

ECHO Summary, 12/December/2025

Session Title: HOB: The Cyanosed Newborn

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Disclaimer:

The information presented in this summary is based on the presentation given by the panelists and is intended for general informational purposes only. The authors and collaborating partners do not accept responsibility for any outcomes resulting from the implementation of treatments outlined in this document. It is strongly recommended that individuals verify the information against their national guidelines and seek professional advice before making any decisions related to the content presented herein.

Areas Covered

- Systematic evaluation of the cyanotic newborn using ABCs
- Differentiation of cardiac vs respiratory causes of neonatal cyanosis
- Use of pre-ductal and post-ductal oxygen saturation and hyperoxia testing
- Nursing and multidisciplinary management of a cyanotic neonate
- Referral pathways and advanced cardiac care at Uganda Heart Institute
- Importance of early screening and stabilization prior to referral

ECHO Session Panelists:

Experts: Dr. Tali Baliku, Dr. Dora Nija

Patient Case Presenters: Dr. Gatamongi A. , Sr. Astella A.

Moderator: Dr. Ed Bagasha

Epidemiology

- Neonatal cyanosis is a life-threatening emergency requiring urgent evaluation
- Cyanotic congenital heart diseases often present within the first days of life
- Many affected newborns have subtle signs and may be missed without pulse oximetry screening
- Duct-dependent cardiac lesions are a major cause of early neonatal cyanosis

Risk Factors

- Prolonged rupture/leakage of liquid (PROM) → risk of neonatal sepsis/pneumonia
- Need for resuscitation at birth and delayed initiation of breastfeeding
- Cesarean delivery (risk of Transient Tachypnea of Newborn)
- Congenital heart lesions (especially duct-dependent CHD)
- Hypothermia and poor temperature regulation (worsens oxygen demand)

Clinical features

- **AIRWAY:** Assess patency, suction visible secretions. Consider nasal obstruction causes (e.g., choanal atresia) if cyanosis improves when crying
- **BREATHING:** Tachypnea (e.g., RR >60), signs of increased work of breathing (retractions/grunting). Note that cardiac cyanosis may have minimal distress (“quiet tachypnea”). Mild distress (Silverman-Anderson 1/10), RR 64, no creps/wheeze
- **CIRCULATION:** Central cyanosis (lips/tongue) suggests significant desaturation. Pulse quality, capillary refill, warmth of extremities. Murmur may be present (case: machinery murmur LUSB radiating to back) but can be absent in some cyanotic CHD. Pre/post-ductal saturation pattern helps with ductal shunting physiology
- **EXPOSURE:** Temperature (hypothermia increases oxygen demand). Jaundice (case: onset day 3 of life). Dysmorphic features (none in case), edema (none), hepatosplenomegaly (none)

Diagnostics

- **Pre-ductal and post-ductal SpO₂** (right hand vs foot)
 - Pre 71% and Post 71% (no differential)
- **Hyperoxia response** (100% oxygen):
 - Marked rise → more consistent with respiratory causes
 - Minimal rise → suggests cyanotic CHD/mixing lesion
- **Chest X-ray** (not done in case due to cost) can support lung vs cardiac patterns
- **Echocardiography (definitive in suspected CHD) :**
 - Transposition of Great Arteries (TGA) + PFO with VSD + small PFO + moderate-large PDA (~3 mm)
- **Sepsis and baseline labs:** CBC, electrolytes, RFT/LFT

Treatment

- **Immediate stabilization (ABCs):** keep airway patent, support breathing, maintain circulation
- **Thermal care:** keep baby warm, avoid cold stress and overheating
- **Oxygen therapy:**
 - Use judiciously, improve hypoxia and reduce workload when indicated
 - Avoid indiscriminate high FiO₂ in suspected duct-dependent CHD (may promote ductal closure and worsen some lesions)
- **Respiratory support:** CPAP as needed (case started on CPAP 6 cm H₂O, later weaned to free-flow then room air)

- **If suspected duct-dependent CHD:** initiate/arrange **prostaglandin** (PGE1 where available) to maintain PDA while awaiting definitive care
- **Feeding support:** small frequent feeds, consider NG feeds if tiring/sweating during feeds
- **Infection management:** antibiotics if risk factors/clinical suspicion (case received ampicillin + gentamicin initially due to PROM history, later stopped when markers normal)
- **Definitive cardiac management:** referral to UHI for specialized care (case referred for balloon atrial septostomy)

Complications

- Hypoxic injury (neurologic damage), apnea, cardiorespiratory collapse
- Heart failure (especially with increased pulmonary blood flow lesions)
- Pulmonary edema/worsening respiratory distress
- Sepsis (if underlying infection risk)
- Poor feeding, failure to thrive, dehydration/electrolyte imbalance

Disposition

- **Urgent referral:** If persistent central cyanosis, low saturations (<90% concerning), poor response to oxygen, suspected cyanotic CHD, shock, severe distress, or abnormal pre/post-ductal pattern
- Coordinate referral with receiving center (pre-referral call), stabilize before transport
- At higher level: echo confirmation, targeted therapy, interventional/surgical planning (e.g., UHI services)

Special Notes

- **Pattern clues matter:**
 - Differential cyanosis (legs more blue than arms) can suggest right-to-left ductal shunt (e.g., PPHN physiology)
 - Reverse differential cyanosis can occur in specific CHD physiology (e.g., TGA + PPHN)
- **Paradoxical cyanosis:** worse at rest/feeding but improves with crying → think **choanal atresia** (obligate nasal breathing)
- **Pulse oximetry screening before discharge** (right hand + foot):
 - SpO₂ >95% and ≤3% difference is reassuring
 - Any SpO₂ <90% or a concerning difference warrants evaluation/referral
- Nursing care is central: vigilant monitoring, documentation, clustering care, infection prevention, and parent counseling significantly improve outcomes.

Collaborating Partners

1. [Ministry of Health of the Republic of Uganda](#)
2. [Seed Global Health](#)
3. [Techies Without Borders](#)

References

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