Canadian Cardiovascular Society

GUIDANCE FROM THE CCS COVID-19 RAPID RESPONSE TEAM

Guidance on Community-based Care of the Cardiovascular Patient During the COVID-19 Pandemic

March 25, 2020

Topics covered

1. Introduction

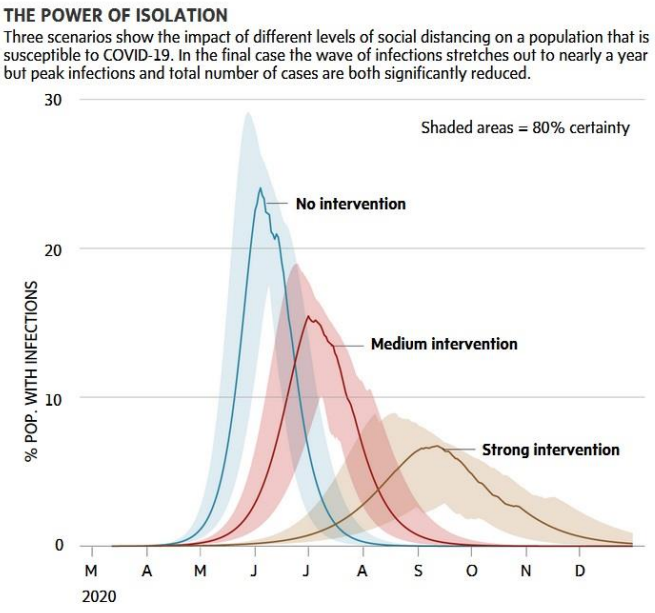
CCS represents the entire spectrum of cardiovascular healthcare professionals. A clear, concise statement is desired for the community cardiologist/health care provider in a clinic setting who is managing cardiovascular disease during the COVID-19 pandemic. Hospitals are currently focused solely on providing care for patients with urgent and emergent cardiovascular disease. The public is instructed to avoid hospitals, unless absolutely necessary.

This may mean that patients who should attend the Emergency Department for urgent and emergent conditions risk are not doing so. Consequently, optimal care for common cardiac conditions, such as acute coronary syndromes, heart failure, and atrial fibrillation may be delayed. Evidence from China and Italy suggests a marked drop in acute cardiac presentations with presumed consequences when medical attention is not sought. The unintended sequelae may be increased cardiovascular morbidity and mortality during this pandemic.

Community cardiologists play a pivotal role in pre-emptive care. This will limit visits to the emergency department, prevent hospital admissions, direct patients to the most appropriate specialized care and reduce the burden on family physicians. Rather than abbreviating or eliminating patient access, efforts should be focused on patients who require timely assessment, and directing triage, diagnostic testing, and important, effective therapies for the at-risk public. Guidance on the provision of accessible urgent care to at-risk patients is outlined below.

2. Principles

Be a champion: Lead the people around you in advocating for best practices to reduce transmission of COVID and flatten the curve (see Figure below).



From "When does social distancing end? Where we're headed and why". Ivan Semeniuk. *The Globe and Mail*, March 20, 2020.

Teamwork: It is critical that hospitals focus on the sickest and highest-risk patients. In the COVID era, it is important that community cardiologists play a central role in preventing emergency department visits and hospitalizations and support early discharge of hospitalized cardiac patients. This includes urgent care, satellite, and outreach clinics to ensure access to care.

Regional planning. Coordinate with other providers and services to ensure access to urgent cardiac clinical assessment, using ambulatory facilities, particularly Emergency Departments. Sites are encouraged to increase consultant availability to increase capacity for urgent assessments, which could involve recent retirees. Patients assured of rapid access are likely to accept reassurance and comply with follow-up.

Triage. Community cardiologists have a leadership role in the triage of referrals with active clinical decision-making, regarding prioritizing referrals and determining the best course of action for investigation, care and follow-up. The CCS guidance document on ambulatory management and diagnostic testing during the COVID-19 crisis is a useful resource (www.ccs.ca).

Diagnostic testing. Access to selective diagnostic testing is necessary after clinical assessment that incorporates risk prioritization and maximizes telehealth and videoconferencing for initial review. Testing should focus on clinically urgent situations where tests would result in immediately actionable data, or potentially disclose high-risk or life-threatening disease. Routine tests should be deferred wherever possible.

Providing patient-focused care. Promote telemedicine (by telephone, or virtual care when technology is available and practical for patients). In some cases, an in-office visit may be necessary, with appropriate precautions. Consider faxing prescriptions or providing verbal prescriptions to pharmacies to reduce the amount of time a patient spends in public waiting in the pharmacy. Ensure adequate follow-up is arranged to avoid visits to the Emergency Department. Most jurisdictions support full reimbursement for virtual care, and some have introduced temporary billing codes for telephone visits/virtual care.

