

Module 8:

**Obstetrics, Infants and
Children**

OBJECTIVES

At the completion of this lesson, the student will be able to:

COGNITIVE OBJECTIVES

- 8-1 Assess and provide care to the obstetric patient
- 8-2 Assist with the delivery of an infant
- 8-3 Assess and provide care to the newborn
- 8-4 Assess and provide care to the mother immediately following delivery of a newborn
 - Identify pre-delivery emergencies.
 - State the steps to assist in the delivery.
 - Discuss the steps in the delivery of the placenta.
 - List the steps in the emergency medical care of the mother post-delivery.
 - Summarize neonatal resuscitation procedures.
 - Describe the procedures for the following abnormal deliveries
- 8-5 Assess and provide care to an ill or injured infant or child with:
 - Respiratory distress
 - Shock (hypoperfusion)
 - Cardiac Arrest
 - Seizures
 - Trauma

AFFECTIVE OBJECTIVES

- 8-6 Explain the rationale for having knowledge and skills appropriate for managing infant and child patients.
- 8-7 Understand the provider's own response (emotional) to caring for infants and children.

PSYCHOMOTOR OBJECTIVE

- 8-8 Demonstrate steps to assist in the normal cephalic delivery.
- 8-9 Demonstrate post delivery care of the infant.
- 8-10 Demonstrate post delivery care of the mother.

PREPARATION

Motivation: Infant and child patients, as well as expectant mothers, often cause anxiety for the prehospital care provider. This is caused by a lack of dealing with this special population as well as a fear of failure. Understanding the special factors involved, such as body size, developmental considerations and normal ranged vital signs of infant and child patients is important in their emergency medical care.

MATERIALS

AV Equipment: Utilize various audio-visual materials relating to infants and children. The continuous design and development of new audio-visual materials relating to EMS requires careful review to determine which best meet the needs of the program. Materials should be edited to assure meeting the objectives of the curriculum.

EMS Equipment: Exam gloves, stethoscope, blood pressure cuff, penlight.

PERSONNEL

Primary Instructor: One EMT-Basic instructor, knowledgeable with childbirth, infants and children.

Assistant Instructor: The instructor to student ratio of 6:1 should be maintained to allow for supervision of psychomotor skill practice. Individuals used as assistant instructors should be knowledgeable in infant and child emergencies.

PRESENTATION

Declarative (What)

1. Reproductive anatomy and physiology
 1. Fetus - developing unborn baby
 2. Uterus - organ in which a fetus grows, responsible for labor and expulsion of infant
 3. Birth Canal - vagina and lower part of the uterus
 4. Placenta - fetal organ through which fetus exchanges nourishment and waste products during pregnancy
 5. Umbilical cord - cord which is an extension of the placenta through which fetus receives nourishment while in the uterus
 6. Amniotic sac (bag of water) - the sac that surrounds the fetus inside the uterus
 7. Vagina - lower part of the birth canal
 8. Perineum - skin area between vagina and anus, commonly torn during delivery.
 9. Crowning - the bulging-out of the vagina which is opening as the fetus' head or presenting part presses against it.
 10. "Bloody Show" - mucus and blood that may come out of the vagina as labor begins.
 11. Labor - the time and process (defined in 3 or 4 stages) beginning with the first uterine muscle contraction until delivery of the placenta
 1. Delivery is imminent
 2. Crowning
 3. In the process of delivering
 12. Presenting Part - the part of the infant/fetus that comes first- usually the head
 13. Abortion - miscarriage - delivery of products of conception early in pregnancy
2. Emergency Medical Care - Predelivery Emergencies
 1. Miscarriage - Spontaneous abortion - emergency medical care

2. Seizure during pregnancy - emergency medical care
 3. Vaginal bleeding - late pregnancy vaginal bleeding, with or without pain.
 4. Trauma - emergency medical care - same as other trauma patients
3. Normal Delivery
 1. Pre-delivery considerations
 1. It is best to transport an expecting mother, unless delivery is expected within a few minutes.
 2. Questions to ask
 1. Are you pregnant?
 2. How long have you been pregnant?
 3. Are there any contractions or pain?
 4. Any bleeding or discharge?
 5. Is crowning occurring with contractions?
 6. What is the frequency and duration of contractions?
 7. Does she feel as if she has to move her bowels?
 8. Does she feel the need to push?
 9. Rock hard abdomen?
 2. Precautions
 1. Use body substance isolation.
 2. Do not touch vaginal areas except during delivery and when your partner is present.
 3. Do not let the mother go to bathroom.
 4. Do not hold mother's legs together.
 5. Recognize your own limitations and transport even if delivery must occur during transport.

If you have committed to deliver a newborn and then delivery does not occur within 10 minutes - transport.
 3. Delivery procedures
 1. Apply gloves, mask, gown, eye protection for infection control precautions.
 2. Have mother lie with knees drawn up and spread apart.
 3. Elevate buttocks - with blankets or pillow.
 4. Create sterile field around vaginal opening with sterile towels or paper barriers.
 5. When the infant's head appears during crowning, place fingers on bony part of skull (not fontanelle or face) and exert very gentle pressure to prevent explosive delivery. Use caution to avoid fontanelle.
 6. If the amniotic sac does not break, or has not broken, use a clamp to puncture the sac and push it away from the infant's head and mouth as they appear.

