International Journal of Medical Science in Clinical Research and Review
Online ISSN: 2581-8945
Available Online at http://www.ijmscrr.in Volume 05|Issue 05 (September-October)|2022|Page: 564-573
NLM ID: 101768774 **SJIF Impact Factor:** 5.782

Original Research Paper

COVID 19 INFECTION IN PREGNANT FEMALE: CLINICAL SPECTRUM AND FETO-MATERNAL OUTCOME

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Article Received: 07-08-2022 **Revised:** 26-08-2022 **Accepted:** 16-09-2022

ABSTRACT:

Background and Objective-COVID19 is caused by SARS CoV-2 strain of coronavirus. Our objective was to study the complete clinical spectrum and feto-maternal outcome in pregnant females with Covid 19 infection. **Methods**-This is a retrospective study, including pregnant women with confirmed COVID 19 infection. Data was collected and analysed with regard to clinical spectrum of covid 19 infection and feto-maternal outcome. **Results-** Clinical spectrum of covid 19 infection in pregnancy included, Asymptomatic (20%), mild (30%), moderate (30%) and severe infection(20%). The mean maternal age was 30.9 years. Out of total patients 20 % was primigravida. Among all patients covid infection during third trimester occurred in 80%. 70% was term delivery, 30% was preterm deliveries, out of which 66.67% was iatrogenic preterm. Mode of delivery was LSCS in 70% out of which 57% was emergency LSCS for obstetric indication (85.7%), and in 14.28% cases emergency LSCS was done for severe maternal covid 19 pneumonia. Fetal outcomes were Mean birth weight- 2.65 kg, Median APGAR score at 1min and 5 min was 7 and 8 respectively. There was neither any evidence of vertical transmission nor prolonged NICU stay due to maternal covid infection in our study. **Conclusion**-Feto-maternal outcome is good in asymptomatic as well as in mild to moderate covid 19 infection. Patients with severe disease had increased maternal morbidity with adverse Fetal outcome in the form of fetal hypoxia and iatrogenic preterm delivery.

Keywords:- Clinical spectrum, Covid19 infection, Feto-maternal outcome, Vertical transmission

INTRODUCTION:

The novel corona virus disease (COVID-19) is the most challenging global health crisis that we are facing today. Amid this pandemic, it becomes imperative to study the effects of this infection on pregnancy and feto-maternal outcome. Pregnant women do not appear more likely to contract the infection than the general population [1,2]. Most of the pregnant women with COVID-19 infection are asymptomatic or having mild illness. Compared to COVID 19 infection in non-pregnant females, pregnant women with COVID-19 infection have increased risk of severe illness or death mainly during third trimester of pregnancy [3]. The physiological changes during pregnancy involves cardiovascular system, respiratory systems along with immunological adaptation to tolerate antigenically diverse fetus which inflates the risk towards development of severe respiratory diseases [4,5,6]. The clinical spectrum of COVID 19 infection in pregnancy ranges from asymptomatic COVID-19 infection, through to mild, moderate and severe COVID-19 pneumonia. More than two-third of pregnant women with COVID-19 infection are asymptomatic. Severe maternal COVID-19 infection is associated with two to three times greater risk of preterm birth, principally iatrogenic preterm [7,8]. Other than this, there is no confirmed evidence till date that COVID-19 infection has vertical transmission or any other adverse effect on fetal and neonatal outcomes [8-10].

MATERIAL AND METHODS

Study design and setting: This is a retrospective cohort study conducted in the department of Obstetrics

and Gynaecology, at a tertiary care COVID dedicated hospital eastern Uttar Pradesh, over a period of one year during first and second COVID wave (May 2020-April 2021).

Study Participants: All pregnant females with RTPCR confirmed COVID-19 infection were included in this study admitted at our hospital during study period.

Study Procedure: Detail information of participant's clinical and obstetric profile was collected. The data source was the hospital information system and the patient's medical records. Collected data included demographic profile, clinical profile with COVID clinical staging. Detailed information of complete obstetric management as well as COVID specific management and feto-maternal outcome was collected. The statistical analysis of data was done.

