Neonatal Resuscitation Program Overview

Lesson 1 - Overview and Principles of Resuscitation

How often is Neonate Resuscitation needed?

- Approximately 10% of all newborns require some assistance to begin breathing at birth and about 1% will need extensive resuscitative measures.
- Careful examination of risk factors may not identify all babies at risk for resuscitation.
- Keep in mind that all newborns require initial assessment to determine whether resuscitation is required.

At every delivery, you should anticipate the need for advanced resuscitation and be prepared and present at the hospital. For this reason, every birth should be attended by at least 1 person skilled in neonatal resuscitation whose only responsibility is the management of the newborn.

3 questions should be asked to help decide the need of resuscitation:

- Is the baby term?
- Is the baby breathing and crying?
- Does the baby have good muscle tone?

If the answer is “no” to any of the above, be ready for resuscitation.

When resuscitation is needed, get help:

- 1 skilled person is required of all deliveries
- 2 skilled people are required for high risk deliveries.
- When twins are expected 4 skilled people are required.

Fetal Oxygen Depravation

When a fetus/newborn becomes deprived of oxygen, the following happens (in this order):

1. Rapid breathing followed by:
2. Primary Apnea

a. Can be resolved by tactile stimulation** 3. Secondary Apnea

1. Decreased heart rate and blood pressure
2. Cannot be resolved by tactile stimulation
3. Secondary apnea requires PPV (Positive Pressure Ventilation) to initial spontaneous breathing. When breathing is corrected, the heart rate will usually improve rapidly.**

The most important resuscitative action is effective ventilation of the newborns lungs. Air that fills that alveoli contains 21% oxygen, and causes the pulmonary arterioles to relax so that oxygen can be absorbed from the alveoli and distributed to all organs**

Resuscitation Basics:

Initial Resuscitation:

- Provide warmth
- Position the head and clear the airway
- Dry and stimulate the baby to breathe
- Evaluate respiration.

  If the baby is apneic or has a heart rate less than 100 bpm:

- Start PPV
- Apply an oximeter probe on the baby's right hand for pre-ductile saturation.

  If the baby has a heart rate less than 60 bpm:**

Begin chest compressions with coordinated PPV; Difficulties can occur in the transition because of inadequate ventilation and poor respiratory effort.

The three signs of effective resuscitation are as follows:

1. Spontaneous respirations
2. Increase in heart rate
3. Increase in oxygen saturations

Premature Baby Challenges:

Premature babies (born in less than 37 weeks) can present unique challenges:

- Fragile brain capillaries that bleed easily.
- Lungs deficient in surfactant making ventilation more difficult.
- Poor temperature control leading to hypothermia.

Higher risk of infection

Lesson II - Initial Steps in Resuscitation

Initial Resuscitation:

1. Begin the initial steps of resuscitation by asking yourself:
    1. Is the infant term?
    2. Is the infant breathing?
    3. Does the infant have good muscle tone?
2. Check for meconium in the amniotic fluid
   a. Meconium is a dark greenish mass of desquamated cells, mucus, and bile that accumulates in the bowel of a fetus and is typically discharged shortly after birth
   b. If meconium is present,
        i. If the infant is vigorous (good muscle tone, strong respiratory effort, and heart rate greater than 100 bpm) clear the secretions with bulb syringe from the mouth and nose immediately and continue with resuscitation.**

        ii. If the infant is not vigorous, the infant's trachea needs to be suctioned.

            1. If suction is needed to clear the oropharynx of meconium prior to inserting an ET (endotracheal tube) use a size 12-14F catheter.

3. Open airway by placing the infant in the sniffing position and if needed suction with a bulb syringe - mouth first, nose second.
4. Provide tactile stimulation by slapping the soles of the feet or gently (not vigorously) rubbing the back
5. If the Infant does not immediately respond, Proceed to PPV with FiO2 at 21%. (FiO2 is the fraction of inspired oxygen)

6. Place oximeter probe on the right hand for pre-ductile saturations. The oximeter will provide you with a minute by minute saturation.

