Third trimester pregnancy and cesarean delivery of a patient with COVID-19: a case report

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Keywords: COVID-19 infection, pregnancy, obstetric management, universal COVID-19 screening, infection control, Puerto Rico.

Posted Date: May 21st, 2020

DOI: <https://doi.org/10.21203/rs.3.rs-29614/v1>

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Abstract

Background: Limited data is available about the clinical features, management and neonatal outcomes of pregnant women COVID-19 positive.

Case: At 37 WGA, a 34-year-old woman G3C1A1 of Puerto Rican origin presented to her follow-up perinatologist visit with flu-like symptoms and COVID-19 contact exposure history. After confirmation of COVID-19 infection and findings on chest radiography, she was successfully treated with ceftriaxone, azithromycin, hydroxychloroquine sulfate, and supportive measures. She had an uncomplicated cesarean delivery with no evidence of vertical transmission. The infant's physical examination was unremarkable, without any clinical indication of infection.

Conclusion: We describe the favorable clinical outcome of a delivery in a woman with COVID-19 in Puerto Rico. It highlights the importance of the rapid clinical management and the hospital coordinated response for the care of a COVID-19 positive pregnant patient at a point where there are no evidence-based or established guidelines. Universal screening for COVID-19 in pregnant women who are admitted for delivery should be considered as part of the hospitals COVID-19's protocols to improve the staff and patient's protection.

Background

Since its first identification in Wuhan, China on December 2019, the novel coronavirus disease (COVID-19) rapidly escalated, with cases now confirmed in over 210 countries [1]. Information about COVID-19 is evolving rapidly which helps to better understand the spectrum of clinical illness and recommendations to be considered in each setting [2]. However, limited data is available about the clinical features, management and neonatal outcomes of pregnant women infected with COVID-19 [3]. On March 13, Puerto Rico announced its first confirmed COVID-19 case [4]. Two weeks later, we received our first third trimester pregnant patient with COVID-19 infection. We describe the clinical course, management and outcome of this case.

Case Presentation

We present the case of a 34-year-old female gravida 3, cesarean 1 with a history of one spontaneous abortion (G3C1A1) of Puerto Rican origin with an intrauterine pregnancy of 37 weeks gestational age (WGA) who presented to her perinatologist for a follow-up visit. She has a past medical history of protein C deficiency and a mitral valve prolapse. She resides in the northwestern region of Puerto Rico, works as a technician in a veterinary clinic and has no recent travel history. Nevertheless, she reported that one of her co-workers at the clinic, had flu-like symptoms and was found positive for coronavirus disease 2019 (COVID-19) three days before. She reported that in the past week she experienced subjective symptoms; fever, myalgia, generalized malaise, anosmia, and ageusia. She lives with her husband and 3-year-old son

who have not presented any symptoms. The physical examination revealed a body temperature of 36.3° C, a pulse of 116 beats per minute, a respiratory rate of 20 per minute, and a blood pressure of 103/65 mmHg. Lungs were found to be clear to auscultation. Obstetric ultrasound revealed a fetus of 37 weeks and 5 days of gestational age, a fetal heart rate of 118 beats per minutes, vertex presentation, estimated fetal weight of 7 pounds, amniotic fluid index of 9 cm, and a posterior placenta. Considering her past medical history of Protein C deficiency and previous cesarean section she was scheduled for cesarean delivery at the 38 WGA.

Having acknowledged a recent exposure to a co-worker with COVID-19, she was sent to a private laboratory reference site for SARS-CoV-2 nucleic acid amplification test (NAAT), also called COVID-19 NAAT. Twenty-four hours after the samples were obtained, the patient's COVID-19 test was confirmed positive. The president of the American College of Obstetricians and Gynecologists (ACOG) and the Medical Task Force of Puerto Rico was consulted, and she was the first pregnant patient with a positive COVID-19 test documented on the island. Given the limited published data regarding the proper management of pregnant women with COVID-19 and the protracted clinical course that is often seen in the general population with confirmed COVID-19 a multidisciplinary care team and maternal-fetal medicine experts on the Island, following ACOG guidelines [5], recommended to perform an early cesarean section. In coordination with hospital leadership and staff, at 37 weeks and 2 days of gestational age she was admitted to an isolation room with a N95 facemask and negative pressure system at the labor and delivery unit. Measures for airborne precautions were implemented for clinical interactions with the patient.

