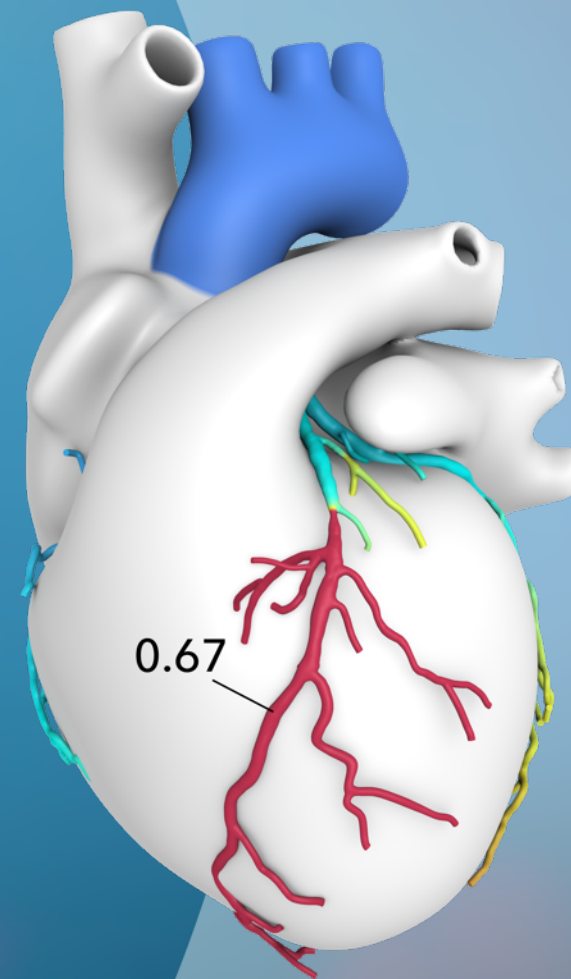


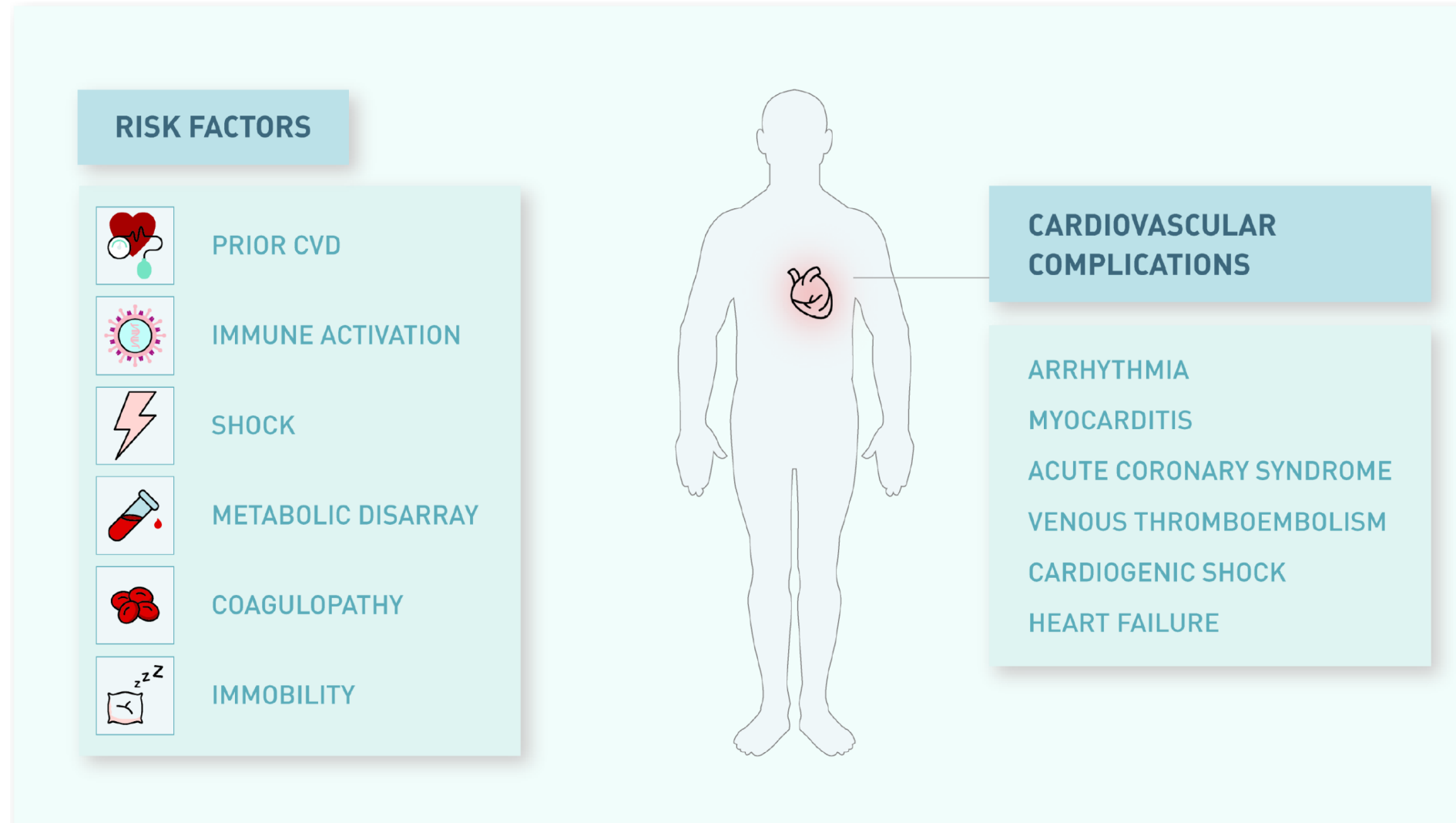
COVID-19 Guidance and Considerations



COVID-19 Guidance and Considerations

- As the COVID-19 situation continues to evolve, guidance documents around elective procedures are being published daily by various entities (government bodies, professional societies, publications, etc.)
- The following provides a summary of:
 - Clinical implications of COVID-19 and cardiovascular disease
 - Key guidance around elective procedures
 - Considerations regarding the appropriate use of CCTA for patients with stable coronary artery disease

COVID-19 and Cardiovascular Disease



JACC: Some patients presenting with elevated troponins and other signs of STEMI or ACS may actually have COVID-19 related myocarditis

Journal of the American College of Cardiology
March 2020
DOI: 10.1016/j.jacc.2020.03.031

JACC STATE-OF-THE-ART REVIEW

Just Accepted

Cardiovascular Considerations for Patients, Health Care Workers, and Health Systems During the Coronavirus Disease 2019 (COVID-19) Pandemic

Elissa Driggin, Mahesh V. Madhavan, Behnood Bikdeli, Taylor Chuich, Justin Laracy, Giuseppe Bondi-Zoccai, Tyler S. Brown, Caroline Der Nigoghossian, David A. Zidar, Jennifer Haythe, Daniel Brodie, Joshua A. Beckman, Ajay J. Kirtane, Gregg W. Stone, Harlan M. Krumholz and Sahil A. Parikh

Myocarditis related to COVID-19 may complicate diagnosis of **STEMI** / ACS.

Key excerpts:

With severe respiratory infection and hypoxia, especially in the setting of severe infection and ARDS due to COVID-19, it is likely that a number of patients will develop such injury. Elevated serum troponin levels have been described in many patients infected with COVID-19, with significant differences noted between patients who died and those who survived to discharge.

Additionally, it is important to note potential overlapping symptomatology between ACS and COVID-19.

