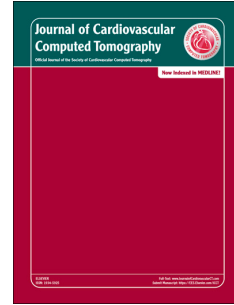


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Society of Cardiovascular Computed Tomography Guidance for Use of Cardiac Computed Tomography Amidst the COVID-19 Pandemic

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Abstract

The world is currently suffering through a pandemic outbreak of severe respiratory syndrome coronavirus 2 (SARS-CoV-2) known as Coronavirus Disease 2019 (COVID-19). The United States (US) Centers for Disease Control and Prevention (CDC) currently advises medical facilities to “reschedule non-urgent outpatient visits as necessary” (1). The European Centre for Disease Prevention and Control, the United Kingdom National Health Service and several other international agencies covering Asia, North America and most regions of the world have recommended similar “social distancing” measures(2, 3). The Society of Cardiovascular Computed Tomography (SCCT) offers guidance for cardiac CT (CCT) practitioners to help implement these international recommendations in order to decrease the risk of COVID-19 transmission in their facilities while deciding on the timing of outpatient and inpatient CCT exams. This document also emphasizes SCCT’s commitment to the health and well-being of CCT technologists, imagers, trainees, and research community, as well as the patients served by CCT.

Key Words: COVID-19, coronavirus, social distancing, cardiovascular computed tomography

Introduction

The world is currently suffering through a pandemic outbreak of severe respiratory syndrome coronavirus 2 (SARS-CoV-2) known as Coronavirus Disease 2019 (COVID-19). The United States (US) Centers for Disease Control and Prevention (CDC) currently advises medical facilities to “reschedule non-urgent outpatient visits as necessary” (1). The European Centre for Disease Prevention and Control, the United Kingdom National Health Service and several other international agencies covering Asia, North America and most regions of the world have recommended similar “social distancing” measures(2, 3).

The Society of Cardiovascular Computed Tomography (SCCT) offers guidance that fully support and extend these international recommendations specifically for cardiac CT (CCT) practitioners to decrease risk of COVID-19 transmission in their facilities while allowing for optimal timing considerations for effective utilization of CCT to improve cardiovascular health outcomes. While many institutions will have their own guidelines for clinicians and imagers to follow, these recommendations are meant to help CCT labs which are interested in developing or refining such policies. It is important to emphasize the SCCT’s commitment to the health and well-being of CCT technologists, imagers, trainees, and research community, as well as the patients served by CCT by preventing the spread of disease.

As this represents initial guidance for a rapidly evolving pandemic, the SCCT advises that CCT practitioners work closely with their referring physicians to determine the appropriateness and timing of each individual study on a case by case basis, while also considering the local epidemiology of COVID-19 and local institutional guidelines for practice.

Basic concepts

- Social distancing — keeping at least six feet (1.8 meters) between individuals in waiting rooms and work spaces as much as feasible.
- Encourage sick employees to stay home. Personnel who develop respiratory symptoms (e.g., cough, shortness of breath) or unexplained fever should be instructed not to report to work.
- Ensure that your sick leave policies are flexible and consistent with public health guidance and that employees are aware of these policies. Make contingency plans for increased absenteeism
- Screen patients and visitors for symptoms of acute respiratory illness (e.g., fever, cough, difficulty breathing) or gastrointestinal symptoms and coronavirus exposure in the last 2 weeks before entering one’s healthcare facility (4).
- Ensure technologist and CCT imager hand hygiene best practices. If soap and water are not readily available, use of a hand sanitizer that contains at least 60% alcohol.
- Consider standard droplet precautions for patients and healthcare personnel as per institutional infection control protocols.
- Increase scheduling intervals or appointment times to allow adequate time to clean equipment as needed.
- Leverage telemedicine technologies and isolated workstations to allow for reading and interpretation, that allow for social distancing to limit staff exposure, when possible.
- Assign a team member to monitor and incorporate regular updates from the CDC and appropriate regional jurisdictions.

Patients under investigation (PUI) and confirmed COVID-19

In patients under investigation (PUI) and with confirmed COVID-19, the benefit of CCT scanning in most clinical scenarios **will likely be lower than the risk of COVID-19 exposure and infection** to healthcare personnel. These cases should be considered on a case-by-case basis.

For these PUI and confirmed COVID-19 patients in which CCT scanning is determined to be necessary, the following issues should be considered:

- **Ensure proper use of personal protection equipment (PPE).** Healthcare personnel including technologists, radiologists and cardiac imagers who come in close contact with confirmed or suspected COVID-19 should wear the appropriate personal protective equipment(5, 6). Patients should wear a surgical mask during imaging to ensure standard droplet precautions.
- **Appropriate environmental cleaning and decontamination** of rooms by thorough cleaning of the surfaces by a staff member with appropriate PPE as per CDC and local institutional guidelines for airborne viral diseases(7).

Cardiac CT Indications and Timing

To advise practitioners of cardiovascular CT on how to implement the CDC recommendation of rescheduling non-urgent visits as necessary and international guidelines on social distancing, the SCCT offers the following guiding points (**Table 1**) and suggestions for CCT timing based on various indications (**Table 2**). As this is not an exhaustive list, the SCCT advises CCT practitioners to work with referring physicians on a case by case basis.

