Newborn Assessment and Resuscitation

PALS Newborn Chapter
Newborn Resuscitation

EMC 420: Maternal & Child Emergency Care
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Objectives

This lecture will enable you to:

- Triage and identification conditions that predispose the newborn to the need for intervention, including cardiopulmonary resuscitation
- Proper management of the environment
- Proper timing and selection of NR equipment
- Rapid newborn assessment
- Differentiate the apnic conditions: primary apnea and secondary apnea

Objectives , cont.

This lecture will also enable you to describe:

- NR algorithms
- High risk OB patient
- Indications for intubation
- Algorithm for management of meconium
- Indications for chest compressions
- Indications for drug therapy
- Post resuscitation respiratory problems
- Indications for $D_{10}W$ IV therapy

Core Concepts and Skills

- Quick "across the room" assessment
  - Color / pink
  - Cry / respiratory effort
  - Muscle tone
  - Size / term
  - Meconium
- Airway and environment: assess and manage
- Prevent radiant heat loss
- Ventilation and oxygenation: adequate support
- Cardiac output : assess and manage
- Drugs: assess the need for epinephrine; for $D_{10}W$

The Major Concept of the NRP

- The most important and effective intervention in newborn resuscitation:
  - Ventilation and O_2

Differentiating Apnic Conditions

- Apnea
  - Respiratory arrest
  - "$\geq$ 20 seconds" [does not apply in the newborn]
- Primary apnea
  - "Struggling"
  - Newborn <u>will</u> respond (favorably) to stimulation
- Secondary apnea
  - "Dying"
  - Newborn does <u>NOT</u> respond to simple stimulation

Primary Apnea vs Secondary Apnea

- Primary apnea
  - responds to stimulation
  - RR: poor, decreasing, then absent
  - HR: decreasing
  - BP: normal
- Secondary apnea
  - Does NOT respond to simple stimulation
  - RR: absent
  - HR: decreased
  - BP: decreased
  - Dying: do something NOW !

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Effective Triage

- Ideal location for problem delivery to occur:
  - Delivery room
- For immanent delivery, ideal ambulance temperature
  - 98.6
- Avoid delays in the field,
  - Especially in the high risk mother

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Prehospital OB Concerns
("Bad Risk Moms")

B leeding - Hemorrhage and/or hypotension
A ge > 35 yr.
D iabetes

R upture of membranes (prolonged labor)
I nadequate prenatal care
S ize or number problem
- preterm
- multiple

K ocaine - and cocaine-like states: ***hypertension***

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Prehospital OB Concerns

M econium staining
O n cord compression and
Other : Infection, Fetal distress
M aternal drugs
M orphine
O piates
M agnesium OD

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Additional Intrapartum Risks

Expect a depressed or asphyxiated newborn if:
- Abnormal fetal heart tones
- Malodorous amniotic fluid
- Precipitous delivery
- Profuse Bleeding

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Assignments

- Team leader — Airway
- 2nd member — Pulse check, Compressions
- 3rd member — Medications, IV, equipment

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Inverted Pyramid

Quick look assessment Warming Drying
Positioning Suctioning Stimulating
O2 (as necessary)
Evaluate: Resp HR color
PPV by BVM *
Chest *
Compressions
Drugs *

* Intubation can be done at several steps

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Indications for BVM

- Apnea or gasping, ineffective respirations
- HR less than 100
- Cyanosis
  - that persists after 100% blow by O2

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Ventilation of the Newborn

- With the BVM and 100% O2 squeeze the resuscitation bag:
  - 40 to 60 breaths per minute
- Signs of adequate ventilation
  - Chest rises bilaterally
  - Breath sounds bilaterally
  - Improved HR, color [and tone]

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CPR and Intubation

HR less than 60
- Intubation
  - may be considered at several steps
- Chest compressions

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Indications for Intubation

- If HR less than 60 and not responding to BVM
- If BVM / PPV will be prolonged
- If thick meconium in a non vigorous newborn

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Indications for Intubation in the Presence of Meconium