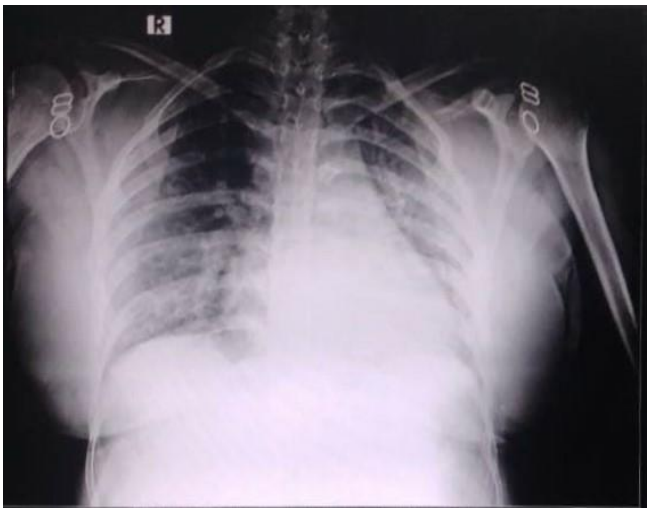
Case Presentation according to clinical staging

[a] Asymptomatic COVID 19 infection

Case 1: A 27 years, Gravida2 Para1 Live1, 39+5 weeks pregnancy with asymptomatic COVID 19 infection in early labour came to the emergency department. On admission her general condition was fair and vitals were stable, Obstetric examination was normal. Her management was started as per hospital protocol (Table-1). Her labour progressed spontaneously and a female baby of 3.2 kg was delivered with APGAR- 7 and 8 at 1 and 5 minutes, atonic PPH occurred and managed medically, average blood loss was 600 ml for which 1 unit whole blood was transfused to the patient. Vital monitoring was done. There was no oxygen requirement. RT-PCR for the baby was done on Day 2 which came out to be negative and the patient was discharged on post normal delivery Day 3 with the baby in satisfactory condition for home isolation. Patient's COVID-19 RT-PCR came negative after 1 week of discharge (Table-2).

Case 2: A 37 years, Gravida3 Para1 Live1 Abortion1 at 36+3 weeks pregnancy with Intrahepatic Cholestasis of Pregnancy (IHCP), asymptomatic COVID-19 infection with history of previous Lower Segment Cesarean Section reported to the emergency department with false labour pain. Her vitals and obstetric examination was with in normal limit. Her management was started as per hospital COVID protocol (Table-1) (Figure 1). Elective Lower Segment Caesarean Section was done at 37 weeks in view of previous Lower Segment Caesarean Section not willing for Trial of Labour after Caesarean with Intrahepatic cholestasis of pregnancy. A male baby was delivered of 3.1 kg, APGAR 7 and 8 at 1 and 5 minute respectively. RT-PCR of the baby on day 2 of life was done, which was negative. Patient was discharged on postoperative Day 7 after suture removal at satisfactory condition with COVID 19 RT-PCR negative status (Table-2).

(Figure 1: X-Ray Case 2)



[b] Mild category

Case 3: A 35 years, Gravida2 Para1 Live1 at 38+6 weeks pregnancy with breech presentation, COVID 19 infection and previous 1 Lower Segment Cesarean Section was admitted to our COVID dedicated hospital with complaints of on & off fever (maximum 101F) for 3 days. She was a known case of hypothyroidism. Her vitals were: Pulse Rate – 100/min, Blood Pressure-128/82 mmHg, SpO2- 99% at room air, Temperature-100.20F. Her Complete Blood Count, Liver Function Test, Kidney Function Test, D-Dimer, C Reactive Protein, Erythrocyte Sedimentation Ratio were normal. Ultrasound Obstetrics was done for fetal well being. Treatment started as per hospital protocol (Table-1)(Figure 2). Tablet Thyronorm was continued. Elective Lower Segment Cesarean Section was done at 39 weeks in view of previous Lower Segment Cesarean Section with Breech presentation. A female baby of 2.6 kg delivered, APGAR 7 and 8 at 1 and 5 minutes. Vital monitoring was continued. She was afebrile postoperatively. There was no oxygen requirement during her complete hospital stay. RT-PCR for the baby was done on Day 2 which was negative and the patient was discharged on postoperative day 7 with the baby in satisfactory condition with COVID 19 RT-PCR negative status (Table-2).

