



GUIDELINE

Cardiac: Arrhythmias

Scope (Staff):	Nursing and Medical Staff
Scope (Area):	NICU KEMH, NICU PCH, NETS WA

Child Safe Organisation Statement of Commitment

CAHS commits to being a child safe organisation by applying the National Principles for Child Safe Organisations. This is a commitment to a strong culture supported by robust policies and procedures to reduce the likelihood of harm to children and young people.

This document should be read in conjunction with this [disclaimer](#)

Aim

This guideline outlines the identification and management of arrhythmias in the neonatal population.

Background

Neonatal arrhythmias are relatively common, especially supraventricular tachycardias. These arrhythmias may or may not be associated with underlying structural heart problems.

Post-operative arrhythmias usually occur in those that have had open cardiac surgery. If an arrhythmia is suspected, rapidly assess the infant for signs of respiratory or cardiac decompensation.

Key Points

- Immediately run a rhythm strip from the bedside monitor and perform a blood gas to determine acid base, electrolyte, PGL and haemoglobin status.
- If the child is stable perform a 12-lead ECG. It is also important to perform a 12-lead ECG after the rhythm returns to normal.
- All arrhythmias should be discussed with the duty NICU consultant.

Narrow Complex Tachyarrhythmia

Sinus Tachycardia

Most common tachycardia. Heart rate between 180-220. Can be difficult to differentiate from an SVT.

- Low cardiac output due to hypovolaemia/cardiac tamponade.
- Respiratory e.g. pneumothorax
- Seizures: other signs may not be obvious. Consider in at risk situations.
- Pain/agitation especially post op (normal BP, lactate, urine output)
- Fever and/or sepsis.
- Drugs e.g. Caffeine

Treatment: Correct the underlying cause.

Supraventricular Tachycardia

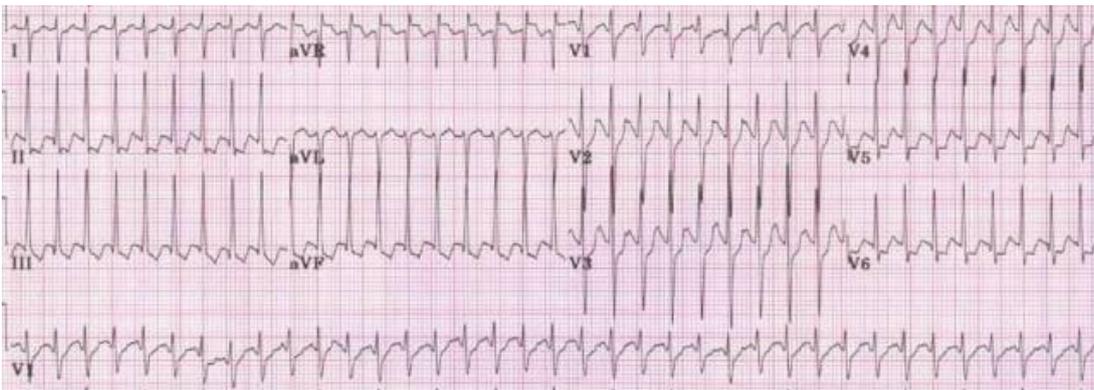
Causes

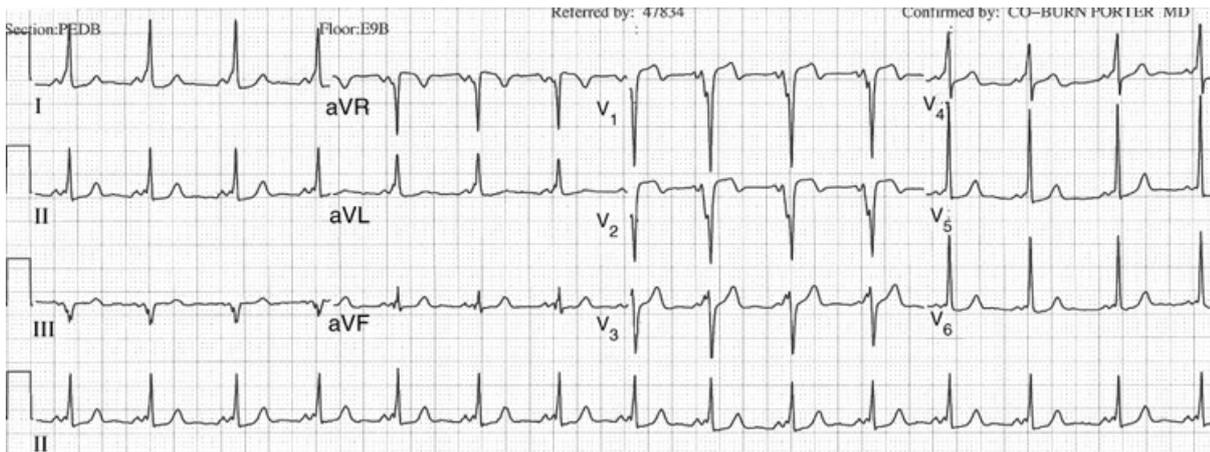
An atrial ectopic site which has a faster intrinsic rate than the sinus node.