- In a non vigorous baby (with no airway)
  - In the non vigorous newborn, suctioning of thick meconium via the ET may be necessary to open the airway
- In a vigorous (already crying) baby, the outcome is ***not*** improved with intubation and suctioning

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Indications for Chest Compressions

After 30 seconds of effective ventilation
- HR less than 60
- HR less than 60 - 80, and not responding to BVM

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Chest Compressions

After 30 seconds of effective ventilation, then
- 3 : 1 compressions (3) : breaths(1)
  - Administered at a "rate of 120," in order to deliver the desired HR of at least 90 / min
  - 120 "events" per minute
    - 90 compressions
    - 30 breaths
- Out loud: " 1 and 2 and 3 and breath and 1…"

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Chest Compressions

After 30 seconds of effective ventilation, and chest compressions then:
- If HR greater than 60 [PALS 80]
  - Stop compressions
  - Continue BVM
    - 40 - 60 breaths
- If HR greater than 60
  - Drugs
    - epi

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Epinephrine Indications

- If HR : 0
  or
- If after 30 seconds of effective ventilation, and another 30 seconds of chest compressions :
  - HR still less than 60 (after 60 sec)

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Epinephrine Dose

- 0.1 to 0.3 mL/kg [which is 0.01- 0.03mg/kg] of 1 : 10,000 solution
- As quickly as possible
  - ET
  - [PALS - IO]
  - IV
    - Umbilical vein [if local protocol permits]
- Repeat Q 5 min as needed
- Consider ET 1.0 mL/kg 1:10,000 (0.1 to 0.3 mL/kg of 1 : 1,000 [old PALS])
  - Concerns: endotracheal route may not result in as effective a level of epinephrine as does the intravenous route; however, the data are insufficient to recommend a higher dose via the endotracheal route (*Circulation*. 1999;99:1927-1938; *Pediatrics* 2006; 117(5): 978-88)

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Other Drugs

- For volume expansion
  - NS ***10*** mL / kg , over ***10*** minutes
    (not the usual 20 mL/kg)
- For maternal narcotics (within 4 hr prior to delivery)
  - naloxone
    - 0.1 mg / kg ET, IM, SQ, IV*
    - * umbilical vein [if local protocol permits]
      - 2 A / 1 V

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Other Drugs

- Bicarbonate
  - No ! There is no evidence of benefit
    - May injure brain and myocardium
  - Only after (long after) adequate ventilation
  - Only into large vein *
  - Not through ET tube

* umbilical vein [if local protocol permits]

Post Resuscitation

- Sudden deterioration
  - Airway / Breathing
  - "DOPE"
    - **D** isplaced ET tube
    - **O** structed ET tube
    - **P** neumothorax
    - **E** quipment failure
      - Inadequate ventilation
      - Gastric distension

Post Resuscitation

- Temperature regulation
- For documented hypoglycemia [< 40 mg/dl*]
  - $D_{10}W$ (2-5 mL/kg)
  - Large vein **

* < 25; or < 40 and symptomatic (which a resuscitation would be)
** umbilical vein [if local protocol permits]

Indications for $D_{10}W$ IV Therapy

- Glucose test strip: < 25 , with or without symptoms
- Glucose test strip: 25 – 40 , if (2) :
  - If after feeding
  - If symptoms* are present

* Signs and symptoms can be very vague :
- lethargy ; irritability ; jittery
- poor feeding ; emesis
- tachycardia ; pallor

Inverted Pyramid

Quick look assessment Warming Drying
Positioning Suctioning Stimulating
O2 (as necessary)
Evaluate Resp HR color
PPV by BVM *
Chest *
Compressions
Drugs *

* Intubation can be done at several steps

Summary

In this lecture we have discussed:

- An intro to NR algorithms: BVM, BVM, BVM
- The inverted pyramid concept
  - Using this concept in management NR algorithms,
  - Predicting likelihood of each step being needed, and
  - Predicting prognosis
- Cadence of CPR: " 1 and 2 and 3 and breath and 1…"
- In management of meconium, a vigorous baby's outcome is ***not*** improved with intubation and suctioning