Original Research Article

Impact of COVID 19 in antenatal patient with gestational diabetes mellitus and vice a versa: a retrospective study

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ABSTRACT

Background: The objective of this study is to compare the incidence, severity and feto-maternal outcome of antenatal Coronavirus disease 2019 (COVID-19) positive patients with GDM vs non GDM patients.
Methods: This is a retrospective observational study. The study was carried out in department of Obstetrics and Gynecology, GSVM Medical College, Kanpur from March 2020 to December 2020. All the antenatal women with COVID 19 positive status who were admitted during this period were enrolled in the study. Analysis were made on the basis of observation regarding the severity of symptoms COVID 19 disease, oxygen requirements, mode of delivery and neonatal outcome in GDM vs non GDM COVID positive antenatal patient.
Results: A total of 421 COVID positive antenatal patients were enrolled of which 21 patients were having GDM and 400 were non GDM. Of these 21 patients, 14 (66.7%) were diagnosed with GDM after admission while 7 patients i.e., 33.3% were already diagnosed GDM before admission in current pregnancy. Of these 21 (42.9%) antenatal COVID pt with GDM majority shows mild symptoms of COVID 19, however the severity of fever, myalgia and cough was increased in GDM compared to Non GDM Group. While in non GDM Group, majority of patients were asymptomatic (44.3%) and severity was also less.
Conclusions: It is also evident that patients with GDM had longer duration of hospital stay, higher incidence of caesarean delivery and oxygen requirements.

Keywords: COVID 19, Antenatal, GDM, Severity, Vertical transmission

INTRODUCTION

The outbreak of novel corona virus has emerged as the most important health challenge all over the world. It has been proven that the viral infection has a more pronounced effect on elderly and patients with underlying diseases (example- Hypertension, diabetes mellitus, cardio-vascular diseases). Pregnant women are one of the most critical population groups. Presence of gestational diabetes may further weaken the immune system and may increase the risk of Coronavirus disease 2019 (COVID-19) infection and its severity. In 2019 global prevalence of hyperglycemia in pregnancy in the age group 20-49 years was 20.4 million or 15.8% of live births, out of these 88.6% were due to GDM.[1,2] This emphasizes the need to screen all pregnant women for hyperglycemia in pregnancy. The oral glucose tolerance test (OGTT) has, to date, been considered the cornerstone of the diagnosis of gestational diabetes mellitus (GDM). However, in the context of the current COVID-19 pandemic, both clinicians and pregnant women are increasingly unwilling to recommend or undergo the OGTT.[3] So in our study all pregnant patients admitting to our setup underwent a single step diagnostic test irrespective of fasting to diagnose GDM according to DIPSI (Diabetes in Pregnancy Study Group of India) criteria.

Aims of this study was to Study the incidence of COVID19 infection among antenatal patients and to study impact of GDM on COVID 19 symptomatology and effect of COVID 19 infection on maternal and neonatal outcomes among GDM patients.

METHODS

All pregnant women with COVID 19 infection admitted to hospital were enrolled from March to December 2020. This study was retrospective observational study conducted in Obstetrics and Gynaecology department of GSVM Mediacl College Kanpur. This period corresponds to first 9 months of COVID pandemic. COVID19 testing was performed by nasopharyngeal swab and RTPCR test. All pregnant women underwent 2 hrs 75 grams OGTT (single step- DIPSI criteria). Patient with plasma blood sugar value more than 140 mg/dl was considered GDM.[4] Cases were categorized as symptomatic, mild, moderate, severe disease for COVID 19 symptomatology. Stastical calculation done by using Statistical package for social sciences (SPSS) software.

Demographic data were collected regarding age, parity, BMI in GDM and non GDM, Taking non GDM as control. GDM COVID positive pregnant patient was treated by diet and lifestyle management non responder treated with insulin. COVID Symptoms were analyzed according to severity and compare in GDM and non GDM COVID positive patients.

Categorization of patient into mild, moderate and severe was done according to govt. of India guidelines:[5]

Mild- patients with uncomplicated upper respiratory tract infection may have mild symptoms such as fever, cough, sore throat, nasal congestion, malaise, and headache. RR-20/min. Spo2 >96%.

Moderate- features of mild with dyspnea with or without exertion. RR >24/min. Spo2 <94% on room air.

Severe- features of mild with dyspnea with or without exertion. RR >30 /min. Spo2 <90% on room air.

