

CARDIAC RHYTHMS

Learners Guide

Author **Anna McCorquodale**

(Edits by the DFTB Team)

fellows@dontforgetthebubbles.com

PRE-READING FOR LEARNERS

Please have a read of one or more before your session

<https://www.gosh.nhs.uk/conditions-and-treatments/conditions-we-treat/supraventricular-tachycardia>

<https://www.apls.org.au/algorithm-svt>

<https://www.escardio.org/static-file/Escardio/Guidelines/publications/NEONAT-guidelines-neonatal-slides.pdf>

[https://www.ajemjournal.com/article/S0735-6757\(08\)00240-4/pdf](https://www.ajemjournal.com/article/S0735-6757(08)00240-4/pdf)

<https://www.youtube.com/watch?v=1o2vSR206Ts>

WHAT ARE THE KEY LEARNING POINTS?

- Presenting features of arrhythmias in children
- Emergency treatments
- Concerning features on ECGs
- The child has cardioverted, what now?
- Developing an approach to the child with a complicated cardiac background

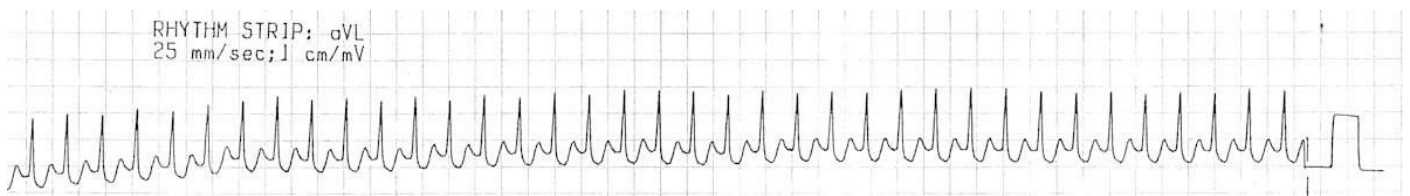
CASE 1

A 5 year old girl presents feeling 'butterflies'. She has recently started school, her mother initially thought it was related, however, she has now mentioned this around once a fortnight and not necessarily on school days.

Today she complained of the same feeling and mum thought she looked pale so brought her to the ED for an opinion.

In triage her heart rate (HR) was 220 so she was taken to resus. Blood pressure (BP) is normal although she does look pale. She is talking to you about butterflies and points to her sternal notch.

This is her 3 lead ECG:



What are your immediate management steps?

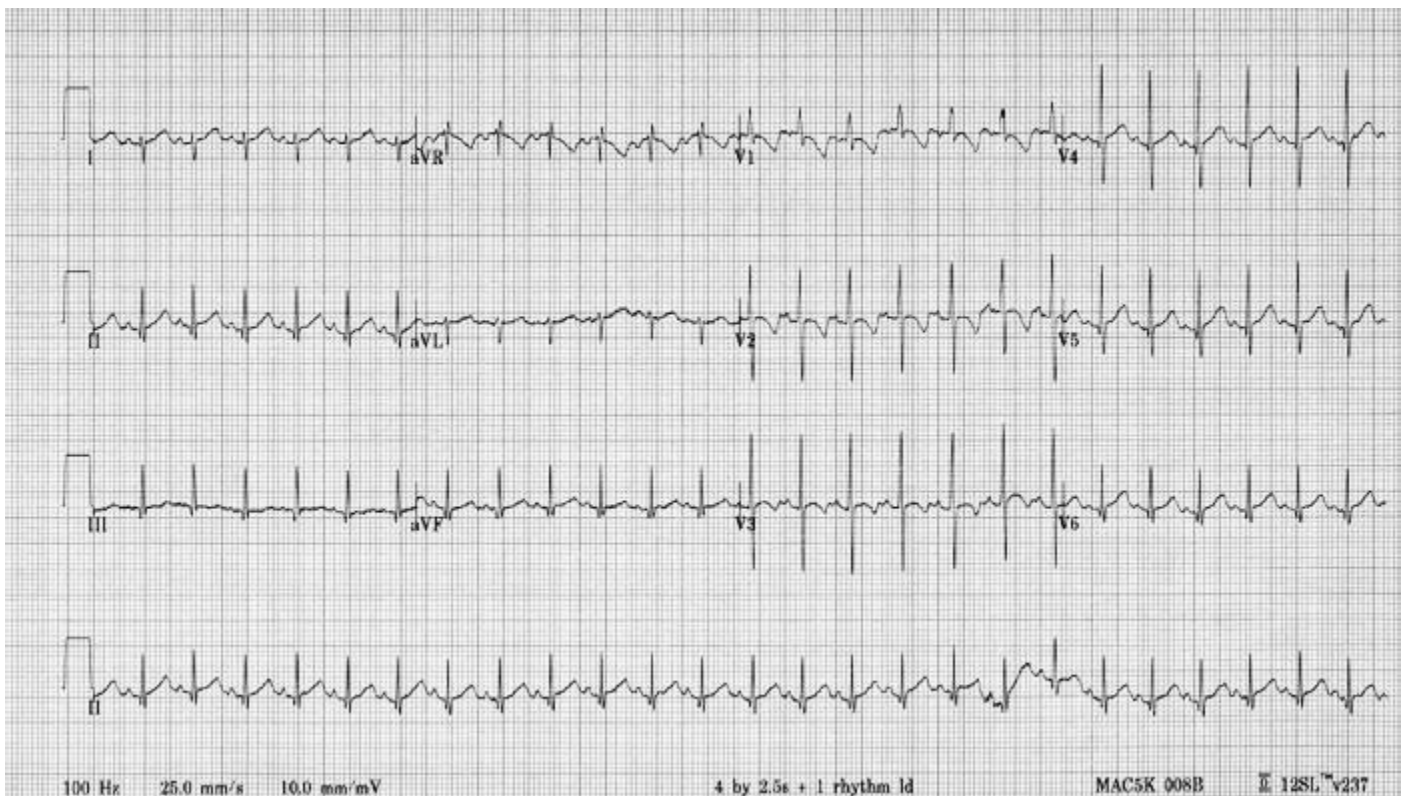
Assuming a progression to pharmaceutical therapy is required, what do you do and what do you do if the first attempt does not work?

