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Objective: While rapid recourse to delivery after failed CPR has been shown to improve outcomes of pregnant patients with cardiac arrest,[1,2] it is not known whether delivery improves or compromises the outcome of COVID patients with respiratory failure.[3,4] Our objective was to evaluate the safety and utility of delivery of COVID-19 infected pregnant women needing respiratory support.

Study Design: This is a retrospective observational study of COVID-19 infected pregnant women (PCR diagnosed), with severe disease (defined per prior publications.[3]). A subset of these cases was previously presented, but without detail on the effect of delivery on disease (London, et al. "The Relationship Between Status at Presentation and Outcomes Among Pregnant Women with COVID-19" *Am J Perinatol.*, in press). The study was exempted by IRB.

Results: Of 125 confirmed cases of COVID-19, twelve (9.6%) had severe disease (Table 1). Among the 12, three resolved spontaneously after transient respiratory support in hospital and were discharged home (one subsequently returned in preterm labor and delivered by cesarean two weeks later). Of the remaining nine who continued to need respiratory support, seven (77.8%) had iatrogenic preterm deliveries (six by cesarean delivery) for maternal respiratory distress (needing increasing levels of respiratory support without improved oxygen saturation), one had an early term delivery due to PROM, and one, now 30 weeks, has required intensive care with high-flow nasal cannula for three weeks.

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Of the eight patients delivering with maternal respiratory distress, seven did not require intubation, and one was intubated for emergent cesarean delivery, and remained on a ventilator for 19 days. Among the non-intubated, four had an improvement in oxygenation within two hours postpartum; two required less respiratory support, and two were taken completely off respiratory support. None of the other three required an increased level of respiratory support, and were off of all support between four and seven days postpartum.

Conclusion: Delivery did not worsen the respiratory status of women with persistent oxygen desaturation and the need for increasing respiratory support. Among women not needing a ventilator, return of normal respiratory status after delivery occurred within hours to days. The one patient intubated intraoperatively took longer to recover. It is possible delivery may be less salutary when damage to the lungs are sufficient to warrant intubation. This series suggests that maternal respiratory distress should not be a contraindication to delivery.

As noted in a recent SMFM-SOAP guideline, it's not known whether uterine decompression improves respiratory status; we are unable to shed light on that issue.[4] While we saw no harm, we cannot be certain that delivery per se caused the improvement we saw, or whether a similar outcome could have been achieved with ongoing respiratory support (although one of three patients managed conservatively, remained on respiratory support for three weeks). In sum, while more data on the effects of delivery are needed, we have shown in a small series that women with COVID-19 requiring respiratory support fared well when they underwent delivery.

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References

1. Society for Maternal-Fetal Medicine (SMFM). Electronic address: pubs@smfm.org, Pacheco LD, Saade G, Hankins GD, Clark SL. Amniotic fluid embolism: diagnosis and management. Am J Obstet Gynecol. 2016;215(2):B16□B24. doi:10.1016/j.ajog.2016.03.012
2. Jeejeebhoy FM, Zelop CM, Lipman S, et al.; American Heart Association Emergency Cardiovascular Care Committee, Council on Cardiopulmonary, Critical Care, Perioperative and Resuscitation, Council on Cardiovascular Diseases in the Young, and Council on Clinical Cardiology. Cardiac Arrest in Pregnancy: A Scientific Statement From the American Heart Association. Circulation. 2015 Nov 3;132(18):1747-73.
3. Society for Maternal-Fetal Medicine. Management Considerations for Pregnant Patients With COVID-19. https://s3.amazonaws.com/cdn.smfm.org/media/2334/SMFM_COVID_Management_of_COVID_pos_preg_patients_4-29-20_final.pdf. Accessed April 30, 2020.
4. Society for Maternal-Fetal Medicine and Society for Obstetric and Anesthesia and Perinatology. Labor and Delivery COVID-19 Considerations. https://s3.amazonaws.com/cdn.smfm.org/media/2327/SMFM-SOAP_COVID_LD_Considerations_-_revision_4-14-20_-_changes_highlighted.pdf. Accessed April 30, 2020.

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85 Table 1: Characteristics and Outcomes of Pregnant Women with Severe COVID-19

Patient Number	1	2	3	4	5	6	7	8	9	10	11	12
Age (years)	44	33	34	28	37	32	34	25	32	24	30	29
BMI* (kg/m^2)	28.4	30.3	36.0	25.9	29.3	29.3	30.8	32.5	41.0	31.0	42.0	29.4
Medical History	None	None	Pre-gestational diabetes, Hepatitis B	None	Gestational Diabetes A2	None	Gestational Diabetes A1	None	Chronic Hypertension	None	None	None
Gestational age at initial symptom	29^4	33^4	35^3	31^0	28^5	31^5	37^2	33^0	26^0	34^6	26^0	25^3
Mode of Delivery	Cesarean	Cesarean	Cesarean	Cesarean	Cesarean	Cesarean	Vaginal	Cesarean	-	Vaginal	-	-
Indication	Maternal respiratory distress	Maternal respiratory distress	Maternal respiratory distress	Maternal respiratory distress	Mono-Di Twins	Maternal respiratory distress	Early Term PROM	Maternal respiratory distress	-	Maternal respiratory distress	-	-

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Gestational Age at Delivery	31[4]	35[3]	36[2]	32[4]	31[4]	31[6]	37[2]	34[4]		35[1]		
Respiratory support	Non-rebreather	Simple Nasal cannula	Mechanical ventilation	Non-rebreather	Simple nasal cannula	Simple nasal cannula	Simple nasal cannula	Simple nasal cannula	Simple nasal cannula	Simple nasal cannula	High-flow nasal cannula	Simple nasal cannula
ICU	No	No	Yes	No	No	No	No	No	No	No	Yes	No
LOS* (days)	9	4	26	8	7	7	3	9	3	8	X*	5
LOS* after delivery (days)	7	4	26	5	4	4	3	8	-	5	-	-

*BMI, body mass index, LOS, length of hospital stay, X, Currently admitted for 15 days as of May 1st

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Statement of authorship

Rodney McLaren: data curation, writing-original draft, review and editing; **Viktoriya London:** data curation, writing-review and editing; **Fouad Atallah:** data curation, writing-review and editing; **Sandra McCalla:** writing-review and editing; **Shoshana Haberman:** writing-review and editing; **Nelli Fisher:** writing-review and editing; **Janet Stein:** writing-review and editing; **Howard Minkoff:** conceptualization, supervision, writing-review and editing

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