(Figure 2: X-Ray Case 3)

Case 4: A 25 year old, Gravida2 Abortion1 (G2P0+1L0) at 38+5 weeks pregnancy with breech presentation and COVID 19 infection admitted to our COVID dedicated hospital with fever (102 F), sore throat and cough. On examination, Pulse Rate- 98/min, Blood Pressure- 110/80 mmHg, SPO2-98% on room air, Temperature- 100.1F. Her obstetric examination was normal with breech presentation. Management started as per hospital protocol (Table-1). Elective Lower Segment Cesarean Section was done at 38+6 weeks. A male baby of 3.2 kg was delivered, with APGAR 7 and 8 at 1 and 5 minutes. Postoperative stay was uneventful. RT-PCR for the baby was done on Day 2 which was negative and the patient was discharged on postoperative Day 7 with the baby in satisfactory condition with COVID 19 RT-PCR negative status (Table-2).

Case 5: A 30 years, Gravida3 Para1 Live1 Abortion1 at 40 weeks gestation with COVID-19 infection presented to the emergency department with fever, cough, sore throat and labour pains, she was a known case of hypothyroidism and previous LSCS. On examination, Pulse Rate was 120/min, Blood Pressure - 110/71 mmHg, SPO2-98% at room air, Temperature- 100.6F. Management was started as per Hospital protocol (Table-1). Ultrasound and obstetric examination were WNL. Tablet Thyronorm 50mcg was continued. Emergency Lower Segment Caesarean Section was done in view of scar tenderness. A live female baby of 2.90kg was delivered with APGAR 6 and 7 at 1 and 5 minutes respectively. Vital monitoring was continued as per protocol. Postoperative hospital stay was uneventful, there was no O2 requirement during her hospital stay. RT-PCR of the baby was sent on day 2 of life which was negative. Patient discharged on postoperative day 8 after suture removal at satisfactory condition with COVID 19 RT-PCR negative status (Table-2).

[c] Moderate category

Case 6: A 30 years, primigravida at 34+3 weeks with Rh negative pregnancy, Gestational Diabetes Mellitus (on oral hypoglycemic agent) and COVID-19 infection reported to emergency department with antepartum hemorrhage (placenta previa with bleeding per vaginum). On examination, the patient was conscious, oriented, Pallor was present, her Pulse was 112/min, BP- 110/70mmHg, SPO2 - 94%on oxygen by face mask at 4 litre/min. All the investigations were sent as per hospital protocol (Table-1) (Figure 3), out of which CRP, D-Dimer and ESR were raised. Ultrasound Obstetrics was done for fetal well being. Emergency Lower Section Cesarean Section was done in view of bleeding placenta previa after arranging blood products. A female baby of 1.5 kg was delivered, with APGAR 7 and 8 at 1 and 5 minutes respectively. Patient was shifted to the High Dependency Unit and given oxygen support via Non rebreathing mask (NRM) at 15 litre/min. Broad spectrum antibiotics, I.V. steroid therapy, Anticoagulant therapy and Injection Remdesevir was started as per hospital protocol. Patient's condition improved gradually over 10 days. Suture removal was done on day 10 and she was discharged on postoperative day 14 with RT-PCR negative status. RT PCR of baby on day 2 of life was negative, baby admitted to Neonatal Intensive Care Unit in view of preterm and low birth weight for observation; baby was discharged with mother in satisfactory condition (Table-2).

(Figure 3: X-Ray Case 6)

Case 7: A 29 years, Gravida 2 Abortion 1 at 27 weeks pregnancy with COVID 19 infection came to the emergency with complaints of fever, dry cough, and breathlessness for 7 days. On admission patient was conscious, oriented, her pulse was 80/min, Blood

Pressure 104/64 mmHg, Respiratory Rate- 20/min, SpO2- 99% at 6 litre O2 via Non Rebreathing Mask, Temperature- 100.8 F. Investigations were sent as per protocol (Table-1), which were mildly deranged. Chest X-ray with abdominal shield was done after taking consent. Ultrasound Obstetrics was done for fetal well being. She was started on Broad spectrum antibiotics, I.V. steroid therapy, and anticoagulant therapy. Injection Remdesevir was started after relevant counseling and taking consent. Patient gradually improved over the period of 7-8 days and was able to maintain oxygen saturation of 98% on room air. Patient was discharged on day 10 of admission in satisfactory condition (Table-2). Patient was followed up regarding her feto-maternal outcome. Her antenatal period after discharge was uneventful. Emergency Lower Segment Cesarean Section was done in a non-COVID hospital at 38 weeks in view of fetal distress. A male baby was delivered of 3.7 kg, APGAR of 7 and 8 at 1 and 5 minutes.

