



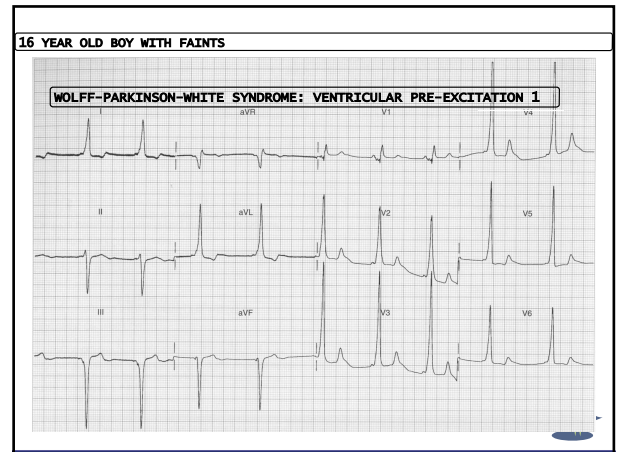
**ThinkAskLearn**  
Health Professional Education

## Managing Paediatric Cardiac Arrest

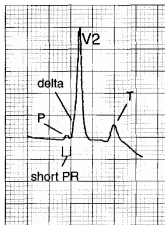
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[www.thinkasklearn.com.au](http://www.thinkasklearn.com.au)



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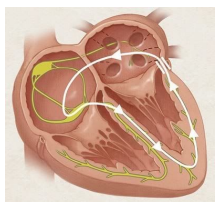


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**Bundle of Kent**

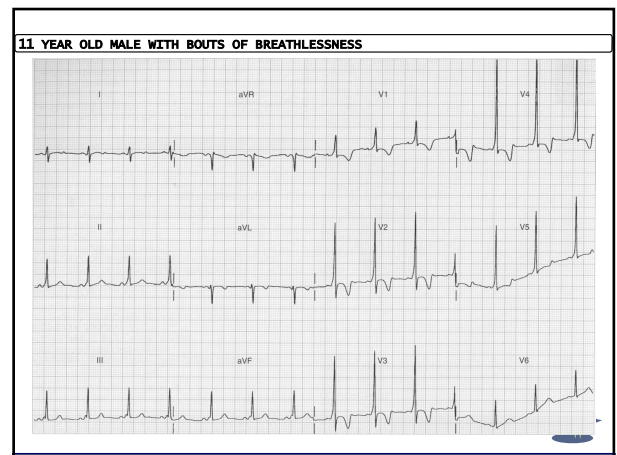
ECG  
Short PR interval  
Delta Wave  
Wide QRS



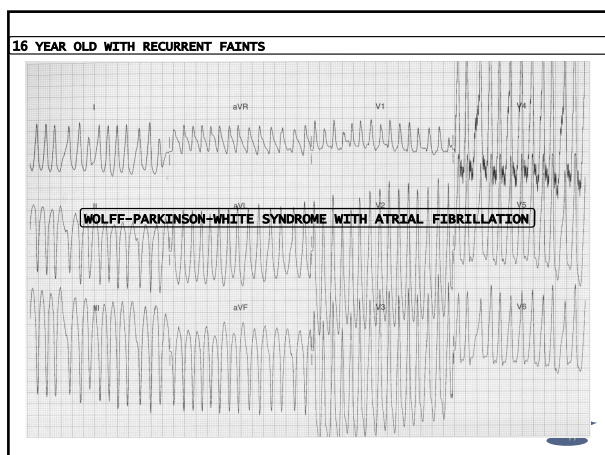
Unusual conductive tissue  
Allows bypass of AV node



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**Basic Life Support**

- D** Dangers?
- R** Responsive?
- S** Send for help
- A** Open Airway
- B** Normal Breathing?
- C** Start CPR  
30 compressions : 2 breaths
- D** Attach Defibrillator (AED)  
as soon as available, follow prompts

**Continue CPR until responsiveness or normal breathing return**

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## Initial Actions in Cardiac Arrest

- Commence **basic life support**
- Secure **airway**
- Deliver high-flow **oxygen**
- Assess **rhythm**



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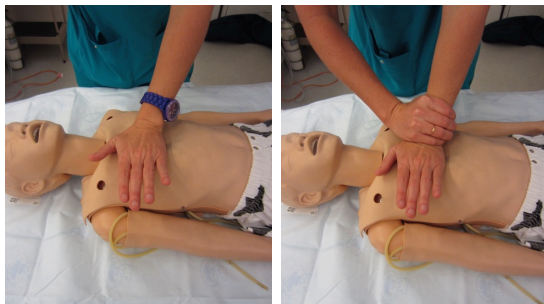
## "Don't be afraid to push too hard"

- At least 1/3 of the chest
- Centre of chest lower half
- Between 100-120 compressions/min\*\*



