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Critical Care Master Plan

1. Emergency Departments
   - Patient is identified by team as suspect- testing is considered
     o Consider having discussion around goals of care for those at highest risk for mortality
     o Titrate O2 needs up to High flow O2 only by nasal cannula up to 15L
       ▪ If clinical presentation suggests patient may benefit from NIV, short term BiPap in Airborne precautions (negative pressure room preferred)
       ▪ If declining respiratory status occurs
         - Intubation
           o Intubation performed by ER physician
           o Anesthesia acts as back up
         - Prefer using glidescope
           o Protective box/shield when available
         - MDI inhalers as per ER protocol
       ▪ Move to COVID unit rule out unit upon admission
       ▪ Consults
         - Infectious disease/Cardiology/Stewardship pharmacist if patient is rule out if COVID-19 treatment is warranted
         - Pulmonology/Critical Care if needed or declining respiratory status
2. Inpatient COVID-19 Units (Rule out and positive)
   - Goals of care discussion at this point if not previously performed
   - PPE
     o Per current standards on Clinician Portal
   - Monitoring
     o If respiratory status is declining and pt needs intubated
       ▪ Anesthesia first line
       ▪ Pulmonary/trauma
       ▪ Other MD comfortable with intubation
       ▪ Glidescope preferred
       ▪ Limit bag-mask ventilation (BVM)
         - If using BVM, must be done with (2) people – one sealing the mask, one delivering breaths
       ▪ For intubation- RSI with glidescope
         - Pharmacy to restock after use

COVID critical care schedule

- Implemented when first critical (rapidly) declining/ intubated with positive patient
- One team for Herrin
- One team for Carbondale
- Team lead- Pulmonary physician on call and first
    - 1st Replacement anesthesia/trauma
- If lead physician gets overwhelmed/ large number of positive/critical patients- next line of help
    a. Dr. Hornik (when on) at MHC
    b. Anesthesia provider on call
        i. Dr. Bajwa from anesthesia is critical care trained and has offered to come on call if one of the providers is sick
    c. If these teams are unavailable, next used is trauma- followed by cardiology (need schedule)
- Liaison for knowing next physician to help is Ginger Funk - can be reached via perfect serve
- Anesthesia will be helping with most of the intubation on the floor

Author: Dr. Bambra

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Initiation of Mechanical Ventilation: COVID-19 Clinical Practice Guideline

- Should be performed by anesthesia team, who can facilitate appropriate ventilator settings
- Use "Mechanical Ventilation with Sedation" order set.
- Avoid or at least limit bag mask ventilation if possible during intubation.
- Video laryngoscope (Glidescope) preferred
- PPE: Airborne precautions
- Pulmonary and critical consult for ventilator management if attending is not intensivist
- Initial respiratory rate 16-24, higher if acidosis present.
- Initial PEEP based on BMI
- Initial FiO2: -100% on intubation then rapidly wean to SpO2 92-96%
- Avoid portable CXR to confirm endotracheal tube location unless indicated for other clinical reasons
- Within 30 minutes of intubation, obtain an ABG (preferred) or a VBG and adjust ventilation and oxygenation as needed

Author: Dr. Bambra

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Management of Hypoxemia: COVID-19 Clinical Practice Guideline

- Supplemental Oxygen:
    - Humidified nasal cannula (NC) 1 to 8 LPM for target SpO2 92-96%
    - Please consider Proning of Non-Intubated SOP
    - If a patient requires > 8 LPM NC, initiate dry Venturi mask (non-humidified to reduce aerosolization risk)
    - Start Venturi mask /nasal cannula at 9 LPM and FiO2 28%
    - Up-titrate FiO2 to goal SpO2 is >/= 90% (not exceeding FiO2 35%)
    - If FiO2 > 35% then increase flow to 15 LPM maximum- notify ICU/ anesthesia to evaluate for early intubation
    - Limit high-flow nasal cannula (HFNC) and non-invasive positive pressure ventilation (NIPPV; i.e. CPAP/BiPAP) for ARDS.
    - Intubation: recommend early consultation with anesthesia for possible intubation in the setting of rapidly progressive hypoxia.

