Paediatric OHCA

Dr Pat Leighton

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Objectives

1. Epidemiology
2. Cardiac Arrest in Paeds vs Adults
3. Prevention
4. The Chain of Survival
5. Scenario Review
6. Termination of Resus
7. Post-Resus Considerations

Paediatric OHCA

3.69
events per 100 000 child years: **rare!**

90%
mortality

40–55%
of OHCA in children occur in infants, compared with other age categories

Local data

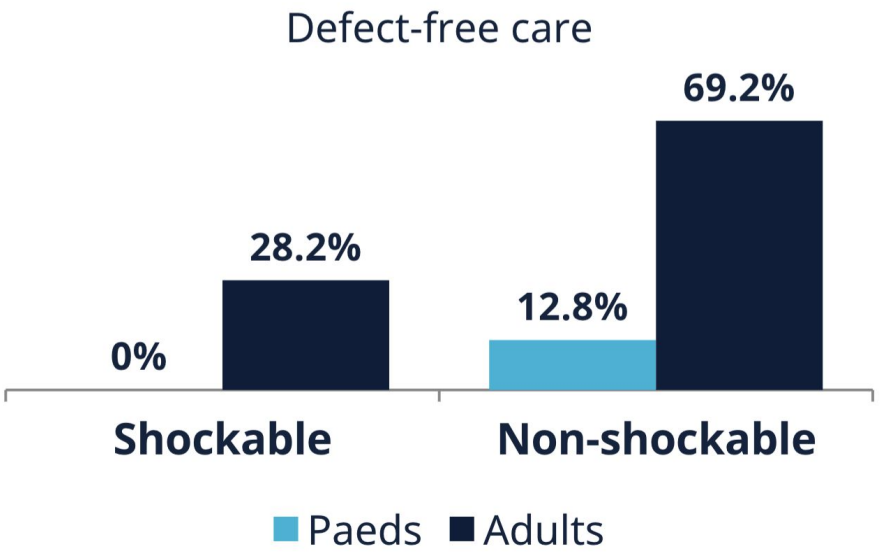
3.5% of OHCA in Cape Town were children (Stassen et al)

44% of children received bystander CPR: private EMS audit (Coetzee et al)

Paediatric Resuscitation Quality

Hansen et al: Comparison of Resuscitation Quality in Simulated Pediatric and Adult Out-of-Hospital Cardiac Arrest

215 clinicians · 156 simulations (2 adult, 2 paeds) · fire-based EMS, Oregon, USA



Defect-free = correct CPR depth, rate and C:V ratio, time to BVM, time to defib

55%
incorrect mask size

20%
adrenaline dosing errors

20%
errors in joules for defib

58%
incorrect compression depth

Scenarios

Scenario A

You're dispatched to a nearby school. A 14 year old has collapsed while playing soccer. A teacher has started chest compressions.

Scenario B

A 6 month old is found unresponsive at home after being in the care of a relative. Mom reports 2 days of diarrhoea and vomiting

What are your priorities of care?

Who would you like on your team, and how do you delegate roles?

- Stay & Play or Scoop & Run?
- Ongoing CPR?
- Monitoring?
- IV access?
- Airway management?
- Drugs?
- Defibrillation?

Paeds vs Adults

	Children	Adults
Witness status	More often unwitnessed	More often witnessed
Initial rhythm	Usually asystole	More often shockable (VF / VT)
Aetiology	Mostly non-cardiac (e.g. respiratory arrest, drowning, tox, trauma)	More often cardiac

Chain of Survival

Prevention!

