Cardiac surgery in Canada during the COVID-19 Pandemic: A Guidance Statement from the Canadian Society of Cardiac Surgeons

Ansar Hassan, MD, PhD, Rakesh C. Arora, MD, PhD, Corey Adams, MD, MSc, Denis Bouchard, MD, PhD, Richard Cook, MD, MSc, Derek Gunning, MD, Yoan Lamarche, MD, MSc, Tarek Malas, MD, MSc, Michael Moon, MD, Maral Ouzounian, MD, PhD, Vivek Rao, MD, PhD, Fraser Rubens, MD, MSc, Philippe Tremblay, MD, Richard Whitlock, MD, PhD, Emmanuel Moss, MD, MSc, Jean-François Légaré, MD, MSc, on behalf of the Canadian Society of Cardiac Surgeons

PII: S0828-282X(20)30323-8

DOI: https://doi.org/10.1016/j.cjca.2020.04.001

Reference: CJCA 3705

To appear in: *Canadian Journal of Cardiology*

Received Date: 31 March 2020

Revised Date: 1 April 2020

Accepted Date: 1 April 2020

Please cite this article as: Hassan A, Arora RC, Adams C, Bouchard D, Cook R, Gunning D, Lamarche Y, Malas T, Moon M, Ouzounian M, Rao V, Rubens F, Tremblay P, Whitlock R, Moss E, Légaré J-F, on behalf of the Canadian Society of Cardiac Surgeons, Cardiac surgery in Canada during the COVID-19 Pandemic: A Guidance Statement from the Canadian Society of Cardiac Surgeons, *Canadian Journal of Cardiology* (2020), doi: https://doi.org/10.1016/j.cjca.2020.04.001.

Cardiac surgery in Canada during the COVID-19 Pandemic: A Guidance Statement from the Canadian Society of Cardiac Surgeons

Ansar Hassan MD, PhD[1]; Rakesh C. Arora MD, PhD[2]; Corey Adams MD, MSc[3]; Denis Bouchard MD, PhD[4]; Richard Cook MD, MSc[5]; Derek Gunning MD[6]; Yoan Lamarche MD, MSc[4]; Tarek Malas MD, MSc[7]; Michael Moon MD[8]; Maral Ouzounian MD, PhD[9]; Vivek Rao MD, PhD[9]; Fraser Rubens MD, MSc[10]; Philippe Tremblay MD[11]; Richard Whitlock MD, PhD[12]; Emmanuel Moss MD, MSc[13] and Jean-François Légaré MD, MSc[1] on behalf of the Canadian Society of Cardiac Surgeons

1. New Brunswick Heart Center, Dalhousie University, Saint John, NB
2. Max Rady College of Medicine, Department of Surgery, University of Manitoba, Winnipeg, MN
3. Libin Cardiovascular Institute, University of Calgary, Calgary, AL
4. Montreal Heart Institute, Department of Surgery, University of Montreal, Montreal, PQ
5. St. Paul's Hospital, Department of Surgery, University of British Columbia, Vancouver, BC
6. Royal Columbian Hospital, Department of Surgery, University of British Columbia, Vancouver, BC
7. Quebec Heart and Lung Institute, Laval University, Quebec, PQ
8. Mazankowski Heart Institute, University of Alberta, Edmonton, AL
9. Department of Surgery, Division of Cardiovascular Surgery, University of Toronto, Toronto, ON
10. Ottawa Heart Institute, Division of Cardiac Surgery, University of Ottawa, Ottawa, ON
11. Maritime Heart Centre, Dalhousie University, Halifax, NS
12. McMaster University, Hamilton, ON
13. Jewish General Hospital, Department of Surgery, McGill University, Montreal, PQ

Address for correspondence:
Dr. Jean-François Légaré MD MSc
New Brunswick Heart Centre
Saint John Regional Hospital
400 University Ave, PO Box 2100
Saint John, New Brunswick, Canada E2L 4L2
Telephone: 506 648 6102 Fax: 506 648 6110
Email: legarej@me.com

Disclosure statement: All authors have denied any financial and personal relationships with other people or organizations that could inappropriately have influenced the current submission.