    1. Do not expect the saturation to be greater than 60% initially.
    2. It will take at least 10 minutes for healthy newborns to increase their saturations to >90%.
    3. Pre-ductile saturation are
        i. Target pre-ductile sats are as follows:**
        ii. 1 min. = 60-65%
        iii. 2 min. = 65-70%
        iv. 3 min. = 70-75%
        v. 4 min. = 75-80%
        vi. 5 min. = 80-85%
        vii. 10 min. = 85-95%
7. Check the heart rate by counting the beats in 6 seconds and multiply by 10.
8. If the heart rate is less than 60 bpm, begin chest compressions.**

After completing the initial steps of providing warmth, positioning the infant in the sniffing position, clearing the airway and evaluate the infant's response with the following:

- Respirations with good chest movement.
    - Gasping respirations are ineffective and require PPV.
- Heart rate should be greater than 100 bpm
- Color - the infant should have pink lips and a pink trunk.
    - There should not be central cyanosis which indicates hypoxemia.
    - If central cyanosis exist, free-flow supplemental oxygen or CPAP(continuous positive airway pressure) is required.

Supplemental Oxygen and Pulse Oximetry:

O_2 be provided in the following ways:

- Holding the oxygen tubing cupped closely over the infants mouth and nose.
- Closely hold the mask of a flow-inflating bag or T-piece resuscitator over the infant's mouth and nose.**
- If supplemental oxygen is required for longer than a few minutes, the oxygen needs to be heated and humidified.**

    Use a pulse oximeter when:

    - Resuscitation is anticipated
    - PPV is required for more than a few minutes
    - Central cyanosis is present.
    - Supplemental oxygen is administered.

Lesson III - Use of Resuscitation Devices for Positive Pressure Ventilation:

Effective Ventilation:

The single most important step in Neonate Resuscitation

Is your ventilation effective?

Effective ventilation causes:

1. The presence of bilateral breath sounds
2. Chest movement with each bag mask ventilation
3. An increasing heart rate

When should you begin PPV?**

- Apnea or gasping
- Heart rate of less than 100 bpm even if breathing
- Persistent central cyanosis
- Low SpO2 despite free-flowing oxygen

The most important indicator of successful PPV is a heart rate that is rising.**

If PPV is effective the following are the indicators:

- Heart rate rises over 100 bpm**
- Improvement of oxygen saturation
- Sustained spontaneous respirations**

If there are no audible bilateral breath sounds and you see no rise and fall of the chest intervention is required. To correct inadequate ventilation use the pneumonic MR SOPA** to determine interventions that may be helpful:

M = Mask adjustment
R = Reposition the airway
S = Suction the mouth and nose O = Open the mouth
P = Pressure increase
A = Airway alternative

If the infant does not improve with your ventilatory resuscitation effort, MR SOPA is always your first priority.

The AAP recommends resuscitation of newborns may begin with room air PPV.

- Resuscitation of preterm newborns may begin with slightly higher oxygen concentration.

- Pulse oximetry is used to help adjust the amount of supplemental oxygen to avoid giving too much or too little oxygen concentration.

  While one person is doing PPV, a second member should be

- Applying the pulse oximeter probe to the right hand (pre-ductal saturations)
- Listening for the rise in heart rate
- Watching for rising oxygen saturation

  To provide a varying degree of FiO2, a blender connected to the ventilation device is required.** If an oxygen blender is not available, start PPV with 21% oxygen (room air) while you obtain an air-oxygen source and oximeter. Using a pulse oximeter, supplemental oxygen concentration should be adjusted to achieve the target values for pre-ductal saturations:

  1 min. = 60-65% 3 min. = 70-75% 5 min. = 80-85% 2 min. = 65-70% 4 min. = 75-80% 10 min. = 85-95%

Ventilations:

Rate: 40-60 breaths per minute**

Do not over inflate the lungs which may result in pneumothorax.

Pressure: The initial pressure should be 20 cm.

Orogastric Tubes:

- Providing positive pressure ventilation for greater than a few minutes requires the insertion of an orogastric tube.
- The orogastric tube needs to be inserted from: the distance from the bridge of nose to the ear, and then half way between the umbilicus and the xyphoid process.

