

STATE OF OHIO

EMS BOARD

Emergency Medical Services Pediatric Guidelines and Procedures Manual

INTRODUCTION

On behalf of the State Board of Emergency Medical Services, the Ohio Emergency Medical Services for Children Program was charged with proposing a pediatric protocol for EMS agencies to use as a guideline in setting a standard for emergency medical services to the children of Ohio. The guidelines were created through a cooperative effort between the Ohio Emergency Medical Services for Children program, the Emergency Care Committee of the Ohio Chapter of the American Academy of Pediatrics and the Regional Physicians Advisory Board.

The proposed protocol is not mandatory for Ohio EMS agencies. However, the EMS Board recommends that EMS agencies adopt the protocol as a means of ensuring that ill or injured children will be provided the same level of EMS care throughout the state. The EMS Board offers this recommendation pursuant to Section 4765.09, Ohio Revised Code.

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PEDIATRIC
ALTERED LEVEL OF CONSCIOUSNESS

FIRST RESPONDER

- A. ABC's Manually stabilize cervical spine as per Multiple Trauma Protocol if cause of unconsciousness is unknown.
- B. If not breathing, assist ventilation via mouth to mouth using barrier device.
- C. Administer 100% oxygen by NRB mask.
- D. Evaluate patient's general appearance, relevant history of condition and determine:

Onset
Provokes
Quality
Radiates
Severity
Time
Interventions

Allergies
Medication
Past Medical History - especially, diabetic, seizures, stroke,
head injury, drug abuse
Last Meal
Events leading to present illness

EMT-B

- A. Transport IMMEDIATELY unless an advanced life support unit is enroute and has an ETA of less than 5 minutes to the scene.

EMT-I

- A. Assist EMT; obtain patient condition and circumstances.
- B. Apply monitor and check rhythm.
- C. Determine blood sugar level by available means.
 - 1. If blood sugar is less than 70, administer oral glucose if alert. May be repeated in 10 minutes if blood sugar remains below 70.

PATIENT MUST HAVE A GAG REFLEX.

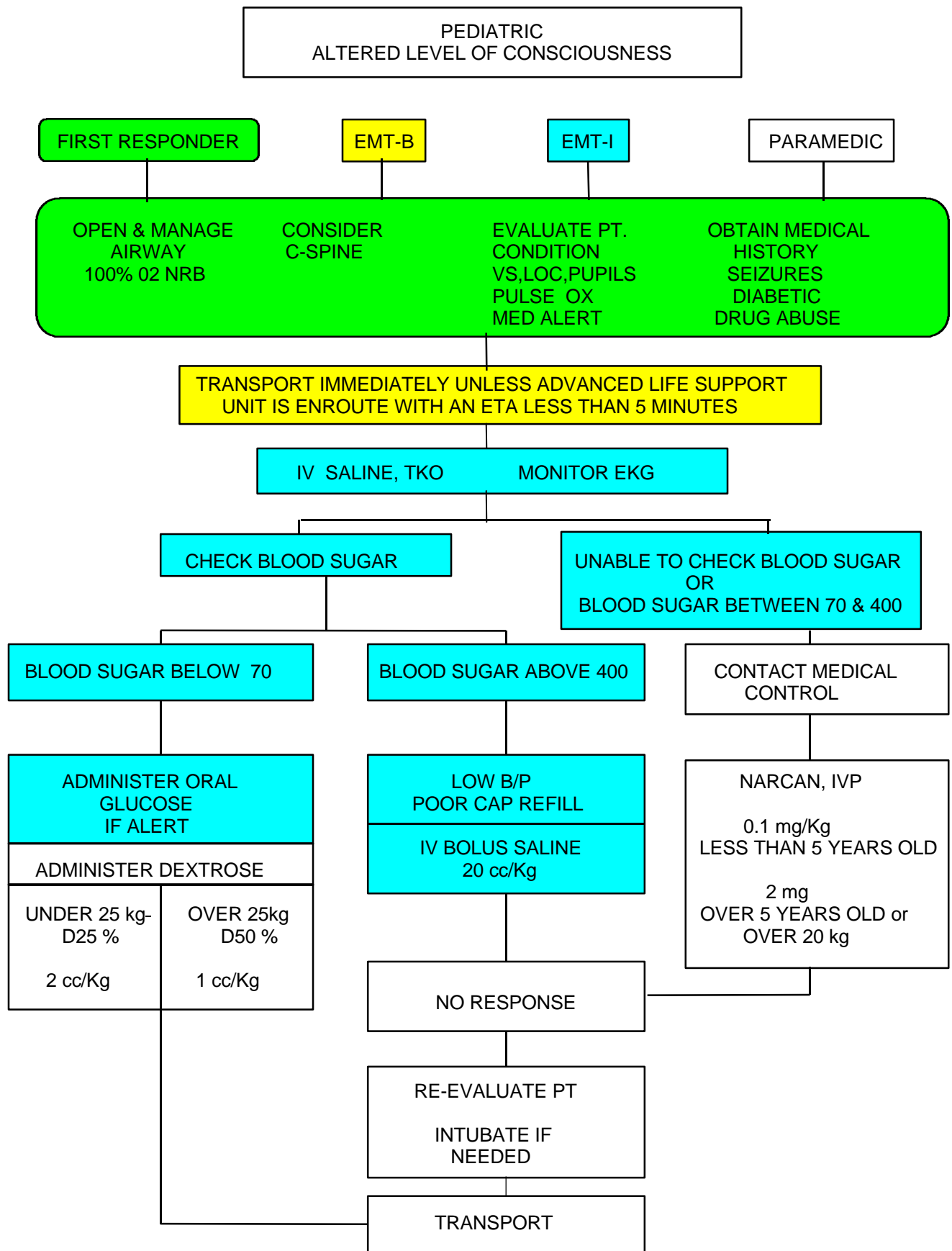
- 2. If blood sugar is greater than 400, TRANSPORT.
- E. If unable to check blood sugar or blood sugar is between 70 and 400, establish communications with Medical Control and advise of patient condition.
- F. If any of the following are present: patient is unresponsive, appears dry, has a low BP, poor capillary refill and/or blood sugar is above 400, IV fluid bolus 20cc/kg of saline.
- G. Start IV saline, TKO, while enroute to hospital

DO NOT DELAY TRANSPORT

PARAMEDIC

- A. Assume charge of situation and confer with EMTs about condition of patient and situation.
- B. If patient does not have a secure, protective airway, intubate patient per intubation procedure.
- C. Apply monitor and check rhythm.
- D. Start IV/IO saline. If any of the following are present: patient is unresponsive, appears dry, has a low BP, or poor capillary refill, try a fluid challenge of 20cc/kg saline IV/IO push.
- E. Determine blood sugar level by available means. Treat accordingly:
 - 1. Blood sugar less than 70, administer IV bolus:
 - a. 2ml/kg of 25% dextrose (D25) for children under 50 pounds (25 kgs) or 1ml/kg of 50% dextrose (D50) diluted with 1ml/kg of sterile water.
 - b. 1ml/kg of 50% dextrose (D50) for children over 50 pounds (25 kgs)
 - c. May be repeated in 10 minutes if blood sugar remains below 70
 - 2. Blood sugar greater than 400 and signs of hypoperfusion are present, administer an IV fluid bolus:
 - a. 20cc/kg of saline
 - b. May be repeated if no response in 10 minutes.
- F. If blood sugar is normal, respirations are impaired, or patient does not respond to dextrose or fluid bolus, administer narcan;
 - a. Patients under 5 years old: 0.1 mg/kg IV bolus
 - b. Patients over 5 years old or greater than 20 kg in weight: 2 mg

If patient improves somewhat with narcan but is not fully awake, contact Medical Control for repeat dose.
- G. Re-evaluate patient condition, contact Medical Control, and transport to the hospital.
- H. In some cases patient may require restraint, and should not be transported until completely restrained.



PEDIATRIC ARRHYTHMIA

GENERAL CONSIDERATIONS

- A. In the treatment of cardiac arrhythmia, current American Heart Association guidelines were referred to for protocol development.
- B. Life-threatening cardiac rhythm disturbances in children are more frequently the result rather than the cause of acute cardiovascular emergencies
- C. In infants and children, arrhythmia should be treated as an emergency only if:
 - 1. the arrhythmia compromises cardiac output, or
 - 2. the arrhythmia has the potential for degenerating into a rhythm that compromises cardiac output
- D. Initial therapy in children will consist of proper ventilation and oxygenation, along with the assessment of cardiac output
- E. Transport is essential when advanced cardiac life support is not available within ten minutes of receipt of the call
- F. Refer to length based drug treatment guide (e.g. BROSELOW PEDIATRIC EMERGENCY TAPE) when unsure about patient weight, age and/or drug dosage.

FIRST RESPONDER

- A. Per current American Heart Association Pediatric Basic Life Support guidelines, establish unresponsiveness, give two quick breaths, assess pulse and begin compressions if indicated. Immobilize cervical spine if indicated.
- B. Assist ventilation with bag-valve-mask while administering 100% oxygen or provide mouth to mouth ventilation using barrier device.

EMT-B / EMT-I

- A. If patient show signs of decreased cardiac output (decreased LOC, poor capillary refill, low blood pressure,) and a slow heart rate does not respond to oxygenation, start CPR.

Less than 60 in infants and children

- B. Evaluate patient's general appearance and determine:
 - 1. Vital signs
 - 2. Level of consciousness
 - 3. Cardiac output
 - 4. Lung sounds

EMT-B / EMT-I CONTINUED

- C. Obtain relevant history of current condition.
- D. Establish communications with Medical Control and advise of patient condition. Transport IMMEDIATELY unless an advanced life support unit is enroute and has an ETA of less than 5 minutes to the scene.
- E. If cardiac monitor is available, and patient has an unusual and/or irregular heart rate or pulse, apply monitor and run a strip for interpretation by ED Physician, during transport only.

