Coronavirus infection in a high-risk obstetrical population of the South Bronx, New York

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OBJECTIVE: The coronavirus disease 2019 (COVID-19) pandemic is a serious public health emergency with limited information to guide obstetrical management. As of April 22, 2020, New York City has documented 10,290 deaths, of which 2272 belong to the Bronx, the third largest borough affected.[1] It has disproportionately affected the high-risk patient population. The South Bronx is a vulnerable population area, composed mostly of Hispanics (57%) and African Americans (39%), with a median household income below the eighth percentile.[2] Lower socioeconomic status predisposes many to a plethora of comorbidities such as diabetes, hypertension, asthma, and obesity. In this research letter, we outline the clinical course of 33 pregnant patients from a South Bronx community hospital with symptomatic COVID-19 infection, 81.8% of which have underlying medical conditions.

STUDY DESIGN: This analysis was conducted in the Department of Obstetrics and Gynecology at Lincoln Hospital Medical and Mental Health Center, the designated public hospital and COVID-19 center of the South Bronx. Pregnant patients diagnosed with symptomatic COVID-19 infection were registered, and their clinical and laboratory data were retrospectively obtained using the electronic medical record system. New York City Health and Hospitals Corporation investigation medical review board approval was obtained.

RESULTS: A total of 33 COVID-19—positive symptomatic pregnant patients were included in this study, 2 (6.1%) in the first trimester, 9 (27.2%) in the second trimester, and 22 (66.7%) in the third trimester. Gestational age at diagnosis, comorbidities, and obstetrical complications were recorded. Obesity was present in 70.9% of cases, and 32.3% had a body mass index (BMI) of 40 or above. Of 33 patients, 27 (81.8%) had 1 or more comorbidity; 15% had pregestational diabetes mellitus type II. Cough, malaise, and chills were the most common presenting symptoms.

The 2 patients in the first trimester had severe disease, requiring admission for mild hypoxemia. No miscarriage was reported. Although, 1 patient at 17 weeks required mechanical ventilation, the remainder of the patients in the second trimester presented with mild upper respiratory symptoms and were monitored by means of telephone encounters. No obstetrical complications were reported in these patients. The 22 patients in the third trimester had variable presentations. Of note, 4 patients in the third trimester had preterm deliveries (18.2%), 2 of them presented with mild respiratory symptoms and had abnormal fetal heart rate tracings requiring delivery before 37 weeks. Of the 22 patients in the third trimester, 7 were amenable to home monitoring by means of telephone encounters.

In addition, 2 patients presented with considerable poor obstetrical outcomes; both had pregestational diabetes type II and presented with diabetic ketoacidosis and intrauterine fetal demise. These cases are further detailed below.

Patient 1 was a 30-year-old G4P2012 at 28 weeks 5 days with a history of poorly controlled insulin-dependent pregestational diabetes type II (hemoglobin A1c [HbA1c], 8.8%), morbid obesity (BMI, 41), asthma, and chronic hypertension. She initially presented with cough and nasal congestion and was discharged home because of clinical stability. However, 3 days later, she returned with Kussmaul breathing, with tachypnea to 50 respirations per minute, tachycardia 135 beats per minute, temperature 98.1°F, blood pressure 129/95 mm Hg, and saturation 100% on the right atrial. Blood glucose was 360 mg/dL. Maternal stabilization was initiated, and severe dehydration required central line placement. During maternal stabilization, fetal bradycardia was noted, and soon afterward, demise was confirmed. Laboratory results were considerable for pH 7.17, bicarbonate level 5 mEq/L, and beta-hydroxybutyrate of 3.15 mmol/mL. She was transferred to the medical intensive care unit for severe diabetic ketoacidosis and asthma exacerbation; after achieving maternal stabilization, labor induction was started, during which an insulin drip was necessary for glycemic control. After delivery, the patient was found to have *Staphylococcus aureus* methicillin-resistant bacteremia and remained hospitalized until the completion of antibiotics.

