

Critical Care COVID-19 Management Protocol

(updated 6-17-2020)

Prophylaxis

While there is very limited data (and none specific for COVID-19), the following “cocktail” may have a role in the prevention/mitigation of COVID-19 disease.

- Vitamin C 500 mg BID and Quercetin 250-500 mg BID
- Zinc 75-100 mg/day
- Melatonin (slow release): Begin with 0.3mg and increase as tolerated to 2 mg at night
- Vitamin D3 1000-4000 u/day
- *Optional:* Famotidine 20-40mg/day

Mildly Symptomatic patients (at home):

- Vitamin C 500mg BID and Quercetin 250-500 mg BID
- Zinc 75-100 mg/day
- Melatonin 6-12 mg at night (the optimal dose is unknown)
- Vitamin D3 2000-4000 u/day
- *Optional:* Ivermectin 150-200ug/kg (single dose)
- *Optional:* ASA 81/325mg/day
- *Optional:* Famotidine 20-40mg/day

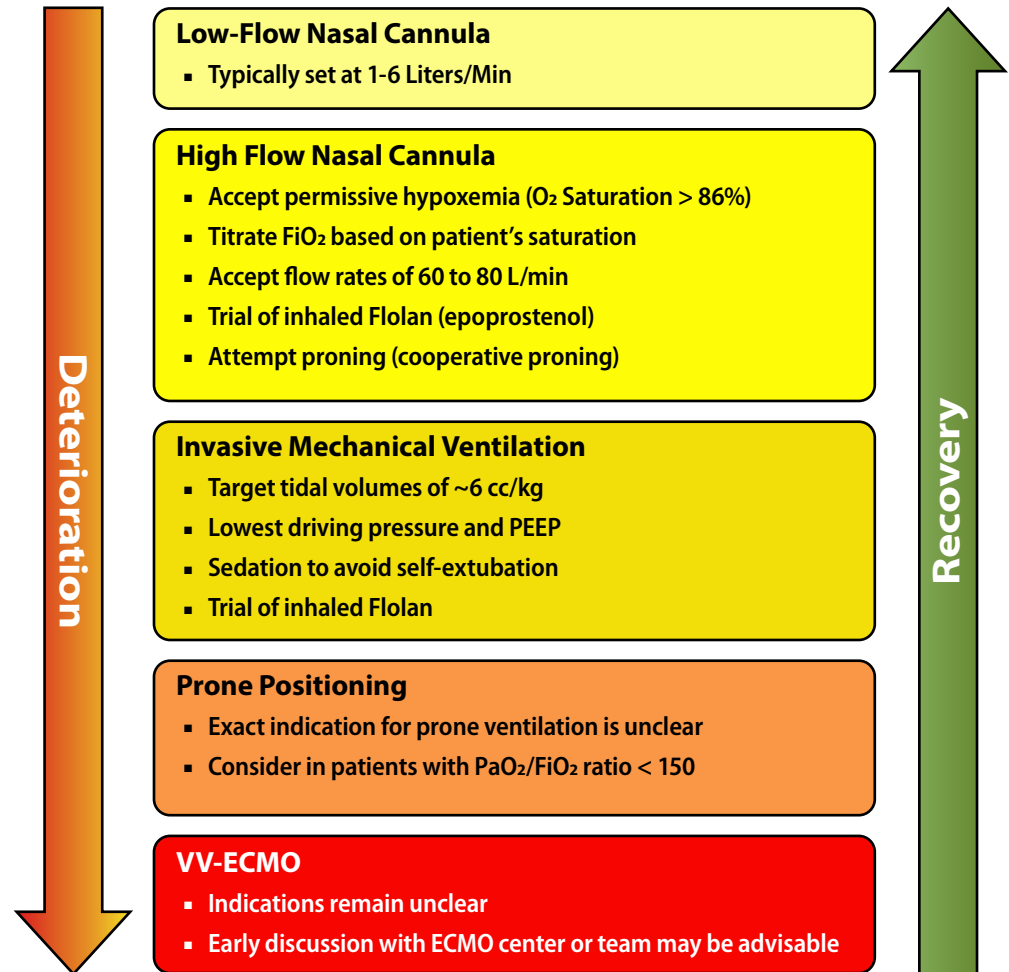
In symptomatic patients, monitoring with home pulse oximetry is recommended. Ambulatory desaturation below 94% should prompt hospital admission

Mildly Symptomatic patients (on floor):

- Vitamin C 500 mg PO q 6 hourly and Quercetin 250-500 mg BID (if available)
- Zinc 75-100 mg/day
- Melatonin 6-12 mg at night (the optimal dose is unknown)
- Vitamin D3 2000-4000 u/day
- Enoxaparin 60 mg daily
- Famotidine 40mg daily (20mg in renal impairment)
- Methylprednisolone 40 mg q 12 hourly; increase to 80 mg q 12 if poor response
- *Optional:* Remdesivir 200mg D1 then 100mg daily for 9 days.

