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COVID-19: Virology, Current Controversies and Getting Back to Patient Care

Thursday, April 30
8:30 – 9:30 PM ET

Agenda

- COVID-19, Advocacy, and Getting Back to Practice – David W. Parke II, MD
- Clinical Virology Update: SARS-COV2 and COVID-19 – James Chodosh, MD
- PPE and Risk Mitigation in the Clinic – Steven Yeh, MD
- Current Controversies and the Need for Evidence – Gary Holland, MD
- Case-based Discussions – Panel

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Clinical Virology Update: SARS-COV2 and COVID-19

James Chodosh, MD
Cornea and External Disease
Department of Ophthalmology
Harvard Medical School

James Chodosh, MD, MPH
Cogan Professor of Ophthalmology, Harvard Medical School

Howe Laboratory – Viral Pathogenesis Unit
Massachusetts Eye and Ear
Massachusetts General Hospital
Shriners Hospitals for Children – Boston
Brigham and Women's Hospital
Dana-Farber Cancer Institute

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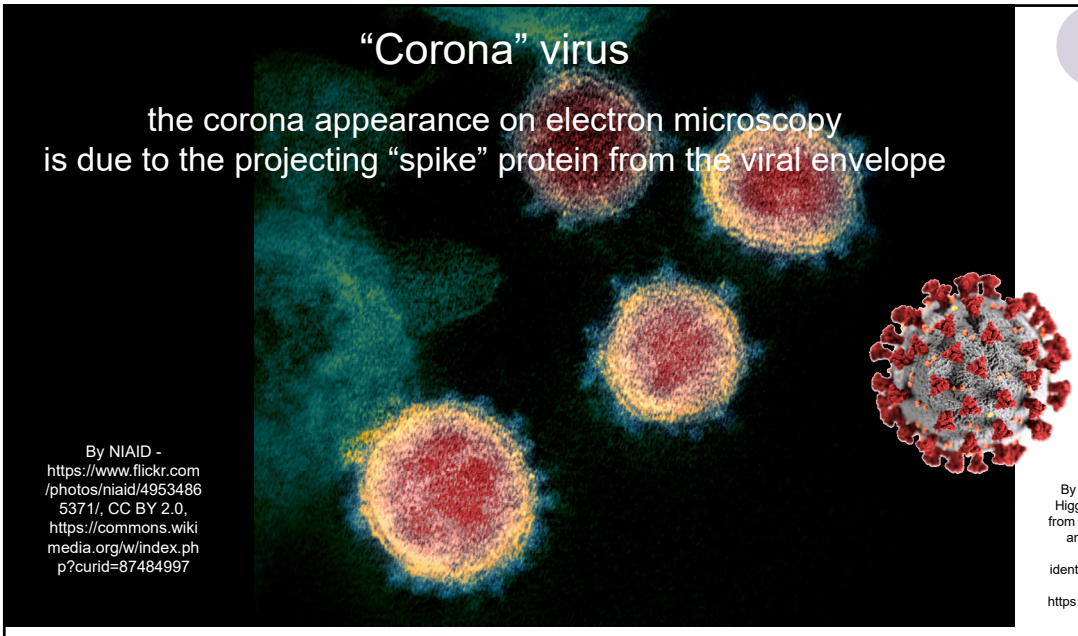
"Corona" virus

the corona appearance on electron microscopy
is due to the projecting "spike" protein from the viral envelope



By NIAID - https://www.flickr.com/photos/niaid/49534865371/, CC BY 2.0, https://commons.wikimedia.org/w/index.php?curid=87484997

By CDC/ Alissa Eckert, MS; Dan Higgins, MAM - This media comes from the Centers for Disease Control and Prevention's Public Health Image Library (PHIL), with identification number #23312. Public Domain, https://commons.wikimedia.org/w/index.php?curid=86444014

