Review of the Hottest COVID-19 Science: Catching You Before the Fall

September 3, 2020
Speakers

- Kim Eagle, MD, FACC, Moderator
- Bina Ahmed, MD, FACC
- Geoffrey D. Barnes, MD, MSc, FACC
- Nicole Bhave, MD, FACC
- Shashank S. Sinha, MD, MSc, FACC
Presenter Disclosure Information

- Kim Eagle, MD, FACC, Moderator
  - Nothing to disclose
- Bina Ahmed, MD, FACC
  - Nothing to disclose
- Geoffrey D. Barnes, MD, MSc, FACC
  - Consulting for Pfizer/Bristol-Myers Squibb, Janssen, Acelis Connected Health.
- Nicole Bhave, MD, FACC
  - Nothing to disclose
- Shashank S. Sinha, MD, MSc, FACC
  - Nothing to disclose
Outcomes from Intensive Care in Patients with COVID-19: A Systematic Review and Meta-analysis of Observational Studies

Armstrong et al Anaesthesia 2020 June 30
Study Question: What is the mortality occurring within ICUs among patients admitted with COVID-19?

Methods:
- The authors performed a systematic review and meta-analysis to assess the reported ICU mortality for patients with confirmed COVID-19.
- The authors searched MEDLINE, EMBASE, PubMed and Cochrane databases up to May 31, 2020, for studies reporting ICU mortality for adult patients admitted with COVID-19.
- The primary outcome measure was death in intensive care as a proportion of completed ICU admissions, either through discharge from the ICU or death.
## COVID-19 Hub

<table>
<thead>
<tr>
<th>Study</th>
<th>Deaths</th>
<th>All Patients</th>
<th>Deaths per 100 admissions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Asia</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Huang et al</td>
<td>5</td>
<td>12</td>
<td>41.67 [15.17–72.33]</td>
</tr>
<tr>
<td>Young et al</td>
<td>0</td>
<td>2</td>
<td>0.00 [0.00–84.19]</td>
</tr>
<tr>
<td>Zhou, F et al</td>
<td>39</td>
<td>50</td>
<td>78.00 [64.04–88.47]</td>
</tr>
<tr>
<td>Wang, L et al</td>
<td>0</td>
<td>1</td>
<td>0.00 [0.00–97.50]</td>
</tr>
<tr>
<td>Ling et al</td>
<td>1</td>
<td>8</td>
<td>12.50 [0.32–52.65]</td>
</tr>
<tr>
<td>Wang, Y et al</td>
<td>133</td>
<td>318</td>
<td>41.82 [36.34–47.46]</td>
</tr>
<tr>
<td>Zhang, G et al</td>
<td>9</td>
<td>32</td>
<td>28.12 [13.75–46.75]</td>
</tr>
<tr>
<td>Zhang, J et al</td>
<td>8</td>
<td>19</td>
<td>42.11 [20.25–66.50]</td>
</tr>
<tr>
<td>Zhou, Y et al</td>
<td>3</td>
<td>16</td>
<td>18.75 [4.05–45.65]</td>
</tr>
<tr>
<td>Zheng et al</td>
<td>0</td>
<td>20</td>
<td>0.00 [0.00–16.84]</td>
</tr>
<tr>
<td><strong>Random effects model</strong></td>
<td>478</td>
<td></td>
<td>35.31 [22.32–50.92]</td>
</tr>
</tbody>
</table>

**Heterogeneity:** $I^2 = 75\%$, $t^2 = 0.5904$, $p < 0.01$

| **Europe**    |        |              |                           |
| Stoecklin et al| 0      | 1            | 0.00 [0.00–97.50]         |
| Grasselli et al| 405    | 661          | 61.27 [57.44–65.00]       |
| Barrasa et al | 14     | 27           | 51.85 [31.95–71.33]       |
| Klok et al    | 23     | 45           | 51.11 [35.77–68.30]       |
| Liljop et al  | 3      | 19           | 15.79 [3.38–39.58]        |
| Pedersen et al| 7      | 11           | 63.64 [30.79–89.07]       |
| ICNARC        | 3483   | 8062         | 43.20 [42.12–44.29]       |
| **Random effects model** | 8826    |              | 48.44 [36.96–60.09]       |

