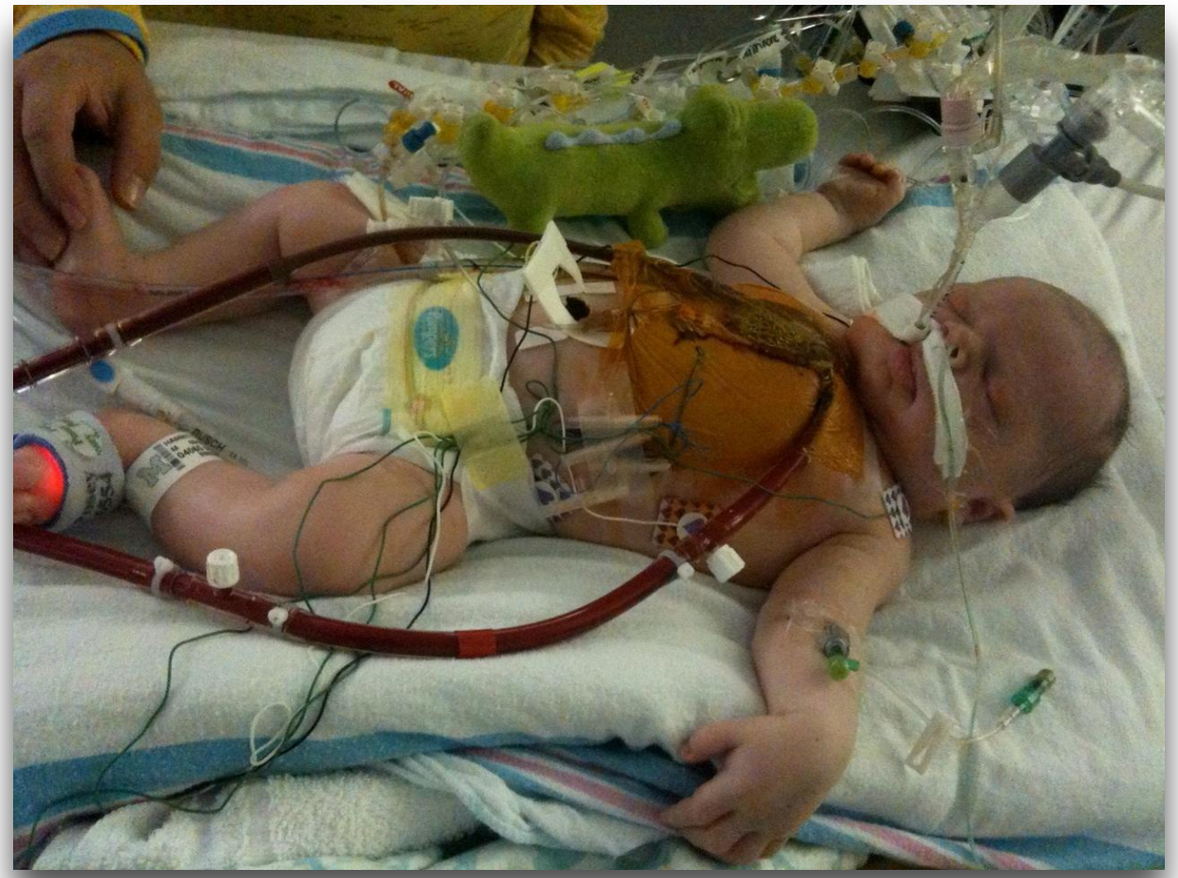


Top Tips in Stabilisation of the Collapsed Neonate & Infant

Dr Gareth Jones
Consultant Paediatric Intensivist

SOUTHAMPTON Children's Hospital

SOUTHAMPTON OXFORD RETRIEVAL TEAM

Parents bring baby to ED

- 12 day old female infant
- Presented to the ED with 48 hour history of:
  - Poor feeding
  - Lethargy
  - Pallor
  - Reduced wet nappies

- **Born at 35+6, birth weight of 3.1kg**
- **Observed on PNW for 48 hours.**
- **No sepsis risk factors & remained well; normal baby check --> discharged home**
- **S/B community midwife day 4 and prescription for chloramphenicol arranged for a sticky eye.**

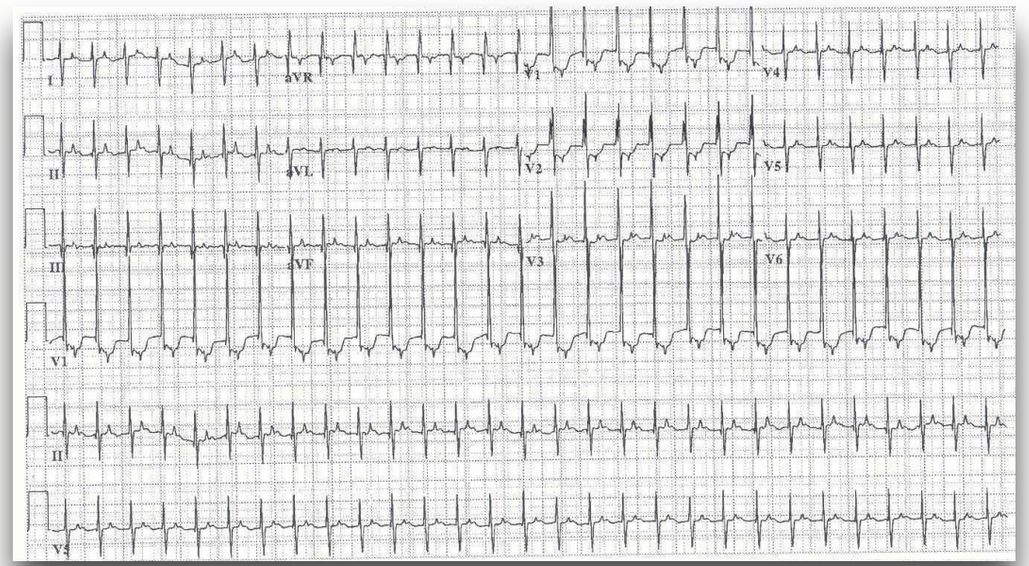
In Triage:
Nurse Assessment

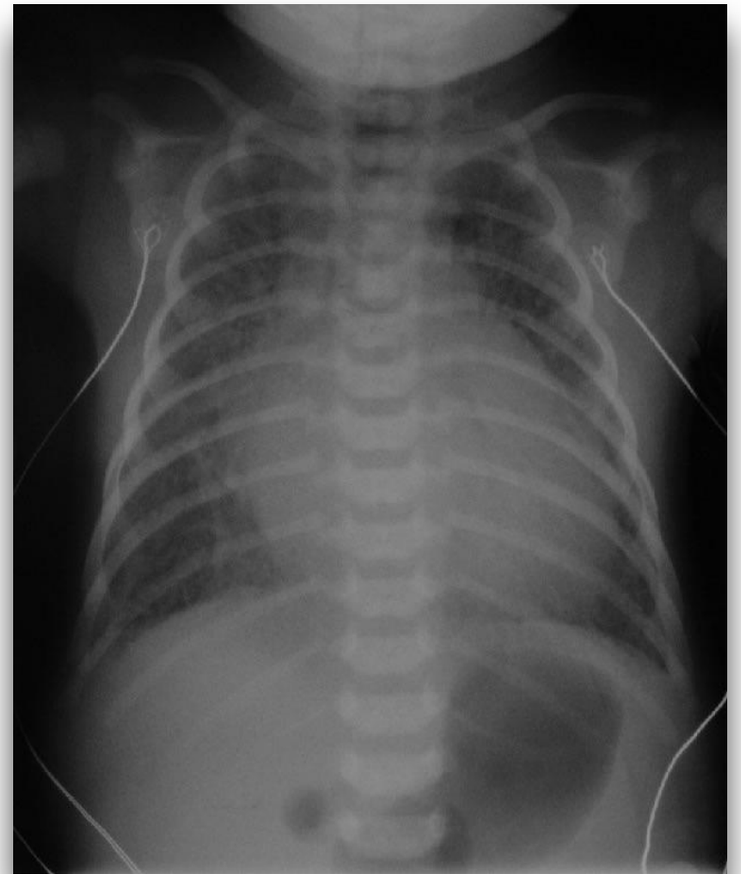
- Baby quiet and pale
- Eyes sticky, runny nose and cough noted
- Observations:
  - HR 192
  - RR 68
  - Sats 88-94% in air (poor trace)
  - Cap refill time 7 seconds centrally