Author: Dr. Bambra

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Managing Oxygenation: COVID-19 Clinical Practice Guideline

- Minimizing oxygen toxicity
    - PEEP and Fi02 drive oxygenation
    - The goal is to deliver a partial pressure of oxygen to perfuse tissues (PaO2 > 75, Sp02 >92%) while limiting lung injury from high distending pressures (Ppl< 30) and hyperoxia (FiO2 < 75, SpO2 < 96%)
    - Lower limit goals PaO2 > 55 and SpO2 >88%
    - Adjust Fi02 after optimizing PEEP
    - Goal FiO2 <75%; if FiO2 > 75%, patient requires ventilator optimization. Consult Pulmonology/Critical Care if attending is not an intensivist
    - It is reasonable to put a desaturating patient temporarily on 100% Fi02, but remember to wean oxygen as rapidly as possible

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Managing Ventilation: COVID-19 Clinical Practice Guideline

- Follow ARDSnet ventilation card where possible
- Tidal volumes should be 4-6 ml/kg using IBW to minimize volumes (and thus ventilator injury)
- Minute ventilation (respiratory rate x tidal volume) typically drives pH and PCO2:
    - Titrate ventilatory parameters to pH, not PCO2
    - To achieve low tidal volumes, we tolerate hypercapnia (functionally no limitation unless clinical sequelae) and acidemia (pH > 7.2).
    - Because tidal volumes are low, the respiratory rate often has to be high to accommodate; typical RR is 20-35 breaths/minute.

- pH goal is normally 7.25-7.45:
    - If pH > 7.45, decrease respiratory rate
    - If pH 7.15-7.30, then increase respiratory rate until pH > 7.30, or PaCO2 < 25 (maximum RR= 35 breaths/minute)
    - If pH < 7.15, then increase respiratory rate to 35 breaths/minute
    - If pH still < 7.15, then perform the following:
        - Tidal volume may be increased by 1 mL/kg until pH > 7.15 (until plateau pressure reaches 30 cm H2O or tidal volume reaches 8 ml/kg)
        - Deep sedation advancing to RASS -5 if needed
        - If no improvement, initiate continuous paralysis
        - If still no improvement, initiate prone ventilation (may improve V/Q matching and better ventilation)

Author: Dr. Bambra

Peep and Mechanics: COVID-19 Clinical Practice Guideline

- Initiate PEEP based on BMI
- If there are changes in clinical parameters (e.g., hypoxia), titrate PEEP according to ARDSnet Lower PEEP table (below).
- Current recommendations are to use ARDSnet Lower PEEP table. This table is selected primarily to avoid initial harm to patients with poor lung compliance.
- After best PEEP determined, obtain respiratory mechanics plateau pressure (with goal <30)
- Obtain arterial blood gas
- Goal pH 7.25 to 7.45
- Calculate P/F ratio from initial post-intubation ABG

Author: Dr. Bambra

PEEP Management: COVID-19 Clinical Practice Guideline

- Initial PEEP should be set as explained in PEEP and Mechanics ARDSnet protocol on Clinician Portal
- If patient is hypoxic with Tidal Volume = 6 ml/kg and ideal PEEP from PV tool, perform the following:
  - Deep sedation, advancing to RASS -5 if needed; if no improvement then:
  - Initiate continuous paralysis (cisatracurium bolus 0.2mg/kg followed by infusion at 0-5 mcg/kg/min titrated to patient-ventilator synchrony); if no improvement then:
  - Initiate prone ventilation (see Proning SOP on Clinician Portal); high consideration for use early in severe ARDS (<36 hours from ARDS onset, start discussion of proning when P:F< 150, prone within 12 hours of FiO2 > 75%)

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Targeting Sedation for Ventilator Synchrony: COVID-19 Clinical Practice Guideline

- Initially target RASS -2 to -3
- Maintain deep sedation immediately post-intubation while paralyzed (assume 60 minutes for Rocuronium, 10 minutes for succinylcholine)
- Preferred initial sedation regimen:
    - Intermittent sedation preferred for initial sedation modality
    - Fentanyl (boluses +/- infusion) + propofol: target analgesia first while decreasing sedative requirements
    - Measure triglycerides and lipase every third day on propofol or earlier if other reasons for hypertriglyceridemia
    - Adjunct agent: Midazolam
    - Use dexmedetomidine when nearing extubation

- Target ventilator synchrony: Ventilator-induced lung injury (VILI) is common in patients who are not synchronous with the ventilator and can cause significant lasting damage
- Once at target RASS after paralytics have worn off, assess patient synchrony with the ventilator (e.g., signs of breath stacking, double triggering, other ventilator alarms)
- Titrate sedatives/analgesics to ventilator synchrony allowing for deeper RASS.
- If patient remains dyssynchronous despite deep sedation (RASS -5), initiate continuous paralytics (ensure BIS 40 to 60 prior to initiating and during paralysis)

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