EMSC Partnership for Children

National Association of EMS Physicians

Model Pediatric Protocols
2003 Revision

Pediatrics Committee
National Association of EMS Physicians
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Introduction

The Need for Standardized Protocols

Our emergency medical services system is founded on the principle of delegated practice. Medical oversight establishes a certain standard of emergency patient care, which is then carried out by prehospital providers in the field.

Broadly speaking, the term *medical oversight* encompasses both direct and indirect facets of medical control. Direct medical oversight is the on-line guidance provided by designated physicians to prehospital providers during emergency calls. Indirect medical oversight consists of training programs, patient care protocols, and quality assurance measures that are initiated by local, regional, state, and agency medical directors or advisory boards. Throughout this document, the term *Medical Direction* represents all forms of medical oversight as applied by any state, region or agency.

To make a delegated system work, medical direction must ensure that all prehospital providers are equipped to meet appropriate standards of patient care. This requires education and training, treatment protocols to guide rescuers' actions in the field, and support from qualified direct medical oversight physicians as needed. The responsibilities of medical direction include authorizing an accepted scope of practice for EMTs of varying skill levels; verifying that EMTs have received the necessary training to render field care swiftly and skillfully; and developing and approving protocols that delineate the proper steps in patient management.

Protocols represent an important element in furthering the quality of prehospital care. While they cannot replace sound clinical judgement, they facilitate rapid and effective treatment. They serve to standardize management actions so that prehospital providers will know how to proceed in a given patient presentation. They also provide an unambiguous gauge by which adherence to EMS practice standards may be measured.

Putting the Protocols to Use

EMS systems provide services under widely varying conditions. Current protocols therefore differ between agencies. The protocols developed and presented in this document provide a basis for medical direction to create or refine existing protocols to meet local, regional, and state needs. In this manner, the protocols set forth a standardized approach to pediatric treatment that can be employed by a wide variety of EMS systems.

The ultimate authority for prehospital patient care rests with medical direction and the state EMS agency. Each EMS jurisdiction must authorize each of these protocols prior to their use. Each EMS jurisdiction must review these protocols and further designate the following:

- interventions that are considered standing orders, requiring no consultation with direct medical oversight
- interventions that are considered medical oversight options, to be carried out only after obtaining approval from an on-line physician
- interventions that are not applicable due to local conditions, training, and resources

Because this is a highly individual determination, these model protocols do not designate these aspects of practice for any specific EMS system

In deciding which interventions should be standing orders and which will require authorization, EMS systems and medical direction should consider critical time factors. For certain lifesaving interventions, taking the time to consult a direct medical oversight physician before initiating the action could have a detrimental effect on patient survival. These interventions should be designated standing orders.

Examples of such actions would include

- any measure needed to establish or maintain airway patency, including advanced airway procedures
- treatment for respiratory distress, failure or arrest
- defibrillation or cardioversion for cardiopulmonary failure or arrest
- treatment for shock
- treatment for active seizures
- treatment for anaphylaxis

In addition to standing orders for life-threatening conditions, contingency guidelines should be established to address circumstances in which a direct medical oversight physician is not available.

While these protocols address both basic and advanced life support measures, they do not attempt to differentiate between the two, nor do they specify which actions are appropriate for EMS providers of varying certification levels. Proper patient care does not vary, regardless of the provider's skills or certification. Ideally, every necessary action should be carried out as specified in the protocol. Realistically, the EMT's skill level will limit the actions that can be provided in the field. Defining how these limitations will be applied to providers at different certification levels is up to medical direction. However, it is important to emphasize that basic life support of airway and breathing are, in most cases, the only actions necessary to deliver a pediatric patient safely to definitive care.

Protocols require constant reevaluation to ensure that they reflect advances in EMS training, medical knowledge, science, and technology. Medical direction must continually evaluate providers' skills to ensure competency and compliance with applicable EMS standards. Implementing new protocols may necessitate that educational and training programs be updated in both initial and continuing prehospital education to ensure that providers have the necessary skills and training to carry out their responsibilities. Medical direction must maintain an ongoing commitment to keep abreast of changes in medical knowledge that may affect the protocols. It is also essential for medical direction to implement continual quality improvement efforts that may lead to further clarification or revision of the protocols and amended standards for provider training.

Protocol Development Process

To develop these protocols, the process employed by the writing team was a combination of literature based and expert consensus judgement. To start the process the writing team reviewed more than 250 representative protocols selected from a national sample, then generated a list of commonly encountered protocols and collated the individual steps associated with each.

To ensure compliance with accepted national standards, the draft protocols were compared with practices described in the EMT-Basic and EMT-Paramedic *National Standard Curricula,* AHA *Pediatric Advanced Life Support* program, AAP and AHA *Neonatal Resuscitation* program, ACS *Advanced Trauma Life Support* program, the Center for Pediatric Emergency Medicine's *Teaching Resource for Instructors in Prehospital Pediatrics*, and NAEMT's *Prehospital Trauma Life Support* program. The published literature was also reviewed for prehospital pediatric studies that would provide additional guidance. If a point of controversy was not addressed in the prehospital literature, a search of the literature in pediatric emergency medicine was conducted and conclusions were extrapolated for applicability to the prehospital environment. Further guidance was obtained when needed from an expert consensus group representing major national professional organizations in EMSC, EMS, pediatric emergency medicine, and emergency medicine.

The resultant draft version of the protocols was mailed to representatives named by major EMS and medical professional organizations with a request for written comments. Based on the responses received, a second draft was developed.

In August 1998, a meeting was held in Washington, DC at which individuals representing the national EMS, EMSC, and medical professional organizations reviewed this second draft. Each protocol was evaluated to see if it was either supported by predominance of scientific literature or based on accepted national standards. All protocols that met one of these criteria were considered acceptable. Participants then reviewed the remaining protocols and based on consensus judgement decided which would be accepted and which would be modified to meet specific recommendations.

In addition to content decisions the group also addressed formatting and overall medical direction issues. The group determined that the protocols should be constructed so that any single protocol could be used independently. Although this strategy necessitates repeating many standard patient care steps from one protocol to the next, it serves to stress the universal importance of initial airway and breathing interventions in pediatric care and highlights the concept that many children may require only basic life support measures as delineated. Furthermore establishing stand-alone protocols greatly facilitates the selection of individual protocols from the overall document as appropriate for various systems.

The group discussed the advisability of designating which actions should be considered standing orders for each protocol, but concluded that this should be a regional decision depending on many variables, including the level of medical oversight, the training received by EMS providers at different certification levels, the clinical experience of individual EMS providers, and the frequency with which the skills are performed. The group ultimately established its recommendation that certain lifesaving procedures should be considered standing orders in all regions based on critical time factors involved. Additional factors governing standing orders should be determined by medical direction.

The group also discussed the advisability of designating separate BLS and ALS protocols and designating which steps applied to which EMS provider certification levels. While the Department of Transportation's National Highway and Traffic Safety Administration has established national training guidelines for Certified First Responder, EMT-Basic, EMT-Intermediate, and EMT-Paramedic, significant variations exist among EMS systems regarding the actual level of provider training, scope of practice, and certification levels for each of these designations. Therefore, the group concluded that while these protocols define the care to be

provided, regional EMS systems should determine which actions fall within specific providers' scope of practice.

