

^Poor Prognostic Factors:

- **Epidemiology:** Age > 65, Cardiovascular disease, Diabetes mellitus, Hypertension, Smoking, BMI >30, Chronic lung disease, Chronic kidney disease, Active cancer (especially hematologic, lung cancer and metastatic disease), History of transplant or other immunosuppression, use of biologic agents, uncontrolled HIV
- **Vitals:** HR > 125, RR > 24, SpO2 < 94% on RA, PaO2/FiO2 < 300
- **Labs:** D-dimer > 1, CK > 2x upper limit, CRP > 100, LDH > 245, Ferritin > 500, Troponin > 0.01, Absolute Lymphocyte Count < 0.8

COVID positive, admitted to hospital

*See Diagnostic work-up (page: 3)
**See specific therapies (page: 4)
^See Prognostic factors (left)

Adapted from MGH illness severity algorithm

1. Complete diagnostic work-up*
2. Ensure Code Status and HCP
3. Assess prognostic factors^
4. Determine severity of illness

Mild/moderate Disease (floor)

Asymptomatic/mild symptoms
SpO2 > 94% on RA

- Maintain oxygenation: SpO2 92-96% (88-92% for COPD)
- Maintain stable breathing: RR < 24, normal effort
- Ensure prophylactic anticoagulation is ordered unless contraindicated.
- **Supportive therapy only**
- Tylenol preferred for analgesia and fever, second-line NSAIDs
- Conservative fluid management
- Avoid antibiotics unless indicated
- No specific COVID-19 therapy indicated
- **Labs:** Daily BMP, CBC. Non-routine labs every other day if elevated at baseline
- Monitor for worsening clinical status and hypoxia

Severe Disease (floor)

SpO2 < 94% on RA, RR>30
PaO2/FiO2 < 300

- More likely in patients with poor prognostic factors^
- Maintain oxygenation: SpO2 92-96% (88-92% for COPD) via supplemental oxygen (nasal cannula to oxymask)
- Maintain stable breathing: RR < 24, normal effort
- Ensure prophylactic anticoagulation is ordered unless contraindicated.
- Therapeutic anticoagulation per protocol can be considered at clinician's discretion.
- Consider antibiotics if superimposed bacterial pneumonia
- Supportive therapy as Mild/moderate disease
- **Specific COVID-19 therapy** as per indication -Steroids, Remdesivir convalescent plasma, anticoagulation and proning per protocol
- **Labs:** Daily CMP, CBC, D-Dimer, PT/aPTT. Non-routine labs every 1-2 days as per severity.
- If worsening hypoxia 4-6L NC and increased work of breathing, consider MICU consult.

Critical Disease (ICU)

SpO2 <92% on > 6L, PaO2/FiO2 <200, rapidly increasing oxygen requirements

- MICU consult and evaluation for ICU admission
- Worsening hypoxia (>6L) and work of breathing (RR>30), hemodynamic instability (SBP <90, HR > 120s), lactate >2 after fluids, acidosis (ABG pH < 7.30), multi-organ failure
- Maintain oxygenation: SpO2 92-96% (88-92% for COPD) via supplemental oxygen (oxymask to HFNC/BiPAP/intubation)
- Consider antibiotics if superimposed bacterial pneumonia
- **Specific COVID-19 therapy** as per indication - Steroids, Remdesivir convalescent plasma, anticoagulation and proning per protocol
- Rest of management per ICU protocol

COVID-19 Inpatient Treatment Algorithm

CHEAT SHEET FOR COVID-19

DOCUMENTATION

COVID-19 specific smartphrases have been created on EPIC for appropriate documentation.

To look up these smartphrases go to

Personalize > Smartphrase manager > User phrases > User: PANDA, SANCHIT [00119762] > Sharing > + Add me

COVID-19 Smartphrases

.COVID19HPI - H&P template

.COVID19PROGRESS - Progress note template

.COVID19VIRTUALVISIT - Virtual visit note for telehealth services

.COVID19ATTESTATION - Attending attestation for patient

.COVID19DCATTEST - Attending attestation for discharge summary

.APNICPROTOCOL – Document relevant details as per APNIC protocol prior to and then 2 hours after initiating proning protocol.

