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Maternal risk factors and outcome associated with COVID-19 disease in COVID-19 RT PCR positive pregnancy in a tertiary care hospital

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Abstract

Background and Objectives: Most of the published literature related to COVID-19 and pregnancy comes from China and other developed countries. There is a paucity of studies in India. The study was done in a dedicated COVID-19 tertiary care hospital which alone caters to the entire population of the Cuddalore district. The study will add to evidence about clinical manifestation in pregnant females that will help the physicians involved in patient care to take rational and timely decisions regarding the management of cases. Therefore, the research was designed to study clinical manifestations and maternal risk factors and outcome of COVID-19 positive pregnant females in a tertiary care hospital.

Methods: The data for this study will be collected from the patient admitted to Rajah Muthiah Medical College and Hospital, Annamalai University, Chidambaram during the period August 2020 to October 2022. The data for this study will be collected from the patient admitted to Rajah Muthiah Medical College and Hospital, Annamalai University, Chidambaram during the period August 2020 to October 2022.

Results: 200 antenatal and postnatal were included in the study. Among those in post-natal period, 61.1% had LSCS and 38.9% had normal delivery. 5.4% had preterm labour, 5.4 % had PPRM and 1.2% had PPH. 0.5% participants had ARDS and 2.5% had pneumonia. Maternal oxygen requirement was 16.5% in antenatal period and 83.5% were in postnatal period during the study. 3% participants had an abortion and 5% had IUD. The mean serum ferritin level was found to be significantly higher among those without pregnancy related complications than those with at least one complication.

Conclusion: A rapid increase of CS was observed, especially at the beginning of the pandemic, most likely due to lack of knowledge and robust recommendations. Preterm birth rates were elevated, with iatrogenic reasons potentially involved. While pregnant women have an increased risk for ICU admission and mechanical ventilation, the mortality trend was not clearly elucidated. Outcomes, maternal ICU admission and mechanical ventilation rates were found relatively lower.

Keywords: COVID-19, SARS, MERS, LDH, ferritin, D-dimer, CRP

Introduction

The world health organization (WHO) declared the corona virus a pandemic epidemic in March 2020, indicating that the deadly virus is circulating outside of control measures in majority of the countries around the world. Corona viruses are large enveloped positive sense RNA viruses. The term “corona” refers to knob like surface glycoprotein (S protein or spike protein) in the family coronaviridae [1]. There are four coronaviruse genera: Alpha coronaviruses, Beta coronavirus, Gamma coronavirus, Delta coronavirus. Coronaviruses (CoV) are known human pathogens which cause respiratory and gastrointestinal disease. Four corona virus are endemic globally and accounts for 10-30% of upper respiratory tract infections in adults. In 2002 and 2012, two new coronavirus were found to be cause of Severe acute respiratory syndrome (SARS) and Middle east coronavirus syndrome (MERS) respectively. WHO in February 2020 designated the disease as COVID-19 (which stands for coronavirus disease 2019). The causative agent is designated as Novel corona virus or SARS CoV-2. SARS CoV 2 structural spike protein binds to the ACE-2 receptor. Following attachment the virus uses host cell receptors and endosomes to enter the cells. Structural proteins are synthesized 2 leading to completion of assembly and release of viral particles. This viral life cycle provides potential target for drug therapy. Corona virus exhibits marked variability in severity, most of them are harmless producing common cold [2]. However few subtypes are highly lethal killing 10-30% of those infected.

Corona virus related common cold is usually associated with fever and sore throat .it might progress to viral pneumonia and bronchitis. There are increased chances of secondary bacterial pneumonia too. Pregnant women don't appear to be more susceptible to consequences of infection of covid-19 than general population (FOGSI). According to studies by ajog 86% are asymptomatic. The risk of preterm birth is higher in babies born to COVID-19 infected females. COVID-19 infection during pregnancy can lead to stillbirth and preterm birth. However there is no vertical spread. Infection mainly occurs by droplet infection. Most of the published literature related to COVID-19 and pregnancy comes from China and other developed countries [3]. There is a paucity of studies in India. The study was done in a dedicated COVID-19 tertiary care hospital which alone caters to the entire population of the Cuddalore district. The study will add to evidence about clinical manifestation in pregnant females that will help the physicians involved in patient care to take rational and timely decisions regarding the management of cases [4]. Therefore, the research was designed to study clinical manifestations and maternal outcome of COVID-19 positive pregnant females in a tertiary care hospital.

