

## CG030 Paediatric SVT

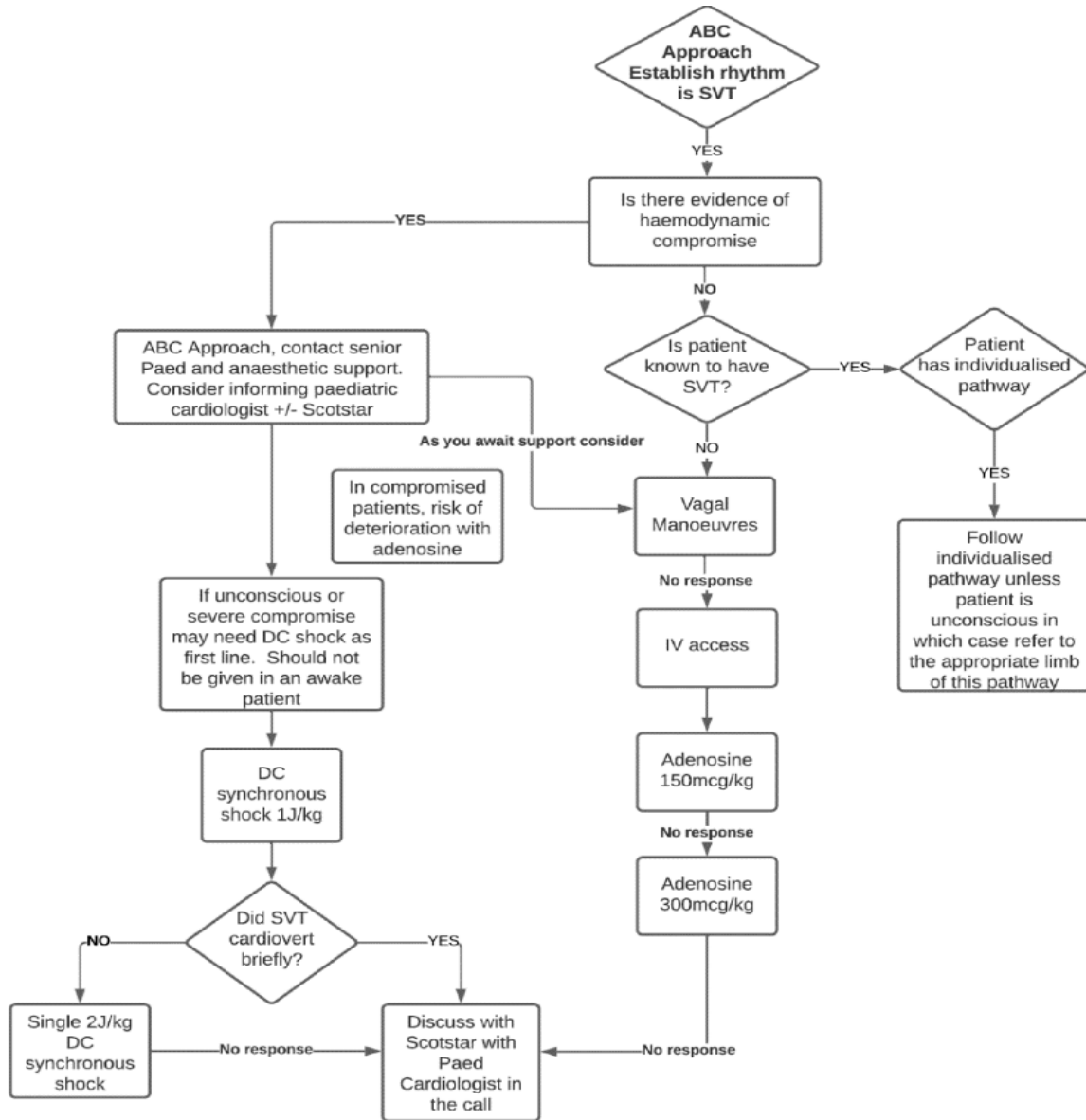
1. Key Recommendations for operational use			Ref
1	Advice and referral	<ul style="list-style-type: none"> <li>Contact the Specialist Services Desk (SSD) in SAS ambulance control to request advice or retrieval from ScotSTAR:               <ul style="list-style-type: none"> <li>- <b>03333 990222</b></li> </ul> </li> <li>As appropriate, the Paediatric Cardiologist and Cardiac Intensivist at the Royal Hospital for Children, Glasgow can be brought into a conference call.</li> </ul>	GPP
2	Stabilisation	<ul style="list-style-type: none"> <li>Airway: ensure clear and patent.</li> <li>Breathing: give supplemental oxygen as needed to target saturations of <math>\geq 94\%</math>.</li> <li>Assess circulation: if shocked call for senior assistance and prepare for urgent DC cardioversion with sedation or general anaesthesia.</li> </ul>	1
3	Diagnosis	<ul style="list-style-type: none"> <li>SVT in a child is usually a narrow complex tachycardia:               <ul style="list-style-type: none"> <li>- it can be difficult to distinguish from sinus tachycardia particularly in infants.</li> <li>- consider other causes of tachycardia: including metabolic and electrolyte disturbance, sepsis, trauma and poisoning.</li> </ul> </li> <li>Typical features usually include:               <ul style="list-style-type: none"> <li>- persistent heart rate <math>&gt;220</math>bpm although can be lower.</li> <li>- narrow complex regular tachycardia at a constant rate.</li> <li>- P waves are often difficult to see, if seen usually at onset of T wave.</li> </ul> </li> <li>Patients may or may not present in a shocked state:               <ul style="list-style-type: none"> <li>- without shock: poor feeding, dyspnoea, pallor, palpitations, tachypnea, chest discomfort.</li> <li>- signs of cardiogenic shock: low blood pressure or prolonged capillary refill, hepatomegaly, agitation or confusion (although level of consciousness may be normal).</li> </ul> </li> </ul>	GPP
4	Access	<ul style="list-style-type: none"> <li>Early access is essential.</li> <li>Site two intra-venous cannulae for administration of drugs:               <ul style="list-style-type: none"> <li>- if unsuccessful, use an intra-osseous approach if haemodynamic compromise.</li> </ul> </li> <li>In patients where peripheral IV access is difficult, consider:               <ul style="list-style-type: none"> <li>- using ultrasound.</li> <li>- consider using sedation through other routes as detailed here: <a href="https://www.clinicalguidelines.scot.nhs.uk/nhsggc-paediatric-clinical-guidelines/nhsggc-guidelines/anaesthetics/premedication-guideline-for-paediatric-patients-prior-to-general-anaesthesia/">https://www.clinicalguidelines.scot.nhs.uk/nhsggc-paediatric-clinical-guidelines/nhsggc-guidelines/anaesthetics/premedication-guideline-for-paediatric-patients-prior-to-general-anaesthesia/</a></li> </ul> </li> </ul>	1
5	Individualised plans	<ul style="list-style-type: none"> <li>Patients known to have SVT may have individualised management plans.</li> </ul>	GPP