Patient 2 was a 33-year-old G4P1023 at 33 weeks 2 days with a past medical history of asthma, morbid obesity, and uncontrolled pregestational diabetes type II (HbA1c, 13.9%) and no prenatal care was brought to the emergency room by the emergency medical services after 3 seizures. On arrival, she was unconscious, apneic, and in cardiac arrest. Return of spontaneous circulation was achieved in 6 minutes. Laboratory results were considerable for glucose of 1753 mg/dL, pH 6.908, bicarbonate level 5 mEq/L, lactic acid of 17.6, complete blood count with lymphopenia of 14%, and liver enzymes aspartate transaminase and alanine aminotransferase of 514 and 533, respectively. Urinalysis indicated protein >1000 mu/L (+4). Patient was 3 cm dilated. She was transferred to the intensive care unit for stabilization of severe diabetic ketoacidosis, eclampsia, and acute respiratory failure. The patient delivered the fetus spontaneously within 12 hours of admission. The patient never regained consciousness and died 1 month after admission.

CONCLUSION: Through this series, adverse events were noted in 6 of 33 patients (18.2%), with 4 cases of preterm

TABLE
Patient characteristics

GA (wk)	Comorbidities					BMI	Clinical presentation	Admission	Obstetrical complications	Oxygen requirement
	DM2	HTN	Obesity	Asthma	Other					
8	No	No	No	No	No	23	Cough, shortness of breath	Coronavirus related	No	Nasal cannula
6	No	No	Yes	No	No	36	Shortness of breath	Coronavirus related	No	Nasal cannula
22	No	No	Yes	No	Recurrent DVT	35	Cough, fever	Coronavirus related	No	Nasal cannula
14	Yes	Yes	No	No	No	28	Cough, fever	No	No	No
19	No	No	No	No	History of tuberculosis, homeless	29	Cough, hemoptysis	Coronavirus related	No	Nasal cannula
17	No	No	Yes	No	No	40	Shortness of breath	Coronavirus related	No	Mechanical ventilation
24	No	No	Yes	No	No	36	Anosmia, nasal congestion	No	No	No
25	No	No	Yes	No	No	30	Malaise, nausea	No	No	No
13	Yes	Yes	Yes	No	No	41	Congestion, fever	No	No	No
16	No	No	No	No	No	unk	Cough, congestion	No	No	No
27	No	No	Yes	No	GDMA	40	Cough, fever	No	No	No
37	Yes	Yes	Yes	No	Chronic hepatitis B	33	Cough, fever	Obstetrical reason	No	No
29	No	No	Yes	No	No	34	Cough, malaise	No	No	No
32	No	No	No	No	Recurrent chlamydia	22	Cough	Obstetrical reason	Preterm prelabor rupture of membranes	No
41	No	No	Yes	No	No	43	Cough, fever	Obstetrical reason	No	No
34	No	Yes	Yes	No	No	40	Cough, chills	No	No	No
41	No	No	Yes	No	No	44	Cough, fever	Obstetrical reason	No	No
37	No	No	Yes	No	No	38	Cough, myalgia	Obstetrical reason	No	No
36	No	No	Yes	No	History of ovarian cancer	30	Cough, myalgia	No	No	No
34	No	No	No	No	No	25	Cough	No	No	No
28	Yes	Yes	Yes	Yes	Hidradenitis suppurativa	41	Shortness of breath	Coronavirus related	IUFD	NRB mask
33	Yes	No	Yes	No	No	40	Apnea, cardiac arrest	Coronavirus related	IUFD	Mechanical ventilation
28	No	No	No	No	No	unk	Cough, myalgia	No	No	No
38	No	No	No	No	No	27	Cough, hemoptysis	Obstetrical reason	No	No
39	No	No	Yes	Yes	No	41	Cough	Obstetrical reason	No	No

Curi. Coronavirus disease 2019 in a high-risk obstetrical population in New York. AJOG MFM 2020.

