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Presenter's Bio

Nisha Viswanathan, MD, FACP

Dr. Nisha Viswanathan is an Assistant professor of medicine and Extensivist physician at UCLA Health. She attended University of Arkansas for medical school and completed her Internal Medicine residency at Mount Sinai Hospital in New York.

Dr. Viswanathan is currently co-Director of the COVID Ambulatory Monitoring Program and Director of the Long COVID program at UCLA.

Presenter's Bio

Sun Yoo, MD, MPH

Dr. Sun Yoo is the Section Chief of Extensivist Medicine in the Department of Medicine at UCLA, and the Medical Director of the Internal Medicine Practice at Ronald Reagan UCLA, and the Director of the COVID Ambulatory Monitoring Program. Dr. Yoo started the COVID Ambulatory Monitoring Program, a multidisciplinary group consisting of primary care doctors, subspecialists, nurses, social workers, and care coordinators, in April of 2020 to take care of COVID patients after hospital discharge and develop new pathways and protocols for the ambulatory care of COVID-19 patients.

Dr. Yoo obtained her medical degree and public health degree from Harvard Medical School, and the Harvard School of Public Health and her undergraduate degree from MIT, and completed her internal medicine residency and chief residency at UCLA.

Long COVID: Primer for the PCP

By: Nisha Viswanathan, MD, FACP Sun Yoo, MD, MPH

July 14, 2022 Live Webinar via WebEx, 12:00 pm - 1:30 pm PST

Directly Provided CME/CE Activity by L.A. Care Health Plan

1.50 CME/CE Credits

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- Leilanie Mercurio, L.A. Care PCE Program Manager, CME Planner
- Alex Li, MD, L.A. Care Deputy Chief Medical Officer, CME Planner
- Nisha Viswanathan, MD, FACP, CME Planner and Faculty
- Sun Yoo, MD, MPH, CME Planner and Faculty

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Learning Objectives

1) List three (3) commonly reported physical and three (3) psychologic/neurocognitive symptoms seen with Post-Acute Sequelae of SARS-CoV-2 (PASC). 2) Describe how you may be able to differentiate existing symptoms worsened by COVID-19 versus symptoms from Post-Acute Sequelae of SARS-CoV-2 (PASC). 3) Identify five (5) assessment tools or tests you could order in your initial workup of a patient fitting the clinical criteria and timeline for PASC for further evaluation.

 4) Describe the recovery time
 expected in COVID-19 and when it is considered "Post COVID" or PASC (AKA Long COVID).



Acute COVID up to 4 weeks

Post COVID > 4 weeks

Long COVID ~ 12 weeks*



*No International consensus on Long COVID Definition to date

Nalbandian, A., et al. Post-acute COVID-19 syndrome. Nat Med 27, 601-615 (2021).

What is Long COVID?

- Long COVID = Longhaul COVID = PASC = Post-COVID Syndrome
- No defined time interval to diagnosis: 4 weeks (NIH/CDC), 12 weeks (NICE), etc.
- Symptoms that persist after acute infection or develop in the first ~1-3 months after infection.
- Symptoms that begin later have an unclear association with this disorder and are evaluated on a case by case basis.

Who is developing Long COVID?

- Increasing Age
- Women > Men
- Requiring hospital assessment
- Asthma (Pre-existing)
- More than 5 symptoms in week 1 of illness



Research Letter | Infectious Diseases Sequelae in Adults at 6 Months After COVID-19 Infection

Jennifer K. Logue, BS; Nicholas M. Franko, BS; Denise J. McCulloch, MD, MPH; Dylan McDonald, BA; Ariana Magedson, BS; Caitlin R. Wolf, BS; Helen Y. Chu, MD, MPH

- Inpatients, Outpatients, Asymptomatic Individuals, and Controls
- Single study cohort (University of Washington)
- Small sample size (n=177)
- 30% reported persistent symptoms
- Most commonly reported symptom was fatigue followed by anosmia
- 76.3% white,1.7% black, 4% LatinX

Annals of Internal Medicine

ORIGINAL RESEARCH

Prevalence of Symptoms More Than Seven Months After Diagnosis of Symptomatic COVID-19 in an Outpatient Setting

Mayssam Nehme, MD; Olivia Braillard, MD; François Chappuis, MD, PhD; Delphine S. Courvoisier, PhD; and Idris Guessous, MD, PhD; on behalf of the CoviCare Study Team*

- Outpatients at Geneva University Hospitals
- Contacted at 30-45 days, again at 7-9 mos
- 629 participants completed baseline, 410 completed follow up at 7-9 months
- 39% reported residual symptoms.
- Fatigue (20.7%) most common followed by anosmia (16.8%) and dyspnea (11.7%)

Pathophysiology

- Chronic inflammation
- System-specific damage during acute infection, including to the autonomic nervous system
- Viral reservoir
- Autoimmune or altered immunologic response
- Microthrombi, prothrombotic state and endothelial damage during acute infection
- Psychiatric/somatic overlay
- EBV reactivation
- All of the above?

