INFLAMMATORY RESPONSE IN CHILDREN & ADULTS

JUNE 3, 2020
<table>
<thead>
<tr>
<th>WEBINAR SERIES PARTNERS</th>
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<td>American Academy of Clinical Toxicology (AACT)</td>
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<tr>
<td>American Academy of Emergency Medicine (AAEM)</td>
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<td>American Academy of Emergency Nurse Practitioners (AAENP)</td>
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<td>American Association of Poison Control Centers (AAPCC)</td>
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<td>Asia Pacific Association of Medical Toxicologists (APAMT)</td>
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<td>European Association of Poison Centers and Clinical Toxicologists (EAPCCT)</td>
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<td>Middle East &amp; North Africa Clinical Toxicology Association (MENATOX)</td>
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All webinars are recorded and posted to the ACMT website

www.acmt.net/covid19web

Questions?
Write to: info@acmt.net
Q&A will be at end of the Webinar

Please type your questions into the Q&A or Chat function during the webinar and we will get to as many as we can

We monitor all platforms, including YouTube and Facebook, for questions
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- Executive Director, American College of Medical Toxicology (ACMT)

Ziad Kazzi, MD, FACMT
- Board Member, American College of Medical Toxicology (ACMT)
- President, Middle East & North Africa Clinical Toxicology Association (MENATOX)
MULTISYSTEM INFLAMMATORY SYNDROME IN CHILDREN (MIS-C)

MEDICAL AND PUBLIC HEALTH CONSIDERATIONS OF COVID-19

James Schneider, MD, FAAP, FCCP
Chief, Pediatric Critical Care Medicine, Associate Professor of Pediatrics, Cohen Children’s Medical Center, New Hyde Park, NY
JSchneider2@northwell.edu
CONFLICT OF INTEREST

THIS SPEAKER DOES NOT HAVE ANY CONFLICTS OF INTEREST TO DISCLOSE
Recognition of New disease?

• March, 2020- 8 pediatric sites in UK
• Identified 37 cases of febrile, inflammatory illness in children during COVID-19 epidemic
• Clinical features:
  ➢ Febrile
  ➢ Sore throat
  ➢ Headache
  ➢ Rash, conjunctivitis
  ➢ Gastrointestinal symptoms

• Relatively high incidence of critical illness: shock, organ dysfunction
• Evidence of inflammatory syndrome: ferritin, CRP, D-dimer
• Mostly negative for SARS-CoV-2 acute infection
Case definition:

1. A child presenting with persistent fever, inflammation (neutrophilia, elevated CRP and lymphopenia) and evidence of single or multi-organ dysfunction (shock, cardiac, respiratory, renal, gastrointestinal or neurological disorder) with additional features (see listed in Appendix 1). This may include children fulfilling full or partial criteria for Kawasaki disease.

2. Exclusion of any other microbial cause, including bacterial sepsis, staphylococcal or streptococcal shock syndromes, infections associated with myocarditis such as enterovirus (waiting for results of these investigations should not delay seeking expert advice).

3. SARS-CoV-2 PCR testing may be positive or negative

Hyperinflammatory shock in children during COVID-19 pandemic

South Thames Retrieval Service in London, UK, provides paediatric intensive care support and retrieval to 2 million children in South East England. During a period of 10 days in mid-April, 2020, we noted an unprecedented cluster of eight children with hyperinflammatory shock, showing features similar to atypical Kawasaki disease, Kawasaki disease shock syndrome, or toxic shock syndrome (typical number is one or two children per week). This case cluster formed the basis of a national alert. All children were previously fit and well. Six of the children were of Afro-Caribbean descent, and five of the children were boys. All children except one were well above the 75th centile.

An outbreak of severe Kawasaki-like disease at the Italian epicentre of the SARS-CoV-2 epidemic: an observational cohort study

Lucio Verdiani, Angelo Meza, Annalisa Gervasoni, Laura Martelli, Maurizio Ruggeri, Matteo Cuzzifeda, Ezio Bonomini, Lorenzo D’Antiga
Preliminary case definition

Children and adolescents 0–19 years of age with fever ≥3 days

AND two of the following:

- a) Rash or bilateral non-purulent conjunctivitis or muco-cutaneous inflammation signs (oral, hands or feet).
- b) Hypotension or shock.
- c) Features of myocardial dysfunction, pericarditis, valvulitis, or coronary abnormalities (including ECHO findings or elevated Troponin/NT-proBNP).
- d) Evidence of coagulopathy (by PT, PTT, elevated d-Dimers).
- e) Acute gastrointestinal problems (diarrhoea, vomiting, or abdominal pain).