PARAMEDIC

- A. Assume charge of situation and confer with EMTs about condition of patient and situation.
- B. Assess airway adequacy and intubate if indicated.
- C. Apply monitor and determine rhythm.
- D. Start IV saline, TKO using pediatric IV tubing set-up if available.
- E. Treat arrhythmias as follows:
 - 1. Bradycardia. Treat only if:
 - a. Infant or Child's heart rate < 60/min. and patient has decreased cardiac output.
 - b. Airway management and 100% oxygenation does not improve patient condition.
 - c. With a, and/or b:
 - i. Begin CPR
 - ii. Administer Epinephrine IV, IO, or ET every three minutes or until cardiac output improves.
 - (a) When IV or IO routes are available, administer 0.01mg/kg (0.1mL/kg) of 1:10,000
 - (b) When administering through ET tube use 0.1mg/kg (0.1 mL/kg) of 1,000 ET Epinephrine must be diluted with sterile water or NS.
 - iii. If no response, administer Atropine 0.02mg/kg May be repeated one time.

MINIMUM DOSE: 0.1mg
MAXIMUM Single DOSES: 1.0mg
 - iv. If no response, transport.
 - v. Contact Medical Control for possible cardiac pacing.

2. Supraventricular Tachycardia (SVT):
 - a. If patient is asymptomatic, do not treat. Transport immediately.
 - b. Consider hypovolemia and follow Hypovolemic Shock Protocol.
 - c. If patient is symptomatic (signs of CHF, poor capillary refill or hypotension) and rate is greater than 240:
 - i. Administer adenosine, 0.1mg/kg (maximum 6mg) RAPID IV bolus over 1 to 3 seconds followed IMMEDIATELY with a 10cc bolus of saline(within 5 seconds)
 - ii. If no conversion, repeat adenosine in 1-2 minutes, 0.2mg/kg (maximum 12mg) RAPID IV bolus followed IMMEDIATELY with a 10cc bolus of saline(within 5 seconds)
 - iii. If no conversion, repeat adenosine in 1-2 minutes, 0.2mg/kg (maximum 12mg) RAPID IV bolus followed IMMEDIATELY with a 10cc bolus of saline(within 5 seconds)

MAXIMUM OF 3 DOSES (30mg) OF ADENOSINE
 - iv. Contact Medical Control for possible synchronized cardioversion at 0.5 joules per kg
 - v. Transport

PEDIATRIC CARDIO-RESPIRATORY ARREST

GENERAL CONSIDERATIONS

- A. Cardiac arrest in children is primarily due to the lack of an adequate airway, resulting in hypoxia.
- B. All EMT personnel must concentrate on opening and maintaining the airway and providing 100% oxygenation.
- C. When using BVM ventilation, cricoid pressure can be applied to occlude the esophagus and prevent gastric distention. Cricoid pressure can be applied until an ET tube can be inserted.
- D. Transport immediately when excessive hemorrhage or hypothermia is present. Advanced life support measures should be carried out during transportation.
- E. If peripheral IV's cannot be established, venous access should be obtained by Interosseous route (IO)
- F. If IV or IO access cannot be established, administer appropriate medications through the endotracheal tube.
- G. If Sudden Infant Death Syndrome (SIDS) is suspected:
 - 1. Initiate basic and advanced life support, unless apparent rigor mortis or signs of lividity are present.
 - 2. Be supportive of family.
 - 3. Encourage family to have friends or neighbors accompany them to the hospital.
 - 4. If infant is not resuscitated, refer parents to Social Services at the Emergency Department to initiate counseling.
- H. Refer to length based drug treatment guide (e.g. BROSELOW PEDIATRIC EMERGENCY TAPE) when unsure about patient weight, age and/or drug dosage.

FIRST RESPONDER

- A. Open and maintain airway with sniffing position.
- B. Ventilate with 100% oxygen, via bag valve mask with oxygen reservoir.
- C. Initiate cardiac compressions in accordance with American Heart Association guidelines.

EMT-B

- A. Establish communications with Medical Control and advise of patient condition. Transport IMMEDIATELY unless an advanced life support unit is enroute and has an ETA of less than 5 minutes to the scene.

EMT-I

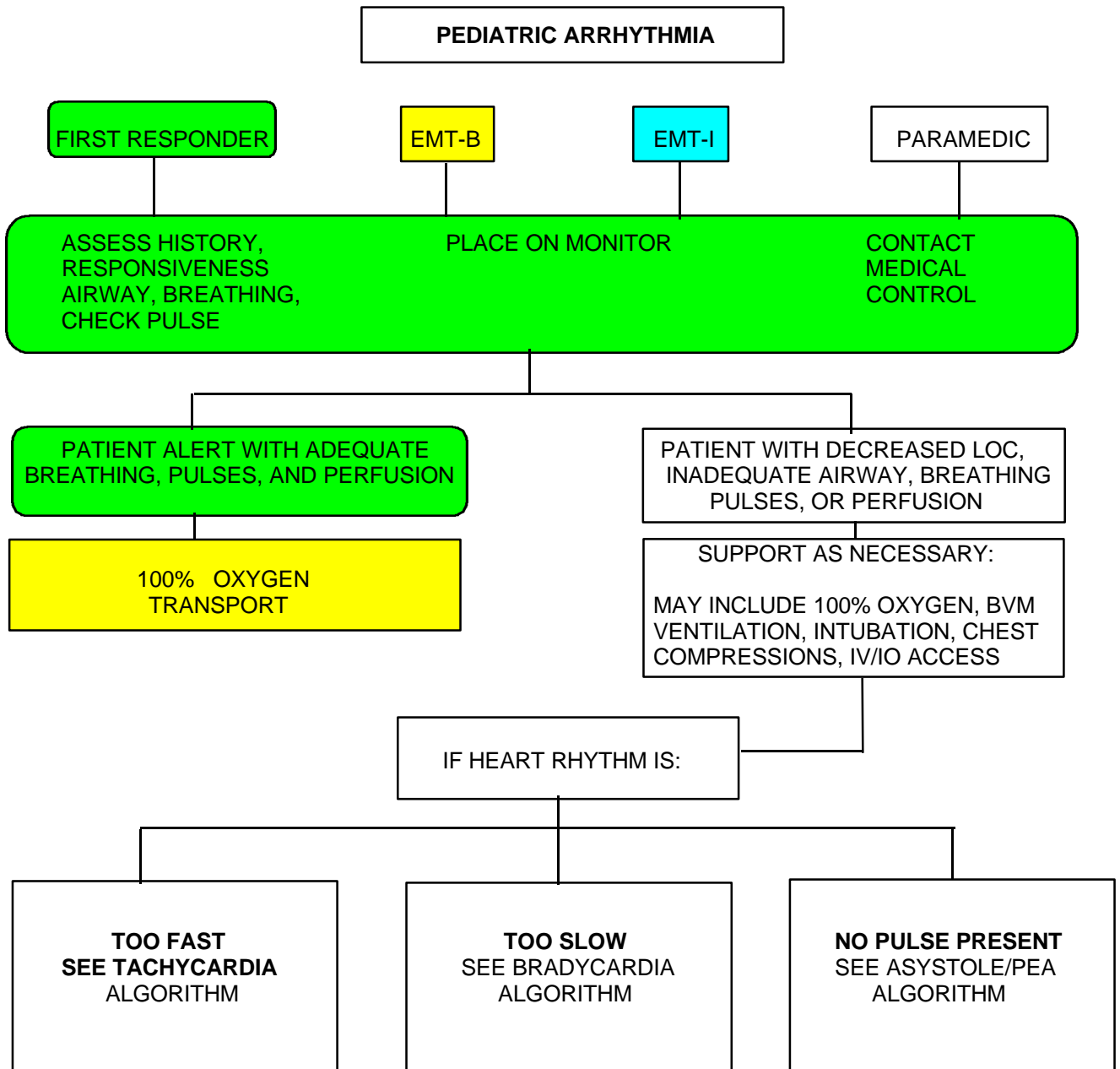
- A. Assume charge and confer with EMT as to patient condition and circumstances.
- B. Apply cardiac monitor and check rhythm.
- C. If monitor shows ventricular fibrillation or pulseless ventricular tachycardia:
 - 1. Defibrillate 2 joules/kg
 - 2. If no change, defibrillate 4 joules/kg
 - 3. If no change, defibrillate 4 joules/kg
 - 4. If no change, continue CPR and transport
- D. Start IV or IO of saline with pediatric IV tubing set-up, if available, and give fluid bolus of 20cc/kg. IV should be accomplished enroute to hospital.

