



## Course: Key Competences

### Background:

In 2007, the Royal College of Paediatrics and Child Health (RCPCH) published a new curriculum for postgraduate medical education, which has been approved by the Postgraduate Medical Education and Training Board <sup>1</sup>. In addition, the RCPCH has devised an assessment strategy that uses multisource feedback tools to map specifically to assessment standards.

By the completion of Level One training, all trainees are expected to be able to initiate therapy in an infant presenting with Supraventricular Tachycardia. This scenario/ workshop has been designed to assess competence in management of this key condition of childhood.

### Curriculum Elements Addressed:

The management of Supraventricular Tachycardia (SVT) can be separated into five distinct phases:

- **Assessment**
- **Recognition of the condition**
- **Formulation of differential diagnoses**
- **Investigation**
- **Definitive therapy**

#### Assessment (Expected)

Brief history should be obtained:

- Key features → poor feeding, one episode of diarrhoea, difficult to settle.

Baby should be examined thoroughly. Key features of examination:

- Tachypnoea 40 breaths.min<sup>-1</sup>
- Tachycardia 230 beats.min<sup>-1</sup>, CRT 3-4 sec, NIBP 68/42
- Liver edge 2cm below costal margin
- irritable child

#### Recognition of condition (Expected)

Signs are of shock. Tachycardia is out of proportion.

#### Formulation of differential diagnosis (Expected)

Diagnostic possibilities include hypovolaemia, sepsis, pain, cardiomyopathy and SVT.

#### Investigations (Expected)

Cardiovascular monitoring

Pulse oximetry

<sup>1</sup> A Framework of Competences for Level 1 Training in Paediatrics.  
<http://www.rcpch.ac.uk/Training/Competency-Frameworks>





Septic screen (partial) [LP should not be performed in this under-resuscitated child]  
Laboratory investigations (to include U&Es, FBC, blood and urine cultures)  
Chest X-ray  
ECG → reveals a regular narrow-complex tachycardia without P waves.  
[Echocardiography] – not routinely available

### Definitive Therapy (Expected)

1. Assess patient using ABCD structured approach
2. Place baby in facemask O<sub>2</sub>
3. Discussion of ECG findings with senior colleagues [Fax]
4. Vagal stimulation. The following techniques can be used:
  - a. Elicit diving reflex (application rubber glove filled with iced water to face, or wrap infant in a towel, and immerse face in iced water for 5 seconds)
  - b. One-sided carotid sinus massage. Procedure:
    - i. Oxygen, ECG monitoring, and IV therapy must be established prior to performing carotid sinus massage. Emergency medications and equipment should be immediately available.
    - ii. Record the ECG rhythm continuously while performing all vagal manoeuvres.
    - iii. Try Valsalva's manoeuvre first if patient is able to cooperate.
    - iv. Locate the carotid pulse near the angle of the jaw using the flat side of two fingers and press firmly against the carotid artery toward the cervical vertebrae.
    - v. Massage the area using either a circular or vertical motion until the heart rate starts to slow or for a maximum of 1-2 minutes. Never massage both carotid arteries at the same time.
    - vi. Continuously monitor the ECG rhythm visually.
    - vii. The maximum number of attempts using carotid sinus massage is three - using the same side only.
  - c. Do not use ocular pressure in an infant or child [risk of damage]
5. Gain intravenous / intraosseous access
6. Give intravenous adenosine:
  - a. Start with a bolus dose of 100 micrograms/kg intravenously. [Attention should be paid to the method of administration: large central vein, rapid administration, and large volume saline flush].
  - b. If SVT recurs, increase Adenosine dose to 200 micrograms/kg after 2 minutes.
  - c. The maximum single dose that should be given is 500 micrograms/kg (300 micrograms.kg<sup>-1</sup> under 1 month), to a maximum of 12 mg



### Assessment Domains:

RCPCH Standards	Level of Achievement		
	Good	Adequate	Poor
Effective skills in paediatric assessment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Knowledge of common and serious paediatric conditions and their management	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Effective initial management of ill-health and clinical conditions in paediatrics, seeking additional advice and opinion as appropriate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Safe practical skills in paediatrics	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Advanced Neonatal and Paediatric Life Support Skills	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Effective communication and interpersonal skills with colleagues	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



## Scenario: Supraventricular Tachycardia

**Learning Objectives:** At the end of the session candidates should be able to:

1. **Structured ABCD approach to acutely ill child**
2. **Recognise symptoms and signs of SVT**
3. **Construct differential diagnosis**
4. **Call for help**
5. **Gain access rapidly IV/IO**
6. **Safely attempt non-pharmacological methods of reversing SVT**
7. **Safely administer incremental doses of adenosine**
8. **Discuss further management strategies should SVT fail to reverse.**
9. **Construct plan for post stabilisation management**

### Faculty Script:

8 month old girl with a 3 day history of poor feeding. GP found her non-specifically unwell, pale and irritable. He has referred her to paediatric assessment unit to rule out an infection.

Child presents in SVT (unmonitored). Candidate should assess infant, apply monitoring and form a differential diagnosis.

She is in fact in SVT (unmonitored). Candidate should assess infant, apply monitoring and form a differential diagnosis. Expected to include SVT in differential – needs ECG and CXR, senior discussion (locally and with cardiology); non-pharmacological reversal attempt.

Presenting HR 230bpm, 4sec CRT and moderate BP; allow time for assessment. If SVT not in differential, stop scenario and refocus management.

If requested a bowl with large “bubble wrap” packaging supplies as ice. **DO NOT ALLOW SimBaby TO BE IMMERSSED IN WATER OR ICE.** If your preference is to provide real ice then please use part task trainer or ALS manekin to immerse.

There is no response to immersion and candidates are expected to attempt vagal manoeuvres. If not performed correct, please pause scenario and demonstrate/clarify correct technique before restarting the scenario.

Unfortunately vagal manoeuvres fail as well and candidates are expected to gain IV/IO access and safely administer Adenosine in incremental doses (with monitoring).

Script allows for 3 doses of Adenosine. Fails to revert with two lower doses (with second slows, but not sustained). Candidates may resort to use of defib (inappropriately early, without sedation). If so, stop scenario and be prepared to discuss role of defibrillation in management of SVT (when pharmacology has failed; intubated and sedated; energy set for cardioversion, not defibrillation, synchronised shock).





## Patient Demographics:

**Name:** Ella Johnstone

**Gender:** F      **Age:** 8months      **Weight:** 5 kg

## Candidate Brief:

### Presenting History (Candidate Storyboard):

An eight-month-old infant is referred to the Paediatric Assessment Unit Child with a 24hr history of poor feeding and being unsettled and fretful. No relevant past medical history. No rash. Child grizzly in mother's arms.