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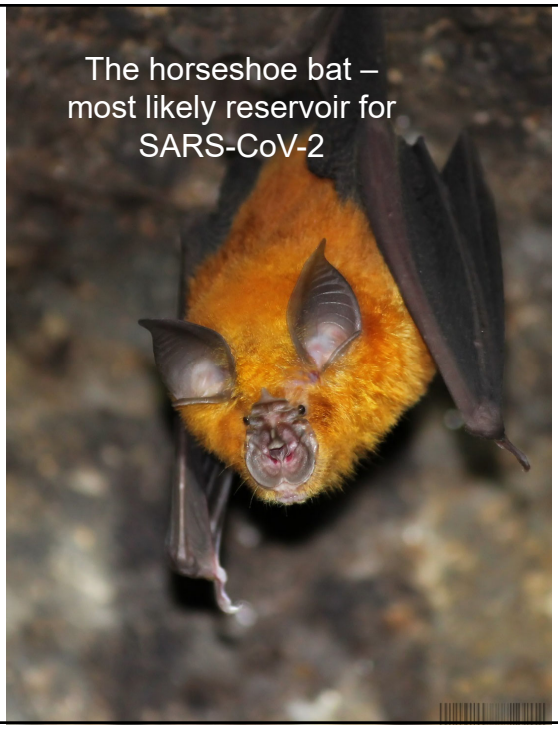
The horseshoe bat – most likely reservoir for SARS-CoV-2



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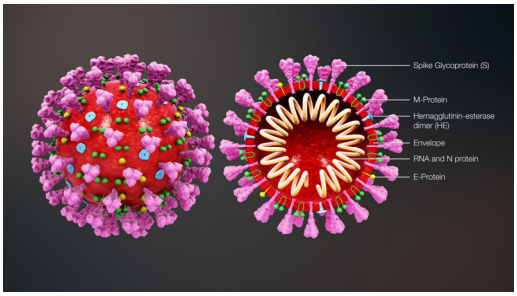
SARS-CoV-2

- A “beta” coronavirus with ~70% sequence identity with SARS-Cov, less with MERS and other human coronaviruses
- Positive sense single stranded RNA genome (like dengue virus, west nile virus, and rhinoviruses)
- The spike protein binds to angiotensin-converting enzyme 2 (ACE-2), expressed in nasopharynx, lung, kidney, GI tract (and possibly conjunctiva)



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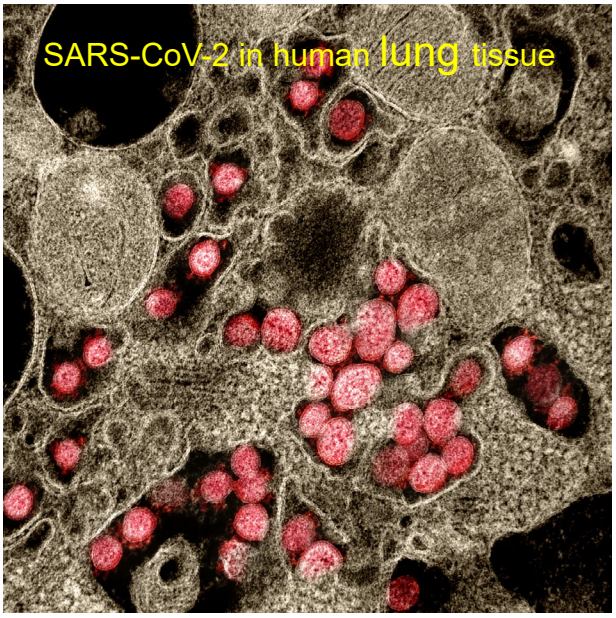

By National Institute of Allergy and Infectious Diseases (NIAID) - Novel Coronavirus SARS-CoV-2, CC BY 2.0, https://commons.wikimedia.org/w/index.php?curid=87960895

