



# COVID-19 AND PREGNANCY

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# Coronavirus disease 2019 (COVID-19) in pregnant women: A report based on 116 cases

- Yan J, Guo J, Fan C, Juan J, Yu X, Li J, Feng L, Li C, Chen H, Qiao Y, Lei D, Wang C, Xiong G, Xiao F, He W, Pang Q, Hu X, Wang S, Chen D, Zhang Y, Poon LC, Yang H
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# Introduction-1

- COVID-19, caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), is a global public health emergency.
- Coronaviruses are enveloped, non segmented, positive-sense RNA viruses
- High mortality rates: 10% for SARS-CoV; 37% for MERS-CoV
- genome similarity of about 80% and 50% with SARS-CoV and MERS-CoV

# Introduction-2

- Pregnant women are particularly susceptible to respiratory pathogens and severe pneumonia, because of the physiologic changes in the immune and cardiopulmonary systems
- Higher mortality and morbidity rate of SARS in pregnant women
- To date, data on the effect of COVID-19 in pregnancy are limited to small case series

# Materials and Methods

## <Data Collection>

- from 25 hospitals within and outside of Hubei province, respectively, between January 20 and March 24, 2020
- Laboratory confirmed case: positive result on qRT-PCR assay of maternal pharyngeal swab specimens
- Complete epidemiological history, clinical symptoms or signs, laboratory and radiologic findings, treatment measures and outcomes data were extracted from electronic medical records
- The date of onset of disease was defined as the day when the symptoms were noticed.

# Materials and Methods

## <Data Collection>

- Data on pregnancy and neonatal outcome was collected
- The degree of severity of COVID-19 pneumonia (severe vs. nonsevere) was defined by the Infectious Diseases Society of America/American Thoracic Society guidelines for community-acquired pneumonia

# Materials and Methods

## <Sample collection>

- Amniotic fluid samples: needle syringe aspiration at the time of CS
- Cord blood and neonatal pharyngeal swab samples: immediately after delivery in the OR or DR
- vaginal secretion samples: lower-third of the vagina on admission
- breast milk: first lactation at hospital

# Materials and Methods

<Study outcomes>

- primary end point: admission to ICU, the use of mechanical ventilation, or death
- Secondary end points were the rates of spontaneous abortion, preterm delivery, Cesarean delivery and neonatal COVID-19



# Results-Clinical Characteristics

- 116 cases: 65 cases of laboratory-confirmed and 51 cases of clinically diagnosed COVID-19 pneumonia
- mean age: 30.8 (range 24-41) ,median GA on admission was 38 (IQR 36+0-39+1) weeks
- 59.5% (69/116) had history of relevant environmental exposure and 32.8% (38/116) had contact with infected persons
- The most common symptoms at presentation were fever in 50.9%, cough in 28.4% and fatigue in 12.9%
- In 23.3% of cases there were no signs or symptoms of the disease

# Results-Clinical Characteristics

- 8 patients (6.9%, 8/116) with severe pneumonia, all requiring ICU admission, of which 1 need plasmapheresis and 1 need ECMO; no cases of maternal death
- lymphocytopenia was present in 44.0% of the patients and leukopenia in 24.1%, according to pregnancy-specific normal ranges

# Results-Pregnancy Outcomes

	All deliveries (n=99)	Laboratory- confirmed (n=50)	Clinically diagnosed (n=49)
<b>Mode of delivery</b>			
Cesarean delivery, n (%)	85 (85.9)	44 (88.0)	41 (83.7)
Vaginal delivery, n (%)	14 (14.1)	6 (12.0)	8 (16.3)
<b>Indication of Cesarean delivery<sup>a</sup></b>			
COVID-19 pneumonia, n (%)	33 (38.8)	19 (43.2)	14 (34.1)
Previous Cesarean delivery, n (%)	16 (18.8)	8 (18.2)	8 (19.5)
Fetal distress, n (%)	9 (10.6)	7 (15.9)	2 (4.9)
Failure to progress, n (%)	5 (5.9)	3 (6.8)	2 (4.9)
Preeclampsia, n (%)	4 (4.7)	1 (2.3)	3 (7.3)
Abnormal fetal growth, n (%)	2 (2.4)	0	2 (4.9)
Placenta previa, n (%)	3 (3.5)	0	3 (7.3)
Others, n (%)	13 (15.3)	6 (13.6)	7 (17.1)
<b>Onset of symptoms to delivery, days</b>			
Median (IQR)	2.5 (1.0,6.7)	4.0 (1.0-7.0)	4.0 (0.5,8.5)
Range	0-38.0	0-38.0	0-22.0
<b>Gestational age at delivery</b>			
Median (IQR)	38.4 (37.3,39.4)	38.0 (36.6,39.2)	39.0 (38.1,39.4)
Range	28.1-41.3	28.1-41.3	31.9-41.0
<34 weeks, n (%)	2 (2.0)	1 (2.0)	1 (2.0)
34-36 <sup>+6</sup> weeks, n (%)	19 (19.2)	15 (30.0)	4 (8.2)
≥37 weeks, n (%)	78 (78.8)	34 (68.0)	44 (89.8)

