

Covid-19: Maternal, Fetal and Neonatal Issues

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The Coronaviruses Causing Severe Disease

- 2002 – 2003: Severe Acute Respiratory Syndrome (SARS)
- 2012 – Middle East Respiratory Syndrome (MERS)
- 2019 – 2021 - SARS-COV-2
 - There are distinctive spikes giving this virus the appearance of a solar corona (hence the term coronavirus).
 - Bats are thought to be the natural reservoir for SARS-COV2
 - It is believed that humans are affected via an intermediate host (the pangolin)
 - Through genetic recombination and variation coronaviruses can adapt to and infect new hosts.

Bats and Covid-19

The virus that causes Covid-19 is similar to a virus that has been found in horseshoe bats in China



Pangolins and Covid-19

The structure of the spike protein found in SARS-CoV-2 is similar in part to the spike protein found in the Malayan Pangolin

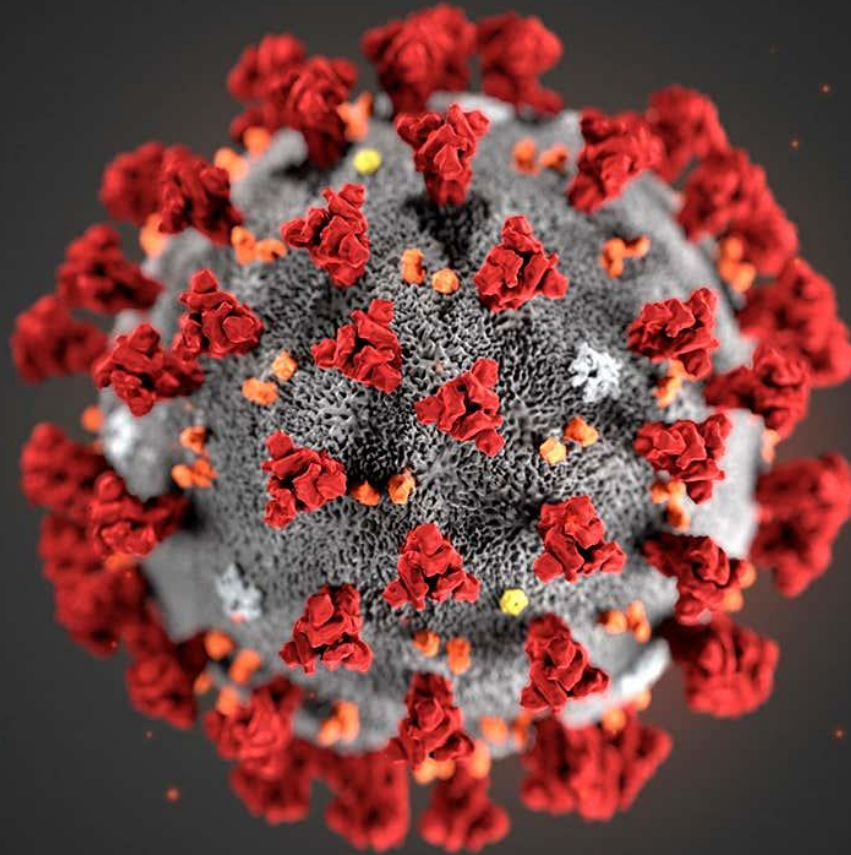


Evolution

Is it possible that the virus jumped from
bats to pangolins to humans?