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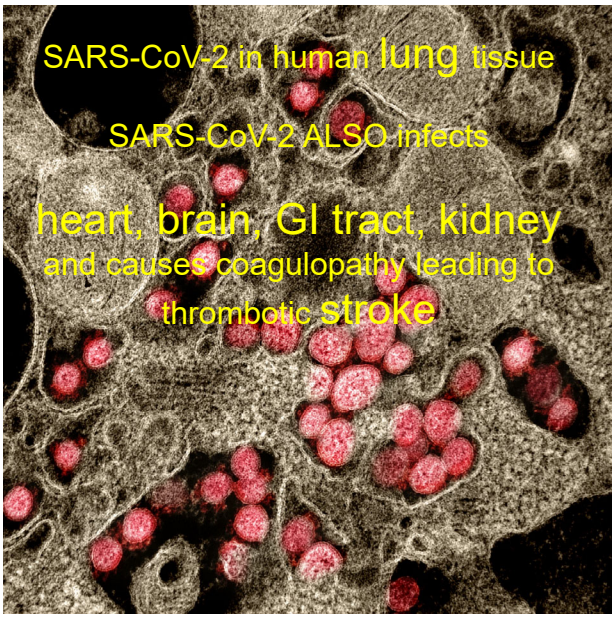

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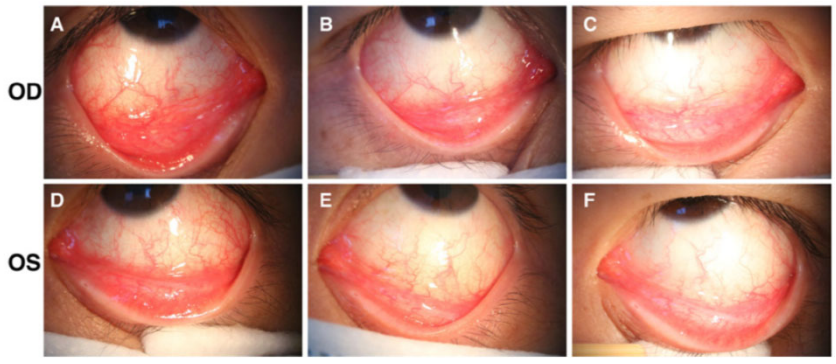
Clinical science

OPEN ACCESS

Ocular manifestations of a hospitalised patient with confirmed 2019 novel coronavirus disease

Lu Chen ,[1] Meizhou Liu,[1] Zheng Zhang,[2] Kun Qiao,[2] Ting Huang,[2] Miaohong Chen,[1] Na Xin,[1] Zuliang Huang,[1] Lei Liu,[2] Guoming Zhang,[1] Jiantao Wang[1]



Day 13 Day 17 Day 19

Dr. Lu Chen, with permission

Chen L, *et al*. *Br J Ophthalmol* 2020;**0**:1–4. doi:10.1136/bjophthalmol-2020-316304

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SARS-CoV-2 Symptoms (CDC)

Symptoms may appear **2-14 days after exposure to the virus.** People with these symptoms or combinations of symptoms may have COVID-19: *

- Cough
- Shortness of breath or difficulty breathing

Or at least two of these symptoms:

https://www.cdc.gov/coronavirus/2019-ncov/symptoms-testing/symptoms.html

- Fever
- Chills
- Repeated shaking with chills
- Muscle pain
- Headache
- Sore throat
- New loss of taste or smell

*Elderly individuals may show only lethargy and confusion

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RT-PCR measures presence of viral RNA

Serology measures humoral immune response

SARS-CoV-2 Testing

RT-PCR vs. Serology

RT-PCR	IgM	IgG	Clinical interpretation
+	-	-	Early infection,* or unable to mount Ab response
+	+	-	Early infection (first 1-2 weeks)
+	+	+	Active infection
+	-	+	Active, late, or recrudescent / recurrent infection**
-	+	-	Early infection, false positive, or false negatives
-	+	+	Recovery phase or false negative RT-PCR
-	-	+	Past infection