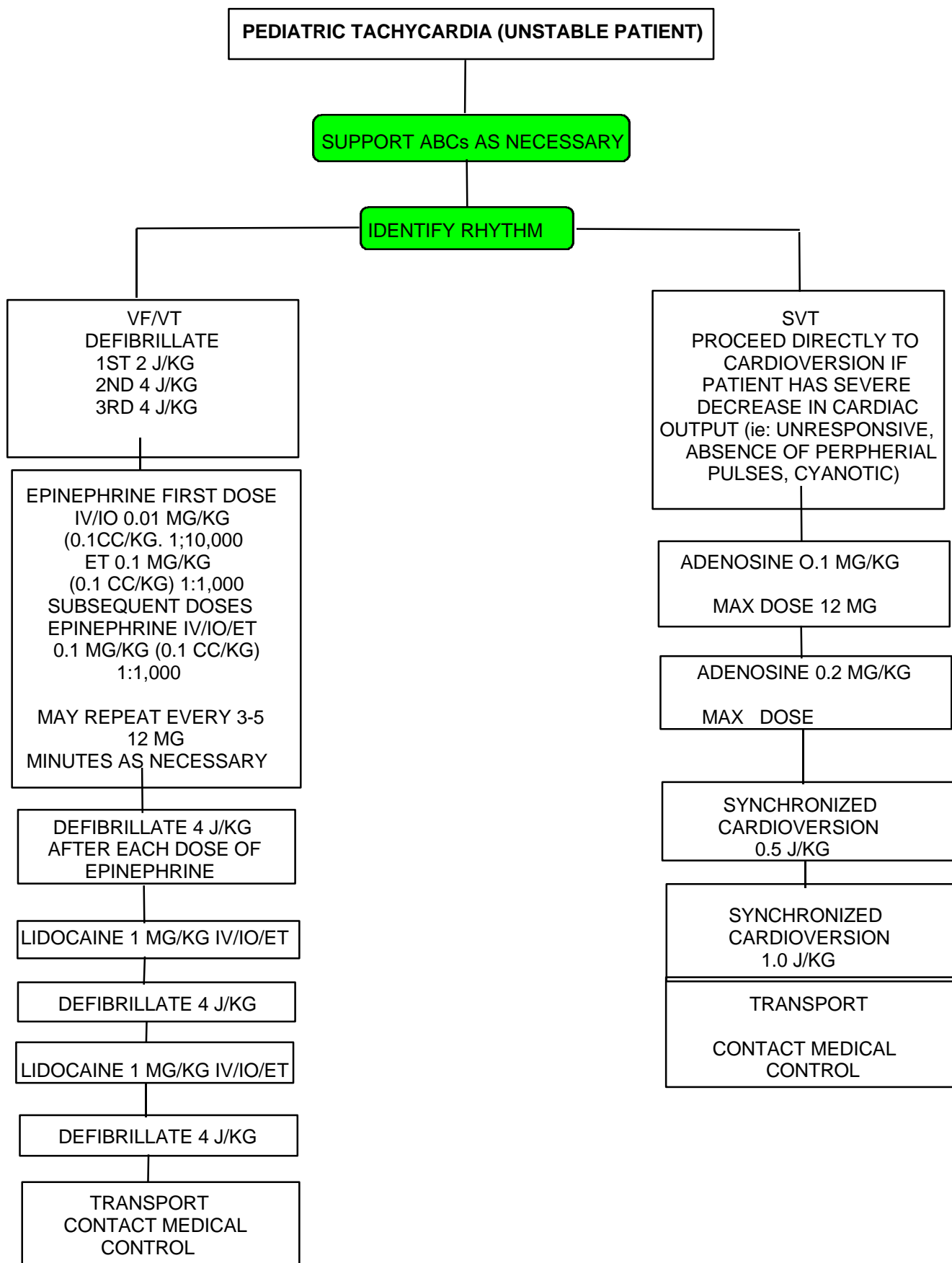
DO NOT DELAY TRANSPORT

PARAMEDIC

- A. Assume charge and confer with EMTs as to patient condition and circumstances.
- B. If EMT-I is in a cycle of defibrillation, complete cycle before continuing.
- C. Assess airway and intubate patient if needed.
- D. Establish IV or IO, whichever is quickest.
- E. Apply monitor. If one of the following conditions exists, treat as follows:
 - 1. Ventricular fibrillation or pulseless ventricular tachycardia:
 - a. Defibrillate 2 joules/kg
 - b. If no response, defibrillate 4 joules/kg
 - c. If no response, defibrillate 4 joules/kg
 - d. If no response, CPR and administer Epinephrine IV, IO, or ET every 3 minutes
 - i. When IV or IO routes are available, administer 0.01mg/kg (0.1 mL/kg) of 1:10,000 for first dose and 0.1mg/kg (0.1 mL/kg) of 1:1,000 for additional doses
 - ii. When administering through ET tube use 0.1mg/kg (0.1mL/kg) of 1,000 ET Epinephrine must be diluted with 1-2mL of sterile water or saline.
 - e. If no response, defibrillate 4 joules/kg
 - f. If no response, lidocaine 1 mg/kg, IV or IO
 - g. If no response, defibrillate 4 joules/kg

- h. If no response, lidocaine 1 mg/kg, IV or IO
 - i. If no response, defibrillate 4 joules/kg
 - j. If no response, CPR and TRANSPORT.
2. Asystole / pulseless electrical activity (PEA)
- a. Confirm asystole by two different lead positions.
 - b. If rhythm is unclear and possibly ventricular fibrillation, follow Pediatric Tachycardia Unstable Patient Protocol.
 - c. TREAT CAUSE: consider hypovolemia or hypothermia, cardiac tamponade, tension pneumothorax, pulmonary embolism, hypoxemia or acidosis, hypoglycemia.
 - d. CPR and administer epinephrine IV, IO, or ET every 3 minutes.
 - i. When IV or IO routes are available, administer 0.01mg/kg (0.1 mL/kg) of 1:10,000 for first dose and 0.1mg/kg (0.1 mL/kg) of 1:1,000 for additional doses
 - ii. When administering through ET tube use 0.1mg/kg of 1,000. ET epinephrine must be diluted with 1-2cc of saline.
 - e. If no response, IV fluid bolus, 20 cc/kg of saline.
 - f. Check blood sugar and if less than 70 administer:
 - i. 2 ml/kg 25% dextrose for children under 25 kg
 - ii. 1 ml/kg 50% dextrose for children over 25 kg
 - g. If no response, CPR and TRANSPORT.





PEDIATRIC BRADYCARDIA (UNSTABLE PATIENT)

SUPPORT ABCs AS NECESSARY

IV/IO EPINEPHRINE 0.01 MG/KG
(0.1 CC/KG 1:10,000)
ET EPINEPHRINE 0.1 MG/KG
MAY REPEAT EVERY 3 MINUTES
AS NECESSARY

ATROPINE 0.02 MG/KG IV/ET
MINIMUM DOSE 0.1 MG
MAXIMUM DOSE 1.0 MG
MAY BE REPEATED ONCE

TRANSPORT
CONTACT MEDICAL CONTROL

PEDIATRIC ASYSTOLE/PEA

SUPPORT ABCs AS NECESSARY

ATTEMPT TO FIND AND
CORRECT ANY OF THE
FOLLOWING:

HYPOVOLEMIA, HYPOXIA,
HYPOTHERMIA, PNEUMOTHORAX

EPINEPHRINE FIRST DOSE

0.01 MG/KG IV/IO

(0.1 CC/KG 1:10,000)

0.1MG/KG ET

(0.1 CC/KG 1:1,000)

EPINEPHRINE 2ND & SUBSEQUENT
DOSES

0.1 MG/KG IV/IO/ET

(0.1 CC/KG 1:1,000)

REPEAT EVERY 3-5 MINUTES

IV FLUID BOLUS

20 CC/KG NS OR LR

MAY REPEAT AS NECESSARY

TRANSPORT
CONTACT MEDICAL CONTROL

CHILD ABUSE / NEGLECT

GENERAL CONSIDERATIONS

- A. Child abuse/neglect are widespread enough that nearly all EMTs and Paramedics will see these problems at some time. The first step in recognizing abuse or neglect is to accept that they exist.
- B. Initiate treatment as necessary for situation using established protocols.
- C. If possible remove child from scene, transporting to hospital even if there is no medical reason for transport.
- D. If parents refuse permission to transport, notify law enforcement for appropriate disposition. If patient is in immediate danger, let law enforcement handle scene.
- E. Advise parents to go to hospital. **AVOID ACCUSATIONS** as this may delay transport. Adult with child may not be the abuser.
- F. Carefully document findings and report to physicians at the hospital. An EMT must also report or assure that actual or suspected child abuse/neglect is reported to the local law enforcement agency or the Children's Services Board.

DOCUMENT THIS NOTIFICATION

DO NOT JEOPARDIZE YOUR SAFETY

FEVER

GENERAL CONSIDERATIONS

- A. If febrile, remove excess clothing, but take great care to avoid shivering. Consider environment and temperature of vehicle.
- B. DO NOT sponge child unless treating for heat exposure. (This includes use of moist towels to “cool” the child)
- C. Suggest transport or urgent medical attention for all infants < 8 weeks of age with a reported temperature > 100.4F (38C) or < 96F(35.5C).
- D. Obtain history:
 - 1. Feeding
 - 2. Previous Illnesses
 - 3. Degree of Temperature
 - 4. Medications or Therapies Administered
 - 5. Immunizations

INTERMEDIATE

- A. Peripheral venous access lines will be the first route for fluid and drug administration for any life or limb threatening emergency situation.
- B. Unless there are compelling factors, no more than two attempts at peripheral access should be made in the pediatric patient.
- C. In **life threatening situation** where venous access appears futile, immediately establish Interosseous access.
- D. Intraosseous Infusion
 - 1. The following are guidelines for the UNSTABLE child requiring alternative vascular access AFTER ensuring airway and ventilation are established:
 - a. **Indications:** Route of choice for fluid and/or drug administration when peripheral IV access cannot be obtained with two quick attempts in < 90 seconds and child is unstable (severely altered vital signs, markedly decreased level of consciousness).
 - b. **Contra-indications:** Recently fractured bone, known bone disorder, unsuccessful prior attempt. Relative Contra-indication: cellulitis or infected burn at site
 - c. **Equipment:** Bone marrow aspiration needle, iodine and alcohol preps, 5cc syringe. Local anesthetic optional.
 - 2. **Procedure:**
 - a. Select site (Tibia preferred)
 - Tibia** - anteromedial aspect of proximal tibial shaft, 1-3 cm below tibial tuberosity.
 - Femur** - distal 1/3 of femur, midline, 3 cm above condyle
 - b.. Prep skin with iodine and alcohol.
 - c. After penetration of the skin, direct the needle at 90 degree angle OR at a slight 10-15 degree vertical angle away from knee, while applying gentle pressure, using a twisting motion.
 - d. After penetration through the cortex, as marrow cavity is entered, operator may feel a 'pop' or less resistance. Remove the inner stylet and attach 5cc syringe.
 - e. Placement usually confirmed by successful fluid administration without edema or swelling.
 - f. Connect to conventional IV tubing and infuse fluids, blood or drugs as per protocol. If infusion fails to run, or runs slowly, flush needle with 5 mL's of isotonic solution.
 - g . Secure as needed, immobilize extremity and observe site frequently for extravasation of fluid.
 - h Infusion may require pressure bag to maintain patency or 60 cc syringe to provide bolus dosing.
 - i . Document procedure and child's response.
- E. Fluid of choice is Normal Saline or lactated ringers, utilizing a macrodrip administration set. If child is less than 2 years old a microdrip set should be used if available.