1. Early recognition and activation
2. High-quality CPR
3. Early defibrillation
4. Advanced resuscitation
5. Post-arrest care
6. Recovery and survivorship

Prevention

- Drowning prevention strategies
- Safe sleeping practices
- Regulation of pesticides, medications and other toxins
- In-hospital education programmes: neonatal resus for new mothers
- Injury prevention: car seats, road safety initiatives
- Recognition of the deteriorating child for parents and health care workers
- First aid training for caregivers and teachers

1. Early Recognition and Activation

- Dispatcher assisted resuscitation (audio / visual)
- EFAR / Public education programmes
- In adults: compression only CPR; less likely to be effective in kids
- Time to AED
- Witnessed vs unwitnessed
- Accurate weight estimation
- Clinician preparedness: adequate resources, training, confidence

On-Scene Management

Higher neuro-intact survival rates (0 to 23%) when shifting from rapid evacuation to an immediate on-scene resuscitation strategy

Faster interventions: effective ventilation, high-quality chest compressions, IV/IO access, and earlier adrenaline administration

Optimal scene times: roughly 10 to 35 minutes yield the best outcomes

Etiology: most pediatric cardiac arrests stem from respiratory failure or asphyxia rather than primary cardiac events

Weight estimation





2. High Quality CPR

1



Hand placement

2



Depth

3



Speed

4

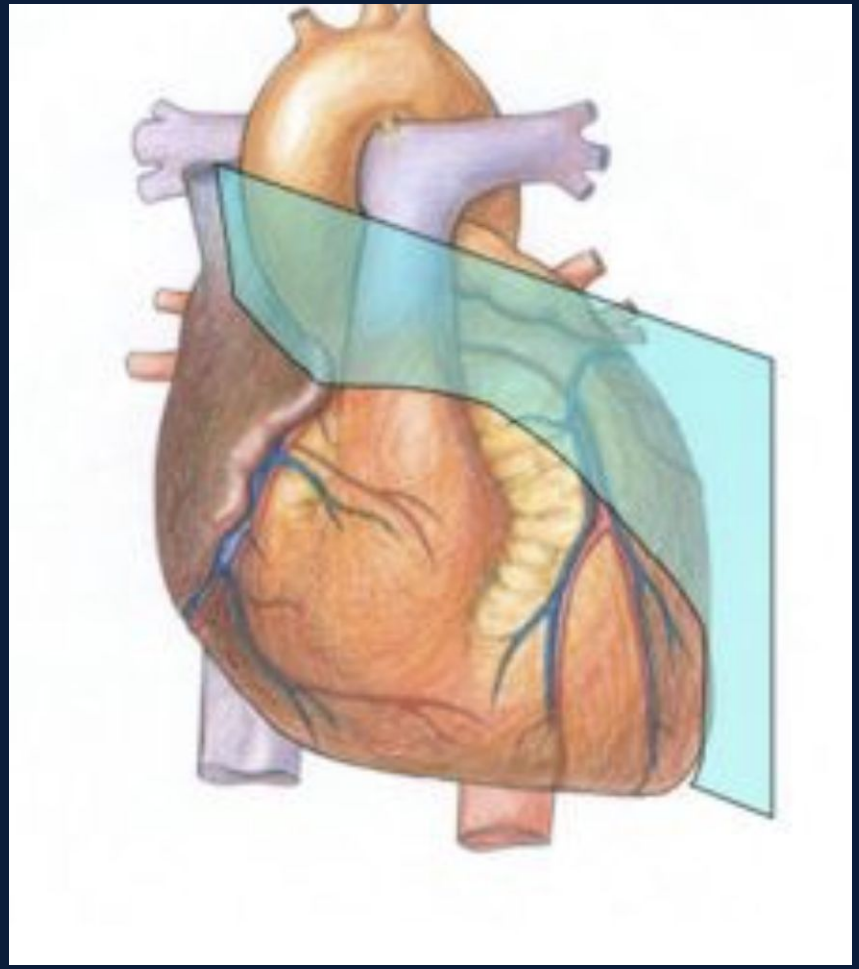


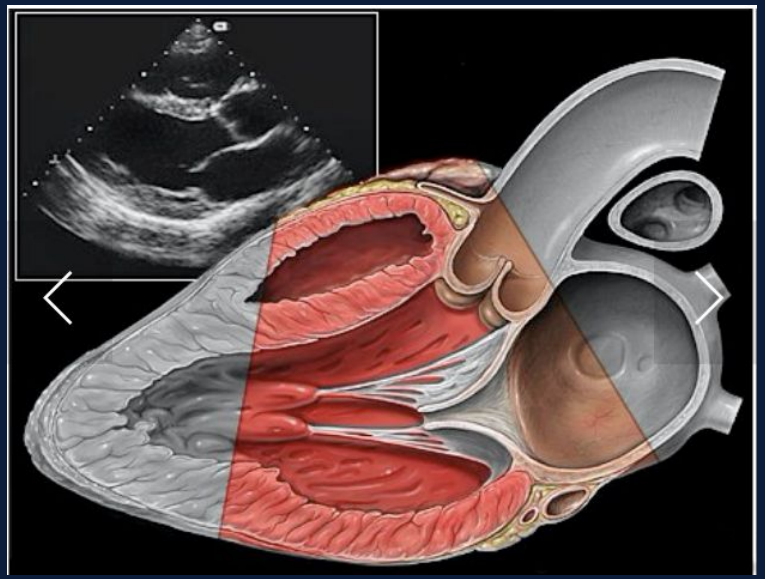
Recoil: avoid leaning

5



Cycle





3. Early Defibrillation

Drugs vs defib?

- Shockable rhythms less common in paeds
- BUT consider in exercise-related cardiac arrest; teenagers
- Time to first defib = NB for ROSC / survival

4. Advanced Resuscitation

H The H's

- Hypoxia
- Hypovolaemia
- Hypo/Hyperkalaemia
- Hypothermia
- Hydrogen ion excess / severe acidosis

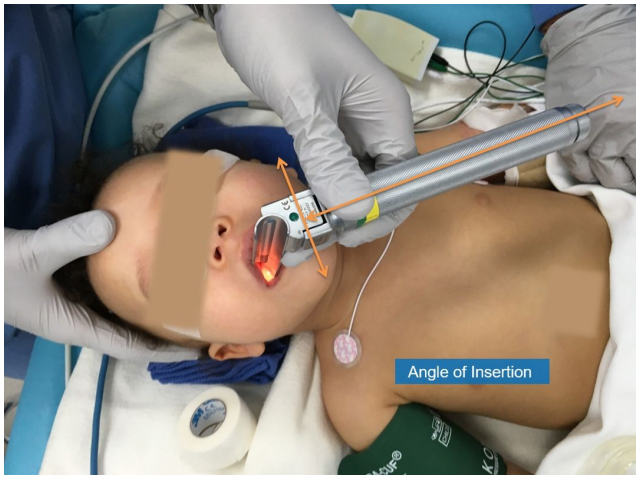
T The T's

- Toxins
- Tension pneumothorax
- Tamponade
- Thrombosis (pulmonary)
- Thrombosis (coronary)

Airway Management







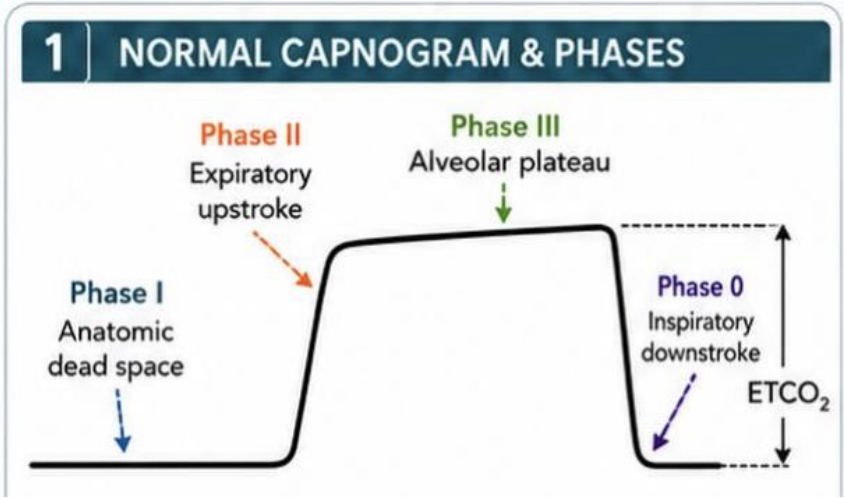
BVM was associated with higher survival to hospital discharge compared to ETI and SGA.