Case 8: A 28 years P1L1 with postpartum day 5 of full term vaginal delivery reported to the emergency department with symptoms of fever, cough, breathlessness since 5 days with COVID 19 RT PCR positive report. Patient was conscious, oriented, pallor was present, febrile at the time of admission temperature of 102.3F, Pulse Rate: 112/ min, Blood Pressure: 124/76 mmHg, SpO2 of 96% at 14 L O2 via non rebreathing mask.

(Figure 4: X-Ray Case 8)

Investigations were sent as per the protocol (Table-1), which were deranged. Chest X-ray was done (Figure 4). She was given broad spectrum antibiotics, I.V. steroid therapy and inj Remdesivir with Inj paracetamol I.V. 1 unit PRBC was transfused in view of moderate anemia. Patient gradually improved and was discharged with COVID 19 RT PCR negative report in satisfactory condition on day 10 of admission (Table-2).

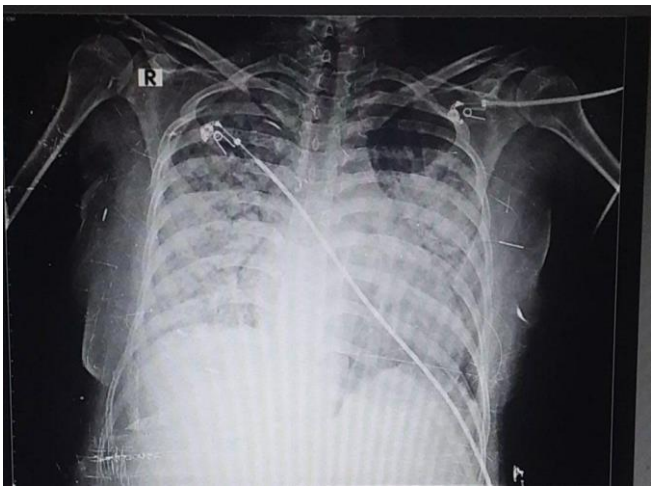
[d] Severe category

Case 9: A 36 years, Gravida 3 Para 1 Live 1 Abortion 1at 28+6 weeks pregnancy with COVID-19 infection was referred to our hospital with fever (102 F) and breathlessness for 7-8days, she was a known case of hypothyroidism and previous LSCS. On admission Patient was oriented but anxious, her Pulse Rate 119/min, Blood Pressure 102/64mmHg, SPO2 88% at room air. Oxygen support started via non rebreathing mask @ 15 lit/min. All investigations were sent as per protocol (Table-1), which came out to be deranged. USG for fetal wellbeing was done. I.V. steroid therapy, Broad spectrum antibiotic was started. Patient was given one unit of convalescent plasma after taking consent and proper counselling regarding risk benefit ratio. She was shifted to High Flow Nasal Cannula @60 lit/min the next day as she was not maintaining saturation. Patient was Intubated as she started becoming delirious and was not maintaining saturation. Decision of preterm emergency Lower Segment Cesarean Section in view of severe COVID 19 pneumonia was taken after discussion with critical care team, Anesthesiologist, Pediatrician and patient's relatives. A female baby was delivered, birth weight 1 kg, APGAR was 2 and 4 at 1 and 5 minutes respectively. Resuscitation was done; the baby could not be revived. Postoperatively, the patient was continued on mechanical ventilation. Broad spectrum Antibiotics and I.V steroid therapy continued, Anticoagulant therapy, Injection Remdesevir started after delivery. On Postoperative day 11 the patient was successfully extubated and shifted to Non Invasive Ventilation. Patient's RT-PCR came out to be negative on postoperative day 26 so that she was shifted to non COVID hospital as the patient still needed non invasive ventilation. Patient followed up telephonically, she developed post COVID transverse myelitis for which she managed conservatively. Over the period of 2 months she recovered and was discharged at satisfactory condition from non COVID hospital (Table-2).

