

Critical Care Support to Cardiac Catheter Laboratory

Aim To provide guidance on the process for emergency Critical Care support to the Cardiac Catheter Laboratory (Cath Lab).
Scope Patients undergoing PCI who require Critical Care support, including those with ROSC after out-of-hospital cardiac arrest and patients who deteriorate unexpectedly in the Cath Lab.

Patient admitted to ED with ROSC after out of hospital cardiac arrest

ED Team Responsibilities

Bleep ICU SpR(1987) if GCS<14, agitated or unstable

Contact cardiology:

- Is immediate PCI indicated?
- If yes, should we go directly to Cath Lab **or** Cath Lab Holding Bay **or** wait in ED Resus until lab available?
- Confirm choice of antiplatelet agent.
- Inform cardiologist if patient on warfarin or if previous CABG/PCI

Start cooling to 36 deg C (chilled fluids/ice packs) if the patient is comatose following ROSC and the primary rhythm disturbance was VF or pulseless VT.

Cardiology Team Responsibilities

- If advice given to wait in ED, Cardiology **must** then call ED Resus (ext. 3848) when ready to accept patient
- Ensure red ICU resuscitation trolley and bag-valve-mask are ready in the Cath Lab
- Assist ICU doctor until ICU transfer nurse arrives
- Inform CCU of admission and ensure CCU nurse is available

Whole Team Responsibility

- If history of trauma – consider CT scan and c-spine immobilisation

Patient admitted directly to Cath Lab with ROSC after out of hospital arrest

Cardiology Team Responsibilities

- Bleep ICU SpR (1987) as soon as patient accepted
- Arrange for the patient to be taken directly to the Cath Lab Holding Bay
- Ensure red ICU resuscitation trolley, bag-valve-mask and grab bag of drugs from fridge are available in the Cath Lab Holding Bay. Access to the controlled drugs cupboard key is also required
- Assist ICU doctor until ICU transfer nurse arrives
- Ensure any antiplatelet agents required are given and the ICU team is informed

ICU Team Responsibilities

- ICU SpR will inform the ICU transfer nurse and ensure the ICU consultant is aware
- ICU team must ensure airway is secure **before** PCI begins. LMA should be exchanged for a tracheal tube.
- Ensure cooling if the patient is comatose following ROSC and the primary rhythm disturbance was VF/VT.

Patients with VF/VT and STEMI will be phoned through to Cardiology by paramedics

Patient deteriorates in Cath Lab requiring urgent Critical Care support

Cardiology Team Responsibilities

- Fast bleep ICU SpR (1987) to the Cath Lab. The ICU SpR will then inform the ICU transfer nurse
- Ensure red ICU resuscitation trolley, bag-valve-mask and grab bag of drugs from fridge are available in the Cath Lab Holding Bay. Access to the controlled drugs cupboard key is also required.
- Assist ICU doctor until ICU transfer nurse arrives
- Ensure any antiplatelet agents required are given and the ICU team is informed

ICU Team Responsibilities

- ICU SpR will inform the ICU transfer nurse and ensure the ICU consultant is aware
- If the airway is compromised, securing the airway takes priority over continuing with PCI. If these cannot safely be done concurrently, PCI must be halted until the airway is secure.
- Ensure cooling if the patient is comatose following ROSC and the primary rhythm disturbance was VF/VT.

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Minimum interventions before transfer to Cath Lab or starting PCI

Before any patient is transferred from ED to the Cath Lab or PCI continues they must have:

- A secure airway. An LMA is not a secure airway and must be replaced for a tracheal tube by the ICU team
- Adequate venous access (preferably 2 large-bore cannulae)
 - Use one cannula for infusion of sedative agent e.g. propofol
 - Use other cannula for fluids and any other drugs/infusions. Suggest using double lumen octopus. Attach a syringe driver infusion giving set (or 'curly wurly') to one of these ports for metaraminol or adrenaline and fluids to the other port. Avoid using the dorsum of right hand for access
 - ECG, NIBP, SpO₂ and ETCO₂ monitoring
- Cardiovascular stability unless PCI is the only way that this can be achieved

Before PCI starts:

- Check right patient, right people and right equipment
- Airway secure – if any problems or concerns this must be resolved first
- BP target (remember cerebral and coronary perfusion are important). Cardiologist usually takes primary responsibility for managing circulation and dysrhythmias but this must include ICU input. Effective communication is paramount
- Is an IABP required and if so when will it be inserted?

