Arrhythmias and Cardiac Arrest on NICU: Treatment Algorithms

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<th>Scope (Staff):</th>
<th>Nursing and Medical Staff</th>
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<td>Scope (Area):</td>
<td>NICU KEMH, NICU PCH, NETS WA</td>
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This document should be read in conjunction with this DISCLAIMER

The following algorithms are to be used for neonates on the NICU, not for resuscitation at birth when the NRP guidelines are appropriate. See Resuscitation Algorithm for the Newborn

In the event of an arrhythmia or cardiac arrest on NICU consider:

- **ABC**
  - Ensure adequate FiO₂.
  - Consider intubation and ventilation.
  - Vascular access – antecubital cannula preferred (if difficult consider intraosseous).
  - Adequate technique of cardiac compressions/ mask ventilation.
  - If no intra-arterial BP monitoring, then cycle BP cuff every 2 minutes.

- **Underlying causes – identify and correct:**
  - Respiratory
    - Pneumothorax/ accidental extubation/ ETT blockage/ pulmonary haemorrhage.
  - Cardiovascular collapse
    - Blood loss/ sepsis/ cardiac tamponade (PICC/ UVC tip in heart and extravasated – stop infusion).
    - Underlying congenital cardiac abnormality.
  - Metabolic
    - Hypo/ hyperkalaemia, hypocalcaemia, hypoglycaemia.
  - Neurological
    - Intracranial haemorrhage, seizures.

- **Who to call** – see algorithm below.
- Other equipment required eg. Defibrillator. If required for use, see ‘Cardioversion and Defibrillation Guideline’.

Who to call algorithm
Cardiac arrest algorithm for NICU
SVT algorithm for NICU
VT algorithm for NICU
Post-resuscitation care:
- Re-evaluate ABCDE.
- Re-evaluate oxygenation and ventilation.
- Identify and treat precipitating causes.
- Consider 12-lead ECG.
- Temperature management – if full cardiac arrest, discussion re: cooling.
- Make sure all relevant personnel and teams aware.
- Are the parents aware?

Who to call in the event of an arrhythmia or cardiac arrest:
Guideline as to who should lead an arrest on NICU 3B PCH:

- In general, the most experienced person in attendance.
- The resuscitation lead should be made clear to all staff at the resus.
- If the lead is handed over at any time during the resus, this should be made clear to all staff at the resus.
- Before a consultant arrives, the NICU registrar/ SR should be the lead.
- If a PICU registrar arrives, the resus should continue to be led by the NICU registrar/ SR unless the NICU registrar/ SR is required to be hands on eg. Intubate/ get vascular access.
- Once the NICU consultant arrives, they should usually take over leadership, unless discussed that the trainee will continue to lead with supervision.
- If the PICU consultant has arrived before the NICU consultant and has taken over as leader, when the NICU consultant arrives there will be a discussion between both consultants as to whether the PICU consultant continues or whether the NICU consultant takes over.
Cardiac arrest algorithm for NICU:

1. **Start CPR**
   - *3 compressions : 1 breath*
   - Minimise interruptions

2. **Assess rhythm**

3. **SHOCKABLE**
   - **Asynchronous DC shock** 4 J/kg
   - Adrenaline after 2nd shock
   - Amiodarone 5mg/kg after 3rd shock
   - Ventricular fibrillation (VF)
   - Pulseless ventricular tachycardia (VT)

4. **CPR for 2 minutes**

5. **Return of spontaneous circulation**

6. **Non-Shockable**
   - **CPR for 2 minutes**
   - Asystole
   - Pulseless Electrical Activity (PEA)
   - Bradycardia <60bpm with cardiovascular compromise

7. **Post-resuscitation care**

*Adrenaline dose:
- 1mL 1:10000 term infants
- 0.5mL 1:10000 preterm infants

*Continuous cardiac compressions are NOT given in intubated neonatal patients.
Continue to use 3:1 ratio, pausing for breaths.

Adapted from ANZCOR 2016
SVT algorithm for NICU:

Yes

Shock present?

No

Vagal manoeuvre (if no delays)

Establish vascular access quicker than preparing for defibrillation?

Yes

Adenosine 100 mcg/kg

2 mins

Adenosine 200 mcg/kg

2 mins

Adenosine 300 mcg/kg

DISCUSS WITH CARDIOLOGY
Consider:
Synchronous DC shock
OR Amiodarone
OR other antiarrhythmic

No

Synchronous DC shock 1 J/kg

Synchronous DC shock 2 J/kg

Consider amiodarone

Adapted from APLS Australia 2017
VT algorithm for NICU:

- **Cardiac arrest protocol**
  - **Pulse present?**
    - **No**
      - CONSULT CARDIOLOGY URGENTLY
        - Amiodarone 5 mg/kg over 30 mins
        - Consider Synchronous* DC shock
    - **Yes**
      - **Shock present?**
        - **No**
          - Amiodarone 5mg/kg once
        - **Yes**
          - Synchronous* DC shock 1 J/kg
          - Synchronous* DC shock 2 J/kg
          - Amiodarone 5mg/kg once

*IF SYNCHRONOUS SHOCK FAILS TO CAPTURE OR DISCHARGE, USE AN ASYNCHRONOUS SHOCK

Adapted from APLS Australia 2017
### Related CAHS internal policies, procedures and guidelines

**Neonatology Guideline**
- Cardioversion and Defibrillation
- Recognising and Responding to Clinical Deterioration
- Resuscitation Algorithm for the Newborn

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**Standards Applicable:** NSQHS Standards:

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