PARAMEDIC

- A. When peripheral or IO access is not available for administering medications:
1. If an ET tube is in place, the ET tube should be the route of administration for
Lidocaine
Atropine
Narcan
Epinephrine
 2. Intramuscular (IM) route may be used for versed or morphine.
 3. Rectal route may be used for Valium (diazepam).

MULTI-TRAUMA

GENERAL CONSIDERATIONS

- A. Pediatric Trauma care should primarily follow the Adult Protocol.
- B. Areas where special focus should occur:
 - 1. May involve both respiratory failure and shock.
 - 2. Assessment and support of cardiopulmonary function is fundamental.
- C. Common errors of pediatric trauma resuscitation are:
 - 1. Failure to open and maintain the airway.
 - 2. Failure to provide appropriate fluid resuscitation to children with head injury.
 - 3. Failure to recognize and treat internal hemorrhage.
- D. IO infusion is indicated in the trauma setting when shock needs to be treated and rapid venous access is unobtainable.
- E. The Proper size equipment is very important to resuscitation care. Refer to length based drug treatment guide (e.g. BROSELOW PEDIATRIC EMERGENCY TAPE) when unsure about patient weight, age and/or drug dosage and when choosing equipment size.
- F. MAST devices are not indicated except for the treatment of shock associated with unstable pelvic fractures.

GENERAL CONSIDERATIONS

- A. Body heat must always be maintained. As soon as the baby is born, wipe the baby dry and place in a warm environment. The following are ways to maintain body heat:
 - 1. Cover infant's head, place infant against mother's skin, and cover both.
 - 2. Use child seat with heat packs under and beside infant. Be sure to place towels between heat packs and infant.
 - 3. Use indirect, heated, humidified oxygen if available.
- B. Always position infant in the sniffing position (1" towel under shoulders). This will allow for an adequate open airway and drainage of secretions.
- C. Intermittently suction infant until airway is clear of all secretions. Prolonged deep suction may cause bradycardia.
 - 1. Meconium aspiration is a major cause of death and morbidity among infant. If thick meconium is present and not removed adequately a high percentage (60%) of these infant will aspirate the meconium.
 - 2. If meconium is present, suction the mouth and nose thoroughly. It may also be necessary to visualize the trachea and suction the lower airway. Lower airway suction is achieved by intubating the infant and suctioning directly through the ET tube. Each time this suctioning is done the infant will have to be reintubated with a new tube. This lower airway suction is only done when thick meconium is present; watery or thin meconium does not require routine endotracheal intubation.
 - a. Mechanical suction may be used on infant but only if the suction pressure does not exceed -100 mmHg or -136 cmH₂O. Bulb suctioning is preferred.
- D. If drying and suction has not provided enough tactile stimulation, try flicking the infant's feet and/or rubbing the infant's back. If this stimulation does not improve the infant's breathing, then BVM may be necessary.
- E. Avoid direct application of cool oxygen to infant's facial area as this may cause respiratory depression due to a strong mammalian dive reflex immediately after birth
- F. American Heart Association standards will be used as a guideline for both Basic and Advanced Life Support procedures.
- G. Refer to length based drug treatment guide (e.g. BROSELOW PEDIATRIC EMERGENCY TAPE) when unsure about patient weight, age and/or drug dosage.

FIRST RESPONDER

- A. After delivery of the newborn's head, but prior to delivery of the body, quickly and thoroughly suction mouth, oropharynx, then nose with a bulb syringe.
- B. After delivery of the infant, assess airway and breathing while drying and positioning head down. If amniotic fluid NOT clear, continue to suction PRIOR to ventilating and stimulating.

FIRST RESPONDER CONTINUED

- C. If infant not breathing, assist ventilations via mouth to mouth using barrier device.

- D. If no pulse or pulse below 60, begin CPR.
- E. Keep infant warm. Wrap in dry blankets.

EMT-B / EMT-I

- A. If heart rate is < 100, BVM ventilation is necessary to increase heart rate.
- B. If heart rate is < 80 despite adequate ventilation, cardiac compressions should be initiated.
- C. BVM ventilation is also indicated for apnea and persistent central cyanosis.
- D. BVM ventilation rate should be between 40 and 60 breaths per minute. Cardiac compression rate should be at a rate of 120 times per minute.(COMPRESSION TO BREATH RATIO OF 3:1)
- E. Establish communications with Medical Control and advise of patient condition. Transport IMMEDIATELY unless an advanced life support unit is enroute and has an ETA of less than 5 minutes to the scene.

PARAMEDIC

- A. Assume charge of situation and confer with EMTs about condition of patient and situation.
- B. Intubate patient if thick meconium is present in lower airway; suction through ET tube using a meconium aspirator and reintubate with new tube.
- C. Apply monitor and check rhythm.
- D. If asystole or spontaneous heart rate is less than 80 despite adequate ventilation:
 - 1. Administer epinephrine 0.01-0.03 mg/kg (0.1-0.3 mL/kg) of 1:10,000 via IV or ET
 - 2. If no response, repeat every 3-5 minutes.
- E. Establish IV or IO.
- F. If infant shows signs of hypovolemia, administer saline 10 cc/kg over 5 minutes
- G. Consider narcan administration if respirations are depressed and narcotic dependence is suspected
 - 1. 0.1mg/kg repeated every 3 minutes until respirations improve.
- H. Check blood sugar level and administer 1cc/kg of 10% Dextrose if level is below 40
- I. Transport to hospital.

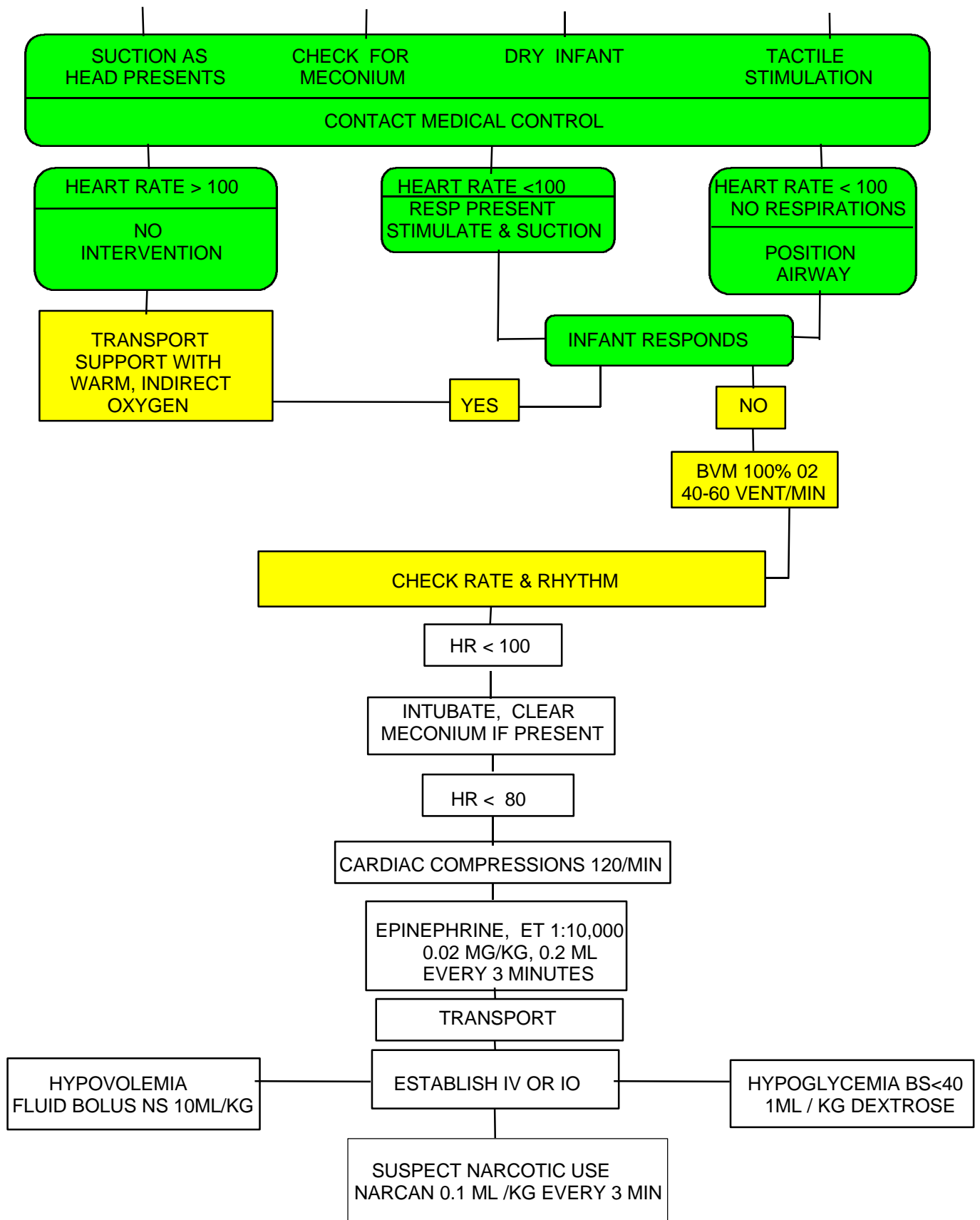
NEWBORN RESUSCITATION

FIRST RESPONDER

EMT-B

EMT-I

PARAMEDIC



PEDIATRIC RESPIRATORY DISTRESS

GENERAL CONSIDERATIONS

- A. In children, open airway by using the sniffing position.
- B. In suspected cases of upper airway obstructions, DO NOT attempt to visualize the airway; unless a foreign body is suspected. Keep patient calm and transport upright.
- C. If BVM ventilation is necessary, cricoid pressure can be applied to minimize gastric distention until airway is secured.
- D. Refer to length based drug treatment guide (e.g. BROSELOW PEDIATRIC EMERGENCY TAPE) when unsure about patient weight, age and/or drug dosage.
- E. Evaluate patient's general appearance, relevant history of condition and determine:

Onset
Provokes
Quality
Radiates
Severity
Time
Interventions

Allergies
Medication
Past Medical History – especially RESPIRATORY
Last Meal
Events leading to present illness

UPPER AIRWAY OBSTRUCTION

Stridor, gagging or choking in the breathing patient with respiratory distress may indicate upper airway obstruction.