General schema for respiratory support in patients with COVID-19

TRY TO AVOID INTUBATION IF POSSIBLE



- *Optional:* Ivermectin 150-200 ug/kg (single dose)
- N/C 2L /min if required (max 4 L/min; consider early t/f to ICU for escalation of care).
- T/f EARLY to the ICU for increasing respiratory signs/symptoms and arterial desaturations.

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Respiratory symptoms (SOB; hypoxia- requiring N/C \geq 4 L min: admit to ICU):

Essential Treatment (dampening the STORM)

1. Methylprednisolone 80 mg loading dose then 40 mg q 12 hourly for at least 7 days and until transferred out of ICU. In patients with poor response, increase to 80 mg q 12 hourly.
2. Ascorbic acid (Vitamin C) 3g IV q 6 hourly for at least 7 days and/or until transferred out of ICU. Note caution with POC glucose testing.
3. Full anticoagulation: Unless contraindicated we suggest FULL anticoagulation (on admission to the ICU) with enoxaparin, i.e 1 mg kg s/c q 12 hourly (dose adjust with Cr Cl < 30mls/min). Heparin is suggested with CrCl < 15 ml/min.

Note: Early termination of ascorbic acid and corticosteroids will likely result in a rebound effect.

Additional Treatment Components (the Full Monty)

4. Melatonin 6-12 mg at night (the optimal dose is unknown).
5. Famotidine 40mg daily (20mg in renal impairment)
6. Vitamin D 2000-4000 u/day
7. Thiamine 200mg IV q 12 hourly
8. Simvastatin 80 mg/day (caution drug-drug interactions) or Atorvastatin 80mg/day
9. Magnesium: 2 g stat IV. Keep Mg between 2.0 and 2.4 mmol/l. Prevent hypomagnesemia (which increases the cytokine storm and prolongs Qtc).
10. Optional: Azithromycin 500 mg day 1 then 250 mg for 4 days
11. Optional: Remdesivir, 200 mg IV loading dose D1, followed by 100mg day IV for 9 days
12. Broad-spectrum antibiotics if superadded bacterial pneumonia is suspected based on procalcitonin levels and resp. culture (no bronchoscopy).
13. Maintain EUVOLEMIA
14. Early norepinephrine for hypotension.

15. Escalation of respiratory support; See General Schema for Respiratory Support in Patients with COVID-19.

Salvage Treatments

- Plasma exchange. Should be considered in patients with progressive oxygenation failure despite corticosteroid therapy. Patients may require up to 5 exchanges.
- High dose corticosteroids; 120 mg methylprednisolone q 6-8 hourly
- Siltuximab and Tocilizumab (IL-6 inhibitors)
- Convalescent serum; the role and timing of convalescent serum are uncertain.

Treatment of Macrophage Activation Syndrome (MAS)

- A sub-group of patients will develop MAS. A ferritin > 4400 ng/ml is considered diagnostic of MAS. Other diagnostic features include increasing AST/ALT and increasing CRP.
- Methylprednisolone 120 mg q 6-8 hourly for at least 3 days, then wean according to Ferritin, CRP, AST/ALT. Ferritin should decrease by at least 15% before weaning corticosteroids.

Monitoring:

- On admission: PCT, CRP, IL-6, BNP, Troponins, Ferritin, Neutrophil-Lymphocyte ratio, D-dimer and Mg.
- Daily: CRP, Ferritin, D-Dimer and PCT. CRP and Ferritin track disease severity closely (although ferritin tends to lag behind CRP).
- Thromboelastogram (TEG) in patients with high D-dimer and repeated as indicated.
- In patients receiving IV vitamin C, the Accu-Chek™ POC glucose monitor will result in spuriously high blood glucose values. Therefore, a laboratory glucose is recommended to confirm the blood glucose levels

Post ICU management

- a. Enoxaparin 40-60 mg s/c daily
- b. Methylprednisone 40 mg day, then wean slowly
- c. Vitamin C 500 mg PO BID
- d. Melatonin 3-6 mg at night