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CSANZ Imaging Council Position Statement on Echocardiography Services During the COVID-19 Pandemic[☆]



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Abstract

This Cardiac Society of Australia and New Zealand (CSANZ) Imaging Council Position Statement aims to guide local, regional and national clinical practice, and facilitate resource and echocardiographic service planning appropriately during the current COVID-19 global pandemic. General considerations include workforce arrangements and contingency plans, patient risk assessment for COVID-19 and level of care (personal protective equipment) for staff. Both outpatient and inpatient settings are addressed, including specific considerations in the in-patient setting including scanning protocols, screening modalities and indications for echocardiograms in the context of COVID-19 infection.

Keywords

COVID-19 • Echocardiography • Patient risk assessment • Personal protective equipment

Background

In light of the rapidly evolving COVID-19 pandemic, it was considered important for the CSANZ Imaging Council to provide a position statement to guide clinical practice and facilitate resource and service planning appropriately.

This statement represents expert consensus opinion, available evidence and international guidelines. Given the changing nature of our understanding of COVID-19, institutional

protocols should increasingly be guided by evidence-based practices and recommendations.

It is important to emphasise that this is a general statement and that individual laboratories should consider their unique circumstances in adapting this statement to their situation. We are mindful that we cannot totally stop providing outpatient services until we reach a critical stage (as advised by state and local health networks). However, rationalising resources and services to prepare for the pandemic and demand is crucial.

[☆]This is the first version of a living document (current as of 30 March, 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 Considerations

Workforce Arrangements and Contingency Plans

The following recommendations are made:

- Assess staff capacity and defer non-essential leave.
- Exclude vulnerable staff members (includes: >60 years of age; immunocompromised; pregnant; and those with cardiovascular/respiratory disease) from scanning suspected and confirmed cases of COVID-19.
- Discourage/disallow drop-in visits to echo reporting rooms—ask staff to make telephone contact for urgent information.
- Consider remote and off-site reporting cover in the event of staff sick leave (i.e. inter-hospital echo reporting cover)
- At peak, consider implementing a contingency roster to allow ‘stand-by’ staff, i.e. alternate days or ‘teams’ of reporting doctors/sonographers—in event of multiple staff members requiring sick leave/isolation.

Evaluation of Risk for Performing Echocardiograms

Risk assessment will determine the appropriate use of personal protective equipment (PPE):

- All patients - inpatients and outpatients - must undergo a risk assessment for COVID-19 [1] categorised as:
 - a) Minimal Risk – not suspected
 - b) Moderate Risk – suspected
 - c) High Risk – confirmed.

Levels of care (and use of PPE) required during scanning, are based on risk assessment [2]:

These protocols need to be based on advice from local institutional infection control as well, based on the extent of community transmission of COVID-19, when screening for risk factors may be less effective.

Level A: Standard care:	Hand washing and gloves
Level B: Droplet precautions:	Gown, gloves, facemask, and eye shield
Level C: Airborne/aerosol precautions:	As above, plus N95 masks or equivalent +/- shoe covers.

Outpatient Procedures

The following recommendations are made when conducting transthoracic echocardiography (TTE), exercise stress echocardiography (ESE), dobutamine stress echocardiography (DSE) and/or transoesophageal echocardiography (TOE) on an outpatient basis:

- Prior to appointment, where possible, patient should be contacted to check if they have fever, respiratory symptoms, loss of appetite and fatigue and/or recent travel or contact with a positive or probable COVID-19 case for risk stratification (*as per local hospital policy*) for COVID-19; if

categorised as moderate or high risk, consider postponing the echocardiogram for 2 weeks.