FIRST RESPONDER

- A. Quickly obtain history and non-invasive respiratory assessment.
 - 1. History of foreign body airway.
 - a) Manual clearing only if foreign body is visible - NO BLIND FINGER SWEEP
 - b) Backblows and chest thrust in children less than 1 yr.
 - c) Abdominal and/or chest thrusts in children over 1 yr.
 - d) If airway cannot be cleared in 60 seconds:
 - i) Transport immediately to nearest hospital.
 - ii) Do not take history.
 - iii) Do not make further physical assessment.
 - 2. Other cause of upper airway obstruction.
 - a) DO NOT AGITATE CHILD, DO NOT EXAMINE THROAT.
 - b) Administer oxygen by NRB if tolerated or by “blow-by”.
- B. Allow the child to assume a position of comfort. The child may assume the tripod position. Encourage parent to hold the child upright. Keep child and parent (or care-giver) CALM. Do not agitate child.

- A. Transport in an upright position immediately to the nearest appropriate hospital.

EMT-I

- A. Assume charge of situation and confer with EMTs about condition of patient and situation.
- B. Reassess breath sounds and treat as follows:
 - 1. Do not establish IV access unless child is in arrest. DO NOT agitate child.
 - 2. If foreign body in airway is suspected in unconscious patient with complete obstruction and basic procedures are unsuccessful, try to visualize obstruction with laryngoscope.

PARAMEDIC

- A. Assume charge of situation and confer with EMTs about condition of patient and situation
- B. Reassess breath sounds and treat as follows:
 - 1. If cause of upper airway obstruction is unknown and child is calm, a normal saline aerosol may be administered. DO NOT further agitate child.
 - 2. Do not attempt invasive airway unless child has respiratory arrest. Bag-valve mask ventilation is acceptable.
 - 3. If foreign body in airway is suspected in unconscious patient with complete obstruction, and basic procedures are unsuccessful, try to visualize obstruction with laryngoscope and remove with magill forceps.
 - 4. If airway is completely obstructed a needle, or surgical cricothyrotomy may be life saving. Contact medical control. A Pedi trach may be used if available.

**PEDIATRIC RESPIRATORY DISTRESS
LOWER AIRWAY OBSTRUCTION**

Wheezing in the breathing patient with respiratory distress indicates lower airway disease, which may come from a variety of causes. The patient with severe lower airway disease may have altered LOC, be unable to talk, may have absent or markedly decreased breath sounds and severe retractions with accessory muscle use.

FIRST RESPONDER

- A.. Place child in position of comfort, encourage parent to hold child upright. Keep child and parent CALM.
- B. Quickly obtain history and non-invasive respiratory assessment.
- C. Administer 100% Oxygen in the least threatening manner.
- D. If respiratory effort is insufficient or patient is becoming unconscious, assist ventilations with bag-valve-mask.
 - 1. If allergic reaction is suspected:
 - a) Secure airway and support with oxygen.
 - b) Ask patient or bystanders if epinephrine by auto-injector has been prescribed for these situations, administer medication as per protocol, then transport patient immediately.
 - 2. For other causes of wheezing:
 - a) Ask patient or bystanders if a bronchial dilator by inhaler has been prescribed for these situations. If they have the medication with them, administer medication as per protocol, then transport patient.

EMT-B

- A. IF MEDICATION IS NOT AVAILABLE- Transport immediately, unless ALS unit is enroute and has an ETA of less than 5 minutes

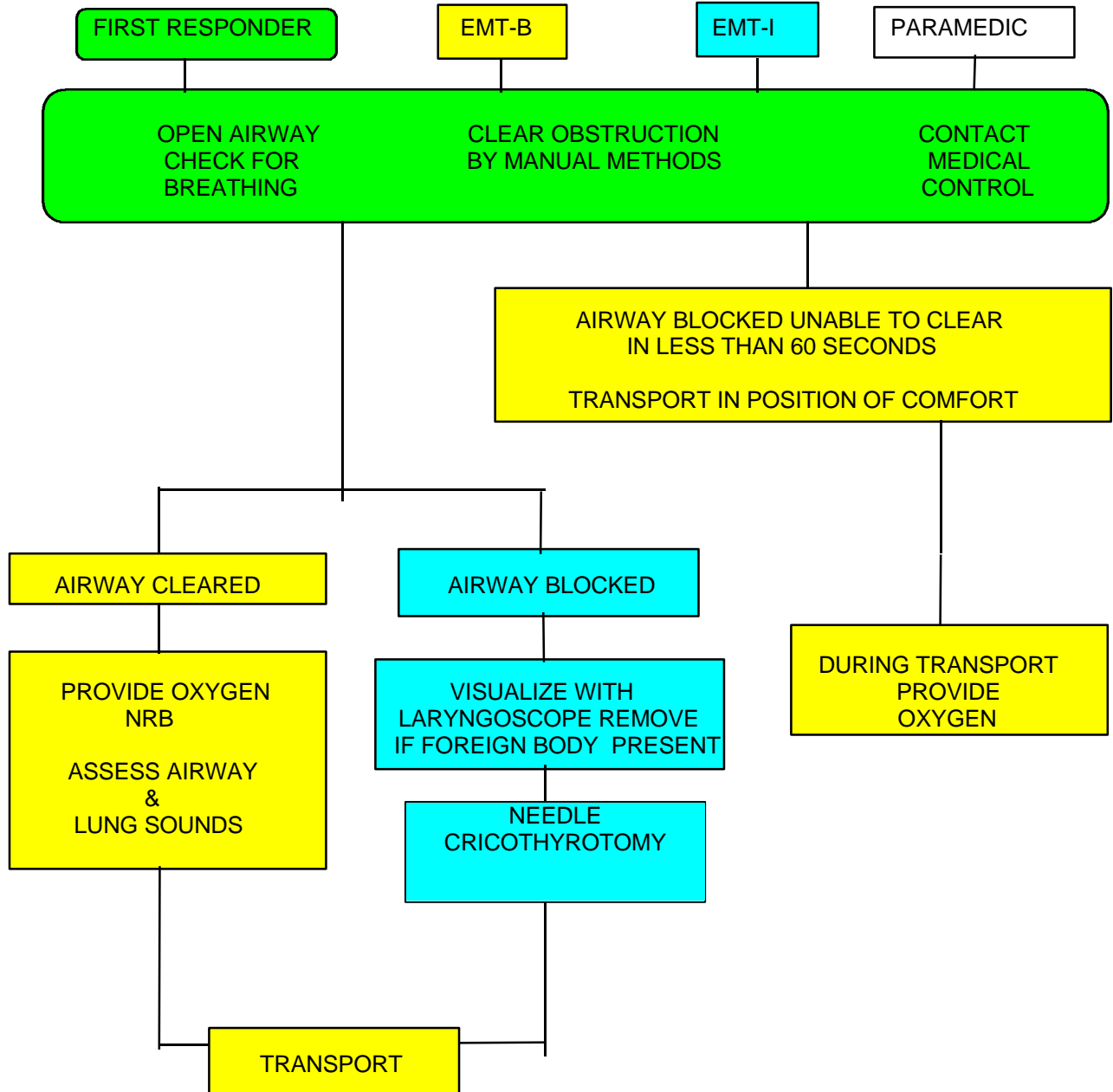
EMT-I

- A. Assume charge of situation.
- B. Reassess breath sounds.
- C. DO NOT establish IV access unless child is in arrest. Do not agitate child.
 - 1. If allergic reaction is suspected.
 - a) Give 0.01 mg/kg (0.01 mL/kg) of 1:1000 epinephrine by subcutaneous injections MAX Dose 0.3mg (0.3mL)

PARAMEDIC

- A. Assume charge of situation and confer with EMTs about condition of patient and situations.
- B. Reassess breath sounds and treat as follows
 - 1. If allergic reaction is suspected:
 - a) Give 0.01 mg/kg (0.01 mL/kg) of 1:1000 epinephrine by subcutaneous injection. MAX dose 0.3mg (0.3mL)
 - 2. For other causes of wheezing:
 - a) Administer 2.5 mg albuterol aerosol with 6 L/min oxygen over 10-15 minutes. Observe and document child's response. If no improvement, notify receiving facility or Medical Control.
 - b) DO NOT attempt invasive airway unless child has respiratory arrest.