On admission, she informed having subjective fever, general malaise, fatigue, slight anosmia, and ageusia. On physical examination she had a body temperature of 36.8° C, a pulse of 107 beats per minutes, a respiratory rate of 20 per minute, and a blood pressure of 97/62 mmHg. Lungs were found to be clear to auscultation. An obstetrical doppler ultrasound revealed a fetal heart rate of 120 beats per minutes. Table 1 shows her laboratory work-up on admission following Institutional protocol for the management of suspected and confirmed patients with COVID-19. Baseline EKG showed normal sinus rhythm. The chest x-ray (Figure 1) showed scattered patchy groundglass airspace opacities in both lungs with some mild central bronchial cuffing, suggesting a nonspecific multifocal infectious/inflammatory process. Due to this imaging finding, ceftriaxone 2g intravenous (IV), azithromycin 500mg IV and supportive measures were included in her treatment. Enoxaparin 60mg subcutaneous every 12 hours was added to treat her protein C deficiency. Hydroxychloroquine sulfate 400mg orally twice a day for two doses and then 200mg twice a day to complete a therapy of five days was introduced. On hospital day 3, azithromycin had to be discontinued due to a slight QT interval prolongation of 427ms on repeated EKG, after which QT interval returned to baseline values. Later, a cesarean delivery with bilateral salpingectomy was performed in an operating room with negative pressure under strict infection control and prevention with personal protective equipment donning and doffing procedures supervised. At 37 weeks and 4 days of gestation a baby boy was born, weighed 6 pounds and 7 ounces with Apgar of 8 and 9 at 1 and 5 minutes, respectively. Amniotic fluid, cord blood and placenta samples were obtained at the time of delivery. Contact between the mother and infant was not permitted thus the infant was moved to the

Neonatal Intensive Care Unit (NICU) in isolation and with airborne precautions for observation. The physical examination was unremarkable without any clinical evidence of neonatal infection. The neonate was nourished with formula which was well tolerated. He had normal stools and urinary output. Nasopharyngeal swabs were negative for COVID-19 at 24 hours and 72 hours of life. The infant was discharged home after 4-days of an uneventful stay.

On hospital day 4 and day one of post cesarean delivery, the patient denied fatigue, subjective fever, anosmia, and ageusia, and respiratory difficulty. Therapy with ceftriaxone and hydroxychloroquine sulfate was continued. The COVID-19 test was repeated with a confirmed positive result. Her postpartum care throughout her hospital stay was adequate without complications. After completing five days therapy of ceftriaxone and hydroxychloroquine sulfate the patient remained asymptomatic. She was discharged home using the CDC guidelines of non-test-based strategy [6]. Likewise, she was oriented to follow the CDC guidelines for breastfeeding and for persons with COVID-19 and be on isolation in a separate room from others in the household, social distancing and infection control [6, 7]. The patient was also instructed to complete enoxaparin therapy for 30 days to prevent postpartum thrombophilia. Both the mother and the infant received follow-up five days after cesarean delivery and 2 weeks after their discharge. On the initial follow-up visit, the mother COVID-19 test was still positive although she and the infant remained asymptomatic. At the 2-week follow-up visit both testes were negative and both mother and infant were asymptomatic. Neither her husband nor older son have been reported COVID-19 positive.

There was no evidence of vertical transmission. The pathologic report of the placenta showed a three-vessel umbilical cord and membranes negative for inflammation caused by viral infection and the amniotic fluid was negative for SARS-CoV-2 using the nucleic acid amplification test. Fresh breast milk sample in a sterile cup was also collected to test against COVID-19 NAAT with a negative result.

Discussion And Conclusion

We report the first confirmed case of COVID-19 in a pregnant woman in Puerto Rico. At this point, the data available about COVID-19 during pregnancy is limited to small series of cases [8], the largest being 38 pregnant women with COVID-19 and their newborns in China and two meta-analyses which combine data of Coronavirus related illness, either SARS, MERS or COVID-19 [9, 10].