Viral persistence

GI tract

Central nervous system

Other ACE2-expressing organ systems

Persistent inflammation

Altered homeostatic milieu of organs

· Decreased tissue-resident macrophages

Stromal injury

Persistence of proinflammatory cells

Infiltrating monocytes, neutrophils and PDCs
Effector T cells and plasma cells

Altered cytokine production • Type I and type III IFN, IL-1β, IL-6, TGF-β, PTX3

Altered immunometabolic pathways

OXPHOS

· ROS

Heme-related metabolic pathways

Altered Fc-dependent signaling • Afucosylated antibodies

Pulmonary fibrosis and scarring Cardiac remodeling Neural inflammation and remodeling Dysautonomia Autoimmunity

Viral mimicry

· Microbially induced breakdown of tolerance

Epitope spreading

Presentation of cryptic antigens

Autoimmune antibodies

ITP

Guillain–Barré syndrome

Polyneuritis

- Antiphospholipid antibodies
- Autoreactive T cells

Organ damage during acute COVID

.

Exacerbation of underlying medical and psychiatric illness

First evaluation

History of COVID illness

Review acute symptoms, SpO2 requirements Need for hospitalization or ICU-level care Medications utilized in treatment of acute COVID

Review of medical and social history
 Diet and alcohol intake

Exercise

Life stressors (work, home life, etc.)

Comprehensive Review of Symptoms

Fatigue:	Rash:	
Brain Fog:	Flushing/rashes:	
Depression/Anxiety/PTSD:	Itching:	
Myalgias/Arthralgias:	GI (nausea, abd pain, bloating, diarrhea,	
Headache:	constipation):	
SOB/Cough/Wheezing:	GU (incontinence, difficulty with urination):	
CP:	Neuropathy:	
Palpitations:	Temperature sensation/fluctuations:	
Lightheadedness:	Persistent fevers:	
Dizziness:	Hair loss:	
Nasal congestion/Rhinorrhea:	Oral ulcers/dryness:	
Anosmia/parosmia/dysgeusia:	Ocular symptoms:	
Insomnia:	Other Sxs:	

Evaluation and Treatment of Symptoms of Long COVID



Shortness of Breath

• Initial work-up:

6-minute walk test evaluating both heart rate and oxygenation throughout

Validated in COPD populations to evaluate airflow limitations¹

Utilize cones 30 meters apart to indicate distance to help evaluate exercise intolerance (normal 500m)

Pulmonary function tests

Imaging: Chest Xray and/or CT scan (more severe initial illness)

Assessments: Modified Medical Research Council Dyspnea Scale (mMRC)

Treatments for Shortness of Breath

Empiric bronchodilators (only sometimes show improvement)²

Qi Gong or STASIS breathing³

Pulmonary Rehab⁴

Biofeedback programs



Breathing exercise for Covid-19



healthline

Breathing Exercises

- Additional breathing exercises:
 - Yawn to a smile
 - Humming while exhaling
- LA Opera Program
- STASIS

https://www.stasis.life/

Cardiac Management

- Most common symptoms: tachycardia, chest pain, palpitations, shortness of breath
- Initial work-up:

Basic lab work: ESR, CRP, Troponin

EKG in clinic

If normal, consider Holter or Ziopatch

TTE – post-COVID myocarditis⁵ is always a consideration

If high suspicion, consider cardiac MRI and Cardiology involvement

Stress Test

CPET – to distinguish between cardiac and pulmonary involvement

Evaluation for dysautonomia





2022 ACC Expert Consensus Decision Pathway on Cardiovascular Sequelae of COVID-19 in Adults: Myocarditis and Other Myocardial Involvement, Post-Acute Sequelae of SARS-CoV-2 Infection, and Return to Play: A Report of the American College of Cardiology Solution Set Oversight Committee.