Show your commitment. Implementing these changes will involve additional effort and reduced efficiency initially but are a tangible message of our commitment to patients. We are responsible physicians who recognize that these measures are necessary for optimal patient care.

Take time to plan.

- Take inventory of personal protective equipment (PPE) and restocking.
- Office location hours may change and impact access (e.g., mall hours).
- Consider office exposure and measures to reduce contamination (see below)
- Be vigilant about physician and staff exposure risk, which will result in 14-day isolation or illness.
- Ensure a plan is in place for your call group, including back up call schedules in the event of member illness.
- Protect your home from exposure if working in a high-risk area like a hospital.

3. Diagnostic Testing

a) All patients undergoing testing should be screened for symptoms of COVID infection (fever, new cough or difficulty breathing) at the time of test booking, and again when presenting for testing. See screening recommendations below.

b) All tests other than urgent or semi-urgent should be deferred. Pre-test clinical review conducted or directed by a Physician (telehealth or virtual consultation) should determine urgency. Diagnostic testing staff should not take primary responsibility for triage. Insist that test requisitions contain sufficient information to facilitate appropriate triage.

c) Conduct testing that minimizes exposure but answers the clinical question, including a preference for testing that requires minimal interaction, exposure and risk. Examples include patch monitors and treadmill testing without accompanying imaging, to reduce staff exposure.

d) Put quality assurance practices in place to manage the inevitable backlog of requisitions. Use the principles outline in the CCS Guidelines and Choosing Wisely resources to discourage unnecessary testing. Non-urgent requisitions should be deferred or returned to the ordering physician, and staff should work with them to determine an appropriate time frame the referring physician is comfortable waiting for the requested cardiac investigations.

4. In-Person Office Care

If a patient's condition requires an in-office visit, we recommend the following protocols:

a) Implement a policy of mandatory screening of all patients (and caregivers who will be accompanying them) before they attend the office. Several screening tools are outlined under resources below.

b) Have staff call the patient the day before their appointment to confirm their attendance, and to complete a screening questionnaire with the patient (and accompanying caregiver). Staff and office voicemail should convey the need for screening. Once a patient has been screened, sign and date the questionnaire and place in the patient chart. A patient with a high-risk screen should be directed to 811. A borderline screen should lead to physician follow-up.

c) The office entrance should include clear signage regarding the COVID screening process that the patient and caregiver should expect. Consider the languages necessary to best serve the population, and reflect that in any signage. Keep the medical office assistant window closed except when in use with a patient. If consent for testing is obtained, consider verbal consent to minimize contact and paper.

d) Schedule appointments to ensure minimal waiting persons in the waiting room. Move chairs two meters apart to ensure social distancing. Any items that cannot be easily cleaned (e.g., pamphlets, newspapers, magazines, stuffed toys) should be removed. Offer the option of the patient (and caregiver) to wait in their vehicle and text or call them when it's time for their appointment.

e) Add additional hand sanitizer stations throughout your clinic. Ask staff to regularly check on the availability of hand sanitizer and soap.

f) Minimize clinical decisions that lead to additional diagnostic testing (such as medication adjustment with associated blood work).

5. Cleaning the Clinic

a) Refer to the Public Health Agency of Canada's (PHAC) Infection prevention and control for coronavirus disease (COVID-19): Interim guidance for acute healthcare settings.

b) Healthcare organizations' terminal cleaning and disinfecting protocols for cleaning after discontinuation of contact and droplet precautions should be followed. See PHAC's information here.

c) Recommend and facilitate increased hand hygiene. Increased frequency of cleaning and disinfecting high-touch surfaces is essential in controlling microorganism fomite spread during a respiratory infection outbreak (e.g. phones, elevator buttons, washrooms, tables). Environmental cleaning products registered in Canada with a Drug Identification Number (DIN) and labelled as a broad-spectrum virucide are sufficient. All surfaces, especially those that are horizontal and frequently touched, should be cleaned and disinfected at least twice daily, and whenever soiled.

6. Supporting Office Staff

a) The opinions and recommendations regarding PPE are dynamic and variable according to jurisdiction. The local Medical Officer of Health/Public Health guidelines, including those around the merits of masks and gloves for staff or the public, should be observed. As of March 25, 2020, PPE is not recommended for asymptomatic low-risk patients or care providers, though there is a trend to advocate for more mask use and PPE in general, which must be balanced by concerns regarding adequate supply for future use. Staff should be educated in rigorous hand hygiene and social distancing tactics. Consider appointing an office champion.

b) Frequent communication is vital to reduce staff anxiety. Offer daily COVID-19 updates, implement daily virtual huddles, or share daily hospital bulletins or CCS guidance documents.

c) Open communication regarding home and work status is key. It may be necessary to defer staff vacation time. Home supports may be difficult to access, particularly child care.

d) Determine your policy regarding “excused from work”. A request to be off work may come from a patient for a variety of reasons, including patients in essential services such as health care workers. Weigh the risk of exposure and infection consequences in the workplace in rendering your judgment. There is no current decision framework for this difficult decision.

e) CCS has compiled a list of links to proposed and implemented resources from federal and provincial/territorial governments that provide support for businesses, employees and employers in response to the pandemic.