Materials and Methods

Study Design: Retrospective study.

Study Population: Pregnant women attending Department of Obstetrics and Gynaecology, RMMCH. Study Period: 2 Year

Study Tool: All covid positive mothers admitted in RMMCH

Sample Size: 200.

Source of data: The data for this study will be collected from the patient admitted to Rajah Muthiah Medical College and Hospital, Annamalai University, Chidambaram during the period August 2020 to October 2022.

Methods of collection of data

Type & place of study: It is a retrospective study based on pregnant women admitted to covid ward in a tertiary care hospital in the southern part of India.

Inclusion Criteria: 1. All antenatal patients with RT PCR positivity for COVID 19.

Exclusion Criteria: 1. All RT PCR negative antenatal patients with or without COVID 19 like symptoms in their perinatal

period. 2. All RT PCR negative mothers with positive CORADS 0 to 5. 3. Not willing to participate. 4. Sample who had lost contact.

Methodology

After approval from the institutional ethical committee, all COVID 19 positive mothers admitted in RMMCH will be included in the study. Retrospective study will be conducted based on the designed profoma. Relevant details will be collected from maternal and neonatal case sheets which include maternal details like their age, address, socioeconomic status, educational status, maternal weight, risk factors ((Hypertension, Anemia, Gestational Diabetes mellitus, Multiple gestation, Chronic medical illness, Hypothyroidism, HIV status, Hepatitis B, Maternal fever), order of birth, gestational age, Antenatal steroids, premature rupture of membranes, mode of delivery and Baby's details include their sex, need of resuscitation, Apgar score, gestational age, birth weight and their outcome.

Statistical analysis Microsoft Excel 2013 was used to organise the data, and SPSS 16 was used to analyse it. Frequencies and percentages were used to talk about qualitative data, while Mean and Standard Deviation were used to talk about quantitative data.

Observation and Results

Retrospective study was conducted where clinical manifestations, maternal and perinatal mortality was studied in patients admitted in Covid ward of Rajah Muthiah medical college and hospital, Chidambaram between January 2021 to December 2022 (2 years) were included in the study. 200 antenatal and postnatal mothers fulfilling the inclusion and exclusion criteria were included in the study.

Table 1: Comparison of mean age, serum LDH, serum ferritin, CRP and D-dimer among those with and without high-risk pregnancy.

Variables	Complicated / high risk pregnancy	N	Mean	Std. Deviation	P value
Age	Yes	76	26.30	3.91	0.786
	No	124	26.15	3.67	
Serum LDH	Yes	76	327.14	43.41	0.961
	No	124	327.40	30.79	
Serum ferritin	Yes	76	298.89	70.13	0.001
	No	124	326.77	50.61	
CRP	Yes	76	10.743	5.69	0.110
	No	124	9.572	4.54	
D-dimer	Yes	76	388.22	136.88	0.537
	No	124	398.90	105.56	

