I-RECOVER

LONG COVID TREATMENT

An Approach to Treating Long COVID

Up to 80% of patients experience prolonged illness after COVID-19, characterized by prolonged malaise, headaches, generalized fatigue, sleep difficulties, hair loss, smell disorder, decreased appetite, painful joints, dyspnea, chest pain and cognitive dysfunction. Long COVID may persist for months after acute infection, and it is likely that patients who did not receive adequate treatment during the symptomatic phase are much more likely to develop long COVID. Treatment should be individualized to clinical signs and symptoms.

FIRST LINE THERAPIES

In order of priority; not all required.

- **Prednisone:** 10-15 mg daily for 3 weeks. Taper to 10 mg for three days, then 5 mg for three days, then stop.
- **Ivermectin:** 0.2–0.3 mg/kg daily for 2-3 weeks.
- **Low dose naltrexone (LDN):** Begin with 1 mg daily, increase to 4.5 mg daily as required.
  May take 2-3 months for full effect.
- **Intermittent daily fasting and/or periodic daily fasts:**
  Fasting promotes autophagy, the body's protective mechanism to remove misfolded, foreign and damaged proteins. It also promotes mitophagy and the release of stem cells. It is likely that promoting autophagy will aid in the removal of the spike protein. NOTE: Hydroxychloroquine inhibits autophagy and should be avoided in patients undergoing intermittent fasting.
- **Spermidine and/or Resveratrol:**
  These compounds have been demonstrated to augment autophagy. Wheatgerm, mushrooms, grapefruit, apples and mango are high natural sources of spermidine. A bio-enhanced formulation containing trans-resveratrol from Japanese Knotwood Root appears to have good bio-availability.
- **Melatonin:** 8 mg at night (slow release/extended release preferred).
  Patients should pay attention to good sleep habits. Increase dose from 1 mg as tolerated (may cause severe bad dreams at high dosages).
- **Vitamin D:**
  The majority of those with long COVID continue to have Vitamin D deficiency. Patients may require a loading dose based on baseline Vitamin D levels (see Table 2). If baseline levels are unknown, the needed dose can be calculated from body weight or BMI (see Table 3).
- **Omega-3 fatty acids:** Vascepa, Lovaza or DHA/EPA 4 g day.
- **Aspirin:** 81 mg daily.
- **Curcumin (turmeric):** 500 mg twice daily.

SECOND LINE THERAPIES

If symptoms do not improve after 1-2 weeks continue steroids, Omega-3 fatty acids and LDN and add second line therapies as below.

- **Fluvoxamine:** 50 mg twice daily.
  Start on a low dose of 12.5 mg/day and increase slowly as tolerated. Stop if the symptoms increase. Caution with the use of other antidepressants and psychiatric drugs. Taper and discontinue once symptoms improve.
- **Hydroxychloroquine (HCQ):** 200 mg twice daily for 1-2 weeks, then reduce as tolerated to 200 mg daily.
  HCQ is the preferred second line agent. With long term usage, the dose should be reduced (100 mg or 150 mg daily) in patients weighing less than 61 kg (135 lbs).

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About this Protocol

The information in this document is our recommended approach to COVID-19 based on the best (and most recent) literature.

It is provided as guidance to healthcare providers worldwide on the early treatment of COVID-19. Patients should always consult with their provider before starting any medical treatment.

New medications may be added and/or changes made to doses of existing medications as further evidence emerges. Please check our website at flccc.net to be sure you are using the latest version of this protocol.

For more information on nutritional therapeutics and how they can help with COVID-19, visit geni.us/COVID_nutrition

For additional information on long COVID treatment, the rationale behind these medications, and other optional treatments, see 'An Approach to Treating Long COVID'.

Long COVID Phenotypes

• Inflammatory phenotype (with high C-Reactive Protein) — likely due to persistent spike protein and immune activation.

• Microvascular and macrovascular clotting syndrome (with high D-dimer and antiphospholipid antibodies).

• Predominantly CNS syndrome with microinfarcts and neural loss, especially of frontal lobes and hippocampus (diagnosed by MRI) — likely poorly reversible.

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- **Intravenous Vitamin C:** 25 g/week, together with oral Vitamin C 1000 mg (1 gram) 2-3 times daily.
  Oral Vitamin C is important to provide nutrients for the microbiome. Total daily doses of 8-12 g have been well-tolerated, however chronic high doses have been associated with the development of kidney stones, so the duration of therapy should be limited. Wean IV Vitamin C as tolerated.
- **Mitochondrial energy optimizer** with pyrroloquinoline quinone (e.g., Life Extension Energy Optimizer or ATP 360®).
- **N-acetyl cysteine (NAC)**: 600-1500 mg/day**.**
- **Fluvoxamine:** 25-50 mg twice a day.
  Can substitute fluoxetine (Prozac; 20-40 mg daily) if fluvoxamine not available.
- **N-acetyl cysteine (NAC)**: 600-1200 mg orally twice a day.

THIRD LINE THERAPIES

- **Maraviroc:** 300 mg by mouth twice daily.
  If 6-8 weeks have elapsed and significant symptoms persist despite first and second line treatment, this drug can be considered. Note maraviroc can be expensive and it has risk for significant side effects and drug interactions.
- **Non-invasive brain stimulation (NIBS):** using transcranial direct current stimulation or transcranial magnetic stimulation.
  NIBS is painless, extremely safe, and easy to administer. NIBS is offered by many Physical Medicine and Rehabilitation Centers. Patients may also purchase an FDA-approved device for home use.

Table 1. How to calculate ivermectin dose for long COVID

Note that ivermectin is available in different strengths (e.g., 3, 6, or 12 mg) and forms (e.g., tablets, drops). Tablets can be halved for more accurate dosing. Doses below are calculated for the upper end of the weight ranges listed.

