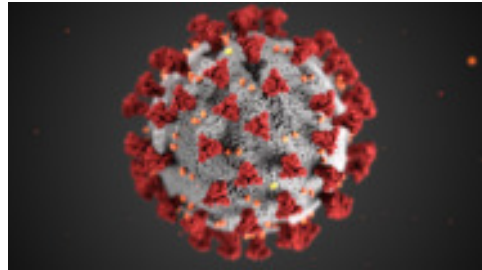
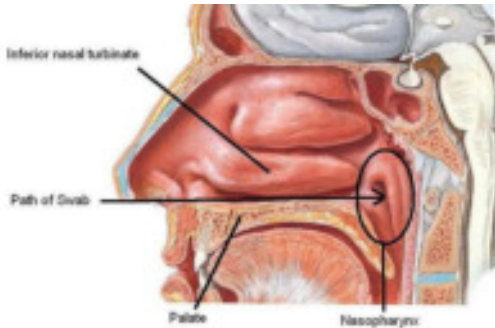


Guidelines for COVID19 Management in the ED or ICU



These management guidelines are not meant to be comprehensive but summarizes key recommendations from trusted sources including the CDC, Massachusetts General Hospital, University of California San Francisco, University of Washington, Surviving Sepsis Campaign as well as the experience from Italy, China, New York and Seattle. These guidelines are not a substitute for good clinical judgement and individualized care given the resources available.

SCREENING GUIDELINES



Screening Test:

- Nasopharyngeal swab for Reverse Transcription-PCR Testing of SARS-CoV-2 (COVID19)



Who should get screened:

- Fever **AND** cough or shortness of breath
- Symptomatic Patients with comorbid conditions, age>65, or immunocompromised
- Symptomatic First responders, healthcare workers
- Symptomatic patients being admitted to a healthcare facility
- Symptomatic patients who are residents of long-term care facilities, correctional facilities, psychiatric facilities, homeless shelters

ISOLATION GUIDELINES



Non-intubated or Patients on Mechanical Ventilation:

- Droplet precautions (providers can wear surgical mask)
- Non-intubated patients should wear a surgical mask
- Individual performing NP Swab should wear N95 mask during collection procedure

Patients Receiving Aerosolizing Procedures

- Intubation, extubation, bronchoscopy, noninvasive positive pressure ventilation, nebulized medications, Metaneb, EZ-PAP, NGT placement, sputum induction (avoid if possible) and high flow nasal cannula >6 L/min
- Airborne precautions (providers must wear N95 respirator)
- Non-intubated patients should wear a surgical mask

TRANSPORT GUIDELINES

Non-intubated Patients

- Patients should wear a surgical mask
- Transporters should wear full Personal Protective Equipment (PPE)
 - N95 respirator, face shield or goggles, gown, and gloves
- Consider use of an aerosol reduction cover developed at the Washington University in St Louis
 - See https://docs.google.com/document/u/o/d/1gHpmqhzd-Ef54K1RL5_-R5vgO3NMkPEpb1DJTeRfFHc/mobilebasic

Intubated Patients

- Transporters should wear full Personal Protective Equipment (PPE)
 - N95 respirator, face shield or goggles, gown, and gloves
- Consider use of an aerosol reduction cover developed at the Washington University in St Louis
 - See https://docs.google.com/document/u/o/d/1gHpmqhzd-Ef54K1RL5_-R5vgO3NMkPEpb1DJTeRfFHc/mobilebasic

BEDSIDE PROCEDURES

Intubation

- Physician and respiratory therapist only people present in negative pressure room
 - Should wear full PPE: N95 respirator, face shield or goggles, gown, and gloves
 - Most experienced clinician should perform intubation
- Rapid sequence intubation using induction agent and neuromuscular blocker
 - Assure full paralysis prior to intubation
 - Preoxygenate with nonrebreather mask
 - Avoid bag valve mask ventilation prior to intubation
 - Video laryngoscopy preferred over direct laryngoscopy
 - Use viral filter in-line with ventilator
- Wait 45 minutes before post-intubation CXR



Vascular Access

- Bundle procedures if possible
- Place arterial line and central line immediately after intubation

Procedures to Avoid if Possible

- Bronchoscopy
- Sputum induction
- Minimize use of formal transthoracic echocardiograms
 - Operator performed point-of-care ultrasound (POCUS) to help guide management

Bronchodilators

- Use MDIs vs Nebulized medications in non-intubated patients
- In-line nebulized medications can be used in intubated patients

CONSULTATIONS

- Tele consults should be performed as much as possible
- Minimize in-person exams to preserve PPE and minimize viral transmission