Brief Summary

In light of the COVID-19 pandemic and the impact that it has had on the delivery of cardiac surgery across Canada, the Canadian Society of Cardiac Surgeons (CSCS) and its Board of Directors have come together to formulate a series of guiding statements intended to provide guidance to their colleagues on the subjects of leadership, patient triage and risk reduction.

WORD COUNT: 60 words

Abstract

On March 11, 2020, the World Health Organization declared that COVID-19 was a pandemic.[1] At that time, only 118,000 cases had been reported globally, 90% of which had occurred in 4 countries.[1] Since then, the world landscape has changed dramatically. As of March 31, 2020, there are now nearly 800,000 cases with truly global involvement.[2] Countries that were previously unaffected are currently experiencing mounting rates of the novel coronavirus infection with associated increases in COVID-19 related deaths.

At present, Canada has over 8000 cases of COVID-19, with considerable variation in rates of infection between provinces and territories.[3] Amidst concerns over growing resource constraints, cardiac surgeons from across Canada have been forced to make drastic changes to their clinical practices. From prioritizing and delaying elective cases to altering therapeutic strategies in high risk patients, cardiac surgeons along with their heart teams are having to reconsider how best to manage their patients.

It is with this in mind that the Canadian Society of Cardiac Surgeons (CSCS) and its Board of Directors have come together to formulate a series of guiding statements. With strong representation from across the country and the support of the Canadian Cardiovascular Society, the authors have attempted to provide guidance to their colleagues on the subjects of leadership roles that cardiac surgeons may assume during this pandemic, patient assessment and triage, risk reduction and real-time sharing of expertise and experiences. A visual abstract of the main principles underlying our recommended approach is provided in Figure 1.

WORD COUNT: 246

MANUSCRIPT WORD COUNT: 1121 (excluding references); 1239 (including references)

As the number of COVID-19 cases continues to increase across Canada, the Canadian Society of Cardiac Surgeons (CSCS) and its Board of Directors strongly support the need to contain COVID-19 and to limit its transmission through social distancing, self-isolation and self-quarantine, as directed by the public health authorities. We also fully endorse the efforts taken at every level of the health care system (hospital, local health authority, provincial department of health, federal health ministry) to prepare for the potential surge in COVID-19 patients and any clinical needs that may come as a result.

Unfortunately, few have been able to accurately estimate the extent to which COVID-19 will affect the population of Canada in terms of incidence rates, duration and recovery. Even less is known about how the impact of COVID-19 will vary from hospital to hospital and from province to province. Amongst all of this uncertainty, cardiac surgeons from across the country are being required to scale back their clinical practices in anticipation of an eventual scarcity of resources, including shortages in personal protective equipment (PPE), surgical drapes, mechanical ventilators, extracorporeal membrane oxygenation (ECMO) circuits and, ultimately, health care personnel. Despite this, cardiac surgeons now, more than ever before, have an incredibly valuable role to play during these challenging times.

The CSCS feels that it is imperative that cardiac surgeons maintain an active leadership role on the health care team during this pandemic and contribute their skill sets, both within and outside of their traditional scope of practice. To this effect, the CSCS has proposed the following guiding statements in an effort to guide cardiac surgeons over the short-term as the COVID-19 pandemic continues to unfold.

