Outcomes of cesarean delivery in obstetric patients with SARS-CoV-2 infection

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Keywords: complications, COVID-19, obstetrics, perinatology

The impact of SARS-CoV-2's infection on cesarean delivery (CD) outcomes is not well described in the current literature. The present study's objective was to explore outcomes in SARS-CoV-2 infected CD patients using a statewide administrative database in Maryland, USA.

The University of Maryland, Baltimore, institutional review board provided ethical approval for this study. Data was obtained from the Maryland Health Services Cost Review Commission (HSCRC) on May 27, 2021, and covered approximately the first half of the 2021 fiscal year. CD patients were identified using Medicare diagnosis related groups. For all patients, we collected demographics, insurance status, comorbidities, postoperative morbidity and mortality, hospital charges, discharge location, and unplanned hospital readmissions. Primary outcomes were maternal mortality, intensive care unit (ICU) admission, mechanical ventilation, preterm birth (PTB), and stillbirth. Patient characteristics and outcomes were summarized with descriptive statistics and were compared using the Wilcoxon rank-sum test (skewed continuous data), the chi-squared test (categorical data), or Fisher’s exact test (categorical data with a low cell count).

36,174 patients underwent vaginal or CD and had SARS-CoV-2 testing. In total, 727 (2.0%) of these patients were positive for SARS-CoV-2 infection. Furthermore, 261 CD patients were SARS-CoV-2 positive, and 12,046 CD patients were SARS-CoV-2 negative. Table 1 lists patient characteristics and outcomes. Patients with SARS-CoV-2 infection were more frequently non-white (P < 0.001) and had Medicaid (P < 0.001). They were also more likely to have pre-eclampsia (7.3% vs. 4.1%, P = 0.01).

There was no 30-day mortality in patients with SARS-CoV-2 infection and one 30-day mortality occurred in 12,046 patients without SARS-CoV-2 infection. SARS-CoV-2 patients had more ICU admissions (3.1% vs. 0.8%, P < 0.001) and mechanical ventilation for 24–96 h or >96 h (P = 0.009 and P = 0.02, respectively). PTB and stillbirth rates were higher in SARS-CoV-2 patients; 8.8% vs. 4.5% for PTB and 3.1% vs. 0.8% for stillbirth (P = 0.001 and P < 0.001).

The present study suggests that SARS-CoV-2 infection was not associated with excess maternal mortality in CD patients, although there was a modest increase in maternal morbidity (mainly respiratory failure). PTB and stillbirth were also more common in SARS-CoV-2 patients, which is consistent with prior studies and suggests that SARS-CoV-2 infection may confer increased perinatal risk.1–3 More SARS-CoV-2 positive patients were Hispanic and had Medicaid, highlighting the disproportionate impact of the COVID-19 pandemic on underserved minority women with access to fewer resources in the USA. These findings highlight the critical need for continued vaccination efforts in underserved obstetric patients who are at risk of adverse maternal and fetal outcomes.

ACKNOWLEDGMENTS
The Maryland Health Services Cost Review Commission provided the data for this study, but is not responsible for the analysis that was performed.

CONFLICTS OF INTEREST
The authors have no conflicts of interest.

AUTHOR CONTRIBUTIONS
AL, JB, IB, AJ, HA, MM: substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work; drafting the work or revising it critically for important intellectual content; final approval of the version to be published; and agreement to be accountable for all aspects of the
work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

**REFERENCES**

1. Metz TD, Clifton RG, Hughes BL, et al. Disease severity and perinatal outcomes of pregnant patients with coronavirus disease 2019 (COVID-19). Obstet Gynecol. 2021;137(4):571-580.

2. Allotey J, Stallings E, Bonet M, et al. Clinical manifestations, risk factors, and maternal and perinatal outcomes of coronavirus disease 2019 in pregnancy: living systematic review and meta-analysis. BMJ. 2020;370:doi: 10.1136/bmj.m3320

3. Mullins E, Hudak ML, Banerjee J, et al. Pregnancy and neonatal outcomes of COVID-19: coreporting of common outcomes from PANC-OVID and AAP-SONPM registries. Ultrasound Obstet Gynecol. 2021;57(4):573-581.