7. As the infant's head is being born, determine if the umbilical cord is around the infant's neck; slip over the shoulder or clamp, cut and unwrap.
 8. After the infant's head is born, support the head, suction the mouth two or three times and the nostrils. Use caution to avoid contact with the back of the mouth.
 9. As the torso and full body are born, support the infant with both hands.
 10. As the feet are born, grasp the feet.
 11. Wipe blood and mucus from mouth and nose with sterile gauze, suction mouth and nose again.
 12. Wrap infant in a warm blanket and place on its side, head slightly lower than trunk.
 13. Keep infant level with vagina until the cord is cut.
 14. Assign partner to monitor infant and complete initial care of the newborn.
 15. Clamp, tie and cut umbilical cord (between the clamps) as pulsations cease approximately 4 fingers width from infant.
 16. Observe for delivery of placenta while preparing mother and infant for transport.
 17. When delivered, wrap placenta in towel and put in plastic bag; transport placenta to hospital with mother.
 18. Place sterile pad over vaginal opening, lower mother's legs, help her hold them together.
 19. Record time of delivery and transport mother, infant and placenta to hospital.
4. Vaginal bleeding following delivery - A moderate amount of blood loss is expected following delivery and is normally tolerated by the mother.
 1. The EMT-Basic must be aware of this loss so as not to cause undue psychological stress on himself or the new mother.
 2. With excessive blood loss, massage the uterus.
 1. Hand with fingers fully extended.
 2. Place on lower abdomen above pubis.
 3. Massage (knead) over area.
 4. Bleeding continues - check massage technique and transport immediately, providing oxygen and ongoing assessment.
 3. If mother appears in shock (hypoperfusion), or bleeding continues, initiate treatment for shock and immediately transport, maintaining uterine massage en route.
 5. Initial care of the newborn
 1. Position, dry, wipe, and wrap newborn in blanket and cover the head.
 2. Repeat suctioning.
 3. Assessment of infant
 1. Appearance - color: no central (trunk) cyanosis
 2. Pulse - greater than 100/min

3. Grimace
4. Activity
5. Breathing effort
4. Stimulate newborn if not breathing.
 1. Flick soles of feet.
 2. Rub infant's back.

6. Resuscitation of the newborn follows the inverted pyramid - after assessment, if signs and symptoms require either cardiac or pulmonary resuscitation, do the following when appropriate:
 1. Breathing effort - if shallow, slow or absent provide artificial ventilations:
 1. 60/min
 2. Reassess after 30 seconds.
 3. If no improvement, continue artificial ventilations and reassessments.
 2. Heart rate
 1. If less than 100 beats per minute provide artificial ventilations:
 - (1) 60/min
 - (2) Reassess after 30 seconds.
 - (3) If no improvement continue artificial ventilations and reassessments.
 2. If less than 80 beats per minute and not responding to bag-valve-mask, start chest compressions.
 3. If less than 60 beats per minute, start compressions and artificial ventilations.
 3. Color - if central cyanosis is present with spontaneous breathing and an adequate heart rate administer free flow oxygen - administer oxygen (10-15 LPM) using oxygen tubing held as close as possible to the newborns face.

4. Abnormal Deliveries
 1. Prolapsed Cord - condition where the cord presents through the birth canal before delivery of the head; presents a serious emergency which endangers the life of the unborn fetus.
 1. Size up
 2. Initial assessment
 3. Mother should have high flow oxygen.
 4. History and physical exam
 5. Assess baseline vitals.
 6. Treatment based on signs and symptoms.
 7. Position mother with head down or buttocks raised using gravity to lessen pressure in birth canal.
 8. Insert sterile gloved hand into vagina pushing the presenting part of the fetus away from the pulsating cord.
 9. Rapidly transport, keeping pressure on presenting part and monitoring pulsations in the cord.

2. Breech birth presentation - breech presentation occurs when the buttocks or lower extremities are low in the uterus and will be the first part of the fetus delivered.
 1. Newborn at great risk for delivery trauma, prolapsed cord more common, transport immediately upon recognition of breech presentation.
 2. Delivery does not occur within 10 minutes.
 3. Emergency medical care
 1. Immediate rapid transportation upon recognition.
 2. Place mother on oxygen.
 3. Place mother in head down position with pelvis elevated.

3. Limb presentation - occurs when a limb of the infant protrudes from the birth canal. Is more commonly a foot when infant is in breech presentation.
 1. Immediate rapid transportation upon recognition.
 2. Place mother on oxygen.
 3. Place mother in head down position with pelvis elevated.

4. Multiple births
 1. Be prepared for more than one resuscitation.
 2. Call for assistance.

5. Meconium - amniotic fluid that is greenish or brownish-yellow rather than clear; an indication of possible fetal distress during labor.
 1. Do not stimulate before suctioning oropharynx.
 2. Suction.
 3. Maintain airway.
 4. Transport as soon as possible.

6. Premature
 1. Always at risk for hypothermia.
 2. Usually requires resuscitation.

5. The human body
 1. Developmental concerns
 1. Newborns and infants - birth to 1 year of age.
 1. Minimal stranger anxiety.
 2. Do not like to be separated from parents.
 3. Do not want to be suffocated by an oxygen mask.
 4. Need to be kept warm - make sure hands and stethoscope are warmed before touching child.
 5. Breathing rate best obtained at a distance - watch chest rise, note color and level of activity.
 2. Toddlers - 1 year to 3 years
 1. Do not like to be touched.
 2. Do not like being separated from parents.