There are three types of resuscitative devices:

1. Flow-inflating bags
2. Self-inflating bags
3. T-piece Resuscitators

Flow-inflating bags:

- Fill only when gas from a compressed source flows into it.
- Are dependent of an oxygen source
- Must have a tight mask-to-face seal to inflate
- Have a flow-control valve to regulate the pressure.
- Looks like a deflated balloon when not in use.
- Can be used to administer free-flow oxygen and CPAP

(Continuous positive airway pressure)

Flow-inflating bag will not work if:

- The bag is not properly sealed over the newborns nose and mouth.
- There is a hole in the bag.
- The flow-control valve is open too far.
- The pressure gauge is missing.

Self-inflating bags:

- Fill spontaneously after they are squeezed.
- Remain inflated at all times.
- Must have a tight mask-to-face to inflate the lungs.
- Can deliver PPV without a compressed gas source but must be connected to a gas source to deliver supplemental oxygen.
- Cannot be used to deliver free flow oxygen or CPAP.
- Must have an oxygen reservoir attached to deliver high concentrations of oxygen.
- Without the reservoir, the bag delivers a maximum of only about 40% oxygen which may be insufficient for resuscitation.

T-piece resuscitators:

- Allow consistent pressure when ventilating.
- Depend on a compressed gas source.
- Must have a tight seal mask-to-face to inflate the lungs.
- Require selection of a maximum pressure, peak inspiratory pressure (PIP) and positive end expiratory pressure (PEEP).
- May require adjustment of PEEP during resuscitation to achieve physiologic improvement.
- Provide PPV when the operator alternately occludes and opens the PEEP cap.
- Can be used to deliver free-flow oxygen or CPAP.
- Have a built in safety feature - Pressure Gauge and Pressure Relief Control Valve.

Review:

For an apneic infant:

1. Provide PPV
2. Apply an oximeter
3. Check for rising heart rate
4. Watch for rising O2 saturation

Lessons IV & V - Chest Compressions and Intubation:

How do chest compressions work?

The heart lies in the chest between the lower third of the sternum and the spine. Compressing the sternum compresses the heart against the spine and increases the pressure in the chest causing the blood to be circulated to the vital organs.

The following are the guidelines for providing chest compressions:

- Always provide PPV for 30 seconds and then check the heart rate. Give 30 breaths and 90 compressions in a minute's time.**
- Chest compressions are indicated when the heart rate remains less than 60 beats per minute (bpm) despite 30 seconds of effective PPV to circulate blood to the vital organs.**
- Once the HR is below 60 bpm the oximeter may not work. You should increase the oxygen concentration to 100% until return of the oximeter reading. Once the oximeter is reading, then adjust FiO according to the pre-ductal saturations.

  Acceptable techniques for providing chest compressions: the two finger technique and the encircling thumbs technique. The encircling thumbs technique is preferred this technique may be superior in generating peak systolic and coronary artery perfusion pressure.**
  .

2 Finger CPR Hand Placement

Chest compressions should be: 2 Rescuer Encircling Thumbs Technique

2 Rescuer Encircling Thumbs Technique

- Applied to the lower third of the sternum, which lies between the xyphoid process and a line drawn between the nipples. (One finger's width below the nipple line.)
- Given to a depth of one third the distance from the anterior to the posterior of the infant's chest.
- Coordinated by the compressor counting out-loud "One-and-Two-and-Three-and-Breath-and-One..."
- Allowed to have full recoil of the chest during the relaxation phase.
- Performed with the thumbs or fingers, remaining in the contact with the chest at all imes, performed with the downward stroke being shorter than the release.
- Well-coordinated with PPV including supplemental oxygen.
- Given for 45-60 seconds before pausing to reassess.

If the heart rate is greater than (>) 60 bpm:

- Discontinue chest compressions and continue ventilations at 40-60 ventilation/min**
- Discontinue chest compressions and gradually discontinue ventilation if the infant is breathing spontaneously.

If the heart rate is less than (<) 60 bpm:

- Consider intubation if not already done. Intubation provides a more reliable method of ventilations.
- Give epinephrine, preferably intravenously with an emergent UVC line. Complications of chest compressions include fractured ribs and injury to the liver.