Medical Assessment

System	Findings
Airway	Patent. No concerns.
Breathing	Sats 95% in 15L facemask O2 Increased work of breathing, RR~70 Chest clear except transmitted upper airway sound
Circulation	HR 200 regular BP 42 systolic CRT 7 secs centrally Weak but palpable pulses throughout HS I + II + 0
Disability	Quiet, responding to pain Hypotonic posture Soft anterior fontanelle
Exposure	Temp 34.6oC Abdo soft, not distended/tender, 3cm liver edge Generally grey/mottled

Initial Investigation Results





What Now?

Venous Blood Gas

pH 6.89
pCO2 7.11
pO2 3.13
HCO3- 8.3
BE -28

Lactate 12
Na 131
K 5.7
Cl 102
iCa 0.86
Hb 11.4
HCT 0.382

Glucose 2.9

WELCOME TO YOUR WORST NIGHTMARE.

The collapsed neonate.

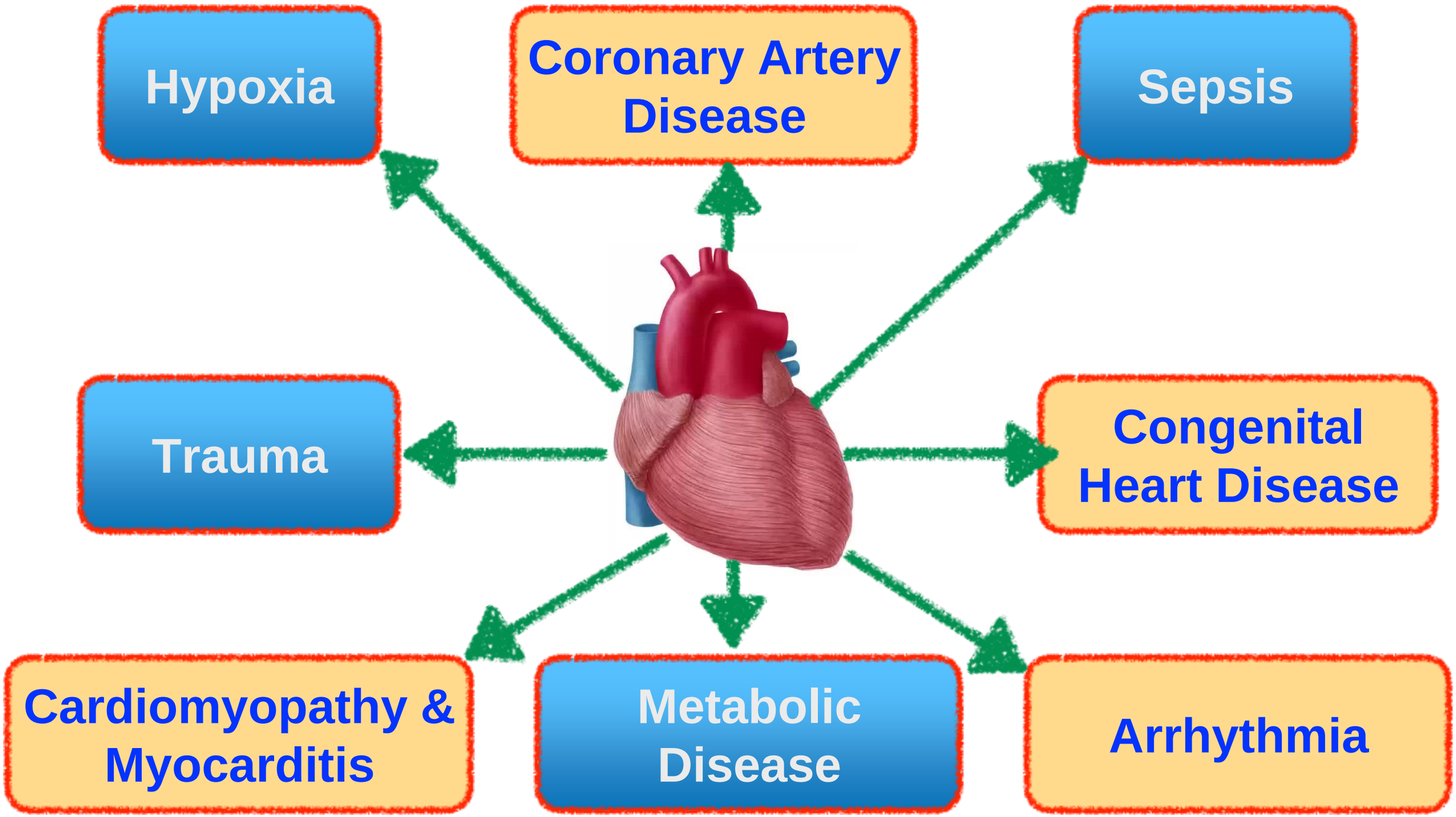
Aims

- 5 tips in stabilisation of the neonate & infant
- Improve confidence in dealing with this cohort
- Questions