PEDIATRIC RESPIRATORY DISTRESS
UPPER AIRWAY OBSTRUCTION



PEDIATRIC RESPIRATORY DISTRESS
LOWER AIRWAY DISEASE

FIRST RESPONDER

EMT-B

EMT-I

PARAMEDIC

OPEN AIRWAY
PROVIDE OXYGEN
NRB/BVM

EVALUATE PT.
CONDITION
PULSE OX, LUNG SOUNDS

OBTAIN HISTORY
&
MEDICATIONS

CONTACT
MEDICAL
CONTROL

TRANSPORT IN
POSITION OF COMFORT

ALLERGIC REACTION

OTHER CAUSES

ASSIST WITH AUTO INJECTOR
EPINEPHRINE

ASSIST WITH INHALER
MEDICATION

EPINEPHRINE SUBQ
0.01MG/KG
0.01ML/KG OF 1:1000
MAX DOSE 0.3mg

ALBUTEROL AEROSOL
2.5 MG WITH 8 L/MIN OXYGEN

TRANSPORT

PEDIATRIC SEIZURE

GENERAL CONSIDERATIONS

- A. The seizure has usually stopped by the time the EMS personnel arrive. The patient will normally be in the postictal state.
- B. The basic rule with seizures is to "protect and support" the patient.
- C. Aspiration precautions should include:
 - 1. Coma position: a left side-lying position with the head lowered 15 to 30 degrees.
 - 2. Suction readily available.
 - 3. Clear mouth of foreign bodies (food, gum, etc.)
- D. Febrile Seizures (seizures with fever) are common in children and should be treated like other seizures.

FIRST RESPONDER

- A. Place patient away from objects on which they might injure themselves; protect but do not restrain them.
- B. Clear and maintain airway; consider C-spine injury.
- C. Administer 100% oxygen with NRB as needed for ventilation.
- D. Obtain history from family and/or bystanders:
 - 1. Seizure history
 - 2. Description of onset of seizure
 - 3. Medication
 - 4. Other known medical history, especially fever, head trauma, diabetes, drugs
- E. Evaluate any evidence of injury, especially head trauma.

EMT-B

- A. Bring any medications with child to the hospital.
- B. Establish communications with Medical Control and advise of patient condition. Transport IMMEDIATELY unless an advanced life support unit is enroute and has an ETA of less than 5 minutes to the scene.

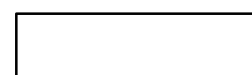
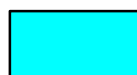
EMT-I

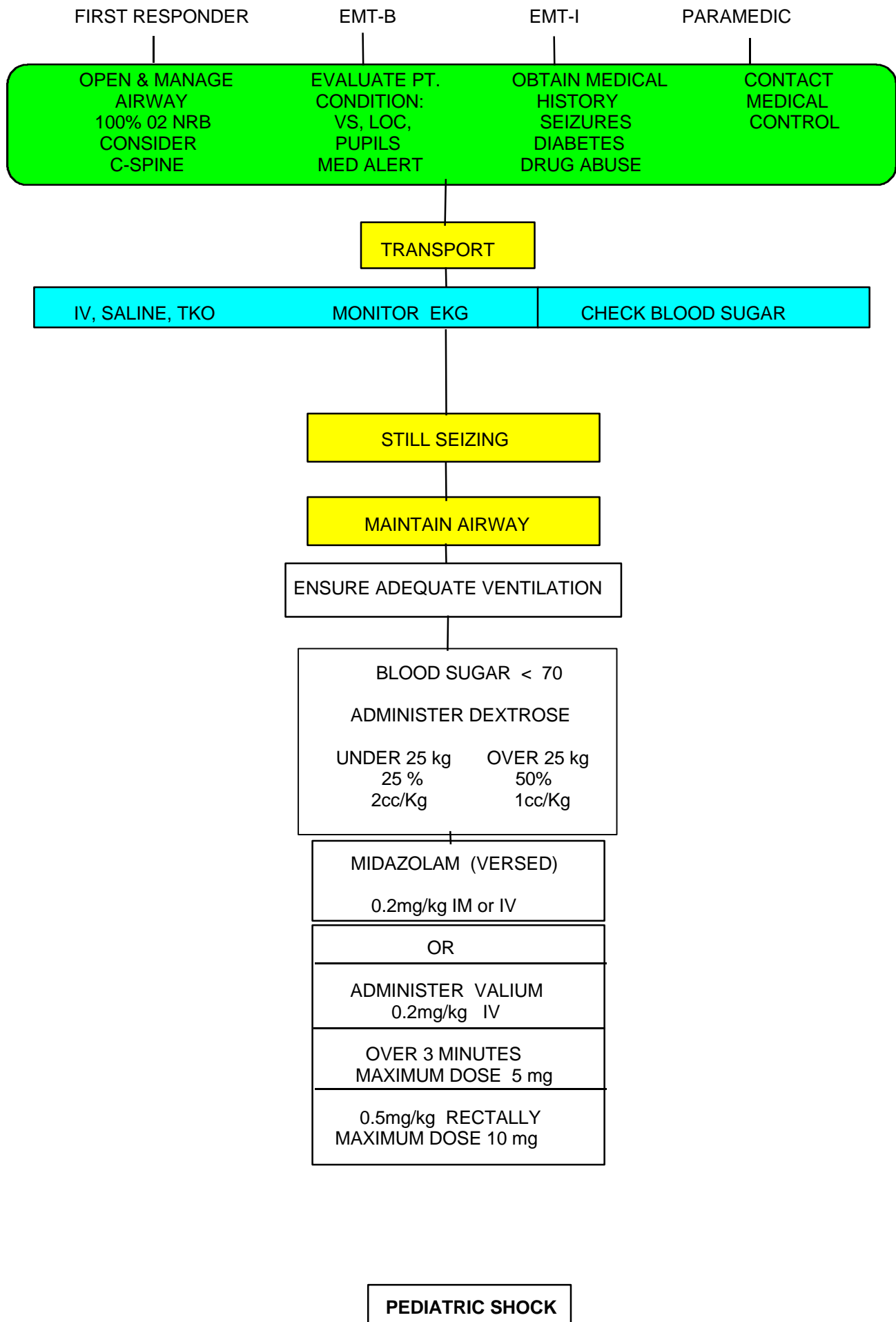
- A. Assist EMTs, obtain patient condition and circumstances.
- B. Apply monitor and check rhythm.

PARAMEDIC

- A. Assume charge of the situation and confer with EMTs about patient and situation
- B. Make sure patient has good airway. In some cases intubation may be necessary.
- C. If seizure activity persists:
 - 1. Establish airway
 - 2. Start IV per Fluid and Medication Procedure
- D. If seizure activity persists, determine blood sugar level and treat accordingly
 - 1. Blood sugar less than 70, administer IV bolus:
 - a) 2ml/kg of 25% Dextrose for children under 50 pounds (25 kg)
 - b) 1ml/kg of 50% Dextrose for children over 50 pounds (25 kg)
 - 2. Administer midazolam (versed) 0.1mg/kg IM or,
 - 3. Administer valium, 0.2 mg/kg, slow IV push over three minutes, to a maximum dosage of 5 mg.
 - a. If no IV is available, administer valium rectally, 0.5 mg/kg, to a maximum dose of 10 mg.

PEDIATRIC SEIZURES





GENERAL CONSIDERATIONS

- A. Shock is not only caused by blood loss. The EMT must evaluate for fluid loss from other causes such as excessive vomiting and/or diarrhea, heat exposure, severe infection, severe allergic reaction (anaphylaxis), spinal trauma, and heart failure.
- B. Do not use only the patient's blood pressure in evaluating shock; also look for lower body temperature, poor capillary refill, decreased level of consciousness, increased heart rate, and/or poor skin color or turgor. **Tachycardia is often the first sign of shock.**

NOTE: DO NOT depend on blood pressure.

- C. Transport should not be delayed. The airway must be secured and then transport immediately. It is preferable IVs and/or IOs be done during transportation.

FIRST RESPONDER

- A. Open and maintain the airway with sniffing position and the use of an oral airway if needed.
- B. Control all external bleeding and evaluate for internal hemorrhage and/or dehydration.
- C. Provide 100% oxygen through NRB mask, and if needed assist ventilations with a BVM.
- D. Obtain vital signs: pulse and respirations.

EMT-B

- A. Establish communications with Medical Control and advise of patient condition. Transport IMMEDIATELY unless an advanced life support unit is enroute and has an ETA of less than 5 minutes to the scene.

EMT-I

- A. Assist EMT, obtain patient condition and circumstance.
- B. Hypovolemic, Neurogenic or Septic Shock:
 - 1. Start IV saline during transport to the hospital.

DO NOT DELAY TRANSPORT FOR IV

- 2. Administer IV fluid bolus of 20cc/kg of saline if signs of hypoperfusion or dehydration are present
 - 3. Transport. Repeat bolus during transport if patient does not respond to first bolus.