2022 ACC Expert Consensus Decision Pathway on Cardiovascular Sequelae of COVID-19 in Adults: Myocarditis and Other Myocardial Involvement, Post-Acute Sequelae of SARS-CoV-2 Infection, and Return to Play: A Report of the American College of Cardiology Solution Set Oversight Committee.

Myocarditis (inflammation of part of the heart muscle) occurs more frequently among COVID-19 patients



bit.ly/MMWR83121b

Post-vaccination **Myocarditis**

- Benefit of vaccination still outweighs risk per ACC guidelines
- CDC recommends 8 weeks between both doses of mRNA vaccines in males between 12 and 39 years of age⁶



MMWR

Myocarditis ACC treatment guidelines⁵

Cardiology involvement for guideline-directed medical therapy

Exercise abstinence for 3-6 months followed by graded exercise program (preferably cardiac rehab)



 Recognizing dysautonomia: disorder of the autonomic nervous system (ANS) leading to failure of the sympathetic and parasympathetic parts of the ANS

Can affect heart rate, blood pressure, breathing, digestion, temperature, hormonal and bladder function, sexual function

Four main types of dysautonomia

Neurocardiogenic syncope – frequent fainting spells

Postural Orthostatic Tachycardia Syndrome (POTS) – disruption of blood flow leading to syncope, chest pain, SOB and dizziness

Multiple system atrophy – rare, mirrors Parkinson's disease

Pure autonomic failure – orthostatic hypotension with chest pain, dizziness, fainting. Feel best when sitting or laying down.

Evaluation for Dysautonomia

- Assessments: COMPASS-31
- Orthostatics

Obtain at 1,3,5,7, and 10 minutes (if possible) and can have patients lean on wall to prevent falls

Autonomic reflex screen

Not as easily obtained everywhere

Need sudomotor testing to evaluate for small fiber neuropathy

Treatment of Dysautonomia

POTS/POTS-Like syndromes

- Graded exercise treatment (Levine protocol)⁷
 - <u>https://www.dysautonomiainternational.org/pdf/CH</u>
 <u>OP_Modified_Dallas_POTS_Exercise_Program.pdf</u>
 - Can provide this protocol for PT to utilize
 - ACC guidelines recommend starting with completely recumbent initially⁵
- Compression stalking/abdominal binders
- Increased salt intake (up to 4g daily) can consider salt tabs
- Increase fluid intake (up to 8L daily)
- Can consider midodrine, fludro, BB depending on etiology
- Biofeedback⁸



A Note about Athletes⁵

Asymptomatic? Resume exercise training after 3 days of exercise abstinence during self-isolation. Mild or moderate noncardiopulmonary symptoms? May resume exercise training after their symptoms have resolved.

Remote infection (≥3 months) without ongoing symptoms? No additional testing. Ongoing cardiopulmonary symptoms and/or those requiring hospitalization or after resumption of exercise? Additional testing.

Cardiac MRI is recommended if testing is abnormal or cardiopulmonary symptoms persist.

CMR not recommended to screen athletes who are asymptomatic

Repeat cardiac testing is not warranted in athletes with recurrent COVID-19 in the absence of cardiopulmonary symptoms.



Fatigue

- Vague and hard to quantify
- Consider assessments to track over time

WHO-DAS, Fatigue Assessment Scale

• Initial work-up:

Lab tests: CBC, CMP, TSH, CRP, ferritin, iron panel, HIV, Hepatitis B/C, Vitamin B12, ANA, other rheumatological work-up as indicated per history

STOP-BANG and evaluate for OSA

Ask about associated body aches/pains

PHQ-9/GAD-7 to evaluate for untreated depression/anxiety

Myalgic Encephalomyelitis (ME)/CFS

- Reduction in ability to engage in pre-illness activities that is accompanied by new onset fatigue >6 months (>3 months in PASC) and is not accounted for by another diagnosis
- Post-exertional malaise
- Unrefreshing sleep
- Cognitive impairment OR Orthostatic intolerance
- Must r/o sleep apnea and other contributing conditions

Treatment Options for Fatigue

Alternative medicine can play a large role here

Fatigue-focused acupuncture

Anti-inflammatory diet

Supplements: ashwaganda, American ginseng, B Complex, magnesium for pain

 Concomitant presence of depression/anxiety often present

Sertraline is more activating than other antidepressants

If having associated body aches/pains, duloxetine is a better first line agent

One study on fluvoxamine in COVID, but high rate of GI upset and unclear benefit⁹ Activating medications

