Cardiovascular Complications of COVID-19

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Figure 1. Clinical course of COVID-19 infection.
The incubation period averages 7 days, but can be up to 14 days. There can be asymptomatic, presymptomatic, or postsymptomatic viral shedding, likely contributing to its rapid transmission. Cardiac biomarkers such as high-sensitivity troponin (hsTroponin) can be detectable in patients at symptom onset and are prognostic. Continued increases in troponin together with rising cytokines predict the need for intensive care unit stays, ventilation, and vascular complications. Together with cytokine rise, NTproBNP rise can predict the risk of myocarditis or heart failure. Lymphopenia, with suppression of T cells and inefficient viral clearance, set the stage for overstimulated macrophages, cytokine amplification, and hemophagocytosis with organ failure, including the heart. COVID-19 indicates coronavirus disease 2019; CRP, C-reactive protein; IL-1β, interleukin-1β; IL-6, interleukin-6; and NTproBNP, N-terminal pro-brain natriuretic peptide.
Figure 1. Spectrum of the acute coronavirus disease 2019 (COVID-19) cardiovascular syndrome (ACovCS).
Fig. 1. Implications of Delay and Disruption of Care for Patients with and at Risk for Cardiovascular Disease During the COVID-19 Pandemic. Adapted with permission from Victor Tseng, MD. ** The chronology, magnitude of impact, and duration of the second and third waves are for illustrative purposes only. At present, there are no publicly available models that can provide specificity regarding estimates.
FIGURE 1 STEM Activations During the COVID-19 Pandemic

(Top left) Map of the United States showing the 9 high-volume ST-segment elevation myocardial infarction (STEMI) centers participating in this registry (yellow stars). (Lower left) Bar chart displaying average number of STEMI activations per site per month before and after the COVID-19 pandemic affected the U.S. health care system. (Right panel) Bar chart displaying total number of STEMI activations per month (blue: 2019; red: 2020).
Monthly STEMI Cases – Piedmont Athens

CASES

2019

2020
Impact of the COVID-19 Pandemic on Cost and Readmission Rates of Heart Failure patients at Piedmont Athens Regional

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Table 1. Average length of stay and cost of care for patients by demographic during the pre-pandemic and pandemic time periods. The values in white were determined to be significantly different (p-value < 0.05) when comparing the different time periods.

|                | Pre-pandemic (Jan 1 - Mar 11) | Pandemic (Mar 12 - May 31) |
|----------------|-------------------------------|-----------------------------|
|                | Average LOS (days) | Average cost    | Average LOS (days) | Average cost    |
| African American | 2019      | 4.73            | $33,000.80          | 3.95            | $27,521.05          |
|                | 2020      | 4.41            | $30,758.82          | 6.79            | $47,310.00          |
| Caucasian      | 2019      | 5.65            | $39,418.62          | 5.05            | $35,208.60          |
|                | 2020      | 5.13            | $35,753.85          | 5.14            | $35,856.00          |
Deaths in 2020

79,000 weekly deaths –

Expected deaths in 2020

Jan. Dec.

U.S.

https://www.nytimes.com/interactive/2020/04/21/world/coronavirus-missing-deaths.html
| Detection unlikely | PCR positive | PCR negative |
|--------------------|--------------|-------------|
| SARS-CoV-2 exposure | Viral isolation from respiratory tract | Nasopharyngeal |
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| SARS-CoV-2 exposure | Viral isolation from respiratory tract | Nasopharyngeal |

**Fig. 1 | Timeline of post-acute COVID-19.** Acute COVID-19 usually lasts until 4 weeks from the onset of symptoms, beyond which replication-competent SARS-CoV-2 has not been isolated. Post-acute COVID-19 is defined as persistent symptoms and/or delayed or long-term complications beyond 4 weeks from the onset of symptoms. The common symptoms observed in post-acute COVID-19 are summarized.
Fig. 2 | Interdisciplinary management in COVID-19 clinics. Multidisciplinary collaboration is essential to provide integrated outpatient care to survivors of acute COVID-19 in COVID-19 clinics. Depending on resources, prioritization may be considered for those at high risk for post-acute COVID-19, defined as those with severe illness during acute COVID-19 and/or requirement for care in an ICU, advanced age and the presence of organ comorbidities (pre-existing respiratory disease, obesity, diabetes, hypertension, chronic cardiovascular disease, chronic kidney disease, post-organ transplant or active cancer). The pulmonary/cardiovascular management plan was adapted from a guidance document for patients hospitalized with COVID-19 pneumonia™. HRCT, high-resolution computed tomography; PE, pulmonary embolism.
COVID-19 Recovery Clinic
Piedmont Pulmonary

Process Flow Diagram- COVID Recovery Clinic

Step 1 Referral Intake/Scheduling Process
All referrals will be scheduled by the COVID Recovery Nurse.
Initial referral target- Hospital ED will be provided number to call 770-819-6084
and a-bucket message links COVID Recovery Clinic.
Then next phase, Physician offices, Community ( Urgent Care Minute clinics), GPDF can call 770-819-6084
(M-F) between 8:30-4:30

COVID Recovery Nurse Responsibilities: Yolanda Come-Hines- COVID nurse
- Monitor referrals- phone line and SPHC- in caseload
- Contact patient within 24 hours (business days) of referral
  - Schedule both appointments
    - Baseline APP clinic visit within 7 days of referral- virtual or phone
    - Physician clinic visit a minimum of 21 days after referral
  - Confirm patient demographics, insurance, etc
  - Ensure MyChart is activated (if not already set up)
  - Complete Symptom Assessment Screen
  - 72 hours after baseline APP visit- re-contact patient and complete Symptom Assessment Screen

COVID RECOVERY CLINIC
770-819-6084

If Symptom Assessment score is > 8 then the recommendation is to escalate care to seek immediate attention: established MD, urgent care or ED (in that order)

If Symptom Assessment score is < 4 then the recommendation is to proceed to Step 3- 7-day virtual visit

Step 2- 7-day virtual visit baseline intake
1. H/R
2. Assessment of condition
3. Treatment plan
4. Arrange in person F/U appointment in 2 weeks

Consider follow-up call within 72 hours if provider deems it necessary after virtual visit

Step 4- 2 week in person visit- Pulmonary physiology assessment

Step 5- Monitor and Reassessment
Symptomatic- 3-month follow up
Asymptomatic- F/U as indicated

Potential Referrals:
- Cardiology (PUL- Epic order)
- Neurology- Pulmonary Venology Clinic
- Prequel- Primary care or 1st app
- Pulmonary- Secondary/Epoc order (CP FT)
- Nutrition: support- Epic order
- Physiatry- Epic order

*Need to track where referrals are being placed to follow-up