



ASSESSING THE OUTCOMES OF PREGNANCY IN PATIENTS WITH COVID-19 USING INFLAMMATORY MARKERS

Obstetrics & Gynaecology

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KEYWORDS

INTRODUCTION:

The COVID-19 disease is a respiratory infectious disease caused by Severe Acute Respiratory Syndrome coronavirus 2(SARS COV-2).¹ Pregnancy can alter the body's immune system and response to viral infections in general. this can occasionally result in more severe symptoms². The aim of this study is to investigate and report the clinical characteristics and laboratory test results of pregnant women with COVID-19. Impact of SARS-CoV-2 infection on pregnancy outcomes have not yet been consistently reported. Women infected with SARS-CoV-2 were reported to show increased rates of obstetric complications such as caesarean delivery and preterm birth³.

AIMS AND OBJECTIVES:

- To study the inflammatory markers in COVID-19 infection in pregnancy.
- To correlate the values of inflammatory markers with symptomatology.
- To compare the inflammatory markers of patients in first and second waves of COVID-19 infection.

MATERIALS AND METHODS:

This retrospective study was conducted on 47 pregnant women with COVID-19 infection admitted in Father Muller Medical College, Mangalore between June 2020 to May 2021 after approval from institutional ethical committee. Medical records of the pregnant women who met the inclusion and exclusion criteria were studied. Informed written consent was waived owing to the retrospective nature of the study.

The clinical characteristics of pregnant patients extracted from medical records were gestational age; initial symptoms (fever, cough, abdominal pain, rupture of membranes at term, chest tightness, asthma and vomiting); maternal comorbidities (gestational diabetes, gestational hypertension, premature rupture of membranes), mode of delivery. Reviewed laboratory tests includes white blood cell (WBC) count, neutrophil count and percentage, lymphocyte count and percentage, Inflammatory markers such as C- reactive protein, Serum Ferritin, D-dimer, LDH.

Data was used to compare first and second wave of COVID 19 infection in pregnancy to observe any difference in the two waves .

The collected data was analyzed statistically by frequency, percentage and chi square using SPSS version 21.0.

Inclusion criteria:

All pregnant patients with COVID -19 infection admitted in our hospital including patients in labor, symptomatic COVID with pregnancy, Obstetric and medical complications during pregnancy.

Exclusion criteria:

Non pregnant patients with COVID-19 infection, patients with a referral history from our hospital to other hospitals were excluded owing to the difficulty in obtaining their medical data, patients whose relevant investigations were not available.

RESULTS:

A total of 47 pregnant women with COVID 19 infection were included. They presented with higher rate of asymptomatic infection (61.7%), only a few presented with mild symptoms (38.3%), no patients developed pneumonia during the study.

TABLE 1: OBSTETRIC COMPLICATIONS

OBSTETRIC COMPLICATIONS	(n=47)	Percentage (%)
Preterm labor	3	6.38
PROM/PPROM	7	14.89
Oligohydramnios	7	14.89
Anhydramnios		
IUGR		
Intrauterine demise	3	6.38

Obstetric complications in the form of Preterm labor (6.38%), Premature rupture of membranes (14.89%), Oligohydramnios (14.89%) and Intrauterine demise(6.38%). Maternal comorbidities such as Gestational diabetes in 11(23.4%), Gestational hypertension in 8(17%), Hypothyroidism in 6(12.7%), Anemia in 4(8.51%) were observed.

TABLE 2 LABORATORY TEST RESULTS OF PATIENTS WITH COVID-19(N=47)

Inflammatory markers	n=47	P value
WBC count >11000/cumm	23(48.9%)	0.627
Neutrophils >70%	39(82.9%)	0.122
Lymphocytes <20%	37(78.7%)	0.112
D-dimer >243ng/dl	45(95.7%)	0.728
C-reactive protein >5mg/l	40(85.1%)	0.788
LDH >250IU/L	26(55.3%)	0.563
Serum Ferritin >150ng/ml	9(19.4%)	0.673

It shows higher levels of inflammatory markers such as WBC count (48.9%), Neutrophil count(83.0%), C-reactive protein(85.1%), Serum Ferritin(19.1%), Serum LDH(55.3%), D-dimer(95.7%); and Mean lymphocyte percentage(78.7%) was lower in pregnant women with COVID 19.