7. Resources

a) CCS home page for latest COVID-19 updates

b) Screening tools (all are free access)
   i. Alberta Health Services COVID-19 Self-Assessment Tool
   ii. BC COVID-19 Symptom Self-Assessment Tool
   iii. Manitoba COVID-19 Screening Tool

c) American College of Cardiology COVID website

d) PPE guidance (self-directed learning module) Alberta Health Services

e) PPE donning guidance (poster), World Health Organization, English
PPE donning guidance (poster), World Health Organization, French
PPE doffing guidance (poster) World Health Organization, English
PPE doffing guidance (poster) World Health Organization, French

f) Selection and Use of Personal Protective Equipment (PPE), Government of Canada

g) Choix et utilisation de l'équipement de protection individuelle (EPI), Gouvernement du Canada

Canadian Cardiovascular Society

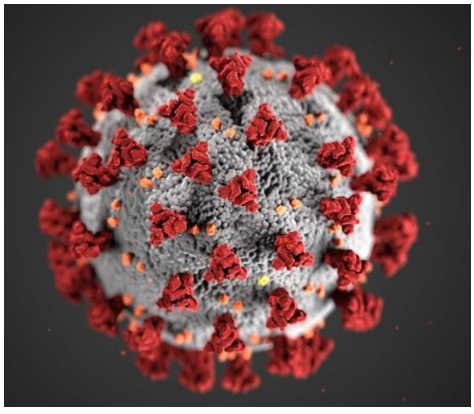
GUIDANCE FROM THE CCS COVID-19 RAPID RESPONSE TEAM

COVID-19 and Cardiovascular Disease: What the Cardiac Healthcare Provider Should Know

March 22, 2020

Topics covered

1. About the SARS-CoV-2 virus and COVID-19 infection



- ssRNA enveloped virus that binds to ACE2 on lung alveolar cells
- Ro is 2-3: the expected number of secondary cases produced by a single (typical) infection in a completely susceptible population
- Case fatality rate (CFR) ~3.8%
- Incubation 1-14 days, most patients show symptoms in 3-7 days
- Disease severity breakdown: 80% mild, 15% severe, 5% critical
- Mild symptoms include fever, cough, dyspnea, myalgias, fatigue, and diarrhea
- Severe and critical disease includes viral pneumonia, acute respiratory distress syndrome (ARDS), shock, and cytokine storm

2. Acute cardiovascular manifestations

a) Myocardial injury

i. Myocardial injury defined as an elevation in troponin level is common (7-17%)
ii. Troponin elevations are more common in severe illness vs non-severe and are associated with worse outcomes
iii. Mechanism of troponin elevation likely heterogeneous with most representing Type 2 ACS
iv. No specific therapy has been shown effective in these circumstances
v. ACC cautions against routinely ordering/trending troponin if it is unlikely to change therapy
vi. Type 1 ACS is very uncommon in COVID-19 patients

b) Myocarditis and cardiomyopathy

i. Myocarditis including fulminant forms have been described in several case series and case reports
ii. No confirmatory pathological specimens showing viral inclusions have been reported
iii. Severe disease includes a subgroup of patients who reportedly develop a cytokine storm syndrome, including elevated NTproBNP (27.5%), troponin (10%) and interleukin-6 levels
iv. Recent data from Seattle suggests cardiomyopathy was common (7%), however patients had a high rate of prior congestive heart failure (42%)
v. Unclear if fulminant myocarditis occurs independent of cytokine storm as an isolated entity, and the degree to which de novo cardiomyopathy occurs in the absence of pre-existing heart failure
vi. Transthoracic echocardiography (TTE) should be the first line non-invasive test to help support the diagnosis in these patients

c) Arrhythmia

i. Arrhythmia was reported in up to 16.7% of patients
ii. Granular details of arrhythmia type are not available presently, and whether this represents the systemic metabolic and inflammatory stressors of severe infection or cardiac disease involvement remains unclear

3. Impact on those with pre-existing cardiovascular disease

a) Pre-existing cardiovascular disease is common in COVID-19 patients. Hypertension is the most common cardiovascular comorbidity among patients hospitalized with COVID-19.
b) Prevalent underlying cardiovascular disease is associated with an increased rate of ICU admission, increased disease severity, and mortality
c) Prevalent cardiovascular disease may represent a degree of immunologic dysregulation, and along with aging may lead to an increased risk of infection susceptibility and severity