3. Do not like having clothing removed. Remove, exam, replace.
 4. Do not want to be suffocated by an oxygen mask.
 5. Assure child that he was not bad. Children think their illness/injury is punishment.
 6. Afraid of needles.
 7. Fear of pain.
 8. Should be examined trunk to head approach. This is done to build confidence. It should be done before child becomes agitated.
3. Preschool - 3 years to 6 years
 1. Do not like to be touched.
 2. Do not like being separated from parents.
 3. Do not like having clothing removed. Remove, exam, replace.
 4. Do not want to be suffocated by an oxygen mask.
 5. Assure child that he was not bad. Children think that the illness/injury is a punishment.
 6. Afraid of blood.
 7. Fear of pain.
 8. Fear of permanent injury.
 9. Modest.
 4. School Age - 6 years to 12 years
 1. Afraid of blood.
 2. Fear of pain.
 3. Fear of permanent injury.
 4. Modest.
 5. Fear of disfigurement.
 5. Adolescent - 12 years to 18 years
 1. Fear of permanent injury.
 2. Modest.
 3. Fear of disfigurement.
 4. Treat them as adults.
 5. These patients may desire to be assessed privately, away from parents or guardians.
2. Airway
 1. More anterior than the adult - less head tilt needed to open the airway.
 2. Smaller airway than adult - blocked easily by secretions or blood
 3. Large tongue in relation to jaw size - likely to cause obstruction when child is unresponsive.
 4. Infants prefer to breathe through their nose - nasal obstruction can cause respiratory distress.
 3. Breathing
 1. Small children are dependent upon contraction of the diaphragm to breathe.

2. Children in respiratory distress compensate rapidly by increasing their rate of breathing and using their accessory muscles, which causes fatigue.
 3. Increased work of breathing is demonstrated by nasal flaring and intercostal retractions.
 4. Slow pulse (Bradycardia) is a sign of hypoxia in the pediatric patient.
4. Circulation
1. Children compensate rapidly in shock by increasing heart rate and vasoconstricting then decompensate rapidly.
 2. Perfusion in the child is assessed by determining the heart rate, distal pulses, mental status, capillary refill and skin color and temperature.
 3. Hypovolemia can develop from vomiting and/ or diarrhea in children.
 4. Blood pressure is a poor indicator of perfusion status in the pediatric patient.
6. Airway
1. Essential skills - review from module 2-1, Airway, with emphasis on infants and children.
 2. Specific skills
 1. Airway opening
 1. Position to open airway is different - head-tilt chin-lift - do not hyper extend.
 2. Jaw thrust with spinal immobilization.
 2. Suctioning
 1. Sizing
 2. Depth
 3. Technique
 3. Clearing complete obstructions
 1. Infants <1 year old
 - (1) Back blows/chest thrusts
 - (2) Visual foreign body removal
 2. Children >1 year old
 - (1) Abdominal thrusts
 - (2) Visual foreign body removal
 4. Airway adjuncts
 1. Oral airways
 - (1) Adjunct, not for initial artificial ventilation
 - (2) Should not have a gag reflex
 - (3) Sizing
 - (4) Techniques of insertion – use tongue depressor.
 - (1) Insert tongue blade to the base of tongue.
 - (2) Push down against the tongue while lifting upward.

- (3) Insert oropharyngeal airway without rotation following oropharyngeal curvature.
 2. Nasal airways
 - (1) Adjunct not for initial artificial ventilation
 - (2) Sizing
 - (3) Technique of insertion
 - (4) Should not be used in head trauma
7. Oxygen Therapy
1. Oxygen delivery
 1. Nonrebreathers
 2. Blow by techniques
 1. Hold tubing no more than two inches from mouth and nose.
 2. Insert tubing into a paper cup
 2. Artificial ventilation
 1. Mask sizing/bag sizing
 2. Trauma considerations
 3. Mask seal
 1. Two hand
 2. One hand
 4. Mouth-to-mask artificial ventilation
 5. Use of bag-valve-mask
 1. Squeeze bag slowly and evenly enough to make chest rise adequately.
 2. Rates for child and infant are 20 breaths per minute.
 3. Provide oxygen at 100% concentration by using an oxygen reservoir.
8. Assessment
1. General Principles of Pediatric Exam
 1. Children differ from adults, but also differ from each other depending on age
 2. Large amounts of clinical information can be obtained by observation before approaching the child
 1. Child often anxious and scared by presence and examination of EMT as opposed to adults who are often relieved
 3. It is important to maintain a calm and relaxed manner when dealing with a pediatric patient
 1. Speak softly (It is a known fact that monsters and mean people speak loudly)
 - (1) Use the child's name
 - (2) Adjust your height to the child's (Monsters are most threatening when they tower over you)
 - (3) Look before you touch, and touch gently (Monsters are rough)

- (4) Tell the child what you are going to do then do it immediately
 - (5) Never lie to a parent or a child or you will lose their trust
 - (6) Enlist the parent's (care giver's) help
 - (7) Attempt to keep the parent and child together
9. Initial impression - begin **actively observing** the child from the doorway
- 1. Much of the assessment can be performed prior to touching (thereby upsetting) the Child
 - 2. General Impression of well versus sick versus very sick
 - 1. Pay particular attention to:
 - 2. Mental status
 - 1. How is the child interacting with environment and parents (including eye contact)
 - 2. What is the child's behavior?
 - 3. What is the child's response to the EMT?
 - 4. Tone/body position
 - (1) Flaccid?
 - (2) Is the child able to maintain an upright position?
 - (3) Tripod Positioning?
 - 3. Color
 - 1. Pink?
 - 2. Pale?
 - 3. Cyanosis?
 - 4. Respiratory rate and effort
 - 1. What is the respiratory rate?
 - 2. Is the chest rising and falling normally?
 - 3. How much effort is the child making just to breathe?
 - 4. Is the breathing noisy?
10. Primary Assessment - During the primary assessment life threatening problems are detected and treated.
- 1. Responsiveness
 - 1. Stabilize cervical spine
 - 2. Establish unresponsiveness
 - 2. Airway
 - 1. Is the child speaking or does the child have a vigorous cry?
If not then position head
 - 1. Trauma - Neutral with jaw thrust
 - 2. Medical - Sniffing or Sniff Plus
 - 3. OPA insertion as necessary
 - 2. Is stridor (indicates upper airway obstruction) or other evidence of upper airway obstruction present ?