*Infection may be asymptomatic, presymptomatic, or symptomatic

**Patients may remain RT-PCR positive for 5 weeks after onset or show late shedding after resolution

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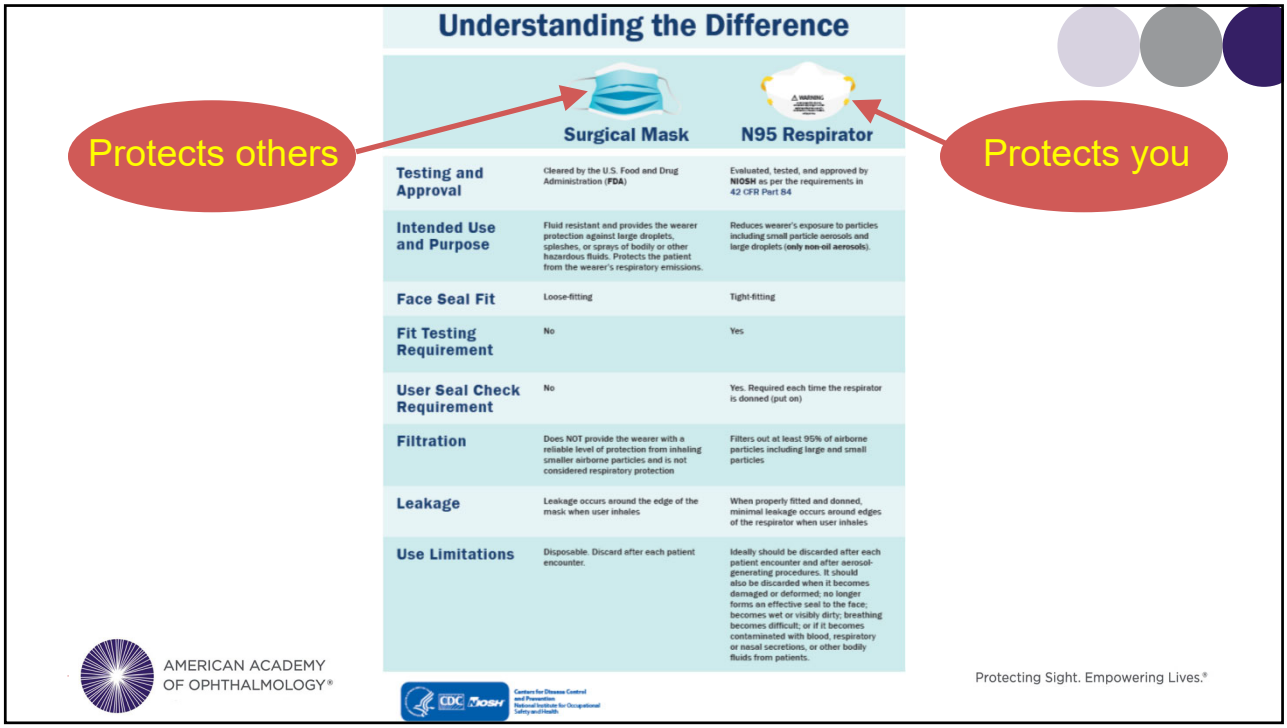

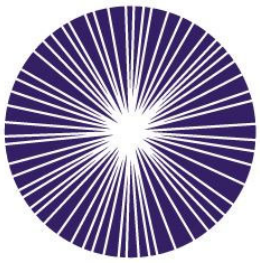

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PPE and Risk Mitigation in the Clinic

Steven Yeh, MD
Uveitis and Vitreoretinal Surgery
Emory Eye Center
Emory University School of Medicine

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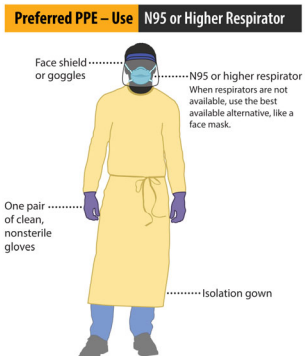
Factors Influencing PPE: Exposure, Durability, Appropriateness and Fit

	MRSA	Tuberculosis	COVID-19	Ebola
Pathogen Exposure	*Contact, Skin, Surfaces*	*Aerosols, Droplet nuclei*	*Contact, Surfaces, Respiratory Droplets, AGPs*	*Direct Contact – Blood, Fluids of Symptomatic Pts*
PPE				
	Dhs.Wisconsin.gov		*www.cdc.gov*	*www.emory.edu*

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AAO Interim Guidance: Patient and Provider PPE

Asymptomatic patient, Urgent visit	Respiratory Symptoms, Non-PUI, Non-COVID-19, Urgent/Emergent Condition	High-risk for COVID 19, PUI / COVID 19, Urgent/Emergent Condition
• Standard precautions • No speaking at slit lamp • Patient: Mask • Provider: Mask / Eye Protection • **Some institutional differences may exist depending on PPE shortages	• Patient: Mask • Provider: Mask, Gloves, Gown, Eye Protection	• High-risk for COVID-19 → Send to ER or hospital for COVID-19 management • **Covid-19 testing and management take precedence over eye disease • Patient: Mask • Provider: N95 Mask, Gloves, Gown, Eye Protection

www.aao.org

Note: For H/O prior COVID-19+ (convalescent), exact duration for viral transmission unknown.