Discharge instructions

.COVIDSELFQUARNOTICE – Notice for self-quarantine

.COVIDPLASMAPROJECT – Plasma donations after discharge

COVID-19 specific discharge instructions are also available for lookup on

Discharge instructions > Insert smart-text tab > Search COVID

ADMISSION AND ISOLATION

- COVID-positive patients (and rule-outs) should be admitted to **INPATIENT** status.
- All patients with confirmed COVID-19 infection should be placed on Enhanced airborne precautions.
- COVID Rule-out – Patients with with high suspicion of COVID based on clinical presentation but testing negative.
- Rule out patients should be placed on Enhanced airborne precautions for 10 days since onset of symptoms.
- High risk patient groups are patients from nursing homes, group homes, assisted living facilities, rehab facilities, memory care unit, correctional facilities, homeless or homeless patients living in shelters.
- If high risk patients are asymptomatic on presentation, they are tested and placed under droplet precautions if negative. Droplet precautions are discontinued if a repeat test on day 4 is negative.

Admission criteria for COVID positive patients (any one):

- Respiratory Rate > 24 breaths/min
- Heart Rate > 125 beats/min
- SpO2 ≤ 94% on ambient air
- Dyspnea (Clinically defined as the inability to speak in full sentences)
- Sepsis
- Suspicion of ARDS (Consider MICU Evaluation)
- Suspicion of Acute coronary event, Stroke or thrombotic phenomenon
- Based on clinical judgement, on discussion with admitting team

COVID-19 patients with mild symptoms should not be admitted solely based on abnormal investigational findings.

DIAGNOSTIC WORKUP

Labs

On admission (Routine):

CBC with diff, BMP, Mg, Phos, LFTs, D-Dimer, LDH, CRP, PT/PTT, Fibrinogen, Ferritin, Troponin, CPK, proBNP, Procalcitonin, EKG

If LFTs elevated: Acute hepatitis panel, HCV antibody, and HIV Ab/Ag

If AKI present: UA and urine protein: Cr ratio

Women of childbearing age: B-HCG

Consider blood cultures if suspecting bacteremia

Follow up labs:

Routine

CBC with diff, BMP, Mg, Phos (D-Dimer, PT/PTT if severe disease)

Non-Routine : Consider every 1-2 days if elevated at baseline or depending on clinical severity

LFTs, D-Dimer, LDH, CRP, PT/PTT, Fibrinogen, Ferritin, Troponin, CPK, Procalcitonin

If clinically worsening:

Fibrinogen, LDH, Troponin, EKG, ABG

CRP, Ferritin, D-dimer if rising LFTs and hypotension with concern for cytokine storm

Imaging

Portable Chest X-Ray on admission or if any change in clinical status

Findings: 20% normal, expect consolidation or bilateral ground glass opacities in lower lung fields

CT chest without contrast is not routinely recommended unless otherwise indicated.

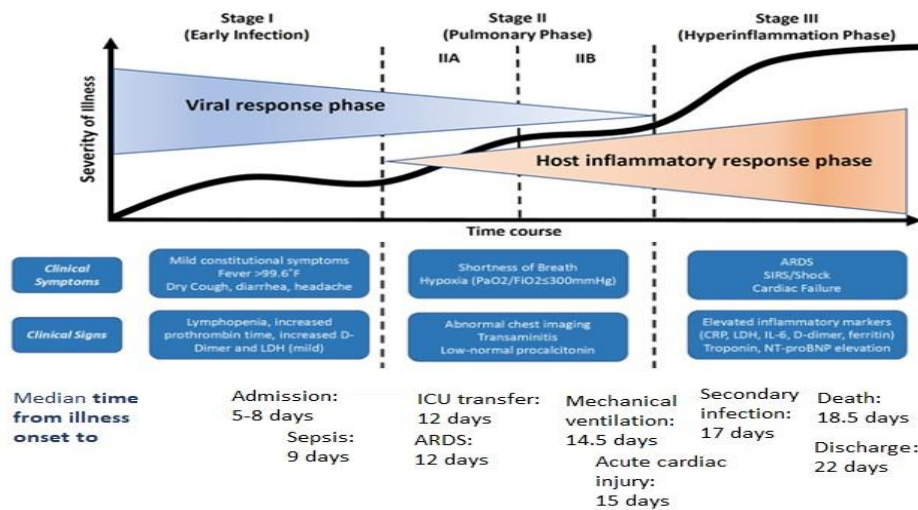
Consider CT Thorax angiography if PE suspected or unexplained hypoxemia present.