1. Foreign body - FBAO procedure as per AHA guidelines
 2. Swelling due to disease - Possibly croup or epiglottitis
 - (1) Serious medical emergency
 - (2) Do not agitate child
 - (3) Maintain position of comfort
 - (4) If necessary assist ventilations with a BVM
 3. Is gurgling / snoring present?
 1. Excessive secretions require suctioning
 2. Obstruction with the tongue requires repositioning of the head or insertion of OPA / NPA as indicated
3. Breathing
1. What is the respiratory rate?
 2. Is chest rise adequate?
 3. What is the respiratory effort?
 1. Increased work of breathing
 2. Retractions
 3. Nasal flaring
 4. What are the breath sounds?
 1. Listen at mid-axillary line for equality and abnormal breath sounds
 5. Is oxygenation / ventilation adequate?
 1. Cyanosis - Central versus peripheral
 2. Altered Mental State
 3. If oxygenation is inadequate provide supplemental oxygen
 - (1) Non-Rebreather Mask (if tolerated) with 10-15 LPM flow rate
 - (2) Blow-by Oxygen with oxygen tubing at 6 LPM flow rate
 4. If ventilations are inadequate provide assisted ventilations
 - (1) BVM with a reservoir
 5. Are there signs of trauma to the chest?
 - (1) Seal holes
 - (2) Stabilize fractures
4. Circulation
4. Assess the rate and quality of peripheral pulses
 1. Diminished or absent peripheral pulses indicates compensated shock especially in the presence of a strong central pulse.
 2. Absence of central pulses (femoral or in children older than one year brachial) indicates decompensated shock
 3. Absence of carotid pulse (brachial in infants) indicates cardiac arrest
 2. Assess capillary refill
 1. Normal is less than 2 seconds
 2. Delayed (2-4 seconds) is seen with compensated shock
 3. Absent (greater than 4 seconds) is seen with

- decompensated shock
 - 3. Assess skin color and temperature
 - 1. Pale and/or cool skin can indicate shock
 - 4. Is shock present? If present is it compensated or decompensated
 - 5. Is their signs / symptoms of internal and/or external bleeding?
 - 6. Blood pressure is difficult to measure in pediatric patients and is of limited value
 - 7. Support circulation as necessary
 - 1. Control bleeding
 - 2. Elevate the legs in the absence of trauma
 - 3. Maintain body temperature
 - 5. Disability
 - 1. Altered mental status is indicative of hypoxia or hypoperfusion
 - 2. Assess the level of consciousness
 - 3. Mental status evaluation is dependent on the patient's age
 - 4. AVPU scale
 - 5. Assess pupils and ability to move all four extremities
 - 6. If collar has not been applied and is indicated, apply a rigid extrication collar
 - 6. Expose
 - 1. Attempt to locate all injuries
 - 2. Maintain body temperature
 - 7. CUPS Decision
 - Use pediatric CUPS Status
11. Newborn Assessment and Management
- 1. Importance of the Lesson
 - 1. Newborn resuscitation needs to be provided immediately following delivery which is most likely to be provided by the first responder
 - 2. Newborn Assessment
 - 1. Respiratory Effort
 - 1. Respiratory Rate
 - 2. Respiratory Effort
 - (1) Retractions, nasal flaring, chest wall movement
 - 3. Skin Color
 - (1) Peripheral cyanosis is normal in the newborn
 - (2) Central or persistent cyanosis is worrisome
 - 2. Perfusion
 - 1. Heart Rate
 - (1) Assess by palpating umbilical cord or listening with stethoscope for heartbeat
 - (2) Skin Color

3. Muscle Tone
 1. The newborn should have a normal grasp and movement of all extremities

3. Newborn Management
 1. Warm and Dry
 1. All newborns require warming and drying, this alone may stimulate breathing
 2. Suctioning
 1. All newborns require suctioning of the mouth and nose
 2. Suctioning will stimulate the newborn to breathe
 3. Always suction the mouth before the nose to prevent aspiration
 3. Tactile Stimulation
 1. After warming, drying and suctioning if the newborn has a poor or absent respiratory effort they may need to be stimulated
 2. Tactile stimulation is accomplished by either rubbing the back or flicking the soles of the newborn

4. Blow-By oxygen and Assisted Ventilations
 1. Most newborns do not require supplemental oxygen or assisted ventilations
 2. Blow-by oxygen should be provided for the newborn who has either central cyanosis or prolonged peripheral cyanosis AND a normal respiratory effort and a heart rate above 100
 3. If the indications for blow-by oxygen resolve the blow-by oxygen should be gradually withdrawn
 4. Assisted ventilations should be provided to any newborn with either:
 1. Heart rate below 100
 2. Absent or poor respiratory effort despite warming, drying, suctioning and stimulating the newborn
 3. Cyanosis which has not improved with blow-by oxygen
 4. If the newborns indications for assisted ventilations resolve ventilations should be stopped and blow-by oxygen provided

