ORIGINAL RESEARCH PAPER
Volume - 14 | Issue - 03 | March - 2025 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

EVALUATION OF MATERNAL AND NEONATAL OUTCOME AMONG PREGNANT WOMEN WITH OR WITHOUT COVID-19 INFECTION IN A TERTIARY CARE CENTRE

Obstetrics & Gynaecology

Dr. S. G. Vijayshree M.S.,(OG), Assistant Professor ,Department of Obstetrics and Gynaecology, Coimbatore Medical College Hospital, Coimbatore, Tamilnadu, India.

Dr. B. Palanisamy M.S., Assistant professor, Department of General Surgery, Government Medical College and ESI Hospital, Coimbatore, Tamilnadu, India.

Dr. Gayathri Ganesh M.S., Assistant professor, Department of General Surgery, Government Medical College and ESI Hospital, Coimbatore, Tamilnadu, India.

ABSTRACT

Background: The impact of coronavirus disease 2019 (COVID 19) on maternal and newborn health is unclear.We aimed to evaluate the association between severe acute respiratory syndrome coronovirus- 2 (SARS-CoV-2) infection during pregnancy and their outcomes compared with unaffected pregnant women. **Methods:** A Prospective observational study conducted in tertiary care centre from April, May , June of 2021. During this period 387 covid affected mothers were identified. They along with unaffected mothers were followed up till discharge. Spectrum of presentation and course of disease in pregnancy with its maternal and fetal outcome were analysed and compared. **Results:** OF the total 3137 antenatal mother followed up ,12.7%were affected by covid infection. Among 387 covid affected mothers 59 found to have obstetric complication .43.5%required supportive care,27.6%needed nasal oxygen ,11.3%required CPAP and 4.6% were intubated. 78% underwent caesarean delivery. Mortality was high among covid mothers compared to unaffected mothers. **Conclusion:** COVID 19 infection in pregnancy was associated with substantial risk of morbidity and mortality and to some extent affect neonates also. Clinically better outcome were observed in those antenatal patients who were treated early.

KEYWORDS

COVID 19 ,CT score, Pregnancy outcome.

INTRODUCTION

Corona virus disease 2019 (COVID-19) is caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and was declared a global pandemic in March 2020. Pregnant people and infants may be particularly susceptible to COVID-19 because the physiologic changes of pregnancy involve cardiorespiratory and immune systems, which may result in an altered response to SARS-CoV-2 infection in pregnancy.

Although there has been extensive research on COVID-19 since its initial emergence, the broad range of perinatal COVID-19 outcomes continues to emerge. COVID-19 on pregnancy have reported higher rates of cesarean delivery, preterm birth, and maternal morbidity and mortality index scores.

Pregnant women who are older, overweight or have pre-existing medical conditions such as hypertension and diabetes are at particular risk of serious outcomes of this disease. Its spread and mortality rate among antenatal women has been alarming , making it a new entity to be managed by Obstetricians.

Nasopharyngeal, Oropharyngeal swabs are being used to diagnose the infection. Whereas X rays , CT chest, Lung ultrasound are the radiological tools which have been used to detect and evaluate the severity of lung involvement from the COVID 19 infection. Different scores for HRCT chest were formulated to quantify the severity of lung involvement.

OBJECTIVE:

To compare and analyse the effect of Coronavirus disease 2019 [Covid -19] on Maternal , Perinatal and Neonatal outcome compared with non infected , concomitant antenatal wome.

MATERIAL & METHODS

Study Design: Prospective Observational study

Place Of Study : Coimbatore Medical College Hospital

Study Population:

Pregnant mothers admitted in Coimbatore Medical College Hospital during the 2nd wave of Covid-19 during the months of April , May and June 2021.

Inclusion Criteria

All pregnant mothers admitted in Coimbatore Medical College Hospital during the months of April, May and June 2021.

Inclusion criteria for COVID – 19 mothers include laboratory confirmed and or clinically diagnosed COVID – 19 , patient being pregnant on admission and availability of clinical characteristics of COVID – 19.

Exclusion Criteria

Patient who did not give consent for the study

Study Protocol

After obtaining informed consent from the pregnant women who are admitted in Coimbatore Medical College Hospital in the department of Obstetrics and Gynaecology, they were divided as COVID affected pregnant mother and non COVID pregnant mother and was followed up till her discharge from the hospital .

COVID -19 in pregnancy determined by laboratory confirmation of COVID -19 and / or Radiological pulmonary findings.

CT CHEST

Low dose unenhanced chest spiral ungated CT scans for suspected COVID 19 were acquired on an 80 slice system (Aquilon prime; Canon medical system)

All CT scan were successfully acquired during a single inspiratory breath hold using the HRCT technique based on thin sections and high spatial resolution kernel to improve lung Parenchymal anatomical details. The diagnosis of COVID 19 pneumonia was based on presence of Consolidation , Ground glass opacities and Crazy paving pattern according to Fleischner society standard glossary for thoracic imaging .