4. Approach to the COVID-19 patient

a) Appropriately personal protective equipment (PPE) is paramount
b) Donning and doffing protocols should be reviewing and practiced in anticipation of a markedly increased number of cases. Consider assigning a “PPE spotter” on the team/ward to educate and ensure proper donning and doffing (interactive reference below).
c) Healthcare workers should be familiar with their local hospital and regional protocols for CODE BLUE situations and high-risk of aerosolization procedures such as intubation. Intubation should only be performed by the most experienced airway expert available.

d) Pragmatic approaches to limit both time of exposure and number of health care personnel should be employed. These may include prescribing once daily medication options if available, limiting the physical examination to necessary components only, limiting cardiac testing, and providing phone consultation when appropriate.
e) The ACC currently recommends an echocardiogram for patients with biochemical or ECG evidence of myocardial injury. A detailed statement from the Canadian Society of Echocardiography (CSE) to help guide Echocardiography Labs is forthcoming.

5. Treatment of the COVID-19 patient

a) There are numerous biologically plausible therapies being considered for treatment of COVID-19, but insufficient evidence to support any of their use outside of evaluative studies, which are rapidly evolving and ongoing

b) As of March 22, 2020, no specific therapy is known to be effective for COVID-19-related cardiac injury. It is reasonable to treat these patients similar to current practice around non-specific troponin elevation in the ICU.

c) For adults with COVID-19 and shock, we recommend norepinephrine as first line therapy (not dopamine), and adding vasopressin as a second-line agent, over titrating norepinephrine dose. Based on currently available data, we recommend usual management strategies of myocarditis-induced cardiogenic shock/septic cardiomyopathy.

d) Some experimental therapies being used for COVID-19 have known cardiovascular toxicities and/or interact with cardiovascular medications[1]

   i. Azithromycin, hydroxychloroquine and lopinavir/ritonavir can cause QTc prolongation and resulting Torsade de Pointes.

   ii. Lopinavir/ritonavir is a potent liver enzyme (CYP3A4) inhibitor and can interact with antiplatelets, oral anticoagulants, digoxin, statins, and many others.

   iii. See http://www.covid19-druginteractions.org/ or speak to your pharmacist for updated guidance

e) As there is no clearly defined COVID-related viral myocarditis, there is no evidence-based indication to provide steroids to those with presumed myocarditis outside of the clinical entity of cytokine storm at this point.

f) If immunomodulating agents are being considered in fulminant myocarditis , involvement of multiple specialties on a case by case basis is recommended.

g) Please see the CCS website for guidance on use and safety of cardiovascular medications. In general, guideline-directed medical therapy for any pre-existing cardiovascular disease should NOT be altered in the absence of a compelling rationale.

6. How COVID-19 may affect delivery of cardiovascular care to non-infected patients

a) Patients in Hong Kong with STEMIs delayed seeking medical attention for up to 4 hours longer, presumably due to concern regarding COVID-19

b) Chinese hospitals developed rapid access chest pain clinics for those with unclear infectious status and provided telehealth when appropriate

c) Patients presenting with isolated chest pain and low/no suspicion of COVID-19 were immediately sent to a separate urgent cardiac care clinic to decant ER

d) Chinese hospitals developed protocols resulting in primary thrombolysis of STEMI patients where primary PCI was previously performed due to concerns of catheterization laboratory

activation delays and health care worker exposure. A detailed statement from the Canadian Association of Interventional Cardiologists (CAIC) is forthcoming

e) It remains unclear if Canada will experience the same issues with delivery of urgent cardiac care during the pandemic. Contingency and scenario planning is actively underway.

7. Additional resources

Clinical guidance, front-line clinical perspectives and more

- ACC's COVID Hub
  American College of Cardiology

How to conduct a safe echocardiogram

- COVID-19 Preparedness for Echo Labs: Insights from the Frontlines
  American Society of Echo
  Recording of webinar held Thursday, March 19th (also posted at www.csecho.ca)

Managing critically ill adults with COVID-19 in the intensive care unit (ICU)

- Surviving Sepsis Campaign: Guidelines on the Management of Critically Ill Adults with Coronavirus Disease 2019(COVID-19)
  Society of Critical Care Medicine

Clinical perspectives

- The Chinese Experience of the Cardiovascular Effects of COVID-19
  Chinese Cardiac Association and the American College of Cardiology
  Recording of webinar held Friday, March 20th

