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SARS-CoV-2 (COVID-19)

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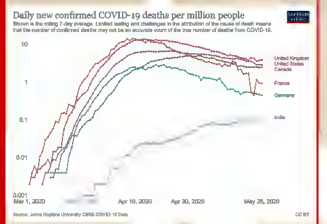
What Topic?

SARS-CoV-2 (COVID-19)

- A Virus that primarily affects the respiratory tract (Yuki et al., 2020)

Why SARS-CoV-2?

- Over 18 million people have been infected by the virus in the span of a year. Labeling this virus a global pandemic (Nikose et al., 2020).
- Symptoms for COVID-19 range from mild to severe with end organ failure (Yuki et al., 2020).
- 34,067,912 confirmed cases and 608,884 deaths in the United States alone (John Hopkins University of Medicine, 2021)



(COVID-19 confirmed deaths, Our World In Data, 2021)

Signs & Symptoms

- Symptoms range from no symptoms to severe adult respiratory distress syndrome (ARDS)
- Common clinal symptoms include:
- Fever
- Cough
- Dyspnea
- Myalgia
- Fatigue
- (Binda et al., 2021)

Underlying Pathophysiology

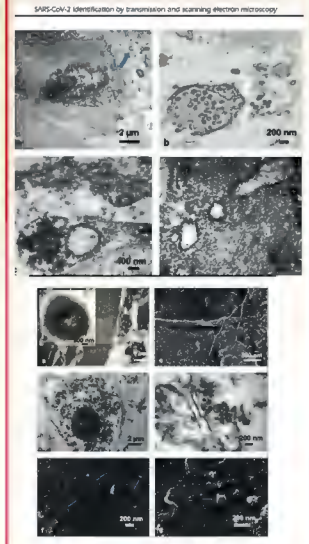
- COVID-19 enters the body via close contact or an individual coughing the viral particles into the air.
- The virus binds to the host cells and enters the cell by endocytosis and replicates it RNA, which makes viral proteins.
- COVID-19 virus has a spike that comprises of two functional subunits:
  - S1: responsible for binding to the cell.
  - S2: causes fusion between viral proteins and cellular membrane
- In the lungs angiotensin enzyme is a functional receptor site for COVID-19. The lungs are the primary organ affected by the virus.
- (Yuki et. al., 2021)

Significance Of Pathology

- The pathology of this virus impacts the lungs, by attaching to one of the major enzymes ACE2 (Yuki et. al., 2021).
- Knowing this provides understanding to the disease process and the symptoms associated with the virus.
  - Dyspnea
  - Fever (host response to infection)
  - Low partial pressure of oxygen (PaO2)
- This pathology guides are clinical decisions and treatment plans:
  - Ventilator support or CPAP/BIPAP/HHF
  - Plasma Therapy
  - Antiviral treatment
- (Nikose et. al., 2020).

Transmission & Spread

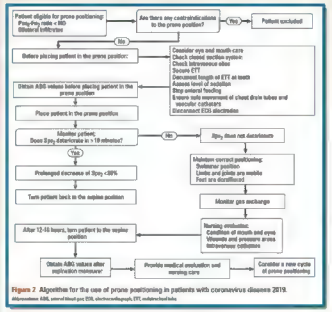
- COVID-19 can be transmitted from human to human, when a healthy individual comes in contact with an infected person.
- Can spread from asymptomatic or symptomatic individuals.
- Transmission and spread is seen initially from family members and then healthcare workers who come in contact with infected persons.
- Spreading of the virus can be external (family members/community) or in the body leading to end organ failure via the bloodstream or lymphatic system.
- Preventing the spread of the virus requires frequent hand washing or utilization of 70% (V/V) alcohol based hand sanitizer.
- (Nikose et. al., 2020)



Transmission of COVID-19 into Lung and kidney tissue, (Pesaresi et al., 2020)

Treatment

- Several different treatment options once the virus has been contracted
- Antivirals
  - Remdesivir
  - Oseltamivir
  - Umifenovir
- Steroids
- Plasma Therapy
- Supplemental Oxygen support
- (Nikose et al., 2020)
- Severe Cases of COVID-19:
- Respiratory failure/ARDS
- Supplemental Oxygen:
  - Ventilator Support
  - Noninvasive Oxygen Strategy (NIOS)
  - i.e. CPAP/BIPAP and Heated High Flow.
- Continuous Renal Replacement Therapy
- Prone Position technique (Binda et al., 2021)



