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Patients With Genetic Heart Disease and COVID-19: A Cardiac Society of Australia and New Zealand (CSANZ) Consensus Statement



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In the context of the current global COVID-19 pandemic, this Consensus Statement provides current recommendations for patients with, or at risk of developing, genetic heart disease, and for their health care management and service provision in Australia and New Zealand. Apart from general recommendations, there are specific recommendations for the following conditions: cardiomyopathy, Brugada syndrome (including in children), long QT syndrome (LQTS) and catecholaminergic polymorphic ventricular tachycardia (CPVT). Other recommendations are relevant to patient self-care and primary health care.

Keywords

COVID-19 • Genetic heart disease • Cardiomyopathy • Brugada syndrome • Long QT syndrome • Catecholaminergic polymorphic ventricular tachycardia

Introduction

We acknowledge that severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) – the virus that causes coronavirus disease 2019 (COVID-19) – is a newly discovered virus, and genetic heart diseases are relatively rare in the population. Therefore, there are few scientific data to inform best

practice on this subject thus far. However, we have identified areas of consensus among specialists from the Cardiac Society of Australia and New Zealand (CSANZ) Cardiovascular Genetics Diseases Council with regards to managing patients with genetic heart disease in this current COVID-19 pandemic.

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[☆]This is the first version of a living document (current as of the 7 April 2020); any subsequent versions can be accessed at the Cardiac Society of Australia and New Zealand (CSANZ) website at www.csanz.edu.au.

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General Recommendations

- Patients with pre-existing structural heart disease are at increased risk of complications from COVID-19 and therefore **we recommend** all patients follow government recommendations to help minimise exposure and prevent infection (e.g. social distancing, hand washing)
- **We recommend** patients should continue all of their cardiac medications including beta blockers, calcium-channel blockers, angiotensin converting enzyme inhibitors (ACE-I), angiotensin II receptor blockers (ARBs) and anti-coagulation agents.

There have been some reports with conflicting advice with regards to ACE-I and ARBs. The concerns are theoretical regarding COVID-19 accessing cells via the ACE-2 receptors potentially leading to worse outcomes but, currently, there is no strong evidence to substantiate this. Of greater concern is haemodynamic instability and the risk of ventricular dysfunction due to sudden transition from one medication to another at a time of potential myocardial stress.

A number of international cardiac societies have recommended continuation of a patient's current medications at present [1,2]. We also support continuation of current medications, especially in the setting of impaired ventricular function and cardiomyopathy.

- **We recommend** all our patients have their annual influenza vaccination as soon as possible to reduce the chance of having seasonal influenza and COVID-19 infection at the same time.
- **We recommend** that, if a patient with a known genetic heart disease is admitted to an intensive care unit, or is to be commenced on novel or atypical therapies (such as hydroxychloroquine), a specialist cardiologist – ideally their regular cardiologist or one with suitable subspeciality expertise – should be consulted.

Specific Recommendations

Cardiomyopathies

- People who are gene carriers for a familial cardiomyopathy variant, but without clinical expression of the disease, are possibly at risk and **we recommend** they should be vigilant with preventative measures.
- A patient's level of risk may be dependent on the degree of clinical expression. Those with severe ventricular dysfunction (of either the left or right ventricle) or with symptomatic left or right ventricular failure should be considered at highest risk, and therefore **we recommend** they take great efforts to minimise risk of exposure to COVID-19 (e.g. by adopting self-isolation).
- **We recommend** that the management of patients who are unwell with COVID-19 and have an underlying cardiomyopathy should include specialist cardiology advice.

Brugada Syndrome

- Patients with Brugada syndrome are at risk of arrhythmia with high fever. Therefore, **we recommend** patients treat fever ($>38^{\circ}\text{C}$) aggressively with paracetamol and seek medical attention.
- **We recommend** that Brugada syndrome patients with fever that is unresponsive to paracetamol should seek urgent specialist cardiology advice as they may require more intensive monitoring.

Children with Brugada Syndrome

- As above, **we recommend** that fever should be managed aggressively, and medical attention be sought in children with a type 1 Brugada electrocardiograph, or children of a parent with *SCN5A*-mediated Brugada syndrome (unless they are known to be gene negative).
- Preliminary evidence suggests that children of a parent affected with Brugada syndrome, in whom *SCN5A* pathogenic variants have been excluded, and where the child has a normal baseline electrocardiograph (ECG), are at much lower risk from fever than previously feared. Many of these non-*SCN5A* families have been advised to bring their children to hospital with a fever to see if the Brugada electrocardiograph signature manifests. **We recommend** that in such children, during this pandemic, to avoid exposure to COVID-19 and reduce stress on hospitals, fever should be managed at home as usual and children who are well should not be brought into a hospital or hospital emergency department just for an ECG.

Long QT Syndrome (LQTS)

- There are no data to suggest patients with LQTS are at increased risk from COVID-19 infection.
- **We recommend** all beta blockers are continued in patients with LQTS during their illness.
- Some experimental therapies for COVID-19 (such as hydroxychloroquine, azithromycin and ritonavir) are known to prolong the QT interval, and may cause acquired LQTS even in patients without congenital LQTS; therefore, we advise great caution in use of these medications [3]. **We recommend** that patients and their treating physicians consult www.crediblemeds.org prior to commencing any new medications.

We support the proposed flow chart by Wu et al. [4]; key points as below:

- QT interval monitoring for all patients commenced on hydroxychloroquine or when combining anti-viral drugs for COVID-19;
- Avoid the use of more than one medication which prolongs the QT interval as far as is possible;
- If the corrected QT interval (QTc) is consistently >500 ms, **we recommend** consultation with a cardiogenetics expert or an electrophysiologist for guidance on

further management to minimise risk of Torsade de Pointes.

- In patients with LQTS with significant gastrointestinal complications of COVID-19 (e.g. diarrhoea), **we recommend** their serum electrolyte levels (especially potassium) are checked and replaced as needed. **We recommend** a serum potassium level at the higher end of the normal range (i.e. above 4 mmol/L).

Catecholaminergic Polymorphic Ventricular Tachycardia (CPVT)

- There are no data to suggest patients with CPVT are at increased risk from COVID-19 infection.
- **We recommend** CPVT patients continue their regular cardiac medications.
- **We recommend** avoidance of epinephrine in the setting of a ventricular tachycardia/ventricular fibrillation (VT/VF) arrest where possible. **We recognise** this is likely to be the only situation where epinephrine is contraindicated in the setting of a cardiac arrest.

Other Recommendations

- There is some suggestion non-steroidal anti-inflammatory drugs (NSAIDs) may worsen the respiratory course of

COVID-19, and **we recommend** paracetamol is used preferentially to manage fever.

- We understand many of our patients and their families are feeling worried or anxious about their risk of poorer outcomes given their underlying heart disease. **We recommend** individuals seek additional support and information on coping in a crisis, and seek professional assistance as required (e.g. www.beyondblue.org.au; www.psychology.org.au).

Conflicts of Interest

Authors have declared no conflicts of interest.

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