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## Compressions – Hand placement older child



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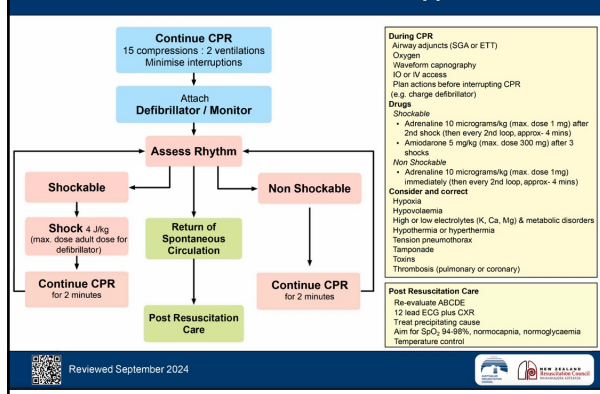
Valid in Adults but shows no benefit in Paediatric CPR (questioned<sup>2010</sup>)

Ventilation main issue for kids

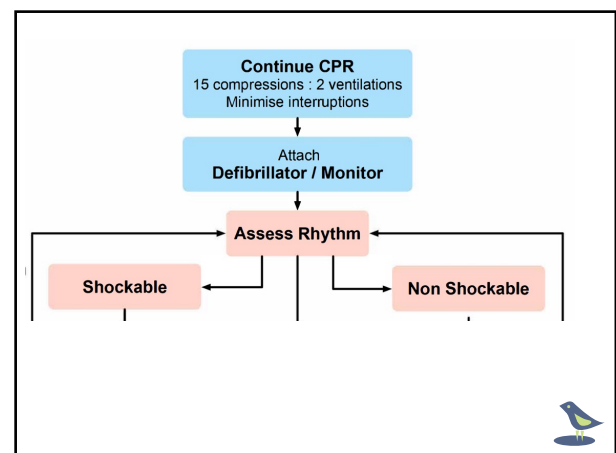


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## Paediatric Advanced Life Support



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## Types of Rhythms

- Non Shockable
  - Asystole/pulseless electrical activity (PEA)
- Shockable
  - Ventricular fibrillation/pulseless VT



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Clinical paper

The influence of time on the accuracy of healthcare personnel to diagnose paediatric cardiac arrest by pulse palpation\*

James Tibballs<sup>a,b,c,\*</sup>, Cyveen Weeraratna<sup>c</sup>

- 82 nurses, 71 dr asked to assess pulse on Cardiac arrest child on ECMO
- Pt blinded, essentially on arm exposed
- Median time to detect pulse or not - 30s +/-19s
- Questions the value of pulse check in cardiac arrest



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## VT Characteristics

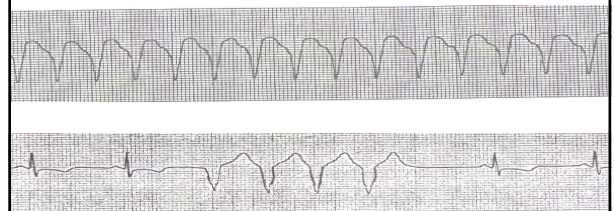
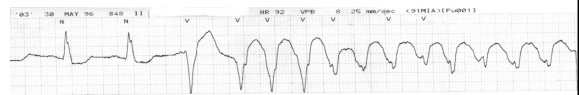


- RATE: 100 - 220/min
- RHYTHM: Regular
- P WAVES: May be seen but are dissociated from QRS
- PR INTERVAL: Not measurable
- QRS COMPLEX: Wide & bizarre
  - Usually > 0.12sec
  - Same shape – monomorphic
  - Different morphologies – polymorphic



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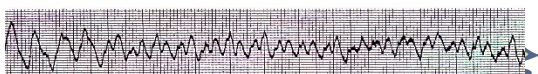
## VT



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## VENTRICULAR FIBRILLATION

- Rapid, ineffective, quivering of the ventricles. Fatal if untreated.
- RATE: Rapid, uncoordinated, ineffective
- RHYTHM: Chaotic, irregular
- P WAVES: None seen
- PR INTERVAL: None
- QRS COMPLEX: No formed QRS complexes
  - Course or fine



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## ASYSTOLE

- Absence of any ventricular rhythm. No QRS complex, no pulse, no cardiac output.
- Characteristics:
  - RATE: None
  - RHYTHM: None
  - P WAVES: May be present if the sinus node is functioning
  - PR INTERVAL: None
  - QRS COMPLEX: None



