
Clinical Guidance

Paediatric Critical Care: Neonatal Collapse

Summary

This guideline is for staff to use when treating the collapsed neonate. It discusses assessment and resuscitation, offers guidance for investigation and advice when managing sepsis, cardiac, metabolic and neonates involved in trauma

Document Detail	
Document type	Clinical Guideline
Document name	Paediatric Critical Care: Neonatal Collapse
Document location	Evelina London website
Version	2
Effective from	<i>November 2017</i>
Review date	<i>November 2020</i>
Owner	Jon Lillie, PICU Consultant
Author(s)	Sara Hanna, PICU Consultant
Approved by, date	November 2017
Superseded documents	
Related documents	
Keywords	Evelina, child, Paediatric, intensive care, STRS, Retrieval, Paediatric critical care, shock, duct dependent, metabolic, cardiac, sepsis, NAI, Neonatal collapse, neonates, PICU
Relevant external law, regulation, standards	
<p>This clinical guideline has been produced by the South Thames Retrieval Service (STRS) at Evelina London for nurses, doctors and ambulance staff to refer to in the emergency care of critically ill children.</p> <p>This guideline represents the views of STRS and was produced after careful consideration of available evidence in conjunction with clinical expertise and experience. The guidance does not override the individual responsibility of healthcare professionals to make decisions appropriate to the circumstances of the individual patient.</p>	

Change History		
Date	Change details, since approval	Approved by

- Non specific presentation: hypothermia, respiratory distress, poor pulses
- Sepsis and cardiac disease commonest cause (both present as shock)
- General supportive measures will improve outcome

1. EARLY VENTILATORY SUPPORT
2. ANTIBIOTICS (presume sepsis)
3. EARLY PROSTIN (exclude cardiac lesion)
(Prostaglandin E2/Dinoprostone (Prostin))

1. Initial evaluation & resuscitation

- Tachycardia/ poor pulses/ obtunded/ low BP = SHOCK
- High flow oxygen
- Intravenous access: use intraosseous (IO) if difficult
- Push 20 mls/kg 0.9% sodium chloride (caution if signs of heart failure)
(If no signs of heart failure and still signs of shock-repeat fluid bolus)
- Antibiotics: cefotaxime 50mg/kg IV and amoxicillin 100mg/kg IV

Consider duct dependent cardiac lesion

2. Immediate investigations

- Arterial/venous gas, U+E's, blood glucose, LFTs, FBC & clotting
- Blood culture, consider LP if no contra-indications
- CXR /ECG if tachycardia (heart rate > 220 bpm, consider SVT)
- Ammonia if seizures/ encephalopathy

3. Fluid refractory shock = hypotension despite 40 mls/kg fluid

- Continue fluid boluses if response (HR improves and liver not ↑)
- **Start peripheral dopamine at 10micrograms/kg/min**
- **Intubate and ventilate**
- Central IV access or IO.
- Central dopamine 10micrograms/kg/min
- Reassess heart rate pulses and blood pressure

4. Dopamine resistant shock (use 2nd line inotrope)

- Adrenaline(ADR) if poor pulses, cold, low cardiac output
- Noradrenaline (NorADR) if vasodilated-bounding pulse/wide pulse pressure
- If ADR or NorADR >0.5 mcg/kg/min or possible Addisonian crisis (low glucose, ↓Na+, ↑K+), consider hydrocortisone 2 mg/kg IV

DUCT DEPENDENT CONGENITAL HEART DISEASE¹

- Cyanosis not responding to oxygen
- Poor or absent femoral pulses
- Heart murmur present, or cardiomegaly
(see list below regarding diagnosis of individual lesion)

Pre/post ductal saturations, 4 limb BP

Start Dinoprostone-dose depends on clinical state

- Discuss with STRS: dose is in nanograms (ng)
 - 5 ng/kg/min if clinically well
 - 20 ng/kg/min if unstable or absent femoral pulses
 - 50-100 ng/kg/min if no response-consultant approval
- Apnoea common: 1st hour and increase in dose
- Hypotension may occur with high dose

Lack of response = urgent cardiology review

DO NOT DELAY TRANSFER

- Intubate and ventilate if
 1. Preductal sats < 70%
 2. Grunting / acidosis / poor pulses/ apnoea
 3. Transferring on Dinoprostone ≥ 15ng/kg/min²

ASSESSMENT OF HEART FAILURE

- Signs: gallop, cardiomegaly, hepatomegaly
- Potential diagnosis CHD, cardiomyopathy, myocarditis
- Cautious fluid resuscitation- stop if increasing liver size

Glucose in neonates

- Monitor regularly & aim blood sugar 4-8 mmol/l
- Start 0.9% sodium chloride/10% glucose 2mls/kg/hr
- If metabolic/hypoglycaemic- calculate:
• $\text{glucose mg/kg/min} = \frac{\text{glucose}\% \times \text{mls/hr}}{\text{weight} \times 6}$

Sepsis	Group B strep, E Coli	PROM, maternal GBS, fever in labour	Cefotaxime 50mg/kg IV and amoxicillin 100mg/kg IV
	Herpes Simplex	↓GCS, coagulopathy, ↑ALT, herpes contact	Add Aciclovir 20 mg/kg IV. High index suspicion, history often absent
	Pertussis	Apnoea, cough-pt. or contact, ↑WCC (lymph)	See pertussis guideline. Add macrolide. 6 hourly FBC- may need exchange Tx.
Cardiac	Coarctation aorta	Systolic arm/leg gradient > 20 mmHg	Urgent Prostin (may need high dose) and support (ventilation/inotropes)
	Hypoplastic Left heart	Poor pulses –may be pink= pulm. overcirculation	Prostin. Avoid oxygen-can cause pulm. overcirculation. Target sats 75%
	Transposition (TGA)	Preductal sats < post ductal sats	Urgent Prostin. If no response: urgent septostomy
	TAPVD (obstructed)	Shocked & cyanosed/CXR plethoric	Prostin may make worse. Need echo confirmation and surgery
	SVT	HR>220 despite fluid, fixed HR, narrow QRS	See arrhythmia guideline. Adenosine, if shocked: ventilate +DC shock
	Myocarditis	Cardiac failure, tachycardia, small QRS	Supportive (ventilation, inotropes). Consider immunoglobulin. Viral PCRs.
	Metabolic	Urea cycle defect	↓GCS, Seizures, ↑ammonia, alkalosis
	Organic acidaemia	Profound metabolic acidosis, ketone positive	Supportive (inotropes, ventilation). May co-present with sepsis
	Mitochondrial	↑Lactate, seizures, cardiomyopathy	Supportive (inotropes, ventilation). May co-present with sepsis
Trauma	Intracranial bleed	Focal neuro signs, fontanelle↑, retinal bleeds	Head CT to exclude neurosurgical problem/ ?NAI ?haemorrhagic disease
	Intra-abdominal bleed	Unexplained anaemia, abdominal bruising	Abdominal and head CT, ?non-accidental injury (NAI), ?haemorrhagic disease of newborn