

Drawing Lines for Critical Care: Does Your Patient Need an ICU?

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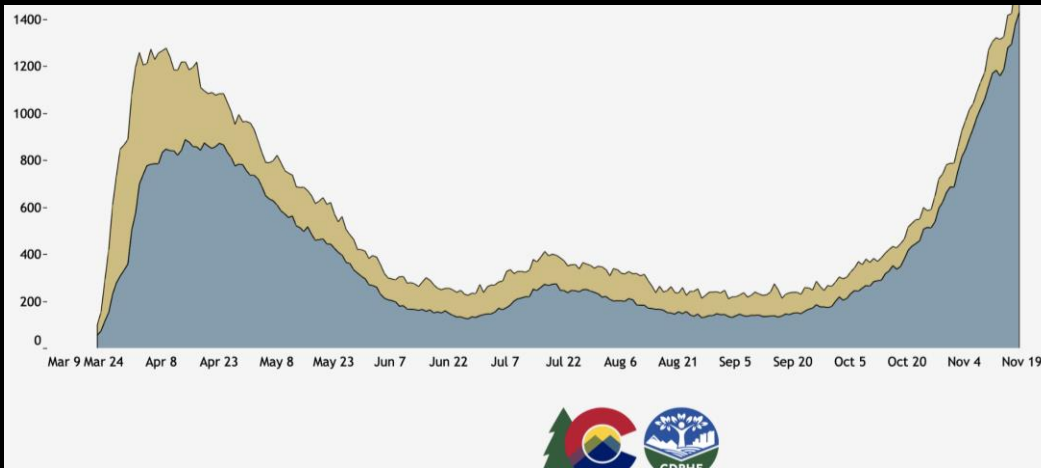
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COVID Critical Care Updates 11-
20-20

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ICU criteria in COVID 19 patients

- Triage from ED
- Floor to ICU transfer
- ICU to Floor transfer
- Flexing ICU oxygen criteria due to Capacity issues
 - Stable or improving oxygen needs
 - Minimal work of breathing
 - NIV vs. HHF vs HFNC
- Non pulmonary organ failures (AKI, encephalopathy, shock)

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When to intubate patients with COVID PNA

- Intubation is not therapeutic
- WOB, inadequate ventilation, inadequate oxygenation, Encephalopathy
- Tempo of change
- Don't create a dangerous peri-intubation scenario
 - Self-proning
 - NIPPV-PEEP dependency
- Discuss HFNC, Mask ventilation, HHF, NIPPV, Helmet NIPPV

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Labs and imaging studies

Acute phase reactants

D-dimer

Procalcitonin

Troponin

Chest CT

Daily CXR

Daily labs (BMP, CBC, CMP?)

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Current interventions and treatments


Protocolized Evidence-based ARDS management

- Protocolized management for lung protective ventilation
- Fluid protocol
- Proning
- Neuromuscular blockade protocol
- Ventilator asynchrony tool
- Refractory hypoxemia
 - Alternative modes of ventilation
 - Discuss iNO, Epoprostenol
 - Discuss ECMO


Evidence-based Multidisc ICU management

- Fluids, Sedation, NMB
- Nutrition
- ABCDEF bundle
- trach plan
- Have plan to reduce nursing burden with crisis staffing ratios

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<p>DEFINITION</p> <ul style="list-style-type: none"> • $P_aO_2:F_iO_2 < 300$; < 150 Mod/Severe • Bilateral opacities (CT or CXR) • Not fully explained by cardiogenic pulmonary edema • Occurring within 7 days of onset of a known risk factor: <ul style="list-style-type: none"> ✓ Sepsis ✓ Pneumonia (including COVID) ✓ Aspiration ✓ Trauma ✓ Transfusion ✓ Pancreatitis 	<p style="text-align: center;">ARDS Guideline</p> 	<p>INITIAL TREATMENT</p> <ul style="list-style-type: none"> • Ensure reliable IV access (two peripheral IVs, PICC, or central line) • Consider early intubation in patients who: <ul style="list-style-type: none"> ✓ Have rapid escalation in O2 needs ✓ Develop respiratory distress ✓ Have mental status changes ✓ Have additional organ failures • Utilize intubation checklist when intubation is necessary • Preferential use of <u>etomidate</u> or ketamine as induction agent • Have vasopressors available at the time of intubation for all patients • Determine height prior to intubation
<p>EVALUATION</p> <p>Initial</p> <ul style="list-style-type: none"> • ABG, CBC, CMP, HIV test • Chest x-ray or chest CT • Consider echocardiogram • Consider testing for respiratory viruses (influenza, COVID-19) <p>Daily labs</p> <ul style="list-style-type: none"> • CBC, BMP, Mg, Phos, ABG • Daily CXR NOT RECOMMENDED • CXR for clinical change (fever, increased O2 requirement) 		<p>COVID</p> <ul style="list-style-type: none"> • <u>Remdesivir</u> • Dexamethasone 6 mg IV/PO daily • Convalescent plasma • Higher dose DVT prophylaxis (see COVID order set)

