

The Critically Ill Neonate

For infants 0-28 days. At birth, refer to NRP guidelines. Not intended for preterm infants <37 weeks.



Recognize the Critically Ill Neonate:

Pediatric Assessment Triangle:

- **Appearance:** floppy, lethargic or irritable
- **Work of Breathing:** laboured breathing or apnea
- **Circulation:** central cyanosis, grey/dusky, central cap refill > 2 sec

Alert Pediatric Referral Centre

Initial Stabilization & Management

- Cardiorespiratory monitor, vital signs+ SpO₂ (R hand) + POCT glucose, warm environment (see Tips below)
- **Airway / Breathing (A, B):**
 - Suction nares and ensure patency (5 Fr catheter)
 - Apply O₂ to keep O₂ sats ≥92%
 - BVM ventilation if apneic or poor respiratory effort. Consider CPAP at 5 cm H₂O if RR<40 and/or O₂ sats < 92%
 - Insert NG (6 Fr), apply low intermittent suction if abdominal distention
 - Shoulder roll for ideal airway position
 - Obtain portable CXR

• Circulation (C):

- Secure 2 peripheral IVs and send CBC, blood culture, glucose, blood gas, and lactate, if possible
- If HR <60 follow PALS bradycardia algorithm
- If HR >180 give NS 10 mL/kg IV bolus over 10 min and reassess
- If HR > 220 consider SVT (fixed rate/absent p-waves) and follow PALS tachycardia algorithm

• Disability (D):

- Perform POCT glucose:
 - » If glucose <2.6 mmol/L (<72 hrs old) or <3.3 mmol/L (≥72 hrs old) give D10W 2 mL/kg IV
 - » After D10W bolus, start D10W infusion at 4 mL/kg/hr IV
 - » Recheck POCT glucose within 15 - 30 min



ALWAYS TREAT FOR POSSIBLE SEPSIS/MENINGITIS

Defer LP in an unstable neonate. Give Ampicillin and Cefotaxime STAT (within 60 minutes of treatment) even if an LP has not been performed. Add Acyclovir if suspected HSV infection.



Further Assessment & Management

Consideration	Features	Immediate Management
Is it the heart?		
Duct-dependent cardiac lesion	<ul style="list-style-type: none"> • Decreased perfusion/shock • Central cyanosis, SpO₂ <92% despite O₂ therapy • Differential SpO₂ (≥3% diff between R hand and L or R foot) • Upper R arm BP > lower extremity BP; absent femoral pulses 	<ul style="list-style-type: none"> • Prostaglandin E1 (PGE1, alprostadil) infusion, starting at 0.05 mcg/kg/min. Discuss with Pediatric Referral Centre for further dosing adjustments. Risk of apnea with PGE1. • Provide supplemental O₂ and aim for 85% SpO₂ once PGE1 started • Repeat fluid bolus prn. Assess pre/post bolus for signs of CHF.
SVT	<ul style="list-style-type: none"> • Fixed HR >220, no p-waves 	<ul style="list-style-type: none"> • See PALS tachycardia algorithm
Is it the lungs?		
Bronchiolitis or Pneumonia	<ul style="list-style-type: none"> • Laboured respirations • Wheezing/crackles • SpO₂ improves with oxygen 	<ul style="list-style-type: none"> • Suction nares and oropharynx • Start with low flow oxygen via nasal cannula • Consider a trial of nebulized epinephrine for bronchiolitis with severe distress • High-flow nasal cannula (HFNC) for persistent resp distress and/or sats <92%, if available • CPAP/BVM support, as required
Pneumothorax (Tension)	<ul style="list-style-type: none"> • Laboured respirations, low SpO₂, unilateral decreased AE, deviated trachea • Bradycardia, hypotension 	<ul style="list-style-type: none"> • Needle thoracostomy, chest tube
Is it the CNS?		
Bleed/Trauma/Stroke	<ul style="list-style-type: none"> • Apnea, floppy tone, focal neurological signs • Skin/MSK evaluation for signs of trauma/maltreatment 	<ul style="list-style-type: none"> • Stabilize C-spine, avoid hypoxia and hypotension, keep ETCO₂ 35-40 • Discuss further head injury management with Pediatric Referral Centre
Seizure	<ul style="list-style-type: none"> • Apnea, bradycardia, hyper- or hypotonia • Facial movements, lip smacking, eye deviation • Subtle tonic-clonic movements 	<ul style="list-style-type: none"> • Lorazepam 0.1 mg/kg IV x 1 dose over 2 minutes then Phenobarbital 20 mg/kg IV over 20 minutes
Is it metabolic?		
Metabolic disorders	<ul style="list-style-type: none"> • Vomiting, lethargy, alkalosis, acidosis or hypoglycemia 	<ul style="list-style-type: none"> • NPO • High rate D10W infusion @ 6 mL/kg/hr
Congenital Adrenal Hyperplasia (CAH)	<ul style="list-style-type: none"> • Ambiguous genitalia; hypoglycemia, hyponatremia, hyperkalemia 	<ul style="list-style-type: none"> • Hydrocortisone 25 mg IV push • Treat hypoglycemia as per Initial Stabilization & Management above • Monitor glucose q5 min until stable, then q30 min
Is it a surgical emergency?		
Volvulus/GI Obstruction	<ul style="list-style-type: none"> • Yellow/green emesis; distended abdomen • Shock, acidosis 	<ul style="list-style-type: none"> • Support ABCs • NG low intermittent suction; NS 10-20 mL/kg IV boluses prn • Emergent Pediatric Surgery consult • Intubate and ventilate if suspected CDH. Call Anesthesia for help, if available. Avoid non-invasive ventilation.
Congenital Diaphragmatic Hernia (CDH)	<ul style="list-style-type: none"> • Laboured respirations • Scaphoid abdomen 	

*See drug dosing binder for equipment details

Practical Tips:

Keeping baby warm

- Use overbed warmer with temp sensor, hat, warmed blankets, Bair hugger™
- Warm resuscitation room, closed doors

Difficulty with peripheral IV access

- Consider scalp veins
- Warm up limb (wrap in warm diaper/blanket)
- Can insert umbilical vein catheter up to 7 days of age
- Obtain intraosseous (IO) access using proximal tibia, distal femur, or proximal humerus (pink IO needle used 3 kg and above)
- Use ultrasound assisted IV placement, if available

Airway/Respiratory support

- Can provide CPAP/PPV with flow inflating bag (use caution with pressures)

Discussion with Pediatric Referral Centre

- Vital signs
- Ventilatory support
- Vascular access
- Diagnostic considerations/management (e.g., suspected cardiac/PGE1, CAH/hydrocortisone, CNS concerns)

Defer further labs/imaging to Pediatric Referral Centre



Scan or click the QR code to learn more, to see a list of key references, and development team members.

Disclaimer: The purpose of this document is to provide emergency healthcare professionals an approach to the assessment and management of Critically Ill Neonate. The TREKK Network is not liable for any damages, claims, liabilities, costs or obligations arising from the use of this document, including loss or damages arising from any claims made by a third party.



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