- On presentation, all outpatients must be asked, if they have fever, respiratory symptoms, loss of appetite and fatigue and/or recent travel or contact with a positive or probable case for risk stratification for COVID-19 (*as per local hospital policy*); if categorised as moderate or high risk, consider postponing the echocardiogram for 2 weeks.
- In all instances, whilst patients is in waiting areas, maintain physical distancing (whether suspected of COVID-19 or not).
- Do not allow family members to accompany patient in waiting area or while the echocardiogram is being performed.
- Triage existing and incoming requests with medical personnel – any category 2/3 requests should be deferred, if appropriate.
- Fulfil Category 1/urgent requests at discretion of medical personnel and requesting physician to be performed (this should be evaluated on a case-by-case basis).
- No outpatient elective TOEs to be performed at present; defer for 3 months and review.

Table 1.

In-Patient Procedures

The following recommendations are made when conducting TTE, ESE and DSE on an inpatient basis:

- Fulfil Category 1/urgent TTE requests only (e.g. 12-month follow-up for moderate aortic stenosis (AS) or stable cardiomyopathy should be deferred. [Table 2](#) lists likely examples.
- Defer ESE where possible due to increased risk of droplet spread, e.g. if required prior to elective surgery, this should be deferred in view of elective surgery likely being postponed. Deferral may not be possible in cancer-related surgery and tests should proceed if appropriate, and patient is deemed minimal risk.
- If unsure whether to proceed, discuss with requesting physician to determine need.

Transoesophageal Echocardiography:

- Avoid TOE, which has a high risk of aerosolisation and therefore high risk of spread [2].
- Conduct urgent in-patient TOEs only – i.e. strict clinical indications that will alter management – e.g. TOE for endocarditis should only be for very high index of suspicion (positive blood cultures, change in valvular regurgitation on serial TTEs, suspicion of an aortic root abscess), where TOE will significantly alter management
- Medical officers should discuss with requesting teams the rationale and indication for TOE, and whether this will significantly alter management of the patient
- Consider serial TTE imaging or other modalities if possible [2].
- Where possible, in a COVID-suspect patient, defer the TOE till COVID status is known

Table 1 Patient Risk assessment and level of PPE care for staff.

Minimal Risk	Moderate Risk	High Risk*
Afebrile	Current fever/temperature >37.5	Confirmed case of COVID-19
No history of recent travel and no contact with someone with recent travel	Current cough	Close contact with confirmed COVID-19 case
	Documented recent travel or close contact with someone with recent travel	
Level A care while scanning	Level B care for TTEs Level C care for TOEs	Level C care TTE/TOEs

*Level of care when performing TTE scans in high risk patients might need to be adjusted according to institutional policy. The British Society of Echocardiography recommends Level C care [1].

Abbreviations: TOE, transoesophageal echocardiography; TTE, transthoracic echocardiography.

- If a TOE is deemed necessary in a COVID-positive patient, there should be clear discussion and agreement between requesting and performing consultant physician. The procedure must be done within the intensive care unit (ICU) negative pressure rooms. If this is not available, then an alternative might be a dedicated theatre suite (if this has been assigned) or discussed with infection control.
- Additionally, consider intubation or at minimum anaesthetic sedation for performance of TOE.

Specific Considerations in In-Patients

Logistics

- All requests for tests on patients with suspected/confirmed COVID-19 to be approved by medical officers (see table II below for examples). Refer to Appropriate use criteria [3] when in doubt.
- Dedicated ultrasound machines for scanning suspected/positive COVID-19 patients (i.e. hand-held, portable, or older machines).
- All suspected/confirmed cases to be scanned at patient bedside to minimise patient transport and spread [2].
- Training considerations – trainee sonographers should not scan or observe echoes on patients with suspected/confirmed COVID-19 [2], to minimise patient contact, and conserve PPE.
- Limit traffic in echo lab/reporting room and social distancing e.g. if other doctors want to discuss a request or result, they should be asked to do so via phone

Scanning Protocols [1,2]:

- Focussed scans to be performed when appropriate in suspected/confirmed COVID patient contact:
 - Answer clinical question **only** in order to limit exposure time (know the specific indication and what exactly is being asked).
 - For suspected COVID-19 inpatients the ultrasound machine should be covered using the plastic drapes sourced from the Cath Lab (Fig. 1).