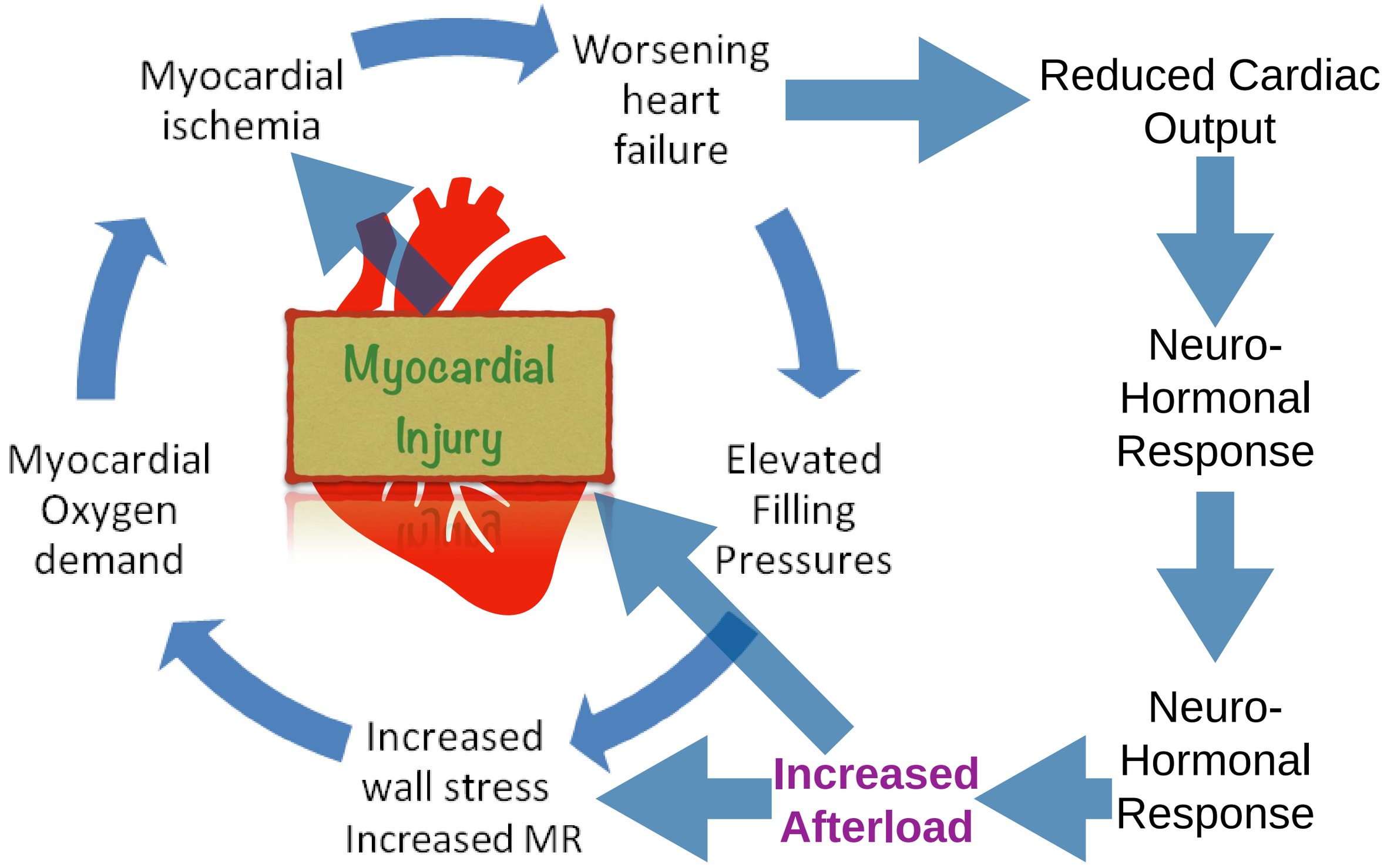
1

Look After The Left Ventricle

What Causes the Myocardial Injury in Infants?



A Downward Spiral(s)



2

Maintain Coronary Artery & Cerebral Perfusion

Restore Physiology

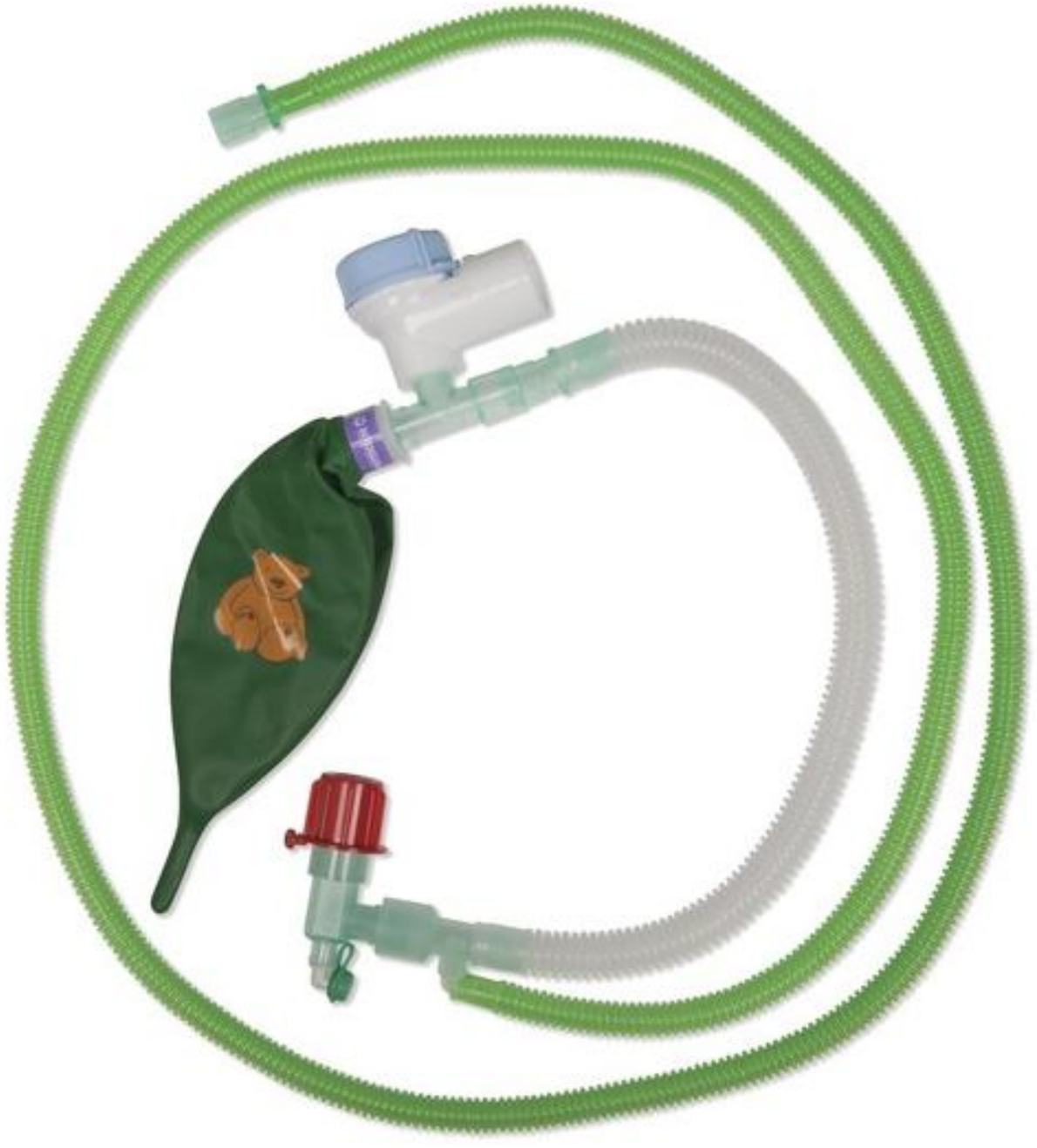
- Presentation of critically unwell children can be varied & non-specific

- Don’t get worried in the initial assessment about the diagnosis

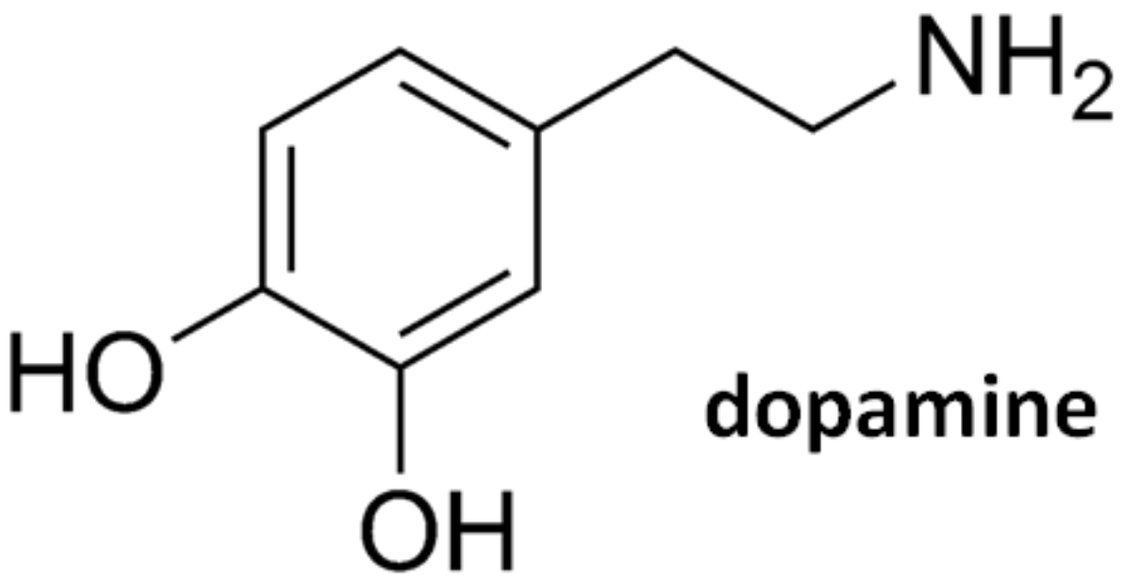
- Aim to restore normal physiology quickly

To keep someone alive - perfuse brain and coronaries!