5. Chest Compressions
 1. Rarely does a newborn require chest compressions
 2. If the newborn's heart rate is either below 80 and not improving despite warming, drying, tactile stimulation and 30 seconds of BVM ventilation, begin, chest compressions

12. Common Problems in Infants and Children
 1. Airway obstructions
See current AHA guidelines on specific procedures.

1. Partial airway obstruction - infant or child who is alert and sitting.
 1. Stridor, crowing, or noisy
 2. Retractions on inspiration
 3. Pink
 4. Good peripheral perfusion
 5. Still alert, not unconscious.
 6. Emergency medical care
 - (1) Allow position of comfort, assist younger child to sit up, do not lay down. May sit on parents lap.
 - (2) Offer oxygen
 - (3) Transport
 - (4) Do not agitate child
 - (5) Limited exam. Do not assess blood pressure.
 2. Complete obstruction and altered mental status or cyanosis and partial obstruction.
 1. No crying or speaking and cyanosis.
 - (1) Child's cough becomes ineffective
 - (2) Increased respiratory difficulty accompanied by stridor
 - (3) Victim loses consciousness
 - (4) Altered mental status
 2. Clear airway.
 - (1) Infant foreign body procedures.
 - (2) Child foreign body procedures.
 3. Attempt artificial ventilations with a bag-valve-mask and good seal.
2. Respiratory emergencies
1. Common causes are:
 1. Aspiration of foreign objects
 - (1) Respiratory diseases and infections
 - (2) Near drowning or electrocution
 - (3) Poisonings
 - (4) SIDS
 2. Recognize the difference between upper airway obstruction and lower airway disease.
 1. Upper airway obstruction - stridor on inspiration
 2. Lower airway disease
 - (1) Wheezing and breathing effort on exhalation
 - (2) Rapid breathing (tachypnea) without stridor
 - (3) Know respiratory rates for age
 3. Complete airway obstruction.
 1. No crying
 2. No speaking
 3. Cyanosis is present
 4. No coughing
 4. Respiratory Assessment
 1. Check respiratory rate

- (1) Rate can be affected by many factors such as fear, fever and age
- (2) Initial response to respiratory distress is an increased respiratory rate, followed by a drop in the respiratory rate as the child fatigues
2. Assess respiratory effort
 - (1) Chest rise
 - (2) Retractions
 - (3) Nasal flaring
3. Auscultate breath sounds
 - (1) Should be performed at the mid-axillary line
 - (2) Sounds on inspiration usually indicate upper airway problems while sounds with expiration usually represent lower airway problems
 - (3) Look for asymmetry
 - (4) Wheezes are a sign of small airway narrowing and reduced air flow.
4. Inspect and palpate the chest
 - (1) Are there any visible signs of trauma
5. Assess Skin Color
 - (1) Central or peripheral cyanosis
5. Respiratory Distress - Recognize signs of increased effort of breathing.
Needs non rebreather mask.
 1. Early respiratory distress is indicated by any of the following:
 - (1) Nasal flaring
 - (2) Intercostal retraction (neck muscles), supraclavicular, subcostal retractions
 - (3) Stridor
 - (4) Neck and abdominal muscles - retractions
 - (5) Audible wheezing
 - (6) Grunting
 2. The presence of signs of symptoms of early respiratory distress and any of the following:
 - (1) Rate >60
 - (2) Cyanosis
 - (3) Decreased muscle tone
 - (4) Severe use of accessory muscles
 - (5) Poor peripheral perfusion and color
 - (6) Altered mental status
 - (1) alert, irritable, anxious
 - (7) Grunting
 3. Respiratory arrest/failure -
Needs assisted BVM assisted ventilations. Use the patient as medical control (i.e. any pediatric patient who will tolerate a BVM needs a BVM).
 - (1) Difficulty with breathing

- (1) increased respiratory effort at sternal notch
- (2) Breathing rate less than 10 per minute
- (3) Retractions
- (4) Head bobbing
- (5) grunting
- (6) severe accessory muscle use
- (7) absent or shallow chest wall motion
- (2) Limp muscle tone
 - (1) Decreased muscle tone or poor muscle tone (e.g. unable to maintain sitting position in infant > 4 months)
- (3) Change in Mental Status
 - (1) sleepy
 - (2) intermittently combative
 - (3) agitated
 - (4) unresponsive to voice or touch
 - (5) Unconscious
- (4) Slower, absent heart rate
- (5) Difficulty with color/perfusion
 - (1) Central cyanosis
 - (2) Marked tachycardia or bradycardia
 - (3) Poor peripheral perfusion
 - (4) Weak or absent distal pulses.
- 4. Respiratory ailments are the primary cause of cardiac arrest, not due to trauma
- 6. Emergency medical care

See current AHA, ARC or NSC guidelines on specific procedures.

Maintain the airway.