RESULTS

The present study was conducted in Dept. of Obstetrics and Gynecology at GSVM Medical College Kanpur. Among 421 COVID positive antenatal patients 21 patients diagnosed as GDM who was taken as cases and 400 COVID 19 positive without GDM was taken as control group. Of these 21 patients with GDM 14 (66.7%) were diagnosed with GDM after admission while 7 patients i.e. 33.3% were already diagnosed GDM before admission in current pregnancy. It was a retrospective observational study. All calculations were done using SPSS software system.

Table 1: Grading of COVID 19 symptoms in antenatal patients.

	COVID positive with GDM (n=21)	COVID positive without GDM (n=400)
Asymptomatic	6 (28.5%)	177 (44.3%)
Mild	9 (42.9%)	141 (35.3%)
Moderate	5 (23.8%)	62 (15.5%)
Severe	1 (4.76%)	3 (7.5%)

Table 2: Management of GDM in COVID positive antenatal patients.

Management	N=21	%
Diet	7	33.33%
Insulin on Sliding scale	14	66.66%

In table 1 In our study among 21 patients who were COVID 19 positive with GDM 33.3% were asymptomatic, 42.9 % showed mild and 23.8% showed moderate symptoms. One patients shows severe symptoms in study group of COVID 19 disease while 3 patients in control group shows severe symptoms in which all three was having co morbidities explaining the increase severity of COVID 19 disease in these patients. Two patients out of three in severe category in non GDM group succumbed. Mortality in these two patients can be explained on the basis of associated co morbidities in which one patient was having stage 4 ovarian carcinoma and other one was the antepartum eclampsia. The chi square statics is 5.444. The p value is 0.142026. The result is not significant at p<0.05 showing the severity of COVID disease was not related to blood sugar level. However, it can be explained on the fact that blood sugar level in all patients with GDM was well controlled with either diet or insulin therapy according to sliding scale.

Table 2 shows that in the study group 33.33% patients of GDM was managed by diet only and 66.66% patients was given insulin on sliding scale.

Table 3 shows that in patients with moderate symptoms of COVID disease 14.2% in study group (GDM) need oxygen and 10% in control group required oxygen to maintain their saturation level while among patients with severe symptoms one patient in study group (4.7%) and 3 in control group required (0.75%) required oxygen support along with ICU care. Two patients among control group succumbed to COVID 19 diseases and its complication although they have associated co morbidities.

Table 4 shows the chi square statistics with Yates correction is 4.0579. The p value is .043966. the p value was significant at p<0.05 indicating that cesarean sections was performed more in GDM group than vaginal deliveries as opposed to control group.

Table 3: Maternal outcome in COVID 19 positive patients (GDM versus non- GDM).

| | Asymptomatic | | Symptomatic | | | | | |
| | | | Mild | | Moderate | | Severe | |
	GDM	Non GDM	GDM	Non GDM	GDM	Non GDM	GDM	Non GDM
Patients need oxygen	0	0	0	0	3 (14.2%)	10 (2.5%	0	3 (0.75%)
Patient ICU transfer	0	0	0	0	0	0	1 (4.7%)	3 (0.75%)
Caesarean delivery	2 (28.6%)	30 (15%)	4 (44.4%)	13 (13.4%)	3 (60%)	40 (40%)	0	3 (100%)
Normal delivery	5 (71.4%)	170 (85%)	5 (55.5%)	84 (84.97%)	2 (40%)	60 (60%)	0	0

Table 4: Obstetrical outcome in COVID 19 pts (GDM versus non GDM).

Mode of delivery	Non GDM COVID positive pt	GDM COVID positive pt
Caesarean section	86 (21.5%)	9 (42.8%)
Vaginal delivery	314 (83.5%)	12 (57.14%)

Table 5: Neonatal outcome in GDM versus non-GDM COVID positive patients.

	GDM COVID positive mother (n=21)	NON GDM with COVID 19 mother (n=400)
NICU admission	8 (38%)	85 (21.25%)
Not admitted in NICU	13 (61.9%)	315 (78.75%)
Total	21	400

This can be explained on the basis of that GDM is one of the main reasons of caesarean section due to various obstetrics indication in GDM patients and it is not because of COVID disease itself. Moreover, we had very less no patients in study group affecting our results.

Table 6: COVID status of newborn baby in non GDM versus GDM patients.

COVID status of newborn baby	Non GDM COVID positive mother	GDM COVID positive mother
COVID 19 negative	392 (98%)	20 (95.2%)
COVID 19 positive	8 (2%)	1 (4.76%)

(Table 5) The chi square statics with Yates correction is 2.3837. The p value is 0.122603, not significant at p<0.05. All newborn babies were admitted to NICU for observation NICU care. There was statically no difference in both the groups regarding neonatal complication.

