



# Clinical Practice Procedures: Resuscitation/ Mechanical Chest Compression Device (MCCD) referral

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<b>Purpose</b>	To ensure a consistent procedural approach for Mechanical Chest Compression Device (MCCD) referral
<b>Scope</b>	Applies to Queensland Ambulance Service (QAS) clinical staff.
<b>Health care setting</b>	Pre-hospital assessment and treatment.
<b>Population</b>	Applies to all ages unless stated otherwise.
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<b>Author</b>	Clinical Quality & Patient Safety Unit, QAS
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# Mechanical Chest Compression Device (MCCD) referral

February, 2023

**Mechanical Chest Compression Devices (MCCDs)** are used by QAS paramedics to safely provide chest compressions while transporting suitable patients in Out-of-Hospital Cardiac Arrest (OHCA) to hospital facilities with Extracorporeal Cardiopulmonary Resuscitation (eCPR) and/or primary Percutaneous Coronary Intervention (pPCI) capability.

The decision as to whether a patient receives eCPR or pPCI will be made by the receiving hospital in consultation with specialist teams, following careful consideration of the patient's presenting history and likely prognosis.

## **Extracorporeal cardiopulmonary resuscitation (eCPR)**

Extracorporeal cardiopulmonary resuscitation (eCPR) is an advanced rescue therapy where an Extracorporeal Membrane Oxygenation (ECMO) device is used to support circulation in patients with cardiac arrest refractory to conventional CPR.<sup>[1]</sup>

This support requires the commencement of VA (Veno-Arterial) ECMO allowing for blood to be removed from the venous system and circulated by a mechanical pump through an ECMO device. This enables the oxygenation, temperature regulation and the removal of carbon dioxide from the blood, before being returned into arterial circulation.<sup>[2]</sup>

## **Primary Percutaneous Coronary Intervention (pPCI)**

pPCI is a time critical procedure using coronary catheterisation to visualise the coronary arteries and if required, restore coronary artery blood flow.

Provision of eCPR requires highly qualified clinicians who have been specifically trained in its use, complemented by a sophisticated integrated health system approach. At present, ECMO availability is confined to a number of QAS facilities where patient trajectory to an approved eCPR/pPCI facility is available.

## **Indications**

MCCD referral is indicated for all OHCA patients who are refractory to 3 cycles of ACLS management and meet the following criteria:

- Effective CPR commenced within 10 minutes of OHCA
- Patient age 18–65 years (inclusive)
- First identified rhythm VF/VT OR a PEA (> 40 bpm)
- Patient is able to be transported to an approved eCPR/pPCI facility within 60 minutes total pre-hospital time.

For any patient with a proven STEMI or suspected pulmonary embolus in cardiac arrest after 2 cycles of ACLS, a mandatory discussion with the QAS specialist emergency physician on the *QAS Clinical Consultation & Advice Line* must occur to discuss ongoing treatment considerations.

Outside of these indications, special circumstances such as complicated toxidromes, may exist. For these cases, early discussion with the QAS specialist emergency physician on the *QAS Clinical Consultation & Advice Line* must occur to consider the potential to proceed with eCPR referral.



### Contraindications

- History of serious systemic disease (e.g. advanced/terminal cancer, severe liver or kidney disease)
- Resident of a care facility requiring assistance with daily living
- Traumatic arrest



### Complications

- Unrecognised ROSC

### QAS Approved MCCD Referral Hospitals

REGION	HOSPITAL	eCPR	pPCI
Far Northern	<b>Cairns Hospital</b> (24/7)		●
Northern	<b>The Townsville University Hospital</b> (24/7)		●
Mackay	<b>Mackay Hospital</b> (Mon 0800–Fri 2400 hrs)		
Darling Downs & South West			
Sunshine Coast & Wide Bay	<b>Sunshine Coast University Hospital</b> (24/7)		●
Metro North*	<b>The Royal Brisbane &amp; Women’s Hospital</b> (24/7) <b>The Prince Charles Hospital</b> (24/7)	●	● ●
Metro South*	<b>Princess Alexandra Hospital</b> (24/7)		●
Gold Coast*	<b>Gold Coast University Hospital</b> (24/7)	●	●

\* In the Metro North, Metro South and Gold Coast Regions, patients in refractory cardiac arrest fulfilling MCCD referral indications should be preferentially transported to the RBWH or GCUH.

## Procedure – Mechanical chest compression device (MCCD) referral

1. Manage the patient in accordance with the appropriate QAS Clinical Practice Guidelines.
2. On arrival of appropriate resources and with minimal interruptions to cardiac arrest management, apply the MCCD (refer to *CPP: Cardiac Mechanical Cardiac Compression Device – corpuls cpr*).
3. Confirm suitability for MCCD referral.
4. At the earliest opportunity, commence safe extrication and transport to the appropriate pPCI/ECMO facility.
5. The senior clinician ensures ongoing clinical management in accordance with the appropriate QAS clinical guidelines.  
If at any stage sustained ROSC is achieved, the patient must be considered for referral for pPCI.
6. En-route to hospital, contact the appropriate Emergency Department. The following narrative is suggested:

***“Can I please confirm I have contacted [hospital]? I am a paramedic with the QAS and currently have a [XX] year old [gender] in refractory cardiac arrest.***

***The patient had a witnessed [VF/VT/PEA] cardiac arrest at [time] with effective CPR commencing at [time].***

***The patient has an [ETT/SAD] in situ remains unresponsive to [X] cycles of ACLS. The patient is on a mechanical chest compression device.***

***Our estimated time of arrival to your facility is [HH:MM]”.***

### Additional information

- High-quality chest compressions are a critical component in the cardiac arrest chain of survival.<sup>[1]</sup> Apart from a very brief pause (less than 5 seconds) during application, a MCCD can provide a safe means of providing uninterrupted high-quality chest compressions in situations where it is unlikely that effective chest compressions can be provided manually (e.g. during extrication and transport to specialist definitive care).<sup>[2]</sup>
- Mechanical chest compression devices are capable of delivering consistent, high-quality chest compressions, but this does not translate into improved patient outcomes when devices are routinely used in OHCA.<sup>[3]</sup>
- eCPR for OHCA appears to offer mortality benefit and positive neurologic outcomes in a very select patient population when combined with a comprehensive definitive care plan that includes reperfusion techniques.<sup>[4]</sup>

7. Complete the eARF in accordance with existing policy.

## Audit

All cases involving MCCD are subject to clinical audit and review. In situations where there are complications or concerns, officers must immediately contact the *QAS Clinical Consultation and Advice Line* and discuss the case with the QAS specialist emergency physician.

## Data collection and research

All cases attended by QAS officers which involve a cardiac arrest at any stage during the case, are subject to mandatory specific data collection.

The submission of data is the responsibility of the primary patient care officer and must include the completion of a *Death and Cardiac Arrest Report Form* (DCARF) and the adherence to the following process:

- On the eARF select primary diagnosis as 'Cardiac Arrest' and complete documentation in accordance with current standards.
- Complete and forward the physical hard copies of the relevant DCARF, eARF and in cases where monitoring or defibrillation has been performed, a complete *Mission Protocol* print out, *ECG rhythm strips* and *CORPATCH CPR SUMMARY* at the earliest opportunity to:

### **Manager, Cardiac Outcomes Program**

Information Support, Research and Evaluation Unit  
Mail Cluster 10.14  
Queensland Ambulance Service  
PO Box 1475  
BRISBANE, QLD 4001