How much do I weigh?		The protocol says 0.2 mg/kg; how much should I take?	The protocol says 0.3 mg/kg; how much should I take?
70–90 lb	32–40 kg	8 mg	12 mg
91–110 lb	41–50 kg	10 mg	15 mg
111–130 lb	51–59 kg	12 mg	18 mg
131–150 lb	60–68 kg	13.5 mg	20 mg
151–170 lb	69–77 kg	15 mg	23 mg
171–190 lb	78–86 kg	16 mg	26 mg
191–210 lb	87–95 kg	18 mg	28.5 mg
211–230 lb	96–104 kg	20 mg	31 mg
231–250 lb	105–113 kg	22 mg	34 mg
251–270 lb	114–122 kg	24 mg	37 mg
271–290 lb	123–131 kg	26 mg	39 mg
291–310 lb	132–140 kg	28 mg	42 mg

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- Mast cell activation syndrome (in those with genetic predisposition).
- Autoimmune syndromes including Lupus-like syndrome, adrenal insufficiency (anti-ACTH antibodies), ITP, TTP, GBS, small fiber neuropathy, POTS and dysautonomic syndromes .
- Pulmonary phenotype with a) ongoing organizing pneumonia; b) a fibrotic form.
- Reactivation of dormant viruses, (i.e., Epstein-Barr virus, Herpes type I/II and Zoster, Herpes VI, CMV — likely due to low CD8+ levels).

Long COVID symptoms

The clinical signs and symptoms of long COVID can be grouped in the following clusters to allow organ-specific targeted therapy or individualized therapy:

1. Respiratory: shortness of breath, congestion, persistent cough, etc.

2. Neurological/psychiatric: brain fog, malaise, tiredness, headaches, migraines, depression, inability to focus or concentrate, altered cognition, insomnia, vertigo, panic attacks, tinnitus, anosmia, phantom smells, etc.

3. Musculoskeletal: myalgias, fatigue, weakness, joint pains, inability to exercise, post-exertional malaise, inability to perform normal activities of daily life.

4. Cardiovascular: Palpitations, arrhythmias, Raynaud-like syndrome, hypotension, and tachycardia on exertion.

5. Autonomic: Postural tachycardia syndrome (POTs), abnormal sweating

6. Gastrointestinal disturbance: anorexia, diarrhea, bloating, vomiting, nausea, etc.

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Table 2. How to replenish Vitamin D levels based on baseline levels

Achieving serum 25(OH)D concentrations above 50 ng/mL based on baseline concentration in non-emergency situations in a 70 kg adult.*#

Baseline Vitamin D level (ng/mL)**	Vitamin D dose, 50,000 IU capsules: Initial and weekly[$]		Duration (weeks)	Total amount for deficit correction (IU, in millions) ****
	Initial Dose (IU)	Weekly dose (50,000 IU caps)		
< 10	300,000	x 3	8 – 10	1.5 – 1.8
11–15	200,000	x 2	8 – 10	1.0 – 1.2
16–20	200,000	x 2	6 – 8	0.8 – 1.0
21–30	100,000	x 2	4 – 6	0.5 – 0.7
31–40	100,000	x 2	2 – 4	0.3 – 0.5
41–50	100,000	x 1	2 – 4	0.2 – 0.3

* Example of daily or once weekly dose ranges for adults with specific body types (based on body weight or BMI Appropriate dose reductions are necessary for children. A suitable daily or weekly maintenance dose should start after completing the schedule.
[#][#]For those with chronic co-morbid conditions, such as hypertension, diabetes, asthma, COPD, CKD, depression, osteoporosis and to reduce all-cause mortality, higher doses of Vitamin D should be taken, as recommended for persons with obesity (BMI, 30-39).Those with multiple sclerosis, cancer, migraine headaches, metabolic syndrome, and those routinely taking medications, such as anti-epileptic and antiretroviral agents that increase catabolism of Vitamin D, should consider taking doses recommended for those with morbid obesity (BMI ≥40).
**To convert ng/mL to nmol/L, multiply by 2.5.
[$]Doses can be taken as single cumulative doses or spread out through the week.

Source: SJ Wimalawansa (with permission).

Table 3. How to calculate Vitamin D dose when baseline not available

Longer-term maintenance of serum 25(OH)D concentrations above 50 ng/mL based on body weight *				
Body-weight category		Dose (IU) kg/day	Dose (IU) (Daily or Weekly)*	
BMI (wt. kg/Ht. M^2)	Average (Kg)		Daily dose (IU)	Once a week (IU)
BMI ≤ 19 (under-weight)	55 (under-weight)	40 – 70	2,000 – 4,000	15,000 - 25,000
BMI 20–29 (non-obese)	70 (non-obese)	70 – 100	5,000 – 7,000	35,000 - 50,000
BMI 30–39 (obese persons)[#]	100 (obese persons)	100 – 150	9,000 – 12,000	60,000 - 90,000
BMI ≥ 40 (morbidly obese)[$]	140 (morbidly obese)	150 – 200	15,000 – 25,000	100,000 - 175,000

Source: SJ Wimalawansa (with permission).

7. Dermatologic: itching, rashes, dermatographia.

8. Mucus membranes: running nose, sneezing, burning and itchy eyes.

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Never disregard professional medical advice because of something you have read on our website and releases. This is not intended to be a substitute for professional medical advice, diagnosis, or treatment regarding any patient.

Treatment for an individual patient is determined by many factors and thus should rely on the judgement of your physician or qualified healthcare provider. Always seek their advice with any questions you may have regarding your medical condition or health.

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