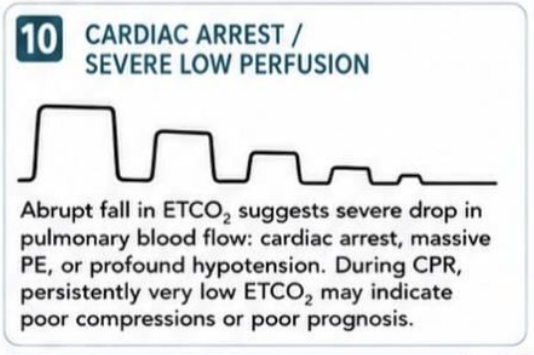
Vascular Access

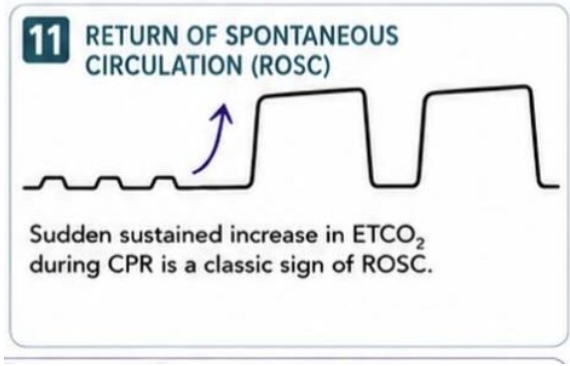




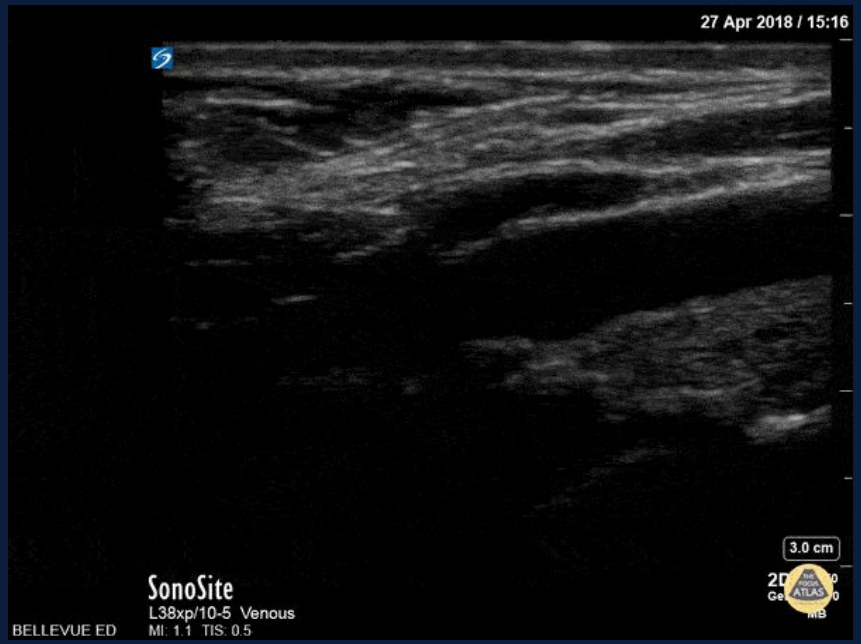
ETCO2 Monitoring





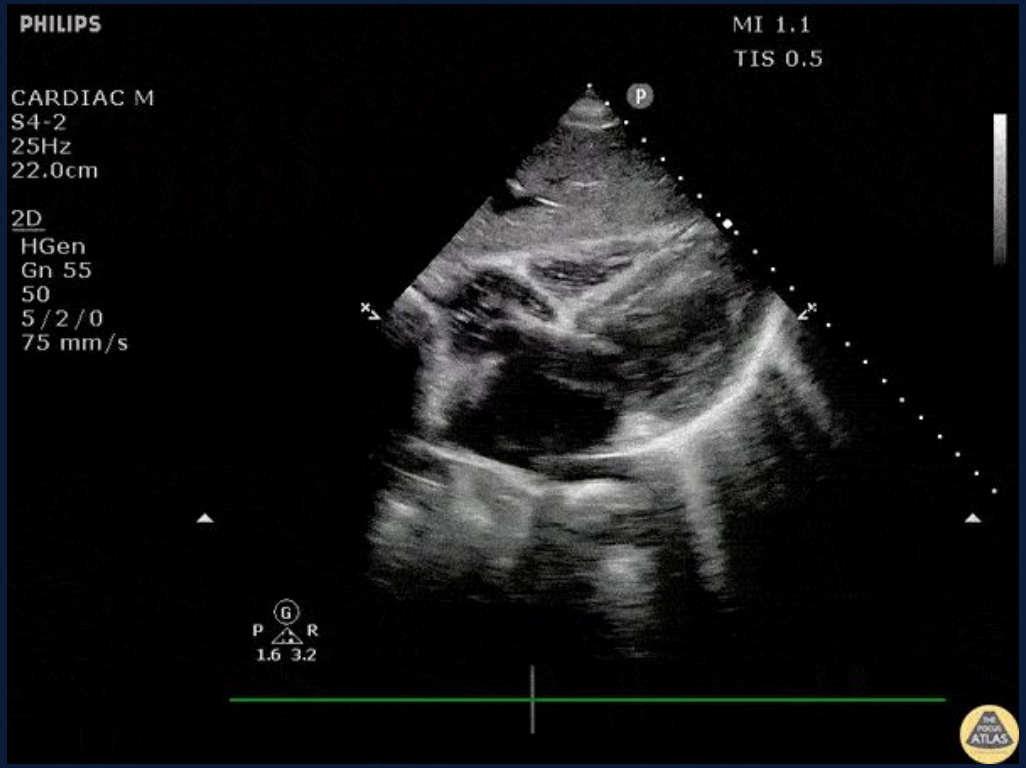


Point of Care Ultrasound: Carotid Artery Pulse Check

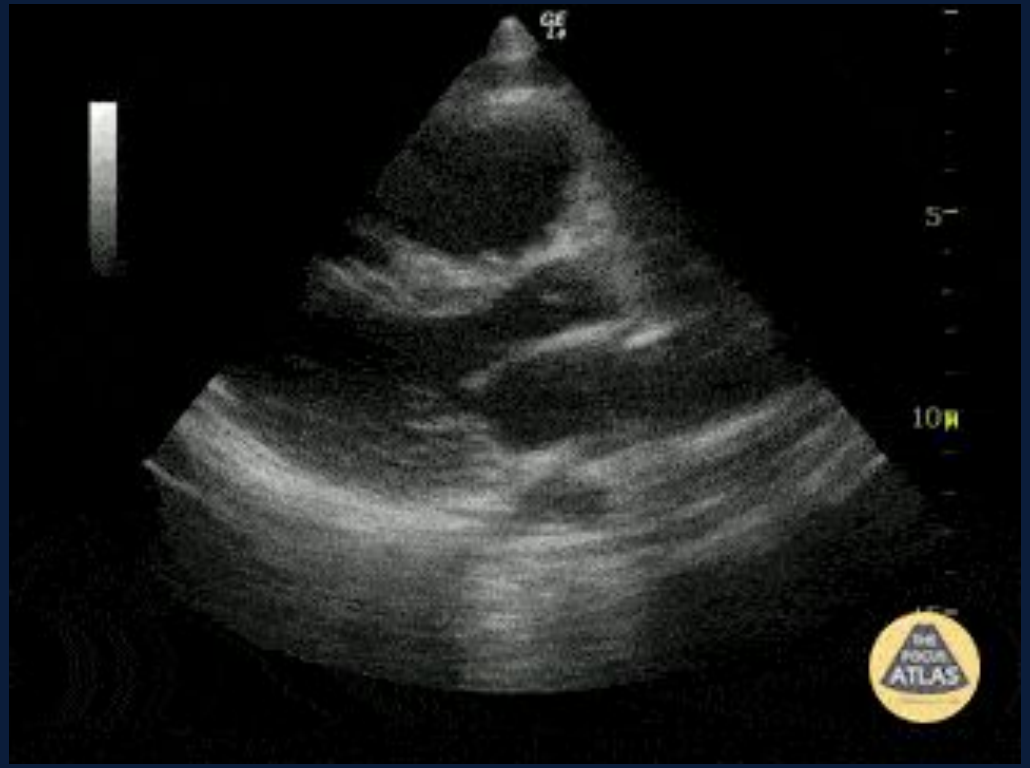




VF Arrest


PHILIPS
MI 1.1
TIS 0.5
CARDIAC M
S4-2
25Hz
22.0cm
2D
HGen
Gn 55
50
5/2/0
75 mm/s
P
G
P R
1.6 3.2

Pseudo PEA



CPR-induced consciousness



Patients may become aware during high quality CPR



Consider mitigation with Ketamine



Consider giving ketamine only after the high-priority tasks of resuscitation are completed

5. Post-Arrest Care

Priorities

- Stabilizing blood pressure
- Identifying and treating reversible causes
- Avoiding hypotension and hypoxia
- Glucose management
- Targeted temperature management: avoid hyperthermia >37.5°C
- Transport to appropriate paeds-capable facility

6. Recovery & Survivorship