Neonatal Intubation

What situations is intubation with an ETT indicated?

- To suction the trachea in the presence of meconium when the newborn is not vigorous.
- To improve efficacy of ventilation if mask ventilation is ineffective.
- To improve efficacy of ventilation if mask ventilation is required for more than a few minutes.
- To facilitate coordination of chest compressions and ventilation and to maximize the efficiency of each ventilation.
- To improve ventilation in special conditions, such as extreme prematurity, surfactant administration, ineffective ventilations or suspected diaphragmatic hernia.

How to prepare for intubation:

1. Select the proper size laryngoscopy blade
    1. #1 is used for term infants (>37 weeks but <40 weeks).
    2. #0 blade is used for preterm infants (<37 weeks).**
    3. #00 blade is used for extremely preterm infants.
    4. Straight, rather than curved, blades are preferred.
2. Select the proper size endotracheal tube (ETT)
    1. 2.5mm ET - for the infant less than 1,000 grams (<1kg)- below 28 weeks.
    2. 3.0mm ET - for the infant that is 1,000-2,000 grams (1-2kg) - between 28-34 weeks.
    3. 3.5mm ET - for the infant that is 2,000-3,000 (2-3 kg) grams - between 34-38 weeks.
    d. 3.5-4.0 ET - for infants above 3,000 grams (>3.5-4.0 kg) - above 38 weeks.

3. Calculate the proper depth of ETT insertion.

a. Insertion depth is (The weight of the infant in kg +6) i. 1kg+6=7cmdepth

ii. 2kg + 6 = 8cm depth
iii. 3kg + 6 = 9cm depth

Intubation Steps:

1. Only trained personal should attempt endotracheal intubation**
2. Position and oxygenate the infant for intubation
    1. Stabilize the head in the sniffing position
    2. Provide free flow oxygen during intubation
    3. Lift the laryngoscope rather than rocking.
3. Look for landmarks. The ET tube is inserted into the glottis (The hole between the vocal cords)
4. Insert the tube into the right side of the mouth with the curve of the tube lying on the horizontal plane, so the tube curves from left to right. Slightly withdraw the laryngoscope if the esophagus is visualized.
5. Allow only 30 seconds to complete ET intubation
6. If unsuccessful in 30 seconds discontinue efforts and oxygenate the infant with PPV.

Successful intubation indicators are:

- Improved vital signs (HR, color/oximeter and activity)
- Vapor in the tube when the stylet is withdrawn
- No epigastric gurgling with bag/mask ventilation
- Bilateral breath sounds with bag/mask ventilations
- CO2 detector indicates the presence of CO (color change from purple to golden/yellow)
- Direct visualization
- Chest x-ray if the tube will be left in place

Laryngeal Mask Airway (LMA)

The laryngeal mask airway is considered an acceptable means of intubating an infant. LMAs can be helpful when an infant present with the following situations:

- Congenital anomalies involving the mouth, lip or palate, that make achieving a good seal with bag and mask difficult.
- Anomalies of the mouth, tongue, pharynx, or neck that make it difficult to visualize the larynx with the laryngoscope.
- When PPV fails to achieve effective ventilations and ET intubation is not possible.

LMA Drawbacks:

- The device cannot be used to suction meconium.
- Stomach cannot be decompressed with orogastric tube (LMA balloon blocks the esophagus)
- Current LMAs are too large for premature infants.
- If you need to use high ventilation pressure, air may leak through an insufficient seal.
- There is insufficient evidence that ventilations with compressions are adequate with the LMA.
- There is insufficient evidence that medications can be delivered with the LMA
- There is insufficient evidence that prolonged assisted ventilations are adequate with the LMA

Lesson VI - Medications

Epinephrine:

Epinephrine increases heart rate and contractility and improves coronary artery pressure. It is the most significant and commonly used drug in neonatal resuscitation.

Indications:

Persistent heart rate less than 60 beats per minute, despite 30 seconds of PPV and followed by an additional 30 seconds of chest compression

Route:

Persistent heart rate less than 60 beats per minute, despite 30 seconds of PPV and followed by an additional 30 seconds of chest compressions.**

ET or IV through an Umbilical Venous Catheter

The intravascular route is recommended as the best choice. Allow 60 seconds before rechecking the heart rate (HR).

