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SAFETY in Echo LAB During the COVID-19 Pandemic

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INTRODUCTION

Coronavirus Cases: 5,684,795
Deaths: 352,225
Recovered: 2,430,593

Worldmeters.info

covid19.go.id
INTRODUCTION

• Covid-19 Pandemic changes the protocol of every echocardiography procedures including TTE, TEE, and DSE

• Echocardiographic is an important part of critical ultrasonography, which helps to quickly identify the hemodynamic status.
Transmisi COVID-19
Risk of infection during echocardiography

- Physical proximity to the patient: **30-50 cm**
- The USS room or enclosure area is typically **small**
- The USS room often have **restricted ventilation**
- The examination time may last between **10-60 minutes**
- There is risk of patient coughing, sneezing or exhaling heavily
- The surface of echo machine: keyboard, trackball, touch screen are **touched frequently**
Safety

Personnel: doctors, sonographer, patient

Room

Echo machine:
ISE Algorithym for TTE Examination

Pemeriksaan ekokardiografi

Evaluasi ulang indikasi pemeriksaan

Tunda / Jadwalkan ulang bila memungkinkan*

Lanjutkan prosedur jika pemeriksaan dianggap dapat mengubah tatalaksana pasien

Pasien COVID-19 negatif atau risiko rendah dan asimtomatik*

Pemeriksaan dilakukan dengan APD level 2 (droplet precaution)

Pasien COVID-19 positif atau diduga positif atau tidak jelas status COVID

Pemeriksaan Ekokardiografi dikerjakan

Gunakan APD level 3 (airborne precaution) pada:
- Pasien dengan ventilasi invasif & non invasif
- ICU dan ruang operasi
- Selama prosedur TEE

Gunakan APD level 2 (droplet precaution) di:
- Bangsal
- Echo lab
- IGD

* Disesuaikan dengan kebijakan rumah sakit setempat

Selalu mengikuti protokol keamanan rumah sakit
Transthoracic echocardiography (TTE) protocol

1. ECG monitoring
   - Omitted
   - Offline
   - Reducing exposure and contamination

2. Curtailed echocardiography
Transoesophageal echocardiography

Stressful and should be avoided

Reserved for certain patients*

High risk of contamination

*where the suspected findings are of crucial importance to confirm or exclude a diagnosis or to guide treatment
Indication for other echo method

**Stress echocardiography** and other stress imaging techniques

- Very limited indication
- Should be avoided in acute infection

**Ultrasonic contrast agent**

- may be useful in some patients
- should not be used in circulatory unstable or critically ill patients
Protection of Echo Personnel

• The WHO in beginning of April had reported that more than 22,000 healthcare workers across 52 countries and regions are infected with COVID-19.

• Protection of echo personnel should always start with **meticulous and frequent hand washing** and the use of gloves.

• Application of PPE can vary according the level of the risk of each patient and the availability of PPE.
Recommendation of PPE

- All suspected or confirmed cases should be evaluated in separate room.

- PPE for **droplet precaution in suspected patient** and **airborne precaution for positive COVID-19 patients**.

- PPE for **droplet precautions is required in TEEs** in all non-COVID patients (for non COVID-19 patients, surgical mask can conserve N-95 or N-99 respirators).

- A specific room should be addressed for donning, doffing and storage of all the PPEs.

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*Table:

<table>
<thead>
<tr>
<th>PPE Level</th>
<th>Hand washing</th>
<th>Gloves / double gloves</th>
<th>Isolation gown</th>
<th>Surgical mask</th>
<th>N-95 or N-99 mask</th>
<th>Face shield</th>
<th>PAPR system</th>
<th>Surgical cap</th>
<th>Shoe cover</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Special droplet</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X*</td>
<td>X*</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Airborne**</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X*</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X*</td>
<td></td>
</tr>
</tbody>
</table>

*Surgical mask may be used for droplet precaution to conserve N-95/N-99 respirators

**Patient location may determine level of protection (airborne precautions for all patients in the ICU)*
Recommendation of PPE in Indonesia

PPE level 1/2 can be worn in performing TTE of minimal risk or COVID-19 negative patients.

PPE level 3 is suggested for TTE in suspected or confirmed COVID-19 patients and recommended for all TEE cases.
Recommendations for patients during all imaging modalities

<table>
<thead>
<tr>
<th>Risk of infection</th>
<th>Surgical mask</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower risk</td>
<td>Preferable</td>
</tr>
<tr>
<td>Moderate risk</td>
<td>Obligatory</td>
</tr>
<tr>
<td>Severe risk/confirmed COVID-19</td>
<td>Obligatory</td>
</tr>
</tbody>
</table>
# Recommendations during TTE