Modafinil – 100mg BID under consideration as many patients may be struggling from Type 2 narcolepsy

Amphetamines – only if indicated with cooccurring concentration issues, although side effects have been noted to worsen fatigue

• Improving sleep quality

Consider melatonin, Valerian root

Some evidence for TCAs – nortriptyline is first line (can help with GI side effects as well)

Would avoid Ambien, Sonata

Role of Exercise in Fatigue

- Exercise therapy is controversial many Long COVID patients note worsening fatigue with cardio-based exercise
- NICE (UK guidelines)¹¹ and CDC¹² recommend against graded exercise or cognitive behavioral therapy to discuss fear of exercise for management of fatigue (CBT for underlying psych conditions is appropriate)
- Adaptive pacing technique seems most helpful (PACE trial)¹⁰

Stay within the limits of activity that would cause worsening of symptoms, use internal cues and activity diaries, rest, switch types of exercise



Neurological Sequelae of Long COVID

Brain fog and cognitive impairment – most common and hardest to treat	Neuropathic pain and myalgias	Dizziness
Headaches	Sensorimotor deficits	Dysautonomia

Loss of taste and smell (Anosmia/Parosmia/Ageusia/Dysgeusia)

Initial workup of Neurological Symptoms

Lab tests: CMP, A1c, TSH, ANA, SSA/SSB, B12, MMA, SPEP, UPEP, immunofixation, Hep B, Hep C, HIV, sensory neuropathy panel (ANNA-1, etc), CK/aldolase if weakness and myalgias

Imaging: Brain MRI or MRI spine depending on symptoms

Assessments:

MOCA/MMSE – hasn't been proven to be helpful given these were created for dementia evaluations

Neurobehavioral Symptom Survey

Wood Mental Fatigue Inventory

Isolated neuronal involvement? Consider EMG

Associations Between Long-COVID and Neuropathy



The long-term symptoms of COVID-19 (long-COVID) have been indirectly linked to underlying small-fiber neuropathy

Is long-COVID associated with incident small-fiber neuropathy?

Analysis of tracking data from patients with long-COVID without prior neuropathy history or risks



Small-fiber neuropathy beginning within a month of COVID-19 onset may be common in long-COVID, though larger investigations are required

Neurology Neuroimmunology & Neuroinflammation

Small Fiber Neuropathy

- Symptoms include pain and burning in extremities, electric "shocks", cramps, lightheadedness, orthostatic BP, excess sweating, GI issues, bladder control issues, skin discoloration
- Can begin within 1 month of COVID infection¹²
- Treatment options¹³:

SNRIs, TCAs

Neuropathic medications – Lyrica, gabapentin, lidocaine cream, capsaicin cream

Opioids only if all else fails

Aquatic PT

Acupuncture or TENS unit

Massage and heat/cold therapy

Alpha-lipoic acid if EMG is negative

Screen for depression/anxiety and manage accordingly

Evaluate for sleep disorders

Neurocognitive evaluations can help determine degree of disability and ability to work

Cognitive rehabilitation with speech therapy

App based technology: Lumosity app

Alternative medications: B Complex, Magnesium, Vitamin D

Brain Fog Management

Loss of Taste and Smell

- Minimal role for ENT unfortunately
- Smell retraining (ABSCENT.org)

Can recommend smell retraining kits, or recommend daily mindful smelling of bright scented essential oils (4-5 max at a time)

Medications (low evidence): alpha lipoic acid, Vitamin A drops

Apps: NoseWell, Snif (mostly provide online communities for our patients)

Persistent congestion? Nasal rinses, BID antihistamines (2nd generation)

Depression/ Anxiety/PTSD Management

Extremely common diagnoses in this population of patients

Sequential assessments: PHQ-9, GAD-7, PTSD Symptom Scale, Impact of Event Scale

Medication management is high in utility in this population

Consider involvement of therapist early, would try to find trauma-informed therapist for those with PTSD

Consider support groups: Body Politic, Survivor Corps, Long COVID Alliance, Long COVID Kids

Preventing Long COVID

• *Nature*, May 2022¹⁴

"Compared to people with SARS-CoV-2 infection who were not previously vaccinated, patients with breakthrough infections exhibited lower risks of death and incident post-acute sequelae"

mRNA vaccination proved to be the most successful.