 - 1. Provide oxygen to all children with respiratory emergencies.
 - 2. Provide oxygen and assist ventilation for severe respiratory distress.
 - (1) Respiratory distress and altered mental status
 - (2) Presence of cyanosis with oxygen
 - (3) Respiratory distress with poor muscle tone
 - (4) Respiratory failure
 - (5) Provide oxygen and ventilate with bag-valve-mask for respiratory arrest.
- 3. Seizures
 - 1. Seizures in children who have chronic seizures are rarely life-threatening. However, seizures, including febrile, should be considered life-threatening by the EMT.
 - 2. May be brief or prolonged.
 - 3. Assess for presence of injuries which may have occurred during seizures.
 - 4. Caused by fever, infections, poisoning, hypoglycemia, trauma, decreased levels of oxygen or could be idiopathic in children.
 - 5. History of seizures. Ask the following questions:

1. Has the child had prior seizure(s)?
 2. If yes, is this the child's normal seizure pattern?
 3. Has the child taken his anti-seizure medications?
 6. Emergency medical care
 1. Assure patency of airway.
 2. Position patient on side if no possibility of cervical spine trauma. Protect patient from injury.
 3. Have suction ready.
 4. Provide oxygen and if in respiratory arrest or severe respiratory distress, assure airway position and patency and ventilate with bag-valve-mask.
 5. Transport. Although brief seizures are not harmful, there may be a more dangerous underlying condition.
 7. Seizures can be caused by head injury.
 8. Inadequate breathing and/or altered mental status may occur following a seizure.
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4. Altered mental status
 1. Caused by a variety of conditions
 1. Hypoglycemia
 2. Poisoning
 3. Post seizure
 4. Infection
 5. Head trauma
 6. Decreased oxygen levels
 7. Hypoperfusion (shock)
 2. Emergency medical care
 1. Assure patency of airway.
 2. Be prepared to artificially ventilate/suction.
 3. Transport.
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5. Poisonings
 1. Common reason for infant and child ambulance calls
 2. Identify suspected container through adequate history. Bring container to receiving facility if possible.
 3. Emergency medical care
 1. Responsive patient
 - (1) Contact medical control.
 - (2) Provide oxygen.
 - (3) Transport.
 - (4) Continue to monitor patient - may become unresponsive.
 2. Unresponsive patient
 - (1) Assure patency of airway.
 - (2) Be prepared to artificially ventilate.
 - (3) Provide oxygen if indicated.
 - (4) Call medical control.
 - (5) Transport.

- (6) Rule out trauma, trauma can cause altered mental status.

6. Fever

1. Common reason for infant or child ambulance call
2. Many causes - rarely life threatening. A severe cause is meningitis.
3. Fever with a rash is a potentially serious consideration.
4. Emergency medical care: Transport. Be alert for seizures.

7. Shock (hypoperfusion)

In children, like adults, most shock is secondary to trauma. However non-traumatic causes of shock exist.

1. Causes:

1. Common:

- (1) Diarrhea and dehydration
- (2) Trauma
- (3) Vomiting
- (4) Blood loss - The loss of any amount of blood in an infant or child is can be life threatening.
 - (1) Infants - 50ml
- (5) Infection
- (6) Abdominal injuries

2. Less common:

- (1) Allergic reactions
- (2) Poisoning
- (3) Cardiac

2. Assessment of Shock (hypoperfusion)

1. Different than for adults
2. Blood pressure hard to measure and unreliable, especially true when < 3 years old, don't even obtain BP measurement
3. Key assessment is peripheral perfusion and mental status
4. Be aware that shock in a child can rapidly deteriorate
5. Diminished or absent peripheral pulses indicates compensated shock especially in the presence of a strong central pulse.

3. Signs and symptoms

1. Compensated Shock

- (1) Altered mental status
- (2) Weak or absent peripheral pulses
- (3) Delayed capillary refill
- (4) Rapid pulse (tachycardia)
- (5) Cool extremities

2. Decompensated Shock

- (1) Weak or impalpable central pulses
- (2) Extensive cyanosis of all extremities
- (3) Absence of tears, even when crying

- (4) Systolic blood pressure less than 70 mm hg.
- 4. Emergency medical care
 - 1. Assure airway / oxygen.
 - 2. Provide supplemental oxygen
 - 3. Be prepared to artificially ventilate.
 - 4. Manage bleeding if present.
 - 5. Immobilize the patient as indicated
 - 6. Elevate legs if no indication of trauma.
 - 7. Keep warm.
 - 8. Transport. Note need for rapid transport of infant and child patients with secondary exam completed en route, if time permits.
- 8. Near drowning
 - 1. Artificial ventilation is top priority.
 - 2. Consider possibility of trauma.
 - 3. Consider possibility of hypothermia.
 - 4. Consider possible ingestion, especially alcohol.
 - 5. Protect airway, suction if necessary.
 - 6. Secondary drowning syndrome - Deterioration after breathing normally from minutes to hours after event. All near drowning victims should be transported to the hospital.
- 9. Sudden Infant Death Syndrome (SIDS)
 - 1. Characteristics
 - 1. Sudden death of infants in first year of life.
 - 2. Causes are many and not clearly understood.
 - 3. Baby most commonly discovered in the early morning.
 - 2. Emergency medical care
 - 1. Resuscitate if indicated.
 - 2. Parents will be in agony from emotional distress, remorse and imagined guilt.
 - 3. Avoid any comments that might suggest blame to the parents.
- 13. Trauma
 - 1. Injuries are the number one cause of death in infants and children.
 - 2. General Considerations in the Pediatric Trauma Victim
 - 1. Most pediatric trauma is blunt trauma and arises from falls and motor vehicle accidents
 - 2. Blunt trauma has less overt signs and has a later deterioration than penetrating trauma, therefore rely on the mechanism in the absence of overt signs and / or symptoms of serious trauma
 - 3. Children have relatively large liver and spleen and have poor muscle protection of these organs making them extremely susceptible to injury
 - 4. Head trauma is more prevalent in children because of the larger