Case 10: A 32 years, Gravida 2 Para 1 Live1 at 34+1 weeks pregnancy, with severe COVID 19 pneumonia, severe acute hepatitis, acute cholecystitis and septicaemia admitted to ICU with severe jaundice and in hepatic encephalopathy, she was a known case of previous 1 lower segment caesarean section. On admission the patient was disoriented (GCS-E2V4M4), her pulse- 120/min, BP- 100/60 mm of Hg,

Temperature-100.8F, SPO2 95% at room air. management was started as per hospital COVID protocol (Table-1) (Figure 5) and consultation with gastroenterologist. Patient went into spontaneous preterm labour on day 4 of admission, delivered a baby girl with birth weight –2.3 kg, Apgar score 7 &8 at 1 and 5 mins. Patient had received 2 units of Fresh frozen plasma & 1 unit of packed red blood cells but the patient's condition was not improved. She developed septic shock and fulminant hepatic failure, she was started on inotropes. On day 10 of admission the patient became COVID RT PCR negative due to which she was transferred to Non-COVID hospital for further management. Baby was kept in NICU in view of preterm birth & weak rooting and suckling reflex with positive sepsis screen. RT-PCR was done on day 2 of birth which was negative. Baby was discharged on day 10 of birth in satisfactory condition. On telephonic follow up, the patient's condition deteriorated gradually and she expi red after15 days of delivery (Table-2).

(Figure 5: X-Ray Case 10)



Management of Pregnancy with COVID-19 Infection

DEPARTMENT OF OBSTETRICS & GYNAECOLOGY
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MILD
FEVER/ URTI
NORMAL SATURATION
NO BREATHLESSNESS/ HYPOXIA,
RESPIRATORY RATE: <24/MIN,
SPO_2 >94% (at room air)
ASYMPTOMATIC with High Risk factor

COVID ISOLATION WARD/ PRIVATE ROOM
-Symptomatic Management
-Infection Prevention & Control Practices
-Ambulation inside room advised
-**Doxycycline, Ivermectin and Favipiravir are contraindicated in Pregnancy**

-Tab. Azithromycin 500 mg OD for 5 days can be given if indicated.
-Inj. Enoxaperin 40 mg SC OD till patient is hospitalized or continue according to VTE score
-Tab Vitamin C - 500mg TDS (not to be given in renal dysfunction)
-Tab zinc plus multivitamins– OD
-Tab PCM – 500mg – SOS
-Continue Iron/ Calcium/ Folic Acid/
Other prescribed medicine advised by Obstetrician
-SpO_2 and temperature monitoring every 6 hours
-Clinical condition of the patient to be assessed every 24 hours.
-Ultrasound Obstetrics for Fetal Well Being
-Antenatal Investigations as per gestational age.
-Mode and time of delivery as per Obstetric indication

X-Ray and HRCT chest can be done with abdominal shield if clinically indicated as maternal wellness is prime.

MODERATE
RR-24-29/ min, SPO_2-91-94% ON ROOM AIR or Dysponea and Hypoxia along with fever and cough

COVID HDU

O2 Via Nasal Canula/ face Mask/through non rebreat her mask

Target SPO2 92-96%

-Tab. Vitamin C 500mg TDS 15 days(not to be given in renal dysfunction)

-IV Dexamethasone 6 mg /day x 10 Days

-Inj. Enoxaparin 60mg SC OD till patient is hospitalized or continue according to VTE score
-Tab zinc plus multivitamins OD
-Antibiotics: Broad spectrum antibiotics (if indicated)

-Management of Obstetrics Comorbodities

-SpO2,Respiratoryrate,Pulse rate: 2 hourly
-BP ,Temp: 8hrly; Urine output: 24 hrs
-Investigations- as per COVID protocol

-Ultrasound Obst for Fetal Well Being
- Antenatal Investigations as per gestational age
-Mode and time of delivery as per Obstetrics Indication

-If patient's condition is deteriorating, mode & time of delivery should be individualized based on maternal status, concurrent disorder, gestational age.