- CDC allows return to work 14 days after acute illness, no symptoms 7 days, afebrile x 72 hours

www.cdc.gov

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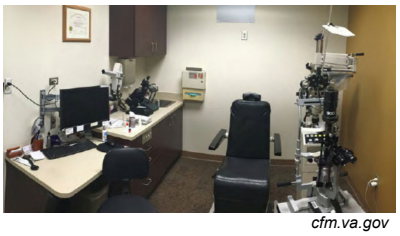
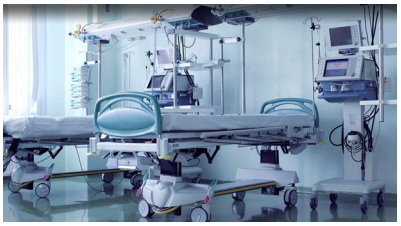
Environment and Equipment: Tips and Reminders for PUI/COVID-19 Care

- Be mindful of the space and equipment landing locations.
- Any equipment / consumables in a patient area (PUI, COVID-19) are considered contaminated.
- Discard or meticulously disinfect (”Dirty” and “Clean” tables often outside inpatient rooms).
- Alert nursing staff and critical care team about dilation and exam time if consulted.
- Additional set of hands outside the room can be extremely helpful for disinfection & procedures.



Clinic

cfm.va.gov



ICU/ Inpatient

www.aamc.org

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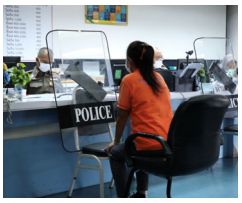
Clinic Risk Mitigation: Clinic, Staff, Environment

Clinic / Crowd Management

- Assessment of respiratory symptoms and COVID-19 status prior to appointment
- Symptom screening +/- temp monitoring
- Increase waiting room space



www.nationalthailand.com

Staff

- Virtual meetings
- Continue to stress leave of absence for fever, respiratory symptoms
- Judicious PPE use

zoom.us

Environment Precautions

- Droplet and fomite precautions for surfaces
- Disinfection protocol for slit lamps and equipment
- Large breath shields
- Imaging devices, VF analyzer (Check manufacturer's guidelines / statements)

"[Redacted product] are not designed to be sterile or sterilized and as such as we do not describe a method of sterilization."

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Li et al *Ophthalmology 2020*

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Operating Room Considerations

Preoperative

- All patients screened for for fever, respiratory symptoms, COVID-19+ contacts
- Preop COVID-19 testing for non-emergent surgery when there is a local/ regional SARS-CoV2 presence (ASA guidelines 4/29/20)
- Higher perioperative morbidity and mortality associated with COVID-19
- Weigh urgency of surgery with risk

www.asahq.org

Operative

- Adjudication / Sign-off for PUI / COVID-19+ by ASC or hospital leadership, dependent on status of overall health system
- ASA intubation precautions, low-flow O_2 by nasal cannula
- Limit number of individuals in the room
- PPE often determined by risk and nature of the procedure

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Li et al *Ophthalmology 2020*

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Challenges Remain: Protecting Health Care Providers with a Global PPE Shortage

Health care workers preparing to work at a new Covid-19 test collection site in Tampa, Fla. Eve Edelheit for The New York Times

NY Times

www.facebook.com

The NEW ENGLAND JOURNAL of MEDICINE

Facing Covid-19 in Italy — Ethics, Logistics, and Therapeutics on the Epidemic's Front Line

L. Rosenbaum NEJM 2020

"…the tragedy in Italy reinforces the wisdom of many public health experts: the best outcome of this pandemic would be accused of being overprepared."