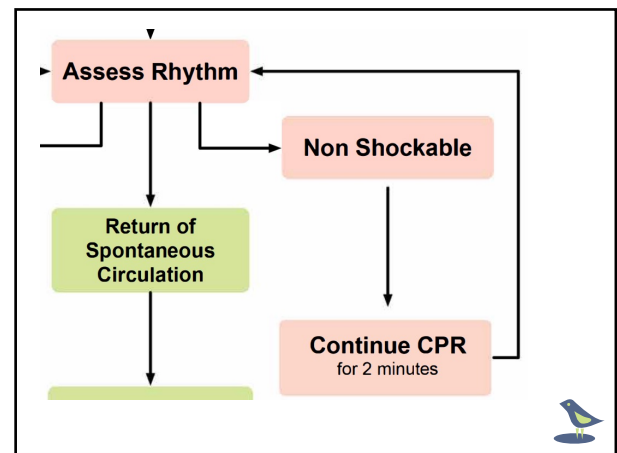
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## Pulseless Electrical Activity

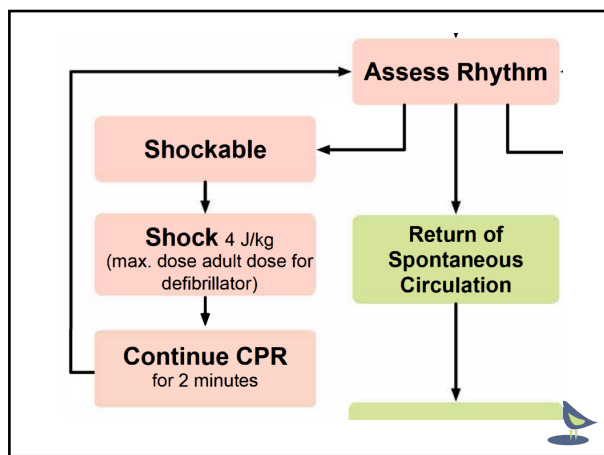
- Clinical absence of cardiac output
- Presence of a rhythm on the monitor that is normally accompanied by good ventricular function
- Multiple Causes but remember 4H's and 4T's



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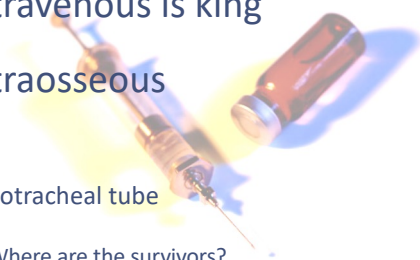
## Defibrillation

- One shock:
- **4 J/kg** – manual defibrillator – all ages
- Paediatric attenuated AED – **1-8 years**
- AED, adult shock – **>8 years**
- Use adult AED for all ages, if this is the only available\*

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## Drug Administration

- Intravenous is king
- Intraosseous
- Endotracheal tube
  - Where are the survivors?



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## EZ-IO Drill



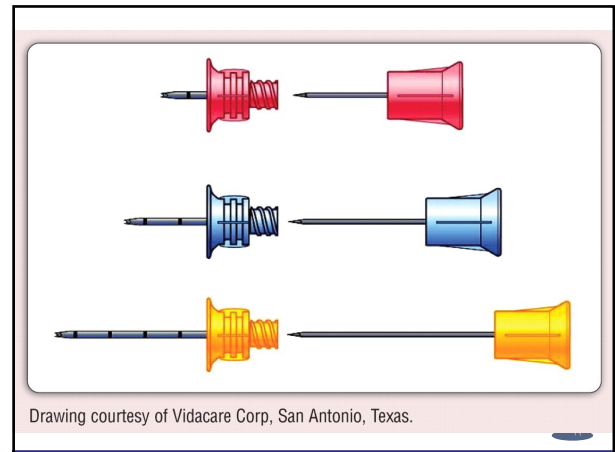
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## EZ-IO

- 15g Cannula all sizes
- Quick easy access
- Better than a CVL
  - Cleaner
  - Faster
  - Less risk of complications
- Stop over to Femoral Line

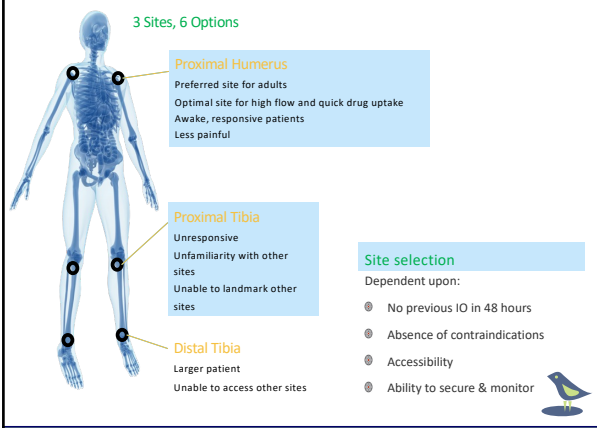


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### 3 Sites, 6 Options



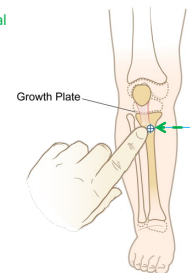
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## Site | Proximal Tibial