Re-entry in which there are two routes for conduction: the normal atrioventricular node-His-Purkinje system and the other is an *accessory pathway* e.g. Wolff-Parkinson-White syndrome (see figure below)

Characteristics

- Sudden onset/offset.
- Rate constant and regular ~240bpm.
- The QRS is narrow, and P waves, if discernible, are related to the QRS.





WPW ECG. Delta waves in leads I, II, aVR, aVL, V1-6.

SVT Treatment:

Type of initial therapy depends on the presence or absence of SHOCK (Clinical findings and metabolic acidosis). See the **SVT algorithm for NICU** in the [Arrhythmia and Cardiac Arrest on NICU: Treatment Algorithms](#) guideline.

If no signs of shock

- Vagal e.g. Ice to face.
- [Adenosine](#)
- **Synchronous** cardioversion (see [Cardioversion and Defibrillation](#) guideline).
- [Amiodarone](#) / [Digoxin](#) / [Propranolol](#) / [Flecainide](#) (after discussion with cardiologist).

JET (Junctional Ectopic Tachycardia)

- Unusual as a spontaneous SVT in neonates.
- More common following open cardiac surgical repair of Tetralogy of Fallot, VSD, AVSD, Truncus Arteriosus and TAPVD.
- Usually within 72 hours of operation, more likely with fever.
- Narrow complex, rate usually regular at 180-250 bpm.
- Beat to beat variability in blood pressure.
- AV dissociation, ventricular rate > atrial rate.
- Haemodynamic instability due to loss of AV synchrony.



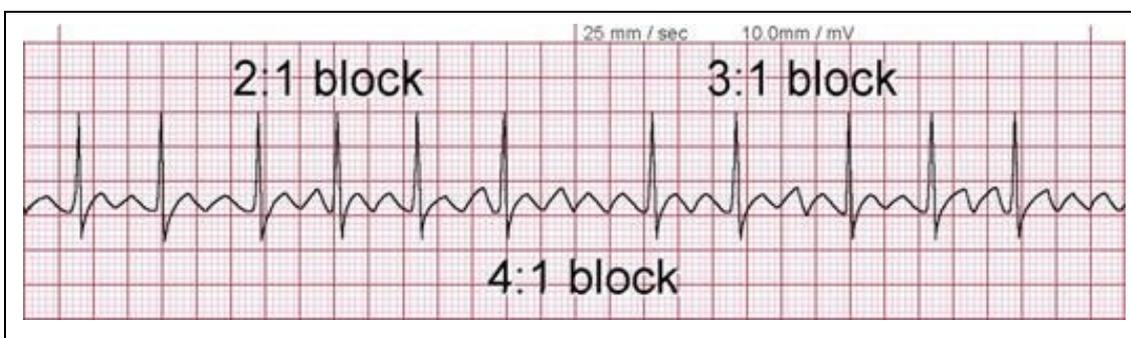
Treatment:

- Whole body cooling.
- Avoidance of adrenergic (catecholamines) or vagolytic (e.g. Pancuronium) drugs.
- Correction of any electrolyte imbalance.
- [Magnesium](#).
- Anti-arrhythmic drugs e.g. [Amiodarone](#).
- Pacing (note: wires usually placed at surgery in at risk procedures and left in place for 3 days post op).
- ECMO.

If suspected, consult neonatologist and PICU consultant/cardiologist immediately.

Atrial Flutter

- Uncommon (unless associated with right atrial problems).
- Variable AV block.
- Saw tooth/irregular baseline.
- [Adenosine](#) may be used as a diagnostic tool by a cardiologist to determine if the narrow complex tachycardia is an SVT or flutter; with flutter adenosine will temporarily slow the ventricular rate



Treatment:

- Synchronised low dose (0.5J/kg) Cardioversion (see [Cardioversion and Defibrillation](#) guideline).
- Preventative treatment is not usually required; [Amiodarone](#) can be used.
- Avoid atropine like drugs, avoid agitation, keep prone.

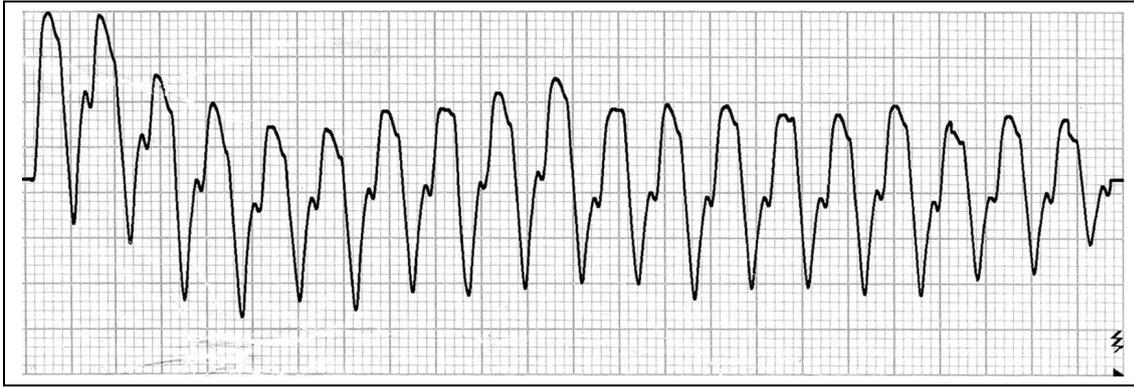
Broad Complex Tachycardia

Ventricular Tachycardia (VT)