The CT severity score proposed by Pan et al was calculated for each of the 5 lobes considering the anatomical extension as follows:

No involvement = 0
<5% involvement = 1
5-25% involvement = 2
26-50 % involvement = 3
51-75% lung involvement = 4
>75% involvement = 5.

The overall CT Score was a sum of each single lobar score and ranged from 0 (No involvement) to 25 (maximum involvement) blinded to official reports , 2 radiologist with more than 10 years experience in

chest imaging reviewed all lung parenchymal CT scans and decisions were reached in consensus.

The clinical severity, morbidity, 02 dependancy, response of the patient to treatment with respect to lung involvement and gestational age were observed by obstetrician of CMCH.

The course of her stay and peripartum period was analysed . Entire events were recorded, and the entire data was analysed using contingency tables, student T test and percentage analysis, and the results were analysed.

Review Of Literature:

In a study titled ' The impact of COVID-19 on pregnancy outcomes: a systematic review and meta-analysis ', COVID-19 in pregnancy is associated with preeclampsia, stillbirth and preterm birth compared with no COVID-19. Symptomatic COVID-19 was associated with an increased risk of cesarean delivery and preterm birth compared with asymptomatic COVID-19. [1]

In a study tilted 'Impact of COVID-19 on maternal and neonatal outcomes: a systematic review and meta-analysis', The clinical course of COVID-19 in most women is not severe, and the infection does not significantly influence the pregnancy and a high caesarean delivery rate is reported [2]

In another study tilted ' COVID-19 (SARS-CoV-2) Infection in Pregnancy: A Systematic Review' shows COVID-19 infection in pregnancy leads to increased risk in pregnancy complications such as preterm birth, PPROM, and may possibly lead to maternal death in rare cases. There is no evidence to support vertical transmission of SARS-CoV-2 infection to the unborn child[3]

Another article,' A systematic review of pregnant women with COVID-19 and their neonates' concluded most covid 19 infections were mild to moderate and the common symptoms were cold and cough [4]

In another study ,regarding neonatal outcome, ,Coronavirus disease 2019 (COVID-19) and pregnancy: a systematic review reports stillbirth , neonatal death , preterm birth , low birth weight , fetal distress , and neonatal asphyxia among covid 19 affected mothers . There are reports of neonatal infection, but no direct evidence of intrauterine vertical transmission has been found[5]

An article named ' Risk factors for oxygen requirement in hospitalized pregnant and postpartum women with COVID-19' In pregnant women, a population at higher risk for developing critical forms of COVID-19, BMI ≥ 30, smoking, chronic hypertension, obstetric reasons for hospitalization, respiratory rate ≥ 24 cycles/min, O2 saturation < 95%, ground glass on CT and combination of altered laboratory parameters were identified as risk factors for oxygen need.[6]

RESULTS

Among the 3137 patients admitted in OG department during the months of April ,May,June 2021 , 387 pregnant mothers had been affected by COVID infection and 2750 were not affected by covid infection .Hence accounting for 12.7% of admitted pregnant mothers are affected by COVID infection.

1. Age

AGE	COVID 19 POSITIVE	COVID 19 NEGATIVE
BELOW 20	39	272
21-25	171	1226
26-30	117	743
31-40	52	374
ABOVE 40	7	135

2. PARITY

PARITY	COVID AFFECTED MOTHERS	COVID UNAFFECTED MOTHERS
PRIMI	202	1288
MULTI	187	1479

3. Preexisting Complication Among Pregnant Women With And Without COVID 19 At The Time Of Admission To Labour Ward

COMPLICATION	COVID POSITIVE	COVID NEGATIVE
GESTATIONAL HYPERTENSION	13	326
PRE ECLAMPIA / HELLP	6	30
ANAEMIA	6	279
GDM	38	386
HEART DISEASE	3	57
THYROID DISORDER	6	285

4. Mode Of Presentation In COVID -19 Positive Pregnant Woman

ASYMPTOMATIC	324
SYMPTOMATIC	
Cough	81
Fever	104
Shortness of breath	24
Vomiting / Diarrhea	17
Myalgia	67
Medical complication	21
Admission in ICU	18

Table 5: CT Chest Score <4 And Severity Of Disease:

AGE	CT CHEST SCORE <4	SURVIVORS	MORIBUND	DECEASED
19-23	88	88	16	0
24-28	92	92	23	0
29-35	18	17	10	1

The percentage of moribund patients in the age groups 19-23 and 24-28 with CT chest score <4 were 18.18% and 25% respectively, whereas the percentage of moribund patients with CT chest score <4 in the age group 29-35 is 55.55% and there was one death in the group.

Table 6: CT Chest Score >4 And Severity Of Disease:

AGE	CT CHEST SCORE >4	SURVIVORS	MORIBUND	DECEASED
19-23	11	10	4	1
24-28	12	12	3	0
29-35	9	8	3	1

The percentages of moribund patients among different age groups of 19-23, 24-28 and 29-35 with CT chest score>4 are 36.36%, 25% and 33.33% respectively.