1. Cardiac surgeons should be actively engaged in the emergency response teams of their respective institutions during the pandemic response.
2. The first priority of the cardiac surgery team is to ensure that the cardiac surgery needs of the hospital, the health region, and in certain instances, the province, are met within the context of the COVID-19 burden within your jurisdiction. However, cardiac surgeons, in this time of need, should also be willing to take on additional responsibilities including, but not limited to: (a) performing non-cardiac surgery, (b) caring for non-surgical cardiovascular patients and (c) caring for critically ill patients irrespective of their COVID-19 status.
3. Cardiac surgeons should be involved in regular discussions with their administration, cardiology colleagues and critical care colleagues to evaluate resource availability in order to ensure the appropriate utilization of potentially scarce resources including, but not limited to, ward and ICU beds, ventilators, ECMO circuits, operating rooms, equipment, drapes, PPE, medications, blood products and health care personnel.
4. Cardiac surgeons should triage patients that are in-hospital or on the elective wait list in a manner that is based not only on the patient's clinical status and risk factor profile but also on the extent to which services are available or have been reduced in response to the COVID-19 pandemic (Figure 2). This is a strategy similar to the one recently adopted by the Canadian Association of Interventional Cardiology (CAIC).[4] Undoubtedly, there is concern that the proposed prioritization strategy will result in a surgical delay and may put patients at significantly increased risk. As such, it is critically important that cardiac surgeons ensure the presence of a robust wait times database at their institution that captures rates of adverse

events in these patients while on the wait list so that decisions around the re-allocation of resources may be made in a timely fashion.

5. Cardiac surgeons should advocate for a continued role for the heart team model to solicit the input of clinical cardiology, interventional cardiology, interventional radiology and critical care in determining the optimal intervention for patients, in particular those who are complex and/or high-risk.
6. In an effort to minimize risk to the patient, cardiac surgeons should employ virtual clinics, using either a secure form of teleconferencing or videoconferencing, to assess patients from home who are either new referrals, post-op follow-ups, or currently on the wait list. Similar technology may be used, if available, to assess inpatients from other institutions to avoid potentially unnecessary hospital-to-hospital transfers.
7. Where it is feasible, cardiac surgical programs should make every effort to maintain areas within their institution for cardiac surgery patients that are completely separate from COVID-19 patients given the vulnerability of the average cardiac surgery patient (increased biologic age and cardiovascular risk factors) were they to become infected with COVID-19.
8. Non-emergent cardiac surgical interventions on patients suffering from an acute viral infection (such as, but not limited to, COVID-19) are largely discouraged based on the belief that this could significantly elevate the risk of post-operative acute respiratory distress syndrome and mortality in that setting.[5] In the event that a cardiac surgical procedure is performed on a presumed or confirmed COVID-19 positive patient, cardiac surgeons must be closely engaged with their hospital administration and infection control personnel to ensure the safety of the health care team.

9. Cardiac surgeons should take the necessary steps (e.g. donning and doffing PPE), as mandated by their institution and their local health authorities, to ensure their own health and well-being as well as the health and well-being of the members of the health care teams that they work with.
10. Cardiac surgeons and their health care team must be aware of procedures and techniques that may potentially generate increased quantities of aerosol matter including, but not limited to: (a) double-lumen vs. single-lumen endotracheal intubation, (b) re-operative minimally invasive surgery requiring lung dissection and (c) re-do sternotomy vs. traditional sternotomy.
11. Cardiac surgeons across Canada are encouraged to share their expertise and novel experiences as they relate to the COVID-19 pandemic in a timely manner to improve overall outcomes. For example, protocols for triaging of patients on the wait list, ECMO use, and the OR management of COVID-19 positive patients should be posted online using readily available web-based platforms that would allow for cardiac surgeons and their teams to learn from one another in real-time.

These are challenging times, and the CSCS is looking for leadership and equanimity. We, as a community, need to continue to rise to the persistently evolving challenges posed by this historic event. We need to employ all of our skills, clinical, academic, administrative and otherwise, to ensure optimal care for our patients while offering a safe environment for our health care teams. Understanding fully that the above-listed guiding statements may change over time given the fluidity and scope of the current pandemic and appreciating that there are geographic differences in practice patterns and the delivery of health care across Canada, it is our hope that this

document will be of assistance to our colleagues as the COVID-19 pandemic continues to unfold.

