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## Brief report

# Gestational diabetes mellitus and COVID-19, clinical characteristics and review of the literature



Jorge R. Violante-Cumpa, Fernando J. Lavallo-González\*, Leonardo G. Mancillas-Adame, Edmundo D. Ávila-Hipólito, Karla A. Violante-Cumpa

Endocrinology Division, Department of Internal Medicine, University Hospital "Dr. José E. González", Universidad Autónoma de Nuevo León, Madero and Gonzalitos Av. s/n Col. Mitras Centro, Monterrey, Nuevo León, 64460, Mexico

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## ABSTRACT

There is a lack of information about the maternal-fetal outcomes in patients with gestational diabetes and concomitant COVID-19; and there is even less information about the outcomes of pregnant women with gestational diabetes and COVID-19. We present a case of a primigravidae of 20-year-old woman with gestational diabetes and COVID-19 and a review of the literature.

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## 1. Case report

A 20-year-old woman was evaluated at a primary healthcare clinic with a complaint of a productive cough of 6-days evolution without dyspnea or fever. She was referred to our center because of hyperglycemia. The patient had a medical history of obesity (BMI of 31.6 kg/m<sup>2</sup> at conception), and she was in her first pregnancy at 30 weeks of gestation with a diagnosis of gestational diabetes mellitus during her 27th week of pregnancy with a BMI of 34.8 kg/m<sup>2</sup> at the time of her evaluation. Her serum glucose levels after a 75 g-OGTT were 107 mg/dl (baseline), 195 mg/dl (1 h) and 164 mg/dl (2 h). The patient is treated with NPH insulin 20 IU twice a day with poor adherence and no blood glucose self-monitoring for economic reasons. She has a poor understanding of her disease and lacks medical care due to the COVID-19 outbreak.

During the interview, the patient denied a previous diagnosis of T2DM. At her first prenatal visit (6 weeks of gestation), she had a fasting glucose of 90 mg/dL with no further evaluations. On initial examination, her body weight was 87.3 kg, height 1.57 m, with a BMI of 35.4 kg/m<sup>2</sup>. Her vital signs were unremarkable, and she did not need supplemental oxygen; however, what was remark-

able was acanthosis on the back and lateral faces of the neck, in the armpits, and groin. There were clinical data of hyperandrogenism (acne, hirsutism, and male-pattern hair loss). Laboratory tests reported hemoglobin 11.7 g/dL, white blood cells 8.4 CC<sup>3</sup>, serum glucose 203 mg/dL, creatinine 0.4 mg/dL, albumin 2.2 g/dL with no alteration in liver transaminases and serum electrolytes. Urinalysis was remarkable for proteinuria 30 mg/dL, glucosuria 500 mg/dL with no erythrocytes and leucocytes. The patient was tested for COVID-19 due to her respiratory symptoms. A SARS-CoV-2 PCR test was positive.

Fasting and a basal plus scheme with a dose of 20 IU of NPH insulin and betamethasone for fetal lung-maturation (12 mg intramuscularly) were started. The fetus was monitored with cardiotocography (CTG). After 10 h, the fetus showed signs of fetal distress on the CTG, and a C-section was performed. A male newborn was delivered. He weighed 2630 g (P > 97%) with an Apgar of 1/3. CPR was given with the return of spontaneous circulation after three cycles. The newborn was then transferred to the neonatal intensive care unit, where he was tested for SARS-CoV2 with a negative result. He persisted with cardiogenic shock secondary to a double outlet right ventricle. The newborn persisted hypotensive and acidotic and passed away three days after delivery.

Our patient remained under surveillance after delivery. We changed the insulin scheme to NPH 10 IU BID, but two days after delivery, she had two asymptomatic hypoglycemia episodes

\* Corresponding author.

E-mail address: [drfernandolavalle@hotmail.com](mailto:drfernandolavalle@hotmail.com) (F.J. Lavallo-González).

**Table 1**  
Clinical characteristics of patients with GDM and laboratory confirmed COVID-19.

Case	Reference	Country	Age	Clinical presentation/ chest X-ray	Gestational week/delivery	Pregnancy complications	Treatment	Maternal outcome	Newborn transmission/outcome
1	Liu W et al. (2020) [12]	China	30	Cough/Subsolid patchy and linear fibrosis in the left lung	37/Vaginal	None	Oxygen via nasal cannula and arbidol hydrochloride 3 g, QID	Recovered	Negative/recovered
2	Gidlöf S et al. (2020) [13]	Sweden	34	Mild headache, hoarseness and malaise/ not reported	36 (twin pregnancy)/Cesarean	Preeclampsia	Oxygen via nasal cannula	Recovered	Negative/recovered
3	Kleinwechter H et al. (2020) [14]	Germany	28	Fever and cough/not reported	25.6/not delivered	Vaginal bleeding	Oxygen via nasal cannula/Tocolytics	Recovered	Negative/recovered
4	Actual Case	Mexico	20	Cough/ normal	30/Cesarean	Fetal distress	No supplemental Oxygen needed	Recovered	Negative/death

GDM: gestational diabetes mellitus.