Concentration:

1:10,000 The route of epinephrine is preferably UVC, but can be given via ETT while preparing for UVC placement.

Dosage:

- 0.1 to 0.3 ml/kg for the IV route
- 0.5 to 1.0 ml/kg for the ETT route
- Epinephrine should be administered rapidly.
- For the test, you will need to calculate doses.

Volume Expanders:

Often infants will be born hypovolemic and will not respond to adequate ventilation and cardiac compressions. Babies who are hypovolemic may appear pale and have weak pulses. They also may have persistently low heart rate.

Hypovolemia signs:**

- Pale skin color
- Weak pulse

- Persistently low pulse rate
- No improvement in circulation despite resuscitation effort.

Indications:

See signs of hypovolemia.

Acceptable solutions:

- Normal Saline (0.9% NaCl)
- Ringers Lactate
- Type O Rh-negative packed red blood cells

Route:

- IV through an Umbilical Venous Catheter
- (Insert the UVC in the large vessel and just far enough to get blood return).

Dosage:

- 10ml/kg of body weight.
- Volume expanders are given slowly - over 5-10 minutes**

Example Dosages:

- 2.5kg = 25ml
- 3.0kg = 30ml
- 3.2kg = 32ml
- 3.8kg = 38ml

Lesson VII - Special Considerations

Special situations may occur that can complicate resuscitation. Ongoing problems can also occur after initial resuscitation. They are as follows:

Dislodged or Misplaced ET tube:

Infant is not improving after ET intubation may be an indication of wrong position of the ET tube.

- Check and reposition ET tube.

Choanal Atresia:

Choanal Atresia which is a nasal airway that did not form properly.
- Rule out by placing a nasal airway or suction catheter through the nares.

Scaphoid Abdomen:

Infants with congenital diaphragmatic hernia have scaphoid abdomens because abdominal organs have herniated up and into the chest.

- Do not resuscitate with PPV.
- Intubate immediately and place an orogastric tube to keep air out of the stomach which may be in the chest cavity.

Pneumothorax:

Unequal breath sounds may be an indication of pneumothorax

- Detect with transillumination of the chest
- Treat with needle decompression. (Place the infant with the affected side superior prior to needle decompression)

 If meconium-stained infant has been resuscitated and then develops acute deterioration, a pneumothorax should be suspected.

The risk is increased with PPV.

Maternal Narcotic Administration:

Maternal narcotic administration prior to birth may cause the infant not to breathe.**

- Immediately provide PPV to maintain a heart rate >100 bpm and then consider administration of naloxone (Narcan) to the infant

- Other drugs given to the mother prior to delivery can depress respirations such as magnesium sulfate.
- Drugs that may have been given through the epidural route may also cause depressed respirations.

Pulmonary Hypoplasia:

Pulmonary Hypoplasia is poorly developed lungs and high inflation pressures will be required to provide adequate ventilation.**

- Severe pulmonary hypoplasia usually is incompatible with survival.

Pulmonary Hypertension:

Pulmonary Hypertension can occur when hypoxemia causes pulmonary constriction. - Provide oxygen to cause blood vessels to relax.

Hypoglycemia:

- Hypoglycemia may occur because energy stores are consumed faster in the absence of oxygen
- Blood glucose levels may drop below normal.

Hypovolemia:

Infants who have been resuscitated may have kidney damage and are likely to need less fluid after resuscitation.

Mechanical Ventilation:

If an infant with mechanical ventilation support develops bradycardia and severe desaturation, you should assess and establish adequate ventilation.

Hypothermia:

Hypothermia may be injurious to the baby.**

o Closely monitor and manage oxygenation, blood pressure, fluid status, respiratory effort, blood glucose, nutritional issues, and temperature.

Therapeutic hypothermia following perinatal asphyxia should be:

- Used only for babies >36 weeks gestation
- Initiated before 6 hours after birth
- Used only in centers with specialized programs
- An infant who has been resuscitated and now has brain damage.