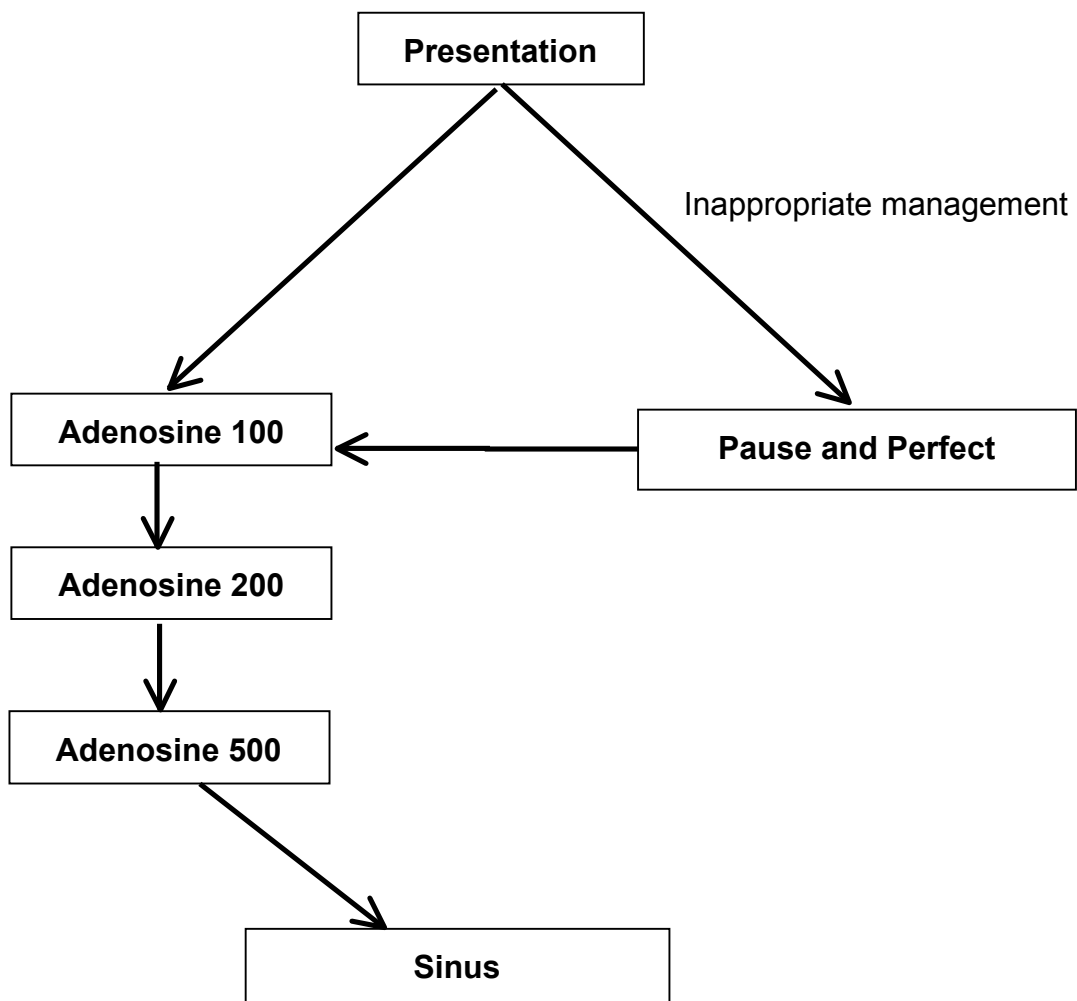
### Previous Medical History:

Nil of note

### Family Medical History:

Nil of note

## Flowchart of Scenario Progression:



## Scenario setup and preparation:

**Faculty Recommended:** Director  **Control**

**Actor/Confederate(s)**

**Roles:** Parent

Nursing Staff

Consultant Paediatrician and Cardiologist  
(available by phone)

If you have a multiprofessional group of candidate then you should have a multiprofessional faculty.

### Participants:

#### Medical Roles

#### Nursing Roles

#### AHP Roles

Paediatric ST3 (plus other group members to assist)

**Location:** Children's Assessment Unit

**Simulator:** SimBaby +/- ALS Baby

**Monitor Setup:** Basic Ward format

### Monitor Parameters Required:

ECG	<input checked="" type="checkbox"/>	S <sub>a</sub> O <sub>2</sub>	<input checked="" type="checkbox"/>	RR	<input checked="" type="checkbox"/>	EtCO <sub>2</sub>	<input type="checkbox"/>	NIBP	<input checked="" type="checkbox"/>	ABP	<input type="checkbox"/>
CVP	<input type="checkbox"/>	PAP	<input type="checkbox"/>	ICP	<input type="checkbox"/>	CPP	<input type="checkbox"/>	Temp (P)	<input checked="" type="checkbox"/>	Temp (C)	<input type="checkbox"/>
Other:											

## Equipment Checklist:

### Respiratory:

Nasal Cannula	<input type="checkbox"/>	O <sub>2</sub> Facemask	<input checked="" type="checkbox"/>	O <sub>2</sub> Reservoir Facemask	<input checked="" type="checkbox"/>
Headbox	<input type="checkbox"/>	Wafting O <sub>2</sub>	<input checked="" type="checkbox"/>	Nebuliser	<input type="checkbox"/>
Suction	<input type="checkbox"/>	Yankuer	<input type="checkbox"/>	Suction Catheter <input type="checkbox"/> size	FG
Self inflating Bag	<input checked="" type="checkbox"/>	Ayers T piece	<input checked="" type="checkbox"/>	Nasopharyngeal airway	<input type="checkbox"/>
Oropharyngeal Airway	<input checked="" type="checkbox"/>	LMA	<input type="checkbox"/>		
Intubated?	<input type="checkbox"/>	ETT position		length	0.00cm at
Respiratory Support		Non Invasive			
				➔ Settings:	
				Flow	l/min
				Insp O <sub>2</sub>	%
				PIP	
				PEEP	
		Invasive			
				➔ Settings:	
				iTime	sec
				Insp O <sub>2</sub>	%
				Rate	bpm
				PIP	
				PEEP	

### Vascular Access:

Line Type	Site
Peripheral (1)	R Hand available if placed
Peripheral (2)	
Central Venous	
Arterial	
Intraosseous	Available if placed



**Other Medical Equipment:**

Drug Chart <input checked="" type="checkbox"/>	Emergency Drug Sheet <input checked="" type="checkbox"/>	Blood gas Venous
Blood Results Sheet <input checked="" type="checkbox"/>	X Rays	Imaging
<b>Other Props:</b>		
Phillips Heartstart XL		
Laerdal defib cable with studs		
Easy IO Drill with training limb		
ALS Manikin for immersion		
Towel		
Iced water / ice		
Saline plastic ampoules labelled "ADENOSINE 3mg/ml"		