- To reduce contact and exposure, avoid attaching ECG electrodes and leads and consider acquisition of images as time-gated rather than ECG-gated.
- Preferable for right-handed scanning, whenever possible.
- When scanning left handed, consider additional barrier measures to be placed between the patient and sonographer to minimise contact (Fig. 2)
- Avoid patient breath-holding during the study
- Only acquire images at patient bedside; perform measurements offline and not at patient bedside.
- Avoid use of contrast, if possible. However, if contrast use is anticipated, plan ahead and take it along before starting the scan, to minimise time with patient and the wastage of PPE use. Consider using the assistance of nursing staff in the room caring for the patient to administer the bolus of contrast.

Point of Care Ultrasound (POCUS)/ Hand-Held Devices: Key Modalities for Screening [2]

- Wherever possible senior/treating clinician who is caring for patient to perform handheld or POCUS (if available) for screening.
- POCUS images should be archived and reviewed to determine the need for full study.
- This approach meets the needs of the patients, while minimising staff exposure and conserving PPE use.
- Cleaning of the handheld or POCUS system is easier than a formal clean and disinfection of the echo machine.

Indications for Echocardiograms in the Context of COVID-19 Infection:

- In a COVID-suspected case, if TTE is not urgent then await COVID-19 results, before performing the echocardiogram
- If COVID-19 suspected/positive, then echocardiogram request should be discussed with treating consultant.

Table 2 Indications for performance of a transthoracic echocardiogram (TTE) during COVID 19 pandemic*

Existing Category	New Category	Examples	Advice
Category 1	<p>Category 1A Urgent – almost certain to result in a serious adverse clinical outcome/ admission to hospital within 2 weeks if the TTE is not performed.</p> <p>Category 1B Semi-Urgent – somewhat likely to result in a serious adverse clinical outcome or admission to hospital if the TTE is not performed.</p> <p>Category 1C All other cases</p>	<ul style="list-style-type: none"> • Evaluation of LV/RV/valvular function in a critically ill patient • Bacterial endocarditis (high probability) • Patients. presenting with chest pain to rule out RWMA (ie triage for cath lab) • Clinical suspicion of tamponade • Post STEMI to evaluate LVEF • Pre CABG evaluation of severity of valvular disease • Chemotherapy patients where TTE required prior to therapy (eg HER2 +ve pts; pts on anthracyclines with drop in LVEF) • Recurrent syncope with clinical suspicion of severe AS, LVOT obstruction • Clinically suspected cardiomyopathy with acute deterioration • HF patients with acute deterioration in clinical status • Pulmonary HT patients with deterioration in clinical status 	<ul style="list-style-type: none"> • Perform targeted scans. • Ensure that risk screening is performed on ALL patients prior to TTE • Where high index of suspicion, see if test can be deferred till COVID status is known • Wear PPE <p>Defer cases for 4-6 weeks and reassess (depending on crisis progression)</p>
Category 2	Category 2	<ul style="list-style-type: none"> • TTE for interval change (ie LV function) • Pre procedural evaluation for structural intervention 	<ul style="list-style-type: none"> • Return patients to waiting list – aim to perform cases within 6 months • Return patients to waiting list

*A detailed and exhaustive list of indications is not possible, but triaging will have to occur using the clinical judgement of the physicians involved, based on the following principles:

1. Consultants to confirm cases that should be performed under Category 1A Criteria.
2. All other cases scheduled in the next 4 weeks should be reviewed by the referring physician and grouped into Category 1B or 1C.
3. All deferred 1B procedures should be reassessed at 4 weeks, in light of developments in the COVID19 pandemic.