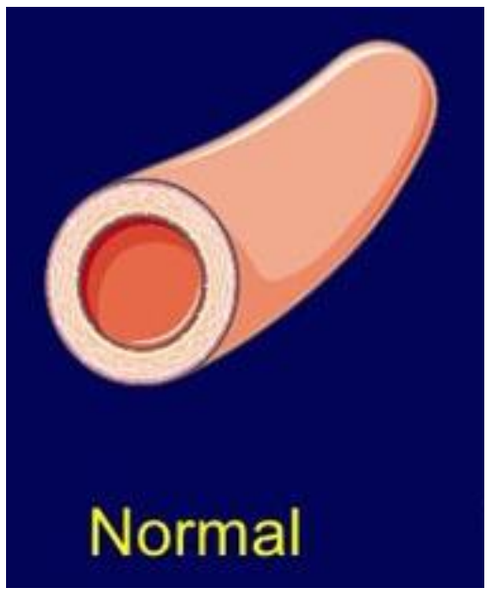
Oxygenation & PEEP

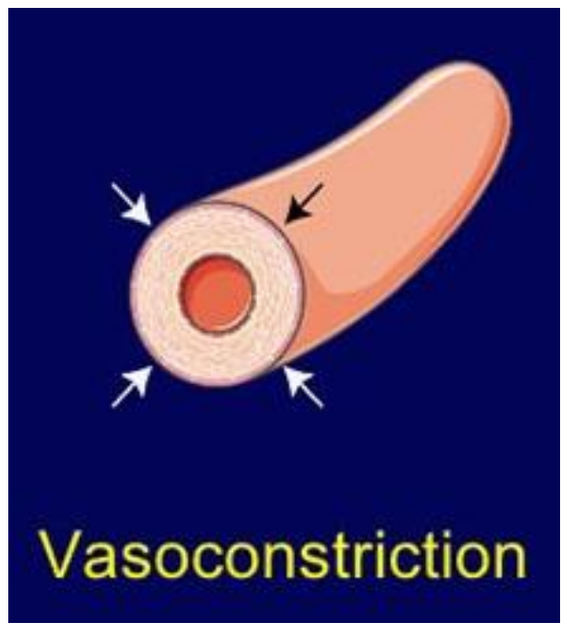


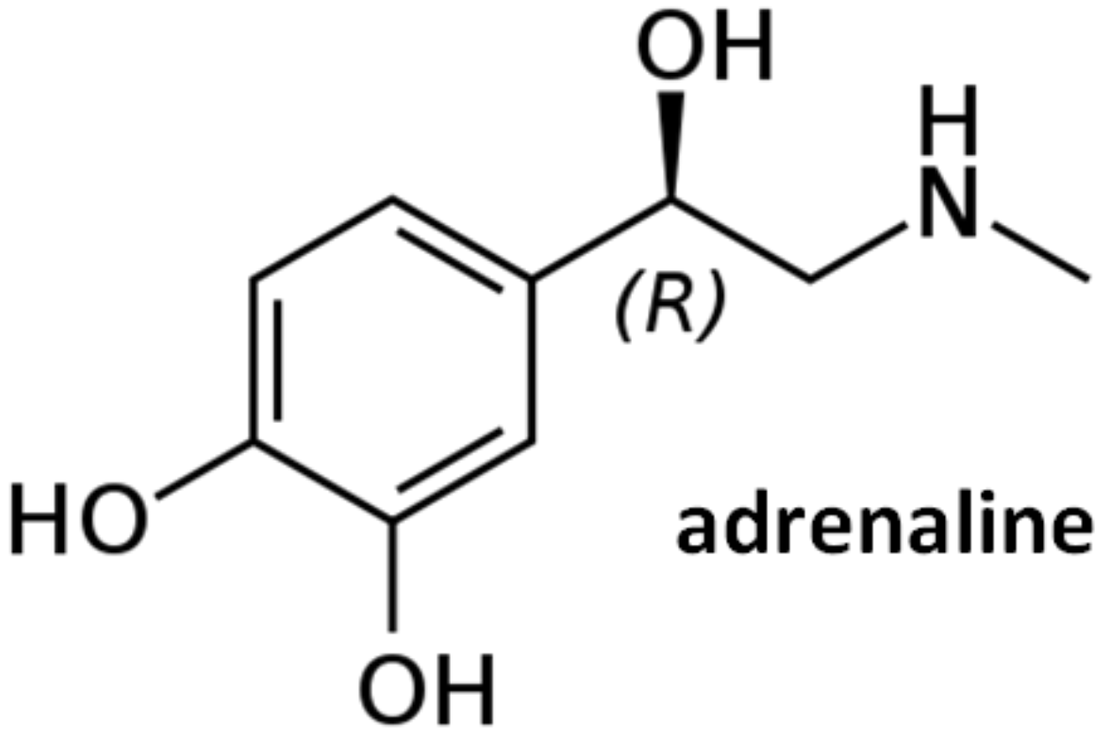
Inotrope Strategy