The decision to admit our patient in her third trimester of pregnancy and infected with COVID-19 to the labor and delivery unit was an unprecedented clinical as well as an organizational challenge for the institution's staff and the patient. Pregnant women in the delivery process have multiple encounters with the staff, representing a challenge under strict infection control and airborne precautions. Recently, a report in a maternity New York hospital showed that 87.9% of their COVID-19 positive patients at admission were asymptomatic at presentation. Only 1.9% of their patients admitted for delivery were symptomatic at admission and resulted positive to COVID-19 [11]. Therefore, it is fundamental to implement strict infection control measures, quarantine of infected mothers, and close monitoring of neonates at risk of COVID-19. Hospital policies have become increasingly restrictive and some

institutions have established universal screening in pregnant women who are admitted for delivery to improve the staff and patient's protection [11]. Additionally, our staff was monitoring her psychosocial needs since from the patient's standpoint, it was also a challenge. To the emotional distress caused by her COVID-19 diagnosis and her upcoming delivery, the isolation and the fact of not being able to count with her husband or family support by her side to support her through the process was an additional stressor. Initial reports are debating about the burden of COVID-19 pandemic on the mental health, especially in vulnerable populations [12].

Her clinical presentation was similar to that seen in non-pregnant adults with mild symptoms. Limited available data suggests that clinical and laboratory findings in pregnant women with COVID-19 are like those seen in non-pregnant patients [13]. Similar findings, based on small clinical data, have also been reported when comparing the presentation in pregnant with non-pregnant individuals from Coronavirus related illness, SARS and MERS [13]. However, early data from a meta-analysis of 41 pregnant women with COVID-19 showed that they have a higher risk of miscarriage, preterm birth, preeclampsia, and cesarean delivery, particularly if they are hospitalized with pneumonia [9].

Several drugs are under investigation for use in COVID-19, although no regimen has been found truly effective until now. Current management consists of supportive care and treatment with antibiotics [14]. Off-label or compassionate-use therapies, including antiretrovirals, antiparasitic agents, anti-inflammatory compounds, and convalescent plasma have been used [14, 15]. However, without a comparison group, it is difficult to know whether some of the improvement observed in patients are because of the drugs. Even though the hydroxychloroquine sulfate indication for COVID-19 is not part of the United States Food and Drug Administration (FDA) approved labeling, its emergency use is authorized for treatment of COVID-19 [16]. In various studies, hydroxychloroquine sulfate has demonstrated antiviral activity, an ability to modify the activity of the immune system, and has an established safety profile at appropriate doses [17]. Randomized, controlled studies are necessary to demonstrate the effectiveness of any of these drugs for treating COVID-19.

All evidence to date indicates that COVID-19 intrauterine or transplacental transmission from infected pregnant women to their fetuses is highly unlikely [7, 18]. However, in a recent study by Zeng et al., three of the 33 neonates born to mothers with COVID-19 under strict infection control and prevention procedures presented with early onset COVID-19 infection with positive nasopharyngeal and anal swabs within two days of life. It is unknown if these babies got the virus before or after birth, and the vertical maternal-fetal transmission cannot be ruled out [8].

This case describes the favorable clinical outcome of a cesarean delivery in a woman with COVID-19 in Puerto Rico. Additionally, it highlights the importance of the rapid clinical management and the hospital coordinated response for the care of a highly complex patient at a point where there is no evidence-based medicine or established guidelines on how to manage pregnant COVID-19 patients. Universal screening for COVID-19 in pregnant women who are admitted for delivery should be considered as part of Hospitals COVID-19's protocols to improve the staff and patient's protection.

List Of Abbreviation

WGA: Weeks gestational age

G#C#A#: Gravida, Cesarean, Abortion

SARS-CoV-2 or COVID-19: Novel Coronavirus Disease

NAAT: Nucleic acid amplification test

ACOG: American College of Obstetricians and Gynecologists

N95: Negativity at Approximately 95 Milliseconds

NICU: Neonatal Intensive Care Unit

FDA: Food and Drug Administration

CDC: Center for Disease Control and Prevention

EKG: Electrocardiogram

Declarations

Ethics approval: This study was approved as exempt by the Ponce Health Sciences University IRB (Protocol number 2004034656 on 04/16/2020).