Finally, the group noted that several protocols include decision points at which more than one treatment option or medication choice could be considered medically acceptable. For those protocols, all options would be listed and medical direction could select the option they would implement. Similarly, when a useful treatment option exists that might exceed providers' capabilities, system resources or system needs in certain regions, the step is listed with the qualifier that it should be considered as permitted by medical direction.

At the conclusion of this meeting, a third draft was generated and distributed to the writing team for comments, which were incorporated into the fourth draft.

This draft was copyedited, then forwarded to the review panel and all state and territorial EMS directors. In an effort to further broaden the input into the development process and to be as inclusive as possible, the protocols were also posted on the NAEMSP web site for download with a comment form to be returned to the writing team. The web site posting was also available through links from other major EMS and EMSC web sites. The comments obtained from this draft were incorporated into the final document. In addition to review of the document, the state EMS directors were asked to suggest mechanisms for distributing the finished protocols nationally and within their individual states and territories.

These protocols are intended to represent model treatment practices. EMS agencies can rely on them to direct patient care, whether they are implemented as standing orders or as options authorized by direct medical oversight physicians. In either case, the protocols should serve as a quality measure to ensure uniformity of care. The authors hope that individuals, EMS providers, and medical directors will use these protocols to help improve the care children receive in emergencies.

2000 and 2003 Revision Process

Since medical knowledge is an ever evolving subject, it was decided during the initial development process that it would be necessary to create an on-going review and revision process for these protocols. The process and timeline that was chosen is that there would be a review of the protocols in September of each year to determine if there was any new research data or new peer reviewed guidelines, which might necessitate a change in the protocols. If such a change was needed, the protocols would be revised with the draft circulated for comment to the organizations involved in the original review process and then edited based on those comments. The edited draft would then be presented at the annual NAEMSP meeting, first to the Pediatric Task Force and then to the board of directors for final approval. The approved and revised protocols would then be distributed as were the original set of protocols via the NAEMSP and EMSC NRC Web sites and via direct mailing to the State and Territorial EMS Directors. Lastly any revised protocols would be submitted to Prehospital Emergency Care for publication.

The first major revision occurred in the Fall of 2000 and was largely a reflection of the new Emergency Cardiac Care Committee guidelines released August, 2000. A subsequent revision employing the process as described was conducted in 2003 and included the addition of protocols for Children with Special Healthcare Needs.

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American Academy of Family Physicians	Douglas Long, MD
American Academy of Pediatrics	Joseph Wright, MD, MPH
American Ambulance Association	Karen Oldham, MD
American College of Emergency Physicians	Craig Warden, MD, MPH
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American College of Surgeons	Arthur Cooper, MD
Emergency Nurses Association	Sherri-Lynn Almeida, DrPH, RN
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National Council of State EMS Training Coordinators	Alonzo Smith
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GENERAL PATIENT CARE

This protocol provides general guidelines for patient management. Refer to additional protocols as appropriate for treatment of specific conditions. A length-based resuscitation tape is recommended to help EMS personnel quickly determine appropriate equipment size, normal vital signs, and correct drug dosages.

1. Ensure scene safety.

2. Perform a scene survey to assess environmental conditions and mechanism of illness or injury. If hazardous conditions are present (such as swift water, hazardous materials, electrical hazard, or confined space), contact an appropriate agency before approaching the patient. Wait for the designated specialist to secure the scene and patient as necessary.

3. Form a first impression of the patient's condition.

4. Observe standard precautions.

5. Establish patient responsiveness. If cervical spine trauma is suspected, manually stabilize the spine.

6. Assess the patient's airway for patency, protective reflexes and the possible need for advanced airway management. Look for signs of airway obstruction.

7. Open the airway using head tilt/chin lift if no spinal trauma is suspected, or modified jaw thrust if spinal trauma is suspected.

8. Suction as necessary.

9. Consider placing an oropharyngeal or nasopharyngeal airway adjunct if the airway cannot be maintained with positioning and the patient is unconscious.

10. Assess the patient's breathing, including rate, auscultation, inspection, effort, and adequacy of ventilation as indicated by chest rise. Obtain pulse oximeter reading.

11. If chest rise indicates inadequate ventilation, reposition airway and reassess.

12. If inadequate chest rise is noted after repositioning airway, suspect a foreign body obstruction of the airway. Refer to the appropriate protocol for treatment options.

13. Assess for signs of respiratory distress, failure, or arrest. If present, refer to the appropriate protocol for treatment options.

14. If the child is not breathing or breathing is inadequate, initiate assisted ventilation using a bag-valve-mask device with high-flow, 100% concentration oxygen. Begin with two slow, deep breaths of about 1-1/2 seconds' duration, then ventilate at 20 breaths/minute for all ages. If abdominal distention arises, consider placing a nasogastric tube to decompress the stomach.

15. If the airway cannot be maintained by other means, including attempts at assisted ventilation,

or if prolonged assisted ventilation is anticipated, perform endotracheal intubation. Consider administration of pharmacological adjuncts, such as sedatives and paralytic agents, to aid with intubation as permitted by medical direction. Confirm placement of endotracheal tube using clinical assessment and end-tidal CO_2 monitoring.

16. If breathing is adequate, place the child in a position of comfort and administer high-flow, 100% concentration oxygen as necessary. Use a nonrebreather mask or blow-by as tolerated.

17. Control hemorrhage using direct pressure or a pressure dressing.

18. Assess circulation and perfusion by measuring heart rate and observing skin color and temperature, capillary refill time, and the quality of central and peripheral pulses. Blood pressure should be measured only in children older than three years.

19. For children with absent pulses, initiate cardiopulmonary resuscitation at a combined rate of 120 compressions per minute for newborns (three compressions to each breath) or 100 compressions per minute for infants and children (fifteen compressions to each 2 breaths for children greater than 8 years of age until the airway is secured with intubation and five compressions to each breath for patients less than 8 years of age and those over 8 years of age with a secured airway). Compression depth is 1/2 to 3/4 inch for neonates, 1/2 to 1 inch for infants, and 1 to 1-1/2 inches for children. There should be a pause in compressions for ventilation until the airway is secured with intubation.

20. Initiate cardiac monitoring. For absent pulses initiate monitoring with either a manual defibrillator or AED and treat per appropriate protocol.

21. If there is evidence of shock, obtain vascular access using an age-appropriate large-bore catheter with large-caliber tubing. If intravenous access cannot be obtained, proceed with intraosseous access. Administer a fluid bolus of normal saline at 20 ml/kg set to maximum flow rate (at a minimum < 20 minutes). Reassess patient after bolus. If signs of shock persist, bolus may be repeated at the same dose up to two times for a maximum total of 60 ml/kg.

22. Evaluate mental status, including pupillary reaction, distal function and sensation, and AVPU assessment.

23. If spinal trauma is suspected, continue manual stabilization, place a rigid cervical collar, and immobilize the patient on long backboard or similar device.

24. Expose the child only as necessary to perform further assessments. Maintain the child's body temperature throughout the examination.