ZOONOTIC SPILLOVER

The Coronavirus



Covid-19

Basic Terms

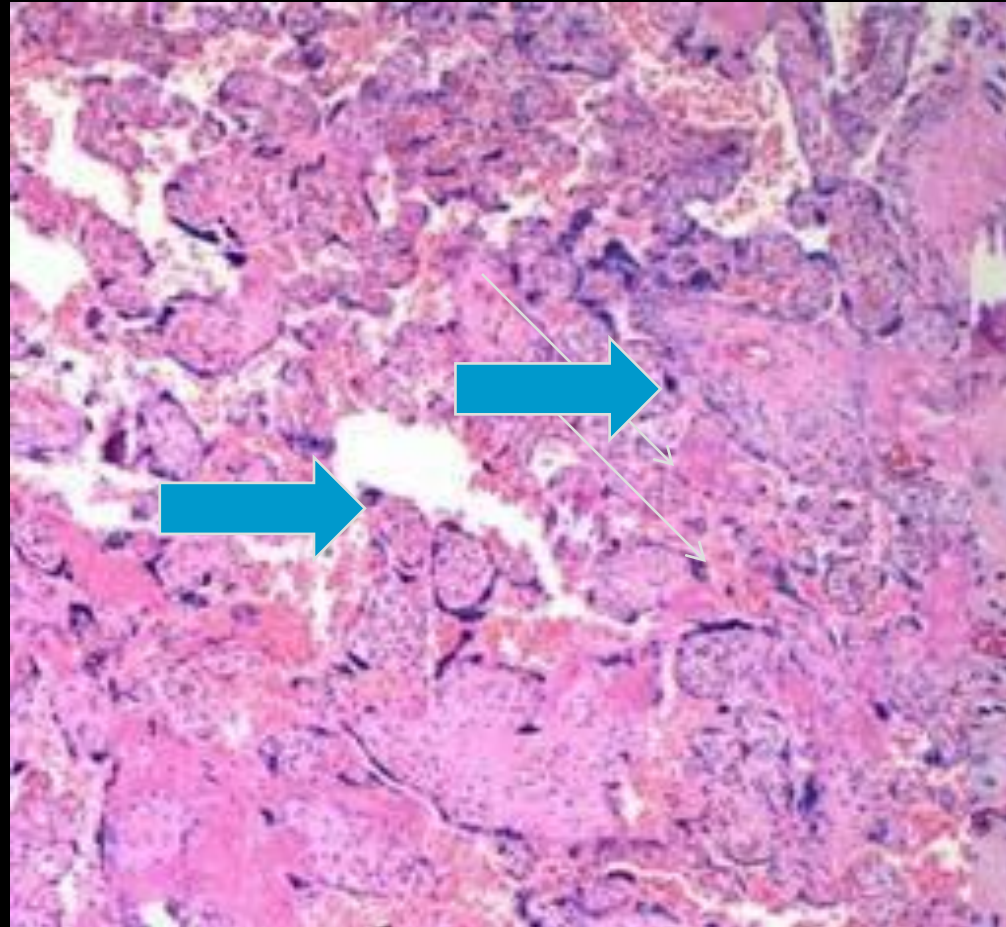
- ❑ Mutation – Change in genetic sequence. Oftentimes in the amino acid sequence of the “spike glycoprotein”.
- ❑ Variant – The entire genome of the sequence.
- ❑ Strain – This is a variant which functionally presents a difference in transmission rate or causes more morbidity or mortality.

Placental Pathology in Covid-19

- Microscopic examination of placental tissue:
 - Increased microcalcification
 - Increased fibrin
 - Increased syncytial knotting
 - Increased small fibrotic vili
 - Increased villous agglutination

Placenta in Covid-19

Microcalcifications



Antibody Transfer in Pregnancy

□ Antibody Transfer in Pregnancy

- SARS-CoV-2 antibodies are transferred across the placenta in 87% of patients (newborn IgG)
- Antibody transfer rates were correlated with maternal IgG levels and increasing time between onset of infection in the mother and delivery
- What antibody levels are necessary?
- How long does antibody last?
- Placental antibody production begins at about 17 weeks gestation and rises exponentially. Vaccinating mothers early in the second trimester may be optimal
- Is it common sense that higher antibody levels offer better protection

Neonates Born to Mothers with Covid-19

- The rate of preterm delivery at least 3-fold higher
- If full term, most neonates did not require hospitalization
- In the delivery room:
 - Skin-to-skin contact
 - Delayed cord clamping
 - Beginning breastfeeding

There were no adverse effects of the above

Clinical Presentation of Newborns with Covid-19

- Findings below may not always be specific:
 - Fever
 - Lethargy
 - Rhinorrhea
 - Cough
 - Tachypnea
 - Increased work of breathing
 - Vomiting
 - Poor feeding
 - Diarrhea

Clinical Presentation of Newborns with Covid-19

- Testing recommendations:
 - 24 hours of age
 - 48 hours of age – if initial test is negative
 - Reverse transcription polymerase chain reaction (RT-PCR)
 - The optimal timing of testing after birth is still unknown. If too early, false-positives occur if contaminated by maternal fluids (if mom covid positive)
 - False negative can occur if the RNA is not yet detectable.

Infection Prevention and Control

- ❑ Mothers with suspected or confirmed SARS-CoV-2 infection and their neonates should be isolated separately.
- ❑ There is a potential risk of SARS-CoV-2 transmission to the neonate by a contact with infectious respiratory secretions from the mother when rooming in occurs.
- ❑ This is especially true if viral replication is high.
- ❑ Mothers who are infectious and have the baby in their room should wear a mask and practice hand hygiene when caring for their infant.
- ❑ If feasible, maintain a physical distance >6 feet or placing the neonate in an incubator.