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Current Controversies and the Need for Evidence

Gary N. Holland, MD
Department of Ophthalmology
David Geffen School of Medicine at UCLA
UCLA Stein Eye Institute

Recurring Questions

- *Why have AAO guidelines changed over the past 8 weeks?*
- *Why can't the AAO be more specific in its recommendations?*
- *Why are various centers and professional groups following different policies?*

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Recurring Questions

- *Why have AAO guidelines changed over the past 8 weeks?*
- *Why can't the AAO be more specific in its recommendations?*
- *Why are various centers and professional groups following different policies?*
  - Specific recommendations depend on multiple factors, including prevalence of disease in a given region, and local availability of PPE.
  - These factors vary markedly from one part of the country to another. Practical decisions must be made; for example, balancing risk against the need to preserve limited PPE supplies for those who need them most.
  - These factors have been changing constantly, resulting in a reassessment of risk.
  - AAO guidelines cannot supersede the policies of local hospitals or institutions.

Controversies

Controversies

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Uncertainties

- In the medical community, different approaches to the pandemic are less about strongly held, opposing views and more about uncertainty and confusion.
- Two current topics of concern:
  - **Resumption of surgery**.
    - *What was the goal of not operating until now, and why are we starting now, if there is still a risk of infection? Why is there such an emphasis on an incremental approach to resuming surgery?*
    - *How can one protect him- or herself? Do some procedures pose a greater risk to the surgeon than others?*
  - **The future and what we should expect**.
    - *What measures do we use in the clinic, as volume increases? When can we stop wearing masks?*
    - *How do we use antibody tests?*

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Resumption of Surgery

- **Practical considerations**.
  - Initial shut-down allowed facilities to establish procedures for infection control, preserve supplies, and determine what resources should be diverted to care of COVID-19 patients.
  - Patient care cannot be delayed indefinitely.
  - Economic and employment considerations.
  - We must continue to employ strict infection control measures, which preclude high surgical volumes for now; new requirements will slow turnover *(e.g. 20-minute shut-down of operating rooms after an aerosol-generating procedure).*

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Resumption of Surgery

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  - We must continue to employ strict infection control measures, which preclude high surgical volumes for now; new requirements will slow turnover *(e.g. 20-minute shut-down of operating rooms after an aerosol-generating procedure).*
- **Risk to surgeons and OR staff.**
  - Assume all patients are SARS-CoV-2-infected.
  - We do not yet know whether there are unique risks associated with some procedures.

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The Future

- "Beyond the Peak"

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The Future

- "Beyond the Peak"

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The Future

- **"Beyond the Peak"**
  - Continue to see smaller outbreaks.

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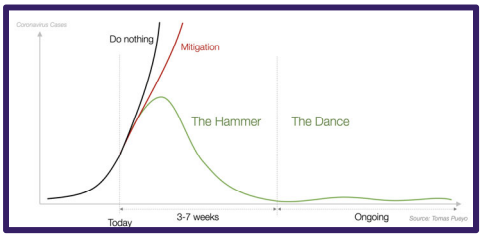
The Future

- **"Beyond the Peak"**
  - Continue to see smaller outbreaks.
    - Commentator Tomas Pueyo on *Medium*.



https://medium.com/@tomaspueyo/coronavirus-the-hammer-and-the-dance-be9337092b56

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The Future

- **"Beyond the Peak"**
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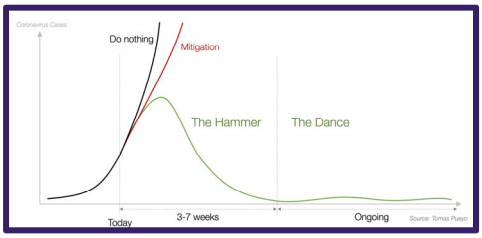
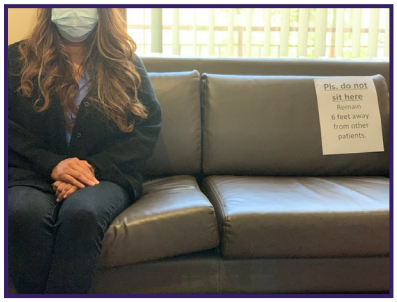


https://medium.com/@tomaspueyo/coronavirus-the-hammer-and-the-dance-be9337092b56

  - A possible second surge in the fall, if re-opening is not managed well by society.