**IV Fluids:**

Setup	Fluid Type
Fluids Running	
Fluids Available (1)	0.9% Saline
Fluids Available (2)	0.9% Saline + 40mmol KCl/L
Fluids Available (3)	0.45% Saline + 5% Dextrose / 10% Dextrose
Other Fluids	0.18% Saline + 4% Dextrose

**Medications: (route, dose/rate)**

Infusions (Running)	Dose	Running Rate (ml/hr)
Nil		

Infusions (Available)	Dose	Running Rate (ml/hr)

Bolus Drugs (Available)	Dose
Adenosine	0.5mg, 1mg and 2.5mg

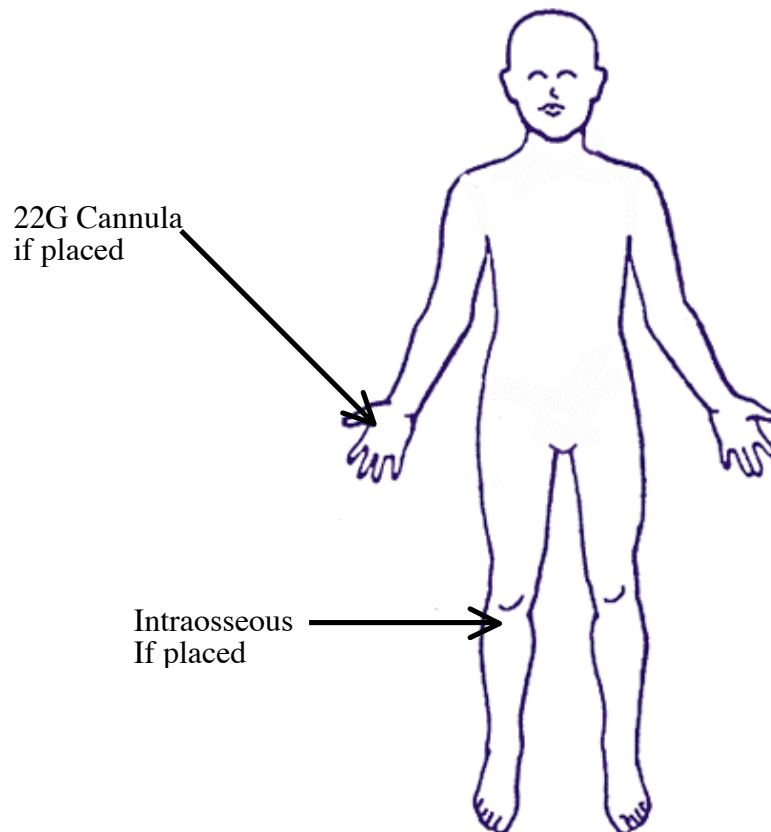




## Moulage:

Effect needed
Bowl with large bubble wrap as ice / Ice with ALS Baby

Draw relevant equipment needed on diagram e.g. cannula, wounds etc.





## Scenario States:

Name of State		Presentation				Duration					
<b>Vital Signs</b>											
Rhythm	SVT	HR	229	SBP	60	DBP	42	CVP			
Resp Rate	42	SaO <sub>2</sub>	92	ETCO <sub>2</sub>		Temp	35.9	Other			
AVPU	V	GCS		Pupils	4 ERL	ICP		NIRS			
<b>Assessment</b>											
Periph Pulses	thready	Cap refill	3 – 4sec	Skin	cool						
ECG/Heart	normal heart sounds										
Airway	unobstructed			Breathing	Erratic						
Air entry	Normal			Breath sounds	Normal						
WOB	grunting intermittently			Recession							
Neuro	Irritable			Renal			Hepatic				
Other											
<b>Results</b>											
Hb	10	WCC	12	PLT	185	HCT	0.3	CRP	5		
PH/ H+ (ven) (cap)	7.22 7.24	PaCO <sub>2</sub>	56 / 7.4 48/ 6.4	PaO <sub>2</sub>	56 / 7.4 56/7.4	HCO <sub>3</sub>	15.0 15.6	BE	- 8.1 - 8.1	Lactate	3.3 2.7
Na <sup>2+</sup>	136	K <sup>+</sup>	3.7	Cl <sup>-</sup>	105	Ur	12.5	Cr	68	Glucose	6.4
Ca <sup>2+</sup>	2.6	Mg <sup>2+</sup>	0.6	PO <sub>4</sub> <sup>-</sup>	1.6						
<b>Expected Outcomes:</b>											
<b>Participants should:</b>	<ol style="list-style-type: none"> <li>Assess patient using ABCD structured approach</li> <li>Place baby in facemask O<sub>2</sub></li> <li>Brief history should be obtained: <ul style="list-style-type: none"> <li>Key features → poor feeding, one episode of diarrhoea, difficult to settle.</li> </ul> </li> <li>Baby should be examined thoroughly. Key features of examination: <ul style="list-style-type: none"> <li>Tachypnoea 40 breaths.min<sup>-1</sup></li> <li>Tachycardia 230 beats.min<sup>-1</sup>, CRT 3-4 sec, NIBP 68/42</li> <li>Liver edge 2cm below costal margin</li> <li>irritable child</li> </ul> </li> <li>Recognise signs are of shock with disproportionate tachycardia</li> <li>Formulate differential diagnosis: Hypovolaemia, Sepsis, pain, cardiomyopathy and SVT.</li> <li>Investigations: Cardiovascular monitoring, Pulse oximetry, Septic screen (partial) [LP should <u>not</u> be performed in this under-resuscitated child], Laboratory investigations (to include U&amp;Es, FBC, blood and urine cultures), Chest X-ray ECG → reveals a regular narrow-complex tachycardia without P waves.</li> <li>Call for senior help</li> </ol>										
<b>Facilitators should:</b>	<p>Feed back regarding perfusion</p> <p>Improve S<sub>a</sub>O<sub>2</sub> to 97% over 2 minutes (by clicking on Oxygen in intervention pane)</p> <p>Remain in <b>Presentation state</b> during vagal manoevers</p> <p>If Adenosine 100mcg/kg given go to <b>Adenosine 100 state</b> (By clicking on Adenosine 100)</p>										