**Heterogeneity:** $I^2 = 93\%$, $t^2 = 0.2405$, $p < 0.01$

| **North America** |        |              |                           |
| Arentz et al      | 11     | 13           | 84.62 [54.55–98.08]       |
| Bhatraju et al    | 12     | 21           | 57.14 [34.02–78.18]       |
| Richardson et al  | 291    | 371          | 78.44 [73.90–82.51]       |
| Ferguson et al    | 3      | 21           | 14.29 [3.05–36.34]        |
| Auld et al        | 62     | 209          | 29.67 [23.56–36.36]       |
| Maatman et al     | 27     | 106          | 25.47 [17.51–34.86]       |
| Mitra et al       | 18     | 105          | 17.14 [10.49–25.73]       |
| **Random effects model** | 846    |              | 42.02 [19.96–67.81]       |

**Heterogeneity:** $I^2 = 97\%$, $t^2 = 1.9030$, $p < 0.01$

| **Random effects model** | 10150 |              | 41.65 [34.01–49.70]       |

**Heterogeneity:** $I^2 = 93\%$, $t^2 = 0.4083$, $p < 0.01$

**Residual heterogeneity:** $I^2 = 94\%$, $p < 0.01$
• **Results:**
  - In-ICU mortality in reported studies ranged from 0 to 84.6%. Only seven studies reported outcome data for all patients.
  - In the remaining 17 studies, the proportion of patients discharged from the ICU at the point of reporting varied from 24.5% to 97.2%.

• **Conclusions:**
  - This systematic review and meta-analysis identified 24 observational studies including 10,150 patients from centers across Asia, Europe and North America, and demonstrated an ICU mortality rate in those with a completed ICU stay of 41.6% (95% CI, 34.0%-49.7%, $I^2=93.2$%) broadly consistent across the world.

• **Key Takeaway:** The mortality of patients with COVID-19 admitted to the intensive care unit (ICU) is reportedly high, but the current literature contains small case series and cohort studies.
Out-of-hospital Cardiac Arrest Response and Outcomes During the COVID-19 Pandemic

Out-of-hospital cardiac arrest during the pandemic

- Sites: Multnomah County, OR and Ventura County, CA
- Study period: March 1-May 31, 2020, compared with 2019
- OHCA incidence: 231 cases in 2019, 278 in 2020
- 3-month incidence rates
  - Multnomah: 12.2 → 15/100,000 (P=0.12)
  - Ventura: 14.2 → 17.7/100,000 (P=0.07)
- OHCA pts younger during pandemic (64.9 vs. 69.1 yr, P=0.01)
- More in-home OHCA during pandemic (61% vs. 51%, P=0.01)
COVID-19 Hub

Survival to hospital discharge
- 2019: 14.7%
- 2020: 7.9%

Response time ≥6 minutes (vs <6 minutes)
- 2019: 57%
- 2020: 71%

Bystander CPR
- 2019: 61%
- 2020: 51%
Perspective: OHCA in US and Europe

- Marked increase in OHCA incidence in Italy, France, and NYC
- Non-shockable rhythms, failure to achieve ROSC more common
- Communities of color hardest hit
- Message to patients: if you feel sick, don’t go it alone

Lai et al., *JAMA Cardiol.* 2020
Factors Associated with Death in Critically Ill Patients with Coronavirus Disease 2019 in the US

Gupta, et al JAMA Internal Medicine 2020 July 15
• **Study Question**: What are the characteristics, outcomes and factors associated with death among critically ill patients with coronavirus disease 2019 (COVID-19) in the US?