Abbreviations: AF, atrial fibrillation; CABG, coronary artery bypass graft; COVID, coronavirus disease; HER2, human epidermal growth factor receptor 2; HF, heart failure; LV, left ventricular; LVEF, left ventricular ejection fraction; LVOT, left ventricular outflow tract; PPE, personal protective equipment; RV, right ventricular; RWMA, regional wall motion abnormalities; STEMI, ST segment elevation myocardial infarction; SVT, supraventricular tachycardia; TTE, transthoracic echocardiogram.



Fig. 1 When scanning COVID-19 patients, the ultrasound machine can be covered using the plastic drapes.



Fig. 2 Additional barrier measures can be placed between the patient and sonographer to minimise contact while scanning left-handed. Courtesy Dr S. Moir, Monash Medical Centre (MMC).

- For COVID-19 suspected/confirmed cases, acceptable indications include [2]:
 - Suspicion of heart failure/myocarditis,
 - Significant arrhythmias
 - Significant ECG changes
 - More than mild pericardial effusion on chest CT
- Haemodynamic instability or previous heart disease with shock (disproportionate to the respiratory involvement).
- In COVID-positive patients, performance of TTE should be limited to instances when it would definitely impact on

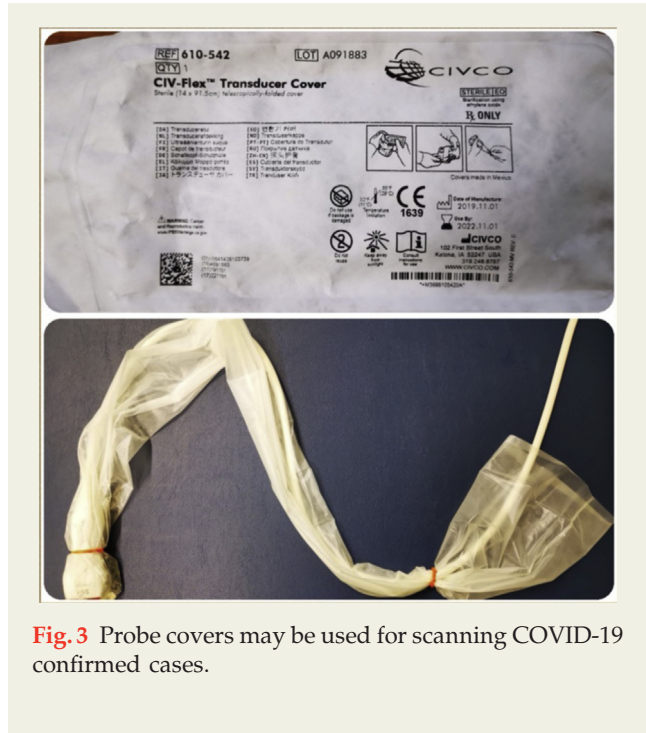


Fig. 3 Probe covers may be used for scanning COVID-19 confirmed cases.

patient management (eg, evaluation prior to extracorporeal membrane oxygenation [ECMO]).

Personal Protective Equipment (PPE) and Equipment Cleaning:

- PPE – stored appropriately with all staff knowing where items are stocked. Have protocols in place for obtaining more when stocks are low.
- Ensure all staff are trained in donning and removal of PPE
- A number of dedicated COVID-19 PPE kits containing required equipment and usage instructions to be prepared for use (*as per local hospital policy*).
- PPE minimum requirements – gloves, gown, eye protection, head cover and medical/surgical face mask. N95 mask and shoe covers if COVID-19 positive or ventilated patient [2] (*as per local hospital policy*).
- Require patient to wear mask during an echocardiogram, if positive or at high risk/suspected of having COVID-19 infection [2].
- Usual cleaning and disinfecting protocols for equipment (once not enough – clean in room, move out of room and clean again, importance of “wet time” after wiping, ie, time to allow the disinfectant solution to air dry (the equipment should not be wiped dry
- Probe covers may be used for scanning confirmed cases as an additional barrier (Fig. 3)
- Important to clean workstations and reporting room – wipe down keyboards, phone etc.

Conflicts of Interest

Authors have declared no conflicts of interest.

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