<b>Name of State</b>		<b>Adenosine 100</b>				<b>Duration</b>					
<b>Vital Signs</b>											
<b>Rhythm</b>	SVT	<b>HR</b>	229 – 186-233	<b>SBP</b>	48	<b>DBP</b>	48	<b>CVP</b>			
<b>Resp Rate</b>	42	<b>SaO<sub>2</sub></b>	97	<b>ETCO<sub>2</sub></b>		<b>Temp</b>	35.9	<b>Other</b>			
<b>AVPU</b>	P	<b>GCS</b>		<b>Pupils</b>	4 ERL	<b>ICP</b>		<b>NIRS</b>			
<b>Assessment</b>											
<b>Periph Pulses</b>	thready		<b>Cap refill</b>	3 – 4sec		<b>Skin</b>	cool				
<b>ECG/Heart</b>	normal heart sounds										
<b>Airway</b>	unobstructed			<b>Breathing</b>	tachypnoeic						
<b>Air entry</b>	Normal			<b>Breath sounds</b>	Normal						
<b>WOB</b>	grunting intermittently			<b>Recession</b>							
<b>Neuro</b>	Irritable			<b>Renal</b>			<b>Hepatic</b>				
<b>Other</b>											
<b>Results</b>											
<b>Hb</b>	10	<b>WCC</b>	12	<b>PLT</b>	185	<b>HCT</b>	0.3	<b>CRP</b>	5		
<b>PH/ H+ (ven) (cap)</b>	7.22 7.24	<b>PaCO<sub>2</sub></b>	56 / 7.4 48/ 6.4	<b>PaO<sub>2</sub></b>	56 / 7.4 56/7.4	<b>HCO<sub>3</sub></b>	15.0 15.6	<b>BE</b>	- 8.1 - 8.1	<b>PH/ H+ (ven) (cap)</b>	7.22 7.24
<b>Na<sup>2+</sup></b>	136	<b>K<sup>+</sup></b>	3.7	<b>Cl<sup>-</sup></b>	105	<b>Ur</b>	12.5	<b>Cr</b>	68	<b>Na<sup>2+</sup></b>	136
<b>Ca<sup>2+</sup></b>	2.6	<b>Mg<sup>2+</sup></b>	0.6	<b>PO<sub>4</sub><sup>-</sup></b>	1.6					<b>Ca<sup>2+</sup></b>	2.6
<b>Expected Outcomes:</b>											
<b>Participants should:</b>	<ol style="list-style-type: none"> <li>1. Continue facemask O<sub>2</sub></li> <li>2. Establish continuous ECG if not already done so (preferably on Defibrillator to allow printing)</li> <li>3. Administer 100mcg/kg Adenosine</li> <li>4. Reassess patient after administration 100mcg/kg</li> <li>5. Plan to administer 200mcg/kg</li> </ol>										
<b>Facilitators should:</b>	<p>Pay attention should be paid to the method of administration: large central vein, rapid administration, and large volume saline flush.</p> <p>With administration of Adenosine <b>slow HR to 186 over 10sec</b> before <b>increasing HR again over 10sec to 233bpm</b></p> <p>If 200mcg/kg Adenosine administered move to <b>state Adenosine 200</b></p>										





<b>Name of State</b>		<b>Adenosine 200</b>				<b>Duration</b>						
<b>Vital Signs</b>												
<b>Rhythm</b>	SVT	<b>HR</b>	233 – 132 - 4 - 237		<b>SBP</b>	48		<b>DBP</b>	48	<b>CVP</b>		
<b>Resp Rate</b>	42	<b>SaO<sub>2</sub></b>	97		<b>ETCO<sub>2</sub></b>			<b>Temp</b>	35.9	<b>Other</b>		
<b>AVPU</b>	P	<b>GCS</b>			<b>Pupils</b>	4 ERL		<b>ICP</b>		<b>NIRS</b>		
<b>Assessment</b>												
<b>Periph Pulses</b>	thready		<b>Cap refill</b>	3 – 4sec		<b>Skin</b>	cool					
<b>ECG/Heart</b>	normal heart sounds											
<b>Airway</b>	unobstructed				<b>Breathing</b>	tachypnoeic						
<b>Air entry</b>	Normal				<b>Breath sounds</b>	Normal						
<b>WOB</b>	grunting intermittently				<b>Recession</b>							
<b>Neuro</b>	Irritable				<b>Renal</b>			<b>Hepatic</b>				
<b>Other</b>												
<b>Results</b>												
<b>Hb</b>	10	<b>WCC</b>	12		<b>PLT</b>	185		<b>HCT</b>	0.3		<b>CRP</b>	5
<b>PH/ H+ (ven) (cap)</b>	7.22 7.24	<b>PaCO<sub>2</sub></b>	56 / 7.4 48/ 6.4	<b>PaO<sub>2</sub></b>	56 / 7.4 56/7.4	<b>HCO<sub>3</sub></b>	15.0 15.6	<b>BE</b>	- 8.1 - 8.1	<b>PH/ H+ (ven) (cap)</b>	7.22 7.24	
<b>Na<sup>2+</sup></b>	136	<b>K<sup>+</sup></b>	3.7		<b>Cl<sup>-</sup></b>	105	<b>Ur</b>	12.5	<b>Cr</b>	68	<b>Na<sup>2+</sup></b>	136
<b>Ca<sup>2+</sup></b>	2.6	<b>Mg<sup>2+</sup></b>	0.6		<b>PO<sub>4</sub><sup>-</sup></b>	1.6					<b>Ca<sup>2+</sup></b>	2.6
<b>Expected Outcomes:</b>												
<b>Participants should:</b>	<ol style="list-style-type: none"> <li>1. Continue facemask O2</li> <li>2. Establish continuous ECG if not already done so (preferably on Defibrillator to allow printing)</li> <li>3. Administer 200mcg/kg Adenosine</li> <li>4. Reassess patient after administration 200mcg/kg</li> <li>5. Plan to administer 500mcg/kg</li> </ol>											
<b>Facilitators should:</b>	<p>Pay attention should be paid to the method of administration: large central vein, rapid administration, and large volume saline flush.</p> <p>With administration of Adenosine <b>slow HR to 132 over 10sec</b> before <b>reducing HR to a junctional rhythm with rate 4bpm for 5 sec</b> followed by <b>increase to 237 over 10 sec</b></p> <p>If 500mcg/kg Adenosine administered move to <b>state Adenosine 500</b></p>											