• **Methods**:
  - This multicenter cohort study assessed 2215 adults with laboratory-confirmed COVID-19 who were admitted to ICUs at 65 hospitals across the US from March 4 to April 4, 2020.
  - Patient level data, including demographics, comorbidities, and organ dysfunction, and hospital characteristics, including the number of ICU beds
  - The primary outcome was 28-day in-hospital mortality.
  - Multilevel logistic regression was used to evaluate factors associated with death and to examine inter-hospital variation in treatment and outcomes.
## COVID-19 Hub

### Table: Characteristics and Odds Ratio (95% CI) for Death

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Odds ratio (95% CI) for death</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age groups</td>
<td></td>
</tr>
<tr>
<td>18-39</td>
<td>1 [Reference]</td>
</tr>
<tr>
<td>40-49</td>
<td>1.63 (0.97-2.80)</td>
</tr>
<tr>
<td>50-59</td>
<td>2.71 (1.05-6.80)</td>
</tr>
<tr>
<td>60-69</td>
<td>3.18 (1.95-5.19)</td>
</tr>
<tr>
<td>&gt;70-79</td>
<td>5.30 (3.20-8.80)</td>
</tr>
<tr>
<td>&gt;80</td>
<td>11.15 (6.35-20.05)</td>
</tr>
<tr>
<td>Male sex</td>
<td>1.55 (1.19-2.00)</td>
</tr>
<tr>
<td>Race other than White</td>
<td>1.13 (0.88-1.46)</td>
</tr>
<tr>
<td>hypertension</td>
<td>1.04 (0.81-1.36)</td>
</tr>
<tr>
<td>Diabetes</td>
<td>1.14 (0.91-1.43)</td>
</tr>
<tr>
<td>BMI</td>
<td></td>
</tr>
<tr>
<td>&lt;25</td>
<td>1 [Reference]</td>
</tr>
<tr>
<td>25-29</td>
<td>1.01 (0.73-1.39)</td>
</tr>
<tr>
<td>30-34</td>
<td>0.95 (0.68-1.32)</td>
</tr>
<tr>
<td>35-39</td>
<td>1.24 (0.81-1.90)</td>
</tr>
<tr>
<td>≥40</td>
<td>1.31 (0.83-2.09)</td>
</tr>
<tr>
<td>Coronary artery disease</td>
<td>1.47 (1.07-2.02)</td>
</tr>
<tr>
<td>Congestive heart failure</td>
<td>1.08 (0.75-1.55)</td>
</tr>
<tr>
<td>Chronic obstructive pulmonary disease</td>
<td>1.33 (0.95-1.84)</td>
</tr>
<tr>
<td>Current smoker</td>
<td>1.21 (0.76-1.90)</td>
</tr>
<tr>
<td>Active cancer</td>
<td>2.15 (1.35-3.43)</td>
</tr>
<tr>
<td>Days from symptom onset to ICU day 1</td>
<td>1.29 (0.99-1.67)</td>
</tr>
<tr>
<td>Lymphocyte count &gt;1000/L on ICU day 1</td>
<td>1.11 (0.85-1.48)</td>
</tr>
<tr>
<td>PaO2/FIO2 on ICU day 1</td>
<td></td>
</tr>
<tr>
<td>No respiratory support</td>
<td>1 [Reference]</td>
</tr>
<tr>
<td>&lt;200</td>
<td>1.48 (0.95-2.33)</td>
</tr>
<tr>
<td>200-299</td>
<td>1.72 (1.13-2.60)</td>
</tr>
<tr>
<td>300-399</td>
<td>2.14 (1.34-3.47)</td>
</tr>
<tr>
<td>≥400</td>
<td>2.29 (1.42-3.60)</td>
</tr>
<tr>
<td>Shock on ICU day 1</td>
<td>0.90 (0.50-1.63)</td>
</tr>
<tr>
<td>Congestion component of SOFA score</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>1 [Reference]</td>
</tr>
<tr>
<td>1</td>
<td>1.20 (0.88-1.60)</td>
</tr>
<tr>
<td>2</td>
<td>1.64 (1.20-2.29)</td>
</tr>
<tr>
<td>Liver component of SOFA score</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>1 [Reference]</td>
</tr>
<tr>
<td>1</td>
<td>1.07 (0.72-1.60)</td>
</tr>
<tr>
<td>2</td>
<td>1.61 (1.30-2.25)</td>
</tr>
<tr>
<td>Renal component of SOFA score</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>1 [Reference]</td>
</tr>
<tr>
<td>1</td>
<td>1.54 (1.20-2.02)</td>
</tr>
<tr>
<td>2</td>
<td>1.89 (1.26-2.84)</td>
</tr>
<tr>
<td>3</td>
<td>2.10 (1.18-3.92)</td>
</tr>
<tr>
<td>4</td>
<td>2.43 (1.45-4.02)</td>
</tr>
<tr>
<td>No. of ICU beds</td>
<td></td>
</tr>
<tr>
<td>Mail (2/50)</td>
<td>1 [Reference]</td>
</tr>
<tr>
<td>Medium (50-91)</td>
<td>1.07 (1.02-1.53)</td>
</tr>
<tr>
<td>Low (&lt;50)</td>
<td>3.24 (2.16-4.90)</td>
</tr>
</tbody>
</table>