The following interventions are not essential:

Arterial line - An ABG can be taken prior to transfer if required. The cardiologist will be monitoring invasive arterial pressures within minutes of arrival in the Cath Lab. If an arterial line is necessary, please avoid the right radial artery.

Central lines - If emergency adrenaline infusion is required then use a large bore peripheral cannula. The infusion site must be reviewed frequently to check for extravasation. This should be exchanged for a central line or use the 3rd port on the Icy-Cath at the earliest safe opportunity after PCI.

Urinary catheters

Nasogastric or orogastric tube - insert if possible before transfer but do not delay if repeated attempts unsuccessful. Discuss with cardiologists about alternative routes of antiplatelet medications if still unsuccessful once in Cath Lab.

CXR - can wait until after PCI unless concerns about tube/line positions. The radiographer can image the position of the NGT in the Cath Lab.

Before transfer to ICU following PCI

- Arterial sheath to be removed and TR band or Femostop applied if required
- Arterial line sited prior to transfer if unstable. If IABP in situ and/or stable this can sometimes wait until back on DCCQ but it should be then sited immediately. If in doubt then site before transfer.
- Clear, documented instructions from Cardiology team including antiplatelet drugs and continued care.

Other notes

Cath Lab Holding Bay

The holding bay is intended for temporary use only (up to 20 minutes) when:

- patients are brought directly to the Cath Lab by paramedics (bypassing ED)
- The Cath Lab is not yet fully prepared or Cath Lab staff are still awaited

Trauma

Patients with a significant history of trauma (including paramedic decision to immobilise cervical spine) should always be assessed initially in ED

Removal of TR Band device in Critical Care

On arrival in DCCQ:

- The TR band should be left for 15 minutes, after which 1-2ml air should be removed
- If there is bleeding, increase the volume by 1-2ml
- Leave for a further hour and then decrease as below
- In the intervening hour, and until the TR band is removed, the following should be checked every 15 minutes:
 - **Pulse** – place oxygen saturation probe on thumb or forefinger. If a trace is obtained, press hard on the ulnar border of the forearm, just above the TR band to occlude the ulnar artery (see below). A wave form should still be present.
 - **Colour and capillary refill time**
 - **Warmth**
 - **Sensation/movement** – unlikely to be measurable in the majority of DCCQ patients

After 1 hour in DCCQ:

- Reduce TR band volume by 2mls every 15 minutes
 - If you notice bleeding then re-inflate the TR band by 1ml in the first instance. If this fails to control the bleeding then add another 1ml. If haemostasis is achieved then re-check after 15 minutes and proceed.
- Once the volume in the TR band is zero then leave for a further 15 minutes
 - If bleeding occurs follow the steps above.
- If no further bleeding, remove the TR band using the following method
 - Put 15ml air into the green syringe
 - Undo the velcro strap
 - Slowly re-inflate the TR band and this should lift the band off the wrist
 - Gently remove the band
 - DO NOT clean the wrist straight away – leave for 10 minutes
 - If no further bleeding, clean skin gently and apply a dressing
 - If bleeding does occur at this point, apply manual pressure for 10 minutes, then re-assess:
 - If no further bleeding, gently clean and re-dress
 - If further bleeding the patient will require application of a new TR band. Apply direct pressure until a new TR band can be obtained. Contact CDU on Ext. 1360/1361 during daylight hours or CCU on Ext. 6034 or 6746 at any time.
 - If a new TR band is placed, leave for 30 minutes and then reduce volume as described above.