- Unusual in neonates.
- Haemodynamic compromise common.
- Can be idiopathic and relatively benign.
- Low and high potassium and low calcium &/or magnesium levels may be a factor
- Associated with myocardial ischemia or residual cardiac defects.
- Long QT syndrome in unexpected VT.
- ECG usually diagnostic - AV dissociation.
- No response to adenosine.

Treatment:

- See the [Arrhythmia and Cardiac arrest on NICU: Treatment Algorithms](#).
- Call neonatologist/ cardiologist immediately.
- **Urgent treatment** depends on 2 simple clinical features: are pulses present; if yes is shock present.
- If pulses present and no shock consider [Amiodarone](#) loading dose –as first line or if VT is resistant to shock.
- Immediate synchronous Cardioversion if **pulseless/shock**- commence at 4J/kg (ensure adequate analgesia/sedation).
- [Lignocaine](#) loading dose may have role in prophylaxis of recurrent VT/VF.
- [Magnesium](#) may be useful in ventricular tachyarrhythmias, particularly Torsades de Pointes, but infuse slowly as has potential pro-arrhythmic action.

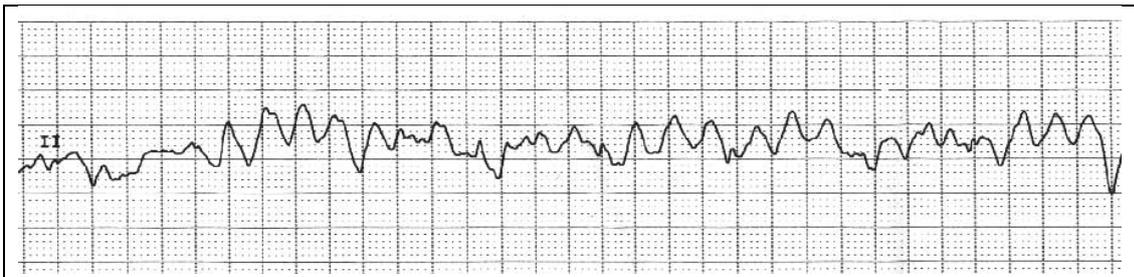


Ventricular Fibrillation (VF)

- Uncommon and usually terminal event, more likely in:
 - Severe hypertrophy or myocardial disease.
 - Severe electrolyte disturbance.
 - Prolonged QT interval.
 - Wolf-Parkinson-White Syndrome.
- May also result from degeneration of haemodynamically unstable SVT or VT.

Treatment:

- See the [Arrhythmia and Cardiac arrest on NICU: Treatment Algorithms](#)
- Call neonatologist/ cardiologist immediately.
- Cardioversion (unsynchronised) - commence at 4J/kg.
- Anaesthesia/sedation usually not required as patient unconscious.



Bradyarrhythmias

Sinus (Baseline) Bradycardia

- P wave before every QRS.
- HR 80-100 very common.
- Usually associated with normal SaO₂.

- Usually post perinatal stress and not of concern but may be associated with hypothermia, cooling, raised potassium, raised intra cranial pressure, hypothyroidism, drugs (before and after birth).
- Slow rate disadvantageous in immediate post-op period.

Treatment:

- Underlying cause if present.
- May be atrial paced if wires in situ (in PICU).

AV Block

Second degree

- Not every P wave conducted.
- May be associated with underlying heart disease.

Third degree

- P and QRS waves completely dissociated.
- Ventricular rate is 40-80 with little variation.
- Can be associated with underlying structural heart disease.
- Maternal SLE with neonatal His bundle fibrosis
 - Maternal antibodies anti Ro or La
 - Mother maybe asymptomatic (undiagnosed)
 - Heart failure can develop if HR <50
 - Treatment is with Isoprenaline infusion.
 - Permanent pacemaker may be required

Post open cardiac surgery

- Exclude electrolyte disturbance, may require pacing with intra cardiac wires.

Related CAHS internal policies, procedures and guidelines

[Arrhythmias and Cardiac Arrest on NICU: Treatment Algorithms](#)

[Cardioversion and Defibrillation](#)

References and related external legislation, policies, and guidelines

[King Edward Memorial Hospital - Neonatal Medication Protocols \(health.wa.gov.au\)](http://health.wa.gov.au)

This document can be made available in alternative formats on request.

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