Evaluate for any thrombotic disease if clinical suspicion present.

Trans Thoracic ECHO:

Obtain if markedly elevated troponin (>5x ULN), shock, new heart failure, or arrhythmia. Avoid routine TTE.

CLINICAL COURSE



Siddiqi HK, Mehra MR. COVID-19 illness in native and immunosuppressed states: A clinical–therapeutic staging proposal. *The Journal of Heart and Lung Transplantation*. 2020;39(5):405-407. doi:10.1016/j.healun.2020.03.012

GENERAL MANAGEMENT AND SUPPORTIVE THERAPY

- Applicable for all patients admitted for COVID-19 regardless of disease severity.
- Maintain oxygenation SpO₂ 92-96% (88-92% for COPD).
- Ensure pulse oximetry is ordered with appropriate parameters.
- Analgesic and anti-pyretic – Acetaminophen first line, second line NSAIDs.
- Continue home statin, ACE/ARBs, inhalers.
- Conservative fluid management.
- Avoid empiric antibiotics unless there is a specific concern for superimposed bacterial pneumonia
- Ensure all patients receive SCDs and pharmacologic DVT prophylaxis unless contraindicated.

- Monitor for complications: Respiratory failure, ARDS, thromboembolic phenomena, inflammatory damage, AKI, DIC, secondary infections, acute cardiac injury, heart failure, encephalopathy.

- Ensure code status and HCP is established on admission, update families with changes in care.
- Do not initiate specific COVID-19 therapies unless the patient meets criteria for administration.
- If concern for rapid deterioration or for guidance on interventions, consider MICU and/or ID consult.

SPECIFIC THERAPY

NON-PHARMACOLOGICAL THERAPY

Awake Proning

- Awake proning is an effective non-pharmacologic intervention to improve oxygenation/hypoxia in cooperative patients.
- It can be combined with simultaneous use of any other non-invasive oxygen supplementation (NC/HFNC/Oxymask)
- Ideal candidate – Patient with isolated hypoxemic respiratory failure without substantial dyspnea (the “paradoxically well appearing” hypoxemic patient)
- The main risk of awake proning is that it could cause excessive delay in intubation

Criteria for patient selection

1. Patient should be able to move independently
 2. Not have multi-organ failure
 3. Patient expected to have a reversible lung injury and might avoid intubation
 4. No hypercapnia (PacO₂ <50) or substantial dyspnea (Respiratory rate <35, not using accessory muscles)
 5. Normal mental status, able to communicate distress
 6. No anticipation of difficult airway
- Can consider proning patients whose code status reflects DNI (Do Not Intubate).
 - Can be used as a Stop-gap measure for a hypoxemic patient when intubation is not immediately available (Desaturation during transportation).

Contraindications

- Signs of respiratory failure (RR >35, PacO₂ >50 or pH <7.3)
- Unstable hemodynamics (HR >120, SBP <90 mm hg)
- Spinal instability
- Facial or pelvic fractures
- Open chest or unstable chest wall
- Relative contraindications include delirium, confusion, immediately after meals, inability to change position independently, recent nausea/vomiting, advanced pregnancy

Patient Monitoring

- EKG leads should remain on the anterior chest wall for continuous monitoring (if clinically indicated)
- SpO2 probe (continuous) should be placed on the patient if not already in use.
- Patient's spO2, oxygen device (i.e. NC, simple face mask) L/min of oxygen, respiratory rate and dyspnea should be assessed just prior to proning and two hours after proning with appropriate documentation. (.APNICPROTOCOL)

Proning protocol can be ordered from EPIC order sets.

For further details refer to [APNIC protocol](#).

PHARMACOLOGICAL THERAPY

FOR ALL PATIENTS

- Due to the increased risk of thrombotic events with COVID-19, all patients should receive pharmacologic DVT prophylaxis unless contraindicated.
- Can consider using therapeutic anticoagulation per [protocol](#) at clinician's discretion.
- Dose and choice of anticoagulant depends on presence or absence of VTE, D-Dimer levels, or clinical worsening.

FOR PATIENTS WITH SEVERE DISEASE

Severe disease is classified as:

SpO2 < 94% on room air, or PaO2/FiO2 <300, or RR > 30 breaths per minute, or lung infiltrates with >50% involvement

The following treatment options are available for patients with severe disease and can be administered together.