References

1. "WHO Director-General's Opening Remarks at the Media Briefing on COVID-19 - 11 March 2020." World Health Organization, 11 Mar. 2020, www.who.int/dg/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19---11-march-2020.
2. "Coronavirus Disease (COVID-19) Situation Dashboard." World Health Organization, 1 Apr. 2020, https://experience.arcgis.com/experience/685d0ace521648f8a5beeeee1b9125cd.
3. Public Health Agency of Canada. "Government of Canada." *Canada.ca*, Government of Canada, 1 Apr. 2020, https://www.canada.ca/en/public-health/services/diseases/2019-novel-coronavirus-infection.html.
4. Wood DA, Sathananthan J, et al. "Precautions and Procedures for Coronary and Structural Cardiac Interventions during the COVID-19 Pandemic: Guidance from Canadian Association of Interventional Cardiology." *Can J Cardiol*. E-pub ahead of print (March 23, 2020).
5. Groeneveld, Geert H., et al. "Influenza Season and ARDS after Cardiac Surgery." *New England Journal of Medicine*, vol. 378, no. 8, 2018, pp. 772–773., doi:10.1056/nejmc1712727.

Figure 1: Visual abstract of the guiding principles for the cardiac surgery

Figure 2: Suggested template for patient triage for cardiac surgery procedures to be modified based on local context, infrastructure and capacity (AS: aortic stenosis; ASD: atrial septal defect; CAD: coronary artery disease; EF: ejection fraction; LM: left main; LOS: length of stay; MR: mitral regurgitation; PFO: patent foramen ovale; TAVI: trans-catheter aortic valve implantation).

Cardiac Surgery in Canada During the COVID-19 Pandemic

Continue to provide ongoing leadership with the Heart Team

Develop an institutional strategy for triaging cardiac surgery procedures

Contribute your skills to where they are needed

STAGE 1 (0-30% reduction in services)

Essential services	Deferred
• All in-patients waiting for surgery including emergency services • Outpatients who are at greatest risk of adverse event o Symptomatic critical AS o Symptomatic severe CAD with LM, 3 vessel CAD and low EF Cardiac tumors at risk of obstruction or embolization o Aortic aneurysm at risk based on size and or symptoms o High risk TAVI with short expected LOS o (low EF, or recent hospitalization)	• All other patients who will mainly be least symptomatic outpatients • Truly elective intervention could include o Asymptomatic severe MR o ASD and or PFO surgery o Asymptomatic aneurysm with demonstrated stable size

- **Patients on the wait list for surgery should be contacted to explain the current situation and screened for changes in their current status**
- **Programs are encouraged to adopt a mechanism by which patients who are having increased symptoms or who are not doing well can contact the program to receive additional screening**

STAGE 2 (30-50% reduction in services)

Essential services	Deferred
• All in-patients waiting for surgery including emergency services • Outpatients who are most symptomatic and demonstrated to fail medical management • TAVI - Limited inpatient cases that would facilitate hospital discharge	• All other patients who will mainly be least symptomatic outpatients

- **Patients on the wait list for surgery should be contacted to explain the current situation and screened for changes in their current status**
- **Programs are encouraged to adopt a mechanism by which patients who are having increased symptoms or who are not doing well can contact the program to receive additional screening**

STAGE 3 (>50% reduction in services)

Essential services	Deferred
• **Only emergency services based on resource availability** • **Most urgent in-patients if capacity allow**	• All inpatients judged to be stable and capable of waiting • All outpatients • Patients deteriorating while waiting would need to meet criteria for admission before consideration for surgery • TAVI Procedure

- **Patients on the wait list for surgery should be contacted to explain the current situation and screened for changes in their current status**
- **Programs are encouraged to adopt a mechanism by which patients who are having increased symptoms or who are not doing well can contact the program to receive additional screening**