swab. We assessed the clinical manifestations of SARS-CoV-2 during pregnancy and the risk of vertical transmission in the newborn.

Results: A total of forty pregnant women with COVID-19 were included in this study. The twenty eight patients underwent lower caesarean section and twelve patients had spontaneous vaginal delivery. Twelve of the forty patients presented with fever and their body temperature ranges within 38-39°C, but none had postpartum fever. Other symptoms of upper respiratory tract infection were also found: Fifteen patients had a cough, thirty-two had shortness of breath, twelve reported sore throat and twenty indicated malaise, five had diarrhea and four had loss of taste. Twenty pregnant women with COVID-19 pneumonia had elevated white cell count (>11.0X10^9), while five showed leucopenia (<4.0X10^9). The presence of SARS-CoV-2 was tested in all neonates through sample taken from nasal and oral swab; however none the test detected SARS-CoV- 2 in these samples.

Conclusion: The COVID-19 symptoms in pregnant women were various, with main symptoms being shortness of breath, malaise and cough. We found no evidence of vertical transmission in neonates.

Keywords: COVID-19; Clinical characteristics; Vertical transmission; Pregnant women; Neonates

INTRODUCTION

In December 2019, new cases of viral pneumonia of unspecified etiology were reported in a city of China named, Wuhan [1]. It was declared as pandemic by WHO due to rapid increase in cases throughout the globe [2]. Symptoms of COVID-19 pneumonia may vary from common cold like symptoms to severe respiratory problems such as pneumonia which may require admission in ICU, ending up on ventilator support or death. The common symptoms are fever, cough, myalgia, headache, chills, sore throat, runny nose, shortness of breath, loss of taste and loss of smell [3].

Pregnancy is a physiologically immunocompromised state with increased oxygen consumption and decreased functional residual capacity; therefore pregnant women are more prone to develop this disease [4].

SARS-CoV-2 positive pregnant women shows worsening of symptoms and very bad consequences compared with non-pregnant women [5]. Due to insufficient knowledge regarding this diasease, it is presumed that infected mother can infect their

Correspondence to: Jai Shankar, Liaquat National Hospital & Medical College, Pakistan; E-mail: Shankerj18@gmail.com

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newborn; hence baby should be isolated to avoid the spread among other newborn babies [6].

This study will help the medical practitioners to acknowledge the effects of COVID-19 during pregnancy and to refine the perception of COVID-19 infection during pregnancy for more productive outcomes.

The aim of this study is to conclude the clinical manifestations of SARS-CoV-2 during pregnancy and the risk of vertical transmission in the newborn.

MATERIALS AND METHODS

This is a prospective observational study was conducted in 40 pregnant women with positive COVID-19, admitted to Liaquat National Hospital And Medical College Karachi, Pakistan from 2nd June 2020 to 18th June 2020 and Informed consent was taken from the all study participants. All 40 patients were tested positive for severe acute respiratory syndrome corona virus 2 (SARS-CoV-2) by use of quantitative RT-PCR (q RT-PCR) on sample from nasal and oral swab.

Data was obtained from electronic medical records of 40 pregnant women with the permission of respective department. Informed consent was taken from each admitted patient. Maternal nasal and oral swab samples were collected and tested for SARS-CoV-2 with the centers for disease control and prevention (CDC) recommended kits. Positive confirmatory cases of COVID-19 infection were defined as those with the positive test result. Neonatal oral and nasal swab were collected immediately after delivery in the operating/labour room. All samples, as described above, were tested for SARS-CoV-2 by the use of qRT-PCR, with the CDC recommendation kits.

RESULTS

A total of forty pregnant women with COVID-19 were included in this study. The twenty eight patients underwent lower caesarean section and twelve patients had spontaneous vaginal delivery (Table 1). The median age was 28 years (22-34 years) and the range of gestational age was 30+2 weeks-40+5 weeks. No underline comorbids were present such as diabetes, hypertension or cardiovascular disease. Four of the patients however had gestational hypertension, while nine had gestational diabetes mellitus at 36 gestational weeks. In addition to that three patients were found to have gestational thrombocytopenia at the time of admission, besides another three had obstetric cholestasis, while three had per-eclampsia and one had placenta Previa (Table 2).