Dexamethasone and other glucocorticoids

Dexamethasone is shown to reduce mortality among hospitalized patients with severe disease

Dose

6 mg daily for 10 days or until discharge, whichever is shorter

If Dexamethasone is unavailable, can use other glucocorticoids at equivalent dose
Monitor closely for adverse effects while on steroids

Remdesivir (RDV)

It is an RNA dependent RNA polymerase inhibitor.

RDV should be used as early as possible and best within 7-10 days of onset of symptoms

RDV can also be used in patients with Mild/moderate disease with immunosuppression if they are admitted to the hospital.

Dose

200 mg IV on day 1, followed by 100 mg IV for 4 days

Full course of 5 days need not be completed if patient has improved and is stable for discharge.

Adverse effects:

Diarrhea, transaminitis, rash, renal impairment

Contraindications: Hypersensitivity to RDV or ALT \geq 10x upper limit of normal

Convalescent plasma

The potential benefits

Rapid decline and clearance of virus
Decrease in the cytokine storm seen in acute respiratory distress syndrome associated with severe COVID-19 infection
Improved morbidity and mortality
Decrease of time on ventilator with improved oxygenation
Decrease in total hospitalization days

The potential risks

Allergic reaction
Volume overload
Potential antibody enhancement of the virus

Eligible patients

Severe COVID-19 as defined above
Life-threatening disease: respiratory failure, septic shock, multiorgan failure

Dose

Treat with 1 unit of convalescent plasma and this may be repeated once daily for a maximum of 3 doses

EXPERIMENTAL THERAPIES

Casirivimab and Imdevimab (Regeneron)

An antibody cocktail administered together for the treatment of COVID-19 in adults.
Please contact ID if a patient is interested in Regeneron to see if they would be eligible candidates.
Patients receiving convalescent plasma are excluded from the trial.

Bamlanivimab

A monoclonal antibody to the spike protein of SARS-COV-2 used in the ED for patients early in course and with mild disease. Shown in clinical trials to reduce COVID-19-related hospitalization or emergency room visits in patients at high risk for disease progression within 28 days after treatment when compared to placebo.
A benefit has not been shown in patients hospitalized due to COVID-19, it is only available for use in ED and ambulatory setup.

DISCHARGE

Discharge of COVID positive patients can be considered when patients have resolution of symptoms and do not require any further specific or supportive therapy.

For discontinuation of transmission precautions following strategies can be followed, refer to policy [COV D-04](#).

Symptom-based strategy (Must meet all criteria)

- Resolution of fever > 24 hours without antipyretics
- Improvement in signs and symptoms (cough, dyspnea, oxygen requirement)
- > 10 days since the onset of COVID (1st day of symptoms or 1st positive test)

Test-based strategy (Must meet all criteria)

- Resolution of fever without antipyretics, improvement in symptoms
- 2 negative RT-PCR from at least 2 consecutive respiratory specimens collected > 24 hours apart
- > 10 days since the onset of COVID (1st day of symptoms or 1st positive test)

Medications

If the patient has decreased mobility or D-Dimer >0.5 on day of discharge can consider anticoagulation for DVT prophylaxis at discharge for 14 days. (Group 1).

If therapeutic anticoagulation was used during hospital admission, discharge with anticoagulation as per [protocol](#). (Group 2/3)

COVID Transitions Team

Will follow COVID discharges for clinical stability and facilitate triage. Find under "COVID-19 Transitions Clinic" on Amion.

Discharge pending test results

Patients with a pending test who are clinically stable may be discharged provided patient is given the mandatory self-quarantine order from the County. The DOH does NOT need to be notified. If the subsequent test result is positive, the DOH is notified by the lab and will contact the patient. They can follow up in My Chart or with PCP for negative results.

AMA Discharges

- If a patient has the capacity to make his or her own health care decisions and the discharge plan determines that the patient is not a threat to the public (i.e., the patient can and will agree to quarantine), the patient may be discharged AMA. Infection Control and DOH notified by team or case manager.
- If the patient is not willing/able to quarantine, Dr. Housam Hegazy [C: (315) 491-9588] must be contacted; he will do a legal and ethical analysis, mainly assessing the public health risk and guiding safe discharge planning. If there is a public health concern or other legal concerns, then he will raise it to legal and possible ethical departments for further action as per policy [COV D-02](#).

Skilled Nursing Facilities

- COVID positive patients can be discharged to SNF after transmission precautions have been discontinued, please refer to policy [COV D-04](#).

