NTS Clinical Guideline

Title:	Tachyarrhythmias (SVT and VT)		
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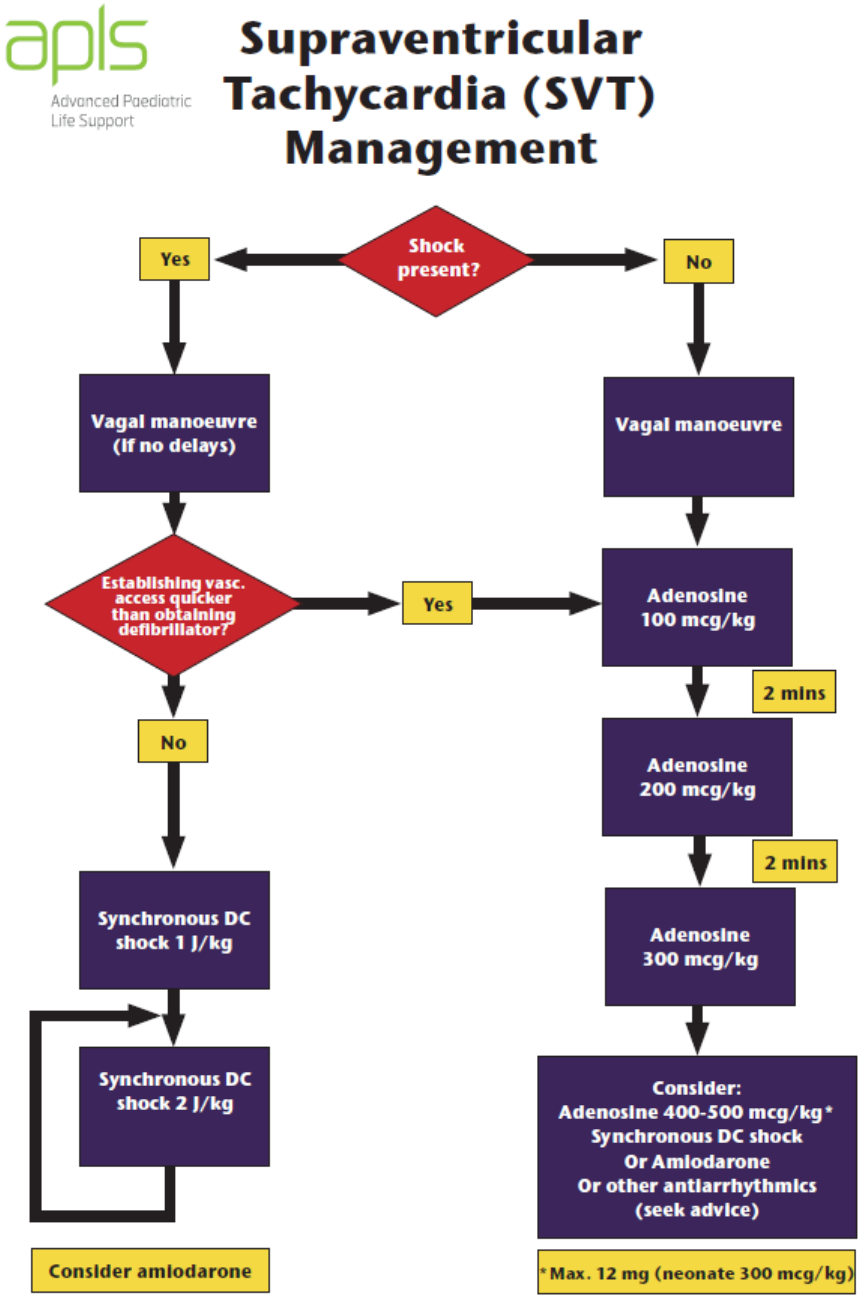
Foreword

This document provides guidance for the recognition and management of neonatal arrhythmias.

Infants with known cardiac lesions / arrhythmias who weigh ≥ 1.5kg, should normally be transferred by the Children's Acute Transport Service (CATS). However, it is possible that NTS may become involved in the management of these infants if CATS are unable to undertake the transfer, or if a cardiac lesion comes to light during the referral or assessment process.

