



Presents

The EMS Quick Study Guide

- ABCs 90% of cardiopulmonary problems start as respiratory problems
 - ③ Respiratory distress is hypoxia, where work of breathing is increased
 - ③ Respiratory failure is the inability to maintain adequate O₂ in the blood
 - ③ Apnea is the absence of airflow (breathing) for more than 15 seconds
 - ③ Signs and symptoms: nasal flaring, retractions, head bobbing, grunting, stridor, prolonged expiration, slow irregular resps. Dyspnea causes bradycardia
- Vital signs: respiratory rate and quality, pulse rate and quality, BP (over 3), pupils, skin temp. color and condition

Broselow Tape: resuscitation tool referencing proper range of vital signs as well as resuscitation equipment

History: get info from the parent/guardian/caregiver. SAMPLE history

Detailed physical: Infants and young children go toes to head. Older children head to toes

Managing the ABCs:

Allow the parent to hold infant and young children

Unconscious children, towel under shoulders will hold head in a sniffing position. Hyperextension can occlude the airway

Blocked airway? Never blind sweep the back of the mouth - abdominal thrusts for older children, chest thrusts and back blows for infants

OPAs: must use the right size - corner of mouth the earlobe, use tongue depressor to hold the tongue up, NPA: proper size, tip of nose to tragus ET tube can double as an NPA

Suction: no greater than 120 mm Hg, use a flexible tip. Monitor heart rate so they don't vagal out and brady down

Intubation equipment: ET tube should be the size of the pinkie finger or $\text{Age}/4 + 4 = \text{mm ET}$
Tube, blade sizes go down to zero

Bag Valve Mask Ventilation: at least 20 breaths/minute, O₂ set at 15 L/min with a 450 mL bag

Nasal Canula @ 2-4 L/min O₂

Blow by O₂ from a cup and hold the mask close to face

IV Therapy: very important to ill and injured children

Do not try to start a line in the cases of:

Traumatic injury - transport asap

Epiglottitis or other severe resp. distress

Intraosseous Infusion: Children 6 and under. Inserting a needle in the long bone of the leg. The tibular plateau

Severe shock

Cardiac arrest

Unconscious

Can't get an IV anywhere else

Fluid Administration: Isotonic (LR or normal saline) 20 mL/kg in less than 20 minutes

Kid's weight in kg x 20 for example:

$$20 \text{ lbs} / 2.2 = 9.09 \times 20 = 181.1 \text{ 30}$$

$$\text{lbs} / 2.2 = 13.6 \times 20 = 272 \text{ 40 lbs} /$$

$$2.2 = 18.18 \times 20 = 363.6 \text{ 50 lbs} /$$

$$2.2 = 22.72 \times 20 = 454.4 \text{ 60 lbs} /$$

$$2.2 = 27.27 \times 20 = 545.4 \text{ 70 lbs} /$$

$$2.2 = 31.81 \times 20 = 636.2 \text{ 80 lbs} /$$

$$2.2 = 36.36 \times 20 = 727.2$$

Pediatric Resuscitation: cardiac arrest usually results from respiratory arrest/hypoxemia

Asystole: flatline on the cardiac monitor: To treat asystole:

CPR

Ventilate with BVM 15 L/min O₂

Intubate
IV with LR or normal saline
Epinephrine

V-Fib: chaotic looking rhythm with varied waveforms, no P waves, QRS complexes or T waves. Rarely occurs in children except congenital heart disease, acidosis, hypothermia, drug toxicity. To treat V-Fib:

CPR
Ventilate with BVM 15 L/min O₂
Defibrillate up to three times with 2 joules/kg

Intubate
IV with LR or normal saline
Epinephrine
Repeat defib at 4 L/kg
Repeat epinephrine

Pediatric Respiratory Compromise:

Upper Airway Obstruction:

Foreign body: toddlers/preschoolers most common. Abdominal thrusts for children back blows and chest thrusts for infants

Tonsillitis

Croup (laryngotracheobronchitis): children 3 months to 3 years. Viral infection, slow onset, upper resp infection and low fever, Hoarse with stridor (subglottic edema) and a barking cough. O₂, transport in position of comfort

Epiglottitis: inflammation of the epiglottis, most often 3 years to 7 years. Bacterial infection, progresses rapidly and can lead to complete airway obstruction and respiratory arrest. They look very ill, stay very quiet, tripod position, drooling, muffled voice and stridor. They need nebulized epinephrine. Keep them comfortable and calm

Lower Airway Obstruction:

Asthma: reactive airway disease, any age, response to allergy exercise, infection, family history, drugs reverse bronchospasm. High flow O₂, transport

- Status asthmaticus: severe, prolonged attack which can't be stopped with traditional bronchodilators

Bronchiolitis: 6-18 months, any time or year, viral infection, mild fever, cough runny nose which progresses to respiratory distress. No history of asthma, drugs may not be effective

Pneumonia: infection of the lower airway and lung. Common in infants, toddlers and preschoolers. Bacterial or viral. Fever, rales, rhonchi, pain in chest, grunting respirations

Pediatric Shock: inadequate delivery of O₂, and is the body's response to poor perfusion. A child may lose up to 20% blood volume before a change in appearance. Leading cause of shock in kids is gastroenteritis with dehydration.

