

Management considerations for a critically ill 26-gestational week patient with COVID-19: a case report

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Abstract

Coronavirus-2019 (COVID-19) pandemic is a global health challenge where pregnant women are potentially more vulnerable to respiratory infections. We describe the successful management of a case a 35 years old pregnant woman, G3, P1, with a history of caesarian section who tested positive for COVID-19 and required critical care support

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Abstract: Coronavirus-2019 (COVID-19) pandemic is a global health challenge where pregnant women are potentially more vulnerable to respiratory infections. We describe the successful management of a case a 35 years old pregnant woman, G3, P1, with a history of caesarian section who tested positive for COVID-19 and required critical care support.

Keywo rds: COVID-19, SARS-CoV-2, Pregnancy, Intubation, Critical Care

Key Clinical Message: Early aggressive management of pregnant women severe or critical cases of COVID-19 by the multidisciplinary team is key to minimizing complications and early recovery.

Background

Coronavirus Disease 2019 (COVID-19) is a disease caused by the Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) virus.¹ Which was declared by The World Health Organization as a pandemic on 11 March 2020. As of August 2020, a total of more than 21 million cases have been confirmed globally. Qatar has recorded its first documented case of COVID-19 on February 29, 2020, and has a total of 124,850 confirmed cases, with a total of 214 deaths (updated Sep 28, 2020).² With the COVID-19 pandemic; pregnant women and their newborns were also afflicted significantly due to anatomical, physiological, and immunological changes. Pregnant women are a potentially highly vulnerable population.³

Pregnant women are potentially more vulnerable to respiratory pathogens including COVID-19³ due to anatomical, physiological, and immunological changes of pregnancy putting them and their unborn babies at higher risks of adverse outcomes.

Case Presentation

A healthy 35-year-old pregnant woman, gravida 3, para 1, with a history of previous caesarian section 3 years back for fetal distress was brought to the emergency department (ED) by emergency medical services (EMS) at 26+3 weeks gestation with a one-day history of fever and shortness of breath. Three days ago, she had attended the adult Ambulatory Care Center (ACC) with a history of contact with COVID-19, cough and mild shortness of breath. She was afebrile; her oxygen saturation was 99% and was systemically well. COVID-19 swabs were taken and advised home quarantine while awaiting the results. Telephone consultation was to take place within three days but advised to return to the hospital if she experiences worsening symptoms.

On admission to ED, she was tachypnea with respiratory rate (RR) of 50 breaths/min, 88% oxygen saturation (SpO₂) on room air (94-100%), febrile at 38.5° C and tachycardia with a heart rate (HR) of 120 beats/min (60-100 beats/min). She was immediately transferred to the Intensive Care Unit (ICU); chest x-ray showed a typical COVID-19 presentation (Figure 1).

Her investigations showed: hemoglobin 11.0gm/dl, WBC 9.2 x10³/uL, D-Dimer 0.39 mg/L FEU, Fibrinogen 4.7 gm/L (NR 2.0 – 4.1), LDH 334 U/L (NR 135 – 214), Myoglobin 80 ng/mL (NR 25 – 58), CRP 70.2 (NR 0 – 5), Interleukin-6 59 pg/mL (NR [?] 7), and Albumin level 21 (NR 35 – 52). Echocardiogram was normal apart from minimal pericardial effusion and renal function and liver function tests were normal.

She was managed by MDT involving the ITU, obstetrics, and infectious disease teams. She was quickly put on CPAP high flow oxygen (Fio₂) 50% which improved her oxygen saturation to 99%. She was started on tazocin (piperacillin, tazobactam), azithromycin, immune globulin, convalescent plasma, Dexamethasone, enoxaparin along with other supportive measures. Bedside ultrasound showed a viable active fetus with a regular heart rate in cephalic presentation with the anterior upper placenta and mildly reduced liquor volume. After 30 minutes, she was tachypneic up to 70bpm (12-20 b/m) and she expressed abdominal discomfort on non-invasive ventilation (NIV), hence discontinued and connected to a Non-rebreathing mask (NRBM) 15LPM. Her tachypnea came down to 50 BPM on NRBM.