(Allorhythmia for Prone Position Therapy, Binda et al., 2021)

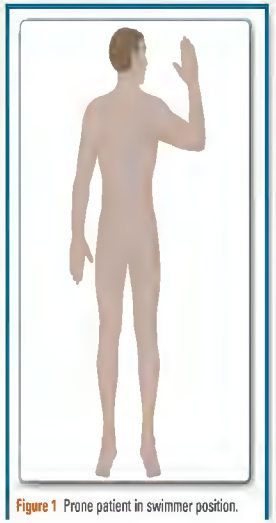


Figure 1 Prone patient in swimmer position.

(Prone Position, Binda et al., 2021)

Prone Position Therapy

- Can be used with non-ventilated or ventilated patients.
- Promotes better oxygen exchange
  - Pulmonary Recruitment
  - Increases Lung Volume
  - Reduces Atelectatic Regions
- Preparations Prior to proning:
  - Secure endotracheal Tube (if applicable).
  - Lubricate eyes
  - Applying Hydrocolloid dressings to protect skin
- (Binda et. al., 2021)
- Intubated patients require six total healthcare works to perform safely:
  - 4 Nurses
  - 1 Respiratory Therapist
  - 1 provider that can reintubate if necessary
- Continuous monitoring while prone:
  - SpO2
  - Arterial Line
  - End-Tidal Carbon Dioxide
  - (Minimal Requirement)
- (Binda et. al., 2021)

Vaccinations

- Three vaccinations have come on the market to decrease spread and mortality rates, if COVID-19 is acquired.
- Pfizer, Moderna, and Johnson & Johnson have been approved by FDA (emergency).
- Both Pfizer and Moderna utilize new techniques, such as nucleic acid (DNA & RNA)
- (Nikose et al., 2020)

Vaccine Brand Name	Who Can Get this Vaccine [1]	How Many Shots You Will Need	When Are You Fully Vaccinated?
[illegible]	People 12 years and older	2 shots (Given 3 weeks (21 days) apart [2]	2 weeks after your second shot
Moderna	People 18 years and older	2 shots (Given 4 weeks (28 days) apart [2]	2 weeks after your second shot
Johnson & Johnson's Janssen	People 18 years and older	1 shot	2 weeks after your shot

Vaccines approved by FDA, (Center for Disease Control and Prevention [CDC], 2021)

Nursing Care

- Care for COVID-19 patients:
- Supportive care and managing symptoms:
  - Fever (Tylenol, ice packs, etc.)
  - Dyspnea (Oxygen)
  - Cough
  - Muscle Aches (Motrin)
- Phycological Support from being isolated from family and support system.
  - Virtual Calls
  - Phone accessibility
- Constant monitoring of symptoms progression (mild to severe).
- (Centers for Disease Control and Prevention [CDC], 2021)

Complications of COVID-19

- COVID-19 can have a number of complications.
- Respiratory failure/ARDS requiring ventilatory support (Jackson & Wands, 2021)
- End organ failure:
  - Kidneys
  - Heart
  - Brain
- Additional services maybe needed to treat and manage organ failure:
  - CRRT
  - Swan-gantz catheter placement
  - Anticoagulation
  - Computerized Tomography (CT) scan
- (Yuki et. al., 2021)

Conclusion

- COVID-19 is a virus that has impacted millions around the world causing a global pandemic.
- The virus primarily impacts the lungs, but can have a multiorgan impact with patients (Pesaresi et. al., 2020).
- Several treatment options are available to support mild or severe cases of COVID-19:
  - Vaccines
  - Antivirals
  - Ventilatory support
  - Prone Therapy
  - NSAIDS
  - (Nikose et. al., 2020)
- Three vaccines have been approved by the FDA (emergently) to slow the spread of COVID-19 and decrease mortality rates of those that contract the virus (Nikose et. al., 2020).
- COVID-19 can have many complications and requires supportive care and phycological support for patients hospitalized. (Centers for Disease Control and Prevention [CDC], 2021)

References

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