Paediatric cardiac arrhythmias

Assess with ABCDE approach – recognise and treat reversible causes
Oxygen if SpO₂ < 94%, respiratory rate, heart rate, CRT, cardiac monitoring, blood pressure, vascular access, AVPU

Signs of circulation?

NO

Follow ADVANCED LIFE SUPPORT ALGORITHM

YES

Compensated
Normal LOC, +/- respiratory distress and signs of circulatory compromise, BP > 5th centile

Decompensated – seek expert help
Signs of vital organ perfusion compromise: Reduced LOC, tachypnoea, bradycardia/tachycardia, BP < 5th centile, CRT > 2 secs, weak or impalpable peripheral pulses

Bradycardia

< 1 year < 80 min⁻¹
1 year < 60 min⁻¹

Optimal oxygenation with positive pressure ventilation if required
If unconscious and HR < 60 min⁻¹ despite oxygenation, start chest compressions
No response to oxygenation:
If vagal stimulation possible cause – atropine
If no response to oxygenation or atropine consider adrenaline
Pacing – very rarely required and guided by aetiology.

Tachycardia

Sinus tachycardia

Infant typically 180–220 min⁻¹
Child typically 160–180 min⁻¹
Gradual onset

Treat the cause:
Physiological response:
– Crying
– Exercise
– Anxiety/fear
– Pain

Identify precipitant
Compensatory mechanism:
– Respiratory/circulatory failure
– Hypovolaemia
– Sepsis
– Anaemia

SVT

Infant > 220 min⁻¹
Child > 180 min⁻¹
Abrupt onset

Synchronised cardioversion with appropriate sedation + analgesia (e.g. IM/intranasal ketamine if delay in IV access)
Chemical cardioversion may be 1st choice if suitable IV access is in place and delay in synchronised cardioversion.
Adenosine
Consider amiodarone before 3rd shock

VT

Could be VT or SVT, if unsure treat as VT

If conscious:
Synchronised cardioversion with appropriate sedation + analgesia (e.g. IM/intranasal ketamine if delay in IV access, do not delay cardioversion).
If unconscious:
Immediate synchronised cardioversion
Consider amiodarone before 3rd shock

Treat the cause:
If bradycardia, consider oxygenation and vagal tone
If SVT, consider vagal manoeuvres
Reassess
Consider adenosine

Broad complex

Optimal oxygenation with positive pressure ventilation if required
If unconscious and HR < 60 min⁻¹ despite oxygenation, start chest compressions
No response to oxygenation:
If vagal stimulation possible cause – atropine
If no response to oxygenation or atropine consider adrenaline
Pacing – very rarely required and guided by aetiology.

Drug

Atropine

Adrenaline

Adenosine

Amiodarone

Synchronised cardioversion

Magnesium

Treatment

Up to 11 years: 20 mcg kg⁻¹.
12–17 years: 300–600 mcg. Larger doses may be used in emergency.

For bradycardia: 10 mcg kg⁻¹ repeat if necessary.

Up to 1 year: 150 mcg kg⁻¹, increase 50–100 mcg kg⁻¹ every 1–2 min. Maximum single dose: Neonates 300 mcg kg⁻¹, Infants 500 mcg kg⁻¹
1–11 years: 100 mcg kg⁻¹ increase 50–100 mcg kg⁻¹ every 1–2 min. Maximum single dose: 500 mcg kg⁻¹ (max. 12 mg)
12–17 years: 3 mg IV, if required increase to 6 mg after 1–2 min, then 12 mg after 1–2 min

5 mg kg⁻¹ – by SLOW IV infusion (> 20 min) before 3rd cardioversion in discussion with paediatric cardiologist/expert
With appropriate sedation + analgesia (e.g. IM/intranasal Ketamine if delay in IV access + airway management) – IV access attempts must not delay cardioversion
1st shock: 1 J kg⁻¹
2nd shock: 2 J kg⁻¹, consider up to 4 J kg⁻¹
25–50 mg kg⁻¹ Maximum per dose 2 g to be given over 10–15 min, may be repeated once if necessary, in Torsades de pointes VT

Age

* Systolic BP 5th centile mmHg

1 month
50
1 year
70
5 years
75
10 years
80