4	Vagal manouevres	<ul style="list-style-type: none"> <li>• <b>Neonates &amp; infants (&lt; 1 year old):</b> <ul style="list-style-type: none"> <li>- establish monitoring: ECG, SpO2 &amp; BP.</li> <li>- explain to family.</li> <li>- wrap patient including their arms in towel.</li> <li>- immerse whole face in iced water for 5 seconds, do not occlude airway.</li> </ul> </li> <li>• <b>Toddlers (1-4 years old):</b> <ul style="list-style-type: none"> <li>- establish monitoring: ECG, SpO2 &amp; BP.</li> <li>- apply facecloth soaked in ice cold water to face for 30 seconds.</li> <li>- do not apply eye ball pressure.</li> </ul> </li> <li>• <b>School aged children:</b> <ul style="list-style-type: none"> <li>- establish monitoring: ECG, SpO2 &amp; BP.</li> <li>- use Valsalva technique: <ul style="list-style-type: none"> <li>▸ blow hard for 15 seconds on “thumb in mouth” after full inspiration <b>or</b></li> <li>▸ blow as hard as possible through a syringe barrel from the plunger end, if need be asking them to lift a suspended tissue with the air jet.</li> </ul> </li> <li>- Headstand: <ul style="list-style-type: none"> <li>▸ Child can be helped, with appropriate adult support, to perform a headstand.</li> </ul> </li> </ul> </li> </ul>	1
5	Adenosine	<ul style="list-style-type: none"> <li>• Ensure ECG attached and recording running.</li> <li>• Administer preferably via large cannula in proximal vein with 3-way tap attached.</li> <li>• Adenosine can cause hypotension, chest tightness, flushing and bronchospasm, although it is not contra-indicated in wheeze or asthma.</li> <li>• First dose: <ul style="list-style-type: none"> <li>- Adenosine 150micrograms/kg (max 12mg).</li> <li>- give dose by fast injection followed rapidly with 10ml 0.9% sodium chloride flush.</li> </ul> </li> <li>• Second Dose: <ul style="list-style-type: none"> <li>- wait 2 minutes, if the SVT continues give Adenosine 300micrograms/kg (max 12mg).</li> <li>- give dose by fast injection followed rapidly with 10ml 0.9% sodium chloride flush.</li> </ul> </li> <li>• If there is no response after two doses seek expert advice via SSD (section 1):</li> <li>• Further options after seeking expert advice may include: <ul style="list-style-type: none"> <li>- Third dose of Adenosine 400-500micrograms/kg (max 12mg).</li> <li>- IV Amiodarone (section 6).</li> <li>- DC cardioversion (section 7).</li> </ul> </li> </ul>	GPP