On day 2 of ICU admission, she was not tolerating the NIV; she became tired; hence she was intubated and kept on mechanical ventilation. Following intubation and MDT was held and a decision was made to deliver by category 3 cesarean section (CS) in view of deteriorating maternal condition and to avoid possible sudden fetal demise. The procedure was done without complication and a baby was delivered in stable condition and transferred to the Neonatal Intensive Care Unit (NICU). His COVID-19 screening result was negative.

On day 4 of ICU admission, the patient's oxygenation has improved, and trial extubation was carried out but failed as the patient became agitated. Her wound site was clean and healing well, post-operative hemoglobin was stable. There was minimal serosanguinous fluid in her drain which was removed.

She was successfully extubated on day 6 of hospital admission and kept on NRBM 10 LPM maintaining 98% oxygen. After extubating she was kept on NRBM alternative with HFNC for one week maintaining 95-98 % oxygen saturation. Then oxygen requirement decreased and was kept on a nasal cannula. On day 11 of ICU admission, she was mobilized out of bed and on day 12 of ICU admission she was saturating well on

the nasal cannula. Ivabradine 5mg BID was added in view of tachycardia. She was discharged from ICU to home quarantine on day 13 of hospital admission. A chest X-ray before discharge showed a mild regression of the prior seen bilaterally airspace shadowing (Figure 2).

Discussion

Pregnancy complicated with pneumonia is not uncommon and can account for up to 1.5 percent of hospital admission among pregnant women in the USA.⁴ As COVID-19 is a novel virus current knowledge on pregnant women who are severely or critically ill with the virus is still evolving and information is lacking on the overall impact on her unborn child especially in cases of severe prematurity (<28 weeks gestation) which often presents a major management dilemma involving a delicate balance to ensure a good outcome for both mother and baby.

There is limited data on the course of Covid-19 on pregnancy outcome and the role played by normal immunogenic changes of pregnancy remains unclear. Some studies^{5,6} have reported increased fetal and maternal morbidity and mortality, a higher rate of hospitalization and ITU admission among pregnant women compared to non-pregnant women and possibly more severe disease in late pregnancy compared to early pregnancy. While other studies have reported no significant worsening of symptoms and possible shortening of clinical course in pregnant women admitted to hospital with severe or critical COVID-19.⁷ One systematic review reported maternal mortality, stillbirth and neonatal mortality rate of 1.6%, 1.4% and 1.0% respectively.⁸ In another review of reports of 32 women with COVID-19 during pregnancy, preterm delivery occurred in 47% of hospitalized women with one case of stillbirth and one case of neonatal death.⁹ Our patient was 26+3 weeks at the time of admission and her only risk factor was being of Asian origin.

Pregnant women who are positive or in close contact with a confirmed or probable case of COVID-19 must be closely monitored with strict instructions on what to do if there is a worsening of their symptoms. Our patient first presented to ACC with mild symptoms following contact with COVID-19 patient. She has no systemic symptoms and examination was normal; therefore she was advised home quarantine and to report to ED if her symptoms worsen as per hospital protocol.

There is no consensus on the best form of fetal monitoring or the optimal time for delivery in those who are severely or critically ill. It is widely accepted that delivery should only be carried out for obstetric indications and mode of delivery should not be determined by the presence of COVID-19. In one case report¹⁰, fetal heart rate monitoring was carried out thrice daily for 20 minutes to detect any significant fetal abnormality.

Once our patient was intubated the MDT decision was to deliver by category 3 cesarean section as soon as all arrangements including neonatal intensive care support were in place. It was felt that by the time a significant fetal heart rate abnormality is detected on intermittent fetal heart rate monitoring it's possible the fetus might have suffered a significant irreversible hypoxic brain injury. Secondly, our patient was managed in a dedicated COVID-19 intensive care unit located more than 30 minutes' drive from the maternity and neonatal unit making it impossible to get the team across in time for category 1 cesarean section if there is a sudden maternal deterioration or acute fetal distress. Furthermore, the team felt that planned delivery in a calm environment would give the baby the best chance of survival and avoid the increased morbidity associated with an emergency cesarean section especially if it happened in the middle of the night. It is interesting to note that following delivery there was a significant reduction in patient oxygen required.