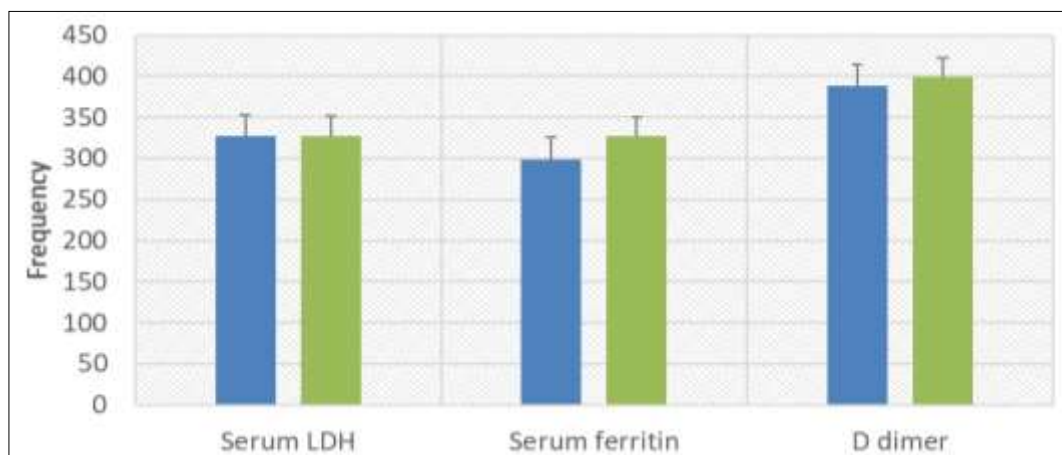


Fig 1: Bar chart showing serum LDH, serum ferritin and D dimer between complicated and normal pregnancies.

The mean serum ferritin level was found to be significantly higher among those without pregnancy related complications than those with at least one complication.

Demographic Profile

In our study mean maternal age among participants was 26.22 ± 3.77 years. 44.5% were in the age group 26 to 30 years followed by 36% in the age group 21 to 25 years. The mean SpO₂ among the participants was 97.91 ± 1.01 . 46% participants had SpO₂ of 98% and 24% had SpO₂ of 99%.

Lab Profile

The mean serum LDH levels was 327.82 ± 35.34 IU/L. 59.5% had serum LDH of 301 to 350 IU/L and 23.5% had serum LDH level of more than 350 IU/L. The mean serum FERRITIN level was 316.18 ± 60.17 ng/ml. 78% had serum ferritin level of 301 to 400 ng/ml. The mean serum CRP level was 10.01 ± 5.02 mg/L. 52.5% had CRP of 6 to 10 mg/L and 22.5% had CRP of 11 to 15 mg/L. The mean D-Dimer level was 394.85 ± 118.22 ng/ml. 35.5% had D Dimer level of 401 to 500 ng/ml and 34.5% were having a level of 301 to 400 ng/ml. 6% participants were FDP positive.

Morbidity Profile

3.5% participants were found to have gestational hypertension, 1% had chronic hypertension and 0.5% had preeclampsia. 5% participants had gestational diabetes and 15 had overt diabetes. 8.5% participants had anaemia and 1% had heart disease. 12% of the participants had hypo and hyperthyroid, respectively. 7.5% had oligohydramnios, 1.5% polyhydramnios, 1.5% gestational thrombocytopenia, 1% abruption. 0.5% participants had ARDS and 2.5% had pneumonia^[5].

Maternal Outcome

Among those in post-natal period, 61.1% had LSCS and 38.9% had normal delivery. 5.4% had preterm labour, 5.4% had PPROM and 1.2% had PPH. 0.5% participants had ARDS and 2.5% had pneumonia^[6]. Maternal oxygen requirement was 16.5% in antenatal period and 83.5% were in postnatal period during the study. 3% participants had an abortion and 5% had IUD. The mean serum ferritin level was found to be significantly higher among those without pregnancy related complications than those with at least one complication.

Conclusion

Although the majority of mothers were discharged without any major complications, severe maternal morbidity as a result of COVID-19 and perinatal deaths were reported^[7]. Vertical transmission of the COVID-19 could not be ruled out. Careful monitoring of pregnancies with COVID-19 and measures to prevent neonatal infection are warranted. In conclusion, a rapid increase of CS was observed, especially at the beginning of the pandemic, most likely due to lack of knowledge and robust recommendations. Preterm birth rates were elevated, with iatrogenic reasons potentially involved^[8-10]. While pregnant women have an increased risk for ICU admission and mechanical ventilation, the mortality trend was not clearly elucidated. Neonates were more frequently admitted to NICU, which may be attributed to precaution or severe maternal infection. The remainder of the fetal/neonatal outcomes presented are of low incidence and were possibly related to prematurity. Even though neonatal infections were rare, the probability of vertical transmission cannot be eliminated. After taking into account only moderate and high quality studies,

ranges of our primary outcomes remained unchanged, while among our secondary outcomes, maternal ICU admission and mechanical ventilation rates were found relatively lower. Further original studies with women from all trimesters and longer follow-up periods are needed^[11-12].

Conflict of Interest

Not available

Financial Support

Not available

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