EMT-I CONTINUED

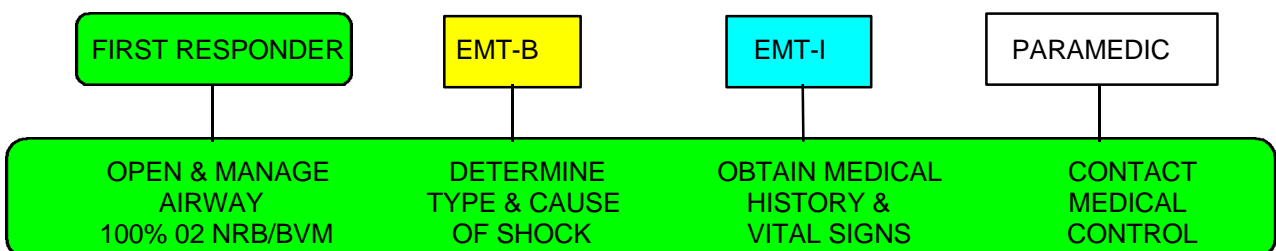
- C. Anaphylaxis from an insect bite or sting:
 - 1. If breathing difficulty with low blood pressure establish IV saline during transport.
 - a. Give 0.01cc/kg (0.01 mL) 1:1000, maximum 0.3mg (0.3mL) epinephrine by injection subcutaneously.
 - 2. Hives, itching, and/or swelling:

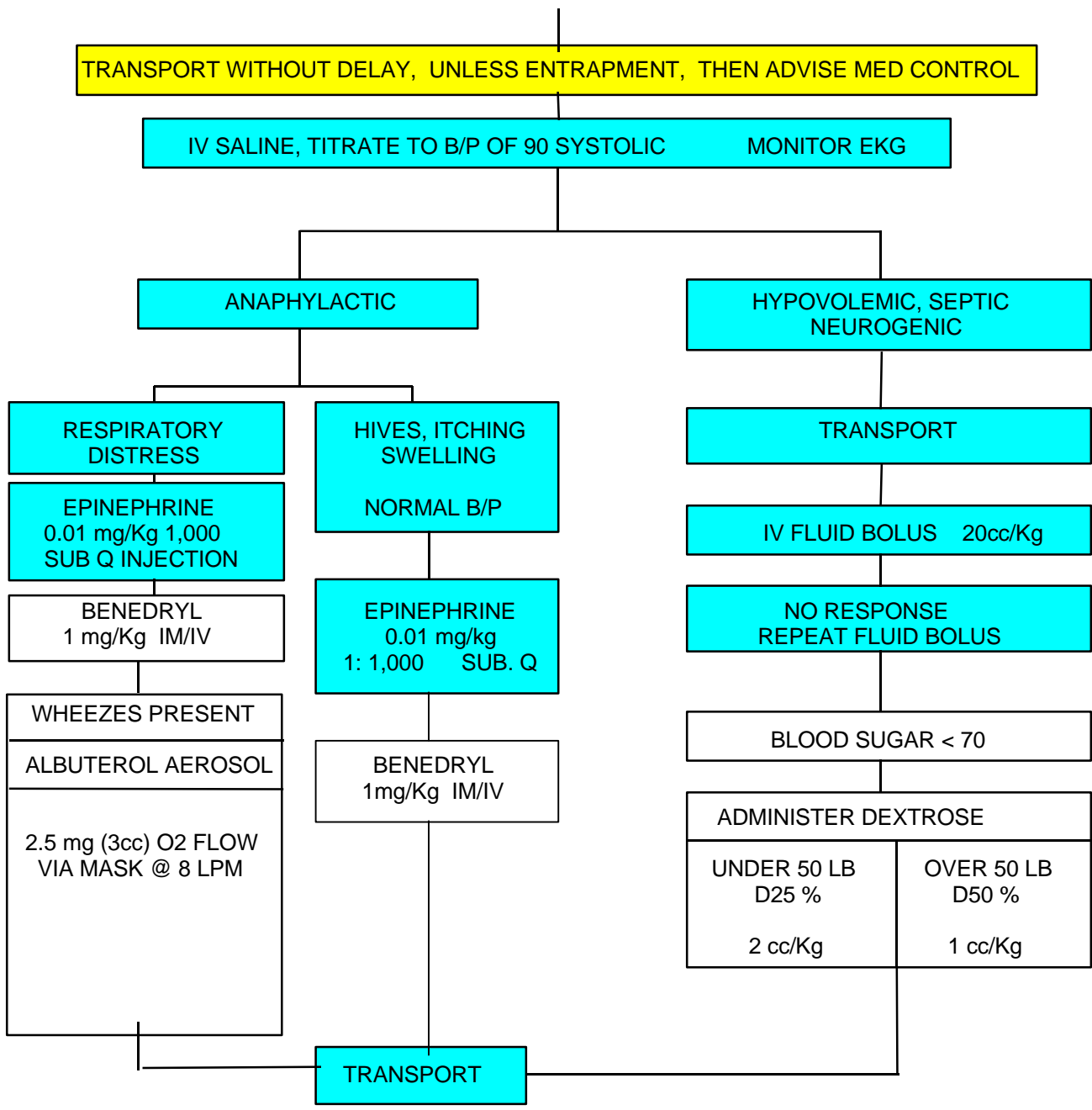
- a. Give 0.01cc/kg (0.01 mL) 1:1000, maximum 0.3mg (0.3mL) epinephrine by injection subcutaneously.
- D. Apply monitor and check rhythm.

PARAMEDIC

- A. Assume charge of situation and confer with EMTs about condition of patient and situation.
- B. Apply monitor and follow protocol for Arrhythmia.
- C. Identify type of shock and treat as follows:
 - 1. Hypovolemic, Neurogenic, Septic:
 - a. Start IV or IO saline and administer fluid bolus of 20cc/kg if sign of hypoperfusion or dehydration are present (low BP, poor capillary refill, poor skin turgor)
 - b. Repeat bolus during transport
 - c. Check blood sugar; if less than 70, administer IV bolus:
 - i. 2ml/kg of 25% Dextrose for children under 25 kg.
 - ii. 1ml/kg of 50% Dextrose for children over 25 kg.
 - 2. Anaphylactic:
 - a. Respiratory distress
 - i. Give 0.01cc/kg (1:1000) epinephrine by injection subcutaneously. Maximum dose 0.3mg.
 - ii. Administer benadryl (Diphenhydramine) to be administered 1mg/kg IM or IV
NOTE: This is especially indicated when drug reactions are suspected.
 - iii. When wheezes are present and not cleared by epinephrine, provide albuterol breathing treatment: 1 unit dose, 2.5mg (3cc), by child aerosol mask over 10-15 min.
 - b. Hives, itching, and/or swelling with normal B/P:
 - i. Give 0.01cc/kg 1:1000 epinephrine by injection subcutaneously. Maximum dose 0.3ml.
 - ii. Administer benadryl (Diphenhydramine) to be administered 1mg/kg IM or IV.
NOTE: This is especially indicated when drug reactions are suspected.

PEDIATRIC SHOCK





CHILDREN WITH SPECIAL NEEDS

SPECIAL CONSIDERATIONS

- A. Children formerly cared for in hospitals or chronic care facilities are often cared for in homes by parents or other caretakers. These children may have self limiting or chronic diseases. Many are often unstable and may frequently involve the EMS system for evaluation, stabilization, and transport.
- B. Knowing which children in a given area have special needs and keeping a log book can be very useful.
- C. Parents and caretakers are usually trained in emergency management and can be of assistance to EMS

personnel.

- D. Special needs children include children with tracheostomy tubes with or without assisted ventilation, children with gastrostomy tubes, and children with indwelling central lines. Most serious complications of these devices are related to tracheostomy problems.

EMERGENCIES IN CHILDREN WITH TRACHEOSTOMIES

FIRST RESPONDER

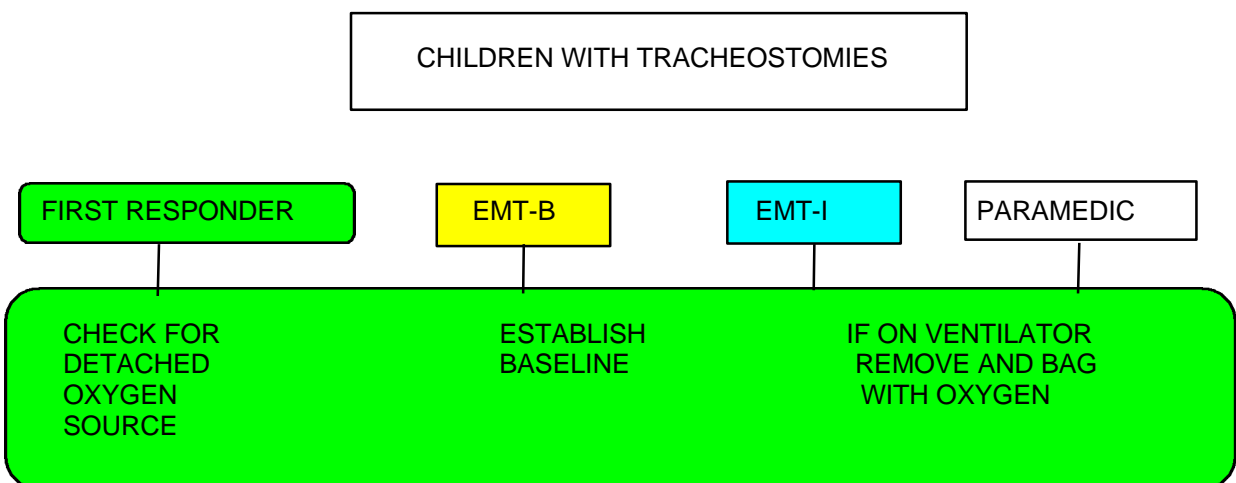
- A. Examine the child quickly for possible causes of distress which may be easily correctable, such as a detached oxygen source.
- B. Try to establish the child's baseline: the child may never look normal.
- C. If on a ventilator, remove the child from the ventilator and bag the child with a secure oxygen source; there may be a problem with the ventilator or oxygen source.