AND

Elevated markers of inflammation such as ESR, C-reactive protein, or procalcitonin.

AND

No other obvious microbial cause of inflammation, including bacterial sepsis, staphylococcal or streptococcal shock syndromes.

AND

Evidence of COVID-19 (RT-PCR, antigen test or serology positive), or likely contact with patients with COVID-19.
Information for Healthcare Providers about Multisystem Inflammatory Syndrome in Children (MIS-C)

Case Definition for MIS-C

Case Definition for Multisystem Inflammatory Syndrome in Children (MIS-C)

- An individual aged <21 years presenting with fever, laboratory evidence of inflammation, and evidence of clinically severe illness requiring hospitalization, with multisystem (≥2) organ involvement (cardiac, renal, respiratory, hematologic, gastrointestinal, dermatologic or neurological); AND
- No alternative plausible diagnoses; AND
- Positive for current or recent SARS-CoV-2 infection by RT-PCR, serology, or antigen test; or COVID-19 exposure within the 4 weeks prior to the onset of symptoms

Additional comments:

- Some individuals may fulfill full or partial criteria for Kawasaki disease but should be reported if they meet the case definition for MIS-C
- Consider MIS-C in any pediatric death with evidence of SARS-CoV-2 infection
COVID-19 Data: North American Pediatric ICUs

547
COVID-19 Positive

30
Confirmed Deaths

9592
Tested*

3567
PICU Days

183
Sites Submitted Data*

North American PICUs can submit data for this dashboard by contacting covid@myvps.org. Data submission is voluntary. Do not submit PHI; no PHI will be displayed on the dashboard. Please refer to the FAQ section for supportive details behind each component including update frequency. The dashboard and data are for information purposes only, not suitable for research publication. The veracity of the data has not been confirmed by VPS.
COVID-19 Clinical Summary II: North American Pediatric ICUs

MIS-C (PIMS-TS)*

Organ Support *

Organ Systems Involved By COVID-19 *

Smoking

Vaping

North American PICUs can submit data for this dashboard by contacting covid@myvps.org. Data submission is voluntary. Do not submit PHI; no PHI will be displayed on the dashboard. Please refer to the FAQ section for supportive details behind each component including update frequency. The dashboard and data are for information purposes only, not suitable for research publication. The veracity of the data has not been confirmed by VPS.
CCMC – MIS-C Treatment Pathway

Arrival to ED with **Fever above 38°C for ≥ 4* days** (*may consider less days with high suspicion) AND One or more of:
- Headache/irritability
- Cough
- Conjunctivitis
- Oral changes
- Gastrointestinal symptoms (includes enteritis on imaging)
- Rash/Swollen hands and feet

Routine Care as a COVID PUI

All Results Normal

Send: CBC/Diff, CMP, CRP, BNP, Troponin, Procalcitonin, Ferritin, D-dimer, Fibrinogen, PT/PTT/INR, LDH, COVID PCR, COVID Serology, Blood culture, RVP
Perform EKG, Obtain risk factors for TB

Abnormal Results

ID Consult
Cardiology Consult
Indications on reverse

Multi-system Inflammatory Syndrome in Children (MIS-C) =
Fever + Inflammation (elevated CRP and/or Ferritin) + One of the following 4 options:

- **Cardiogenic and/or Distributive Shock with Single or Multi-organ Failure.**
  - Fluid refractory hypotension and/or Abnormal Echo
  - And/or AKI
  - And/or Liver injury
  - And/Or Oxygen requirement

- **Classic Kawasaki Disease**
  - At least 4/5 of:
    - Vasculitic rash, palm/sole swelling, non-exudative b/l conjunctivitis, cervical lymphadenopathy (≥ 1.5 cm), red cracked lips and/or oral/pharyngeal mucosa erythema, strawberry tongue