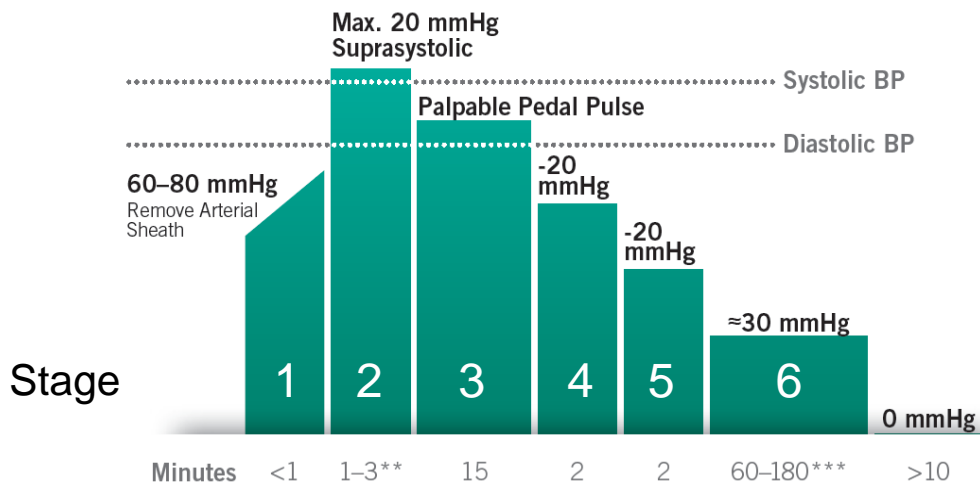
DO NOT over inflate the TR band or leave it on longer than necessary as this will increase the risk of occluding the radial artery with clot.

Adapted from original protocol by M.Drew, January 2011



Press here when testing
for the pulse/waveform

Removal of Femostop device in Critical Care



On arrival in DCCQ:

- Stages 1 and 2 will have been completed in the Cardiac Catheter Laboratory
- Be aware: Stages 1 and 2 may be associated with vagal stimulation and can cause bradycardia and/or hypotension, which can be treated with atropine/glycopyrrolate and/or fluids
- The pressure of the Femostop should be at the mean arterial pressure and pedal pulses should be palpable
- As with the TR band, every 15 minutes the following should be checked:
 - **Pulses**
 - **Colour**
 - **Warmth**
 - **Sensation/movement – unlikely to be measurable in the majority of DCCQ patients**

After 15 minutes in DCCQ:

- Reduce Femostop pressure by approximately 20mmHg every 2 minutes until a pressure of approximately 30mmHg is reached (Stages 4 and 5)
 - If you notice bleeding then re-inflate the Femostop back to Stage 2 (i.e. approximately 20mmHg above systolic pressure)
 - This must not last longer than two minutes as the artery is occluded during this time and there is a risk of vascular occlusion if this stage lasts any longer
 - After two minutes, recommence the reduction process
- Once Stage 6 is reached then the pressure should be left at approximately 30mmHg for between 60 and 180 minutes.
- The length of time required will be influenced by length of procedure and anti-coagulants given
- The Cardiac Catheter Laboratory staff should give an indication of how long Stage 6 should last
- If no indication given then release pressure at 60 minutes
- If there is no bleeding, release the Femostop and gently lift the dome off the patient
- The securing band can be slipped out from under the patient
- DO NOT clean the groin straight away – leave for 10 minutes
- If no further bleeding, clean skin gently and apply a dressing
- If further bleeding does occur at this point, or any other point during the process, then follow the steps above
- Contact CDU on Ext. 1360/1361 during daylight hours or CCU on Ext. 6034 or 6746 after hours if there are any problems

If re-inflation required DO NOT leave at stage 2 for longer than two minutes as the femoral artery is occluded at this point. If left longer there is a risk of clot formation and occlusion

Adapted from product literature