### Graph: Distribution of Odds ratio (95% CI) for Death

- **Odds ratio (95% CI)**
- **Increased risk of death**

- Distribution of Odds ratio (95% CI) for Death
• **Results:**
  - A total of 2215 patients were included. At 28 days after ICU admission, 35.4% had died, 37.2% had been discharged, and 27.4% remained hospitalized.
  - Factors independently associated with death included older age, male sex, higher body mass index, coronary artery disease, active cancer, presence of hypoxemia, liver dysfunction and kidney dysfunction at ICU admission.
  - Patients admitted to hospitals with fewer ICU beds had a higher risk of death (< 50 vs > 100 ICU beds: OR, 3.28; 95% CI, 2.16-4.99).

• **Conclusions:**
  - In this multicenter cohort study of critically ill adults with COVID-19 in the US, more than 1 in 3 died within 28 days after ICU admission.

• **Key Takeaway:** In a cohort of > 2200 patients with COVID-19 who were admitted to intensive care units (ICUs) at 65 geographically diverse sites in the US, 35% died within 28 days, with wide variation observed among hospitals.
Obesity and Mortality Among Patients Diagnosed with COVID-19: Results from an Integrated Healthcare Organization

• **Study Question**: How is body mass index (BMI) associated with death due to coronavirus disease 2019 (COVID-19)?

• **Methods**:
  - The authors conducted a retrospective cohort study of all Kaiser Permanente Southern California members diagnosed with COVID-19 from February 13 to May 2, 2020, identified through ICD-10 codes or laboratory testing.
  - They examined the association between BMI and death within 21 days after diagnosis with COVID-19, stratified by whether or not they were hospitalized or intubated, and adjusting for individual-level factors such as race, sex, and clinical risk factors, in addition to neighborhood level factors such as population density and median income.
  - The authors also explored the interaction between BMI, age, and sex.
What is the association of body mass index (BMI) with risk for death in patients with COVID-19?

Kaiser Permanente Southern California
6,916 patients diagnosed with COVID-19
2/13/20-5/2/20

Risk for death within 21 days of COVID-19 diagnosis adjusted for smoking, comorbidities, age, and sex

<table>
<thead>
<tr>
<th>BMI</th>
<th>Risk Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;18.5 kg/m²</td>
<td></td>
</tr>
<tr>
<td>18.5–24 kg/m²</td>
<td></td>
</tr>
<tr>
<td>25–29 kg/m²</td>
<td></td>
</tr>
<tr>
<td>30–34 kg/m²</td>
<td></td>
</tr>
<tr>
<td>35–39 kg/m²</td>
<td></td>
</tr>
<tr>
<td>40–44 kg/m²</td>
<td></td>
</tr>
<tr>
<td>45 kg/m²</td>
<td></td>
</tr>
</tbody>
</table>

http://support.rhei.org/doi/10.7326/M20-2742
© 2020 American College of Physicians*
• **Results:**
  - Of a total of 6,916 patients with COVID-19 identified (45% male, 55% Hispanics, median age 49 years, and mean BMI of 30.6 kg/m²), 206 (3.0%) died.
  - High BMI (≥40 kg/m²) was associated with a step-wise increase in the adjusted risk of death (2.7-fold increase for BMI 40-44, and 4-fold increase for BMI ≥45 kg/m²), compared to patients with normal BMI of 18.5-24.
  - The impact of obesity on the risk of death was strongest in men and younger patients (≤60 years). Overall, the association was independent of whether patients were hospitalized or intubated, or of clinical risk factors.