Did they survive → how well did they survive

- Physical, cognitive and emotional rehabilitation
- Schooling and education
- Co-survivors
- Rescuers
- Secondary prevention and investigation

Scenario Review

Scenario A

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Scenario B

A 6 month old is found unresponsive at home after being in the care of a relative. Mom reports 2 days of diarrhoea and vomiting

Withholding & Termination of CPR

Withholding CPR:



Injuries incompatible with life or definite signs of death



A valid paediatric advance care plan



If in doubt, start

Termination Decision

Poor prognostic signs

Unwitnessed, asystole/non-shockable rhythm, no sustained ROSC

Consider prolonged CPR if

shockable rhythm, drowning, hypothermia, electrocution, toxins

Don't rely on ETCO2 alone

Follow local protocols and consult if necessary

Should be a team decision + parents

Post-Resuscitation

- Support for family
- Hot vs Cold Debrief
- Breaking Bad News
- Crew support
- Medicolegal considerations
- Ongoing learning and simulations

Summary

Prevent and recognise

The strongest link is the one before the arrest: spot the deteriorating child early

Think hypoxia

Most paediatric arrests are respiratory, unwitnessed and asystolic. Oxygenation and ventilation come first

Resuscitate on scene

High-quality CPR, early IV/IO and adrenaline, BVM first. Avoid rushed transport

Get the numbers right

Estimate weight, then check mask size, drug doses and joules aloud

Teenagers and sport: defib

Exercise-related collapse is the shockable exception. Get the AED on early

Stop well, support everyone

No validated TOR rule: a team and family decision. If in doubt, start. Debrief the crew

Thank you!

Questions?



References

Guidelines

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Ultrasound images

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