- head to body ratio when compared with adults
1. Infants can lose enough blood in their head to develop decompensated shock
 2. Pediatric head injury patients usually die from airway and Ventilatory problems and not the actual head injury. As such control the airway and ventilation
5. Pelvic fractures can cause enough blood loss in the pediatric shock to cause hypovolemic shock
 6. What may seem like a small blood loss may be relatively extensive when compared to the child's smaller blood volume
3. Blunt injury is most common.
 1. The pattern of injury will be different from adults.
 1. Motor vehicle crashes
 - (1) Motor vehicle passengers
 - (1) Unrestrained passengers have head and neck injuries.
 - (2) Restrained passengers have abdominal and lower spine injuries.
 - (2) Struck while riding bicycle - head injury, spinal injury, abdominal injury
 - (3) Pedestrian struck by vehicle - abdominal injury with internal bleeding, possible painful, swollen, deformed thigh, head injury.
 2. Falls from height, diving into shallow water - head and neck injuries
 3. Burns
 4. Sports injuries - head and neck
 5. Child abuse
4. Specific body systems
 1. Head
 1. The single most important maneuver is to assure an open airway by means of the modified jaw thrust combined with a neutral head position.
 2. Children are likely to sustain head injury along with internal injuries. Signs and symptoms of shock (hypoperfusion) with a head injury should cause you to be suspicious of other possible injuries.
 3. Respiratory arrest is common secondary to head injuries and may occur during transport.
 4. Common signs and symptoms are nausea and vomiting.
 5. Most common cause of hypoxia in the unconscious head injury patient is the tongue obstructing the airway. Jaw-thrust is critically important.
 6. Do not use sandbags to stabilize the head because the weight on child's head may cause injury if the board needs to be turned for emesis.

2. Pediatric Cervical Spinal Stabilization and Immobilization
 1. Manual stabilization
 - (1) Initially provide manual stabilization while maintaining an adequate airway
 2. Cervical Collars
 - (1) Initially assure that the head is in a neutral position
 - (2) Choose a collar of appropriate size based on manufacturers recommendations
 - (3) Towels can be used in place of a cervical collar for infants that do not fit in the available collars.
 3. Spinal Immobilization
 1. Immobilization of pediatric patients should account for their anatomical differences
 - (1) Children are shorter than adults - use backboards which have strap holes at multiple locations or use a short backboard.
 - (2) Children are narrower than adults - it may be necessary to pad along the sides to insure a snug fit of the straps.
 - (3) Small children have a large occiput - pad under the upper torso to insure neutral alignment of the cervical spine.
 2. Assure that a cervical collar is in place prior to moving patient to the backboard.
 3. Place a child on the backboard using standard patient moves for a spinal injury patient
 4. Secure the chest, pelvis and knees and then the head
 4. Chest
 1. Children have very soft pliable ribs.
 2. There may be significant injuries without external signs.
 5. Abdomen
 1. More common site of injury in children than adults.
 2. Often a source of hidden injury.
 3. Always consider abdominal injury in the multiple trauma patient who is deteriorating without external signs.
 4. Air in stomach can distend abdomen and interfere with artificial ventilation efforts.
 6. Extremities - extremity injuries are managed in the same manner as adults.
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5. Other trauma considerations
 1. Criticality of burns
 1. Cover with sterile dressing (non-adherent, if possible, sterile sheets may be used).
 2. Identify candidates for burn centers per local protocol.

6. Emergency medical care
 1. Maintain an adequate airway while manually stabilizing the cervical spine
 2. Assure airway position and patency. Use modified jaw thrust.
 3. Suction as necessary with large bore suction catheter.
 4. Provide oxygen.
 5. Assist ventilations for severe respiratory distress and ventilate with a bag-valve-mask for respiratory arrest.
 6. Support circulation
 7. Provide spinal immobilization.
 8. Transport immediately.

14. Child Abuse and Neglect
 1. Definition of abuse - improper or excessive action so as to injure or cause harm.

 2. Definition of neglect - giving insufficient attention or respect to someone who has a claim to that attention.

 3. EMT-Basic must be aware of condition to be able to recognize the problem.

 4. Physical abuse and neglect are the two forms of child abuse that the EMT-Basic is likely to suspect.

 5. Signs and symptoms of abuse
 1. Multiple bruises in various stages of healing.
 2. Injury inconsistent with mechanism described.
 3. Repeated calls to the same address.
 4. Fresh burns.
 5. Parents seem inappropriately unconcerned.
 6. Conflicting stories
 7. Fear on the part of the child to discuss how the injury occurred.

 6. Signs and symptoms of neglect
 1. Lack of adult supervision.
 2. Malnourished appearing child.
 3. Unsafe living environment
 4. Untreated chronic illness; e.g., asthmatic with no medications.