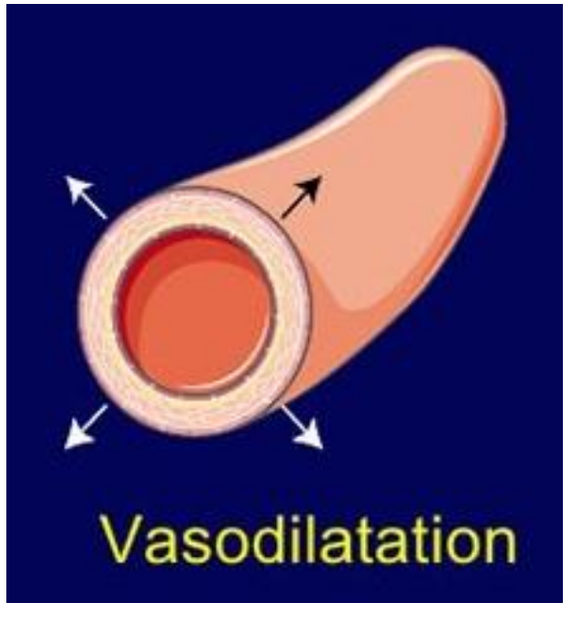
dopamine



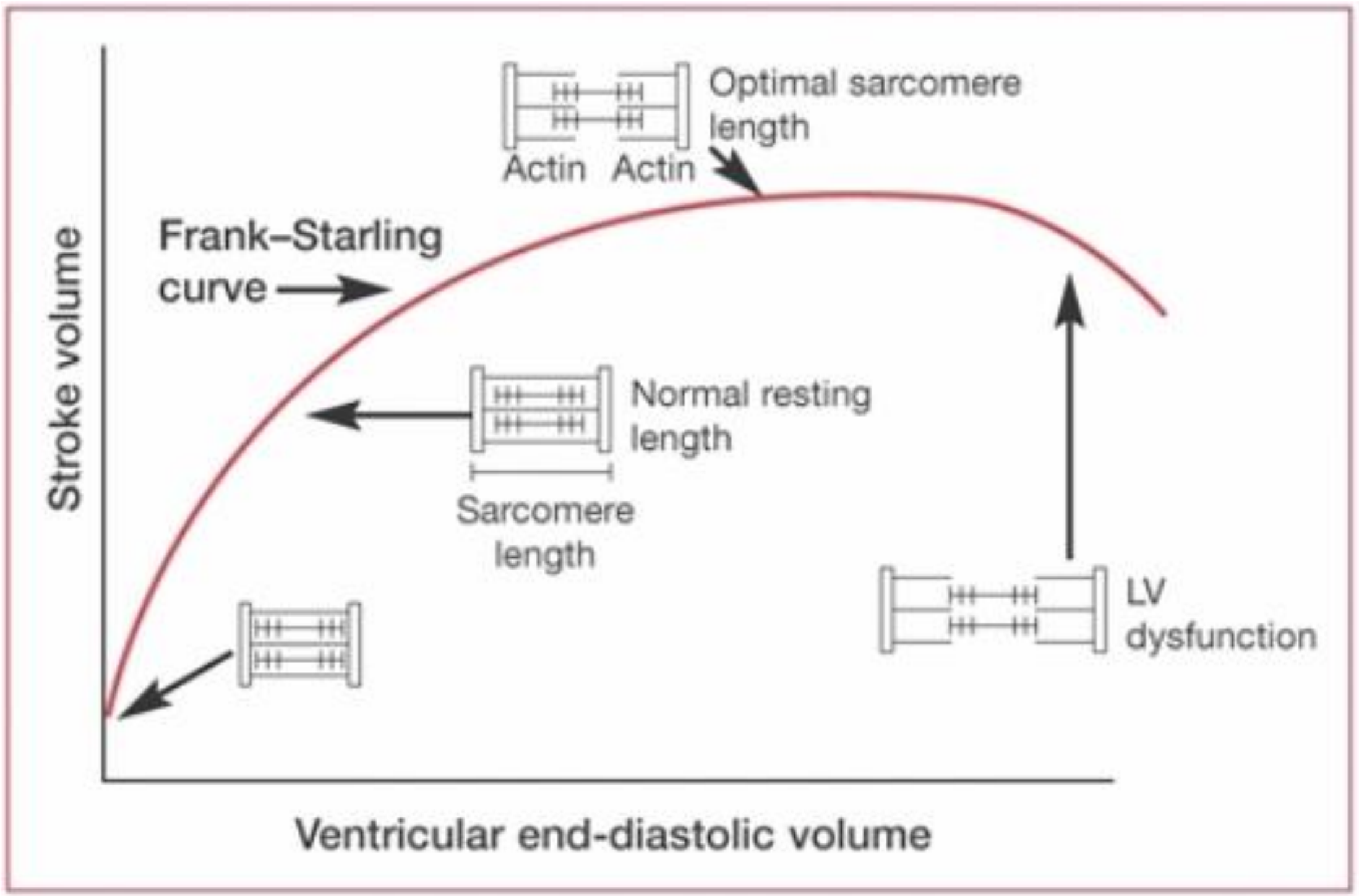




adrenaline

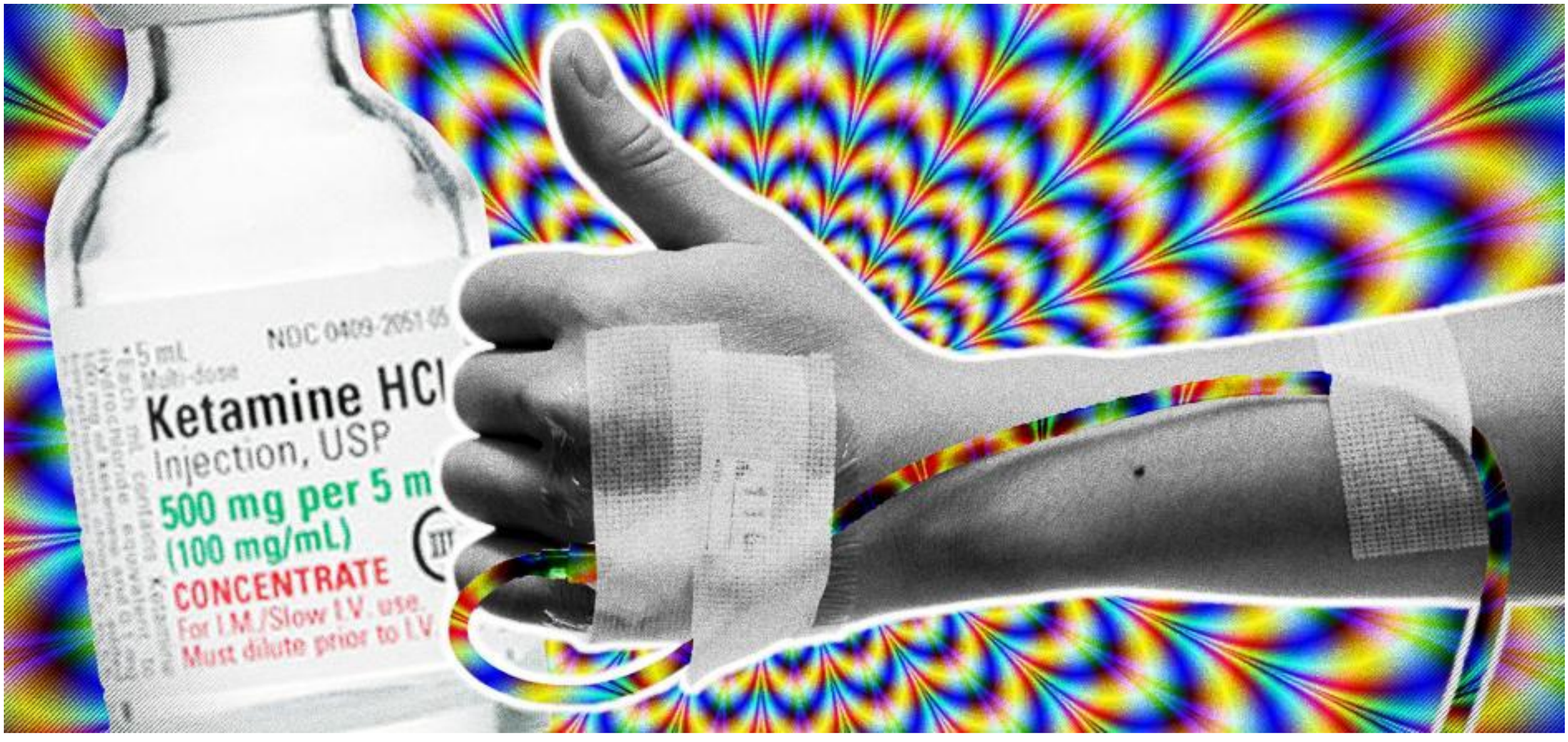


Fluid?