(65 mg/dl and 62 mg/dl). We decided to suspend the basal insulin scheme and continue glucose monitoring without additional insulin therapy. The patient was isolated for five days in our hospital without supplemental oxygen and no sign of respiratory distress. She was discharged with the indication of continuing home isolation and was scheduled for an oral glucose tolerance test and follow-up in 8 weeks.

## 2. Discussion

Gestational diabetes mellitus (GDM) is defined as any degree of hyperglycemia detected for the first time during pregnancy. Hyperglycemia during pregnancy is associated with a higher risk of negative maternal and newborn outcomes [1]. The most frequent maternal negative outcomes are preeclampsia and cesarean delivery, and the newborn's reported outcomes are preterm delivery, neonatal hypoglycemia, neonatal intensive unit care, and macrosomia [2].

As the global pandemic continues with an exponential increase in COVID-19 cases (caused by the SARS-CoV-2 virus), these cases may be associated with negative outcomes in certain high-risk groups, such as patients with chronic-degenerative diseases, oncological diseases, and pregnant women [3]. At the start of 2020, new evidence in the form of case series became available online. Later large observational studies described the clinical characteristics and outcomes of pregnant women with COVID-19 [4,5]. The prevalence of COVID-19 in pregnant women varies with the series, with an overall rate of 10% (7–14%) [6]. The prevalence of GDM varies between 7.5 and 11.6% in the most extensive series [5,7]; however, an analysis of clinical characteristics and prognosis in this subgroup is not available within most extensive series. They are only available in case reports or small case series.

Pregnant women with confirmed COVID-19 have more complications than non-pregnant women of the same age and disease [8]. There is an increased risk of hospitalization (5.4 times), mechanical ventilation (1.7 times), and ICU admission (1.5 times), but there was no difference regarding mortality [4]. The presence of older age ( $\geq 35$  years) and comorbidities (obesity, chronic hypertension, and preeclampsia) are risks factors associated with a more severe clinical presentation of COVID-19 in pregnancy [9] and with a worse maternal-fetal prognosis, such as preterm birth (before week 37th), fetal distress, and cesarean delivery [5,7,10]. The most frequent symptoms in pregnancy depend on the screening criteria. When symptomatic pregnant women were screened, the symptoms were cough (71.4%), fever (63.4%), shortness of breath (34.4%), and loss of taste or smell (22.9%) [11]; however, when universal screening

was applied, the number of symptoms was lower with cough and fever still being the most frequent (39–40%). This finding may be explained by more asymptomatic presentations or a lower rate of symptomatic presentations in pregnant women compared to non-pregnant women [6].

We describe the clinical characteristics of women with GDM and laboratory-confirmed COVID-19 in Table 1 [12–14]. The mean age was 28 years, mean gestational age was 32.2 weeks, cough was the most prevalent initial symptom, the majority were preterm cesarean deliveries, all patients made a complete recovery. There was no vertical transmission, and one newborn died secondary to a cardiac anomaly.

Negative newborn outcomes defined as preterm delivery, hypoglycemia, macrosomia, and the need for NICU management is higher than with non-COVID-19 pregnant women; however, there is not enough information to make a statement regarding women with GDM and COVID-19. Last, mortality is usually low according to the literature (0.5%–1%); however, it depends mostly on the severity of the maternal complications [7,10,15].

We described the clinical characteristics and the maternal-fetal prognosis of women with GDM and COVID-19; even though there were only 4 cases, they had a similar clinical evolution, and all four recovered from COVID-19. We suspect that the unfortunate outcome of the newborn in our case was associated more to the maternal comorbidities (GDM and obesity) than to COVID-19; however, there is still a lack of information regarding this subgroup of patients; thus, we hope this case and the evidence described above can be of assistance for our colleagues.

## Author contribution

All authors had full access to data and a roll in the preparation of this manuscript.

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## Ethical consent

Ethical consent was complied. We received verbal consent from the patient to give details about the case.

**Conflict of interest**

None.

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