(Table 6) The Chi Square statistics with Yates correction is 0.0062. The p value is 0.936997, not significant at p<0.05. Rate of COVID positivity in newborns was statically insignificant in both groups.

DISCUSSION

The present study was conducted in Dept. of Obstetrics and Gynecology at GSVM Medical College Kanpur among 421 COVID positive antenatal patients in which 21 patients diagnosed as GDM who was taken as cases and 400 COVID 19 positive without GDM was taken as control group.

In Table 1 In our study among 21 patients who were COVID 19 positive with GDM 33.3% were asymptomatic, 42.9% showed mild and 23.8% showed moderate symptoms. One patients shows severe symptoms in study group of COVID 19 disease while 3 patients in control group shows severe symptoms in which all three was having co morbidities explaining the increase severity of COVID 19 disease in these patients. Two patients out of three in severe category in non GDM group succumbed. Mortality in these two patients can be explained on the basis of associated co morbidities in which one patient was having stage 4 ovarian carcinoma and other one was the antepartum eclampsia. The chi square statics is 5.444. The p value is 0.142026. The result is not significant at p<0.05 showing the severity of COVID disease was not related to blood sugar level. However it can be explained on the fact that blood sugar level in all patients with GDM was well controlled with either diet or insulin therapy according to sliding scale.

Table 2 shows that in the study group 33.33% patients of GDM was managed by diet only and 66.66% patients was given insulin on sliding scale.

Table 3 shows that in patients with moderate symptoms of COVID disease 14.2% in study group (GDM) need oxygen and 10% in control group required oxygen to maintain their saturation level while among patients with severe symptoms one patient in study group (4.7%) and 3 in control group required (0.75%) required oxygen support along with ICU care. Two patients among control group succumbed to COVID 19 diseases and its complication although they have associated co morbidities. Our study

also coincide with the results of other studies like Poon et al 2019 with the fact that there is no evidence that pregnant women are more susceptible infection with COVID 19 or that those infected are more likely to develop severe disease.[6]

Table 4 shows the chi square statistics with Yates correction is 4.0579. The p value is 0.043966. the p value was significant at p<0.05 indicating that cesarean sections was performed more in GDM group than vaginal deliveries as opposed to control group. This can be explained on the basis of that GDM is one of the main reasons of cesarean section due to various obstetrics indication and it is not because of COVID disease itself. Moreover we had very less no patients in study group affecting our results. Till date no study is present that shows COVID 19 infection leads to increased risk of caesarean section. As such COVID 19 infection is not an indication of cesarean section but it is due to the various obstetrical and maternal complications that necessitates cesarean section in such patients.

Table 5 the chi square statics with Yates correction is 2.3837. The P value is 0.122603, not significant at p<0.05. All newborn babies were admitted to NICU for observation and NICU care. There was no stastical difference in both the groups regarding neonatal complication. All the babies were admitted in NICU irrespective to the apgar score, gestational age, birth weight, other complications as it was the policy of our hospital.

(Table 6) The Chi Square statistics with Yates correction is 0.0062. The p value is .936997, not significant at p<0.05. Rate of COVID positivity in newborns was statically insignificant in both groups. This study was supported by a meta analysis conducted by Alexander et al but on the other hand Chen et reported no evidence of transmission of SARS-CoV-2 from mother to fetus during birth.[7,8] Our conclusion is that SARS-CoV-2 has a potential for vertical transmission in pregnant women and there is a need for evaluating it further.

Limitations

It was a single centre study and sample size was relatively smaller leading to imprecision in the effect measure estimates.

CONCLUSION

Pregnancy is an immune-compromised state and presence of hyperglycemia in GDM patients further weaken the immune system making it more susceptible to SARS-CoV-2 infection. In the context of the current COVID-19 pandemic, a single step diagnostic test irrespective of fasting to diagnose GDM proposed by DIPSI (Diabetes in Pregnancy Study Group of India) is more practical approach to avoid multiple visits of patients to hospital setup in order to undergo full OGTT. The clinical picture of pregnant females infected with SARS-CoV-2 is similar to those of non-pregnant individuals infected with SARS-CoV-2 but antenatal patients with GDM has higher incidence of symptoms of COVID 19 although it is not associated with increase adverse maternal and neonatal outcome than control group statistically. SARS-CoV-2 has a potential for vertical transmission in pregnant women and there is a need for evaluating it further.

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