- **Incomplete Kawasaki Disease**
  - At least 2 clinical criteria +
  - At least 3/6 of: Anemia for age, WBC > 15000, Elevated ALT, Plat > 450 or < 100, Albumin < 3, Sterile pyuria > 10 WBC/field OR
  - At least 2 clinical criteria +
  - Abnormal Echo (↓LVEF, CA dilation*, carditis)

- **Category 4 / Observation**
  - Children who do not fit into any category, though have abnormal labs. Observe clinically and trend labs in consultation with Pediatric Infectious Disease (and Pediatric Cardiology, if needed). May admit to floor and re-enter algorithm below as indicated.
Epidemic Curve of Acute-COVID-19 and MIS-C Cases

Week

Cases

0 1 2 3 4 5 6 7 8 9

1° COVID
MIS-C

~5 weeks

N=38

Cohen Children’s Medical Center
Northwell Health
CCMC Experience - Demographics

Patients included: March 9- May 25, 2020

- Patients Included: 56 currently reported to NYS and NYC
- Age: 8.2 yr (Range: 0.6-19.3 yr)
- Gender: 64% male
- Race: Black 27%, Asian 13%, White 13%
- Ethnicity: Hispanic 21%
CCMC Experience- Clinical Characteristics

N=33

- No underlying medical conditions (excluding obesity): 79%
- Normal weight: 45%; Obese: 39%
- Reactive airway disease: 15%
CCMC Experience- Presenting Signs/Sx’s

N=33

- Fever duration prior to presentation: 4 dy (IQR: 3, 5)
- Neurocognitive sx’s: 58%
- GI sx’s: 97%
- Respiratory sx’s: 52%
- Shock: 76%
- Complete Kawasaki disease criteria: 64%
- With shock: 76%
CCMC Experience- Hospital Course

N=56

- PICU Admission: 61%
- LOS: 4 dy (Range: 2-16 dy)
CCMC Experience- Initial Laboratory Results

N = 33

- WBC: 9.1 K/uL
- Absolute lymphocyte count: 0.80
- Lymphopenia: 80%
- Hemoglobin: 11.2 g/dL
- Platelets: 154 K/uL
- C-reactive protein: 206 mg/L
- D-dimer: 1700 ng/mL
- Fibrinogen: 736 mg/dL
- Ferritin: 736 ng/mL
- Lactate dehydrogenase: 320 U/L
- INR: 1.31
- Pro-BNP: 3325 pg/mL
- Troponin T: 31 ng/L
- Procalcitonin: 12.05 ng/mL
- Na: 133 mmol/L
- ALT: 38 U/L
- AST: 54 U/L
- Total bilirubin: 0.5 mg/dL
- Albumin: 3.4 mg/dL
CCMC Experience- SARS-CoV-2 testing

- IgG (+): 86% (42 tested)
- PCR (+): 24% (50 tested)
- IgG (+) and PCR (+): 22%
- IgG (+) and PCR (-): 78%
CCMC Experience- Organ Involvement

- Acute liver injury: 21%
- AKI: 70%
- $O_2$ or Positive Pressure: 52%
- Intubations: 11%
- Intubation days: 3
CCMC Experience- Cardiac involvement

• Any coronary artery abnormalities: 48%
• LAD/RCA findings: Z-score 2-2.49: 9%; Z-score >2.5: 15%; lack of tapering (Z-score <2): 24%
• Any myocardial dysfunction: 58%
  • Mild: 33%
  • Moderate: 24%
  • Severe: 0%
CCMC Experience- Medications Used

- IVIG: 100%
  - 2\textsuperscript{nd} dose: 30%
- Methylprednisolone: 70%
- Aspirin: 88%
- Anakinra: 12%
- Tocilizumab: 9%
- Infliximab: 3%
- Enoxaparin: 42%
CCMC Experience- Disposition

- Mortalities: 0
- Discharged alive: 86% (14% still hospitalized)
- Cardiac function at discharge:
  - Always normal: 42%
  - Depressed then normalized: 18%
  - Mildly depressed: 27%
MIS-C ass. with COVID-19

Differences from Acute COVID-19

- MIS-C previously healthy (except obesity)
- MIS-C patient age includes 0-19 y range vs. acute-COVID-19 in healthy child typically >10 y
- Pneumonia in acute COVID-19; normal CXR in MIS-C: if vent, for heart failure, shock
- Markedly elevated inflammatory markers in MIS-C; markedly elevated in a subset of acute COVID-19
- MIS-C: almost all SARS-CoV-2 sero-positive and few NAA-positive vs. acute COVID-19 – almost all NAA-positive
MIS-C ass. with acute COVID-19