25. If the child's condition is critical or unstable, initiate transport. Perform focused history and detailed physical examination en route to the hospital if patient status and management of resources permit.

26. If the child's condition is stable, perform focused history and detailed physical examination on the scene, then initiate transport.

27. Reassess the patient frequently.

28. Contact direct medical oversight for additional instructions.

FOREIGN BODY AIRWAY OBSTRUCTION

The following protocol applies to an unconscious child or infant with a foreign body obstruction of the airway.

1. Ensure scene safety.
2. Perform a scene survey to assess environmental conditions and mechanism of illness or injury.
3. Form a first impression of the patient's condition.
4. Observe standard precautions.
5. Confirm that the patient is unresponsive.
6. Open the airway using a head tilt/chin lift.
7. Attempt assisted ventilation using a bag-valve-mask device with high-flow, 100% concentration oxygen. If unsuccessful, reposition airway and attempt bag-valve-mask assisted ventilation again.
8. Use age-appropriate techniques to dislodge the obstruction (for infants younger than one year, apply back blows with chest thrusts; for children one year and older, use abdominal thrusts).
9. If unsuccessful, establish a direct view of the object and attempt to remove it with Magill forceps.
10. If unsuccessful, attempt endotracheal intubation and ventilate the patient.
11. If unsuccessful, perform needle cricothyrotomy and needle jet insufflation.
12. Assess circulation and perfusion.
13. Assess mental status.
14. Expose the child only as necessary to perform further assessments. Maintain the child's body temperature throughout the examination.
15. Initiate transport. Perform focused history and detailed physical examination en route to the hospital if patient status and management of resources permit.
16. Reassess the patient frequently.
17. Contact direct medical oversight for additional instructions.

RESPIRATORY DISTRESS, FAILURE, OR ARREST

A patient who presents with acute respiratory distress of sudden onset accompanied by fever, drooling, hoarseness, stridor, and tripod positioning may have a partial airway obstruction. ***Do nothing to upset the child.*** *Perform critical assessments only. Enlist the parent to administer blow-by oxygen. Place the patient in a position of comfort. Do not attempt vascular access. Transport immediately.*

Definitions

Respiratory distress is indicated by the following findings:

- alert, irritable, anxious
- stridor
- audible wheezing
- respiratory rate faster than normal for age
- intercostal retractions
- nasal flaring
- neck muscle use
- central cyanosis that resolves with oxygen administration
- mild tachycardia
- able to maintain sitting position (children older than four months)

Respiratory failure involves the findings above with any of the following additions or modifications:

- sleepy, intermittently combative, or agitated
- increased respiratory effort at sternal notch
- marked use of accessory muscles
- retractions, head bobbing, grunting
- central cyanosis
- marked tachycardia
- poor peripheral perfusion
- decreased muscle tone

Respiratory arrest involves the findings above with any of the following additions or modifications:

- unresponsive to voice or touch
- absent or shallow chest wall motion
- absent breath sounds
- respiratory rate slower than 10 breaths per minute
- weak to absent pulses
- bradycardia or asystole
- limp muscle tone
- unable to maintain sitting position (children older than four months)

Procedure

1. Ensure scene safety.

2. Perform a scene survey to assess environmental conditions and mechanism of illness or injury.

3. Form a first impression of the patient's condition.

4. Observe standard precautions.

5. Establish patient responsiveness. If cervical spine trauma is suspected, manually stabilize the spine.

6. Assess the patient's airway for patency, protective reflexes and the possible need for advanced airway management. Look for signs of airway obstruction. Signs include

   - absent breath sounds
   - tachypnea
   - intercostal retractions
   - stridor or drooling
   - choking
   - bradycardia
   - cyanosis

7. If foreign body obstruction of the airway is suspected, refer to the appropriate protocol for treatment options.

8. Open the airway using head tilt/chin lift if no spinal trauma is suspected, or modified jaw thrust if spinal trauma is suspected.

9. Suction as necessary.

10. Consider placing an oropharyngeal or nasopharyngeal airway adjunct if the airway cannot be maintained with positioning and the patient is unconscious.

11. Assess the patient's breathing, including rate, auscultation, inspection, effort, and adequacy of ventilation as indicated by chest rise. Assess for signs of respiratory distress, failure, or arrest. Obtain pulse oximeter reading.

12. If chest rise indicates inadequate ventilation, reposition airway and reassess. If inadequate chest rise is noted after repositioning airway, suspect a foreign body obstruction of the airway. Refer to the appropriate protocol for treatment options.

13. If signs of respiratory arrest or respiratory failure with inadequate breathing are present, assist ventilation using a bag-valve-mask device with high-flow, 100% concentration oxygen.

14. If abdominal distention arises, consider placing a nasogastric tube to decompress the stomach.

15. If the airway cannot be maintained by other means, including attempts at assisted ventilation, or if prolonged assisted ventilation is anticipated, perform endotracheal intubation. Consider administration of pharmacological adjuncts, such as sedatives and paralytic agents, to aid with intubation as permitted by medical direction. Confirm placement of endotracheal tube using clinical assessment and end-tidal CO_2 monitoring.

16. If breathing is adequate and patient exhibits signs of respiratory distress, administer high-flow, 100% concentration oxygen as necessary. Use a nonrebreather mask or blow-by as tolerated.

17. If bronchospasm is present, refer to the appropriate protocol for treatment options.

18. Assess circulation and perfusion.

19. Initiate cardiac monitoring.

20. If the patient shows signs of severe respiratory failure or respiratory arrest, consider establishing vascular access and administering normal saline at a sufficient rate to keep the vein open. If intravenous access cannot be obtained, proceed with intraosseous access. Do not delay transport to obtain vascular access.

21. Assess mental status.

22. Expose the child only as necessary to perform further assessments. Maintain the child's body temperature throughout the examination.

23. Initiate transport. Perform focused history and detailed physical examination en route to the hospital if patient status and management of resources permit.

24. Reassess the patient frequently.

25. Contact direct medical oversight for additional instructions.

RESPIRATORY DISTRESS IN THE CHILD ON VENTILATORY SUPPORT

Procedure

1. Ensure scene safety.

2. Perform a scene survey to assess environmental conditions and mechanism of illness or injury.

3. Form a first impression of the patient's condition.

4. Observe standard precautions.

5. Establish patient responsiveness. If cervical spine trauma is suspected, manually stabilize the spine.

6. Open the airway using head tilt/chin lift.

7. For a patient receiving invasive ventilation via a ventilator, assess the patient to determine possible cause of respiratory distress by removing the patient from the ventilator and assisting ventilations with a bag-valve-mask via the tracheostomy tube. Use the following reactions to assisted ventilation with a bag-valve-mask to help determine the cause:

    - If unable to ventilate the patient, there is significant resistance or there is poor air entry with bag-valve-mask ventilation, the problem is likely due to the tracheostomy tube refer to the Respiratory Distress in a Child with a Tracheostomy Protocol.
    - If able to ventilate through the tracheostomy tube and the patient improves or the respiratory distress is still present, the problem is likely due to a medical problem refer to the Respiratory Distress, Failure and Arrest Protocol.
    - If patient improves and is easy to ventilate with bag-valve-mask assisted ventilation, the problem is likely due to the ventilator. In this situation perform the following actions:
        A. Assure that the ventilator is set to the correct settings given to you by the parents or other caregivers, the oxygen supply is not empty and that the power supply is connected to the ventilator.
        B. Confirm that the circuit is securely connected.
        C. Re-connect patient to ventilator circuit. Assure that connection between circuit and tracheostomy tube is secure.
        D. If the tracheostomy tube has a cuff, assure that it is inflated by checking the pilot balloon. If the pilot balloon is deflated, re-inflate the cuff by attaching a syringe to the pilot balloon valve and inflating with air until the pilot balloon is inflated.
        E. Ask the parents or other caregivers to perform any procedure they have been taught to correct ventilator problems.
        F. If the patient remains in distress, disconnect from ventilator and assist ventilations with a bag-valve-mask via the tracheostomy tube and prepare for transport.