• **Conclusions:**
  - Morbid obesity is associated with an increased risk of death, notably in men and patients ≤60 years of age.

• **Key Takeaway:** This study expands our understanding of the association of obesity with death from COVID-19 in many ways. It: 1) confirms previous reports that younger obese patients are likely to do worse, and 2) suggests that the relationship between obesity and death from COVID-19 is not related to comorbid risk factors, or racial or neighborhood level factors.
Outcomes of STEMI Patients During the COVID-19 Pandemic in China

Xiang et al. JACC 2020 Aug 19
Management and Outcomes of Patients with STEMI During the COVID-19 Pandemic in China
Xiang et al.

• There has been concern about the impact of COVID-19 on STEMI care
• Best approach to providing timely and safe PCI during the COVID-19 pandemic has been debated.
• Retrospective analysis from the China Chest Pain Center of approximately 28,000 patients presenting with STEMI (Dec 27, 2019-Feb 20, 2020)
• STEMI protocol modified to default fibrinolytic therapy on January 23 2020 for unconfirmed COVID-19 cases
• **Key findings:**
  - Total number of STEMI cases decreased (26%)
  - Primary PCI dropped by 50% and fibrinolysis increased (4-fold)
  - Non-significant increase in reperfusion times
  - 20% increase in mortality. No significant increase in rates of bleeding

• **Conclusion:**
  - STEMI care was adversely effected during the COVID-19 pandemic on mainland China.
  - Reasons for increased mortality most likely multifactorial (delay in seeking care, change in reperfusion strategy, concomitant COVID-19 infection)

  - Bina Ahmed, MD, FACC
Trends in ED Visits and Hospital Admissions in Health Care Systems in 5 States in the First Months of the COVID-19 Pandemic in the US

Jeffrey et al, JAMA Intern Med 2020 Aug 3
Impact of COVID-19 pandemic on patients seeking timely healthcare have been evident in practices across the world.

How did emergency department visits and hospitalizations change as Covid-19 pandemic intensified in the US?

Cross-sectional analysis from 5 healthcare systems (Colorado, Connecticut, Massachusetts, New York and North Carolina) of ED visits and hospital admission from January to April 2020.
• **Key Findings:**
  - ED visits decreased by more than 40% (up to 60% in New York)
  - Hospital admission increased locally depending on COVID-19 surge (22% to 149%)
  - Strong inverse temporal relationship between COVID-19 case surge and visits to ED.

• **Conclusion:**
  - Stay at home orders dissuaded visits to the ED however impact of decreased ED visits on patient outcomes remains unknown.
  - Increased admission rates shed light on COVID-19 burden on hospital systems.
Case Rates, Treatment Approaches, and Outcomes in Acute Myocardial Infarction During the Coronavirus Disease 2019 Pandemic

Gluckman et al JAMA Cardiol 2020 Aug 7
Case Rates, Treatment Approaches, and Outcomes in Acute Myocardial Infarction During the Coronavirus Disease 2019 Pandemic

Gluckman et al.

- How did COVID-19 effect management of and outcomes among patients with acute myocardial infarction in the United States?
- Retrospective analysis from a large hospital system across 6 US states (Alaska, Washington, Montana, Oregon, California and Texas)
- Data from 15,244 AMI patients (33% with STEMI and 67% with NSTEMI) hospitalized between Dec 30th 2019 to May 16th 2020 was retrospectively analyzed.
Key Findings:

- Appreciable decrease in AMI rates beginning February 23rd followed by slow correction
- Observed/expected mortality ratios were significantly higher during the COVID-19 period among STEMI patients but not among the NSTEMI patients
- Reperfusion strategies did not change over study period

Conclusions:

- AMI rates decreased sharply at the start of the pandemic but STEMI related mortality increased.
- Delay in time to reperfusion and symptoms to first medical contact are speculated to play a role.

Case Rates, Treatment Approaches, and Outcomes in Acute Myocardial Infarction During the Coronavirus Disease 2019 Pandemic

Jeffery et al.