<b>Name of State</b>		<b>Adenosine 500</b>				<b>Duration</b>						
<b>Vital Signs</b>												
<b>Rhythm</b>	SVT	<b>HR</b>	237 – 154 - 11 - 174		<b>SBP</b>	64		<b>DBP</b>	48	<b>CVP</b>		
<b>Resp Rate</b>	42	<b>SaO<sub>2</sub></b>	97		<b>ETCO<sub>2</sub></b>			<b>Temp</b>	35.9	<b>Other</b>		
<b>AVPU</b>	P	<b>GCS</b>			<b>Pupils</b>	4 ERL		<b>ICP</b>		<b>NIRS</b>		
<b>Assessment</b>												
<b>Periph Pulses</b>	thready		<b>Cap refill</b>	3 – 4sec		<b>Skin</b>	cool					
<b>ECG/Heart</b>	normal heart sounds											
<b>Airway</b>	unobstructed				<b>Breathing</b>	tachypnoeic						
<b>Air entry</b>	Normal				<b>Breath sounds</b>	Normal						
<b>WOB</b>	grunting intermittently				<b>Recession</b>							
<b>Neuro</b>	Irritable				<b>Renal</b>			<b>Hepatic</b>				
<b>Other</b>												
<b>Results</b>												
<b>Hb</b>	10	<b>WCC</b>	12		<b>PLT</b>	185		<b>HCT</b>	0.3		<b>CRP</b>	5
<b>PH/ H+ (ven) (cap)</b>	7.22 7.24	<b>PaCO<sub>2</sub></b>	56 / 7.4 48/ 6.4	<b>PaO<sub>2</sub></b>	56 / 7.4 56/7.4	<b>HCO<sub>3</sub></b>	15.0 15.6	<b>BE</b>	- 8.1 - 8.1	<b>PH/ H+ (ven) (cap)</b>	7.22 7.24	
<b>Na<sup>2+</sup></b>	136	<b>K<sup>+</sup></b>	3.7		<b>Cl<sup>-</sup></b>	105	<b>Ur</b>	12.5	<b>Cr</b>	68	<b>Na<sup>2+</sup></b>	136
<b>Ca<sup>2+</sup></b>	2.6	<b>Mg<sup>2+</sup></b>	0.6		<b>PO<sub>4</sub><sup>-</sup></b>	1.6					<b>Ca<sup>2+</sup></b>	2.6
<b>Expected Outcomes:</b>												
<b>Participants should:</b>	<ol style="list-style-type: none"> <li>1. Continue facemask O2</li> <li>2. Establish continuous ECG if not already done so (preferably on Defibrillator to allow printing)</li> <li>3. Administer 500mcg/kg Adenosine</li> <li>4. Reassess patient after administration 200mcg/kg</li> <li>5. Plan post stabilisation management</li> </ol>											
<b>Facilitators should:</b>	<p>Pay attention should be paid to the method of administration: large central vein, rapid administration, and large volume saline flush.</p> <p>With administration of Adenosine <b>slow HR to 154 over 10sec</b> before <b>reducing HR to a junctional rhythm with rate 11bpm for 5 sec</b> followed by <b>increase to 174 over 10 sec</b></p> <p>If 500mcg/kg Adenosine administered move to <b>state Sinus</b></p>											





<b>Name of State</b>		<b>Sinus</b>				<b>Duration</b>			
<b>Vital Signs</b>									
<b>Rhythm</b>	SR	<b>HR</b>	174	<b>SBP</b>	76	<b>DBP</b>	42	<b>CVP</b>	
<b>Resp Rate</b>	36	<b>SaO<sub>2</sub></b>	97	<b>ETCO<sub>2</sub></b>		<b>Temp</b>	35.9	<b>Other</b>	
<b>AVPU</b>	V	<b>GCS</b>		<b>Pupils</b>	4 ERL	<b>ICP</b>		<b>NIRS</b>	
<b>Assessment</b>									
<b>Periph Pulses</b>	thready		<b>Cap refill</b>	3 – 4sec		<b>Skin</b>	cool		
<b>ECG/Heart</b>	normal heart sounds								
<b>Airway</b>	unobstructed			<b>Breathing</b>	normal				
<b>Air entry</b>	Normal			<b>Breath sounds</b>	Normal				
<b>WOB</b>				<b>Recession</b>					
<b>Neuro</b>	settled			<b>Renal</b>			<b>Hepatic</b>		
<b>Other</b>									
<b>Results</b>									
<b>Hb</b>		<b>WCC</b>		<b>PLT</b>		<b>HCT</b>		<b>CRP</b>	
<b>PH/ H+</b>		<b>PaCO<sub>2</sub></b>		<b>PaO<sub>2</sub></b>		<b>HCO<sub>3</sub></b>		<b>BE</b>	<b>Lactate</b>
<b>Na<sup>2+</sup></b>		<b>K<sup>+</sup></b>		<b>Cl<sup>-</sup></b>		<b>Ur</b>		<b>Cr</b>	<b>Glucose</b>
<b>Ca<sup>2+</sup></b>		<b>Mg<sup>2+</sup></b>		<b>PO<sub>4</sub><sup>-</sup></b>					
<b>Expected Outcomes:</b>									
<b>Participants should:</b>	<ol style="list-style-type: none"> <li>1. Continue facemask O2</li> <li>2. Continue monitoring ECG, SaO<sub>2</sub></li> <li>3. Reassess patient</li> <li>4. Plan post stabilisation management</li> </ol>								
<b>Facilitators should:</b>									



## **Educational Material:**

- 1. Differential diagnosis of the tachycardic / shocked child. Should treat also for sepsis (antibiotics) and hypovolaemia (iv fluids);**
- 2. Need for ECG. Many participants may diagnose rhythm from the monitor trace and have no documentation of the rhythm – important for future diagnosis and counselling;**
- 3. Unfamiliarity with performance of vagal manoeuvres. Topographical anatomy of the carotid sinus; importance of not performing bilateral massage; not to apply ocular pressure in children.**

**The following techniques can be used:**

- Elicit diving reflex (application rubber glove filled with iced water to face, or wrap infant in a towel, and immerse face in iced water for 5 seconds)**
  - One-sided carotid sinus massage.**
  - Do not use ocular pressure in an infant or child [risk of damage]**
- 4. Technique of performing facial immersion. Safe technique and duration (10sec). Application of facial ice-pack.**
  - 5. Adenosine – issues with drawing up – unusual concentration, and therefore need for accuracy. Method of administration. Need for monitoring during administration and documentation.**