The Future

- We and our patients will be wearing masks for a long time to come.
- Rigorous cleaning of rooms and equipment.
- We must establish strategies for maintaining social distancing, even as volumes increase.
  - Separate the distance between chairs in the waiting room.
  - Ask people to wait outside until their appointment times.



The Future

- The only sure end-points for these measures:
  - An effective vaccine that is widely available.
  - Sufficient herd immunity from continued spread of infection.
  - Neither will occur soon.

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The Future

- The only sure end-points for these measures:
  - An effective vaccine that is widely available.
  - Sufficient herd immunity from continued spread of infection.
  - Neither will occur soon.
- Antibody testing.
  - Helpful for identifying the extent of infection in various populations.
  - The idea that a positive test means the provider or the patient does not need to wear a mask is premature.
    - Reliability of many current tests is uncertain.
    - Unknown whether the antibodies convey lasting immunity.

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Need for Evidence

- **Modes of transmission**.
  - *Can infection be transmitted via tears? Or acquired through the eye?*
  - *Is the viral material found on surfaces infectious? For how long?*
- **Potential for aerosolization of virus by various procedures.**
- **Spectrum of disease manifestations.**
  - *Does the severity of disease depend on route of inoculation or amount of exposure?*
- **Immunity.**
  - *Is immunity post-infection long-lasting, or can a person be re-infected?*
- **Sensitivity and specificity of various antibody tests.**
  - *What are the clinical implications of a negative or positive test?*

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Case-Based Discussion

Charles Zacks, MD
Rachel Lieberman, MD

Case 1: Managing a Cataract Patient
With a History of COVID-19

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Case 1: Managing a Cataract Patient
With a History of COVID-19

- 80 year old man with visually significant cataracts OU ~20/80 OU
- Mild dementia, largely dependent on his wife for ADLs
- Hx of COVID-19 pneumonia, hospitalized a month ago
  - Pt's previously lived with his wife, who recently succumbed to the disease
  - Pt survived, and has been in a rehabilitation facility.
- Pt. is now ready for d/c, but poor vision interferes with independent living
- When would you operate?
- What are the preoperative considerations?

Case 1: Managing a Cataract Patient
With a History of COVID-19

- Reasons to proceed with cataract surgery
  - Discharge from rehabilitation hospital may depend on better vision
  - Transportation for ASC and postop visits may be easier before discharge
  - Pt may need assistance with postoperative medicines
- Reasons to temporize
  - Pt's general health may be sub-optimum now, better later
  - Pt's social situation may improve with surrogate care givers at home, or placement
  - The rehabilitation facility bed may be needed for another COVID-19 survivor

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Case 1: Managing a Cataract Patient
With a History of COVID-19

- What are the considerations re preoperative COVID-19 testing?
- What are the considerations re anesthesia choice?
- Considerations re planning the second eye surgery
  - If patient is an emmetrope?
  - If patient is a high myope?

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Case 1: Managing a Cataract Patient
With a History of COVID-19

Discussion

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Case 2: Macula-On Retinal Detachment
With Fever and Cough

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Case 2: Macula-On Retinal Detachment
With Fever and Cough

- 72 year old pseudophakic female with history of high myopia
- C/o floaters and a “curtain” OS that began 2 days ago
- Patient endorses subjective fever and a cough that worsened over a week

- Where do you evaluate the patient?

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Case 2: Macula-On Retinal Detachment *With Fever and Cough*

- Evaluate in a hospital setting
- Mac-on RD is considered emergent, but the retina surgeon has discretion
  - Consider temporizing or alternative measures
- Get buy-in from the entire team prior to the OR
- Plan for surgery in a facility that can handle COVID patients

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Case 2: Macula-On Retinal Detachment *With Fever and Cough*

- OR considerations for COVID-19 + patients
  - Dedicated OR for positive patients
  - Empty the OR of nonessential personnel and equipment
  - Use separate OR carts for airway/equipment/medications
  - Keep a runner outside of OR for drugs/equipment
  - Use separate (negative pressure) room for intubation/extubation
  - PPE: N95 mask, eye protection, boot covers
- What are considerations for this patient?
- Can treatment be delayed pending COVID test results?