7. Oxygen Requirement

OXYGEN	COVID AFFECTED MOTHERS		
REQUIREMENT	Apr-21	May-21	Jun-21
ROOM AIR	48	130	41
NASAL O2	10	75	22
CPAP	2	38	6
INTUBATION	0	15	3

8. Distribution Of Cases : Based On Mode Of Delivery

DISTRIBUTION OF CASES	COVID AFFECTED MOTHERS	COVID UNAFFECTED MOTHERS
UNDELIVERED	208	705
LABOUR NATURAL	36	900
LSCS	129	1017
ABORTION/MVA	8	63
ASSISSTED VAGINAL DELIVERY	3	42
HYSTEROTOMY	1	3
LAPAROTOMY	3	15

9. Total Cases Admitted With Complications - Distribution Were As Follows

	COVID AFFECTED MOTHER	COVID UNAFFECTED MOTHERS
HYPERTENSION DISORDERS	16	326
HELLP	2	7
DIVC	1	1
ECLAMPSIA	2	23
HYPOTHYROID	6	276
HEART DISEASE	3	57
ANAEMIA	4	279
GDM	7	386
OVERT DM	1	21

HYPERTHYROID	0	9
SICKLE CELL ANAEMIA	0	3
JAUNDICE COMPLICATING PREGNANCY	1	7
DVT	1	3
THROMBOCYTOPENIA	6	21
APH	0	18
Epilepsy	0	27
PPH	1	11
Preterm delivery	4	220
ICU admission	18	349
NICU admission	19	343

10. Neonatal Outcome

NEONATAL OUTCOME	COVID	NON COVID
1.STATUS OF THE BABY		
ALIVE	169	1962
DEAD	0	52
2.BIRTH WEIGHT OF THE BABY		
1-2Kg	6	206
2-3Kg	124	1316
>3Kg	39	440
3.NICU ADMISSIONS	19	343
4.MORTALITY	3	13

DISCUSSION

- Of the total 3137 patient studied and followed up, 12.7 of the mothers were affected by COVID infection
- Among the COVID affected mothers 43.5% of the COVID infected mothers required supportive measures ,27.6 % needed nasal oxygen , 11.3% required CPAP and 4.6 % were intubated .
- Cesarean deliveries skyrocked in pregnant women with COVID 19 infection.
- 78.1% of COVID infected mothers underwent Cesarean section in place of 52.1% of cesarean section in non COVID mothers.[7]
- This is in concordance with study by Della Gatti et al , where 90.2 % COVID positive mothers underwent cesarean delivery[8]
- Among the 387 COVID affected women 59 found to have complications. Among them 64% had one of the following complication hypertension, Hypothyroid, GDM and Anemia.
- 1.9 % mortality was found among babies delivered to COVID positive mothers.
- Mortality among COVID infected pregnant mothers (3.1%) was more in comparison with pregnant mothers without COVID infection (0.2%)
- Compared with the survivors the deceased patients were more symptomatic during admission and also presented with deranged Biochemical markers . It was also seen that the deceased patients were of advanced gestational age who presented with severe symptoms on admission .

CHEST IMAGING

CT chest taken for the antenatal patients were observed .Typical signs of COVID 19 are mostly bilateral ,multifocal ,lower lobe and posterior predominant ground glass opacities and crazy paving pattern and consolidation.

It was observed that 1 of the deceased person had atypical CT chest finding of peribronchovascular involvement .Other 2 had typical CT chest findings .It was also noted that certain moribund and clinically severe patients had only minor atypical CT chest findings , but there was a strong positive correlation between the CT scores and severity of the COVID disease. Compared with the survivors , deceased patients and severely ill patients had similar CT chest findings on admission.

CONCLUSION

- COVID - 19 infection during pregnancy was associated with substantial risk of morbidity and mortality and to some extent affect neonates also .
- Cesarean section rate is increased in COVID affected mothers when compared to non COVID mothers
- Mortality rate was increased among the COVID -19 affected mothers but mortality among the babies born to COVID positive mothers was unaltered .
- Further CT chest in COVID pneumonia is the gold standard but it is also observed that a significant number of patients who were classified with severe symptoms had atypical or lesser CT scores compared with the surviving and clinically milder cases of infection .We arrive at a conclusion that treatment for the COVID 19 virus infected patients are to be based on combination of clinical symptoms and CT scores rather than to be entirely based on CT scores alone .

Clinically better outcomes were observed in those antenatal patients those who were treated early .In antenatal patients where the risk of exposure to ionising radiation are considered it is better not to entirely depend on CT scores and for early initiation of treatment depending on clinical scenario for better outcomes.

Limitations Of The Study

The study conducted in a small population of a demarcated area under particular time period , which may not reflect the universal effect of COVID- 19.

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