Infection Prevention and Control

- Placement in the NICU will depend at the facility level. That is, if the neonate has suspected or confirmed infection an isolation room will be indicated.
- Criteria for discontinuing isolation and precautions include at least 10 days have passed since symptoms first appeared and at least 24 hours since last fever without the use of antipyretics

Pertinent Questions Still Not Answered

- ❑ Scientific data for 10 day isolation is still questionable.
- ❑ Is the viral load the most important factor?
- ❑ Will a nasal spray offer better protection than the current inoculation route?
- ❑ Will the data allow for a better understanding of decreasing protection?
- ❑ The public is hungry for information and answers. The material presented by the CDC is constantly changing.

Pertinent Questions Still Not Answered

- I am fully vaccinated, why do I still need to wear a mask?

Today you receive an inoculation in your left arm. Your immune system produces IgG antibodies and specific immune T-Cells. These antibodies circulate throughout your body and offer protection.

But where does the Covid-19 virus prefer to invade?

Your nose, upper airways, lower airways.

Pertinent Questions Still Not Answered

These antibodies produced in the nose and upper airways are IgA antibodies which are not as protective and the production of these antibodies are not robust.

IgG produces the majority of antibody-based immunity against invading pathogens.

IgA prevents colonization of pathogens and is present mainly in mucosal areas.

New Classifications of Variants

- ❑ Variants Being Monitored (VBM)
- ❑ Variants of Interest (VOI)
- ❑ Variants of Concern (VOC)
- ❑ Variants of High Consequence (VOHC)

The continual emergence of new variants confusing and leads to disinformation and misinformation.

Variants Being Monitored

- Alpha; Beta; Delta; Delta Plus; Gamma; Epsilon; Eta; Iota; Kappa; Lamda; P1; P2; P3; Mu; Zeta

Alpha, Beta and Gamma were variants of concern but now downgraded.

Eta, Iota and Kappa were variants of interest and now have been downgraded.

Covid-19 Variants

- ❑ The UK variant: B.1.1.7. More contagious and currently the most common variant.
- ❑ The South Africa variant: B.1.351 – More contagious and has moderate ability to evade the vaccine
- ❑ The Brazil variant: P1- More contagious and moderate ability to evade the vaccine
- ❑ The United States variant: B.1.5265 – B.1.526 – Unknown to the contagiousness of this variant.

Covid-19 Variants

- ❑ California variant: B.1427/B.1429 – Detected in San Francisco – This variant is more contagious and has moderate ability to evade the vaccine. There are five mutations including one which has shown resistance to monoclonal antibody therapy.
- ❑ P.2 – Also from Brazil – need more information.
- ❑ P.3 – The Philippine variant, need more information
- ❑ A.23.1(with E484K) from England, need more information.
- ❑ B.1.1.7 (with E484K) from England, need more information.

Covid-19 Variants

- ❑ B.1525 – The same number as the New York variant but from England. Need more information.
- ❑ B.1.318 – New variant, unknown where it came from.
- ❑ B.1324 (with E383K) – New variant, unknown where it came from.
- ❑ B.1.111 (with E383K and 4295) – New variant, unknown where it came from.
- ❑ Double Mutant Variant – Originally from India, carries a E484Q and L452R mutation.

Double Mutant Variant

- ❑ Increased infectivity
- ❑ Possible immune escape
- ❑ This variant can change parts of the Coronavirus spike protein so that there is increased ability to bind and enter the human host cell.
- ❑ If the mutation changes the shape of the spike protein will the antibodies produced be able to neutralize the virus?
- ❑ The UK B.1.1.7 from England possesses a mutation labeled N501Y which makes this more infective.

Newest Variants

- Delta – Predominant variant in the United States
 - Most transmissible and contagious
- Delta Plus – Similar to Delta
 - There are three subtypes: AY.1, AY.2, AY.3
- Lamda – Also known as C.37. Highly infectious
 - Can evade vaccine antibodies
- Mu – First identified in Columbia. May be resistant to vaccines. Also known as B.1.621

Most Important Pertinent Question

Will the virus produce a variant which will be more resistant to the current vaccines?

This is why suggested public health measures remain critically important:

M= Masking

S = Sanitizing

W = Washing hands

AC = Avoiding Crowds

Complete Listing of SARS-CoV-2 Variant Classifications

Refer to the CDC Morbidity and
Mortality Issue September 23, 2021

Which Vaccine is Best?