Differences from Kawasaki Disease

- Older age group: median ~8 y (6 mo-17y) vs 2.5 y (KD at CCMC)
- Higher proportion with shock
- Higher inflammatory markers: CRP > 100 mg/L (>10 mg/dl) is routine (also high ferritin, D-dimer)
- Higher proportion with GI symptoms/signs: abdominal pain/tenderness
THANK YOU
PLEASE REACH OUT WITH ANY QUESTIONS

James Schneider, MD, FAAP, FCCP
Chief, Pediatric Critical Care Medicine, Associate Professor of Pediatrics, Cohen Children’s Medical Center, New Hyde Park, NY
JSchneider2@northwell.edu
IMMUNE MODULATORS FOR COVID-19

MEDICAL AND PUBLIC HEALTH CONSIDERATIONS OF COVID-19

Vincent C. Marconi, MD
Professor, Division of Infectious Diseases, Emory University School of Medicine and Department of Global Health Rollins School of Public Health, Atlanta, GA
vcmarco@emory.edu
At the time this presentation was given, I have received support from Lilly, ViiV, Gilead and Bayer.

Vincent Marconi
### Case

**Azithromycin Treatment**

<table>
<thead>
<tr>
<th>Inflammatory Markers</th>
<th>CRP (mg/mL)</th>
<th>&gt;29</th>
<th>342</th>
<th>&gt;240</th>
<th>&gt;240</th>
<th>&lt;19.8</th>
<th>19.8</th>
<th>37.4</th>
<th>80.4</th>
<th>76.6</th>
<th>32.7</th>
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<tr>
<td>ESR (mm/hr)</td>
<td>&gt;100</td>
<td>&gt;100</td>
<td>&gt;100</td>
<td>&gt;100</td>
<td>&gt;100</td>
<td>&gt;100</td>
<td>&gt;100</td>
<td>&gt;100</td>
<td>&gt;100</td>
<td>&gt;100</td>
<td>&gt;100</td>
</tr>
<tr>
<td>D-dimer (mg/L)</td>
<td>&gt;15174</td>
<td>&gt;76022</td>
<td>&gt;35956</td>
<td>&gt;4475</td>
<td>&gt;3826</td>
<td>&gt;4699</td>
<td></td>
<td></td>
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<tr>
<td>IL-6 (pg/mL)</td>
<td>155</td>
<td></td>
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<table>
<thead>
<tr>
<th>Day of hospitalization</th>
<th>2</th>
<th>4</th>
<th>6</th>
<th>8</th>
<th>10</th>
<th>12</th>
<th>14</th>
<th>16</th>
<th>18</th>
<th>20</th>
<th>22</th>
<th>24</th>
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</table>

**Patient 13**

<table>
<thead>
<tr>
<th>Temperature (°C)</th>
<th>34</th>
<th>35</th>
<th>36</th>
<th>37</th>
<th>38</th>
<th>39</th>
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</thead>
<tbody>
<tr>
<td>Fever</td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>Cough</td>
<td></td>
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<td></td>
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<tr>
<td>Dyspnea</td>
<td></td>
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<td></td>
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<tr>
<td>Diarrhea</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>O2 (mmHg)</td>
<td>6</td>
<td>15</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>ICU admission</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

**PEEP (cmH2O)**

| 20 | 18 | 18 | 16 | 16 | 16 | 14 | 14 | 14 | 12 | 12 | 10 | 10 | 10 |

**FiO2 (%)**

| 80 | 100| 100| 70 | 70 | 70 | 65 | 60 | 60 | 50 | 50 | 40 | 40 | 40 |

**Pao2/Fio2**

| <100 | <100 | 120 | 160 | 186 | 210 | 280 |

**Vasopressors**

**CRRT/HD**

**Vancomycin (mg)**

**Hydroxycholroprine**

**Azithromycin**

| Day of hospitalization | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
|------------------------|---|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|

**C. difficile** | **Pneumocystis** | **Bacterial pneumonia** | **AKI** | **Shock** | **DVT** | **Recovery**

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COVID-19

Siddiqi and Mehra, J Heart Lung Transplant, DOI: (10.1016/j.healun.2020.03.012)
COVID-19
IMMUNE MODULATORS