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<p>MANAGEMENT OF ARDS</p> <p>All patients with ARDS USE ARDS ORDER SET</p> <p>LUNG PROTECTIVE VENTILATION</p> <ul style="list-style-type: none"> • Volume targeted ventilation • 4-6 cc/kg PBW (use PBW card) • Plateau pressure < 30 cm H₂O • Driving pressure (P_{plat}-PEEP) < 15 • Goal SpO₂ 92-98%; P_aO_2 65-80 <p style="text-align: center;">↓</p> <p>FLUID CONSERVATIVE STRATEGY</p> <ul style="list-style-type: none"> • No maintenance IV fluids • Trophic tube feeds • Diuresis as tolerated; Lasix drip with net TBB negative UOP goals • Practice extreme caution if patient on vasopressors <p>Patients with Moderate to Severe ARDS ($P_aO_2:F_iO_2 \leq 150$)</p> <p>Preferentially use High PEEP Ladder</p> <p style="text-align: center;">↓</p> <p>PRONE POSITIONING</p> <ul style="list-style-type: none"> • When FiO₂ ≥ 0.6, PEEP ≥ 10 • Early (within first 24 hours) • Utilize ≥ 16 hours daily • Greatest mortality benefit of all interventions (18% ARR; NNT=5.5) 	<p style="text-align: center;">ARDS Guideline</p> 	<p>Refractory Hypoxemia</p> <p>NEUROMUSCULAR BLOCKADE</p> <ul style="list-style-type: none"> • Boluses first, Infusion if persistent • No mortality benefit, increases neuromuscular weakness <p>ALTERNATIVE VENTILATION MODES</p> <ul style="list-style-type: none"> • (Bilevel, IRV, APRV, PC) have not demonstrated outcome benefit • Oxygenation may improve but, Higher risk of harm from VILI <p>INHALED NITRIC OXIDE</p> <ul style="list-style-type: none"> • Consider only if severe PH coexist • Oxygenation benefit short lived • No outcome benefit, expensive <p>ECMO</p> <ul style="list-style-type: none"> • Selected patients: young, p/f<100, rapid progression, min baseline co-morbidity AND bleeding risk <p>ECMO TEAM AT PORTER Available 24/7 through <u>Centura Connect</u></p>
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PATIENTS WHO ARE IMPROVING

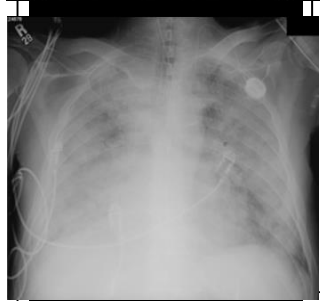
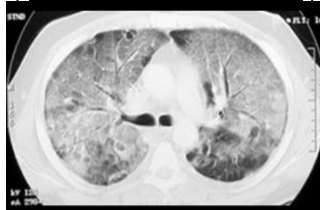
- Perform daily SAT/SBT if PEEP ≤ 8 AND FIO₂ $\leq 50\%$
- Utilize ABCDEF BUNDLE

Prone ventilation

- Reasonable to avoid daily supine. This decision should be made based on individual risk vs. benefit
- Increase PEEP by 3-5 (P_{plat} <30) prior to return to the supine position in order to prevent de-recruitment.
- If P:F >150 at end of 4h period in supine on PEEP ≤ 10 cmH₂O, prone ventilation may be discontinued

Different modes of ventilation

- Caution should be utilized if considering alternative modes like APRV, Bilevel, IRV and PC ventilation
- Though improvements in oxygenation may be observed, outcome benefits have not been demonstrated and ventilator induced lung injury through uncontrolled effects on transpulmonary Pressures (APRV) and uncontrolled changes in Vt and ventilation (PC/Bilevel) may occur