**Discussion of ECG findings with senior colleagues [Fax]**

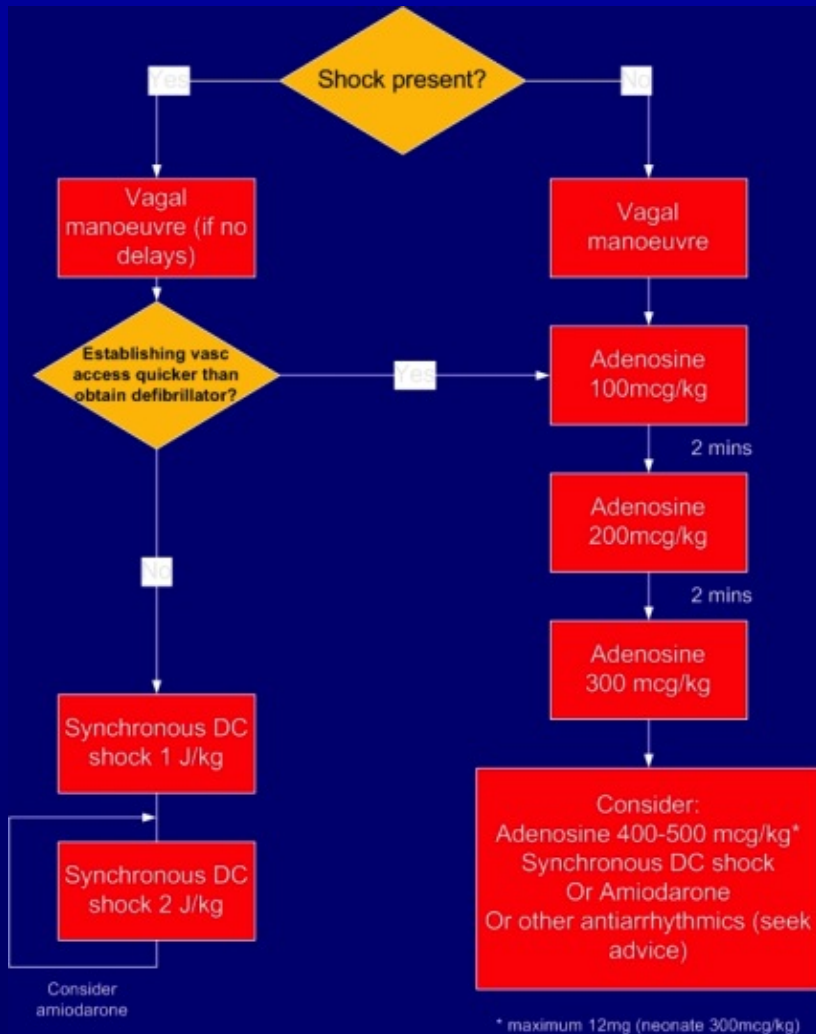
**Gain intravenous / intraosseous access**

**Give intravenous adenosine: Start with a bolus dose of 100 micrograms/kg intravenously. [Attention should be paid to the method of administration: large central vein, rapid administration, and large volume saline flush].**

**If SVT recurs, increase Adenosine dose to 200 micrograms/kg after 2 minutes. The maximum single dose that should be given is 500 micrograms/kg (300 micrograms.kg<sup>-1</sup> under 1 month), to a maximum of 12 mg**

# SVT

Amiodarone/procainamide, seek expert advice before the 3<sup>rd</sup> attempt to DC shock





*A caring practice*  
Everywood Medical Practice  
Bristol  
BS6 6DJ  
Tel: 0117 8928973  
Fax: 0117 8928975

Regarding: Ella Johnstone

8months old

5kg

Dear Doctor

Many thanks for agreeing to see this lovely little girl with a 3 day history of poor feeding.

She was pale and irritable today and despite the lack of fever, I wondered whether she had an underlying infection.

Thank you for seeing and treating.

Yours Sincerely

Dr M Bigstone

GP



*A caring practice*  
Everywood Medical Practice  
Bristol  
BS6 6DJ  
Tel: 0117 8928973 Fax: 0117 8928975

# Rapidsystems™

## VENOUS SAMPLE

24.07.2009 930:00  
System Name Emergency Dept  
System ID 2376-25327  
Patient ID 1483564N  
Lst Name Ella Johnstone  
Operator JONESR

ACID/BASE 37.0 °C  
pH 7.22  
 $p\text{CO}_2$  56.0 mmHg  
 $p\text{O}_2$  56.0 mmHg  
 $\text{HCO}_3^-$  - act 15.0 mmol / L  
 $\text{HCO}_3^-$  - std 15.6 mmol / L  
BE (B) -8.1 mmol / L  
BE (ecf) -9.0 mmol / L

## CO-OXIMETRY

Hct 36.0 %  
tHb 12.0 g / dL  
 $\text{sO}_2$  73.0 %  
FO<sub>2</sub>Hb %  
FCOHb %  
FMetHb %  
FHHb %

OXYGEN STATUS 37.0 °C  
ctO<sub>2</sub>(a) mL/dL

## ELECTROLYTES

Na<sup>+</sup> 136.0 mmol / L  
K<sup>+</sup> 3.7 mmol / L  
Ca<sup>++</sup> 1.1 mmol / L  
Cl<sup>-</sup> 105.0 mmol / L

## METABOLITES

Glu 6.4 mmol / L  
Lac 3.3 mmol / L

pAtm 754 mmHg

# Rapidsystems™

## VENOUS SAMPLE

24.07.2009 930:00  
System Name Emergency Dept  
System ID 2376-25327  
Patient ID 1483564N  
Lst Name Ella Johnstone  
Operator JONESR

ACID/BASE	37.0	°C
pH	7.22	
pCO <sub>2</sub>	7.4	kPa
pO <sub>2</sub>	7.4	kPa
HCO <sub>3</sub> <sup>-</sup> - act	15.0	mmol / L
HCO <sub>3</sub> <sup>-</sup> - std	15.6	mmol / L
BE (B)	-8.1	mmol / L
BE (ecf)	-9.0	mmol / L

## CO-OXIMETRY

Hct	36.0	%
tHb	12.0	g / dL
sO <sub>2</sub>	73.0	%
FO <sub>2</sub> Hb		%
FCOHb		%
FMetHb		%
FHHb		%

OXYGEN STATUS	37.0	°C
ctO2(a)		mL/dL

## ELECTROLYTES

Na <sup>+</sup>	136.0	mmol / L
K <sup>+</sup>	3.7	mmol / L
Ca <sup>++</sup>	1.1	mmol / L
Cl <sup>-</sup>	105.0	mmol / L

## METABOLITES

Glu	6.4	mmol / L
Lac	3.3	mmol / L

pAtm	754	mmHg
------	-----	------

# Rapidsystems™

## CAPILLARY SAMPLE

24.07.2009 930:00  
System Name Emergency Dept  
System ID 2376-25327  
Patient ID 1483564N  
Lst Name Ella Johnstone  
Operator JONESR

ACID/BASE 37.0 °C  
pH 7.24  
 $p\text{CO}_2$  48.0 mmHg  
 $p\text{O}_2$  56.0 mmHg  
 $\text{HCO}_3^-$  - act 15.0 mmol / L  
 $\text{HCO}_3^-$  - std 15.6 mmol / L  
BE (B) -8.1 mmol / L  
BE (ecf) -9.0 mmol / L

## CO-OXIMETRY

Hct 36.0 %  
tHb 12.0 g / dL  
 $\text{sO}_2$  73.0 %  
FO<sub>2</sub>Hb %  
FCOHb %  
FMetHb %  
FHHb %

OXYGEN STATUS 37.0 °C  
ctO<sub>2</sub>(a) mL/dL

## ELECTROLYTES

Na<sup>+</sup> 136.0 mmol / L  
K<sup>+</sup> 3.7 mmol / L  
Ca<sup>++</sup> 1.1 mmol / L  
Cl<sup>-</sup> 105.0 mmol / L

## METABOLITES

Glu 6.4 mmol / L  
Lac 2.7 mmol / L

pAtm 754 mmHg

# Rapidsystems™

## CAPILLARY SAMPLE

24.07.2009 930:00  
System Name Emergency Dept  
System ID 2376-25327  
Patient ID 1483564N  
Lst Name Ella Johnstone  
Operator JONESR