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

<ul style="list-style-type: none"> • The delivery of CCT services should be performed in a manner which will be safe to technologists and imagers, as well as patients.
<ul style="list-style-type: none"> • Consider deferring CCT exams which can be safely postponed in order to minimize risk of exposure to patients and staff.
<ul style="list-style-type: none"> • 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.
<ul style="list-style-type: none"> • The ability of CCT to decisively exclude coronary disease or high risk anatomy may prevent the need for inpatient admissions and resource use.
<ul style="list-style-type: none"> • 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.
<ul style="list-style-type: none"> • 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.

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	<ul style="list-style-type: none"> Asymptomatic coronary artery calcium imaging 		<ul style="list-style-type: none"> Acute chest pain when sufficient clinical suspicion for CAD
	<ul style="list-style-type: none"> Stable chest pain without high suspicion for CAD 		<ul style="list-style-type: none"> Stable chest pain at high risk for events, or when there is concern for possible high-risk coronary anatomy
SHD	<ul style="list-style-type: none"> Stable structural heart patients (eg TAVR, TMVR, LAA closure in conjunction with Heart Team)* 		<ul style="list-style-type: none"> Patient requiring urgent structural intervention (eg, TAVR, TMVR, LAA closure)
A-FIB	<ul style="list-style-type: none"> Pulmonary vein assessment for A-Fib Ablation planning* 	<ul style="list-style-type: none"> Evaluation of left atrial appendage in <u>chronic</u> atrial arrhythmia prior to restoration of sinus rhythm 	<ul style="list-style-type: none"> Evaluation of left atrial appendage in <u>acute</u> atrial arrhythmia prior to restoration of sinus rhythm
Heart Failure	<ul style="list-style-type: none"> Stable cardiomyopathy patients 		<ul style="list-style-type: none"> Acute inpatient cardiomyopathy in low to intermediate pretest probability of CAD where CCT would change management Evaluation of LVAD dysfunction
Valvular	<ul style="list-style-type: none"> Evaluation for aortic stenosis severity 	<ul style="list-style-type: none"> Sub-acute to chronic prosthetic valve dysfunction 	<ul style="list-style-type: none"> Acute symptomatic prosthetic heart valve dysfunction, endocarditis, perivalvular extension of endocarditis or possible valve abscess
Masses/Congenital	<ul style="list-style-type: none"> Cardiac masses, which are suspected to be benign or unlikely to plan biopsy or surgery 		<ul style="list-style-type: none"> New cardiac masses which are suspected to be malignant, if necessary to plan biopsy or surgery Rule-out left ventricular thrombus following equivocal echocardiography when alternative diagnostic tests (e.g. MRI) are not feasible
	<ul style="list-style-type: none"> Elective evaluation of congenital anatomy 		

*Especially in institutions that will delay such elective cases

CAD = coronary artery disease; SHD = structural heart disease; A-Fib = atrial fibrillation; LAA = left atrial appendage; TAVR = transcatheter aortic valve replacement/implantation; TMVR = transcatheter mitral valve replacement/implantation; LVAD = left ventricular assist device

Incidental pulmonary findings in patients at risk of COVID-19 exposure

COVID-19 is a viral pneumonia, with a spectrum of findings ranging from normal lungs to acute respiratory distress syndrome. Typical chest CT findings in known cases are described elsewhere(8, 9). If typical or atypical pulmonary findings are encountered, consultation with a radiologist with thoracic expertise is encouraged, and appropriate documentation and timely communication of these findings is important, especially in cases not known or suspected to have the disease.

Conclusion

As this situation is shifting rapidly, the information contained within this document is likely to evolve. The SCCT will maintain an updated version of this statement as more information becomes available on the Society's website at <http://www.scct.org>. The SCCT advises that members keep informed regarding future updates from the medical and radiological communities on protecting patients, staff, trainees and providers from COVID-19 while deciding on the optimal timing of outpatient and inpatient CCT exams.

Other Resources:

American College of Cardiology COVID-19 Bulletin

<https://www.acc.org/covid19#sort=%40commonsordate90022%20descending>

American College of Radiology Recommendations for the use of Chest Radiography and Computed Tomography (CT) for Suspected COVID-19 Infection

<https://www.acr.org/Advocacy-and-Economics/ACR-Position-Statements/Recommendations-for-Chest-Radiography-and-CT-for-Suspected-COVID19-Infection>

British Society of Thoracic Imaging: COVID-19 Resources

<https://www.bsti.org.uk/covid-19-resources/>

Centers for Disease Control and Prevention Steps for Healthcare Facilities

<https://www.cdc.gov/coronavirus/2019-ncov/healthcare-facilities/steps-to-prepare.html>

Coronavirus (COVID-19): UK government response

<https://www.gov.uk/government/topical-events/coronavirus-covid-19-uk-government-response>

European Centre for Disease Prevention and Control: COVID-19

<https://www.ecdc.europa.eu/en/novel-coronavirus-china>

Radiology Department Preparedness for COVID-19: *Radiology* Scientific Expert Panel

<https://pubs.rsna.org/doi/10.1148/radiol.2020200988>

Society of Thoracic Radiology/American Society of Emergency Radiology COVID-19 Position Statement

<https://thoracicrad.org/>

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9. British Society of Thoracic Imaging: COVID-19 Resources [Available from: <https://www.bsti.org.uk/covid-19-resources/>].