Remdesivir / Tocilizumab/ Convalescent plasma/ Pulse steroid therapy to be considered if benefits outweight risks, after discussion with consultants

SEVERE
RR≥30, SPO_2 ≤90% ON ROOM AIR OR on HFNC/NIV/INVASIVE VENTILATION

COVID ICU

Patient is to be managed by multidisciplinary Team involving Critical Care medicine, General Medicine, Anaesthesia, Pediatrician and Obstetrician.
-IV Dexamethasone 6 mg /day as per COVID ICU protoco

-Inj. Enoxaparin 60mg SC OD till patient is non ambulatory or continue according to VTE Score
-Antibiotic: Broad spectrum antibiotics to be given
-SpO_2,BP, Respiratory rate, Pulse rate: continuous Monitoring
-Temp & RBS: 6 hrly; Urine output: hourly

-Investigations- as per COVID ICU protocol

-Bedside Ultrasound Obstetrics for Fetal Well Being
-Mode & timing of delivery should be individualized based on maternal status and gestational age.

-Preterm termination >28 weeks (preferably >32 wks) may be required in the setting of maternal worsening status for resuscitation purpose

- Breast feeding is not contraindicated in COVID 19 infection
- If patient is stable, breast feeding should be initiated after discussion with the patient and relatives

Table 1: Hospital protocol for management of COVID 19 infection in Pregnancy

Parameters	Case-1	Case-2	Case-3	Case-4	Case-5	Case-6	Case-7	Case-8	Case-9	Case-10
Maternal age	27	37	35	25	30	30	29	28	36	32
GPL Status	G2P1L1	G3P1+1L1	G2P1L1	G2P0+1L0	G3P1+1L1	PRIMI	G2P0+1L0	P1L1	G3P1+1L1	G2P1L1
Period of gestation at time of covid infection	39+5weeks	36+3weeks	38+6weeks	38+5weeks	40weeks	34+3weeks	27wks	Term pregnancy (37wks)	28+6 weeks	34+1weeks
Period of gestation at the time of delivery	39wks 5days	37weeks	39weeks	38+6weeks	40weeks	34+3weeks	38wks	38wks 2days	29+1 weeks	34+5weeks
Mode of delivery	Full term vaginal delivery	Elective LSCS	Elective LSCS	Elective LSCS	Em LSCS	Preterm Em LSCS	Em LSCS	Full term vaginal delivery	Em LSCS	Preterm vaginal delivery
COVID clinical spectrum (signs/symptoms)	Asymptomatic	Asymptomatic	Fever	Cough and cold	Fever Cold	Breathlessness	Fever Cough Breathlessness	Breathlessness	Fever Cough Breathlessness	-
Preterm/Term delivery Spontaneous /induced	Term	term	term	term	Term	preterm	Term	term	Preterm	preterm
Any obstetrics complications/ High risk factors	Atonic PPH	Previous 1 LSCS/ IHCP	IHCP/Breech	Breech presentation	-	Rh negative /GDM / placenta previa	-	-	-	HAV +, severe jaundice
Pre -existing Medical condition / Co-morbidities due to covid	-		Hypothyroidism	-	hypothyroidism,H/O raise BP in previous pregnancy	GDM	-	-	-	Acute cholecystitis with hepatic encephalopathy
Obstetric complication due to covid	-	-	-	-	-	-	-	-	-	-
Birth weight of baby	3.2 kg	3.1 kg	2.6 kg	3.2 kg	2.9 kg	1.5 kg	3.7 kg	-	1 kg	2.3 kg
Baby (Live / still born)	Live	live	live	live	Live	live	live	-	live	live
Apgar score at 1 & 5 mins	7&8	7&8	7&8	7&8	6&7	7&8	7&8	-	2&4	7&8
NICU admission	-	-	-	-	-	-	-	-	-	-
Vertical transmission history	-	-	-	-	-	-	-	-	-	-
Median duration from covid infection to discharge	5 days	12 days	8 days	10 days	12 days	15 days	-	21 days	-	-
Median duration from delivery to	3 days	7 days	7 days	7 days	8 days	14 days	-	15 days	24 days (referred to noncovid	Expired on Day 15 postpartum