Lesson VIII - Resuscitation of Preterm Infants

Preterm infants are defined as infants born less than 37 weeks gestation. When birth occurs before term, there are numerous additional challenges that the fetus must overcome. The likelihood that the preterm baby will need your help becomes greater as the degree of prematurity increases.

Preterm Risk Factors:

- Easily become hypothermic
- Tissues are easily damaged from excess oxygen
- Weak muscles make adequate ventilation more difficult
- Lungs are deficient in surfactant
- Immature immune system is vulnerable to infection
- Fragile capillaries in the brain
- Small blood volume
-

Preterm Resuscitation Requirements:

Additional personnel

o Including someone with expertise in performing endotracheal intubation and placement of a UVC. Additional means of maintaining body temperature

o Polyethylene bags

o Portable warming pad Compressed air source

Oxygen blender Pulse oximeter

o Premature infants are more vulnerable to hypoxia and therefore, an oxygen blender and oximeter should be used to achieve an oxygen saturation of 85-95% range during and immediately following resuscitation.

When assisting ventilations for a preterm infant:

- Follow the same criteria for initiating PPV as with term infants.
- Consider using CPAP if the baby is breathing spontaneously with a heart rate >100 bpm but has labored respirations or a low oxygen saturation.

o Remember CPAP can be given with a flow-inflating bag or a T-Piece resuscitator.

- Use PPV if the infant is intubated and use the lowest inflation pressure necessary to achieve an adequate response.
- Consider giving prophylactic surfactant.

Decrease the risk of brain injury by:

- Handling the infant gently
- Avoid the Trendelenburg position.

o The best position is table flat.

- Avoid high airway pressures when possible.

- Adjust ventilation gradually based on physical examination, oximeter and blood gas.
- Avoid rapid intravenous fluid boluses and hypertonic solutions. IV fluids should be given slowly.

After resuscitation of a preterm infant:

- Monitor blood sugar
- Monitor the infant for apnea, bradycardia, and/or oxygen desaturation.
- Monitor and control oxygenation and ventilation
- Consider delaying feeding or initiating feeds cautiously if perinatal compromise was significant.
  Have a high level of suspicion for infection.

Lesson IX - Ethical Considerations

The ethical principles of Neonatal Resuscitation are no different from those of any other child or adult. They are as follows:

- Ethical and current national legal principles now mandate attempted resuscitation in all circumstances.
- You may want to talk to the parents about the implication of delivery at early gestational age. “Dating” gestational age is accurate within 3-5 days if applied within the first trimester.
- You may want to consult the morbidity and mortality statistics with web-based National Institute of Child Health and Human Development Outcomes.
- Withdrawal of critical care interventions and further institution of comfort care are acceptable if there is an agreement by health care professionals and the parents.
- The approach to decisions to resuscitate should be guided by the same principles used for adults and older children.
- Consider that if further resuscitation efforts would be futile, or would merely prolong dying, or would not offer sufficient benefit to justify the burdens imposed, you may want to withhold resuscitation.
- Parents are considered the decision makers for their own babies. To fulfill this role responsibly, they must be given relevant and accurate information about the risk and benefits of each treatment option.
- When gestation, birth weight, and/or congenital anomalies are associated with almost certain death or unacceptable high morbidity, resuscitation is not indicated although exceptions may be reasonable to comply with parents’ wishes.
- In conditions associated with uncertain prognosis, where there is borderline survival and a high rate of morbidity and where the burden of the child is high, parents’ desires regarding initiation of resuscitation should be supported.
- When counseling parents about the birth of babies born at the extremes of prematurity, advise them that decisions made about neonatal management before birth may need to be modified in the delivery room, depending on the condition of the baby at birth and the postnatal gestational age assessment. (Tell them that you will try to support their decision, but must wait until you examine the infant after birth to determine what you will do.)

- Discontinuation of resuscitation efforts should be considered after 10 minutes of absent heart rate.

Factors to take into consideration are as follows:

- Presumed etiology of the arrest.
- The gestational age of the infant.
- The presence or absence of complications.
- The potential of therapeutic hypothermia.
- The parents' previous expressed feeling about acceptable risk and morbidity.