Infection prevention and control guidance for hospitals and healthcare workers

- Infection prevention and control for coronavirus disease (COVID-19): Interim guidance for acute healthcare settings
  Preliminary edition of infection prevention and control guidance for COVID-19, Public Health Agency of Canada
- Prévention et contrôle de la maladie à coronavirus (COVID-19) : Lignes directrices provisoires pour les établissements de soins actifs
  Version provisoire des lignes directrices en matière de PCI portant sur la maladie à coronavirus (COVID-19), Agence de la santé publique du Canada

Proper donning and doffing procedures for PPE

- Donning and doffing of PPE (video)
  Trillium Health Partners
- PPE gowning and degowning (video)
  Unity Health Toronto
- The correct order for putting on and the safe order for removal and disposal of PPE (video)
  NHS Scotland
- During cardiac emergencies in the cathlab with patients with COVID
  COVID and urgent cardiac procedures at Imperial College NHS Trust (video)
- Personal Protective Equipment, Contact and Droplet, COVID-19 (self-directed learning)
  Alberta Health Services
- Steps to put on personal protective equipment (PPE) (poster, English)
  Étapes pour enfiler l'équipement de protection individuelle (EPI) (poster, French)

Steps to take off personal protective equipment (PPE) (poster, English)
Étapes pour retirer l'équipement de protection individuelle (EPI) (poster, French)
World Health Organization

References

1. Driggin E, Madhavan MV, Bikdeli B, et al. Cardiovascular Considerations for Patients, Health Care Workers, and Health Systems During the Coronavirus Disease 2019 (COVID-19) Pandemic. *Journal of the American College of Cardiology.* 2020.
2. Xiong TY, Redwood S, Prendergast B, Chen M. Coronaviruses and the cardiovascular system: acute and long-term implications. *Eur Heart J.* 2020.
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4. Tam CF, Cheung KS, Lam S, et al. Impact of Coronavirus Disease 2019 (COVID-19) Outbreak on ST-Segment-Elevation Myocardial Infarction Care in Hong Kong, China. *Circ Cardiovasc Qual Outcomes.* 2020:CIRCOUTCOMES120006631.
5. Zheng YY, Ma YT, Zhang JY, Xie X. COVID-19 and the cardiovascular system. *Nat Rev Cardiol.* 2020.

The preparation of this document was led by Thomas Roston, MD, PhD, FRCPC and Nate Moulson, MD, FRCPC, UBC Cardiology Chief Residents, with input from the CCS COVID-19 Rapid Response Team

This is a living document with anticipated updates. Please use discretion as data evolves quickly and inaccuracies may exist. A background slide set with further details is available online on request (email nmoulson@alumni.ubc.ca or rostontm@alumni.ubc.ca).

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GUIDANCE FROM THE CCS COVID-19 RAPID RESPONSE TEAM

March 20, 2020

UPDATED - COVID-19 and concerns regarding use of cardiovascular medications, including ACEi/ARB/ARNi, low-dose ASA and non-steroidal anti-inflammatory drugs (NSAIDS)

(French version to follow)

The Canadian Cardiovascular Society and the Canadian Heart Failure Society make the following recommendations:

1. Patients taking an angiotensin-converting enzyme inhibitor (ACEi), angiotensin receptor blocker (ARB) or angiotensin receptor-neprilysin inhibitor (ARNi) for heart failure or hypertension should continue taking it unless otherwise advised by their physician.

2. **NEW March 20th** Patients with confirmed or suspected COVID-19 infection should not stop taking an ACEi/ARB/ARNi unless there is a compelling reason to do so (such as symptomatic hypotension or shock, acute kidney injury, or hyperkalemia).

3. **NEW March 20th** Patients taking low-dose acetylsalicylic acid (ASA, Aspirin™) for heart disease should continue taking it unless otherwise advised by their physician. This applies to children, adolescents and adults.

4. **NEW March 20th** Confirmed or suspected COVID-19 infection is **not** an indication to stop low-dose ASA.

5. **NEW March 20th** There is no clinical evidence regarding non-steroidal anti-inflammatory drugs (NSAIDs) use in patients with or at risk of COVID-19 infection; however, patients with heart failure or hypertension should preferentially choose acetaminophen over NSAIDs for fever or pain to avoid decompensation of these cardiovascular conditions.

Rationale

- There is no evidence that ACEi/ARB/ARNi or low-dose ASA increase risk of or susceptibility to COVID-19 infection.
- There is no evidence that ACEi/ARB/ARNi or low-dose ASA worsen outcomes in patients with confirmed or suspected COVID-19 infection.
- Cessation of ACEi/ARB/ARNi medications in stable patients with heart failure or hypertension can lead to uncontrolled hypertension and increased hospitalizations for heart failure with an unnecessary increase in health care utilization, exposing patients to risk of contracting the coronavirus, and straining valuable inpatient hospital resources.
- Cessation of low-dose ASA in stable patients with a valid indication for this therapy increases the risk of major cardiovascular events, including myocardial infarction, stroke or death, which would necessitate hospitalization.