Optimal sarcomere length
Actin
Actin
Frank–Starling curve
Normal resting length
Sarcomere length
LV dysfunction
Stroke volume
Ventricular end-diastolic volume

Use An Anaesthetic Recipe That Works

Anaesthetic Induction Agents



Resuscitation Drugs

- Volume (crystalloid *vs* colloid *vs* blood?)
- Peripheral dopamine infusion
- Uppers

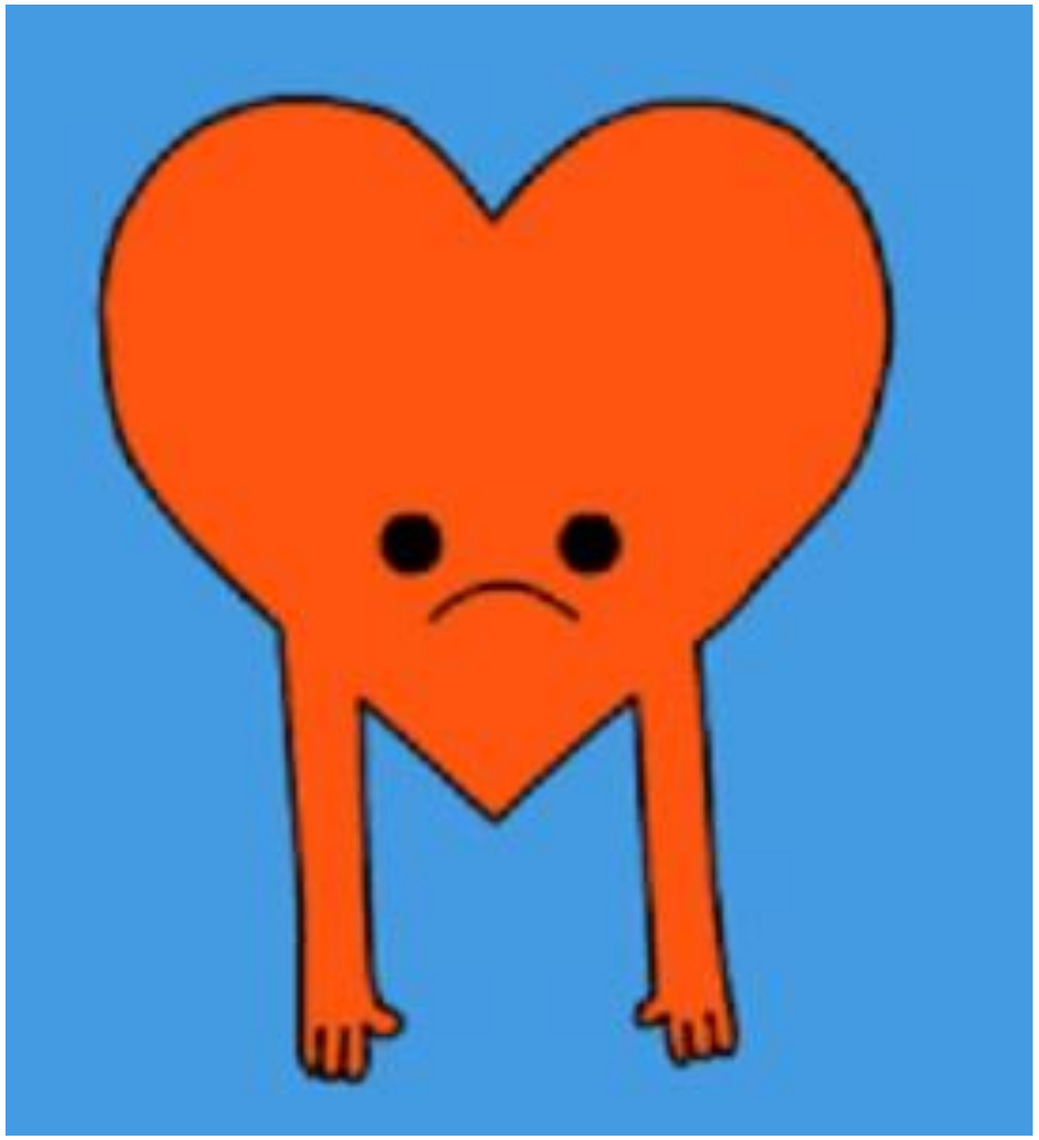
  ➡ Dilute adrenaline (1mcg/kg/ml)
- Cardiac arrest doses of adrenaline (10mcg/kg)
- 10% Calcium gluconate (0.5mls/kg)
- Atropine (20mcg/kg)……????

4

Cover All Key Limited Diagnoses

Classic Presentation

- Lethargic
- Not feeding
- Irritable
- Rapid breathing
- Reduced wet nappies



Neonatal & Infant Collapse: Causes

Cause		Distinguishing Features	Common Features
S	***Sepsis*** *(Any source)*	Temp disturbance Risk factors present Raised CRP/WCC	Shock Hypoxia Acidosis DIC AKI LFT derangement Hypoglycaemia Cardiac arrest
C	***Cardiac*** *(Congenital, Arrhythmia, Cardiomyopathy)*	Murmur Absent pulses Cardiomegaly	
A	***Abuse (NAI)***	Injuries visable Risk factors present	
M	***Metabolic***	Profound hypoglycaemia Metabolic acidosis (lactate) Respiratory alkalosis Raised ammonia	
S	***Seizures & Syndromes***	Abnormal movements Abnormal neurology	

SCAMS Treatment Checklist

Cause		Treatment/Question
S	***Sepsis***	Antibiotics given Antivirals indicated?
C	***Cardiac*** *(Congenital, Arythmia, Cardiomyopathy)*	Prostin commenced (under 1 month) Fluid status assessment (liver edge)
A	***Abuse (NAI)***	Have I checked the Hb and fontanelle? CT of head
M	***Metabolic***	Ammonia checked Blood sugar checked Adequate sugar supply commenced
S	***Seizures***	Neurology assessed before anaesthesia CT of the head needed?

5

Use Resources To Help You

SOUTHAMPTON OXFORD RETRIEVAL TEAM

NHS

Enter Keywords

24 hour retrieval and clinical advice hotline: 023 8077 5502

The Southampton Oxford Retrieval Team (SORT) is a collaboration between two paediatric intensive care units (PICUs). It delivers expert paediatric critical care to hospitals throughout the south of England.

Making a referral

Contact SORT as soon as you suspect a child might need paediatric intensive care.

Clinical guidelines

Retrieval guidelines, formulary and clinical resources produced by the retrieval team.