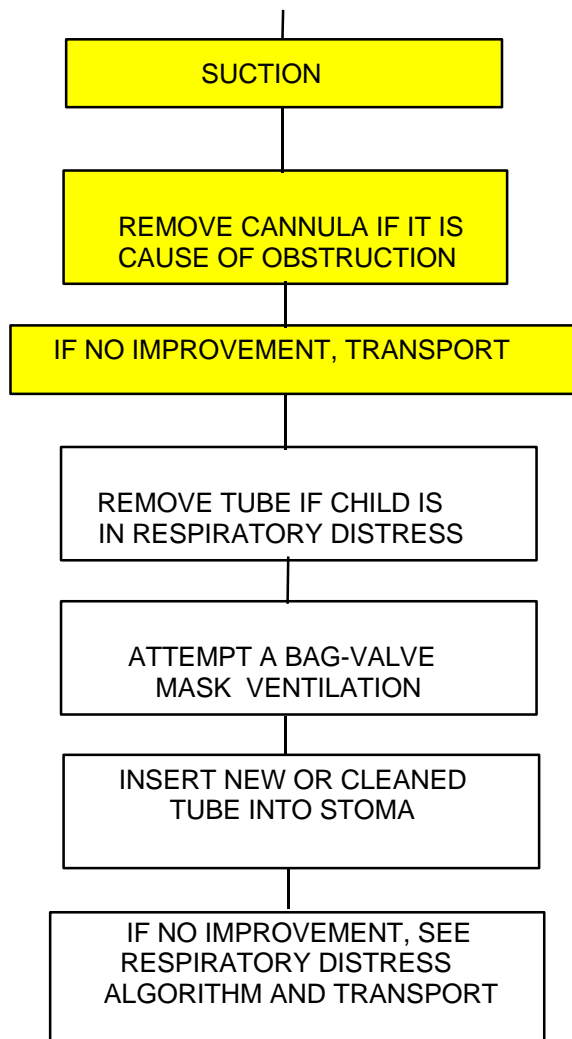
EMT-B & EMT-I

- A. Suction the child as accumulation of debris is a common cause of obstruction; if the tracheostomy tube has a cannula, remove it; if it is the cause of obstruction there should be immediate improvement.
- B. If still no improvement immediately transport to the nearest medical facility; initiate appropriate resuscitation as needed.

PARAMEDIC

- A. If there is no improvement and the child is in severe respiratory distress, the tube should be removed, attempt a bag-valve mask ventilation; if another tube is available, insert into the stoma and resume ventilation (a standard endotracheal tube may be used or the used tracheostomy tube after being cleaned.)
- B. If there is still no improvement see the respiratory distress protocol.





EMERGENCIES IN CHILDREN WITH IN DWELLING CENTRAL LINES

GENERAL CONSIDERATIONS

- A. Children may have central lines in several locations and some complications are due to location; some central lines are located under the skin and can be felt but not seen.
- B. The most common emergencies with central lines include, blockage of the line, complete or partial accidental removal, or complete or partial laceration of the line.

FIRST RESPONDER

- A. Always evaluate child for cardiovascular stability as some complications may be life threatening.
- B. Children may be experiencing complications from their underlying medical condition; ask caretakers about the child's condition.

EMT-B, EMT-I & PARAMEDIC

- A. If line is blocked, do not attempt to force the catheter open, transport to a facility capable of managing

central lines.

- B. For complete removal, do not attempt to reinsert; transport to the nearest emergency department.
 - 1. Infections are a common complication; don't try to push a line back in, even if it is only slightly out.
- C. For complete removal, maintain pressure on site until bleeding has stopped; transport child and catheter to nearest emergency department (part of the catheter may have broken off.)
 - 1. Always bring the line with you to the hospital.
- D. For partial or complete laceration of the line, clamp proximally to laceration and transport child and catheter to nearest emergency department.
- E. For children with sudden deterioration begin basic resuscitation and transport to nearest emergency facility (child may have pneumothorax or internal bleeding.)

EMERGENCIES IN CHILDREN WITH GASTROSTOMY TUBES

GENERAL CONSIDERATIONS

- A. Children with gastrostomy tubes may have complications of obstruction or dislodgment; obstruction is usually not an emergency but the child may require transport; dislodgment is not life threatening but the tube should be replaced as soon as possible. Both conditions are easily recognized.
- B. The child should be examined for any other possible problems.

FIRST RESPONDER

- A. Children who have problems with their tubes may have problems with regurgitation or aspiration.
- B. Be aware of and address any other possible problems from their underlying medical condition.

EMT-B, EMT-I & PARAMEDIC

- A. Transport the child and the tube to the nearest facility capable of replacing the tube; this is not an emergency transport.
 - 1. Do not attempt to replace the tube; it is not as easy as it seems and there may be other complications.

EMERGENCIES IN CHILDREN ON VENTILATORS

GENERAL CONSIDERATIONS

- A. Children on mechanical ventilation may exhibit sudden or gradual deterioration, cardiac arrest, increased oxygen demand, increased respiratory rate, retractions, change in mental status.

- B. Examine the child quickly for possible causes of distress which may be easily correctable (e.g. detached oxygen source) the caretakers will often have done this but double check.
- C. Medications the child is presently taking may be the cause of deterioration.
- D. Try to establish the child's baseline; the child may never look normal.

FIRST RESPONDER

- A. Remove the child from the ventilator and bag the child with a secure oxygen source; if the child improves there may be a problem with the ventilator or oxygen source.

EMT-B & EMT-I

- A. Suction the child as accumulation of debris is a common cause of obstruction; if the tracheostomy tube has a cannula, remove it; if it is the cause of obstruction, there should be immediate improvement.

PARAMEDIC

- A. If there is no improvement the tube should be removed; attempt bag-valve mask ventilation; if another tube is available insert into the stoma and resume ventilation (a standard endotracheal tube may be used or the used tracheostomy tube after being cleaned.)
- B. If there is no improvement immediately transport to the nearest medical facility; initiate appropriate resuscitation as needed.

NORMAL PEDIATRIC VITAL SIGNS¹

<u>Age</u>	<u>Pulse</u>	<u>Respiration</u>	<u>Blood Pressure</u>
Newborn	120-160	30-60	Systolic = 60-70
<1 year	120-140	30-50	systolic = 70+(2 x age) diastolic = 2/3 systolic
1-2 years	100-140	30-40	
3-5 years	100-120	20-30	
6-10 years	80-100	16-20	

¹ Reference: Children's Hospital Pediatric Reference Code Card, Columbus, Ohio, 1996

PEDIATRIC COMA SCORING²

	<u><i>Glasgow</i></u>	<u><i>Infant</i></u>	
Eye opening	Spontaneous	Spontaneous	4
	To voice	To voice	3
	To pain	To pain	2
	None	None	1
Verbal response	Oriented	Coos, babbles	5
	Confused	Irritable cry, inconsolable	4
	Inappropriate	Cries to pain,	3
	Garbled speech	Moans to pain	2
	None	None	1
Motor response	Obeys commands	Normal movements	6
	Localizes pain	Withdraws to touch	5
	Withdraws to pain	Withdraws to pain	4
	Flexion	Flexion	3
	Extension	Extension	2
	Flaccid	Flaccid	1

² A score of < 8 generally is an indication to hyperventilate the child.

PEDIATRIC PREHOSPITAL MEDICATIONS

<u>Medication</u>	<u>Dose</u>	<u>Route</u>	<u>Remarks</u>
• Acetaminophen (Tylenol)	10 mg/kg	PO	Useful for musculoskeletal pain and fever control
• Activated charcoal	1 gm/kg	PO	Do not give to child with altered level of consciousness
• Adenosine	0.1 mg/kg	IV, IO	Indicated for SVT. May double second dose; max. dose 6 mg
• Albuterol	2.5 mg	Aerosol	Indicated for wheezing as per protocol
• Atropine	0.02 mg/kg	IV, IO, ET	Minimum dose 0.1 mg; max dose for child 0.5 mg; max dose for adolescent 1.0 mg; may repeat x1; Also useful before intubating children < 5 years old, blocks bradycardia due to vagal nerve stimulation
• Bretylium	5 mg/kg	IV	May be indicated for refractory ventricular fib; double second dose
• Dextrose 25%	2 mL/kg	IV, IO	Try to obtain bedside glucose level before administering ----administer if blood glucose < 60; dilute 50% 1:1 with sterile water; consult Medical Control if infant < 1 month as solution may need to be further diluted.
• Diazepam (Valium)	0.2-0.3	IV	Indicated for uncontrolled seizure mg/kg activity; anticipate respiratory depression. Max. dose 10 mg.
• Diazepam (Valium)	0.5 mg/kg	Rectal	Indicated for uncontrolled seizure activity; anticipate respiratory depression. Max. dose 10 mg.
• Diphenhydramine (Benadryl)	1 mg/kg	IV	Useful in allergic reactions and anaphylaxis
• Epinephrine (1:10,000)	0.1 mL/kg (0.01 mg/kg)	IV, IO	Commonly used in cardiac arrest rhythms as first dose. Increase second dose 10 X (may use 1:1,000 solution).
• Epinephrine (1:1,000)	0.1 mL/kg (0.1 mg/kg)	ET, IV, IO	Commonly used in cardiac arrest rhythms. Use for all ET doses, and second and subsequent IV/IO doses. *The ET route has limited absorption, use IV/IO route whenever possible
	0.01ml/kg	SubQ	Used for anaphylaxis. Max dose is 0.3ml
• Lidocaine	1 mg/kg	IV, IO, ET	Can repeat once. If successful start continuous infusion at 20-50 mcg/kg/min. Also useful before intubating for cerebral protection and decreases airway reactivity.
• Morphine	0.1 mg/kg	IV/IM	Useful for moderate pain, may cause respiratory depression. Hypotension and reflex bradycardia may develop from histamine release
• Midazolam (Versed)	0.1 mg/kg	IV/IO/IM	Indicated for uncontrolled seizure activity; anticipate respiratory depression Useful to facilitate advanced airway management in combative patients
• Naloxone (Narcan)	0.1 mg/kg	IV, IO, ET	Useful for unknown unconscious, known narcotic overdoses
• Nalbuphine (Nubain)	0.1 mg/kg	IV	Useful for mild or moderate pain, minimal respiratory depression

IV = Intravenous

ET = endotracheal

IO = Intraosseous