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6	Amiodarone	<ul style="list-style-type: none"> <li>• Ideally give through a dedicated line.</li> <li>• Concentration <b>must</b> be 100mg/50ml (2mg/ml): <ul style="list-style-type: none"> <li>- this concentration is safe through a peripheral or central line.</li> </ul> </li> <li>• 50mg/ml Ampoule already in solution - no reconstitution is required.</li> <li>• Add 2ml (100mg) Amiodarone to 48ml <b>glucose 5%</b> ((incompatible with saline).</li> <li>• <b>Loading dose:</b> <ul style="list-style-type: none"> <li>- 25 micrograms/kg/min for 4 hours.</li> <li>- Amiodarone loading dose infusion rate in ml/hr = <math>(1.5 \times \text{patient weight in kg}) / 2</math>.</li> </ul> </li> <li>• <b>Maintenance infusion:</b> <ul style="list-style-type: none"> <li>- 15 micrograms/kg/min.</li> <li>- Amiodarone maintenance infusion rate in ml/hr = <math>0.9 \times \text{patient weight (kg)} / 2</math>.</li> </ul> </li> <li>• Example calculation for a 10kg patient: <ul style="list-style-type: none"> <li>- Loading dose infusion rate = <math>(1.5 \times 10) / 2 = 7.5\text{ml/hr}</math>.</li> <li>- Maintenance infusion rate = <math>(0.9 \times 10) / 2 = 4.5\text{ml/hr}</math>.</li> </ul> </li> <li>• Once amiodarone loading dose is completed a further dose of adenosine may be given.</li> </ul>	GPP
7	DC Cardioversion	<ul style="list-style-type: none"> <li>• DC cardioversion may be indicated if patient shocked or SVT is refractory.</li> <li>• Use procedural sedation or general anaesthesia unless the patient is already unconscious. <ul style="list-style-type: none"> <li>- as <b>CG025 Procedural Sedation:</b> <a href="https://www.snprs.scot.nhs.uk/wp-content/uploads//Procedural-Sedation-CG025.pdf">https://www.snprs.scot.nhs.uk/wp-content/uploads//Procedural-Sedation-CG025.pdf</a></li> </ul> </li> <li>• Use a synchronised DC shock 1 J/kg.</li> <li>• If cardioversion is not achieved, give a further synchronised DC shock 2 J/kg.</li> <li>• If cardioversion is not achieved after two shocks: <ul style="list-style-type: none"> <li>- seek advice from ScotSTAR &amp; Duty Paediatric Cardiologist.</li> <li>- consider amiodarone loading dose with a further synchronised DC shock 1 J/kg following delivery of at least half the loading dose.</li> </ul> </li> <li>• If deterioration into Polymorphic VT or VF then use an unsynchronised shock along standard cardiac arrest algorithms.</li> </ul>	1
8	Ongoing care	<ul style="list-style-type: none"> <li>• If stable and cardioverted the patient may be able to remain locally with ongoing joint care with the Scottish Paediatric Cardiac Service.</li> <li>• If there are ongoing concerns, consider transfer to the Royal Hospital for Children, Glasgow.</li> </ul>	GPP