Palpate peripheral pulse and listen to apical heart rate for clues on hypovolemia

Compensated shock: BP normal, compensate longer than adults

Decompensated shock: hypotensive and shows signs of inadequate perfusion, often irreversible

Signs of shock:

- Altered level of responsiveness
- Hyperventilation leading to respiratory failure
- Tachycardia
- Normotension progressing to hypotension
- Cool, or cold clammy skin
- Prolonged cap refill
- Oliguria - lack of urine production
- Acidosis

Dehydration: threat to infant and child because they are greater proportion of water than adults (they are 65%), decrease in cardiac output>renal failure>shock>death

Fever

Viral gastrointestinal disorder

Nausea, vomiting, diarrhea

Treatment:

Moderate to extreme: IV of normal saline of LR

High flow O₂

Seizures/Epilepsy: 8% of pediatric transports, many are febrile (fever) seizures. Make note of duration, aura, level of responsiveness, parts of body involved, postictal period, incontinence

Simple Partial: no loss of consciousness, motor signs or sensory symptoms

Complex Partial: psychomotor or temporal lobe seizures; purposeless activity

Absence: formerly called Petit Mal, loss of consciousness, short periods of staring

Clonic: jerking muscle activity

Tonic: stiffening of the body

Tonic-Clonic: formerly called Grand Mal, total loss of consciousness with convulsions

Myoclonic: Start/stop abruptly, single or multiple myoclonic jerks

Atonic: drop attack, unexpected lack of muscle tone

Akinetic: lack of movement

Unclassified\

Treatment:

Nasal airway, suction, ventilation is apnea or prolonged hypoventilation If due to a fever, reduce fever with moist cloths, tepid water, fanning

Prolonged seizures, IV Valium or Ativan may be required, rectal diazepam is available for age 2 and older

Status epilepticus: continuous seizure of more than 30 min. or a series of seizures with no conscious period in between.

Meningitis: inflammation of the membranes around the brain and spinal cord. Viral or bacterial. Bacterial is much more serious and contagious. Symptoms:

Fever, dehydration, disorientation

Bulging fontanelle

Loss of appetite, poor feeding, vomiting

Seizures

Respiratory distress, cyanosis, rash

Older children: Kernig's sign, headache, nuchal tenderness

Later symptoms of bacteria in the bloodstream: chills joint pain, sore throat, headache, red spots, exhaustion

Treatment:

BSI, could be contagious, use a mask

Maintain the respiratory and circulatory efforts

Monitor vital signs and cardiac status

High flow O₂

IV bolus of 20 mL/kg as necessary

Make comfortable, transport, watch for seizures

Poisoning: extremely high risk because they are so inquisitive. Kids 18 months to 3 years account for 30% of all accidental poisonings. Household products, medications, toxic plants, contaminated foods. School age and adolescents poison themselves with alcohol, organic solvents, and drugs.

Trauma: 20-40% of pediatric deaths due to trauma are preventable. Most common: Falls, then MVA, accidental injury, sports related injury, assaults/abuse.

Assessment: ABCs

Treatment: IV saline or LR for hypovolemia

Head trauma: most common cause of death because their big, heavy heads hit first. Manage airway, O2, intubate as necessary

Spinal Trauma: more flexible, lack of neck muscle, serious injury can occur without external signs of injury. 60-70% of pediatric neck fractures are at C1 or C2

Child Safety Seats: Cervical spine is still susceptible to maximum flexion. If child's head sticks up over the seat, the head can hyperextend during a rear-end collision. Use the seat for immobilization unless the child is critically injured and will deteriorate. Inspect the seat for damage too. Then pad the body and head to prevent further movement.

C-spine devices for children: make sure it fits. It is much worse to hyperextend the kid's neck to force the collar on than to secure it with towels etc.

Backboards: Short of long can be used, pad under their torso to bring the spine into alignment. Pad around the sides of the board

KEDs/Vest Devices: Adult vest is not recommended because in-line spinal position can't be achieved

Helmets: Removal is recommended to bring the spine in line. Their heads are already so big you have to pad under their shoulders, the helmet just makes it worse.

Chest and Abdominal Trauma: more flexible, fractured ribs are associated with a high mortality rate due to the force required to break the ribs. Flail segments rare. Liver, kidney and spleen are most commonly injured. Treatment: O2, transport definitive care at the hospital.