[Link](#) to publication

Lancet: High Burden of Underlying CVD in COVID-19 Patients

Epidemiological and clinical characteristics of 99 cases of 2019 novel coronavirus pneumonia in Wuhan, China: a descriptive study



Nanshan Chen*, Min Zhou*, Xuan Dong*, Jieming Qu*, Fengyun Gong, Yang Han, Yang Qiu, Jingli Wang, Ying Liu, Yuan Wei, Jia'an Xia, Ting Yu, Xinxin Zhang, Li Zhang

Chronic medical illness	50 (51%)
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Cardiovascular and cerebrovascular diseases	40 (40%)
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Digestive system disease	11 (11%)
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Endocrine system disease†	13 (13%)
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Malignant tumour	1 (1%)
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Nervous system disease	1 (1%)
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Respiratory system disease	1 (1%)
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Admission to intensive care unit	23 (23%)
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Clinical outcome

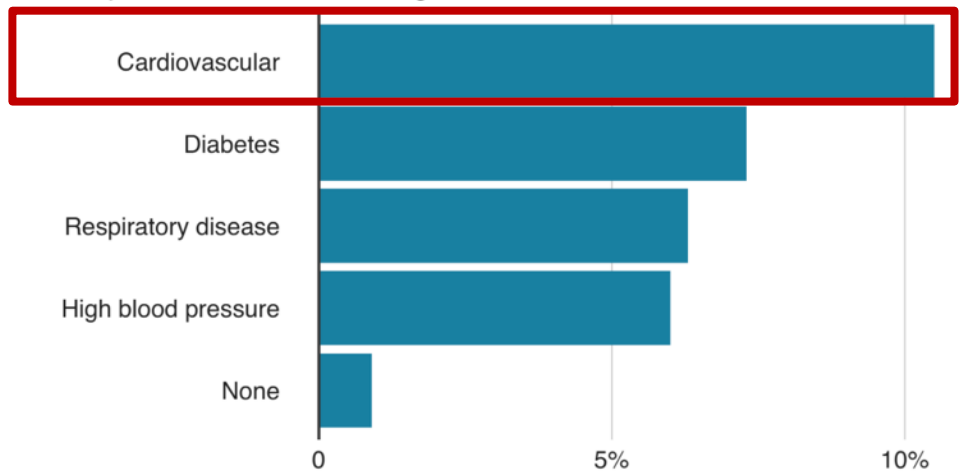
Remained in hospital	57 (58%)
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Discharged	31 (31%)
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Died	11 (11%)
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Death rates depend on underlying health

Proportion of deaths among confirmed cases



Source: Chinese Centre for Disease Control and Prevention, Feb 18

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Advisory Board: COVID-19 Clinical Implications for CV Patients



Clinical implications for CV patients

Early data on the virus has established a sobering prognosis for coronavirus patients with CV comorbidities. The **American College of Cardiology** (ACC) published data indicating that 40% of hospitalized COVID patients have cardiovascular disease. Likewise, according to data from the Chinese Center for Disease Control and Prevention, mortality is highest for patients with underlying CV health conditions (at just over 10%) than for any other comorbidity, including respiratory disease.

