Heart, Lung and Circulation (2020) ■, ■–■
1443-9506/20/$36.00
https://doi.org/10.1016/j.hlc.2020.04.004

EDITORIAL

Cardiovascular Disease in the Post-COVID-19 Era – the Impending Tsunami?

Usaid K. Allahwala, MBBS, FRACP [a,b], A. Robert Denniss, MD, FRACP [b,c,d], Sarah Zaman, MBBS, FRACP, PhD [e,f], Ravinay Bhindi, MBBS, FRACP, PhD [a,b,*]

[a]Department of Cardiology, Royal North Shore Hospital, Sydney, NSW, Australia
[b]The University of Sydney, Sydney, NSW, Australia
[c]Department of Cardiology, Westmead Hospital, Sydney, NSW, Australia
[d]Editor-in-Chief, Heart, Lung and Circulation, Sydney, NSW, Australia
[e]Monash Cardiovascular Research Centre, Monash University, Melbourne, Vic, Australia
[f]Monash Heart, Monash Medical Centre, Melbourne, Vic, Australia

The emergence of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) virus, which causes coronavirus disease 2019 (COVID-19), has rapidly grown into a worldwide pandemic, ever since first being described in Wuhan, China at the end of 2019. At time of writing (10 April, 2020), the rapid spread of the virus throughout the world has resulted in over 1.6 million infections and over 95,000 deaths world-wide; in Australia, there have been 6,203 confirmed cases with 53 deaths, with a mortality rate of 0.85%, much less than the world average of around 6%. Given the ferocity and devastating effects on health care systems abroad, Australia has implemented a series of measures to reduce the rate of spread and prepare the health care system for the pandemic. This has included cancelling elective surgery, social distancing and a nation-wide shut down of non-essential services.

Although there have been some initial promising epidemiological data with respect to a reduction in the rate of new infections following institution of these polices, there is an emerging concern that there will be a peak of patients with other chronic conditions accessing health care once the pandemic has resolved, or indeed rates of new infections have plateaued (Figure 1).

The dramatic impacts on health care provisions, social behaviours as well as economic strategies from governments throughout the world have resulted in a significant shift in public behaviours in an effort to reduce the spread of the virus with the aim to "flatten the curve". One of the unintended consequences of the current pandemic has been a reduction in patients presenting for management of other chronic health conditions, in particular, cardiovascular health conditions. There is gathering data with respect to declining rates of patients presenting with ST elevation myocardial infarction (STEMI) throughout the world, with a reduction of 70% in the north of Italy, 40% in Spain [1], and up to 50% across the United States [2]. A number of theories have been suggested, including a tangible change in diet and lifestyle, whereby a reduction in aerobic exercise may reduce risk of acute plaque rupture [3], whilst less psychological stress by staying at home may also reduce risks of acute coronary syndromes [4]. Furthermore with fewer cars on the roads, there may be a reduction in particulate air pollution [5]. However, worryingly, initial data from Hong Kong has suggested that patients are presenting later to hospital with STEMI, presumably in an effort to minimise interaction with the health care system, in an effort to avoid COVID-19 infection [6]. Furthermore, emerging data from New York, at time of writing the epicentre for the pandemic suggests that rates of out of hospital cardiac arrests have increased by 800% [7,8]. Although some of these patients may be infected with SARS-CoV-2, almost certainly some patients with STEMI may be either hesitant to call for emergency services or else unable to access an increasingly thinly stretched medical service. These worrying findings suggest patients may be tolerating symptoms at home, and as such, complications of non-revascularised coronary disease may present in the coming weeks to months, including heart failure, arrhythmias and valvular heart disease.

Whilst reduction in acute presentations is already becoming apparent, experience with the first SARS epidemic of 2003, suggested that both inpatient and outpatient

*Corresponding author at: Department of Cardiology, Royal North Shore Hospital, Reserve Rd, St. Leonards, Sydney, 2065, Australia. Tel.: +61 2 9463 2506; fax: +61 2 9463 2053; Email: ravinay.bhindi@sydney.edu.au.

© 2020 Published by Elsevier B.V. on behalf of Australian and New Zealand Society of Cardiac and Thoracic Surgeons (ANZSCTS) and the Cardiac Society of Australia and New Zealand (CSANZ).