IMAGING

- Minimize imaging unless the results would absolutely change management
- Usually no need for daily CXR
- If imaging essential, a bedside modality (e.g. ultrasound or x-ray) is preferred over CT scan or MRI or nuclear medicine to minimize patient transportation

LABS

Admission Labs

- EKG, CBCD, CMP, CRP, CK, D-Dimer, Tnl, Ferritin, LDH, NT-pro-BNP, PT, PTT, Flu swab (Nov-Apr)

Daily Labs for Severe Cases

- CBCD, CMP, Mag, CK, Triglyceride (if on propofol)

Clinical Worsening

- CBCD, CMP, Procalcitonin, LDH, Ferritin, CRP, CK, DIC panel

MEDICATIONS

- Consult ID specialist regarding initiation of anti-COVID19 medications
 - Hydroxychloroquine, azithromycin, lopinavir-ritonavir, remdesivir or tocilizumab
- Recommend empiric antibiotics ceftriaxone (discontinue after 48 hours if cultures negative) and azithromycin x 5 days
- Avoid NSAIDS
- Consider methylprednisolone 40-60 mg/day or dexamethasone 10 mg daily for all intubated patients
 - Especially beneficial for the “inflammatory hypoxemic” patients in cytokine storm

FLUIDS

- Conservative fluids (“keep patients dry”)
- Target CVP<8

POOR PROGNOSTIC FACTORS

| | | | |
|-----------------------|------------------------|-------------------|---------------------|
| Age>65 | Chronic lung disease | Immunocompromised | Ferritin>300 mg/dL |
| Lymphopenia (ALC<0.8) | Chronic kidney disease | Use of biologics | D-dimer>1,000 mg/dL |
| Obesity | Cirrhosis | CRP>10 mg/dL | Elevated Tnl |
| Chronic heart disease | Cancer | CK>400 IU/L | LDH>245 U/L |

SHOCK MANAGEMENT

- Operator performed POCUS to determine cardiogenic vs distributive shock

Cardiogenic shock

- Depressed LVEF by POCUS, elevated NT-pro-BNP, ScvO₂<60%
- Norepinephrine for MAP>65
- Diuretics if CVP>14
- Dobutamine if MAP>65 and ScvO₂<60%
- Lactate and ScvO₂ q4-6h

Distributive shock

- Hyperdynamic precordium by POCUS, normal NT-pro-BNP, ScvO₂>65%
- 20-30 ml/kg crystalloid
- Empiric antibiotics
- ID consult for consideration of COVID-specific antimicrobials
- Cultures – blood x 2, urine, sputum
- Source control
- Vasopressors: 1st-line – norepinephrine; 2nd-line – vasopressin; 3rd-line – epinephrine; 4th-line angiotensin II

RESPIRATORY FAILURE

Options Acute Hypoxemic Respiratory Failure

- High-flow nasal cannula (HFNC) in negative pressure room
 - Particularly useful for the “Happy Hypoxemic” patients
- Non-invasive positive pressure ventilation (NIPPV) in negative pressure room
- Awake prone positioning
- Consider intubation
 - Clinical worsening despite HFNC or NIPPV in “Happy Hypoxemic” patient
 - Early intubation reasonable for $SpO_2 < 88\%$ despite 6 L/min NC in “Inflammatory Hypoxemic” patient that appears to be in cytokine storm
 - Push dose pressors (phenylephrine or epinephrine) available and consider hanging norepinephrine drip since patients have a high chance of peri-intubation hypotension

Mechanical Ventilation

- Two phenotypes of ARDS in COVID19 infections
- High compliance, Low elastance ARDS (L type)
 - $V_t = 8-9$ mL/kg Predicted Body Weight, $FiO_2 = 100\%$, PEEP 8-10
 - Minimize PEEP to avoid ventilator-induced lung injury
- Low compliance, High elastance ARDS (H type)
 - $V_t = 6$ mL/kg Predicted Body Weight, $FiO_2 = 100\%$, needs higher PEEP
- Early prone ventilation for $P/F < 150$. Goal 16 hours per day prone
- Keep plateau pressure < 30
- Analgesia and sedation with high-dose fentanyl and low-dose propofol (10-30 mcg/kg/min) to maintain a resp rate ≤ 20

PROPHYLAXIS

- DVT prophylaxis with heparin or enoxaparin if platelets $> 30K$

CODE BLUE

- Early code status discussions at time of admission
- Triage allocation team may be involved if scarce resources available
- Treating physician has the authority to **NOT** initiate CPR if he/she deems that the patient's condition is medically futile and CPR would unnecessarily endanger the healthcare staff
- Minimize providers in room
 - Airway physician, two for CPR, and med/defibrillation nurse
 - All providers must don full PPE prior to entering room
- Consider intubation prior to CPR to minimize virus aerosolization

SOURCES

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