Diary

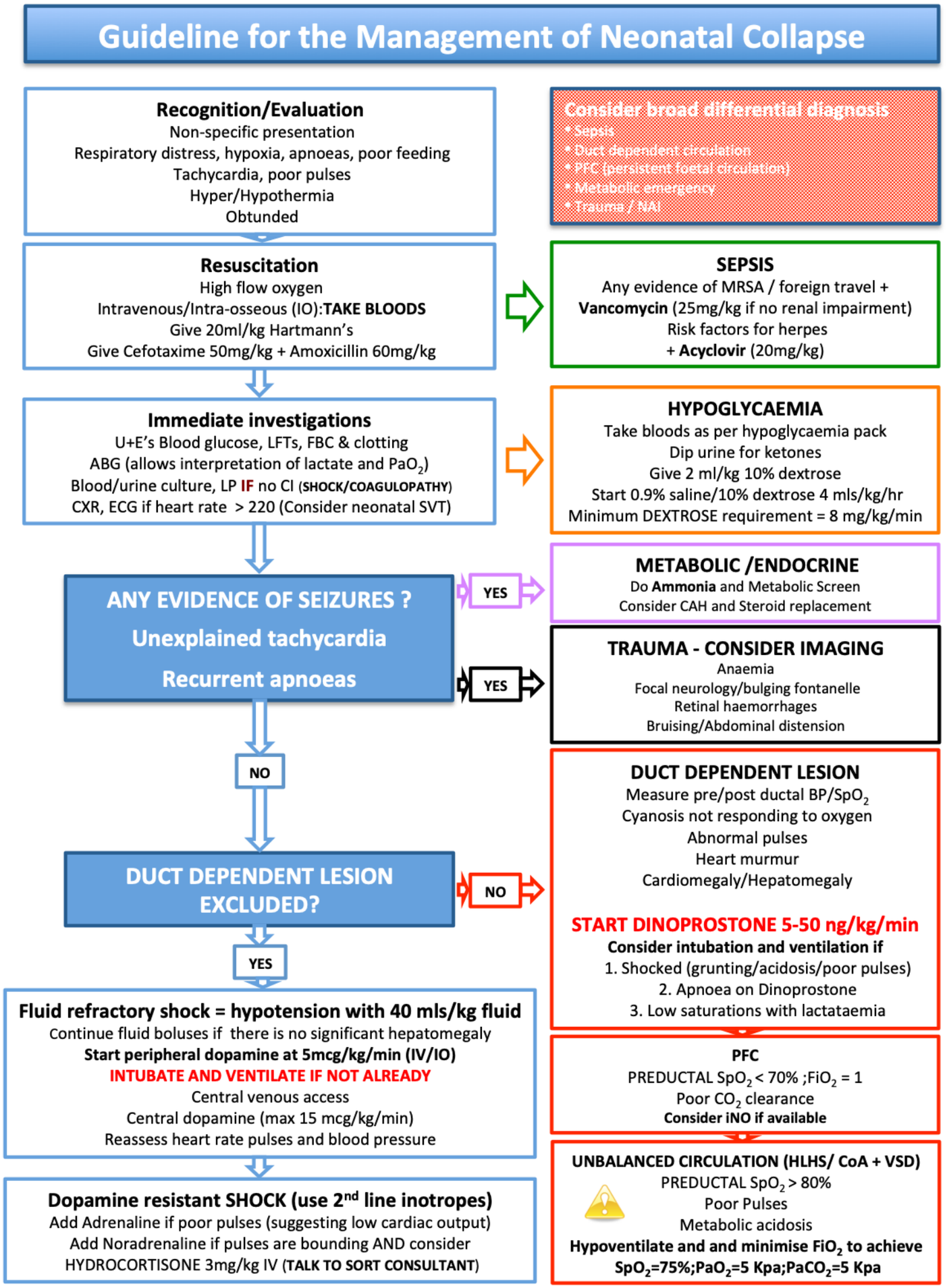
Simulation faculty development course
Monday, 26 to Tuesday, 27 March 2018

Audit
Information on and resources for the HFNP audit

Meet the retrieval team
Find out who's who in SORT

Guidelines

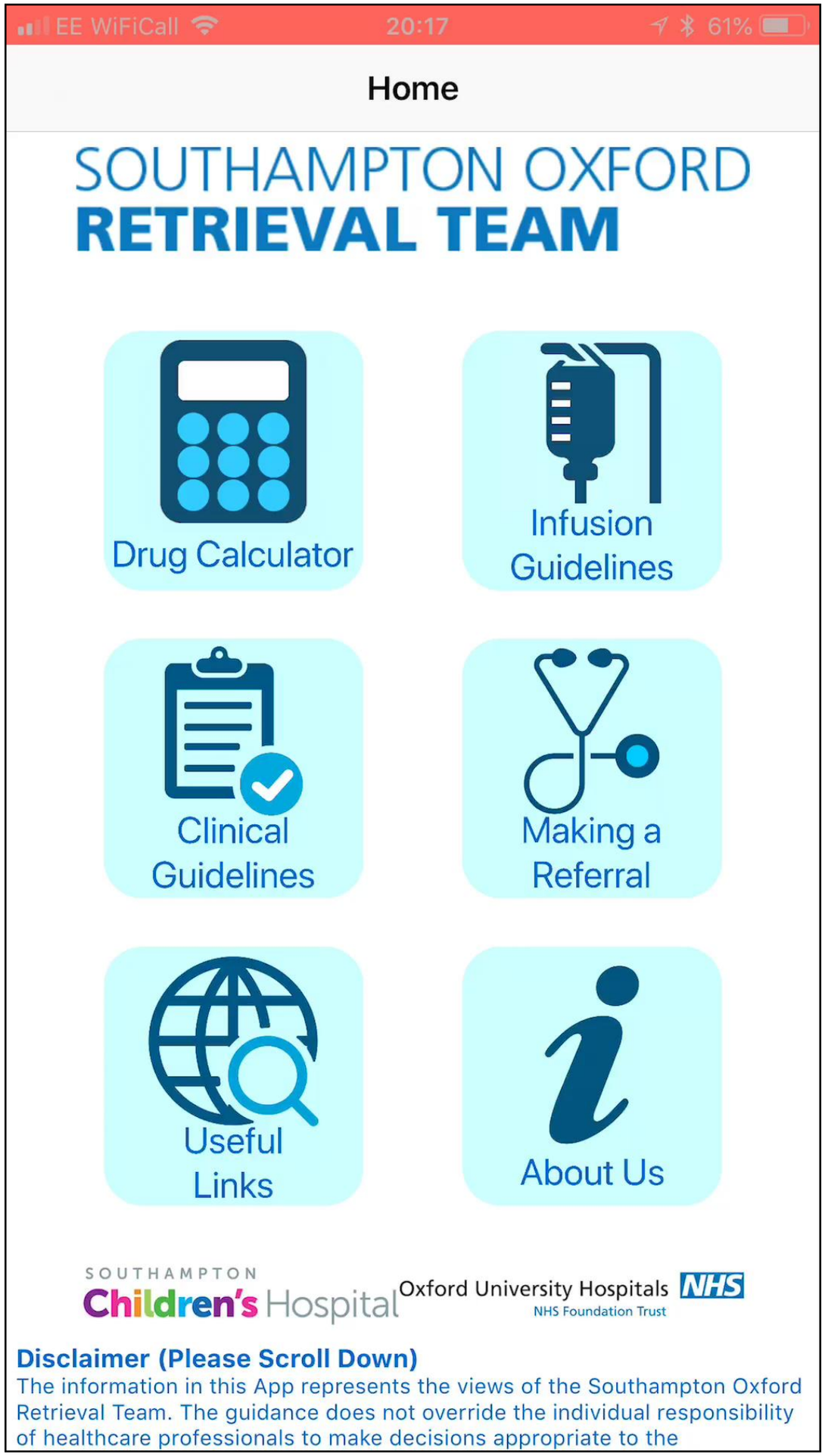
http://www.sort.nhs.uk



Outreach Education Days

The SORT App


COMING
SOON!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20:17
61%
Home
SOUTHAMPTON OXFORD
RETRIEVAL TEAM
Drug Calculator
Infusion Guidelines
Clinical Guidelines
Making a Referral
Useful Links
About Us
SOUTHAMPTON Children's Hospital
Oxford University Hospitals NHS
NHS Foundation Trust
Disclaimer (Please Scroll Down)
The information in this App represents the views of the Southampton Oxford Retrieval Team. The guidance does not override the individual responsibility of healthcare professionals to make decisions appropriate to the

Subsequent Management

- Anaesthetic team contacted - intubated & ventilated
- Further 20ml/kg 0.9%NaCl fluid bolus given
- IO ceftriaxone given
- PICU SORT team contacted - "we will collect..."

In the meantime more results....