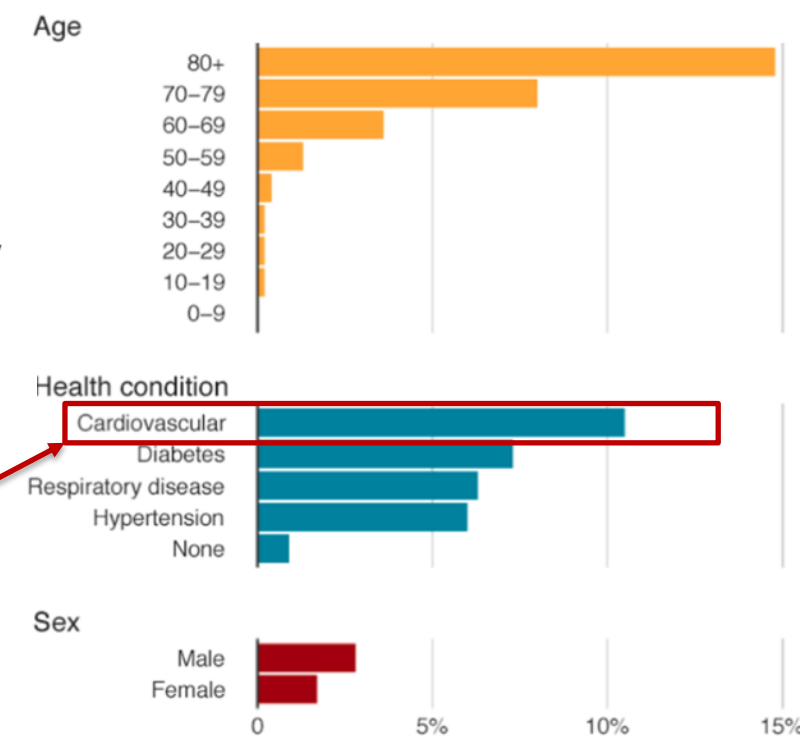
Moreover, by targeting and inhibiting the lungs, coronavirus makes patients more susceptible to developing CV disease once infected. According to the ACC, 16.7% of patients developed arrhythmia and 7.2% developed acute cardiac injury during the course of their inpatient stays. There have also been cases of acute-onset heart failure, myocardial infarction, myocarditis, and cardiac arrest.

[Link](#) to Advisory Board article

Cardiovascular disease is a significant comorbidity for COVID-19

Death rate varies by age, health and sex

Proportion of deaths among confirmed cases



Source: Chinese Centre for Disease Control & Prevention, 18 Feb 2020



85555085 v1

CMS recommends postponing most elective procedures

- The Centers for Medicare and Medicaid Services (CMS) released guidance on March 17 asking healthcare providers to postpone adult elective surgeries and procedures, including dental procedures, until further notice.
- CMS recommended decisions about procedures be made in consultation with the hospital, surgeon, patient and other public health professionals. The agency made up this chart to guide decision-making:
- [Link](#) to CMS guidance



Utilizing CCTA can determine if a patient is 2a or 3b or *neither* (No CAD or OMT)

Tiers	Action	Definition	Locations	Examples
Tier 1a	Postpone surgery/procedure	Low acuity surgery/healthy patient Outpatient surgery Not life-threatening illness	HOPD* ASC** Hospital with low/no COVID-19 census	Carpal tunnel release EGD Colonoscopy Cataracts
Tier 1b	Postpone surgery/procedure	Low acuity surgery/unhealthy patient	HOPD ASC Hospital with low/no COVID-19 census	Endoscopies
Tier 2a	Consider postponing surgery/procedure	Intermediate acuity surgery/healthy patient Not life-threatening but potential for future morbidity and mortality. Requires in-hospital stay	HOPD ASC Hospital with low/no COVID-19 census	Low risk cancer Non-urgent spine & ortho: including hip, knee replacement and elective spine surgery Stable ureteral colic Elective angioplasty
Tier 2b	Postpone surgery/procedure if possible	Intermediate acuity surgery/unhealthy patient	HOPD ASC Hospital with low/no COVID-19 census	
Tier 3a	Do not postpone	High acuity surgery/healthy patient	Hospital	Most cancers Neurosurgery Highly symptomatic patients
Tier 3b	Do not postpone	High acuity surgery/unhealthy patient	Hospital	Transplants Trauma Cardiac with symptoms Limb threatening vascular surgery

COVID-19 RESPONSE

Authors

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Use of cardiac computed tomography amidst the COVID-19 pandemic

Table 1: Guiding points to consider when deciding on the role and timing of CCT.