Disability and Long COVID

Family and Medical Leave Act (FMLA)

- Provides up to 12 weeks of unpaid leave for patients to recuperate from COVID
- After initial infection, if patient continues to have symptoms, it would be advised to provide another month of leave for recuperation with a check-in point one month later to reevaluate symptoms.
- If they persist, then it is appropriate to extend to cover full 12 weeks of leave time.
- Documentation of initial symptoms are important to track symptoms. Assessments can also help evaluate degree of morbidity due to illness.

Short-term disability

- Patients will often times ask you to complete this in addition to their FMLA if they need financial assistance
- Per HHS.org website:

Long COVID can be a disability under Titles II (state and local government) and III (public accommodations) of the Americans with Disabilities Act (ADA), Section 504 of the Rehabilitation Act of 1973 (Section 504), and Section 1557 of the Patient Protection and Affordable Care Act (Section 1557).

 Must be a "physical or mental impairment" that "substantially limits one or more life activities"

Is Long COVID always a disability?

- No! This is why a comprehensive review of systems and sequential assessments can help guide treatment.
- If symptoms are improving or manageable, options to adjust work include:

Adjustments to work schedule (e.g. remote work)

Decreased work hours

More frequent breaks from work

Time off for flares in symptoms

Avoiding sleep-wake cycle disturbances (such as night shifts)

Additional time for testing (e.g. students)

Modifying existing work (e.g. minimize standing, etc.)

Federal Resources for Disability

- Office for Civil Rights of the Department of Health and Human Services (HHS): <u>https://www.hhs.gov/civil-rights/for-</u> providers/civil-rights-covid19/index.html.
- COVID-19 and the ADA: <u>https://www.ada.gov/emerg_prep.html</u>.
- Administration for Community Living's document, "How ACL's Disability and Aging Networks Can Help People with Long COVID," <u>https://acl.gov/sites/default/files/COVID19/ACL</u> LongCOVID.pdf - PDF
- Equal Employment Opportunity Commission <u>www.eeoc.gov/coronavirus</u>.

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Clinical Resources

Clinical Guidance

Evaluating and Caring for Patients with Post-COVID Conditions: Interim Guidance. CDC. Updated June 14, 2021. https://www.cdc.gov/coronavirus/2019-ncov/hcp/clinical-care/post-covid-index.html
 COVID-19: Evaluation and management of adults following adult viral illness, UpToDate. July 2021.
 NICE. Covid-19 rapid guideline: managing the long-term effects of covid19. https://www.nice.org.uk/guidance/ng188/chapter/4-Planning-care December 2020

Assessment Tools

- 1. https://www.healthmeasures.net/index.php
- Academy of Physical Medicine & Rehabilitation's functional assessments: https://now.aapmr.org/functionalassessment/

ACP Managing Transitions of Care for Post-Acute COVID Patients

https://www.acponline.org/practice-resources/covid-19-practice-management-resources/covid-19-recovery-team-based-care-toolkitEXT

Thank you!

Nisha Viswanathan, MD, FACP NViswanathan@mednet.ucla.edu

Frequently Asked Questions (FAQs)

1. What are the most commonly reported physical symptoms in Post-Acute Sequelae of SARS-CoV-2 (PASC) AKA Long COVID?

- a. Fatigue, Dyspnea, Anosmia
- b. Myalgias, Fever, Fatigue
- c. Rash, Fatigue, Diarrhea
- d. Dypsnea, Rash, Nausea

Answer: A

FAQs

2. Which of the following psychologic and neurocognitive symptoms can be seen in PASC?

- a. Impaired memory
- b. Poor concentration
- c. Anxiety
- d. Insomnia
- e. All of the above

Answer: E

FAQs

- 3. Which of the following tool is **not** typically used as a screening tool for PASC?
- a. Montreal Cognitive Assessment (MoCA)
- b. 6 minute walk test
- c. PET Scan
- d. Patient Health Questionnaire-9 (PHQ-9)

Answer: C

FAQs

- 4. How long do symptoms need to persist for it to be considered "Post COVID" under current CDC guidance?
- a. Greater than 10 days
- b. Greater than 14 days
- c. Greater than 4 weeks
- d. Greater than 3 months

Answer: C

Q & A

UCLA David Geffen School of Medicine



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Thank you!