- Na 133
- K 5.9
- Urea 18.4
- Creat 247
- CRP 99
- Glucose 2.8

- **Bili 26**
- **ALT 598**
- **Alb 32**
- **CaCorr 1.7**
- **Mg 0.98**
- **PO4 1.32**

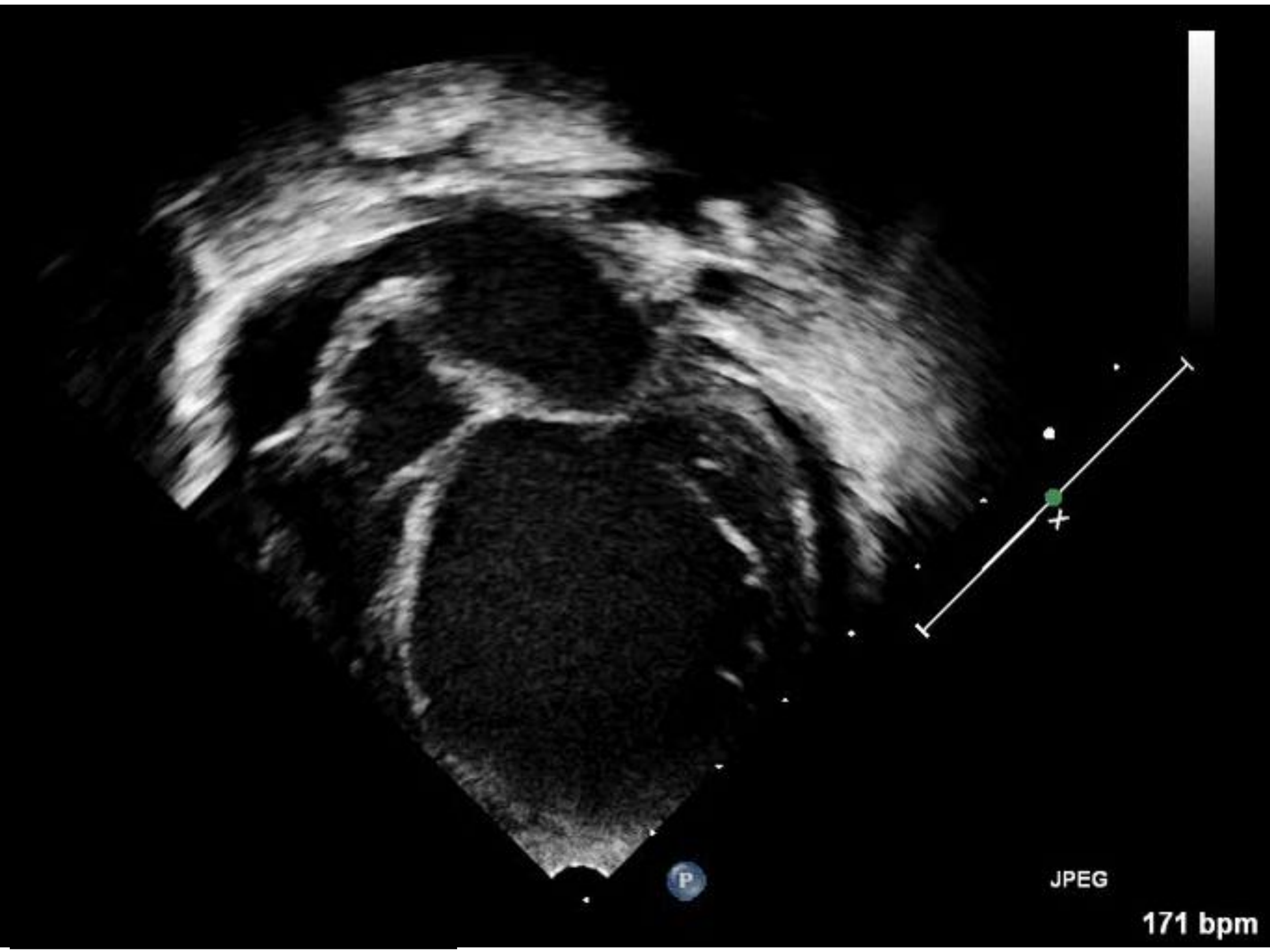
- **Hb 118**
- **WCC 2.7**
- **Plts 94**
- **INR 10.7**
- **APTTR 4.6**
- **Fibrinogen 0.4**

On Arrival of PICU Team

System	Findings
Airway	3.0 COETT, 11cm at lips
Breathing	CMV 25/5 Ti 0.75 RR 25 FiO2 0.6 but no sats picking up Equal chest wall movement ETCO2 1.4
Circulation	HR 187 sinus on monitor BP not recordable CRT 7 secs No palpable central pulses
Disability	Sedated with Morphine & Midazolam
Exposure	Mottled, white Bleeding from puncture sites

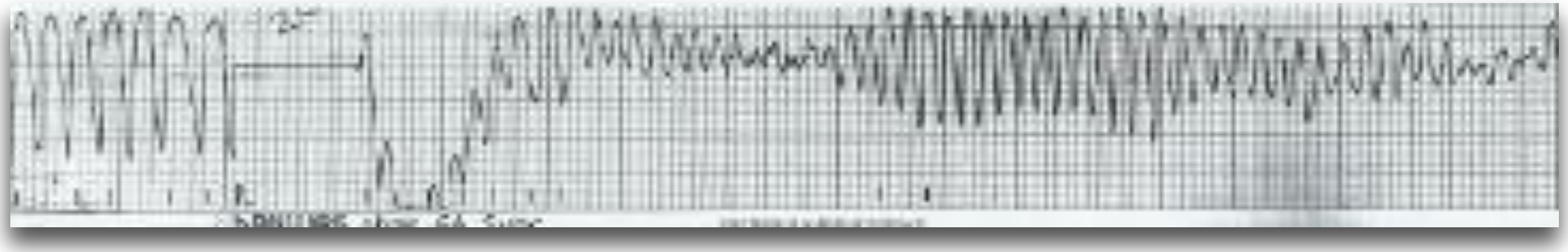
Action of PICU Team

- APLS - IV adrenaline, CPR, hand ventilated --> ROSC after 3 mins
- Bolus of calcium given
- RIJ CVC inserted..... Femoral arterial line (minimal pulsation)
- Prostin commenced
- Red cells, FFP and Cryoprecipitate given
- Inotropes commenced (calcium infusion, dopamine & adrenaline and later milrinone and vasopressin)
- Sodium bicarbonate given
- IV aciclovir given and IV cefotaxime
- Echo performed....


P
JPEG
171 bpm

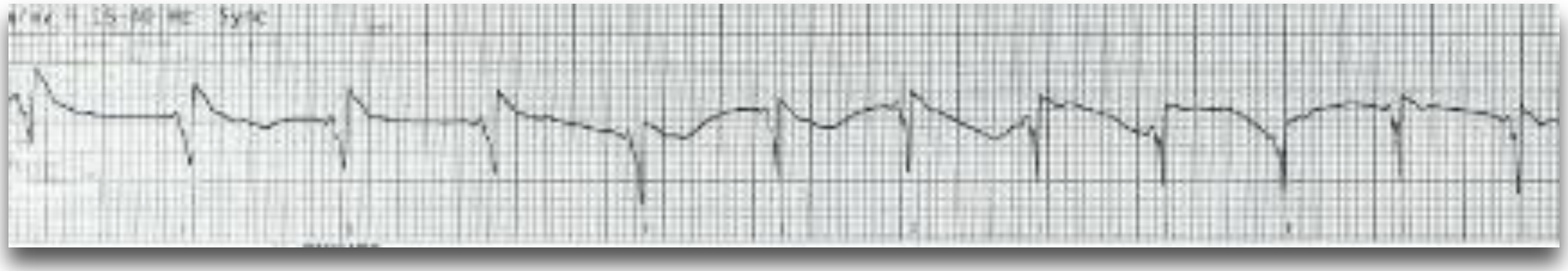
Some issues kept arising....

- Problems during CVC insertion
- Problems during movement



HOWEVER...

- Tried to move for ECMO
- But on moving.....



- **Returned to local DGH and care withdrawn**

Take Home Messages

- Maintain coronary artery and cerebral perfusion
- Look after the left ventricle
- Use an anaesthetic recipe that works
- Treat all the limited differential diagnoses: SCAMS
- Use the resources that exist to help you

Any Questions?

Thank you!