

Critical Care COVID-19 Management Protocol

(updated 9-28-2020)

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 mg daily
- Zinc 75-100 mg/day
- Melatonin (slow release): Begin with 0.3mg and increase as tolerated to 2 mg at night
- Vitamin D3 1000-3000 u/day
- 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
- ASA aspirin 81-325 mg/day (unless contraindicated)
- Famotidine 40mg BID (reduce dose with renal impairment)

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 20 000 – 60 000u single oral dose. Calcifediol 200 -500 ug is an alternative. This should be followed by 20 000u D3 (or 200ug calcifediol) weekly until discharged from hospital.
- Enoxaparin 60 mg daily
- Famotidine 40mg BID (reduce dose with renal impairment)
- Methylprednisolone 40 mg q 12 hourly; increase to 80 mg q 12 if poor response
- T/f EARLY to the ICU for increasing respiratory signs/symptoms and arterial desaturations.

General schema for respiratory support in patients with COVID-19

TRY TO AVOID INTUBATION IF POSSIBLE

Low-Flow Nasal Cannula

- Typically set at 1-6 Liters/Min

High Flow Nasal Cannula

- Accept permissive hypoxemia (O_2 Saturation > 86%)
- Titrate FiO_2 based on patient's saturation
- Accept flow rates of 60 to 80 L/min
- Trial of inhaled Flolan (epoprostenol)
- Attempt proning (cooperative proning)

Invasive Mechanical Ventilation

- Target tidal volumes of ~6 cc/kg
- Lowest driving pressure and PEEP
- Sedation to avoid self-extubation
- Trial of inhaled Flolan

Prone Positioning

- Exact indication for prone ventilation is unclear
- Consider in patients with PaO_2/FiO_2 ratio < 150

SALVAGE THERAPIES

- High dose corticosteroids; 120 -250 mg methylprednisolone q 6-8 hourly
- Plasma exchange
- “Half-dose” rTPA

Deterioration

Recovery

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.

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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 CrCl < 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 40 mg- 80 mg BID (20 -40 mg/day in renal impairment)
6. Vitamin D3 20 000 – 60 000u single oral dose. Calcifediol 200 -500 ug is an alternative. This should be followed by 20 000u D3 (or 200ug calcifediol) weekly until discharged from hospital.
7. Thiamine 200mg IV q 12 hourly
8. 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: Remdesivir, 200 mg IV loading dose D1, followed by 100mg day IV for 9 days
11. Broad-spectrum antibiotics if superadded bacterial pneumonia is suspected based on procalcitonin levels and resp. culture (no bronchoscopy).
12. Maintain EUVOLEMIA
13. Early norepinephrine for hypotension.
14. 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; Bolus 250- 500mg/ day methylprednisolone

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).
- 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

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

Post hospital discharge

1. Consider extended DVT prophylaxis in high risk patients.
2. Consider tapering course of corticosteroids (guided by CRP)
3. Omega-3 fatty acids
4. Atorvastatin 40mg daily
5. Melatonin
6. Multivitamins including B complex and Vitamin D