An infant about to be delivered is known to have major congenital malformations. The issues that you should cover with the parents are as follows:

- Review the current obstetric plans and expectations.
- Explain who will be present and their respective roles.
- Explain the statistics and your assessment of the infant's chances for survival and possible disability.

- Determine the parents' wishes and expectations.
- Inform the parents that decisions may need to be modified after you examine the infant.
- If attempts to resuscitate the infant are unsuccessful, explain the situation to the parents and ask if they would like to hold the infant.
- Appropriate responses to parents that their baby just died after an unsuccessful resuscitation are: "I'm sorry your baby died. She/he is a beautiful baby." "I'm sorry, we tried to resuscitate your baby, but the resuscitation was unsuccessful and your baby died."

The four principles of medical ethics that apply to parent and neonates are the following:

1. Beneficence = the act of benefiting others.
2. Non-maleficence = the act of avoiding harm.
3. Autonomy = the act of respecting individuals right to make choices that affect life.
4. Justice = the act of treating others truthfully and fairly.

Clinical Scenario

At the end of the course you will lead a resuscitation team to provide care for an infant. The skills sessions will be conducted in a low stress environment to help you implement the material that you will learn in the skills practice. Please don't stress too much about the skills test. We are here to make you comfortable and to help you learn!

You may not need to assist with intubation or placement of a UVC if that is not within your scope of practice. Contact your employer to determine how many lessons you will need to complete to be proficient.

This is an example of a skills scenario:

A pregnant woman contacts her Obstetrician (OB) after noticing a pronounced decrease in fetal movement at 35 weeks gestation. She is admitted to the labor and delivery unit where persistent fetal bradycardia is noted.

As you enter the delivery room you should start by asking the following:

1. What is the gestational age?
2. Will the delivery be vaginal or C-section?
3. Has the mother had prenatal care?
4. Is there meconium in the amniotic fluid?

Next, call for additional personnel and check the equipment:

- Warmer turned on
- Warmed blankets for drying and stimulating
- Catheter suction set at 80- 100mmHG suction
- Bulb syringe
- Prepared bag/mask with oxygen blender
- Pulse Oximeter
- OG tube
- ET tubes with stylet
- Laryngoscope with #0 and #1 blade □ CO detector
- Syringes for medications
- Epinephrine and NS
- Meconium aspirator
- Scales to weigh the newborn

A 34 week gestational age infant is delivered and estimated to be 3kg.

While being handed the infant by the instructor, you should ask:

1. Is infant breathing?
2. Is the tone good or poor?
3. Is the infant crying?
4. What is the skin color?

The instructor responds: "There is no chest movement."

Next you demonstrate how to stimulate the baby to breathe, including:

- PPV (with appropriate Oconcentration)
- Pulse oximetry (placing probe on right hand)

  There is no rise and fall of the chest

  You then delegate someone to increase the FiO and check an umbilical pulse

There are 5 beats in 6 seconds

You state that the heart rate is 50bpm and start chest compressions and PPV. After 45-60 seconds you delegate someone to check the heart rate.

There are 4 beats in 6 seconds

You tell the instructor the heart rate (40bpm) and delegate intubation and UVC insertion.

ET tube size should be 3.0
Laryngoscope blade size should be size 0

(You will need to be able know which sizes are needed)

Your ETT is inserted. How do you know it is placed properly?

You respond with:

- Is there mist in the tube?
- Are there bilateral breath sounds?
- Did the CO detector turned gold?
- (Answer should be yes to all)

Your UVC is inserted what would you like to do next?

You recheck the heart rate and prepare your epinephrine

You feel 6 beats in 6 seconds

You call for epinephrine administration, determine the dose, and administer the drug.

 Epinephrine (0.1-0.3 ml/kg). The infant is estimated to have a weight of 3kg. The dose

would therefore be 0.3 to 0.9 ml of a 1:10,000 solution.

Next you have someone recheck the heart rate.

There are 9 beats in 6 seconds

You tell your team to discontinue chest compressions and continue PPV. Then, you recheck the heart rate.

The HR is 110bpm

You discontinue PPV and continue monitoring the infant until the instructor ends the scenario.