Please cite this article in press as: Allahwala UK, et al, et al. Cardiovascular Disease in the Post-COVID-19 Era – the Impending Tsunami? Heart, Lung and Circulation (2020), https://doi.org/10.1016/j.hlc.2020.04.004

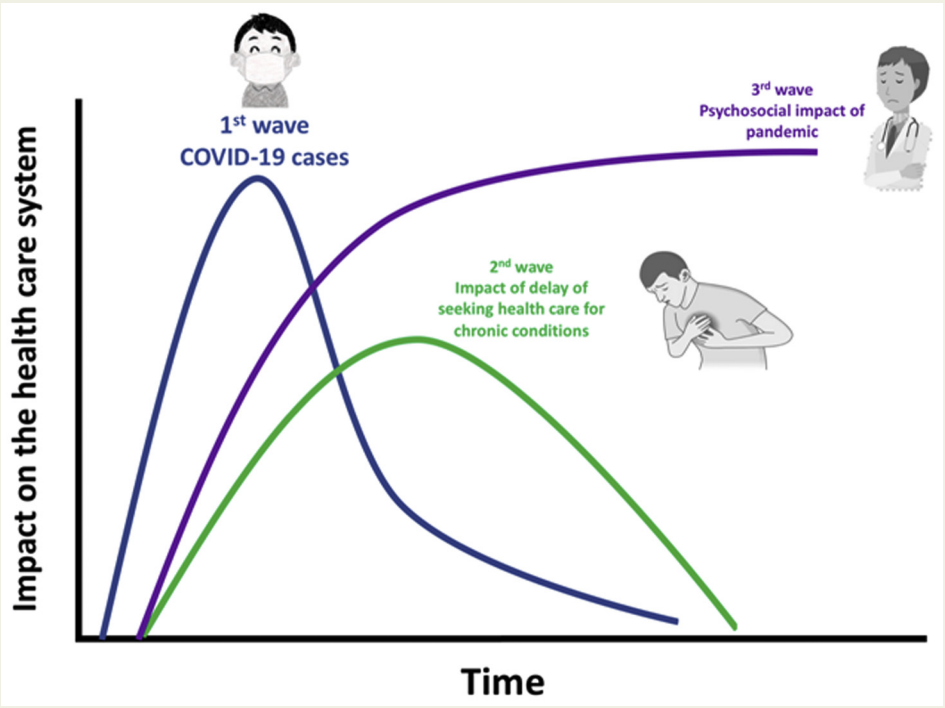

Figure 1 Anticipated health care effects of the COVID-19 pandemic.

presentations remained lower up to 4 years following the epidemic [9], with fear of becoming infected a major determinant of failure to access health services [10]. This suggests that patients may remain sceptical about attending health care professionals for some time following containment of the pandemic. A reduction in access to medical care is associated with a decline in health status [11], whilst close cardiology follow-up in the outpatient setting is associated with improved prognosis and lower mortality in patients with atrial fibrillation [12], chest pain [13], acute coronary syndrome [14] and heart failure [15]. Furthermore, reports in the mainstream media of the—so far, unsubstantiated—risks of the use of angiotensin converting enzyme inhibitors (ACE-I) and angiotensin receptor antagonists (ARBs) in COVID-19 may lead to patients discontinuing antihypertensives. Furthermore, there has been a 40% reduction in patients attending for routine blood tests [16]. Consequently, given the expected long-term duration of social distancing and continued risk of infection, this may well result in suboptimal management of cardiovascular risk factors. Cessation of anti-hypertensives, even for a short duration, can result in adverse cardiovascular events unless closely monitored in specialist settings [17], whilst discontinuation of lipid lowering therapy, particularly in high risk patients, can increase the rate of death or acute myocardial infarction within 1 week [18].

Although the new government announcements of reimbursement for telehealth consultations will improve health care provision [19], this precludes physical examination of patients, which is known to double the accuracy of diagnosis based on history alone [20] and provides independent data on prognosis in the setting of heart failure [21]. It is imperative from a community health perspective that patients are encouraged and reassured about the safety of attending outpatient follow-up, with appropriate personal hygiene and restrictions in place. Whilst telemedicine reviews undoubtedly assist, particularly in triaging patients who require physical review, patients should be encouraged to attend specialist reviews in person to ensure appropriate management and control of chronic conditions.