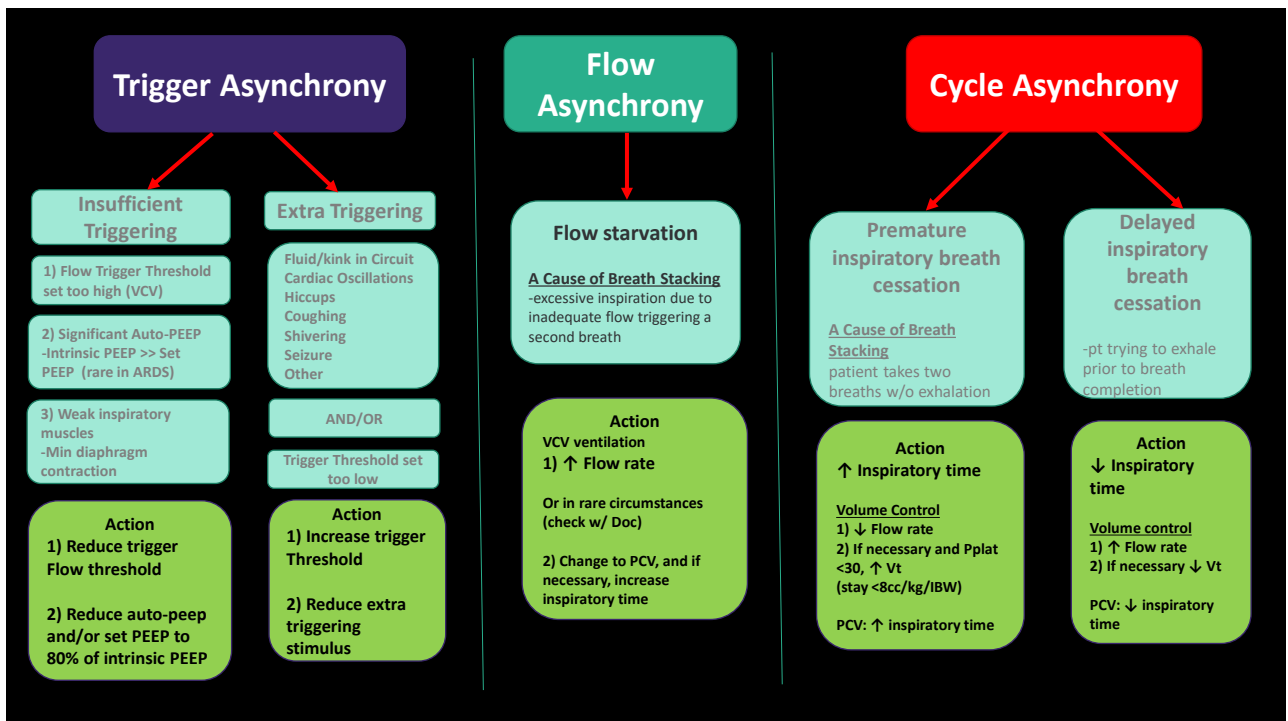
ARDS Guideline**Rationale for trophic feeding**

- Recommend trophic feeds for first 6 days after intubation (Complication rates higher w/ full calorie including aspiration and diarrhea)
- Consider 8-10 Kcal/kg/day, increasing calories toward goal after 1 week. (Eden-JAMA 2012, PermiT-Arabi, NEJM 2015, Cochrane 2018)
- Consider advancing to high calorie goal earlier if patient was severely malnourished prior to ARDS

Addressing ventilator asynchrony

- Assess for 3 most common etiologies
- Use asynchrony algorithm to determine type and solution
- If unsuccessful use intermittent NMB
- If >3 boluses of NMB in <6h, start NMB continuous infusion
- Utilize NMB order set (also embedded in ARDS order set)

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Drug therapy

- Dexamethasone
- Remdesivir
- Convalescent Plasma
- Empiric anti-bacterials
- Antithrombotics
- Statins
- Drugs coming or here (Bamlanivimab)
 - Monoclonal Antibodies
 - Janus kinase inhibitor-baricitinib
 - Hyperimmune globulin against SAR-CoV2 virus

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Immunomodulators

- Use in clinical trials only
- IL-6 inhibitors
 - Tocilizumab/Sarlumab
- 2500+ clinical trials ongoing
 - Pitfalls of use
 - Trouble with Cytokine Storm paradigm
 - Philosophical dilemmas for physicians
- Vaccines

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Recognition and appropriate de-escalation of critical care for COVID-19 patients

- Surge plans: Ventilator scarcity
- Tracheostomy
- Discontinuing isolation on vented patients
- Pay close attention to secondary complications
 - VTE, Nosocomial infections
 - Post-COVID organizing pneumonia
- **Family meetings:** set expectation,
 - clear goals of care beyond DNR/DNI
 - give public health guidance

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Best Sources of truth

- U Michigan protocols: <http://www.med.umich.edu/asp/>
- University of Washington protocols: <https://covid-19.uwmedicine.org/pages/default>
- U Nebraska protocols: <https://www.nebraskamed.com/for-providers/covid19>
- Brigham's guidelines: <https://covidprotocols.org>
- MGH guidelines: <https://www.massgeneral.org/news/coronavirus/treatment-guidances>
- FLARE: <https://www.massgeneral.org/news/coronavirus/treatment-guidance/fast-literature-updates>
- Great for clinical care questions and little pearls: <https://emcrit.org/ibcc/COVID19/>

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Evaluation





Colorado Hospital Association

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