- Canakinumab
- Sarilumab
- Siltuximab
- Tocilizumab
- IL6 receptor

Price J Am Acad Dermatol 2020
### IL-6/R BLOCKADE

**Agents:** sarilumab, siltuimax, sirukumab, tocilizumab

**Pros:** MCD, CA, RA, SoJIA, CAR-T CRS, GCA

**Cons:** Hypersensitivity, lipids, infections (RTI), rash, edema, IV/SC, Liver

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### Tocilizumab Case Series in COVID-19

<table>
<thead>
<tr>
<th>Pub</th>
<th>Demographics</th>
<th>Clinical</th>
<th>Treatment</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Luo <em>J Med Vir</em> 2020</td>
<td>15 patients</td>
<td>47% critical</td>
<td>80-600 mg x1.47 doses (33% 2+)</td>
<td>67% decreased IL6</td>
</tr>
<tr>
<td>China</td>
<td>73y</td>
<td>40% serious</td>
<td>Methylpred 53%</td>
<td>20% died</td>
</tr>
<tr>
<td></td>
<td>80% Male</td>
<td>13% moderate</td>
<td></td>
<td>80% inpt</td>
</tr>
<tr>
<td></td>
<td>IL6 115 pg/mL</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Xu <em>PNAS</em> * 2020</td>
<td>21 patients</td>
<td>19% critical</td>
<td>400 mg x1 dose</td>
<td>0% died</td>
</tr>
<tr>
<td>China</td>
<td>57y</td>
<td>81% serious</td>
<td>LPV/r Methylpred</td>
<td>90% discharged</td>
</tr>
<tr>
<td></td>
<td>86% Male</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>IL6 132 pg/mL</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pereira <em>Am J Transp</em> 2020</td>
<td>14 patients</td>
<td>30% severe</td>
<td>400 mg or 8 mg/kg (max 800 mg) x1</td>
<td>24% died (overall)</td>
</tr>
<tr>
<td>U.S.</td>
<td>57y</td>
<td>15% moderate</td>
<td>(additional doses)</td>
<td>54% discharged</td>
</tr>
<tr>
<td></td>
<td>59% Male</td>
<td></td>
<td>Antivirals+Methyl</td>
<td>6% readmit</td>
</tr>
<tr>
<td></td>
<td>6.6 y post-tran</td>
<td></td>
<td></td>
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**Graphs:**

- **A:** Graph showing the change in CRP (pg/mL) over time.
- **B:** Graph showing temperature change before and after tocilizumab treatment.
- **C:** Graph showing the concentration of oxygen saturation (%).
- **D:** Graph showing the progression of disease over time.
IL-1 BLOCKADE

Agents: anakinra, canakinumab

Pros: Periodic fever syndromes, SoJIA MAS, SC 26d

Cons: HA, inj rxn, lipids, infections, cytopenias, cancer?, IV QID-SC daily

Anakinra for COVID-19 Hemophagocytic Syndrome

Dimopoulos Cell Host Microbe 2020
GM-CSF BLOCKADE

Agents: TJ003234, gimsilumab, lenzilumab, mavrilmumab, otilimab, namilumab

Pros: Ank Spon, CAR-T cytokine storm, RA, MS, CMML, GVHD, Eos Asthma, Th17, CNS, Gut

Cons: HTN, Hypersensitivity, Alveolar Proteinosis, SOB, IV
GM-CSF BLOCKADE

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Cons: HTN, Hypersensitivity, Alveolar Proteinosis, SOB, IV

Sterner Blood 2019
JAK BLOCKADE

Agents: baricitinib, ruxolitinib

Pros: RA, MF, PCV, oral, renal (bari), multiple cytokines, antiviral activity?

Cons: infections, thrombosis, cytopenias, liver (rux)
JAK BLOCKADE

Agents: baricitinib, ruxolitinib

Pros: RA, MF, PCV, oral, renal (bari), multiple cytokines, antiviral activity?