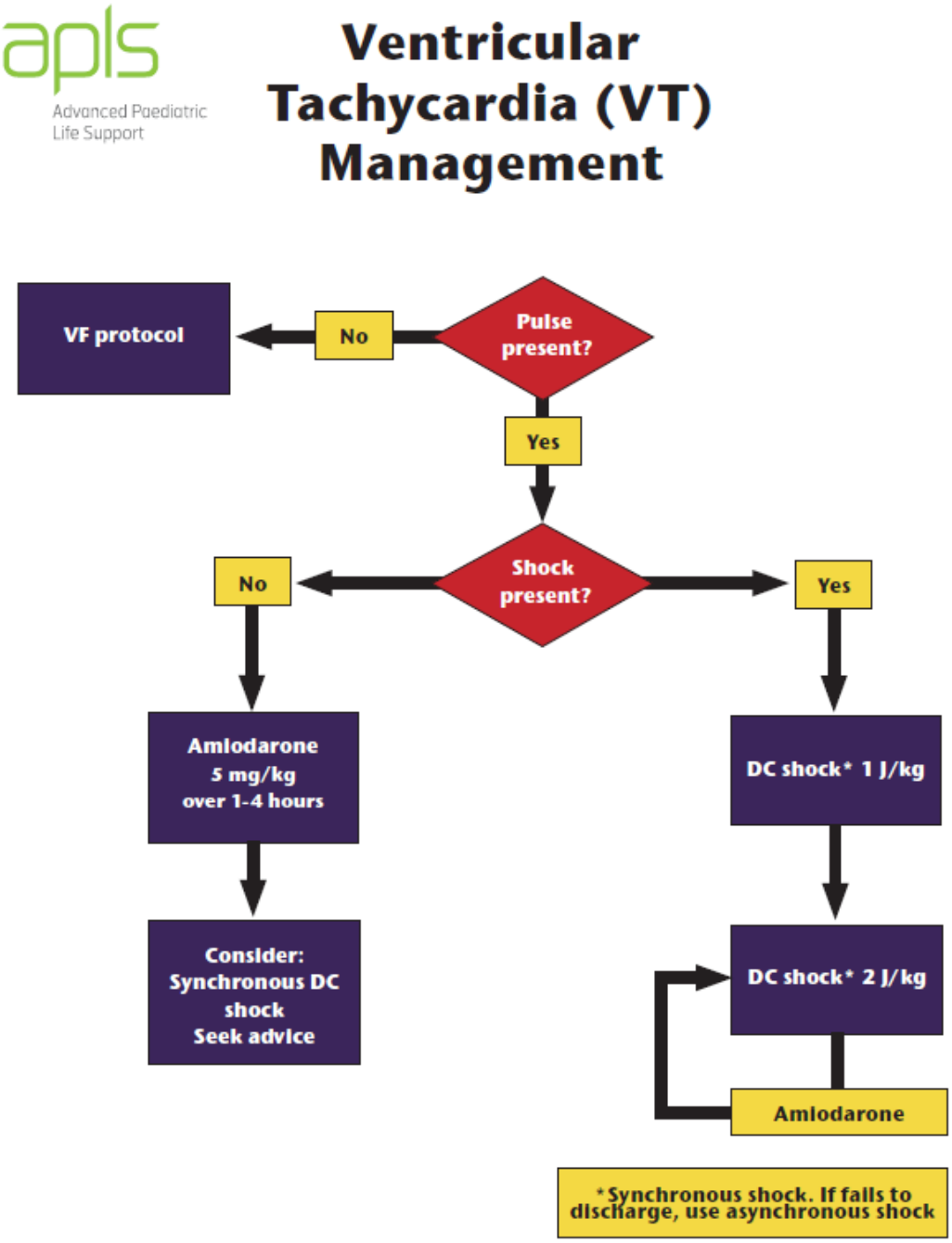
Supraventricular Tachycardia (SVT)

- Heart rate usually > 220bpm, regular, narrow QRS complexes
- Assess airway and breathing – intubate if cardiac failure with acidosis or impending cardiorespiratory collapse
- Check rhythm strip +/- 12 lead ECG if time
- Follow algorithm as per APLS guidance (below)
    - IV adenosine must be given into a large peripheral vein followed by a rapid saline flush
    - If adenosine fails, discuss with Paediatric Cardiologist



Ventricular Tachycardia (VT)

- Rare, wide QRS complexes usually with retrograde p waves and AV dissociation
- ABC assessment with rhythm strip / ECG analysis
- If stable, discuss with Paediatric Cardiologist, check electrolytes and blood gas
- Follow APLS algorithm (below)