### Proximal tibia

Patients up to 39kg

Palpate Tibial  
Tuberosity



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## Adrenaline

- Naturally occurring catecholamine with alpha and beta affects (sympathetic response)
- Peripheral vasoconstriction (blood to brain and heart)
- Improves defib by improving myocardial blood flow during CPR
- IV/IO 10mcg/kg



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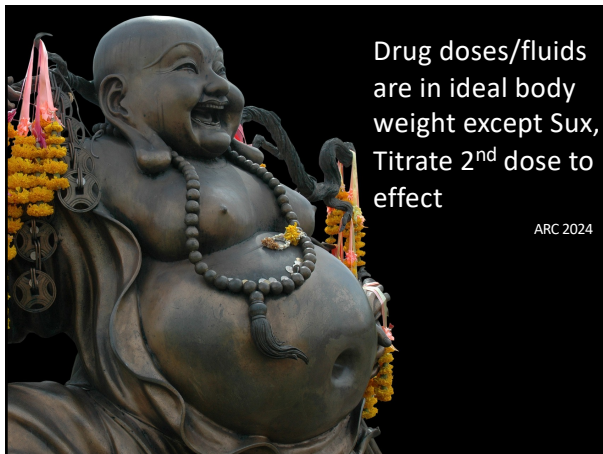
## Adrenaline 10mcg/kg

- 10mcg/kg of 1:10 000 =
- 0.1ml/kg of 1:10 000
- Shift the decimal point
- 13kg = 1.3ml of 1:10 000
- 25kg = 2.5ml of 1:10 000



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### Adrenaline - Indications

- Asystole and PEA as initial treatment
- Ventricular Fibrillation/ Pulseless Ventricular Tachycardia after 2<sup>nd</sup> defib
- 10mg/kg every 2<sup>nd</sup> cycle
- Adverse effects
  - Tachyarrhythmias
  - Severe hypertension
  - Tissue Necrosis

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### Amiodarone

- Complex antiarrhythmic with effects on Na<sup>+</sup>, K<sup>+</sup> and Ca<sup>+</sup> channels as well as alpha and beta adrenergic properties.
- Prolongs action potential
- Suppresses ectopic activity
- VF and Pulseless VT resistant to Defib and adrenaline (3rd unsuccessful Defib)
- Prophylaxis of recurrent VF/VT
- Initial bolus 5mg/kg In 5% Dextrose

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### Review Drug Doses

- Resus drugs
  - In a cardiac arrest not give a first line drug unless it begins with an A even then I only need to remember 2 drugs
- Adrenaline 10mcg/kg
- Amiodarone 5mg/kg

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**During CPR**

Airway adjuncts (SGA or ETT)

Oxygen

Waveform capnography

IO or IV access

Plan actions before interrupting CPR (e.g. charge defibrillator)

**Drugs**

*Shockable*

- Adrenaline 10 micrograms/kg (max. dose 1 mg) after 2nd shock (then every 2nd loop, approx- 4 mins)
- Amiodarone 5 mg/kg (max. dose 300 mg) after 3 shocks

*Non Shockable*

- Adrenaline 10 micrograms/kg (max. dose 1mg) immediately (then every 2nd loop, approx- 4 mins)

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**Consider and correct**

Hypoxia

Hypovolaemia

High or low electrolytes (K, Ca, Mg) & metabolic disorders

Hypothermia or hyperthermia

Tension pneumothorax

Tamponade

Toxins

Thrombosis (pulmonary or coronary)

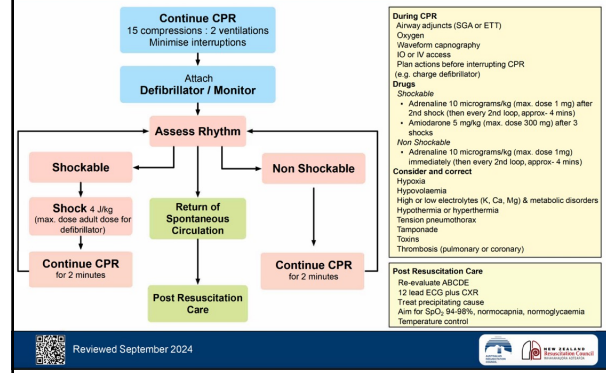
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**Post Resuscitation Care**

Re-evaluate ABCDE  
 12 lead ECG plus CXR  
 Treat precipitating cause  
 Aim for SpO<sub>2</sub> 94-98%, normocapnia, normoglycaemia  
 Temperature control



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**Paediatric Advanced Life Support**

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