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# Clinical Guidance

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## 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*

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<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)

**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-rpt fluid bolus)
- Antibiotics: cefotaxime 50mg/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 j)
- Start peripheral dopamine at 10mcg/kg/min
- Intubate and ventilate
- Central IV access or IO.
- Central dopamine 10mcg/kg/min
- Reassess heart rate pulses and blood pressure

**4. Dopamine resistant shock (use 2<sup>nd</sup> line inotrope)**

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

**DUCT DEPENDANT CONGENITAL HEART DISEASE<sup>1</sup>**

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

**Measure pre and post ductal saturations, 4 limb BP**

**Start prostin-dose depends on clinical state**

- Discuss with STRS:
  - 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
- Apnoea common: 1<sup>st</sup> hr of Rx, ↑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 prostin  $\geq 15\text{ng/kg/min}^2$

**ASSESSMENT OF HEART FAILURE**

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

**Dextrose in neonates**

- Monitor regularly & aim 4-8 mmol/l
- Start 0.9% saline/10% dextrose 2mls/kg/hr
- If metabolic/hypoglycaemic- calculate:  

$$\text{dextrose mg/kg/min} = \frac{\text{dextrose\%} \times \text{mls/hr}}{\text{weight} \times 6}$$

Sepsis	Group B strep, E Coli	PROM, maternal GBS, fever in labour	→ Cefotaxime 50mg/kg IV (add amoxicillin 100mg/kg IV if listeria concerns (rare))
	Herpes Simplex	IGCS, coagulopathy, ↑ALT, family cold sores	→ Add Acyclovir 20 mg/kg IV. High index suspicion, history may be absent
	MRSA	Unresponsive 1 <sup>st</sup> line antibiotics,+ contact	→ Add Vancomycin 15mg/kg IV
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). Immunoglobulin may be beneficial
Metabolic	Urea cycle defect	↓GCS, Seizures, jammonia, alkalosis	→ Ammonia >150mmol/L. Repeat to confirm. Metabolic opinion
	Organic acidosis	Profound metabolic acidosis, ketone negative	→ 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, fontanellej, retinal bleeds	→ Head CT to exclude neurosurgical problem/ ?NAI, ?haemorrhagic disease
	Intrabdominal bleed	Unexplained anaemia, abdominal bruising	→ Abdominal and head CT, ?NAI, ?haemorrhagic disease of newborn