(continued)

TABLE
Patient characteristics (continued)

| GA (wk) | Comorbidities | | | | | BMI | Clinical presentation | Admission | Obstetrical complications | Oxygen requirement |
	DM2	HTN	Obesity	Asthma	Other					
39	No	No	No	Yes	No	38	Cough	Obstetrical reason	No	No
32	No	No	Yes	No	Gestational hypertension	32	Fever, cough	Obstetrical reason	Preterm cesarean delivery	No
32	No	No	No	No	Gestational diabetes	27	Headache, nausea	No	Preterm cesarean delivery	No
34	No	No	Yes	No	No	31	Fever, nasal congestion	Obstetrical reason	Preterm cesarean delivery	No
36	No	No	No	No	Gestational diabetes	27	Nasal congestion	No	No	No
31	No	No	Yes	No	No	42	Nasal congestion, myalgia	No	No	No
38	No	No	No	No	Right bundle branch block	27	Cough	Obstetrical reason	No	
39	No	No	Yes	No	No	31	Cough, headache	Obstetrical reason	No	

A total of 33 COVID-19—positive symptomatic pregnant patients were included in this study (gray is first trimester, blue is second trimester, green is third trimester). Obesity was present in 70.9% of cases, and 32.3% of patients had a BMI of 40 or above. Of note, 15% had pregestational diabetes mellitus type II. Of 33 patients, 27 (81.8%) had 1 or more comorbidity. Cough, malaise, and chills were the most common presenting symptoms. Obstetrical adverse events were noted in 6 of our 33 patients (18.2%), with 4 cases of preterm delivery and 2 of fetal demise (IUFD).

BMI, body mass index; *DM 2*, diabetes mellitus type 2; *DVT*, deep vein thrombosis; *GA*, gestational age; *GDMA*, gestational diabetes mellitus; *HTN*, hypertension; *IUFD*, intrauterine fetal demise; *NRB*, non-rebreather; *unk*, unknown.

Curi. Coronavirus disease 2019 in a high-risk obstetrical population in New York. AJOG MFM 2020.

delivery, 2 of fetal demise, and 1 maternal death (Table). Review of literature has indicated adverse obstetrical outcomes including miscarriage, preeclampsia, preterm delivery, cesarean delivery, and perinatal death (7% of cases).[3] Comparatively, our adverse outcomes were not as elevated for preterm birth in the third trimester (18.2%) or preeclampsia but were higher for perinatal mortality in the third trimester (9.5%). The cases of fetal demise followed maternal instability associated with diabetes ketoacidosis, most likely triggered by coronavirus pneumonia, a scenario commonly observed in nonpregnant patients with diabetes.

Regarding maternal clinical outcomes of coronavirus infection in the obstetrical population we present, 4 (12.1%) had severe disease and 3 (9.1%) had critical disease, with a maternal mortality of 3%. These values are higher than what was previously described in the general population[4] and obstetrical population and may be attributed to the high percentage of comorbidities in our population. However, our number of cases is too small to make adequate conclusions.

COVID-19 may complicate the clinical course in patients with specific comorbidities such as diabetes, hypertension, or asthma. Therefore, it seems reasonable to recommend closer monitoring and individualized admission of obstetrical patients with comorbidities, especially during the febrile period, to observe and prevent deterioration. Additional data is required to understand the relationship of COVID-19 in the high-risk gravid patient, and further study is required to create recommendations for the care for these patients. ∎

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REFERENCES

1. New York City Department of Health and Mental Hygiene. COVID-19: data. 2020. Available at: https://www1.nyc.gov/site/doh/covid/covid-19-data.page. Accessed June 1, 2020.

2. United States Census Bureau. American Community Survey demographic and housing estimates. 2018. Available at: https://data.census.gov/cedsci/table?q=south%20bronx%20hispanic&g=0500000US36005&tid=ACSDP1Y2018.DP05&t=Hispanic%20or%20Latino&vintage=2018. Accessed June 1, 2020.

3. Di Mascio D, Khalil A, Saccone G, et al. Outcome of coronavirus spectrum infections (SARS, MERS, COVID-19) during pregnancy: a systematic review and meta-analysis. Am J Obstet Gynecol MFM 2020. [Epub ahead of print].

4. Wu Z, McGoogan JM. Characteristics of and important lessons from the coronavirus disease 2019 (COVID-19) outbreak in China: summary of a report of 72314 cases from the Chinese Center for Disease Control and Prevention. JAMA 2020. [Epub ahead of print].