ACID/BASE 37.0 °C  
pH 7.24  
 $p\text{CO}_2$  6.4 kPa  
 $p\text{O}_2$  7.4 kPa  
 $\text{HCO}_3^-$  - act 15.0 mmol / L  
 $\text{HCO}_3^-$  - std 15.6 mmol / L  
BE (B) -8.1 mmol / L  
BE (ecf) -9.0 mmol / L

## CO-OXIMETRY

Hct 36.0 %  
tHb 12.0 g / dL  
 $\text{sO}_2$  73.0 %  
F $\text{O}_2$ Hb %  
FCOHb %  
FMetHb %  
FHHb %

OXYGEN STATUS 37.0 °C  
ctO2(a) mL/dL

## ELECTROLYTES

$\text{Na}^+$  136.0 mmol / L  
 $\text{K}^+$  3.7 mmol / L  
 $\text{Ca}^{++}$  1.1 mmol / L  
 $\text{Cl}^-$  105.0 mmol / L

## METABOLITES

Glu 6.4 mmol / L  
Lac 2.7 mmol / L

$p\text{Atm}$  754 mmHg

**Name: Ella Johnstone**  
**Request: 1235-3467**

Serum/plasma

Magnesium	0.60	mmol/L	(0.70-1.00)
Calcium	2.20	mmol/L	(2.25-2.80)
Calcium (corrected)	2.60	mmol/L	(2.25-2.80)
Phosphate	1.60	mmol/L	(1.30-2.00)
Bilirubin	15	umol/L	(< 17)
Alkaline phosphatase	375	IU/L	(70-250)
Alanine aminotransferase	45	IU/L	(5-40)
Total protein	52	g/L	(62-80)
Albumin	26	g/L	(29-55)
Globulin	26	g/L	(22-36)

Serum/plasma

Creatinine	68	umol/L	(28-60)
Urea	8.90	mmol/L	(1.4-5.4)
Sodium	135	mmol/L	(133-143)
Potassium	4.60	mmol/L	(3.7-5.2)
Chloride	105	mmol/L	(95-105)
Bicarbonate	16	mmol/L	(21-34)
Anion gap	10	mmol/L	(6-14)
C-reactive protein	5	mg/L	(< 10)

COAGULATION SCREEN

Prothrombin time	14.00	s	(9.5-12.0)
INR	1.20		
Aptt time	45.00	s	(20.0-45.0)
Aptt ratio	1.00		

Hb:10.00g/dL (11.5-16.5) Plt:186 10\*9/L(150-400) Wbc: 12.00 10\*9/L(5.00-19.00)

Rbc	10*12/L	:	4.60	(3.00-5.40)	Neut	10*9/L	:	8.80	(3.00-9.00)
Hct	l/l	:	0.30	(0.33-0.53)	Lymp	10*9/L	:	2.20	(3.00-16.00)
MCV	fL	:	98.0	(92.0-116.0)	Mono	10*9/L	:	0.30	(0.30-1.00)
MCH	pg	:	32.0	(30.0-36.0)	Eosi	10*9/L	:	0.60	(0.20-1.00)
MCHC	g/dL	:	35.0	(29.0-37.0)	Baso	10*9/L	:	0.00	(< 0.11)
Hypo	%	:	2.00						

# Bristol PICU Drug Sheet

Name	Ella Johnstone		
Date of Birth		February	2012
Weight	8 kg	Height	cm (SA 0.42 m <sup>2</sup> )
Age	8 months (SA estimated from weight alone. Enter height for accurate SA)		



Resuscitation Doses	
Adenosine	0.27 ml (100 mcg/kg). Can use up to 0.67ml (250mcg/kg)
Adrenaline	0.8 ml 1:10000 (subsequent doses 1:10000)
Atropine	160 mcg (20 mcg/kg) = 0.27 ml (600mcg/ml)
Amiodarone	40 mg over 3 min = 0.8 ml (50mg/ml)
Bicarb 8.4%	8 mmol - give and reassess (8 ml of 8.4%)
Ca Gluc 10%	4 ml - give and reassess
Lignocaine	8 mg (1mg/kg) = 0.8 ml of 1%
Naloxone	80 mcg (10 mcg/kg) = 0.2 ml (400mcg/ml)
Vasopressin	3.2 Units (0.4 Units/kg) = 0.16 ml (20 Units/ml)