*JAMA Cardiol.* Published online August 7, 2020. doi:10.1001/jamacardio.2020.3629
Anticoagulation Among Patients Hospitalized With COVID-19 and Post-discharge Venous Thromboembolism Following Hospital Admission with COVID-19

Nadkarni et al JAMA 2020, Aug 26

Roberts et al Blood 2020 Aug 3
COVID-19 and Thrombosis Risk

- Variable risk estimates for venous thromboembolism
  - 4%-46% in hospitalized patients
  - Unknown post-hospital risk
- How best to prevent thrombosis?
  - What dose of anticoagulation?
  - Should it continue post-hospital?
Study Design

Inclusion
- Adult patients hospitalized with COVID-19 March-April, 2020
- 5 Hospitals in New York City

Exclusion
- Hospitalized <24 hours
- Received prophylaxis AND therapeutic anticoagulation

Research Question
Therapeutic vs. Prophylactic vs. No anticoagulation and in-hospital mortality, intubation, or bleeding?
In-hospital Mortality (n=424; 21.6%)

Intubation (n=467, 10.6%)

4389 patients total
900 therapeutic; 1959 prophy; 1530 “none”

Major bleeding in 89 patients
3.0% therapeutic, 1.7% prophy, 1.9% “none”
Take Away Message

• Anticoagulation prevents thrombosis formation
  • Treatment dose ≅ Prophylactic dose?
• Overall major bleeding rates are low

• Observational Study → potential for selection bias, confounding
Study Design

COVID-19 Cohort
• Adult patients discharged with COVID-19 March 3 – May 7, 2020
• Follow up through June 17, 2020
• 2 Hospitals in London, UK

Non-COVID-19 Cohort
• Adult patients hospitalized 2019

Research Question
• What is risk of post-discharge hospital-associated VTE?
## VTE Prophylaxis Regimen

Table. Weight based dosing of thromboprophylaxis for acutely ill medical patients at high VTE risk (without bleeding risk factors)

<table>
<thead>
<tr>
<th>Weight</th>
<th>No renal impairment, eGFR ≥30ml/min</th>
<th>Renal impairment, eGFR 15-30ml/min</th>
<th>End stage renal impairment, eGFR &lt;15ml/min or dialysis dependent</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;50kg</td>
<td>Enoxaparin 20mg daily</td>
<td>Contact haematology for advice</td>
<td>Unfractionated heparin 5000 units bd</td>
</tr>
<tr>
<td>50-100kg</td>
<td>Enoxaparin 40mg daily</td>
<td>Enoxaparin 20mg daily</td>
<td>Unfractionated heparin 5000 units bd</td>
</tr>
<tr>
<td>101-150kg</td>
<td>Enoxaparin 40mg bd or 80mg daily</td>
<td>Enoxaparin 20mg daily</td>
<td>Unfractionated heparin 5000 units tds</td>
</tr>
<tr>
<td>&gt;150kg</td>
<td>Enoxaparin 60mg bd or 120mg daily</td>
<td>Contact haematology for advice</td>
<td>Unfractionated heparin 5000 units tds</td>
</tr>
</tbody>
</table>

VTE, venous thromboembolism; bd, twice daily; tds, three times daily; GFR, glomerular filtration rate.

Prophylaxis “intensified” for ICU patients
## Results

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Discharges</td>
<td>1877</td>
<td>18,159</td>
</tr>
<tr>
<td>All Hosp-associated VTE</td>
<td>84 (2.9%)</td>
<td></td>
</tr>
<tr>
<td>Post-hospital VTE (42 day)</td>
<td>9 (0.5%)</td>
<td>56 (0.3%)</td>
</tr>
<tr>
<td>Time to VTE (median, days)</td>
<td>8 (range 3-33)</td>
<td>29 (IQR 16-51)</td>
</tr>
</tbody>
</table>
Take Away Message

• Post-hospital VTE risk only slightly higher in COVID vs. non-COVID patients
  • Low rates of in-hospital VTE as well
• Utility of post-hospital VTE prophylaxis?

• No data on which patients are highest risk
COVID-19 and VTE: How to Manage?