Background

- Arrhythmias may be detected during either the foetal or neonatal period
- They occur in around 1-2% of all pregnancies and around 1-5% of all newborns in the first 10 days of life
- They are commonly classified as tachycardic, bradycardic or irregular arrhythmias.
- In pregnancy the mother is often asymptomatic and many foetal arrhythmias do not cause problems, however, sustained tachycardia or bradycardia can cause cardiac failure and hydrops.
- Neonatal presentation is variable, with symptom development depending on rate and duration of the arrhythmia.
- The clinical picture ranges from the asymptomatic infant, to one with signs of congestive cardiac failure and cardiogenic shock.
- Tachyarrhythmias are usually in the range 220-300 bpm.
- Premature atrial contractions (PACs) are the most common neonatal arrhythmia, but these are almost always benign and usually disappear in the first month of life.

Tachyarrhythmia

These are broadly classified into supraventricular tachycardia (SVT) or ventricular tachycardia (VT).

Supraventricular tachycardia

SVTs are the most common symptomatic tachyarrhythmia in children, and comprise a group of arrhythmias characterised by a narrow QRS complex with heart rates usually > 220 bpm. The tachycardia may originate in the atria, AV node, or through an accessory pathway between the atrium and ventricles. A rare type of SVT, 'antidromic SVT', occurs when an impulse travels down an accessory pathway and back up the AV node causing a wide QRS similar in appearance to VT.

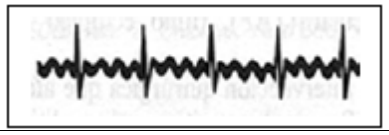
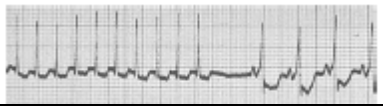
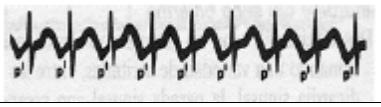
Management (see algorithm above):

- *Stable patients:* Perform 12 lead ECG, try vagal manoeuvres* (diving reflex, unilateral carotid massage). If no response give a rapid bolus of adenosine (ideally during ECG recording) through a large peripheral vein followed by a rapid saline flush. If no response, increase adenosine dose discussing further management with a Paediatric Cardiologist.

- *Shocked patients:* ABC approach, follow emergency algorithm above. If time, give adenosine bolus. If no time, or if no response, give synchronised DC cardioversion 1J/kg (then 2J/kg if still no response) and consider other anti-dysrhythmic on discussion with Paediatric Cardiologist.

* Facial immersion in ice water. This technique must not be used for infants in circulatory shock. The baby is attached to a cardiac monitor, arms are wrapped in a towel, the whole

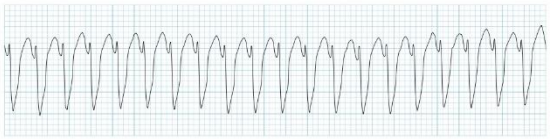
face is immersed in an ice water slurry for five seconds. It is unnecessary to occlude the nostrils.

Atrial flutter 	"Saw-toothed" appearance of irregular p waves Rapid atrial rates (240-360 bpm), not all conducted
Accessory pathway mediated (Wolf Parkinson White) 	Short PR Slurred upstroke to QRS (delta wave) indicating pre-excitation
Permanent junctional reciprocating tachycardia 	Persistent tachycardia, often refractory to pharmacological treatment Tachycardia usually milder than other SVTs, around 180-220 bpm
Atrial fibrillation 	Irregularly, irregular SVT giving chaotic appearance P waves difficult to visualise

<u>Ventricular Tachycardia</u>

This is a rare arrhythmia. It is associated with severe hypoxia, acidosis, cardiomyopathy, ischaemia, prolonged QT interval, pulmonary hypertension, hypomagnesemia, hypocalcaemia, and hyperkalaemia. **The ECG is characterised by a wide QRS complex.**

VT may impair cardiac output with consequent hypotension, collapse and cardiac failure and thus prompt recognition and management are vital.



<u>Management (see algorithm above):</u>

- *Stable patients:* Should have a 12 lead ECG and be discussed with a Paediatric Cardiologist. Check electrolytes and a blood gas urgently and correct any underlying abnormalities. Amiodarone (5mg/kg over 30 minutes) may be given. Lidocaine or magnesium sulphate may also be used in some patients as well as synchrnous DC shock.

- *Shocked patients:* ABC approach and synchronised cardioversion with 1J/Kg (followed by 2J/kg if ineffective).