MODE OF DELIVERY	N
EMERCGENCY LOWER SECTION	C- 18
ELECTIVE LOWER SECTION	C- 10
SPONTANEOUS VAGINAL DELIVERY	12

Table 1: Mode of delivery.

CLINICAL CHARACTERISTICS	N = 40
AGE	28 (22-34 YEARS)
GESTATIONAL AGE	30+2 – 40+5 WEEKS
EXPOSURE HISTORY TO ENVIROMENT	40
COMPLICATION	
A. GESTATIONAL HYPERTENSION	4
B. GESTATIONAL DIABETES MELLITUS	9
C. GESTATIONAL THROMBOCYOPENIA	3
D. PRE-ECLAMPSIA	3
E. OBSTERIC CHOLESTASIS	3
F. PLACENTA PREVIA	1
G. NONE	20

Table 2: Clinical characteristics.

Twelve of the forty patients presented with fever and their body temperature ranges within 38-39°C, but none had postpartum fever. Other symptoms of upper respiratory tract infection were also found: Fifteen patients had a cough, thirty-two had shortness of breath, twelve reported sore throat and twenty indicated malaise. Additionally, five patients reported obvious symptoms of gastrointestinal tract such as diarrhea. Four patient had loss of taste, however another four patients were asymptomatic. None of the patient developed severe pneumonia or required mechanical ventilation or died due to any complication of COVID-19 (Table 3).

SIGN ANS SYMPTOMS	N
FEVER ON ADMISSION	12
POST-PARTUM FEVER	0
COUGH	15
SHORTNESS OF BREATH	32
SORE THROAT	12

DIARRHOEA	5
MALAISE	20
LOSS OF TASTE	4
ASYMPTOMATIC	4

Table 3: Signs and symptoms.

Laboratorical data showed that twenty pregnant women with COVID-19 pneumonia had elevated white cell count (>11.0X10^9), while five showed leucopenia (<4.0X10^9). While, others had normal cell count (Table 4).

LABORATORY CHARACTERISTICS.	**N**
TLC COUNT (NORMAL)	15
(4.0x10^9 – 11.0x10^9)	
LEUCOSYTOSIS (> 11.0x10^9)	20
LEUCOPENIA (< 4.0x10^9)	5
SARS-CoV-2 (CONFIRMATORY)	40

Table 4: Laboratory characteristics.

All the patients were given oxygen through nasal prongs and antibiotic treatment was commenced. Antiviral treatment was administered to 10 patients (Table 5).

TREATMENT AFTER DELIVERY	**N**
OXYGEN SUPPORT (NASAL CANULA)	40
ANTIVIRAL	10
ANTIBIOTICS	40
CORTICOSTEROIDS	0

Table 5: Treatment after delivery.

Thirty six live births and four fetal deaths were recorded. Seventeen pregnant women had premature delivery; nine out of the thirty six neonates had a birthweight lower than 2500gram. The APGAR score of thirty six live birth at one minute and 5 minute were 7-9 and 9-10. No neonatal death and neonatal asphyxia were observed (Table 6).

The presence of SARS-CoV-2 was tested in all live births through sample taken from nasal and oral swab; however none the test detected SARS-CoV- 2 in these samples.

NEONATAL OUTCOMES	**N**
LOW BIRTH WEIGHT (<2500GM)	9
PRE-MATURE DELIVERY	17
APGAR SCORE IN 1 AND 5 MINUTES (7-10)	36
ASPHYXIA	0
NEONATAL DEATH	0
FETAL DEATH	4
SARS-CoV-2 (CONFIRMATORY)	0

Table 6: Neonatal outcomes.