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Consider on discussion with cardiology consultant:

- ADENOSINE 400-500mcg/kg, up to 12mg
- AMIODARONE as per protocol; if there was a brief response with adenosine initially, repeat this after half Amiodarone loading dose has been given  
If there was a brief response initially to DC shock consider repeating once half amiodarone loading dose complete
- Further DC SHOCK  
DC shocks should not be delivered in an awake child

## CG030 Paediatric SVT

2. Document History			
Reference Number	CG030		
Version	1		
Writing group (Chair in bold)	<b>Mark Davidson</b>	Paediatric Intensivist	ScotSTAR
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	Leanne Daly	Retrieval Nurse	ScotSTAR
	Treasa Magee	Retrieval Nurse	ScotSTAR
	Lauren Williams	PICU Pharmacist	RHC-Glasgow
	Scottish Paediatric Cardiac Service Guideline Group	Multi-disciplinary group	RHC-Glasgow
Associate Medical Director	Andrew Inglis		
Date issued	unapproved draft 1st July 2022		
Date for review			
Distribution	BASICS Scotland		X
	Medic 1		X
	Referring centres via service websites		✓
	Rural GPs Association of Scotland		✓
	SAS	Air Ambulance	X
		Specialist Services Desk	X
	ScotSTAR	EMRS West	✓
		EMRS North	✓
		Paediatric	✓
		Neonatal	✓
Tayside Trauma Team		X	
 <p>Scottish Ambulance Service <i>Taking Care to the Patient</i></p>		 <p>SCOTSTAR <small>Critical care, anytime</small></p>	

### 3. Scope and purpose

- **Overall objectives:**

The aim of this guideline is to provide consistent guidance on the assessment and management of paediatric supra-ventricular tachycardia (SVT).

The most common cause of paediatric tachyarrhythmia is a supra-ventricular tachycardia (SVT). These are common in infancy and childhood with an incidence of between 1:250 and 1:1000. Most cases are due to re-entrant pathways and occur in otherwise normal children. They can be very well tolerated for several hours meaning some children may not present until haemodynamic compromise is evident. They can also present in patients with underlying congenital cardiac conditions, cardiac conduction disorders or cardiac failure which may be secondary to the tachyarrhythmia.

- **Statement of intent:**

This guideline is not intended to be construed or to serve as a standard of care. Adherence to guideline recommendations will not ensure a successful outcome in every case, nor should they be construed as including all proper methods of care or excluding other acceptable methods of care aimed at the same results. The ultimate judgement must be made by the appropriate healthcare professional(s) responsible for clinical decisions regarding a particular clinical procedure or treatment plan. Clinicians using this guideline should work within their skill sets and usual scope of practice.

- **Feedback:**

Comments on this guideline can be sent to: [sas.cpg@nhs.scot](mailto:sas.cpg@nhs.scot)

- **Equality Impact Assessment:**

Applied to the ScotSTAR Clinical Standards group processes.

- Guideline process endorsed by the Scottish Trauma Network Prehospital, Transfer and Retrieval group.



### 4. References

1. <https://www.resus.org.uk/library/2021-resuscitation-guidelines/paediatric-advanced-life-support-guidelines>