Cons: infections, thrombosis, cytopenias, liver (rux)

Richardson/Stebbing Lancet 2020

<table>
<thead>
<tr>
<th>Compound</th>
<th>AAK1 Kd (nM)</th>
<th>BIKE Kd (nM)</th>
<th>GAK Kd (nM)</th>
<th>STK16 Kd (nM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baricitinib</td>
<td>8.2</td>
<td>20</td>
<td>120</td>
<td>1100</td>
</tr>
<tr>
<td>Tol betting</td>
<td>7500</td>
<td>4600</td>
<td>18000</td>
<td>5000</td>
</tr>
<tr>
<td>Lipocetinib</td>
<td>9900</td>
<td>11000</td>
<td>2000</td>
<td>9300</td>
</tr>
<tr>
<td>AZD7762</td>
<td>2.9</td>
<td>13</td>
<td>2000</td>
<td>1900</td>
</tr>
<tr>
<td>Sorbinib</td>
<td>35</td>
<td>6.5</td>
<td>35</td>
<td>300</td>
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<tr>
<td>Entilinib</td>
<td>2000</td>
<td>280</td>
<td>21</td>
<td>&gt;30000</td>
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</table>

8.2 nM  20 nM  120 nM  11.1 µM
JAK BLOCKADE

Agents: baricitinib, ruxolitinib

Pros: RA, MF, PCV, oral, renal (bari), multiple cytokines, antiviral activity?

Cons: infections, thrombosis, cytopenias, liver (rux)
JAK BLOCKADE

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JAK BLOCKADE

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Pros: RA, MF, PCV, oral, renal (bari), multiple cytokines, antiviral activity?

Cons: infections, thrombosis, cytopenias, liver (rux)

Adaptive COVID-19 Treatment Trial (ACTT)

NIAID is supporting a randomized, controlled clinical trial to evaluate the safety and efficacy of the investigational antiviral remdesivir in hospitalized adults diagnosed with coronavirus disease 2019 (COVID-19). It will take place in up to 75 locations globally.

Remdesivir, developed by Gilead Sciences Inc., is an investigational broad-spectrum antiviral treatment. It was previously tested in humans with Ebola virus disease and has shown promise in animal models for treating Middle East respiratory syndrome (MERS) and severe acute respiratory syndrome (SARS), which are caused by other coronaviruses.

What does the study involve?

All potential participants will undergo a baseline physical exam.
TNF BLOCKADE

Agents: adalimumab, certolizumab, etanercept, infliximab

Pros: RA, IBD, psoriasis, CRS, Ank Spon, Kawasaki, sepsis, SC

Cons: cytopenia, infections, anaphyl, demyelin, cancer, IV

Outcomes from Patients with Inflammatory Bowel Disease Treated Prior to COVID-19 Diagnosis

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Total N</th>
<th>Outpatient only (n, %)</th>
<th>Hospitalized (n, %)</th>
<th>ICU (n, %)</th>
<th>Ventilator (n, %)</th>
<th>Death (n, %)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall</td>
<td>877</td>
<td>590 (67%)</td>
<td>285 (32%)</td>
<td>55 (6%)</td>
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Feldmann *Lancet* 2020
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CONCLUSIONS

- First large scale test of anti-inflammatory for deadly viral disease, caution for off-label use outside study
- Appear to reduce fever and cytokine storm but time to recovery and mortality data are lacking
- Unclear impact of virus control, secondary infections, thromboses or cytopenias for short term use
- More classes than can fit in 15 min, trials underway
- Steroids not recommended unless in a trial
CREDITS

- John Beigel
- Sushma Cribbs
- Randi Connor-Schuler
- Stephanie De Bono
- Greg Deye
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- Telisha Harrison
- Mike Hart
- Priscilla Hsue

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- Jesse O’Shea
- Nadine Rouphael
- Mehran Salles
- Raymond Schinazi
- David Stephens
- Boghuma Titanji

Special thanks to all patients, staff and my family!
THANK YOU

PLEASE REACH OUT IF YOU HAVE ANY QUESTIONS

Vincent C. Marconi, MD
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vcmarco@emory.edu
ON-DEMAND RESOURCES

All webinars are recorded and posted to the ACMT website

www.acmt.net/covid19web

Questions?
Write to: info@acmt.net
EMS Operations, Cardiac Arrest, and COVID-19 Update From the Front Lines: Brazil

Wednesday, June 10, 2020
3:00 PM EDT

www.acmt.net/covid19web