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EDITORIAL

# Procedural Volumes in the Era of COVID: The Risk Versus Benefit Trade-Off

**Chinmay Khandkar, MD, MMed(Clin) [a,b], Sanjay Patel, MBBS, PhD [b,c,d], Clare Arnott, MBBS, PhD [b,c,e,*]**

[a]Department of Cardiology, Orange Health Service, Orange, NSW, Australia
[b]The University of Sydney, Sydney, NSW, Australia
[c]Department of Cardiology, Royal Prince Alfred Hospital, Sydney, NSW, Australia
[d]Heart Research Institute, Sydney, NSW, Australia
[e]The George Institute for Global Health, University of New South Wales, Sydney, NSW, Australia

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In this issue of *Heart Lung and Circulation*, O'Sullivan *et al.* present a timely and relevant paper [1] on the impact of the COVID-19 pandemic on cardiac procedural volume across Australia. COVID-19 has had a profound impact on the delivery of health care services around the world, requiring policy makers to employ sweeping reforms at a rapid pace to tackle this global pandemic. Although Australia and New Zealand have seen far fewer cases than other nations across the world, the series of health policies implemented, ranging from local health district to federal directives, have caused an understandable decline in the number of non-COVID-19 related tests and procedures. From stay-at-home public health orders and border closures to the delay of non-urgent procedures and cancelling of elective surgical lists, it became clear that these measures would disrupt the standard practice of cardiovascular medicine in Australia. Given the new "delta" strain of COVID-19, at time-of-writing (July 2021) spreading through New South Wales, Australia's most populous state, it is important to reflect on how our past experiences with COVID-19 have shaped current approaches. O'Sullivan *et al.* report on the results of a region specific sub-study of the International Atomic Energy Agency Non-invasive Cardiology Protocol Survey on COVID-19 (INCAPS COVID)[2], a large, multi-national survey across 909 centres in 108 countries to assess the impact of the pandemic on cardiac testing across the world. This paper specifically looked at the sites across Oceania (53 in Australia, 11 in New Zealand, and 1 in Papua New Guinea), of specific interest and relevance to this readership.

There was a 52% reduction in total procedural volumes across Oceania, which is in-line, albeit significantly less so ($p<0.001$), than the reduction of cardiac procedures across the rest of the world (76%). The implications of this reduction are largely unknown, in Australia or globally. Similar to other cardiac societies around the world, the Cardiac Society of Australia and New Zealand (CSANZ) released a series of procedural guidelines at the end of March 2020 with the intent to rationalise resources for diversion as required, and to also protect staff and patients from transmission [3–5]. The results of INCAPS COVID Oceania suggest that these recommendations were well received and likely influential in affecting procedural numbers. For example, CSANZ recommended deferring all outpatient elective transoesophageal echocardiography (TOE) and performing only urgent inpatient TOEs which would significantly alter management, given the high risk of aerosolisation [6]. This corresponded with a marked reduction in TOE volumes in both inpatient (73%) and outpatient (82%) settings. Similarly, numbers of stress electrocardiograms and stress echocardiograms were also reduced in both inpatient (79% and 82%, respectively) and outpatient (94% and 65%, respectively) settings. Computed tomography coronary angiography (CTCA) on the other hand, had a lower magnitude of reduction in procedural volume (inpatient 41% and outpatient 29% reduction), perhaps, in part, due to the lack of aerosolisation

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*Corresponding author at: George Institute, Level 5, 1 King St, Newtown, NSW 2042, Australia; Email: carnott@georgeinstitute.org.au; Twitter: @georgeinstitute

risk from this procedure. Similarly, stress single-photon emission computed tomography (SPECT) testing had a lower reduction, likely due to widespread protocols available for non-aerosolising pharmacological induction of stress. The cancellation of elective surgical lists would have also contributed to the reduction in procedural volumes for all of the above-mentioned non-invasive diagnostic tests.