- The Pfizer-BioNTech mRNA Vaccine – received full FDA approval in September 2021. efficacy of 95% after two doses – Emerging data regarding booster
- The following Vaccines have received Emergency Use Authorization (EUA)
 1. Moderna- mRNA vaccine- efficacy of 95% for prevention after two doses – Waiting for FDA Approval for booster
 2. Janssen/Johnson & Johnson Vaccine- Adenovirus-Vectored Vaccine- efficacy of 65-72% which varied by geographical differences- after one-dose – Data still being collected and analyzed

Which Vaccine is Best?

□ - Janssen Vaccine

- First adenovirus vectored vaccine
- Uses a Cold Virus- Ad 26 which has been engineered to carry the genetic code of the SARS-CoV-2 Spike Protein

Vaccination, Pregnancy and Breastfeeding

- ❑ Women who are pregnant and those trying to get pregnant should receive the Covid-19 vaccine (Moderna and/or Pfizer).
- ❑ As of 4/28 the Janssen (J&J) vaccine only has emergency use authorization (this can and will change quickly).
- ❑ As of 4/28, the vaccine can be given to breastfeeding mothers.

Disposition: Home

- ❑ Neonates who otherwise meet clinical criteria for discharge do not require the results of SARS-CoV-2 testing before discharge.
- ❑ If available the results should be given to family and outpatient healthcare provider.
- ❑ Neonates with suspected or confirmed Covid-19 or ongoing exposure require close outpatient follow up after discharge.

Covid-19

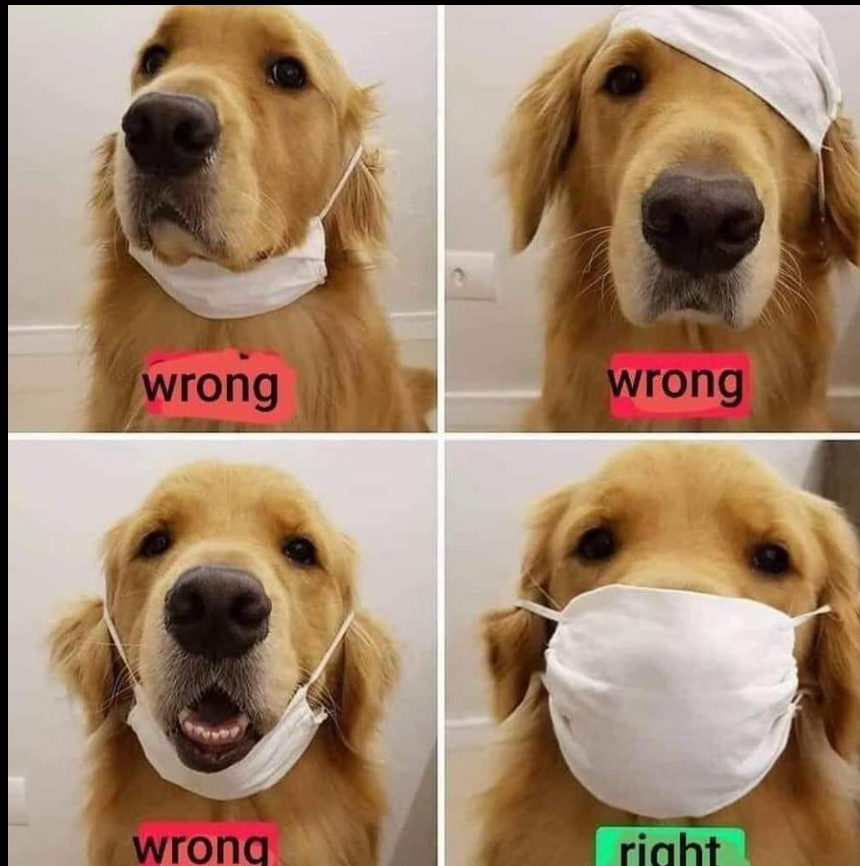
Vaccine - Bartering

- ❑ Supplying the vaccine to countries (governments in exchange for something else).
- ❑ The example is to use the vaccine as a “bartering chip” to free prisoners.
- ❑ Also termed “Dose Diplomacy”.

Masks that make a Statement



Mask Wearing: Do's and Don'ts



Don't Always be the First to Jump on the Bandwagon
A/1a: Joan Hodgman MD (1972)