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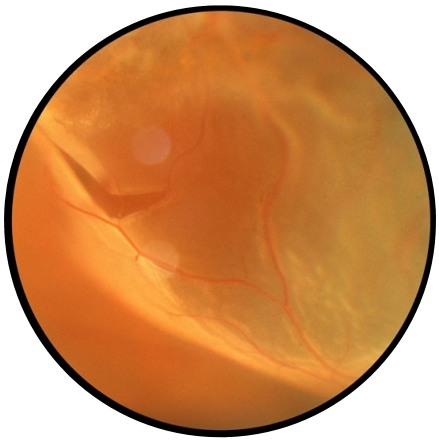
Case 2: Macula-On Retina Detachment
With Fever and Cough

Discussion



asrs.imagebank.org

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Case 3: Temporal Scalp Pain
And a Sick Family Member

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Case 3: Temporal Scalp Pain
And a Sick Family Member

- 78 year old woman presents to the ER with generalized weakness and temporal pain when she brushes her hair
- Lives with her 50 y/o son who is COVID-19 +
  - Mild respiratory illness, no fever
  - Doing well in self quarantine
- What do you need to know
- How do you proceed?

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Case 3: Temporal Scalp Pain
And a Sick Family Member

- Precautions in the ER?
  - Pt qualifies as a Person Under Investigation
- Vision 20/40 OU, fundus exam unremarkable
- Lab testing?
  - Sedimentation rate (ESR) = 75mm/h
  - C Reactive Protein (CRP) = 4.0 mg/dl
  - Coronavirus testing?
  - Other?
- Start Prednisone for presumed temporal arteritis?

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Case 3: Temporal Scalp Pain
And a Sick Family Member

Discussion

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Case 4: Endophthalmitis
While COVID-19 + in the ICU

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Case 4: Endophthalmitis
While COVID-19 + in the ICU

- 89 year old female patient with clinical signs of endophthalmitis
  - Intubated in the ICU for 2 weeks with hypoxic respiratory failure
  - COVID-19+
  - *S. aureus* bacteremia
- How do you handle this?

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Case 4: Endophthalmitis
While COVID-19+ in the ICU

- PPE for bedside procedure: N95, gown, gloves, eye protection, shoe covers
  - Use monitor for donning/doffing
  - Prepare for procedures step-by-step
  - Bring all equipment with you
  - Consider specimen handling
  - Decontaminate equipment
- What are our concerns for this patient?
- Do you dilate other eye?

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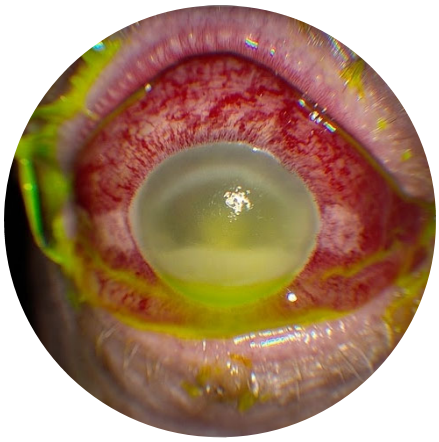
Case 4: Endophthalmitis
While in the ICU with COVID-19

Discussion



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Additional Resources

- AAO – Important coronavirus updates for ophthalmologists
  www.aao.org/headline/alert-important-coronavirus-context
- American College of Surgeons: www.facs.org/covid-19
- WHO: www.who.int/emergencies/diseases/novel-coronavirus-2019
- CDC: www.cdc.gov/coronavirus

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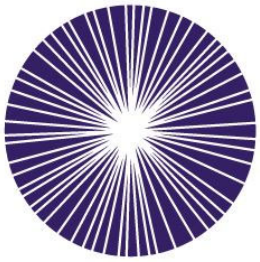

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Q&A

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