8. For a patient receiving non-invasive ventilation via either BiPAP or CPAP assess the cause of the problem by:
    A. Assuring that the device is set to the correct settings given to you by the parents or other caregivers, the oxygen supply is not empty and that the power supply is connected to the ventilator.
    B. Confirming that the patient is correctly attached to the device.
    C. Asking the parents or other caregivers to perform any procedure they have been taught to correct device problems.
    D. If the patient remains in distress, disconnect from the device and assist ventilations with a bag-valve-mask.
    E. If despite assisted ventilations with a bag-valve-mask the patient remains in distress refer to the Respiratory Distress, Failure and Arrest Protocol.

9. Assess the patient's breathing, including rate, auscultation, inspection, effort, and adequacy of ventilation as indicated by chest rise. Assess for signs of respiratory distress, failure, or arrest. Obtain pulse oximeter reading.

10. Record the ventilator settings which may include respiratory rate, tidal volume, pressure settings, inspired oxygen concentration and PEEP.

11. If abdominal distention arises, consider placing a nasogastric tube to decompress the stomach.

12. If bronchospasm is present, refer to the appropriate protocol for treatment options.

13. Assess circulation and perfusion.

14. Initiate cardiac monitoring.

15. If the patient shows signs of severe respiratory failure or respiratory arrest, consider establishing vascular access and administering normal saline at a sufficient rate to keep the vein open. If intravenous access cannot be obtained, proceed with intraosseous access. Do not delay transport to obtain vascular access.

16. Assess mental status.

17. Expose the child only as necessary to perform further assessments. Maintain the child's body temperature throughout the examination.

18. Initiate transport. Perform focused history and detailed physical examination en route to the hospital if patient status and management of resources permit.

19. Reassess the patient frequently.

20. Contact direct medical oversight for additional instructions.

RESPIRATORY DISTRESS IN THE CHILD WITH A TRACHEOSTOMY

The following protocol applies to a patient with a tracheostomy who is experiencing respiratory distress

1. Ensure scene safety.

2. Perform a scene survey to assess environmental conditions and mechanism of illness or injury.

3. Form a first impression of the patient's condition.

4. Observe standard precautions.

5. Open the airway using a head tilt/chin lift.

6. Assess the tracheostomy to make sure that:

   - Tracheostomy tube is in place
   - Obturator has been removed
   - If it is a double lumen that the inner cannula is in place
   - For fenestrated tracheostomy tube that the decannulation plug or talk valve has been removed

7. Assess the patient's breathing, including rate, auscultation, inspection, effort, and adequacy of ventilation as indicated by chest rise. Assess for signs of respiratory distress, failure, or arrest. Obtain pulse oximeter reading.

8. If signs of respiratory arrest or respiratory failure with inadequate breathing are present, assist ventilation using a bag-valve-mask device with high-flow, 100% concentration oxygen via the tracheostomy. If unsuccessful, reposition airway and attempt bag-valve-mask assisted ventilation again. If tracheostomy tube is a double lumen tube, the inner cannula must be in place to attach bag-valve-mask device.

9. If unable to ventilate via the tracheostomy or respiratory distress persists with poor or noisy (gurgling, rhonchi) breath sounds, attempt to suction through the tracheostomy using the following procedure:

   A. Ask family and caregivers for patient's suctioning supplies and for assistance as they are more familiar with suctioning of patient. If patient's supplies are not available use a suction catheter of the same size as normally used for patient. If knowledge of size of catheter is not available, the size can be estimated by doubling the inner diameter of the tracheostomy tube and rounding down to an available size catheter.
   B. For double cannula catheters, inner cannula may be removed, suctioned directly and then re-inserted.

C. Determine suction depth by comparing suction catheter to either obturator or patient's spare tracheostomy tube. If these are not available then maximum suction depth for catheter should be 3-6 cm.
D. Assure that suction device is set to 100 mmhg for tracheostomy suctioning.
E. Pre-oxygenate the patient via either non-rebreather mask over face (partial tracheostomy) or tracheostomy tube or via assisted ventilations with bag-valve-mask if patient has ineffective ventilations. If unable to ventilate then proceed immediately to the next step.
F. Instill 2 to 3 ml of sterile normal saline into the tracheostomy tube
G. Insert suction catheter into tracheostomy to pre-determined depth with suction off. Never force catheter while inserting. Apply suction while withdrawing catheter. Limit suctioning to no more than 10 seconds.
H. Suctioning following steps D-G may be repeated up to two times, if significant secretions are removed and patient tolerates procedure.
I. If unable to pass the suction catheter and patient remains in distress despite assisted ventilations proceed to step 10 to change tracheostomy tube.

10. After suctioning, if the patient remains in distress with poor air movement again attempt assisted ventilation using a bag-valve-mask device with high-flow, 100% concentration oxygen via the tracheostomy.

11. If unable to ventilate via the tracheostomy and the patient remains in distress, change the tracheostomy tube by either the following facilitated or direct technique:

Facilitated Technique

A. Ask the patients family or care giver for a new tracheostomy tube and for assistance with changing the tracheostomy tube as they may have more experience then prehospital personnel.
B. For a double cannula tracheostomy tube, remove the inner cannula and follow this technique to insert the outer cannula. Once the outer cannula is in place, insert the inner cannula prior to confirming correct placement via assisted ventilation.
C. Insert a suction catheter through a new tracheostomy tube
D. If the tracheostomy tube has a cuff, deflate the cuff by connecting a syringe to the valve on the pilot balloon and withdrawing air until the pilot balloon collapses.
E. Cut the tracheostomy ties or remove the tracheostomy holder device.
F. Gently remove the old tracheostomy tube in the anatomical direction (outward and towards the patient's feet).
G. Insert the suction catheter in to the stoma. Aim the suction catheter towards the patient's feet and only insert 3-6 cm into the airway.
H. Gently advance the new tracheostomy tube over the suction catheter while holding the catheter in place and using it as a guide.
I. Remove the suction catheter from the tracheostomy tube.
J. If unable to insert new tracheostomy try this same procedure with a smaller size tracheostomy tube
K. If still unable to insert the tracheostomy tube insert a similar internal diameter size endotracheal tube following same technique. The endotracheal tube should only be inserted to a depth equal to the length of the tracheostomy tube which would have been inserted.