Background

There are reports in the news and on social media that certain cardiovascular medications may increase the risk of COVID-19 infection or worsen outcomes in those with confirmed or suspected COVID-19 infections. On March 14th, a report from the French government reported that serious adverse events were noted among people with confirmed or suspected COVID-19 infection who took the NSAID ibuprofen. This message was spread further by the news and social media, with concerns extended to other NSAIDs, including acetylsalicylic acid (ASA). Importantly, this was based on unconfirmed anecdotes.

There is currently no clinical evidence regarding NSAID use (including ASA) in patients with or at risk of COVID-19 infection. There is insufficient mechanistic evidence for how NSAIDs, including ASA, would impact outcomes in COVID-19. One study in diabetic rats suggested that ibuprofen increases the expression of the angiotensin-converting enzyme-2 (ACE2) in myocardial tissue[1]. The COVID-19 virus (also known as SARS-CoV-2) is known to use ACE2 for entry into target cells[2]. Conversely, one study in dogs suggests that the NSAID indomethacin may have antiviral activity against the coronavirus responsible for the 2003 SARS outbreak[3]. It is important to stress that these are preclinical data only, and do not provide reliable guidance for clinical management.

Additional resources

- European Medicines Agency (EMA) press release from March 18, 2020 on NSAIDs for COVID-19: https://www.ema.europa.eu/en/news/ema-gives-advice-use-non-steroidal-anti-inflammatories-covid-19 [accessed March 19 2020]
- Medscape article on NSAIDs in COVID-19: https://www.medscape.com/viewarticle/926940 [accessed March 19 2020]
- World Health Organization (WHO) Official Twitter post from March 18, 2020 on ibuprofen in COVID-19: https://twitter.com/WHO/status/1240409217997189128?s=20 [accessed March 19 2020]
- Preclinical evidence and recommendations on Acei, ARB, ARNi and COVID-19: http://www.nephjc.com/news/covidace2

References

1. Qiao W, Wang C, Chen B, et al. Ibuprofen attenuates cardiac fibrosis in streptozotocin-induced diabetic rats. *Cardiology*. 2015;131(2):97-106. doi:10.1159/000375362

2. Hoffmann M, Kleine-Weber H, Krüger N, Müller M, Drosten C, Pöhlmann S. The novel coronavirus 2019 (2019-nCoV) uses the SARS-coronavirus receptor ACE2 and the cellular protease TMPRSS2 for entry into target cells. *bioRxiv*. January 2020:2020.01.31.929042. doi:10.1101/2020.01.31.929042

3. Amici C, Di Caro A, Ciucci A, et al. Indomethacin has a potent antiviral activity against SARS coronavirus. *Antivir Ther (Lond)*. 2006;11(8):1021-1030.

We will continue to provide updates as information becomes available.

Stay connected and stay healthy, to best support our patients.

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March 19, 2020

Hospital-based care and cardiac procedure use during the COVID-19 crisis

Principles

- Create capacity to accommodate increasing demand for hospital beds and health human resources in response to the COVID pandemic
- Implement social and healthcare distancing to minimize disease transmission, including non-urgent/emergent inter-hospital transfers
- Make decisions informed by understanding of patient risk profile, natural history of disease, spectrum of management options and anticipated length-of-stay data for various cardiac conditions
- Document decision-making processes to ensure due diligence in the care process
- Expect dynamic reassessment and iteration based on daily communication by operational and medical leadership

Recommendations across key clinical service areas

1. Invasive diagnostic testing, surgery and procedures

a) All inpatient procedures should be performed as soon as possible to facilitate treatment and discharge planning. This includes but is not limited to the following:

i. Revascularization by surgical or catheterization means, including acute ST elevation myocardial infarction (STEMI) care

ii. Surgical emergencies such as aortic dissection, infective endocarditis, and cardiogenic shock

iii. Secondary prevention ICD or CRT ICD

iv. Pacemaker implantation in patients with symptomatic bradycardia

v. Surgery or intervention for symptomatic advanced valvular heart disease

vi. Left ventricular assist device (LVAD) implantation or heart transplantation

vii. Pacemaker or ICD lead fracture/dislodgement leading to arrhythmia, hemodynamic compromise, inappropriate shock, and/or hospital admission

viii. Pacemaker or ICD lead extraction for infection

ix. Ventricular tachycardia ablation in medically refractory electrical storm

b) Regular triage by Cardiac Catheterization, Electrophysiology and Cardiac Surgery Directors or designates to ensure appropriateness, urgency and alignment with local outbreak response phase

c) Cancellation of all outpatient invasive diagnostic tests and related outpatient or inpatient procedures, with the following exceptions:

   i. Non-invasive diagnostic testing suggests urgent/high risk for cardiac events, integrated with clinical status to assign urgency and need for short term care as determined through a daily triage process

   ii. Endomyocardial biopsy for post-transplant surveillance (guided by local programs)

   iii. Pacemaker implantation in asymptomatic patients (prolonged pauses, high grade AV block)

   iv. Pacemaker or ICD generator changes for device at end of life, or in dependent patients at elective replacement indication

   v. Cardioversion or ablation of unstable supraventricular arrhythmia (syncope, preexcited atrial fibrillation, acute heart failure), particularly in patients at high risk of emergency room presentation

   vi. Invasive testing for high-risk syncope

d) A daily reassessment of critical care and STEMI capacity through the medical and operational leadership group

2. Ambulatory cardiology (please see CCS's Guidance on ambulatory management and diagnostic testing during the COVID-19 crisis)

a) Transition to virtual health/telehealth if possible and/or cancellation/rescheduling of routine follow-up visits

b) Continue emergency clinic visits based on local triage algorithms, as a mechanism to avoid pressures on the emergency room and to avert potential hospitalization

   i. Urgent appointments by virtual health/telehealth preferred

   ii. When in-person is deemed necessary, consider a "consultant of the day" model

   iii. Use ambulatory facilities where available

c) If face-to-face consults are required, limit the number of heath care providers involved to the minimum number required (especially multi-disciplinary clinics)

3. Non-invasive diagnostic services (please see CCS's Guidance on ambulatory management and diagnostic testing during the COVID-19 crisis)

a) Cancellation of all routine elective/surveillance appointments.

b) Retain limited diagnostic capacity for outpatients who are deemed to be unstable and/or to support urgent clinical assessment

   i. Testing should be preceded by a virtual or face to face assessment

ii. Where the testing is reasonably expected to inform patient management in the short term.

iii. Well defined and finite daily capacity which assumes a substantial reduction in outpatient volumes.

iv. Regular triage by Echocardiography and Electrodiagnostics Lab Directors, or designate at each site, to ensure appropriateness, urgency and alignment with local outbreak response phase.

c) A parallel discussion should be undertaken with adjacent departments such as Nuclear Medicine and Radiology to ensure aligned processes including myocardial perfusion imaging.

We will continue to provide updates as information becomes available.

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GUIDANCE FROM THE CCS COVID-19 RAPID RESPONSE TEAM

March 17, 2020

Ambulatory management and diagnostic testing during the COVID-19 crisis

Based on our local best practice, we are currently guided by the following principles with regards to ambulatory clinical assessment and diagnostic testing:

1. We support the principles of avoiding unnecessary contact and crowding in our workflow for patients and staff.

2. We support the planning of hospital-based and independent clinics to reduce all but urgent in-person visits and related contact and crowding by maximizing telehealth and videoconferencing.

3. Patients should be offered non “in-person” visits if care can be adequately delivered. The process and messaging should come from your local institution to ensure consistency for providers and patients/families.

4. Urgent cardiac clinical assessment using ambulatory facilities (including those external to hospital sites) is encouraged to reduce pressure on hospital-based services, particularly the emergency department. Sites are encouraged to increase Consultant availability to increase capacity for urgent assessments, which could involve recent retirees.

5. ***Suspension of elective and surveillance clinical assessment and diagnostic testing in stable and/or asymptomatic patients is strongly recommended***, pending further resolution of COVID-19 related guidance on care provision in this population from provincial and local authorities.

6. Outpatient and inpatient diagnostic testing should be guided by evaluation for urgent clinical assessment (see below).

The patient population suited to urgent assessment that may be by telephone/video or in- person should focus on:

New onset:

1. chest pain and equivalents with high-risk features
2. shortness of breath with suspected heart failure
3. sustained palpitations with high-risk features
4. suspected cardiac syncope

Worsening and refractory:

1. angina
2. heart failure

3. arrhythmias (such as unstable or rapid atrial fibrillation, ICD shock[s])

There are numerous other less common situations where urgent assessment is warranted, so clinical judgment must be exercised in the triage process of referral management. These include:

1. Left ventricular assist device (LVAD) and cardiac transplant patients, whose care should be guided by local experts

2. Congenital heart disease patients who have been referred to a new adult care provider, the transition visit may be deferred and the patient should continue to see their previous pediatric cardiologist for urgent matters

3. Suspicion of cardiac implantable device malfunction or infection, which may be clarified by remote care or require in-person evaluation

4. Non-invasive diagnostic testing suggests urgent/high-risk for cardiac events, which should be integrated with clinical status to assign urgency and need for short term care:
    a. Suspected cardiac masses, embolic stroke or infective endocarditis
    b. Significant left main or equivalent coronary artery disease on CT angiogram
    c. Large area of myocardium at risk or ischemia on MIBI/Stress Echo or cardiac MRI
    d. New significant structural abnormalities (severe left ventricular dysfunction, critical aortic stenosis, etc.)

