Effectiveness of REGEN-COV combination monoclonal antibody infusion to reduce risk of COVID-19 hospitalization in pregnancy: A retrospective cohort study

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**OBJECTIVE:** (76) Pregnancy is a risk factor for severe COVID-19.\(^1\) REGEN-COV combination monoclonal antibody infusion efficaciously reduced COVID-19 hospitalization in non-pregnant patients at risk for severe disease not meeting admission criteria.\(^2\) When REGEN-COV was issued emergency use authorization in summer 2021, national organizations endorsed anti-spike monoclonal antibodies use in pregnant patients despite their exclusion from efficacy trials.\(^3\) We hypothesize that REGEN-COV infusion reduces risk for COVID-19 hospitalization among pregnant patients diagnosed during alpha and delta predominant COVID waves.

**STUDY DESIGN:** (225) This is a retrospective cohort study in a large regional hospital system including unvaccinated pregnant patients with polymerase chain reaction confirmed symptomatic SARS-COV-2 infection who did not meet admission criteria at time of diagnosis from March 2020 through December 2021. Patients with higher-order multiple gestation and symptom onset > 10 days prior to presentation were excluded, as were those who received inpatient care at time of diagnosis, either for COVID or for delivery. REGEN-COV administration was compared against no administration; decision for administration was made by treating clinician and patient based on shared decision-making model. Primary outcome was subsequent COVID-19 hospitalization. Secondary outcomes included National Institutes of Health defined critical or severe COVID-19, preterm delivery, and perinatal outcomes. Adverse events included infusion reaction or re-presentation to care secondary to suspected complications from REGEN-COV infusion. A subanalysis was planned to assess outcomes in patients at highest risk of admission, defined as COVID-19 Risk of Complications Score ≥3.\(^4\) Demographic and clinical characteristics were compared by Student’s \(t\) test, \(\chi^2\), or Fisher exact test where appropriate. Outcome odds ratios including 95% confidence intervals were generated via logistic regression, with prespecified adjustments made for maternal age, body mass index, and third trimester.
diagnosis based on previous reported risk factors for admission.\(^5\) \(P < 0.05\) or confidence interval not including 1 were considered significant. Data analysis was performed using R.

RESULTS: (121) Among 1186 patients testing positive for SARS-COV-2, 141 previously immunized patients and 281 admitted at diagnosis were excluded from analysis. Of 764 included patients, 88 (12\%) patients received REGEN-COV infusion compared to 676 unexposed patients. No baseline differences were observed between groups, including age, obesity, third trimester diagnosis, or COVID-19 Risk of Complications Score. Primary outcome was similar, with 1.2\% of untreated and 1.1\% of REGEN-COV patients subsequently hospitalized for COVID-19 (aOR 0.86, 95\% CI 0.10, 7.11, Table). Secondary outcomes were likewise similar, with no adverse events reported for REGEN-COV administration. Analysis limited to high-risk patients was precluded by low numbers, though of untreated patients, 2/54 (3.7\%) ultimately required COVID admission, while none of the 8 treated patients were subsequently admitted.

CONCLUSION: (67) In a retrospective cohort of unvaccinated pregnant patients with symptomatic COVID-19, administration of REGEN-COV combination monoclonal antibody infusion did not reduce subsequent COVID-related admission. Findings were primarily related to infrequent admission in the untreated group (1.2\%), well below the 3-5\% reported in non-pregnant efficacy trials. As novel therapies are developed for both new and existing diseases that affect pregnant women, ensuring inclusion in clinical trials is essential.

KEYWORDS: casirivimab, COVID-19, imdevimab, monoclonal antibodies, REGEN-COV, SARS-COV-2
REFERENCES


Table. Outcomes among pregnant patients with COVID-19 meeting criteria for anti-spike monoclonal antibody infusion by administration status

<table>
<thead>
<tr>
<th>Outcome</th>
<th>No antibodies N = 676</th>
<th>REGEN-COV N = 88</th>
<th>OR</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>COVID-19 Hospitalization</td>
<td>8 (1.2%)</td>
<td>1 (1.1%)</td>
<td>0.86*</td>
<td>0.10 – 7.11</td>
</tr>
<tr>
<td>Critical or Severe COVID-19</td>
<td>7 (1.0%)</td>
<td>1 (1.1%)</td>
<td>1.01</td>
<td>0.12 – 8.64</td>
</tr>
<tr>
<td>Supplemental oxygen</td>
<td>6 (0.9%)</td>
<td>1 (1.1%)</td>
<td>1.21</td>
<td>0.14 – 10.71</td>
</tr>
<tr>
<td>Cesarean delivery</td>
<td>128 (35.6%)</td>
<td>14 (29.2%)</td>
<td>0.75</td>
<td>0.39 – 1.44</td>
</tr>
<tr>
<td>Preterm delivery</td>
<td>47 (13.1%)</td>
<td>1 (2.1%)</td>
<td>0.65</td>
<td>0.22 – 1.91</td>
</tr>
<tr>
<td>Neonatal intensive care admission</td>
<td>54 (15.0%)</td>
<td>3 (6.2%)</td>
<td>0.87</td>
<td>0.35 – 2.14</td>
</tr>
<tr>
<td>Small for gestational age</td>
<td>12 (3.3%)</td>
<td>0 (0.0%)</td>
<td>0.73</td>
<td>0.09 – 5.81</td>
</tr>
</tbody>
</table>

*Adjusted for maternal age, pregravid body mass index, and third trimester COVID-19 diagnosis

OR, odds ratio; CI, confidence interval