discharge									hospital)	
Medical therapy	Supportive treatment according to protocol	Supportive treatment according to protocol	Tab PCM, Tab Thyronorm, Tab Udiliv and Supportive treatment	Supportive treatment according to protocol	Tab PCM, Tab Thyronorm,a nd Supportive treatment	inj remdesivir, iv antibiotics, iv steroid, LMWH (as per protocol)	inj remdesivir, iv antibiotics, iv steroid, LMWH (as per protocol)	inj remdesivir, iv antibiotics, iv steroid, LMWH (as per protocol)	Faviflu, inj remdesivir, iv antibiotics, inj dexa, LMWH and Convalescent Plasma (One Unit)	Faviflu, inj remdesivir, iv antibiotics, inj dexa, LMWH
Stay at hospital	3 days	11 days	8 days	8days	8 days	14 days	10 days	10 days	26 days (referred to noncovid hospital)	19 days

Table 2 – Case wise patient's clinico-demographic profiles and management

RESULTS AND DISCUSSION

Pregnant women are especially vulnerable to respiratory pathogens and severe pneumonia because of physiological and immunological changes, increased oxygen consumption, decreased functional residual capacity, and decreased chest compliance, which can result in increased maternal and fetal morbidity and mortality [11]. Furthermore, pregnant women who have pneumonia have a significantly increased risk of having low birth weight infants, as well as preterm and small for gestational age infants with low APGAR scores and being delivered via Caesarean section [12]. There is still insufficient data to assess the impact of COVID-19 on pregnant women, and the consequences of COVID-19 infection and the potential risks of vertical transmission have become a major concern.

Demographic and clinical profile of pregnant patients

In our study it was seen that the mean maternal age of the pregnant COVID-19 infected patients was 30.9 years (25-37 years). In Munir SI et al., 2020 [13] study, the mean age of COVID-19 pregnant women was around 29 years ± 4.17 which is similar to our study findings. Dashraath P et al., 2020 [14] also showed that the average age of presentation of pregnant women with COVID 19 infection was in the range of 27- 44 years. Cao D et al., 2020 [15] study findings (29 to 35 years old) further supports the findings of our study. In our study, among the women presented to the COVID care unit, 20% were asymptomatic to the infection, mild and moderate infection was seen in 30% patients each, while 20% of the women presented with severe infection. Khoiwal K et al., 2022 [16] in their study also showed that among the symptomatic patients in their study, 18% had severe pneumonia which was similar to our study.

Obstetric profile of pregnant patients

The mean gestational age of the pregnant women in our study was 34.9± 4.84 weeks. Chen H et al., 2020 [17] had a similar finding in their study with the range of gestational weeks at admission being 36 weeks to 39 weeks 4 days. Another study conducted in Wuhan reported the mean gestation ranged from 33 to 41 weeks [15]. Among the patients presented in our study, 60% had previously known medical and/or obstetric co-morbidities; namely hypothyroidism (33.3%), intrahepatic cholestasis of pregnancy (33.3%), gestational diabetes mellitus (16.4%), antepartum hemorrhage (16.4%), and hepatitis with severe jaundice (16.4%). In their study, Gajbhiye RK et al., 2020 [18] enlisted the most common comorbidities associated with pregnant women with COVID-19 were hypertensive disorders (10%), diabetes (9%), placental disorders (2%), co-infections (3%), scarred uterus (3%) and hypothyroidism (3%) which were less compared to our study which could be due to early diagnosis and treatment of the study subjects in their study. Munir SI et al., study [13] reported anemia in 60% cases, 20% patients had hypertension in pregnancy, 10% were diabetic and another 10% had hyperthyroidism, whereas, the other 50% of the patients had no associated medical disorders with pregnancy. The difference of results reported here from other publications may be simply due to the small number or other relative risk factors. In our study out of total patients 20 % were primigravida. This finding is supported by Munir SI et al., 2020 [13] in their study done among 20 patients who showed 4 (20%) were primigravida, 5(25%) females were gravida 2 and remaining 11(55%) cases were gravida 3 and 4. In the current study the most common symptom was fever and breathlessness, followed by cough and cold. Other studies also show a similar pattern. In Munir SI 2020 [13] study it was seen that fever was most common presenting symptoms in 9 patients followed by cough in 7, myalgia in 4, and diarrhoea in 2 and shortness of breath in 2 patients. These results are similar to results of a recent study by Chen H et al., 2020 [17] who also reported fever as the most common symptom present.