Consent for publication: Written informed consent was obtained from the patient for publication of this Case report and any accompanying images. A copy of the consent form is available for review.

Availability of data and materials: Data sharing not applicable to this article as no datasets were generated or analyzed during the current study.

Competing interest: All authors declare that they have no competing interest.

Funding: We have no funding support from any organization for the submitted work.

Author's contributions: MRG and MLVM were responsible for data extraction, patient chart review, and creating and writing of the initial manuscript drafts. MOM, WRC, ANR and EST were all involved in the clinical care and treatment. MOM, WRC, EST, MRG and MLVM were all involved in follow up aspects for the case. All authors contributed to the conception of the report. MRG, MLVM wrote the report, and MOM assisted with critical revision. All authors read and approved the final manuscript. All authors gave their final acceptance to the submission of this report.

Acknowledgments: The authors thank the patient; the nurses and clinical staff who provided care for the patient. Additionally, Estela S. Estape MT, PhD from San Juan Bautista School of Medicine for her assistance and helpful discussions during manuscript preparation.

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Tables

Table 1: Maternal clinical and laboratory results.

Test	Range	Results		
		Hospital Day 1	Hospital Day 3 (Post-C Day 0)	Hospital Day 5 (Post-C Day #2)
White Cell Count (x 10 ³ /uL)	4.6-10.2	6.9	8.1	8.4
Hemoglobin (g/dL)	12.0-16.0	11.7	10.7	8.7
Hematocrit (%)	37.7-47.9	35.0	32.0	26.1
Platelet Count (x 10 ³ /uL)	142.0-424.0	275.0	277.0	208.0
Sodium (mmol/L)	136.0-145.0	138.0	140.0	142
Potassium (mmol/L)	3.5-5.1	4.2	3.5.0	4.4
Chloride (mmol/L)	98.0-107.0	108.0	109.0	112.0
Carbon dioxide (mmol/L)	21.0-32.0	22.0	21.0	22.0
Blood Urea Nitrogen (mg/dL)	7.0-18.0	7.0	7.0	6.0
Creatinine (mg/dL)	0.55-1.30	79.0	0.80	0.84
Glucose (mg/dL)	70.0-99.0	78.0	92.0	95.0
Corrected Calcium (mg/dL)	8.5-10.1	9.7	10.1	
Phosphorus (mg/dL)	2.5-4.9		4.8	
Magnesium (mg/dL)	1.6-2.6		1.9	
Total Bilirubin (mg/dL)	0.4-0.9	0.41	0.49	
Albumin (g/dL)	3.4-5.0	2.4	2.1	
Total protein (g/dL)	6.4-8.2	7.1	6.2	
AST (IU/L)	15.0-37.0	68.0	75.0	
ALT (IU/L)	13.0-6.0	59.0	56.0	
Alkaline Phosphatase (IU/L)	45.0-117.0	134.0	109.0	
Total Creatine Kinase (IU/L)	26.0-192.0	35.0		
C-Reactive Protein (mg/dL)	0.0-0.29	2.37	12.60	
PT (sec)	9.0-11.8	9.3		
INR	n/a	0.90		
PTT (sec)	25.0-31.3	27.1		
D-Dimer (mg/L)	0.05-0.59	3.33		

ABG pH	7.35-7.45	7.40		
ABG PCO ₂ (mmHg)	32.0-48.0	28.7		
ABG PO ₂ (mmHg)	83.0-108.0	109.0		
ABG HCO ₃ (mmol/L)	22.0-26.0	17.6		
ABG O ₂ Saturation (%)	94.0-100.0	98.1		
Urinalysis	Negative	Negative		
Procalcitonin (ng/mL)	0.0-0.5	0.41		
Ferritin (ng/mL)	11.0-306.8	96.8		
Interleukin 6 (pg/mL)	5.0-15.0	6.6		

Figures

Zoom:0.21
W:4095.00 L: 2047.00 [Original]
DFOV: 35.4 x 27.1 cm
20 cm

Figure 1

Portable chest x-ray: scattered patchy groundglass airspace opacities in both lungs with some mild central bronchial cuffing, suggesting nonspecific multifocal infectious/inflammatory process.