L. Attach bag-valve-mask and provide assisted ventilations.
M. Confirm placement of the new tracheostomy tube using clinical assessment including bilateral chest expansion with good breath sounds, improvement in vital signs, and pulse oximetry. Secondary confirmation should be via end-tidal CO_2 monitoring.

Direct Technique

A. Ask the patients family or care giver for a new tracheostomy tube and for assistance with changing the tracheostomy tube as they may have more experience then prehospital personnel.
B. For a double cannula tracheostomy tube, remove the inner cannula and follow this technique to insert the outer cannula. Once the outer cannula is in place, insert the inner cannula prior to confirming correct placement via assisted ventilation.
C. If the tracheostomy tube has a cuff, deflate the cuff by connecting a syringe to the valve on the pilot balloon and withdrawing air until the pilot balloon collapses.
D. Cut the tracheostomy ties or remove the tracheostomy holder device.
E. Gently remove the old tracheostomy tube in the anatomical direction (outward and towards the patient's feet).
F. Gently insert the new tracheostomy tube in the anatomical direction. This will be with the curve downward, the tube aimed towards the patient's feet and in a curving motion. Make sure the obturator is in place for insertion and then remove after insertion.
G. If unable to insert new tracheostomy try this same procedure with a smaller size tracheostomy tube
H. If still unable to insert the tracheostomy tube insert a similar internal diameter size endotracheal tube following same technique. The endotracheal tube should only be inserted to a depth equal to the length of the tracheostomy tube which would have been inserted.
I. Attach bag-valve-mask and provide assisted ventilations.
J. Confirm placement of the new tracheostomy tube using clinical assessment including bilateral chest expansion with good breath sounds, improvement in vital signs, and pulse oximetry. Secondary confirmation should be via end-tidal CO_2 monitoring.

12. If patient remains in distress with inadequate breathing and unable to replace the tracheostomy tube with a new tracheostomy tube or an endotracheal tube, attempt to perform orotracheal intubation using standard technique. This should only be attempted for patients with an intact airway proximal to the tracheostomy site (partial tracheostomy).

13. If patient remains in distress with inadequate breathing and unable to replace tracheostomy tube and unable to perform orotracheal intubation, assist ventilations with a bag-valve-mask over the mouth and nose while occluding the stoma (this should only be performed on a patient with an intact airway proximal to the tracheostomy site) or over the stoma while occluding the mouth and nose. Assess for adequate ventilation by clinical assessment including bilateral chest expansion with good breath sounds, improvement in vital signs, and pulse oximetry.

14. Continue with assisted ventilations for patients with continued respiratory distress and

inadequate breathing.

15. If abdominal distention arises, consider placing a nasogastric tube to decompress the stomach.

16. If breathing is adequate and patient exhibits continued signs of respiratory distress, administer high-flow, 100% concentration oxygen as necessary. Use a nonrebreather mask or blow-by as tolerated. In the patient with respiratory distress and absent breath sounds consider obstruction of the tracheostomy tube and proceed with step 9.

17. If bronchospasm is present, refer to the appropriate protocol for treatment options.

18. Assess circulation and perfusion.

19. Assess mental status.

20. Expose the child only as necessary to perform further assessments. Maintain the child's body temperature throughout the examination.

21. Initiate transport. Perform focused history and detailed physical examination en route to the hospital if patient status and management of resources permit.

22. Reassess the patient frequently.

23. Contact direct medical oversight for additional instructions.

BRONCHOSPASM

A silent chest is an ominous sign indicating that respiratory failure or arrest is imminent.

Definition

Bronchospasm is usually accompanied by respiratory distress with the following findings:

- wheezing
- prolonged expiration
- increased respiratory effort (decreased effort may be noted as patient's condition approaches respiratory failure)
- severe agitation, lethargy
- suprasternal and substernal retractions
  - tripod positioning

Procedure

1. Ensure scene safety.

2. Perform a scene survey to assess environmental conditions and mechanism of illness or injury.

3. Form a first impression of the patient's condition.

4. Observe standard precautions.

5. Establish patient responsiveness. If cervical spine trauma is suspected, manually stabilize the spine.

6. Assess the patient's airway for patency, protective reflexes and the possible need for advanced airway management. Look for signs of airway obstruction.

7. Open the airway using head tilt/chin lift if no spinal trauma is suspected, or modified jaw thrust if spinal trauma is suspected.

8. Suction as necessary.

9. Consider placing an oropharyngeal or nasopharyngeal airway adjunct if the airway cannot be maintained with positioning and the patient is unconscious.

10. Assess breathing. Obtain pulse oximeter reading.

11. If breathing is inadequate, assist ventilation using a bag-valve-mask device with high-flow, 100% concentration oxygen. If abdominal distention arises, consider placing a nasogastric tube to decompress the stomach.

12. If the airway cannot be maintained by other means, including attempts at assisted ventilation, or if prolonged assisted ventilation is anticipated, perform endotracheal intubation. Consider administration of pharmacological adjuncts, such as sedatives and paralytic agents, to aid

with intubation as permitted by medical direction. Confirm placement of endotracheal tube using clinical assessment and end-tidal CO_2 monitoring.

13. If breathing is adequate, place the child in a position of comfort and administer high-flow, 100% concentration oxygen as necessary. Use a nonrebreather mask or blow-by as tolerated.

14. If the patient shows signs of respiratory failure with inadequate ventilation or respiratory arrest together with clinical evidence of bronchospasm or a history of asthma, administer one of the following systemic agents for bronchodilation:

    - Epinephrine 1:1000 at 0.01 mg/kg (maximum individual dose 0.3 mg) SQ
    - Terbutaline at 0.01 mg/kg (maximum individual dose 0.4 mg) SQ

15. If the patient shows signs of respiratory distress or respiratory failure together with clinical evidence of bronchospasm or a history of asthma, administer one of the following inhaled beta-2 agonist bronchodilators:

    - Albuterol 2.5 mg via nebulizer over a 10- to 15-minute period or 4 Puffs via metered-dose inhaler (MDI) with spacing device
    - Levalbuterol 0.625-1.25 mg via nebulizer over a 10- to 15-minute period

    If these respiratory findings persist, repeat the inhaled beta-2 agonist bronchodilator via nebulizer at 15-minute intervals throughout transport. Do not delay transport to administer medications.

16. If the patient shows signs of respiratory distress or respiratory failure together with clinical evidence of bronchospasm or a history of asthma consider administering 500 mcg ipratropium bromide via nebulizer over a 10- to 15-minute period. Ipratropium bromide and either albuterol or levalbuterol may be mixed together and administered simultaneously.

17. Assess circulation and perfusion.

18. Initiate cardiac monitoring.

19. If the patient shows signs of severe respiratory failure or respiratory arrest, consider establishing vascular access and administering normal saline at a sufficient rate to keep the vein open. If intravenous access cannot be obtained in a patient with respiratory arrest, proceed with intraosseous access. Do not delay transport to obtain vascular access.

20. Consider administration of steroids in one of the following preparations as permitted by medical direction:

    - Prednisone 2.0 mg/kg (maximum individual dose 60 mg) PO
    - Methylprednisolone 2.0 mg/kg (maximum individual dose 125 mg) IV/IM
    - Hydrocortisone 4.0 mg/kg (maximum individual dose 250 mg) IV/IM

21. Assess mental status.

22. Expose the child only as necessary to perform further assessments. Maintain the child's body temperature throughout the examination.