- | |
|--|
| • The delivery of CCT services should be performed in a manner which will be safe to technologists and imagers, as well as patients. |
| • Consider deferring CCT exams which can be safely postponed in order to minimize risk of exposure to patients and staff. |
| • CCT may be preferred to transesophageal echocardiography (TEE) in order to rule-out left atrial appendage and intracardiac thrombus prior to cardioversion in order to reduce coughing and aerosolization related to TEE. |
| • The ability of CCT to decisively exclude coronary disease or high risk anatomy may prevent the need for inpatient admissions and resource use. |
| • Consider that elderly patients, those with co-morbidities, and those who may be immunosuppressed are at greater risk of morbidity / mortality from COVID-19, and the benefit and risk of cardiac CT should be evaluated on a case by case basis. |
| • In patients under investigation (PUI) and with confirmed COVID-19, the benefit of CCT in most clinical scenarios will likely be lower than the risk of exposure and infection to healthcare personnel. These cases should be considered on a case-by-case basis. |
| • |

Utilizing CCTA
can reduce
need for ICA,
inpatient
admissions and
resource use

SCCT: Use of CCTA during COVID-19 Pandemic

Use of cardiac computed tomography amidst the COVID-19 pandemic

Table 2: Timing considerations for common indications for CCT amidst COVID-19

	Elective Indications (May be rescheduled > 8 weeks)	Semi-Urgent Indications (Consider scanning within 4-8 weeks)	Urgent Indications (Consider scanning within hours to < 2-4 weeks)
CAD	Asymptomatic coronary artery calcium imaging		Acute chest pain when sufficient clinical suspicion for CAD
	Stable chest pain without high suspicion for CAD		Stable chest pain at high risk for events, or when there is concern for possible high-risk coronary anatomy

Data points to consider for determining elective vs. urgent patient types:

- In ISCHEMIA, 5% of patients with left main disease were identified by CCTA (AHA 2019)
- SCOT-HEART demonstrated 41% reduction in death and MI at 5 years with CCTA (Newby, et al. N Engl J Med 2018)
- A meta-analysis found FFR-guided PCI led to a 28% reduction in MI at 5 years (Zimmerman, et al. Euro Heart J 2019)

ACC/SCAI: Defer PCIs for Stable Ischemic Heart Disease



Journal of the American College of Cardiology

March 2020

DOI: 10.1016/j.jacc.2020.03.021

CARDIOVASCULAR MEDICINE AND SOCIETY

Just Accepted

Catheterization Laboratory Considerations During the Coronavirus (COVID-19) Pandemic: From ACC's Interventional Council and SCAI

Frederick G.P. Welt, Pinak B. Shah, Herbert D. Aronow, Anna E. Bortnick, Timothy D. Henry, Matthew W. Sherwood, Michael N. Young, Laura J. Davidson, Sabeeda Kadavath, Ehtisham Mahmud, Ajay J. Kirtane and American College of Cardiology's (ACC) Interventional Council and the Society of Cardiovascular Angiography and Intervention (SCAI)

Key Excerpts:

Under any circumstance, to preserve hospital bed capacity, it would seem reasonable to avoid elective procedures on patients with significant comorbidities or in whom the expected length of stay is >1 to 2 days (or anticipated to require the intensive care unit). In addition, the definition of truly elective requires clinical judgement, because in some cases deferral of patients may have independent deleterious effects.

However, examples of procedures to defer include: a) PCI for stable ischemic heart disease, b) endovascular intervention for ilio-femoral disease in patients with claudication, and c) patent foramen ovale closure.

[Link](#) to publication.

ACC/SCAI recommend avoiding elective invasive procedures when possible.

CCTA+FFR_{CT} has been shown to safely defer >60% of invasive diagnostic angiograms

COVID-19 Considerations: Role of CCTA-first Pathway

Utilization of a CCTA-first diagnostic pathway in symptomatic patients for whom cardiac testing cannot wait can offer the following benefits:

- Non-invasive with little requirement for contact between patient and providers
- Highly accurate CAD diagnostic approach with the highest negative predictive value to safely rule out CAD
- Reduced need for diagnostic invasive coronary angiograms, alleviating the burden on hospital cath labs and minimizing negative cath procedures
- Risk-stratify patients, enabling selection for revascularization of only the patients who would be at highest risk if deferred
- All CT reading, and ordering / interpretation of FFRct can be done remotely once CT scanning is complete