As well as encouraging patients to seek appropriate care, we also need to ensure that physicians will be well placed to provide this care. With the anticipated surge of COVID-19 patients that are expected in the coming months, physicians are expected to be working longer hours in more demanding clinical and physical situations with the need for personal protective equipment. Furthermore, anxiety related to contracting the disease, as well as spreading it to patients, colleagues, friends and family are all likely to result in a degree of "physician burnout" [22]. Physician burnout is associated with poorer patient outcomes [23], and as such it is imperative strategies are implemented early to mitigate the effects of the psychosocial burden physicians will face. Early increase in health care worker provision by mobilising physicians not currently in the hospital sector will allow recovery time for staff, whilst considered rostering of lower acuity areas of the hospital in between caring for COVID-19 patients may also play a role.

Please cite this article in press as: Allahwala UK, et al, et al. Cardiovascular Disease in the Post-COVID-19 Era – the Impending Tsunami? Heart, Lung and Circulation (2020), https://doi.org/10.1016/j.hlc.2020.04.004

It is also anticipated that both medical and nursing staff may be redeployed to other departments and areas which need personnel during the surge. Following return to the cardiology services, debriefing sessions with nursing staff and radiation safety personnel as well as technical staff should be performed.

The current, appropriate, focus and attention of hospital administrators, health policy advisers and government agencies is on the imminent COVID-19 surge and dramatic implications on health care services. However, the reduction in patients presenting for management of chronic conditions during this period may create an influx of patients following resolution of the pandemic, perhaps presenting later, with more complex and hazardous conditions. Superimposed on this fact may be physician burnout, inadequate equipment and material as well as a persisting hesitancy of patients to seek medical attention.

Most of the early literature on the cardiac complications of the COVID-19 pandemic deal with the acute cardiac complications seen with the primary wave of the disease [24,25], however, the current respite in cases is an opportunity to optimise strategies to ensure adequate mitigation of the expected secondary and tertiary waves. It is imperative that strategies be put in place to minimise, and prepare for this impending second wave, which may continue the pressures placed on health care system and physicians.

References

[1] Rodriguez-Leor O, Cid-Alvarez B, O'jeda S, Martin-Moreiras J, Rumoroso JR, Lopez-Palop R, et al. Impacto de la pandemia de COVID-19 sobre la actividad asistencial en cardiología intervencionista en España. REC Interv Cardiol 2020. Apr 2. Epub ahead of print.

[2] Wood S. The mystery of the missing STEMIs during the COVID-19 pandemic. tctMD. Available at: https://www.tctmd.com/news/mystery-missing-stemis-during-covid-19-pandemic. [accessed 9.4.20].

[3] Kumar A, Kar S, Fay WP. Thrombosis, physical activity, and acute coronary syndromes. J Appl Physiol (1985) 2011;111:599–605.

[4] Tofler GH, Kopel E, Klempfner R, Eldar M, Buckley T, Goldenberg I, et al. Triggers and timing of acute coronary syndromes. Am J Cardiol 2017;119:1560–5.

[5] Ho AFW, Zheng H, Earnest A, Cheong KH, Pek PP, Seok JY, et al. Time-stratified case crossover study of the association of outdoor ambient air pollution with the risk of acute myocardial infarction in the context of seasonal exposure to the Southeast Asian haze problem. J Am Heart Assoc 2019;8:e011272.

[6] Tam CF, Cheung KS, Lam S, Wong A, Yung A, Sze M, 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;13. CIRCOUTCOMES120006631.

[7] Marsh J, Campanile C, Moore T, McCarthy C. NYC's coronavirus death toll keeps growing as pandemic claims 3,500. New York Post. Available at: https://nypost.com/2020/04/07/nycs-coronavirus-toll-keeps-growing-as-pandemic-claims-3500. [accessed 7.4.20].

[8] Cohen B, Shaw D. Cardiac arrest deaths at home in New York City have increased by a startling 800%. Angioplasty.org. Available at: http://www.ptca.org/news/2020/0408_INCREASED_DEATHS_NYC.html. [accessed 8.4.20].