<table>
<thead>
<tr>
<th>Risk of contamination</th>
<th>Handwashing</th>
<th>Surgical mask and gloves</th>
<th>Protective clothing, eye protection</th>
<th>Head cap</th>
<th>Study completeness</th>
<th>Equipment protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower risk</td>
<td>Obligatory</td>
<td>Preferable</td>
<td>Probably not</td>
<td>No</td>
<td>Full</td>
<td>None</td>
</tr>
<tr>
<td>Moderate risk</td>
<td>Obligatory</td>
<td>Obligatory</td>
<td>Preferable</td>
<td>No</td>
<td>Preferably full/depending on severity of the cardiac pathology</td>
<td>Intermediate/protection of probe, leads, and other parts near the patient</td>
</tr>
<tr>
<td>Severe risk/confirmed COVID-19</td>
<td>Obligatory</td>
<td>Advanced mask: FFP2/FFP3/N95/N99</td>
<td>Obligatory</td>
<td>Obligatory</td>
<td>Problem focused, adjusted for clinical importance of the cardiac pathology</td>
<td>Full cover/dedicated scanners</td>
</tr>
</tbody>
</table>

Lower risk, patients with no symptoms, no increased risk behaviour, a recent negative virus test, or in areas with low risk of COVID-19. Moderate risk, patients with non-specific/unclear symptoms or patients without symptoms in an area with moderate or high risk of COVID-19. Severe risk, patients with typical symptoms or confirmed COVID-19. FFP2, Filtering Facepiece Particulate class 2 (FFP2 corresponds to US N95, FFP3 corresponds to US N99).
Recommendations during TEE

<table>
<thead>
<tr>
<th>Risk of contamination*</th>
<th>Hand washing</th>
<th>Surgical mask and gloves</th>
<th>Protective clothing, eye protection, head cap</th>
<th>Study completeness</th>
<th>Equipment protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower risk</td>
<td>Obligatory</td>
<td>Obligatory</td>
<td>Optional/preferable</td>
<td>Full</td>
<td>None / protection of parts near the patient</td>
</tr>
<tr>
<td>Moderate risk</td>
<td>Obligatory</td>
<td>Obligatory</td>
<td>Obligatory</td>
<td>Preferably full/depending on severity of cardiac pathology</td>
<td>Intermediate / protection of leads and other parts near the patient</td>
</tr>
<tr>
<td>Severe risk / confirmed COVID-19</td>
<td>Obligatory (double gloves, protective masks FFP2/FFP3/N-95/N-99)</td>
<td>Obligatory ‘advanced kit’</td>
<td>Obligatory ‘advanced kit’</td>
<td>Problem focused adjusted for clinical importance of the cardiac pathology</td>
<td>Full cover/dedicated scanners</td>
</tr>
</tbody>
</table>

*Lower risk: patients with no symptoms, no increased risk behaviour, a recent negative virus test, or in areas with low risk of COVID-19. Moderate risk: patients with non-specific/unclear symptoms or patients without symptoms in an area with moderate or high risk of COVID-19. Severe risk: patients with typical symptoms or confirmed COVID-19.

Source: European Heart Journal - Cardiovascular Imaging (2020)0, 1–7.

- To limit the amount of staffs exposed, there should be at most three personnel during TEE to handle the probe, to operate the machine controls, and to administer sedation.
Plastic barrier to prevent direct contact with patient
Application of PPE in RSUP dr Sardjito
# Facilities Recommendation

| Patients Location | • ER  
|                   | • ICU  
|                   | • Standard Ward  |
| Echo Laboratory   | • Dedicated room for storage and easy cleaning  
|                   | • Separated COVID-19 ‘clean’ & ‘dirty’  |
| Reading Room      | • At least 2 m distances between experts  
|                   | • Large room with projectors or  
|                   | • Virtual conference room  |
Protection of Echocardiography Equipment

1 Machine, 1 area, only for positive one

- In high-volume centers, ideally one dedicated echo machine in a specific designated area should be used in scanning confirmed patients.

No ECG Leads

- EACVI recommended to avoid using ECG leads during TTEs or TEEs in COVID-19 positive patients.

No Unnecessary probes

- Before the scanning starts, remove all the probes that are not necessary on the scans.

Cover the tools

- Probes and machine consoles may be covered with disposable plastic, but this may result in suboptimal images and prolonged scanning time.
Protection of Echocardiography Equipment

Use easier-to-clean Devices

• Hand-held or smaller laptop-based echocardiogram may have an advantage as they are easier to cover, clean, and disinfect than larger machines with higher capability.

Clean after use

• After examinations, echo machines, probes and ECG leads should be thoroughly cleaned and disinfected.

2 minutes minimum

• Any parts that come to close contact with patients should be cleaned with duration of contact with cleaners of at least two minutes and use recommended cleaners and disinfectants (contains alcohol with minimal concentration of 60%).
Protection of Echocardiography Equipment
Conclusion

The COVID-19 pandemic has forced us to reconsider how best to perform cardiac imaging in the right patients at the right time and how to minimize the risk of cross-infection for imagers and patients alike