Patients with a positive COVID-19 test may be discharged following

- DOH notified/approval (this is done by the case manager in conjunction with infection control).
- Patient is given the mandatory self-quarantine order from the County Executive (dot phrase: COVIDSELFQUARNOTICE).
Required only for patients being discharged to home.

CM, infection control, DOH, and SW are helping provide information on discharge.

CM can help arrange follow up with the COVID transition clinic (also see AMION).

COVID discharge kits are available for patients on discharge, please contact CM for the same.

Please give COVID-confirmed patients information regarding the convalescent plasma donations.

Patients that receive convalescent plasma or antibody treatments will not be candidates for plasma donation for 6 months.

Please refer to discharge procedure policy [COV D-02](#) for detailed guidance.

Appendix

ANTICOAGULATION IN COVID-19

| | GROUP 1 | GROUP 2 | GROUP 3 |
|--------------------|--|---|---|
| Criteria | D-Dimer < 3 mcg/mL | D-Dimer ≥ 3 mcg/mL | Confirmed VTE OR Unexplained worsening hypoxemia and suspected VTE with D-Dimer ≥ 3 mcg/mL |
| Treatment | <p>Stable Renal Function eCrCl>30 mL/min Enoxaparin</p> <ul style="list-style-type: none"> • 40mg sq daily (BMI <40) • 40mg sq q12hr (BMI 40-49.9) • 50mg sq q12 hr (BMI ≥50) <p>Stable Renal Function eCrCl≤30 mL/min Enoxaparin</p> <ul style="list-style-type: none"> • 30mg sq daily (BMI <40) • BMI ≥ 40 use heparin, see below <p>Any GFR or Acute Kidney Injury Heparin</p> <ul style="list-style-type: none"> • 5000 U sq q8 hours (BMI <40) • 7500 U sq q 8 hours (BMI ≥40) | <p>Stable Renal Function eCrCl>30 mL/min Enoxaparin 0.5mg/kg sq q12 hrs</p> <p>Stable Renal Function eCrCl≤30 mL/min Enoxaparin 0.5mg/kg subQ daily</p> <p style="text-align: center;">Or</p> <p>Any GFR or Acute Kidney Injury Adult heparin infusion low dose protocol (anti-Xa target range 0.3-0.5)</p> <p>If anticipated procedures and/or high risk bleeding utilize heparin infusion</p> | <p>Stable Renal Function eCrCl>30 mL/min Enoxaparin 1mg/kg subQ q12hrs</p> <p>Stable Renal Function eCrCl≤30 mL/min Enoxaparin 1mg/kg subQ daily</p> <p style="text-align: center;">Or</p> <p>Any GFR or Acute Kidney Injury Adult heparin infusion high dose protocol (anti-Xa target range 0.3-0.7)</p> <p>If anticipated procedures and/or high risk bleeding utilize heparin infusion</p> |
| Monitoring | Check daily CBC with diff, D-Dimer and Fibrinogen, PTT, PT/INR. Can consider Hematology consult. | | |
| Precautions | Active bleeding Platelet count < 50 000 Decreased renal function (GFR<30) and/or BUN > 80 | Active bleeding Severe bleeding diathesis Platelet count < 50 000 Decreased renal function (GFR<30) and/or BUN > 80 If clinician assesses bleeding risk is too high (age, multiple organ failure, significant co-morbidities, previous bleeding, recent surgery), can move to Group 1 | Active bleeding Severe bleeding diathesis Platelet count < 50 000 Decreased renal function (GFR<30) and/or BUN > 80 |
| Discharge | If D-Dimer > 0.5mcg/mL and/or patient has decreased mobility: Apixiban 2.5mg BID x 14 days OR Rivaroxaban 10mg daily x 14 days | Apixiban 2.5mg BID OR Rivaroxaban 10mg daily x 4 total weeks of anticoagulation | Apixiban 5mg BID x 3 total months of anticoagulation OR Rivaroxaban 15mg BID for 21 days then 20mg daily for total 3 months of anticoagulation |
| | For discharge patients with ESRD or HD consider dose reduction as necessary or alternative agent | | |
| Notes | Physician should assess for bleeding daily and can stop anticoagulation if suspected. Physician should complete necessary work up for suspected DVT or pulmonary embolism if clinically appropriate and deemed safe for patient. | | |

APNIC PROTOCOL FOR AWAKE PRONING