	All deliveries (n=99)	Laboratory- confirmed (n=50)	Clinically diagnosed (n=49)
<b>Clinical outcome of neonates (n=100)<sup>b</sup></b>			
Neonatal birthweight (g)	3108 ± 526	3087 ± 504	3130 ± 553
Apgar 1min, Median (IQR)	9 (8,9)	9 (8,9)	9 (9,9)
Apgar 5min, Median (IQR)	10 (9,10)	10 (9,10)	10 (10,10)
Severe neonatal asphyxia, n (%)	1 (1.0)	1 (2.0)	0
<b>Transferred to NICU, n (%)</b>			
Remained in hospital, n (%)	23 (23.0)	13 (26.0)	10 (20.0)
Discharged, n (%)	76 (76.0)	36 (72.0)	40 (80.0)
Neonatal death, n (%)	1 (1.0)	1 (2.0)	0

# Comments-Principal Findings

- First, **clinical characteristics** of these patients with COVID-19 pneumonia during pregnancy were **similar** to those of nonpregnant adults with COVID-19 pneumonia
- Second, 23.3% of pregnant patients did not present with symptoms; however, the majority of these patients were diagnosed with COVID-19 pneumonia based on clinical criteria
- **6.9%** of pregnant patients developed **severe pneumonia** requiring ICU admission and none died
- rate of **spontaneous abortion** was 12.5%

# Comments-Clinical Implications

- most common symptoms at presentation were **fever and cough**
- two-third of patients had **lymphopenia** and **increased C-reactive protein**
- 83% of cases had chest CT scan showing multiple patches of ground-glass opacity in the lungs
- preterm delivery before 37 weeks was 44% and 94% of cases had Cesarean delivery

# Comments-Clinical Implications

- Pregnant women with acute infection were reported to display a **more activated** phenotype
- proactive and **aggressive** management of diagnosed pregnant cases in order to minimize the risk of disease progression
- **multidisciplinary team** including obstetricians, intensivists, obstetric anesthesiologists, virologists, microbiologists, neonatologists, and infectious-disease specialists

# Comments-Clinical Implications

- study has shown reassuring data that the risk of **spontaneous abortion is not increased** in pregnant women with SARS-CoV-2 infection from the background risk of the general population
- **COVID-19 is not associated with an increased risk of spontaneous preterm birth before 37 weeks, though, the risk of any preterm birth before 37 weeks is increased**

# Research Implications

- possibility of vertical transmission of SARS-CoV-2 infection: negative in all of the biological samples (amniotic fluid, cord blood, and neonatal pharyngeal swab)

==> no intrauterine fetal infection occurred as a result of SARS-CoV-2 infection during the **third trimester** of pregnancy when the time interval from clinical manifestation to delivery was up to 38 days

- **whether vaginal delivery increases the risk** of mother-to-child transmission during delivery by testing the vaginal secretions of COVID-19 cases at presentation and these samples were tested **negative**
- **breast milk** samples from twelve mothers with COVID-19 tested **negative** for SARS-CoV2



# Strengths and Limitations

- This is the biggest pregnant series to date, data were collected using a standardized methodology by a team of experienced clinicians
- Limitations:
  - only 8 cases of COVID-19 pneumonia during the first- and early-second-trimester of pregnancy  
→ do not have complete data on the risk of congenital anomalies and FGR
  - included cases that were diagnosed **based on clinical criteria** in this series. According to the WHO, these cases would have been classified as probable cases

# Strengths and Limitations

- Limitations:
  - 34.5% (40/116) of the patients remained in the hospital and some outcomes were unknown at the time of data cutoff
  - May have **missed** patients who were **asymptomatic or had nonsevere disease** and who were treated at home
  - only a small number of cases had vaginal secretion sample collection at presentation and breast milk samples tested for SARS-CoV-2

# Conclusions

- The clinical characteristics of pregnant women with COVID-19 pneumonia are **similar** to those of nonpregnant adults with COVID-19 pneumonia
- no evidence that pregnant women with COVID-19 are more prone to develop severe pneumonia
- risks of spontaneous abortion and spontaneous preterm birth are **not** increased
- **no evidence of vertical transmission** of SARS-CoV-2 when the infection manifests during the **third** trimester

- Ongoing collection of clinical data and research is currently underway with the **aim to answer some of the questions in relation to the risk of congenital infection, intrapartum management and mode of delivery.**

THE END