23. Initiate transport. Perform focused history and detailed physical examination en route to the hospital if patient status and management of resources permit.

24. Reassess the patient frequently.

25. Contact direct medical oversight for additional instructions.

NEWBORN RESUSCITATION

This protocol describes procedures for the resuscitation of a newly delivered infant.

1. Ensure scene safety.

2. Perform a scene survey to assess environmental conditions.

3. Observe standard precautions.

4. Suction the infant's airway using a bulb syringe as soon as the infant's head is delivered and before delivery of the body. Suction the mouth first, then the nasopharynx.

5. Once the body is fully delivered, dry the baby, replace wet towels with dry ones, and wrap the baby in a thermal blanket or dry towel. Cover the infant's scalp to preserve warmth.

6. Open and position the airway. Suction the infant's airway again using a bulb syringe. Suction the mouth first, then the nasopharynx.

7. If thick meconium is present and the patient exhibits either absent or depressed respirations, hear rate less than 100 bpm or poor muscle tone, initiate endotracheal intubation before the infant takes a first breath. Suction the airway using an appropriate suction adapter while withdrawing the endotracheal tube. Repeat this procedure until the endotracheal tube is clear of meconium. If the infant's heart rate becomes bradycardic, discontinue suctioning immediately and provide ventilation until the infant recovers. Note: If the infant is already breathing or crying, this step may be omitted.

8. Assess breathing and adequacy of ventilation.

9. If ventilation is inadequate, stimulate the infant by gently rubbing the back and flicking the soles of the feet.

10. If ventilation is still inadequate after brief stimulation, begin assisted ventilation at 40 to 60 breaths per minute using a bag-valve-mask device with high-flow, 100% concentration oxygen. If the ventilation remains inadequate despite assisted ventilation perform endotracheal intubation.

11. If ventilation is adequate and the infant displays central cyanosis, administer high-flow, 100% concentration oxygen via blow-by. Hold the tubing 1 to 1-1/2 inches from the infant's mouth and nose and cup a hand around the end of the tubing to help direct the oxygen flow toward the infant's face.

12. Assess heart rate by auscultation or by palpation of the brachial artery or umbilical cord stump.

13. If the heart rate is slower than 60 beats per minute after 30 seconds of assisted ventilation with high-flow, 100% concentration oxygen, initiate the following actions:

    A. Continue assisted ventilation.
    B. Perform endotracheal intubation if not already done.
    C. Begin chest compressions at a combined rate of 120/minute (three compressions to each ventilation with a pause for ventilation until the airway is secured with intubation).
    D. If there is no improvement in heart rate after intubation and ventilation, administer 1:10,000 epinephrine solution at 0.01 mg/kg (maximum individual dose 1.0 mg) via endotracheal tube, or establish vascular access and administer the same dose. In the neonate, vascular access may be obtained intraosseously, intravenously, or through the umbilical vein (if medical direction permits). Repeat epinephrine at the same dose every 3 to 5 minutes as needed.
    E. Initiate transport. Reassess heart rate and respirations en route.

14. If the heart rate is faster than 100 beats per minute, initiate the following actions:

    A. Assess skin color. If central cyanosis is still present, continue blow-by oxygen.
    B. Initiate transport. Reassess heart rate and respirations en route.

15. Reassess the patient frequently.

16. Contact direct medical oversight for additional instructions.

BRADYCARDIA

Bradycardia generally arises due to hypoxia. Therefore, airway, ventilation, and oxygenation are the highest management priorities. The cause of the hypoxia should be identified and corrected.

Definition

Severe cardiorespiratory compromise is indicated by

- poor perfusion as evidenced by delayed capillary refill, weak or absent peripheral pulses
- altered mental status
- hypotension
- respiratory difficulty

Procedure

1. Ensure scene safety.

2. Perform a scene survey to assess environmental conditions and mechanism of illness or injury.

3. Form a first impression of the patient's condition.

4. Observe standard precautions.

5. Establish patient responsiveness. If cervical spine trauma is suspected, manually stabilize the spine.

6. Assess the patient's airway for patency, protective reflexes and the possible need for advanced airway management. Look for signs of airway obstruction.

7. Open the airway using head tilt/chin lift if no spinal trauma is suspected, or modified jaw thrust if spinal trauma is suspected.

8. Suction as necessary.

9. Consider placing an oropharyngeal or nasopharyngeal airway adjunct if the airway cannot be maintained with positioning and the patient is unconscious.

10. Assess breathing. Obtain pulse oximeter reading.

11. If breathing is inadequate, assist ventilation using a bag-valve-mask device with high-flow, 100% concentration oxygen. If abdominal distention arises, consider placing a nasogastric tube to decompress the stomach.

12. If the airway cannot be maintained by other means, including attempts at assisted ventilation, if prolonged assisted ventilation is anticipated, or the patient continues to have severe cardiorespiratory compromised despite oxygenation and ventilation, perform endotracheal intubation. Consider administration of pharmacological adjuncts, such as sedatives and paralytic agents, to aid with intubation as permitted by medical direction. Confirm placement of endotracheal tube using clinical assessment and end-tidal CO_2 monitoring.

13. If breathing is adequate, place the child in a position of comfort and administer high-flow, 100% concentration oxygen as necessary. Use a nonrebreather mask or blow-by as tolerated.

14. Assess circulation and perfusion.

15. Initiate cardiac monitoring and determine rhythm.

16. If signs of severe cardiopulmonary compromise are present in an infant or neonate and the heart rate remains slower than 60 beats per minute despite oxygenation and ventilation, initiate chest compressions.

17. If the patient shows signs of severe cardiopulmonary compromise, establish vascular access and administering normal saline at a sufficient rate to keep the vein open. If intravenous access cannot be obtained in a child younger than six years, proceed with intraosseous access. Do not delay transport to obtain vascular access.

18. Check blood glucose.

19. If signs of severe cardiopulmonary compromise persist, administer epinephrine using the first available route as follows: 1:1000 solution at 0.1 mg/kg (maximum individual dose 10 mg) via endotracheal tube *or* 1:10,000 solution at 0.01 mg/kg (maximum individual dose 1.0 mg) via intravenous or intraosseous route. Repeat the dose every 3 to 5 minutes until either the bradycardia or severe cardiopulmonary compromise resolves.

20. If signs of severe cardiopulmonary compromise and bradycardia persist despite epinephrine, administer atropine at 0.02 mg/kg via intravenous route, intraosseous route, or endotracheal tube. The minimum dose is 0.1 mg; the maximum individual dose is 0.5 mg for a child and 1.0 mg for an adolescent. Atropine may be repeated once after 3 to 5 minutes and may be doubled. The minimum doubled dose is 0.1 mg; the maximum doubled individual dose is 1.0 mg for a child and 2.0 mg for an adolescent

    Note: If bradycardia is due to increased vagal tone or primary AV block Atropine should be given prior to epinephrine.

21. For persistent bradycardia with severe cardiopulmonary compromise, consider external pacing as permitted by medical direction.