She cardioverted (pew!), what now? Discharge, if not now, then how do you plan towards this?

CASE 2

A 2 month old (ex 34/40) boy presents with an episode at home of perioral cyanosis, with a possible 5 second lapse in breathing and vacant staring. The episode was reported to last around a minute. On arrival at hospital the child was well with normal observations.

Here is his ECG:



How do you classify a BRUE?

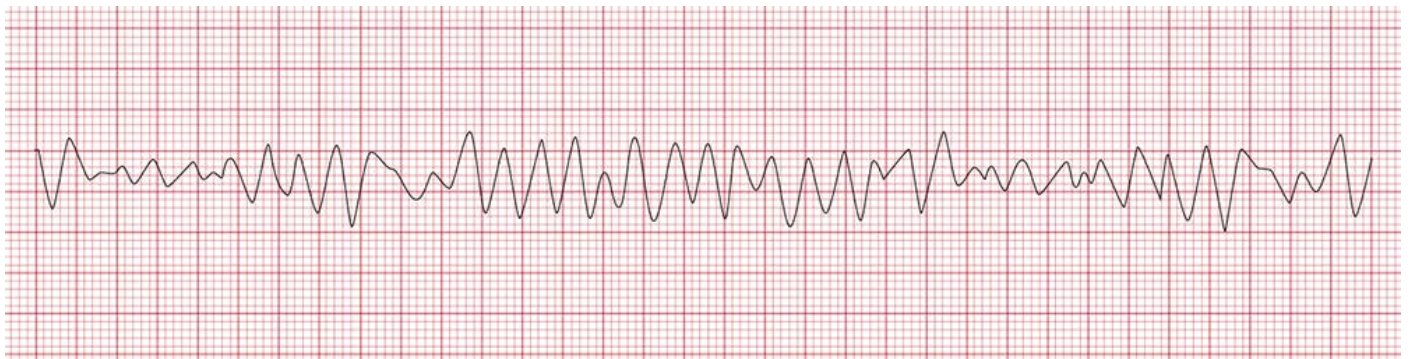
Are there any features that make you more concerned about the clinical risk in this child?

What are the important investigations?

What pertinent parts of the ECG would you focus on and what are you trying to rule out?

ADVANCED CASE 1

A 12 year old girl was heard to be coughing in the middle of the night. Her mother went in to check and found her daughter coughing and distressed. A few seconds later she fell forwards into her mother's arms and became lifeless. Mum (first aid trained) gave back blows and started CPR. Paramedics attended within 7 min, this was her 3-lead ECG:



Following a single DC shock she reverted into sinus rhythm at home and was brought to hospital.

What are your initial actions on her arrival?

Are there any specific conditions that might be implicated?

How might these present in a less catastrophic way to the ED?

What do you anticipate the ongoing plans to be for this patient and the family as a whole?

ADVANCED CASE 2

A 16 year old boy with a completed Fontan circulation for a congenital diagnosis of hypoplastic left heart syndrome. He is complaining of intermittent butterflies in his tummy. Mum has brought him to the ED as she has been unable to contact his specialist team and he was feeling dizzy whilst walking. There is no history of arrhythmias since discharge from hospital. You do not have access to his inpatient notes from the time of repair as this was done over a decade ago. He is haemodynamically stable at triage.

What rhythm possibilities does this case suggest?

What are the medical priorities for this child?

QUIZ QUESTIONS: (10 MINUTES)

Question 1.

Supraventricular tachycardia. A child presents to emergency with a narrow complex tachycardia without CVS compromise that does not respond to vagal manoeuvres but does respond quickly to the first dose of adenosine. What age of child is least likely to require long term therapy or interventional treatment but still subsequently have long term resolution of symptoms?

A: 6 weeks old

B: 5 years old

C: 10 years old

D: 16 years old tomorrow (we will have to refer to adult cardiology anyway!)

Question 2.

BRUE. A child presents at 8 weeks old following a BRUE. Which of the following puts them in a higher risk category for a cardiac diagnosis?

A. Bruising to the upper arms seen during examination

B. Vomited milk and coughed immediately before the event

C. Recurrent UTIs

D. Mycoplasma pneumonia

Question 3.

Corrected congenital heart disease. You encounter a child who had a complete repair of Tetralogy of Fallot during their first year of life in another country. They are now 12, in the UK and have no formal cardiac follow up. They present with the feeling of palpitations which occur intermittently throughout the school day but rarely during holidays. What is the likely cause of these palpitations?

A. SVT

B. Non sustained VT

C. Sinus tachycardia

D. All of the above

Take home tips

- 1 Haemodynamically stable SVT can be initially managed non pharmacologically, modifications to the Valsalva improve its effectiveness
- 2 Infants who present with BRUE should be risk stratified. ECGs should be specifically screened for ventricular pre-excitation, hypertrophic changes and changes in the T wave/QTc
- 3 Over 80% of out of hospital VF arrest have a cardiac aetiology, a full work up is necessary and often also extends to familial screening
- 4 Arrhythmias are a late complication of congenital heart disease seen more due to extended life expectancy in this group of patients

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