Hypothermia: CBT below 95 F, 35 C. Children more susceptible due to large body surface area compare to weight. Look for signs and symptoms:

95 degrees - Shivering, increased resps, may be alert

90 degrees - Muscular rigidity, decreased resp rate, atrial fibrillation, impaired cognition, loss of dexterity

86 degrees - Decreased cerebral blood flow, tachycardia, tachypnea, supraventricular dysrhythmia

80 degrees - bradycardia, bradypnea, V-fib, decreased O2 uptake, rigid extremities, metabolic rate decreased by 50%

77 - hypotension, blood to kidneys reduced 30%

68 - unconscious, no reflexes, unresponsive pupils etc.

Treatment: move to warm environment asap, warm blankets, maintain airway, high flow O2, CPR if no pulse, if heart rate, handle gently to prevent V-Fib. Use heat packs, but don't let them directly touch the skin

Drowning: third leading preventable cause of death. 2,000 annually. Focus on ABCs. Do not intubate a child that has been submerged but has a heart rate - stimulating the vagus nerve may cause asystole.

Water rescue: distress in water but is alert

Submersion: water-related distress, transported to ER

Drowning: considered fatal. Drowning-related death is if they die within 24 hours

SIDS: Sudden Infant Death Syndrome: unexplained after post-mortem exam. Third leading cause of death in children age 1 month to 1 year. 3,400 annually. Peak age 2-4 months. 95% occur by 6 months. More males, during sleep, more in winter esp. January. Native Americans/Blacks, premature, multiples, soft bedding, overheating, young cigarette-smoking moms.

Try to determine the scene as the baby was found, esp. if they have been removed from the bed
Continue CPR if the parents started

Be compassionate, don't give the impression of any wrongdoing

Stress that SIDS can't be predicted or prevented

Child Abuse/Maltreatment

Child Abuse: any recent act or failure to act that results in imminent risk of serious physical or emotional harm, death, sexual abuse or exploitation by a parent or caretaker. 1 million children annually, over half are under 7, 56% of those are under 4. The most important thing for an EMT to remember is to be nonjudgmental. Document everything. Treat physical injuries as appropriate. Protect the child from further abuse. Reporting is mandatory to hospital/local authorities:

Physical abuse: Bruises, welts, burns (glove), fractures, dislocations, wounds in various levels of healing, inappropriate reactions, acting out behavior, withdrawal

Sexual abuse: bruises, bleeding on genitals, torn underwear, pain on urination, STCs

Emotional abuse: withdrawal, fearfulness, lags in development, sleep disorders

Neglect: failure to thrive, malnutrition, unclean, poor teeth

Maltreatment: intentional physical abuse or neglect, emotional abuse or neglect and sexual abuse

Neglect: failure of a parent or guardian to provide for the child's basic needs and an adequate level of care

Shaken Baby Syndrome: can cause fatal intracranial trauma without signs of external head injury. Retinal hemorrhage, CNS injury, bleeding, concussion, soft tissue swelling, skull fracture, hypotension

Special Needs: any condition that interferes with usual growth and development: hearing impaired, mental retardation, tracheotomy, gastrostomy, cerebral palsy, spina bifida, etc.

Cognitive Disabilities: some degree of impaired adaptation in learning, social adjustment or maturation. Actual physical evaluation is all the same, the major difference is the child's level of understanding and ability to communicate

Physical Disabilities: some limitation of mobility, attend to ABCs and don't let devices get in the way

Chronic Illnesses: any disease/situation that extends for a prolonged period

Assistive Technology

- Tracheotomy: temporary or permanent. Airway trauma or weak respiratory muscles. Watch for mucus plugs
- Central Venous Access Devices: extended access to a vein. Several types of devices, but they all end at the superior vena cava or the right atrium. Implanted ports are accessed using a Huber needle
- Vagus nerve stimulator: over 12 yo, stops the progression of seizure activity
- Apnea Monitors: alarm sounds if a breath is not detected in a certain period of time
- Gastrostomy Tube or Button: children who can't take food by mouth. The tube may have become dislodged, there may be internal bleeding

Medications: find out what they are taking and when their last dose was

Latex Allergies: especially in kids with spina bifida, assemble a latex-free kit

Family Issues: Stressful for the entire family

General Considerations: special needs kids are at risk for medical complications or traumatic events. Infections, decreased reflexes, paralysis. Look for Medical Tags, ask for Emergency Information Form (EIF)

Pain Management: pain in children is often underestimated, includes verbal and nonverbal expressions

Family Involvement: always keep the parents and caregivers involved

Transport Guidelines: critically ill or injured kids need a pediatric trauma center