22. Assess mental status.

23. Expose the child only as necessary to perform further assessments. Maintain the child's body temperature throughout the examination.

24. Initiate transport. Perform focused history and detailed physical examination en route to the

hospital if patient status and management of resources permit.

25. Reassess the patient frequently.

26. Contact direct medical oversight for additional instructions, including

- initiation of external pacing
- repeated administration of epinephrine
- repeated administration of atropine

TACHYCARDIA

Definitions

Poor perfusion is indicated by
- delayed capillary refill
- weak or absent peripheral pulses
- altered mental status
- hypotension

The three types of tachycardia may be distinguished by the following signs:

Sinus tachycardia is usually present when
- An infant exhibits tachycardia in which the heart rate is slower than 220 beats per minute or a child exhibits tachycardia in which the heart rate is slower than 180 beats per minute
- There is a normal QRS duration for age (less than or equal to 0.08 seconds)
- Normal P waves are present, the R-R interval is variable, and the P-R interval is constant
- Heart rate varies with activity

Supraventricular tachycardia is usually present when
- An infant exhibits tachycardia in which the heart rate is faster than 220 beats per minute or a child exhibits tachycardia in which the heart rate is faster than 180 beats per minute
- There is a normal QRS duration for age (less than or equal to 0.08 seconds)
- P waves are abnormal or absent
- Abrupt changes in hear rate

Presumptive ventricular tachycardia is present when
- The QRS duration is wide for age (greater than 0.08 seconds)

Procedure

1. Ensure scene safety.

2. Perform a scene survey to assess environmental conditions and mechanism of illness or injury.

3. Form a first impression of the patient's condition.

4. Observe standard precautions.

5. Establish patient responsiveness. If cervical spine trauma is suspected, manually stabilize the spine.

6. Assess the patient's airway for patency, protective reflexes and the possible need for advanced airway management. Look for signs of airway obstruction.

7. Open the airway using head tilt/chin lift if no spinal trauma is suspected, or modified jaw thrust if spinal trauma is suspected.

8. Suction as necessary.

9. Consider placing an oropharyngeal or nasopharyngeal airway adjunct if the airway cannot be maintained with positioning and the patient is unconscious.

10. Assess breathing. Obtain pulse oximeter reading.

11. If breathing is inadequate, assist ventilation using a bag-valve-mask device with high-flow, 100% concentration oxygen. If abdominal distention arises, consider placing a nasogastric tube to decompress the stomach.

12. If the airway cannot be maintained by other means, including attempts at assisted ventilation, or if prolonged assisted ventilation is anticipated, perform endotracheal intubation. Consider administration of pharmacological adjuncts, such as sedatives and paralytic agents, to aid with intubation as permitted by medical direction. Confirm placement of endotracheal tube using clinical assessment and end-tidal CO_2 monitoring.

13. If breathing is adequate, place the child in a position of comfort and administer high-flow, 100% concentration oxygen as necessary. Use a nonrebreather mask or blow-by as tolerated.

14. Assess circulation and perfusion.

15. Initiate cardiac monitoring and determine rhythm.

16. Establish vascular access and administering normal saline at a sufficient rate to keep the vein open. If intravenous access cannot be obtained and the patient shows signs of poor perfusion, proceed with intraosseous access. Do not delay transport to obtain vascular access.

17. Check blood glucose.

18. For probable sinus tachycardia, identify and treat possible causes, such as hypovolemia, shock, hypoxia, or pneumothorax.

19. For probable supraventricular tachycardia with signs of poor perfusion, the following steps should be taken:

    A. Administer adenosine at 0.1 mg/kg (maximum individual dose 6.0 mg) via rapid IV bolus at the port closest to IV hub. Adenosine may be repeated twice at 0.2 mg/kg (maximum individual dose 12 mg) as needed.

    or

    Perform synchronized cardioversion at 0.5 to 1.0 J/kg. If the patient remains in supraventricular tachycardia, repeat cardioversion at double the energy (max 360J). Sedate the patient before cardioversion as permitted by medical direction. Sedation may be accomplished by administering midazolam at 0.1 mg/kg (maximum individual dose 2.0 mg) or diazepam at 0.2 mg/kg (maximum individual dose 5.0 mg) via intravenous route.

    B. Consider treatment with alternative antiarrhythmic medications including:
       Amiodarone 5 mg/kg IV over 20-60 minutes
       Procainamide 15 mg/kg over 30-60 minutes

Lidocaine 1 mg/kg IV bolus

20. For probable ventricular tachycardia with a pulse and poor perfusion, the following steps should be taken:

    A. Perform synchronized cardioversion at 0.5 to 1.0 J/kg. If the patient remains in ventricular tachycardia with a pulse, repeat cardioversion at double the energy (max 360J). Sedate the patient before cardioversion as permitted by medical direction. Sedation may be accomplished by administering midazolam at 0.1 mg/kg (maximum individual dose 2.0 mg) or diazepam at 0.2 mg/kg (maximum individual dose 5.0 mg) via intravenous route.
    B. Consider treatment with antiarrhythmic medications including:
       Amiodarone 5 mg/kg IV over 20-60 minutes
       Procainamide 15 mg/kg over 30-60 minutes
       Lidocaine 1 mg/kg IV bolus

21. For probable ventricular tachycardia with a pulse and adequate perfusion, the following steps should be taken:

    A. Consider treatment with antiarrhythmic medications including:
       Amiodarone 5 mg/kg IV over 20-60 minutes
       Procainamide 15 mg/kg over 30-60 minutes
       Lidocaine 1 mg/kg IV bolus
    B. Perform synchronized cardioversion at 0.5 to 1.0 J/kg. If the patient remains in ventricular tachycardia with a pulse, repeat cardioversion at double the energy (max 360J). Sedate the patient before cardioversion as permitted by medical direction. Sedation may be accomplished by administering midazolam at 0.1 mg/kg (maximum individual dose 2.0 mg) or diazepam at 0.2 mg/kg (maximum individual dose 5.0 mg) via intravenous route.

22. Assess mental status.

23. Expose the child only as necessary to perform further assessments. Maintain the child's body temperature throughout the examination.

24. Initiate transport. Perform focused history and detailed physical examination en route to the hospital if patient status and management of resources permit.

25. Reassess the patient frequently.

26. Contact direct medical oversight for additional instructions

NON-TRAUMATIC CARDIAC ARREST

1. Ensure scene safety.

2. Perform a scene survey to assess environmental conditions and mechanism of illness or injury.

3. Form a first impression of the patient's condition.

4. Observe standard precautions.

5. Establish patient responsiveness. If cervical spine trauma is suspected, manually stabilize the spine.

6. Confirm apnea and provide assisted ventilation using a bag-valve-mask device with high-flow, 100% concentration oxygen. If abdominal distention arises, consider placing a nasogastric tube to decompress the stomach.

7. Confirm absent pulse and begin chest compressions at age-appropriate rate and ratio.

8. Initiate cardiac monitoring and determine rhythm. This an be accomplished with either a Manual Defibrillator or an Automatic External Defibrillator (AED).