TABLE 3: CORRELATION THE INFLAMMATORY MARKERS WITH SYMPTOMATOLOGY

Inflammatory markers	Asymptomatic	Symptomatic	P value
WBC count >11000/cumm	17(73.9%)	6(26.1%)	0.092
Neutrophils >70%	24(61.5%)	15(38.5%)	0.959
Lymphocytes <20%	23(62.2%)	14(37.8%)	0.901
D-dimer >243ng/dl	28(62.2%)	17(37.8%)	0.728
C-reactive protein >5mg/l	25(62.5%)	15(37.5%)	0.788
LDH >250IU/L	18(69.2%)	8(30.8%)	0.237
Serum Ferritin >150ng/ml	3(33.3%)	6(66.7%)	0.052

The correlation of Serum Ferritin in symptomatic patients compared to asymptomatic patients showed that symptomatic COVID patients had significantly higher serum ferritin levels(66.7%,P=0.052).

TABLE 4: COMPARING INFLAMMATORY MARKERS OF FIRST AND SECOND WAVE OF COVID-19

Inflammatory markers	First wave	Second wave	P value
WBC count >11000/cumm	15(65.2%)	8 (35.8%)	0.627

Neutrophils >70%	26(66.7%)	13(33.3%)	0.122
Lymphocytes <20%	25(67.6%)	12(32.4%)	0.112
D-dimer >243ng/dl	28(62.2%)	17(37.8%)	0.728
C-reactive protein >5mg/l	25(62.5%)	15(37.5%)	0.788
LDH >250IU/L	17(65.4%)	9(34.6%)	0.563
Serum Ferritin >150ng/ml	5(55.6%)	4(44.4%)	0.673

This table summarizes that no significant difference was observed on comparing the inflammatory markers between the first and the second wave.

A total of 36(76.5%) pregnant patients underwent delivery of which 11(30.55%) patients had normal vaginal delivery, 4(11.1%) patients underwent elective LSCS, 21(58.3%) patients underwent emergency LSCS.

A total of 12(25.5%) patients received antibiotics, 10(21.3%) patients received antivirals, 5(10.6%) patients received steroids and low molecular weight heparin. Majority 34(72.3%) patients were advised home isolation.

DISCUSSION:

SARS-CoV-2 is a highly infective virus causing the greatest pandemic of the century. As of now, we are in the midst of it, seeking to determine treatments and novel ways to manage this deadly disease. Based on a report by the CDC, most prevalent symptoms in patients with COVID-19 in the general population were cough (84%), fever (80%), myalgia (63%), chills (63%), fatigue (62%), headache (59%) and shortness of breath (57%)³. Whereas, majority of subjects in our study presented with asymptomatic infection (61.7%). Cough, fever and myalgia were the presenting complaints in 23.5% subjects. Only 1 patient presented with acute shortness of breath.

Bozkurt et al conducted a study which showed that early analysis of serum ferritin in patients with COVID-19 might effectively predict the disease severity. Whereas, in our study we found that serum ferritin was significantly higher in symptomatic COVID 19 patients. Hence it would be useful to evaluate if serum ferritin can be used as a screening biomarker for the intensity of inflammation in patients with COVID-19 infection⁴.

Xie et al reported in his study that lymphopenia, increased LDH, CRP and ferritin were the most common laboratory signs among patients with COVID-19⁵. We found similar laboratory signs in our study⁵.

Shi C et al analyzed in his study that the relieving effect of LMWH in patients with COVID-19, to investigate the anti-inflammatory effects of heparin and the delay of disease progression⁶. The patients who had high levels of D-dimer were treated with Low molecular weight heparin⁶.

Khalil A et al in his study found that of the women who tested positive, 88% were asymptomatic⁷. Our study corroborated similar findings⁷. The D-dimer and CRP levels were found specifically higher in patients who presented with PROM and oligohydramnios.

We did not have any mortality or ICU admissions among our subjects. The limitation of the study was its smaller size and it was a retrospective study.

CONCLUSION:

Inflammatory markers play a role in determining therapeutic measures in COVID-19 in pregnancy and for the use of steroids and anticoagulants which helped in guiding COVID-19 infection in pregnancy and in postnatal period better.

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