

Apnea, Hypoxia, & Respiratory Distress

HIVE Talk, Feb 9 & 13 2022

Basic Definitions

1 | Apnea

PRIMARY:

- Receivers with stimulation
- Short lived

SECONDARY

- More severe, no stimulation helps

2 | Hypoxia

Deprivation of oxygen from circulation and tissues

- **ACIDOSIS:** toxic deprivation, causing cellular change
- **ASPHYXIA:** suffocation

3 | Respiratory Distress

Able to breathe, but struggling

- Grunting
- Work of Breathing
- Respiratory Distress Syndrome

What Causes Hypoxia in Adults?

1. Allergic Reactions

Restricted airway due to physical inflammation to an exposure (think: antibiotic administration)

2. Environmental Factors

Smoke, Chemicals, Restricted Breathing due to limited oxygen in air

3. Airway Obstruction

Choking on an object

4. Panic Attacks

Hyperventilation

What are the risks of adult Hypoxia?

- Damage to circulation & tissues to adult
- Restricted circulation to placenta & fetus
- Asphyxia
- Death of adult & fetus

How do we respond to Adult Hypoxia?

1. Allergic Reactions

- a. Remove aggravating substance, if possible
- b. Administer Benadryl (IM) if possible
- c. Administer Epinephrine (IM) if needed
- d. Start CPR if no breathing
- e. Consider IV fluids main line running freely, oxygen, transport to hospital for monitoring

2. Airway Obstruction

- a. Encourage Coughing, Offer Heimlich
- b. Administer CPR if no breathing - focus on chest compressions and check mouth for object
- c. Get HELP!

3. Environmental Factors

4. Panic Attacks

What Causes Hypoxia in Neonates?

1. **Restricted Oxygen flow through Cord/Placenta**

Often as a result of labour contractions, especially if placental insufficiency

2. **Obstruction in lungs**

Thick meconium, abundant amniotic fluid

3. **Secondary Respiratory Distress**

Grunting, RSV, Infection, Lungs not Clearing

4. **Rare Causes**

Transition on SSRIs, Pneumothorax

Fetal/Neonatal Self-Preservation

When choices must be made, baby will preserve brain and heart function over all else

Hypoxia can lead to tissue damage after 6+ minutes of oxygen deprivation

Table 1-1. Transition From Fetal to Neonatal Respiration

Change at Birth	Result
The baby breathes. The umbilical cord is clamped, separating the placenta from the baby.	The newborn uses the lungs, instead of the placenta, for gas exchange.
Fluid in the alveoli is absorbed.	Air replaces fluid in the alveoli. Oxygen moves from the alveoli into the pulmonary blood vessels and CO ₂ moves into the alveoli to be exhaled.
Air in the alveoli causes blood vessels in the lung to dilate.	Pulmonary blood flow increases and the ductus arteriosus gradually constricts.

How do we know that a
baby needs attention d/t
hypoxia?

Visual Assessment and Response

In any setting

Is baby TERM? TONE?
BREATHING/CRYING?

Response to initial stimulation

APGAR scores

- Colour
 - Tone
 - Respirations
 - HR
 - Grimace
-

Fetal Scalp Lactate

A hospital procedure

Small cone placed against fetal scalp, small sample of blood taken for point-of-care (bedside) assessment

If the Lactate result is...	Action
Less than (<) 4.2 mmol/L	Normal, no action required Continue to monitor EFM
4.2-4.8 mmol/L	Repeat lactate testing within 30 minutes
Greater than (>) 4.8 mmol/L	Delivery is indicated

Neonatal Cord Blood Gases

A hospital procedure

Retrospective Look : Liability & Future Care



TABLE 1 Normal values for fetal umbilical cord gases^{6,7}

	Umbilical artery	Umbilical vein
pH	7.18–7.38	7.25–7.45
P _O ₂	5.6–30.4 mm Hg	17.4–41.0 mm Hg
P _{CO} ₂	32.4–66.0 mm Hg	27.0–49.4 mm Hg
BD _{ECF} , mean (SD)	4.79 (3.46) mmol/L	~4.0 (3.5) mmol/L

Ranges based on mean \pm 2 SD.

What does Neonatal Hypoxia look like?



