UPENN TREATMENT GUIDE FOR CRITICALLY ILL PATIENTS WITH COVID-19

Department of Anesthesiology and Critical Care

PRESENTATION

NOTABLE SX

- ~65-80% Cough
- ~15% URI Sx
- ~45% Febrile initially
- ~10% GI Sx
- Acute worsening after early mild sx

HIGH RISK FOR SEVERE DZ

- Age > 55 YO
- Comorbid diseases:
  - Pulm, cardiac, renal
  - DM, HTN
  - Immunocompromise

LABS INDICATING SEVERE DZ

- D-dimer > 1000
- CPK >2X ULN
- CRP>100, LDH > 245
- Troponin elevated/uptrending
- Abs lymphocyte count < 0.8
- Ferritin >300

DIAGNOSTICS

DAILY LABS

- CBC WITH DIFF (TREND LYMPHS)
- CMP
- CPK

RISK STRATIFICATION Q2-3 DAY PRN

- D-dimer
- Ferritin/CRP/ESR
- LDH
- EKG

ONE TIME TEST FOR ALL PATIENTS

- HBV, HCV, HIV TESTING
- Influenza A/B, RSV
- Additional respiratory virus panel per ID
- Tracheal aspirate if indicated
- SARS-CoV2 (if not already sent)

DIAGNOSTICS TYPICALLY SEEN IN COVID19

- LABS: leukopenia/lymphopenia, elevated BUN/SCR, elevated AST/ALT/Tbili
- CXR: hazy bilateral peripheral opacities
- CT: ground glass opacities, consolidation
- Lung POCUS: numerous B lines, pleural line thickening, consolidation

RESPIRATORY FAILURE

Consider early intubation in ICU in Negative Pressure Room

Warning signs: increasing FIO2, decreasing SaO2, worsening CXR

LUNG PROTECTIVE VENTILATION

- Vt 4-6 mL/kg predicted body weight
- Plateau pressure < 30
- Driving pressure (Pplat-PEEP) < 15
- Target Sp02 90-96%, PaO2 > 60
- Starting PEEP 10-12

CONSERVATIVE FLUID STRATEGY

- Diuresis as tolerated by hemodynamics/creat
- No maintenance fluids

PEEP TITRATION

Best PEEP by tidal compliance or ARDSnet low PEEP table

PRONE

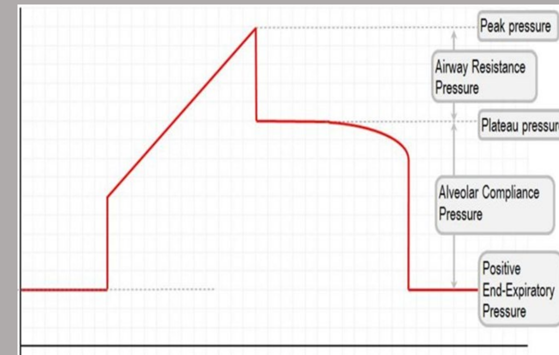
Early consideration if continuing hypoxemia or elevated airway pressures

ADDITIONAL THERAPIES

- Paralytics for vent dysnchrony
- Consider inhaled NO if available

ECMO CONSULT (CALL ICU ATTG)

- PaO2 < 80 on FIO2 100% despite proning, hemodynamic instability X 12 hours
- Age < 65
- BMI < 45
- Smoking hx < 30 ppy



VENTILATOR METRICS

Tidal Volume (Vt): The amount of gas the ventilator delivers

FiO_2: Fraction of inspired oxygen. The percentage of oxygen .you set.

PEEP: Positive end expiratory pressure. The ventilator will hold this set pressure once expiratory flow stops.

Plateau pressure (Pplat): The pressure measured during an inspiratory pause. This is most reflective of the distending force in the lung by the delivered VT. Above 30 cm H2O increases risk of barotrauma.

Compliance (alveolar compliance): Describes the degree of flexibility of the lungs and thoracic cavity. A more compliant lung can tolerate higher volumes without dangerous increases in pressure. COVID-19 lungs generally have normal compliance.

Peak pressure: The pressure measured in the airways. This is not delivered to the lung.

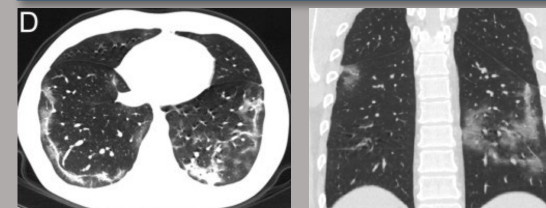
MONITORING

EKG

Pulse oximetry

Non-invasive BP versus arterial line

Central line if on requiring pressors or TPN



HEMODYNAMICS

- Norepinephrine first choice pressor
- If worsening:
  - Consider myocarditis/cardiogenic shock
  - Obtain POCUS echo, EKG, trop, CVO2 (formal TTE if high concern)

CHANGE TO USUAL CARE

- NO ROUTINE DAILY CXR
- MINIMIZE staff contact in room
- HIGH THRESHOLD for bronchoscopy
- HIGH THRESHOLD for travel (to CT, etc)
- BUNDLE bedside procedures
- Appropriate guideline-based isolation for aerosol generating procedures:
  - Bronchoscopy
  - Intubation/extubation (see guidelines)
  - AVOID nebs, prefer MDIs

USUAL ICU CARE

- Sedation vacation daily / assess RASS goals
- Nutrition – start/continue TEN if tolerated
- GI ppx – ranitidine or lansoprazole
- DVT ppx – enoxaparin
- Bowel regimen – daily
- Glycemic control – q6 hours
- POCUS when needed
- Bundle care procedures
- ABCDE bundle

THERAPEUTICS

ALL ICU ADMISSIONS

- Low threshold for empiric abx
- WITH ID GUIDANCE
  - Consider hydroxychloroquine
  - Remdesivir through clinical trials

IMMUNE MODULATION

- Immunomodulatory therapies only in consultation with ID and critical care attending
- NO STEROIDS for resp failure, consider only in s/o additional indications (COPD, asthma) including possibly septic shock