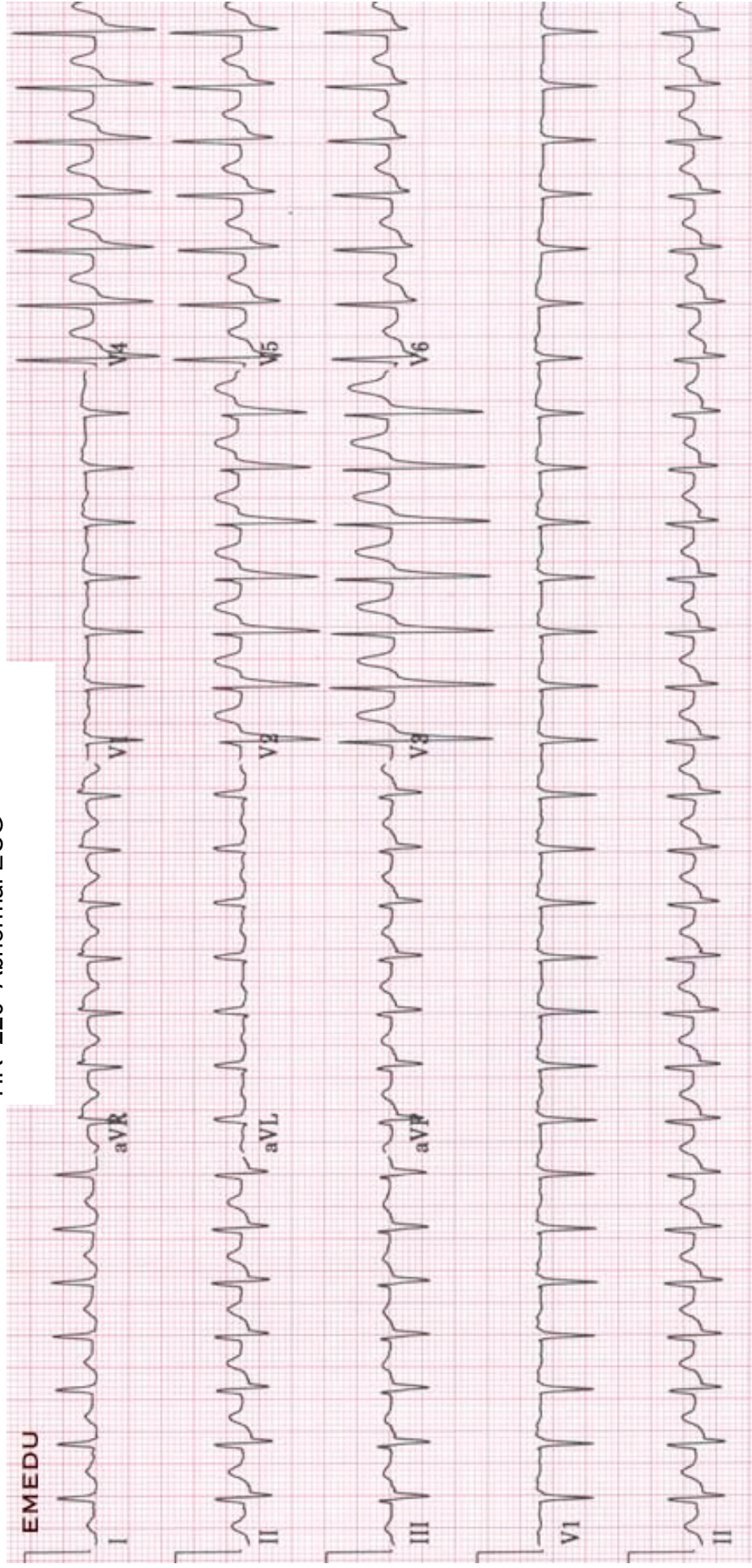
100% fluid requirement = 32 ml/hr

Sedation Infusions		Standard Regime	Calculation	1 ml/hr =
Morphine	1mg/kg	made up to 50ml with Glucose 5% or Saline 0.9%	8 mg/50ml	20 mcg/kg/hr
Midazolam	5mg/kg	made up to 50ml with Glucose 5% or Saline 0.9%	40 mg/50ml	100 mcg/kg/hr
Vecuronium	3mg/kg	made up to 50ml with Glucose 5% or Saline 0.9%	24 mg/50ml	60 mcg/kg/hr
Atracurium	15mg/kg	made up to 50ml with Glucose 5% or Saline 0.9%	120 mg/50ml	300 mcg/kg/hr
Fent/Vec	Mix 10	mg Vecuronium in 20ml Fentanyl (50 mcg/ml)	0.8 to 1.6 ml/hr	
Fentanyl	neat	(50mcg/ml)	0.8 to 1.6 ml/hr (5 to 10 mcg/kg/hr)	
Thiopentone	neat	(25mg/ml) Bolus: 5mg/kg = 1.6 ml	Infusion: 0.3 to 1.9 ml/hr (1 to 6 mg/kg/hr)	
Cardiac Infusions		Standard Regime	Calculation	1 ml/hr =
Dopamine	15mg/kg	made up to 50ml with Glucose 5% or Saline 0.9%	120 mg/50ml	5 mcg/kg/min
Dobutamine	15mg/kg	made up to 50ml with Glucose 5% or Saline 0.9%	120 mg/50ml	5 mcg/kg/min
Adrenaline	0.3mg/kg	made up to 50ml with Glucose 5% or Saline 0.9%	2.4 mg/50ml	0.1 mcg/kg/min
Noradrenaline	0.3mg/kg	made up to 50ml with Glucose 5% or Saline 0.9%	2.4 mg/50ml	0.1 mcg/kg/min
Argipressin	3 Units/kg	made up to 50ml with Glucose 5% or Saline 0.9%	24.0 U/50ml	0.001 U/kg/min
Milrinone	1.5mg/kg	made up to 50ml with Glucose 5% or Saline 0.9%	12 mg/50ml	0.5 mcg/kg/min
Dinoprostone	30mcg/kg	made up to 50ml with Glucose 5% or Saline 0.9%	240 mcg/50ml	10 ng/kg/min
(PGE2 / Prostaglandin)				
Epoprostenol	30mcg/kg	made up to 50ml with Saline 0.9% ONLY	240 mcg/50ml	10 ng/kg/min
(Prostacyclin)				
SNP	3mg/kg	made up to 50ml with Glucose 5% ONLY	24 mg/50ml	1.0 mcg/kg/min
GTN	3mg/kg	made up to 50ml with Glucose 5% or Saline 0.9%	24 mg/50ml	1.0 mcg/kg/min
Amiodarone	30mg/kg	made up to 50ml with Glucose 5% ONLY	240 mg/50ml	10 mcg/kg/min
Lignocaine	neat	1% Lignocaine	0.4 to 2.4 ml/hr	(0.5 - 3.0 mg/kg/hr)
High K+	20mmol	made up to 40ml with Saline 0.9% ONLY	1.6 to 4 ml/hr	(0.1 - 0.25 mmol/kg/hr)
Bronchodilators		Standard Regime	Calculation	1 ml/hr =
<b>Peripheral</b>				
Salbutamol	10 mg	made up to 50ml with Glucose 5% or Saline 0.9%	2.4 ml/hr = 1mcg/kg/min	
Aminophylline	500 mg	made up to 500ml with Gluc 5% or Saline 0.9%	8 ml/hr = 1mg/kg/hr	
<b>Central</b>				
Salbutamol	3mg/kg	made up to 50ml with Glucose 5% or Saline 0.9%	24 mg/50ml	1.0 mcg/kg/min
Aminophylline	50mg/kg	made up to 50ml with Glucose 5% or Saline 0.9%	400 mg/50ml	1.0 mg/kg/hr
Bolus Drugs		Intubation Drugs		
Aciclovir	80 mg	mg (10mg/kg, 8h)	Atropine	160 mcg (20 mcg/kg) (0.27 ml)
Adenosine	0.4 mg	mg, to max 2mg	Fentanyl	40 mcg (5 mcg/kg) (0.8 ml)
Ceftriaxone	640 mg	mg (80mg/kg, 12h)	Ketamine	16 mg (2mg/kg) (1.6 ml)
Dex 10%	40 ml	ml bolus for hypoglycaemia	Midazolam	0.8 mg (100mcg/kg) (0.16 ml)
Lorazepam	0.8 mg	mg	Pancuronium	0.8 mg (100mcg/kg) (0.4 ml)
Mannitol	20 ml	ml of 20% = 0.5g/kg	Propofol	0.8 ml of 1% = 1mg/kg
Mg SO4 50%	1.6 ml	ml, slow iv	Suxamethonium	16 mg (2mg/kg) (0.3 ml)
Phenobarb	120 mg	mg, iv over 30 mins	Thiopentone	1.6 ml = 5 mg/kg
Phenytoin	144 mg	mg, iv over 30 mins	Vecuronium	0.8 mg (100mcg/kg) (0.4 ml)

Drug sheet developed by Bristol PICU 1997-2009. This Version 11.2 (queries to: stephen.marriage@uhbristol.nhs.uk)

Ella Johnstone 8months

HR=220 Abnormal ECG



Ella Johnstone 8months

HR=110 Abnormal ECG