5-10%

Babies will need a form of resuscitation after birth

NRP

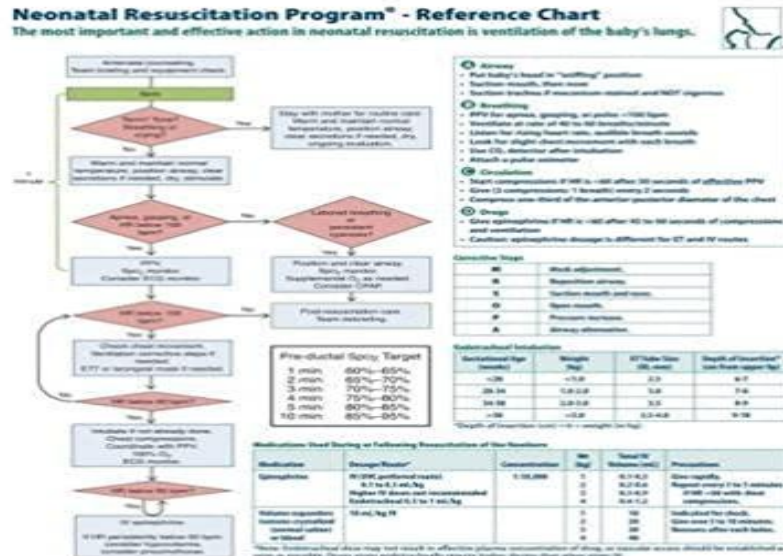
Neonatal Resuscitation Program

Established program, flow charts re: neonatal resuscitation

Designed for a hospital setting, some OOH teachers have adapted to our setting

Essential skill for all apprentices and Midwives

Recommend re-cert annually



NRP Basics

Absolute Essentials

- Indications for PPV
 - Rhythm & HR checks for PPV
 - MRSOPA
 - Chest Compressions
 - Rhythm & HR checks for CC
 - Alternate airways at home?
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NRP Tips

Based on module questions,
adapted OOH practices

- Mouth to Mouth
 - Inflation Breaths
 - Maintaining Temperature
 - Different Mask Seals
 - CPAP at home
 - 1-person PPV&Chest Comp
 - Alternate Airways
 - Audible FHR (doppler)
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Secondary Respiratory Distress

After Birth

- Grunting
- Nasal Flaring
- Work of breathing
- Retractions, Wheezing, Efforts to take breaths
- TTN, MAS, Infection, Cardiac Defects
- CPAP, Transport

Postpartum (24+ Hrs)

- Work of breathing
- Retractions, Wheezing, Efforts to take breaths, Acrocyanosis
- RSV, Cardiac Defects
- Infection
- Urgent Assessment

Scenario 1:

Adult Hypoxia

You are working with a client at home and they are in labour. This client elected to swab for GBS in their pregnancy, and were positive. They elected to have IV antibiotics in labour, and you are using ampicillin. About 20 minutes after the first administration of ampicillin, they say their throat feels scratchy and dry, and tingling in their hands and face. They start to itch all over, and start drawing deep breaths involuntarily.

Scenario 2:

Fetal Hypoxia

Your client is in labour, and is coping well. Fluids are meconium stained and they request a cervical exam when you arrived - it revealed 6cm. You listen with a fetal doppler after a contraction and hear the FHR drop to 80, and take about 45 seconds to recover. You listen after the next contraction, and hear the same thing. After a position change, the repetitive decelerations do NOT resolve.

Scenario 3:

Neonatal Hypoxia

A baby is born at home to a healthy multip. Fluids were clear at birth, no risk factors were present, and FHR were normal throughout the labour. At the time of birth, baby is limp, pale, and makes no efforts towards breathing. After initial stimulation baby makes a weak grimace, but does not let out a clear cry. You estimate FHR at 100 when feeling the cord pulse.

Scenario 4:

Secondary Respiratory Distress

A baby was born at home through meconium stained fluids about 30 minutes ago. APGARS were 9 & 9 (points off for acrocyanosis). Now, you notice nasal flaring and grunting. BAby does not appear to be working hard to breathe, but is grunting with every breath. On gentle stimulation, baby does not let out a big cry.

Scenario 5:

Secondary Respiratory Distress

You are called to the house of a parent whose baby is 2 weeks old. The report baby seems to be having a hard time breathing but “maybe it’s just congestion”. On assessment, lungs sound wet, indrawing around ribs is present on almost every breath, and RR is about 70. When you listen to heart sounds, they sound “swishy” like lung sounds.