Conclusion

Early aggressive management of severe or critical cases of COVID-19 by a multidisciplinary team is key to minimizing complications and early recovery. The timing of delivery should be determined by a multidisciplinary team approach, on a case-by-case basis after a detailed discussion with the patient or her family after considering both maternal and fetal clinical conditions and local circumstances to ensure good outcomes for both mother and baby.

Abbreviations

COVID-19: Coronavirus-2019

ACC: Ambulatory Care Center

EMS: Emergency Medical Services

MDT: Multidisciplinary Team

CRP: C-Reactive Protein

LDH: Lactate Dehydrogenase

NIV: None-Invasive Ventilation

NRBM: Non-Rebreathing Mask

Declarations

Ethics approval and consent to participate

The article describes a case report. Therefore, no additional permission from our Ethics Committee was required.

Consent for publication

The consent for publication was obtained.

Availability of data and material

All data generated or analyzed during this study are included in this published article.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

MYK, VOO, MSE, FME, ASM, AJN: Data Collection, Literature Search, Manuscript Preparation

All authors read and approved the final manuscript

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References

1. Lai C-C, Shih T-P, Ko W-C, Tang H-J, Hsueh P-R. Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and corona virus disease-2019 (COVID-19): the epidemic and the challenges. *International journal of antimicrobial agents*. 2020:105924.
2. Organization WH. Coronavirus disease (COVID-19): weekly epidemiological update. 2020.
3. Chen L, Jiang H, Zhao Y. Pregnancy with COVID-19: Management considerations for care of severe and critically ill cases. *American Journal of Reproductive Immunology*. 2020:e13299.
4. Richey SD, Roberts SW, Ramin KD, Ramin SM, Cunningham FG. Pneumonia complicating pregnancy. *Obstetrics and gynecology*.1994;84(4):525-528.

5. Ellington S, Strid P, Tong VT, et al. Characteristics of women of reproductive age with laboratory-confirmed SARS-CoV-2 infection by pregnancy status—United States, January 22–June 7, 2020. *Morbidity and Mortality Weekly Report*. 2020;69(25):769.
6. Tang P, Wang J, Song Y. Characteristics and pregnancy outcomes of patients with severe pneumonia complicating pregnancy: a retrospective study of 12 cases and a literature review. *BMC pregnancy and childbirth*. 2018;18(1):1-6.
7. Pierce-Williams RA, Burd J, Felder L, et al. Clinical course of severe and critical COVID-19 in hospitalized pregnancies: a US cohort study. *American Journal of Obstetrics & Gynecology Mfm*.2020:100134.
8. Turan O, Hakim A, Dashraath P, Jeslyn WJL, Wright A, Abdul-Kadir R. Clinical characteristics, prognostic factors, and maternal and neonatal outcomes of SARS-CoV-2 infection among hospitalized pregnant women: a systematic review. *International Journal of Gynecology & Obstetrics*. 2020.
9. Mullins E, Evans D, Viner R, O'Brien P, Morris E. Coronavirus in pregnancy and delivery: rapid review. *Ultrasound in Obstetrics & Gynecology*. 2020;55(5):586-592.
10. Hong L, Smith N, Keerthy M, et al. Severe COVID-19 infection in pregnancy requiring intubation without preterm delivery: A case report. *Case Reports in Women's Health*. 2020:e00217.

Figure 1: Chest X-ray on Admission

Figure 2: Chest X-ray before discharge showing Mild regression of the prior seen bilaterally airspace shadowing

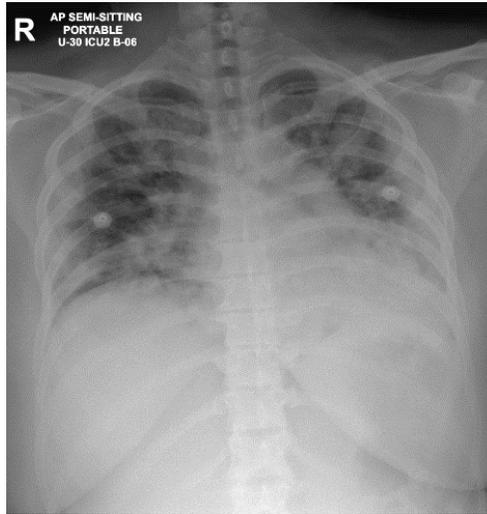


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