Reassuringly, there was no significant difference in the overall reduction of procedural volumes between metropolitan and regional/rural Australia. Australia's unique geographic distribution has always posed a challenge to delivery of care in rural and remote communities. These vulnerable areas often rely on visiting support from metropolitan cardiologists, which could be threatened in the pandemic environment. This may explain a discrepancy that was noted, a more marked reduction in transthoracic echocardiogram volumes across rural/regional sites. Enhanced infrastructure for telehealth and remote assessment services will no doubt be of benefit during this pandemic period but will also hopefully improve our capability to deliver cardiovascular health care to regional and remote communities after the pandemic.

The key question the authors also raise, is whether reduction in cardiovascular testing had any impact on cardiovascular outcomes. It remains unclear whether patients eventually underwent diagnostic tests and treatment as appropriate, or whether they were lost to follow-up altogether. One would expect a possible increase in cardiovascular morbidity and mortality in both scenarios, with presumably worse outcomes in the latter. Given the recent resurgence of COVID-19 in Australia, this question becomes extremely relevant. Two (2) retrospective studies from England [7] and France [8] reported reductions in non ST elevation myocardial infarction (NSTEMI) (42% and 35%, respectively) and ST elevation myocardial infarction (STEMI) (24% and 23%, respectively) hospital admissions during the COVID-19 pandemic. The most likely explanation for these findings is that patients are concerned about COVID-19 exposure risk when attending hospitals, and thus are more likely to tolerate symptoms at home. Another hypothesis could be the reduction in exercise and stress-inducing activity leading to less events, which may have some bearing on these figures. Furthermore, patients may rely on family and friends to help facilitate their engagement with health care providers. With increasing restrictions further isolating patients in the community, this may interfere with their ability to access health care. Observational data from the United States [9] found significant national increases in the number of deaths attributable to ischaemic heart disease and hypertensive diseases during the three (3) months following pandemic onset. Similarly to Australia, there was also a reduction in the volume of cardiovascular diagnostic procedures across the US (68%)[10]. While causal inferences cannot be deduced from these observational studies, the threat of worsening cardiovascular outcomes cannot be ignored. Thus, it remains to be seen what the medium to long term outcomes will show as a consequence of delays in investigation and potentially treatment delivery during COVID-19 in Australia.

A small single-centre study [11] at the Austin Hospital, Melbourne, compared heart failure (HF) hospitalisations across the COVID-19 and non-COVID eras. Toner *et al.* reported a 41% reduction in HF hospitalisations (32 cases from March 2020 to April 2020, compared to a historical mean of 52 cases in this same time-period from 2014 to 2017, $p<0.001$). However, patients who presented to hospital were significantly more symptomatic, with higher New York Heart Association (NYHA) classification scores. Similar observations were noticed across Europe [12–14]. Concerningly, Toner *et al.* reported a significant reduction in the use of angiotensin converting enzyme (ACE) inhibitors and angiotensin receptor blocker (ARB) agents, presumably due to the early reports of renin-angiotensin-aldosterone-system inhibition altering ACE II expression to increase SARS-COV-2 virulence. This hypothesis has shown insufficient supporting data to be clinically meaningful [15]. Given the strong recommendation for using ACE inhibitors and ARBs in heart failure management [16], it is imperative we strive to deliver high quality evidenced-based medicine to our patients even during a pandemic.

COVID-19 continues to pose one of the greatest challenges to our health care system and policy makers in recent history. A coordinated response from cardiovascular societies across the globe has resulted in a series of recommendations which have likely contributed to the reduced volume of cardiac diagnostic procedures performed. Ongoing studies on outcome data will no doubt provide a better picture of the state of cardiovascular medicine in Australia, and provide guidance as to how to better provide much needed cardiac services to our patients. It will be interesting to see whether numbers of cardiac procedures will return to pre-COVID levels once we have successfully managed the threat of COVID-19. Unfortunately, until a significant proportion of Australians are vaccinated, COVID-19 will likely continue to remain a disruptive force on cardiology services for the foreseeable future.

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## Conflicts of Interest

The authors report no relationships that could be construed as a conflict of interest.

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