[9] Chu D, Chen RC, Ku CY, Chou P. The impact of SARS on hospital performance. BMC Health Serv Res 2008;8:228.

[10] Chang HJ, Huang N, Lee CH, Hsu YJ, Hsieh CJ, Chou YJ. The impact of the SARS epidemic on the utilization of medical services: SARS and the fear of SARS. Am J Public Health 2004;94:562–4.

[11] Bindman AB, Keane D, Lurie N. A public hospital closes. Impact on patients' access to care and health status. JAMA 1990;264:2899–904.

[12] Hawkins NM, Scheuermeyer FX, Youngson E, Sandhu RK, Ezekowitz JA, Kaul P, et al. Impact of cardiology follow-up care on treatment and outcomes of patients with new atrial fibrillation discharged from the emergency department. Europace 2019;euz302. Dec 4. Epub ahead of print.

[13] Czarnecki A, Chong A, Lee DS, Schull MJ, Tu JV, Lau C, et al. Association between physician follow-up and outcomes of care after chest pain assessment in high-risk patients. Circulation 2013;127:1386–94.

[14] Doimo S, Fabris E, Piepoli M, Barbati G, Antonini-Canterin F, Bernardi G, et al. Impact of ambulatory cardiac rehabilitation on cardiovascular outcomes: a long-term follow-up study. Eur Heart J 2019;40:678–85.

[15] Avaldi VM, Lenzi J, Urbinati S, Molinazzi D, Descovich C, Campagna A, et al. Effect of cardiologist care on 6-month outcomes in patients discharged with heart failure: results from an observational study based on administrative data. BMJ Open 2017;7:e018243.

[16] Aubusson K. Sixty thousand Australians a day not turning up for routine pathology tests. *Sydney Morning Herald*. Available at: https://www.smh.com.au/national/coronavirus-updates-live-global-covid-19-cases-approaching-1-5-million-record-16-8-million-americans-file-for-unemployment-20200409-p54iog.html#p509zy. [accessed 10.4.20].

[17] Beeftink MM, van der Sande NG, Bots ML, Doevendans PA, Blankestijn PJ, Visseren FL, et al. Safety of temporary discontinuation of antihypertensive medication in patients with difficult-to-control hypertension. Hypertension 2017;69:927–32.

[18] Heeschen C, Hamm CW, Laufs U, Snapinn S, Bohm M, White HD, et al. Withdrawal of statins increases event rates in patients with acute coronary syndromes. Circulation 2002;105:1446–52.

[19] Totten AM, Hansen RN, Wagner J, Stillman L, Ivlev I, Davis-O'Reilly C, et al. Telehealth for acute and chronic care consultations. Rockville (MD): Agency for Healthcare Research and Quality; 2019.

[20] Paley L, Zornitzki T, Cohen J, Friedman J, Kozak N, Schattner A. Utility of clinical examination in the diagnosis of emergency department patients admitted to the department of medicine of an academic hospital. Arch Intern Med 2011;171:1394–6.

[21] Selvaraj S, Claggett B, Shah SJ, Anand IS, Rouleau JL, Desai AS, et al. Utility of the cardiovascular physical examination and impact of spironolactone in heart failure with preserved ejection fraction. Circ Heart Fail 2019;12:e006125.

[22] Fred HL, Scheid MS. Physician burnout: causes, consequences, and (?) cures. Tex Heart Inst J 2018;45:198–202.

[23] Halbesleben JR, Rathert C. Linking physician burnout and patient outcomes: exploring the dyadic relationship between physicians and patients. Health Care Manage Rev 2008;33:29–39.

[24] Denniss AR, Chow CK, Kritharides L. Cardiovascular and logistic issues associated with COVID-19 pandemic. Heart Lung Circ 2020 Apr 10. Epub ahead of print.

[25] Zaman S, MacIsaac AI, Jennings GLR, Schlaich M, Inglis SC, Arnold R, et al. Cardiovascular disease and COVID-19: Australian/New Zealand consensus statement. Med J Aust 2020. Apr 3. Epub ahead of print.

Please cite this article in press as: Allahwala UK, et al, et al. Cardiovascular Disease in the Post-COVID-19 Era – the Impending Tsunami? Heart, Lung and Circulation (2020), https://doi.org/10.1016/j.hlc.2020.04.004