 7. CNS injuries are the most lethal - shaken baby syndrome

 8. Do not accuse in the field
 1. Accusation and confrontation delays transportation.
 2. Bring objective information to the receiving facility

 9. Reporting
Refer to Part 800.21

1. Local regulations
 2. Objective - what you see and what you hear - NOT what you think.
15. Infants and Children with Special Needs
1. This can include many different types of children.
 1. Premature babies with lung disease
 2. Babies and children with heart disease
 3. Infants and children with neurologic disease
 4. Children with chronic disease or altered function from birth
 2. Often these children will be at home, technologically dependent.
 1. Tracheostomy tube
 1. Various types
 2. Complications
 - (1) Obstruction
 - (2) Bleeding
 - (3) Air leak
 - (4) Dislodged
 - (5) Infection
 3. Emergency medical care
 - (1) Maintain an open airway.
 - (2) Suction.
 - (3) Maintain position of comfort.
 - (4) Transport.
 2. Home artificial ventilators
 1. Various types
 2. Parents familiar with operation
 3. Emergency medical care
 - (1) Assure airway
 - (2) Artificially ventilate with oxygen
 - (3) Transport
 3. Central Lines
 1. Intravenous lines (IVs) that are placed near the heart for long term use
 2. Complications
 1. Cracked line
 2. Infection
 3. Clotting off
 4. Bleeding
 3. Emergency medical care
 1. If bleeding, apply pressure.
 2. Transport.
 4. Gastrostomy tubes and gastric feeding
 1. Description - tube placed directly into stomach for feeding. Comes in many shapes. These patients usually cannot be fed by mouth.
 2. Be alert for breathing problems.

1. Assure adequate airway.
 2. Have suction available.
 3. If a diabetic patient, be alert for altered mental status. Infant will become hypoglycemic quickly if they cannot be fed.
 4. Provide oxygen.
 5. Transport
 - (1) Sitting
 - (2) Lying on right side, head elevated
5. Shunts
1. Description - device running from brain to abdomen to drain excess cerebral spinal fluid. Will find reservoir on side of skull.
 2. Change in mental status
 3. Prone to respiratory arrest
 1. Manage airway.
 2. Assure adequate artificial ventilation.
 3. Transport.
16. Family Response
1. A child cannot be cared for in isolation from the family; therefore, you have multiple patients.
 2. Striving for calm, supportive interaction with family will result in improved ability to deal with the child.
 1. Calm parents = calm child; agitated parents = agitated child
 2. Anxiety arises from concern over child's pain; fear for child's well-being
 3. Worsened by sense of helplessness
 3. Parent may respond to EMT-Basic with anger or hysteria.
 4. Parents should remain part of the care unless child is not aware or medical conditions require separation.
 5. Parents should be instructed to calm child; can maintain position of comfort and/or hold oxygen.
 6. Parents may not have medical training, but they are experts on what is normal or abnormal for their children and what will have a calming effect.
17. Provider Response
1. Anxiety from lack of experience with treating children as well as fear of failure.
 2. Skills can be learned and applied to children.
 3. Stress from identifying patient with their own children.

4. Provider should realize that much of what they learned about adults applies to children; they need to remember the differences.
5. Infrequent encounters with sick children; advance preparation is important (practice with equipment and examining children).
6. Encounters with sick or injured children may result in adverse emotional response by the EMT-B.
7. Critical Incident Stress Management (CISM) programs have been helpful in assisting EMS personnel to manage their normal response to these stressful situations.

18. Cardiac arrest

1. Steps of child CPR
 1. Refer to current American Heart Association Guidelines for CPR
 2. Steps of infant CPR
 1. Refer to current American Heart Association Guidelines for CPR
 3. *Refer to current NYS AED protocol. NOTE AED use restricted to children over age 12.*

19. General Principles of Pediatric Exam

1. Children differ from adults, but also differ from each other depending on age
2. Large amounts of clinical information can be obtained by observation before approaching the child
 1. Child often anxious and scared by presence and examination of EMT as opposed to adults who are often relieved
3. It is important to maintain a calm and relaxed manner when dealing with a pediatric patient
 1. Speak softly (It is a known fact that monsters and mean people speak loudly)
 1. Use the child's name
 2. Adjust your height to the child's (Monsters are most threatening when they tower over you)
 3. Look before you touch, and touch gently (Monsters are rough)
 4. Tell the child what you are going to do then do it immediately
 5. Never lie to a parent or a child or you will lose their trust
 6. Enlist the parent's (care giver's) help
 7. Attempt to keep the parent and child together
 8. Consider "toe to head" focused assessment

SUGGESTED APPLICATION

Procedural (How)

1. Review the steps to assist in the normal delivery of an infant.
2. Review the steps in the post delivery care of the infant and the mother.
3. Review the proper assessment of the infant and child.

Contextual (When, Where, Why)

Care of expectant mothers, infants and children often causes fear and anxiety to the prehospital care provider. Due to this fear and anxiety and the relative infrequency in which these individuals request help from prehospital care providers, it is essential that the EMT-Basic become familiar with the needs of these special populations.

STUDENT ACTIVITIES

Auditory (Hear)

1. Students should hear audio tape of a mother in final stages of labor.

Visual (See)

1. Students should see visual aids or materials of infant and child patients with common medical or traumatic complaints.
2. Students should see various infant or child equipment.
3. Students should see audio-visual aids or materials illustrating normal and abnormal delivery of an infant.

Kinesthetic (Do)

1. Students should practice post delivery care of the infant and the mother
2. Students should practice using various infant and child devices that are available in the area.

Instructor Activities

Supervise student practice.

Reinforce student progress in cognitive, affective, and psychomotor domains.

Redirect students having difficulty in content

EVALUATION

Written: Develop evaluation instruments, e.g., quizzes, verbal reviews, handouts, to determine if the students have met the cognitive and affective objectives of this lesson.

Practical: Evaluate the actions of the EMT-Basic students during role play, practice or other skill stations to determine their compliance with the cognitive and affective objectives and their mastery of the psychomotor objectives of this lesson.

REMEDIATION

Identify students or groups of students who are having difficulty with this subject content.

SUGGESTED ENRICHMENT

What is unique in the local area concerning this topic?