Many speciality clinics are initiating a telephone screening physician or nurse-led consultation as a care and triage mechanism, to determine those patients best suited to in-person clinic assessment. When seeing patients that require a face-to-face visit, appropriate disinfectant and droplet precautions should be utilized. When a face-to-face appointment is required, the number of health care providers should be kept to a minimum. Subspecialty Affiliates are also communicating more detailed, patient group specific recommendations (see www.ccs.ca).

In addition, partnering with hospital emergency departments is key to enable their ability to focus on acutely ill patients. As always, these recommendations are based on the best guidance as of March 17th, and members are encouraged to work closely with local health institutions.

We will continue to provide updates as information becomes available.

Stay connected and stay healthy, to best support our patients.

The CCS COVID-19 Rapid Response Team

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CHFS/SCIC

March 15, 2020

La version française sera disponible à une date ultérieure.

COVID-19 and concerns regarding use of ACEi/ARB/ARNi medications for heart failure or hypertension

The Canadian Cardiovascular Society and the Canadian Heart Failure Society **strongly discourage the discontinuation of guideline directed medical therapy (GDMT) involving Angiotensin Converting Enzyme Inhibitors (ACEi), Angiotensin Receptor Blockers (ARB) or Angiotensin Receptor Neprilysin Inhibitors (ARNi) in hypertensive or heart failure patients as a result of the COVID-19 pandemic**. Cessation of these drugs in stable patients can lead to uncontrolled hypertension and increased hospitalizations for heart failure with an unnecessary increase in health care utilization, straining our valuable inpatient hospital resources. Although preclinical data has shown that the COVID-19 virus (also known as SARS-CoV-2), uses the SARS-COV receptor angiotensin converting enzyme (ACE) 2 for entry into target cells[1], *there is NO* clinical evidence at this time to support withdrawal of these agents. Please continue GDMT.

These are difficult times, and we want our members to have all available local, national and global resources to best navigate the COVID-19 pandemic. Based on our local best practice, we are currently guided by the following principles with regards to ambulatory and elective procedure patients:

1. We support the principles of avoiding unnecessary contact and crowding in our workflow for patients and staff.
2. We will provide support for planning of hospital based and private clinics to reduce in person visits and related contact and crowding by maximizing telehealth and videoconferencing.
3. Patients should be offered non "in person" visits if care can be adequately delivered. The process and messaging should come from your local institution to ensure consistency for providers and patients/families.
4. Diagnostic testing warrants review to ensure patients and staff are not placed at unnecessary risk, placing a priority on patients where deferred testing poses potential risk. This safety message must be balanced with inevitable waitlist pressures and need for ongoing care of cardiovascular patients.
5. Pay close attention to local dialogue regarding nonessential procedural bookings in anticipation of increased acute care requirements and the need to delay the procedure.

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CHFS SCIC

Additional resources for members include:

The American College of Cardiology COVID-19 Hub:
https://www.acc.org/latest-in-cardiology/features/accs-coronavirus-disease-2019-covid-19-hub#sort=%40fcommonsortdate90022%20descending

Canada.ca COVID -19 website: https://www.canada.ca/en/public-health/services/diseases/2019-novel-coronavirus-infection.html

COVID -19 Clinical Guidance for the Cardiovascular Team (American College of Cardiology):
https://www.acc.org//~/media/Non-Clinical/Files-PDFs-Excel-MS-Word-etc/2020/02/S20028-ACC-Clinical-Bulletin-Coronavirus.pdf

Caring for critically ill COVID -19 patients:
https://jamanetwork.com/journals/jama/fullarticle/2762996?guestAccessKey=91c67e56-599a-43a4-9b29-1d3aaa70733f&utm_source=silverchair&utm_medium=email&utm_campaign=article_alert-jama&utm_content=olf&utm_term=031120

Preclinical evidence and recommendations on Acei, ARB, ARNi and COVID-19:
http://www.nephjc.com/news/covidace2
https://www.escardio.org/Councils/Council-on-Hypertension-(CHT)/News/position-statement-of-the-esc-council-on-hypertension-on-ace-inhibitors-and-ang
https://www.nature.com/articles/s41569-020-0360-5

Hoffmann M, Kleine-Weber H, Krüger N, Müller M, Drosten C, Pöhlmann S. The novel coronavirus 2019 (2019-nCoV) uses the SARS-coronavirus receptor ACE2 and the cellular protease TMPRSS2 for entry into target cells. bioRxiv 2020:2020.01.31.929042

All of this of course is subject to the rapidly evolving landscape. Stay connected and healthy, to best support our patients.

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