COVID-19 Considerations for Ambulatory Care

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Chair, ASA Committee on Critical Care Medicine
Disclosures

• No relevant disclosures
Pathophysiology

Transmission

Spike protein

ACE2 Receptor

High relative receptor affinity

Alveolar pneumocytes
Stratified epithelial cells
Absorptive enterocytes

Clinical Course

Prone position

Indications
- ↓ mortality (33% → 16%)

Logistics

Risks
Hypoxia Therapies

Always ↓ ventilator induced lung injury (VILI)

**PEEP**

Recruitment maneuvers

Prone (deep sedation) +/- NMB

Nitric oxide??

ECMO (V-V or V-A)
Transpulmonary Pressure: PTP
Critical Care Management Issues

• Sedation
• CV stability, access
• P-SILI (lung injury) prevention
• Nutrition
• AKI
• Nosocomial infection
• Methylprednisolone
• Mobilization
ICU Complications

- Neurological- 50% neuropathy
- Psychiatric- 1/3 PTSD, MDD
- ADLs- Early PT is key
- Cognitive- 75% ICU discharges
- Ongoing healthcare use
- Anticoagulation…
- Renal dysfunction…
- Adrenal insufficiency…
Pre-existing personality traits (e.g., anxiety, pessimism) and psychiatric morbidity (e.g., depression) → Anxiety/Pain → Delirium/delusional memories → Hypoxemia → Hypoglycemia → Sedation → PTSD → Cognitive impairment → Depression → Quality of Life → Other patient level factors that modify the neuro-psychiatric outcomes (e.g., age, sex, pre-ICU intelligence)
Chronic effects of prolonged ICU stay

- CCI 8% of ICU admissions in the US
  - Prolonged mechanical ventilation (72%) and sepsis (64%)
  - Chronic co-morbid conditions in 56% of CCI patients

- Fatigue common following ARDS
- PTSD

- Unclear relationship to OR respiratory function
<table>
<thead>
<tr>
<th>Date in 2020 That EUA Was Issued*</th>
<th>Manufacturer</th>
<th>Test Name</th>
<th>Test Type</th>
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<tbody>
<tr>
<td>3 April</td>
<td>Luminex Corporation</td>
<td>ARIES SARS-CoV-2 Assay</td>
<td>NAAT</td>
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<td>3 April</td>
<td>Co-Diagnostics</td>
<td>Logix Smart Coronavirus Disease 2019 (COVID-19) Kit</td>
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<td>ScientCell Research Laboratories</td>
<td>SARS-CoV-2 Coronavirus Real-time RT-PCR (RT-qPCR) Detection Kit</td>
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<td>2 April</td>
<td>Becton, Dickinson and Company (BD)</td>
<td>BioGX SARS-CoV-2 Reagents for BD MAX System</td>
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<tr>
<td>1 April</td>
<td>Ipsun Diagnostics</td>
<td>COV-19 IDx assay</td>
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<td>1 April</td>
<td>Cellex</td>
<td>qSARS-CoV-2 IgG/IgM Rapid Test</td>
<td>Lateral flow chromatographic immunoassay</td>
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<td>NeuMoDx Molecular</td>
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<td>30 March</td>
<td>QIAGEN GmbH</td>
<td>QIAstat-Dx Respiratory SARS-CoV-2 Panel</td>
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<td>27 March</td>
<td>Luminex Molecular Diagnostics</td>
<td>NxTAG CoV Extended Panel Assay</td>
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<td>26 March</td>
<td>BGI Genomics</td>
<td>Real-Time Fluorescent RT-PCR Kit for Detecting SARS-2019-nCoV</td>
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<td>25 March</td>
<td>Avellino Lab USA</td>
<td>AvellinoCoV2 test</td>
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<td>24 March</td>
<td>PerkinElmer</td>
<td>PerkinElmer New Coronavirus Nucleic Acid Detection Kit</td>
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<td>20 March</td>
<td>Primerdesign</td>
<td>COVID-19 genesig Real-Time PCR assay</td>
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<td>19 March</td>
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<td>ePlex SARS-CoV-2 Test</td>
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<td>DiaSorin Molecular</td>
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<td>18 March</td>
<td>Abbott Molecular</td>
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<td>Quest Diagnostics Infectious Disease</td>
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<td>Thermo Fisher Scientific</td>
<td>TaqPath COVID-19 Combo Kit</td>
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<td>12 March</td>
<td>Roche Molecular Systems</td>
<td>cobas SARS-CoV-2 Test</td>
<td>NAAT</td>
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<td>29 February</td>
<td>Wadsworth Center, New York State Department of Public Health (CDC)</td>
<td>New York SARS-CoV-2 Real-time Reverse Transcriptase (RT)-PCR Diagnostic Panel</td>
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<tr>
<td>4 February</td>
<td>CDC</td>
<td>2019-nCoV Real-Time RT-PCR Diagnostic Panel</td>
<td>NAAT</td>
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Currently FDA authorized for use outside the clinical laboratory environment:

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<tr>
<td>23 March</td>
<td>Mesa Biotech</td>
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<td>Cepheid</td>
<td>Xpert Xpress SARS-CoV-2 test</td>
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CDC = Centers for Disease Control and Prevention; EUA = Emergency Use Authorization; FDA = U.S. Food and Drug Administration; NAAT = nucleic acid amplification test; SARS-CoV-2 = severe acute respiratory syndrome-related coronavirus-2.

* Dates of EUA are indicated to highlight the speed with which the diagnostic landscape is changing.
† Performed on instruments for which other assays from the same manufacturer have been FDA authorized for use outside the clinical laboratory environment, indicating the potential for a similar designation for SARS-CoV-2 assays in the future.
Local hospital testing example

- 98.7% concordance between Abbott and RTPCR (Labcorp)
- 72% sensitivity, 97% specificity
- 84% PPV, 94% NPV
- Swabs & Tracheal Aspirates 100% concordant
- Fever (> 100.4 °F), sore throat, cough, dyspnea, diarrhea, anosmia, dysgeusia, myalgia, diffuse pulmonary infiltrates, flu-like illness
ASCs

• Vector control

• 15% UGI, 15% laparoscopy

• Airway management

• Regional anesthesia

• Steroid administration
Elective Surgery Outcomes

• Lei et al, January 1- February 5, 2020
• 34 patients, asymptomatic when case started
• 100% PNA, 44.1% (15) ICU admission, 20.5% (7) deaths
  • Pancreatoduodenectomy
  • Esophagectomy
  • Thoracoscopic lobectomy x 2
  • Radical resection of rectal cancer
  • Artificial femoralhead replacement
  • Total hip replacement NA
Pre-operative Considerations

• ACE inhibitors

• NSAIDs

• Immune function (pre/post)

• Prophylaxis?

Summary

• Testing will be key to any ambulatory setting

• Multiorgan failure may have ramifications

• COVID-19 is particularly harmful in the perioperative setting

• Long-term effects under investigation