**ABSTRACT**

COVID-19 represents a monumental threat to public health. Pregnant women and fetuses may be at increased risk for complications compared to the general public. As yet, the relationship between COVID-19 and pregnancy remains to be clarified and will require further investigations to understand associations and promote evidence-based treatment practices.

**MECHANISM OF COVID-19 CELL ENTRY**

Spike protein: COVID-19 antigen attaches to ACE2-R of cells

ACE2-R: receptor on cells that engulfs COVID-19 once bound

- Found on many tissues, e.g. placenta and uterus
- Activity in placenta and uterus 1x during pregnancy (in mice)
- RAAS activity is 1 during pregnancy due to 1 estrogen and progesterone in turn 1 ACE2 activity
- Given that ACE2-R exists on pregnancy-associated tissues and 1 in activity during pregnancy, potential for utero-placental changes and vertical transmission following in utero COVID infection requires prompt investigation

**PT #1 FETAL U/S DATA**


**PT #2 FETAL U/S DATA**


**PLACENTAL HISTOPATHOLOGY**

- Patient #1 contracted COVID during her 1st trimester. There was a significant decline in AFI, MVP, and fetal growth trajectory between 34w0d and 38w0d, leading to a diagnosis of oligohydramnios and an emergency c-section. Placental pathology demonstrated changes similar to other reports of COVID-19 pregnancies.
- Patient #2 contracted COVID during her 2nd trimester. There was a decrease in her amniotic fluid level, but overall it remained within the normal range until 39w1d when she delivered.
- Our patients tested positive for COVID-19 in different trimesters, which may have influenced the outcomes of the pregnancies.
- Ultimately, these cases help to demonstrate the need for a more comprehensive understanding of women affected by COVID-19 during pregnancy, as this relationship remains unclear.
- Further investigation to understand associations between COVID and pregnancy is needed to promote evidence-based treatment practices.

**REFERENCES**


**BACKGROUND**

The United States saw >26.2 million COVID-19 cases by 2/1/21. Due to the severity of the disease, research and vaccine efforts have been expedited in vulnerable populations.

- Symptoms are highly variable and range from asymptomatic to having any/all of fever, cough, dyspnea, loss of taste and smell, congestion, sore throat, nausea, vomiting, and diarrhea.
- There are currently three human coronaviruses that can cause a severe respiratory illness, including SARS-CoV-1 (2003), MERS-CoV (2012), and SARS-CoV-2 (2019).
- Several unknown remain about SARS-CoV-2 due to its novelty. Specifically, inadequate research exists to demonstrate its effects during pregnancy.
- Pregnancy 1 the risk of respiratory infections and developing complications due to adaptive changes to the cardiorespiratory and immune systems.
- The SARS-CoV and MERS-CoV epidemics were both preferentially fatal in pregnant women.
- Most COVID-19 studies to date have focused on the general population, esp. those with comorbidities, demonstrating the need for research dedicated to the effects of maternal and fetal outcomes for those infected in all stages of pregnancy.

**PRE-PREGNANCY RISK FACTORS**

- COVID risk factors: Neither pt had pre-pregnancy risk factors for severe COVID-19 infection
- Pregnancy risk factors: Neither pt had pre-COVID risk factors for any pregnancy complications

**PATIENT 1**

- Maternal COVID symptoms: Although pt #2 had a slight fever, runny nose, cough, and headache, neither pt had severe symptoms requiring critical care
- Pregnancy complications: Neither pt developed complications despite in utero COVID infection

**PATIENT 2**

- Maternal COVID symptoms: Both are boys
- Growth: Fetus #1 growth consistently decreases relative to average during the 3rd trimester, whereas fetus #2 growth stays above 50% throughout

**COVID risk factors**

- Chronic lung dx
- HTN
- Diabetic/Obesity
- Tobacco Use

**Pregnancy risk factors**

- Prior h/o GHTN, pre-eclampsia, or eclampsia
- Prior h/o gestational diabetes
- Prior h/o pre-term labor/birth

**ANIMMOCAL FLUID**

- Amniotic Fluid Index (AFI): sum of fluid in all uterine quadrants; normal is between 8-18 (blue box on graphs);
- Maximum Vertical Pocket (MVP): max depth of umbilical-cord and fetal-part-free fluid in any uterine quadrant; normal is between 2-8; <2 meets criteria for oligohydramnios (blue line on graphs)
- Fetus #1 meets criteria for oligohydramnios at 38w0d, possibly d/t COVID-assoc. changes in placental perfusion.