Among all patients in our study COVID infection during the third trimester occurred in 80%, rest 20% infected in the second trimester, none were infected in the first trimester. These results are similar to results of a recent study by Chen H et al., 2020 [17] who reported nine out of nine (100%) women diagnosed with COVID-19 in their third trimester of pregnancy. Munir SI 2020 [13] study also supports our findings in which enrolled subjects acquired COVID 19 infection in their 3rd trimester.

Maternal outcomes

Our study showed 60% women had a term delivery, while 40% women delivered prematurely, out of which 66.67% was iatrogenic preterm. Dashraath P 2020 [14] had a similar finding in which the percentage of preterm birth was 39%. Another study by Chen H et al., 2020 [17] showed out of the nine live births recorded, four patients had preterm labor (44%), which is slightly higher than our study. In the current study the time of delivery was 34-40 weeks with a single delivery at 29+1 weeks. The most common mode of delivery among our pregnant patients was LSCS (70%) out of which 57% was emergency LSCS. The indication of LSCS were obstetric in 6 patients while only in one patient emergency LSCS was done due to severe maternal COVID 19 pneumonia. These findings can be corroborated with Munir SI study [13] the time of deliveries was 35 – 39 weeks; all were delivered by caesarean section. In a study published in the Lancet of Infectious Diseases, Yu N et al., 2020 [19], reported seven COVID 19 positive women. The time of delivery was 37 – 41 weeks, all by caesarean section and the outcome of the pregnant women and neonates was good. Zhu H et al., 2020 [20]reported nine pregnant women with COVID 19. Seven of the women delivered their babies by cesarean section and two by spontaneous vaginal delivery. Chen H et al., 2020 [17] also reported that all nine pregnant women in this study underwent LSCS, and the indications for LSCS included severe pre-eclampsia, a history of caesarean sections, and fetal distress. In Cao D study [15], two patients (20%) underwent vaginal delivery successfully, two patients underwent intrapartum cesarean section for fetal distress (20%), and the remaining six pregnant women underwent elective LSCS (60%) directly for previous LSCS history, pre-eclampsia, placenta abruption, twin pregnancy. In neither of the above mentioned studies COVID 19 was the reason for conducting cesarean delivery, however there is uncertainty about the risk of intrapartum mother-to-child transmission of COVID 19 by vaginal delivery till now.

Fetal outcomes

Our study recorded ten live births, three preterm and the rest term. The mean fetal weight in our study was recorded 2.65 kg (range 1- 3.7 kg). Two neonates had birth weights lower than 2500g. The highest recorded APGAR scores at 1 and 5 mins were 7 and 8; while the lowest was 2 and 4 for a single neonate who was born preterm at 29+1 weeks and had birth weight of 1kg. Similar findings were seen in a study by Chen H et al., 2020 [17] who recorded nine live births with an average birth weight of 2.70 kg. Four patients had preterm labour, but all beyond 36 gestational weeks. All nine live births had a 1-min APGAR score of 8–9 and a 5-min APGAR score of 9–10 which is higher than our study. Similarly, in Cao D study [15], four out of ten newborns were premature, The mean birth weight was 3.05 kg. All live births had a 1 and 5 min APGAR score of 8–9 and 10, which is also higher than our study. The difference in the APGAR scores in our study could be possibly due to better resuscitation services available at their centre. Our study reported no evidence of vertical transmission in neonates nor prolonged NICU stay in any case due to maternal COVID infection. This finding is corroborated from various other publications [15, 17, 20] that also reported no vertical transmission of COVID from mother to infants, however since the sample size is small, such assumption should be made with caution.

CONCLUSION:

Feto-maternal outcome is good in asymptomatic as well as in mild to moderate COVID 19 infection. Patients with severe disease had increased maternal morbidity with adverse Fetal outcome in the form of fetal hypoxia and iatrogenic preterm delivery.

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