- In-hospital VTE prophylaxis for ALL
- Selective use of “intermediate” dose prophylaxis (e.g., ICU patients)
- Limited use of post-hospital prophylaxis

- Participate in clinical trials of prophylaxis vs. treatment anticoagulation

Outcomes of Cardiovascular Magnetic Resonance Imaging in Patients Recently Recovered from COVID-19

Puntenmann et al. JAMA Cardiol. 2020; Jul 27
• N=100 pts in University of Frankfurt COVID-19 registry, ≥2 wks from initial dx, with respiratory recovery
• Patients referred for clinical CMR excluded
• Healthy and risk-factor matched controls
• CMR protocol: native T1 and T2 mapping, late gadolinium enhancement (LGE) imaging
• Mean age 49 yrs, 53% male
• COVID severity: 33% hospitalized, 2% ventilated, 15% with hsTnT ≥13.9 pg/ml in hospital
• At time of CMR, hsTnT detectable (>3 pg/ml) in 71%
• Abnormal CMR findings: 78%
  • Increased native T1: 73%
  • Increased native T2: 60%
  • Myocardial LGE: 32%
  • Pericardial LGE: 22%
• Biopsy in 3 pts → lymphocytic inflammation, no viral genome
• AUC in pts vs. healthy controls
  • Native T1: 0.86
  • Native T2: 0.84
  • LVEF: 0.70
  • RVEF: 0.74
  • hsTnT: 0.79
  • NT-proBNP: 0.56 (P=NS)
CMR in COVID: unanswered questions

• Are non-cardiac muscles also affected?
• What are the clinical implications of mild CMR abnormalities?
• How should these patients be followed?
• What about exercise?
Effect of Remdesivir vs Standard Care on Clinical Status at 11 Days in Patients With Moderate COVID-19

Bavry, ACC.org Trial Summary, 2020
Aug 24
Study Design

- Randomized, parallel, open-label design in US, Europe, Asia (105 hosp)
- Inclusion: COVID-19 infection, moderate pneumonia (SpO2 >94% on room air)
- Exclusion: AST/ALT >5x ULN, CrCl <50 ml/min
- Intervention: remdesivir x10d (n=197), x5d (n=199), or none (n=200)
- Primary outcome: Disease progression
Figure 2. Clinical Status on a 7-Point Ordinal Scale on Study Days 11, 14, and 28 by Treatment Group

Day 11

Day 14

Day 28

Clinical status
- Discharged
- Hospitalized, not requiring supplemental oxygen or ongoing medical care (other than per-protocol remdesivir administration)
- Hospitalized, not requiring supplemental oxygen; requiring ongoing medical care (COVID-19-related or otherwise)
- Hospitalized, requiring low-flow supplemental oxygen
- Hospitalized, requiring noninvasive ventilation or high-flow oxygen
- Hospitalized, requiring invasive mechanical ventilation or ECMO
- Death

OR 1.65
(1.09-2.48)
Take Away Message

• Remdesivir may slightly improve short-term outcomes in moderate COVID-19 infection (hospitalized, no baseline O₂ requirement)
  • Uncertain clinical importance

• Remdesivir use may be most effective for sicker patients (requiring O₂)
  • Some mixed efficacy results by baseline severity
Dexamethasone in Hospitalized Patients with COVID-19 – Preliminary Report

Bavery ACC.org Trial Summary 2020, Aug 24
Dexamethasone in COVID-19

- Open-label trial at 176 UK sites
- Dexamethasone 6 mg daily: 2104 pts; usual care: 4321 pts
- Other treatments studied: tocilizumab, convalescent plasma, azithromycin (hydroxychloroquine, lopinavir-ritonavir stopped)
- Data collection: web-based forms
- Primary endpoint, all-cause mortality at 28 days: 22.9% dex, 25.7% usual care (rate ratio 0.83, 95% CI 0.75-0.93, P<0.001)
Ventilation (N=1007)

- ARR: 12.3%

No oxygen (N=1535)

- Rate ratio, 0.64 (95% CI, 0.51–0.81)
- Usual care
- Dexamethasone

Perspective

- Dexamethasone on WHO essential med list; widely available at low cost
- Need data on cardiovascular effects of steroids
- Hyperglycemia must be managed