DISCUSSION

We have presented the clinical data of forty pregnant women with laboratory confirmed COVID-19. The Characteristics of pregnant and non-pregnant women with COVID-19 were identical. No patient had developed severe pneumonia or died from COVID-19. Pregnant women are more susceptible to different pathogens due to their immunocompromised state and physiological changes such as, in 1918 influenza pandemic cause a 37% mortality in pregnant women while 2.6 % in overall population [7]. The risk of complications in pregnant women appeared to increase four times more likely than the general population in pandemic H1N1 2009 influenza viral infection [8]. Wong et al [9] reported that 33% of pregnant women with SARS required mechanical ventilation and 50% were admitted to ICU and mortality rate was 25% from these women. In our study none of the patient had developed severe pneumonia or died due to COVID-19 infection. However our observations established on small number of cases and short duration. According to our observation pregnant women with COVID-19 demonstrated same pattern as with non-pregnant women. Main symptoms of COVID-19 pneumonia in these women were shortness of breath, cough and malaise, whereas less common symptoms were diarrhea, sore throat and loss of taste. Laboratory data indicated that leukocytosis may likely to occur in these women. However not every pregnant women with COVID-19 had same specific symptoms.

Twenty eight pregnant women underwent lower caesarean section. Specifically, the risk of intrapartum vertical transmission by vaginal delivery was one of the main reasons for doing caesarean sections. A study was done showing no risk of vertical transmission in COVID-19 positive women in their last trimester [10]. Another publication revealed low risk of intrauterine transmission of SARS-CoV-2 [11]. Conversely, a publication revealed that vertical transmission in a COVID-19 positive pregnant female with 34 weeks of gestation is possible; Her baby was delivered *via* caesarian section in negative pressure isolation room and was asymptomatic with positive COVID-19 test [12].

Predisposing risk factors in a pregnant female can be use of unsterilised surgical instruments, contamination of labour room or opertaion theatres or close contact with the infected practitioners. Also, newborns can get infected after delivery. However, an increased number of preterm deliveries has been seen with COVID-19 positive pregnant women [13]. The complications seen in these patients were preterm labour, fetal distress and preterm rupture of membranes. The newborn babies had complications of prematurity, respiratory distress syndrome and still birth [10].

In this study seventeen of the forty patients had preterm labour. However premature birth were not related to COVID-19 pneumonia. Importantly, the APGAR score of thirty six live birth at one minute and 5 minute were 7-9 and 9-10 respectively. None of the neonates needed especial treatment.

Notably we tested neonatal oral and nasal swabs sample immediately after birth to find out the possibility of intrauterine infection. Therefore all the samples were taken in operating room at the time cesarean section and in labour room after spontaneous vaginal delivery so that the samples were not contaminated. Our finding showed SARS-CoV-2 was negative in all samples, suggesting no intrauterine vertical transmission. Previous studies also showed no evidence of vertical transmission among infants born to the mothers who developed SARS-CoV-2.

However our observation could be affected by small sample size. All the patients in our study were included in their third trimester of pregnancy so we were not able to certain the possibilities in first and second trimester. For example rubella infection in first trimester could affect more than fifty percent, however incidence rate decrease by half by the end of second trimester [13]. We did not collect the samples from vaginal mucosa which hindered us from analyzing that COVID-19 could transmit through vaginal delivery.

This study was limited by small sample size. Some important consideration should be taken in account to interrupt the finding. First, all pregnant women in their third trimester of pregnancy. Second, the effect COVID-19 infection in first and second trimester of pregnancy should be clarified. Third, the effects of time and mode of delivery on pregnancy outcome should be evaluated. Fourth, whether COVID-19 could affect the placenta which could provide link in vertical transmission should also be investigated further. Fifth, follow up studies in pregnant women and neonates should be done.

CONCLUSION

In conclusion the COVID-19 symptoms in pregnant women were various, with main symptoms being shortness of breath, malaise and cough. We found no evidence of vertical transmission. We believe that findings in our study are important for understanding the clinical characteristics and vertical transmission in pregnant women with COVID-19 pneumonia.

CONFLICT OF INTEREST

We declare no conflict of interest.

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