9. Refer to appropriate protocol for further management actions:

    - Ventricular Fibrillation/Pulseless Ventricular Tachycardia for BLS Providers with an Automated External Defibrillator (AED)
    - Ventricular Fibrillation/Pulseless Ventricular Tachycardia
    - Asystole or Pulseless Electrical Activity

VENTRICULAR FIBRILLATION/PULSELESS VENTRICULAR TACHYCARDIA FOR BLS PROVIDERS WITH AN AUTOMATED EXTERNAL DEFIBRILLATOR (AED)

For a child 8 years of age or older, a standard AED with adult energy settings should be used. For a child younger than 8 years of age, the preferred device is one designed for children younger than 8 years of age and FDA approved for this indication. In general devices approved for children younger than 8 years of age have software which can accurately detect ventricular fibrillation or ventricular tachycardia and employ technology to reduce the energy delivered.

For children younger than 8 years of age and when a device specifically designed and approved for children younger than 8 years of ages is not available, one must recognize that although using a fixed energy AED in some children may have the potential for harm, not treating ventricular fibrillation has the potential for even greater harm, death of the child. As such, defibrillation should not be withheld based on weight and size criteria alone and a standard AED delivering adult energy levels should be used if protocols and medical oversight permit.

1. Turn on the AED.
2. Apply the appropriate AED pads to the child's bare, dry chest. Peel one pad at a time off the backing and, following the diagram, press the pad firmly to the child's bare skin; Place one pad on the child's upper right chest and other pad on the child's lower left side (apical and sternal placement) as long as pads do not touch each other. If the child's chest is to small for use of this location then pads should be placed in an anterior and posterior position.
3. Plug in connector (if necessary).
4. Tell everyone to stand clear.
5. Let the AED analyze the heart rhythm (or push the button marked "analyze").
6. Deliver a shock by pushing the shock button if prompted by the AED. Let the AED re-analyze and provide additional shock if prompted by the AED. Follow AED prompts; re-check for signs of circulation, when indicated.
7. If no shock indicated or after 3 shocks have been delivered, re-check for the presence of a pulse.
8. If pulse is still absent perform CPR for one minute and then repeat steps 4-7.
9. Check for presence and adequacy of ventilation.
10. If patient is still apneic, continue to provide assisted ventilation using a bag-valve-mask device with high-flow, 100% concentration oxygen.
11. Initiate transport.

12. Perform focused history and detailed physical examination en route to the hospital if patient status and management of resources permit.

13. Reassess the patient frequently.

VENTRICULAR FIBRILLATION OR PULSELESS VENTRICULAR TACHYCARDIA

Throughout the following resuscitation sequence, check pulses and cardiac rhythm after each sequence of shocks and drug administration.

1. Perform steps 1 through 9 as listed in the protocol for non-traumatic cardiac arrest. Confirm the presence of ventricular fibrillation (VF) or pulseless ventricular tachycardia (VT).

2. Defibrillate at 2.0 J/kg (maximum 200 joules).

3. Defibrillate at 4.0 J/kg (maximum 360 joules).

4. Defibrillate at 4.0 J/kg (maximum 360 joules).

5. Perform endotracheal intubation. Confirm placement of endotracheal tube using clinical assessment and end-tidal CO_2 monitoring.

6. Obtain vascular access. If intravenous access cannot be obtained, proceed with intraosseous access.

7. Using the most readily available route, administer epinephrine 1:1000 solution at 0.1 mg/kg (maximum individual dose 10 mg) via endotracheal tube *or* 1:10,000 solution at 0.01 mg/kg (maximum individual dose 1.0 mg) via intravenous or intraosseous route. Subsequent doses of epinephrine should be administered every 3 to 5 minutes for the remainder of resuscitation. Consider higher doses of epinephrine for the second or subsequent doses.

8. Flush the medication port with 10 to 20 ml of intravenous fluid after each dose of IV medication to aid entry of drugs into central circulation.

9. Defibrillate at 4.0 J/kg (maximum 360 joules) 30 to 60 seconds after each medication bolus. From this point the pattern should be compressions, followed by medication administration and then an attempt at defibrillation.

10. Administer an antiarrhythmic agent(s) from the following:
    - Amiodarone 5 mg/kg IV/IO bolus
    - Lidocaine 1 mg/kg IV/IO bolus
    - Magnesium 25-50 mg/kg IV/IO bolus for torsades de pointes or hypomagnesia (max. dose of 2 grams)
11. Defibrillate at 4.0 J/kg (maximum 360 joules). Followed by compressions.

12. Continue compressions and repeat steps 8-9.

13. If VF or pulseless VT recurs after successful defibrillation, repeat defibrillation using the last energy level that restored perfusing rhythm.

14. Contact direct medical oversight for additional instructions.

15. Initiate transport.

16. Assess mental status.

17. Expose the child only as necessary to perform further assessments. Maintain the child's body temperature throughout the examination.

18. Perform focused history and detailed physical examination en route to the hospital if patient status and management of resources permit.

19. Reassess the patient frequently.

ASYSTOLE AND PULSELESS ELECTRICAL ACTIVITY

Potentially treatable causes of asystole and pulseless electrical activity include severe hypoxemia, severe acidosis, severe hypovolemia, tension pneumothorax, cardiac tamponade, profound hypothermia, toxic ingestion, severe bradycardia, and hyperkalemia (renal failure).

Definition

Pulseless electrical activity (PEA) appears upon cardiac monitoring as absent pulses with organized QRS complexes. The following dysrhythmias may present as PEA:

- electromechanical dissociation (EMD)
- pseudo-EMD
- idioventricular rhythms
- ventricular escape rhythms
- bradyasystolic rhythms
- post-defibrillation idioventricular rhythms

1. Perform steps 1 through 9 as listed in the protocol for non-traumatic cardiac arrest. Confirm the presence of asystole in two leads.

2. Perform endotracheal intubation. Confirm placement of endotracheal tube using clinical assessment and end-tidal CO_2 monitoring.

3. Obtain vascular access. If intravenous access cannot be obtained, proceed with intraosseous access.

4. Using the most readily available route, administer epinephrine 1:1000 solution at 0.1 mg/kg (maximum individual dose 10 mg) via endotracheal tube *or* 1:10,000 solution at 0.01 mg/kg (maximum individual dose 1.0 mg) via intravenous or intraosseous route.

5. Repeat epinephrine every 3 to 5 minutes. Consider higher doses of epinephrine for second or subsequent doses.

6. Flush the medication port with 10 to 20 ml of intravenous fluid after each dose of IV medication to aid entry of drugs into central circulation.

7. Contact direct medical oversight for additional instructions.

8. Initiate transport.

9. Assess mental status.

10. Expose the child only as necessary to perform further assessments. Maintain the child's body temperature throughout the examination.

11. Perform focused history and detailed physical examination en route to the hospital if patient status and management of resources permit.

12. Asystole that does not respond to the above treatment sequence may be considered refractory.

It may be appropriate to discontinue resuscitative efforts in refractory asystole as permitted by medical direction.

13. Reassess the patient frequently.

VASCULAR ACCESS VIA CENTRAL CATHETER

The following protocol is intended for patients with a central catheter who require vascular access as defined by other patient care protocols and for whom peripheral access can not be obtained. If there is any question of the need to access these devices, contact direct medical oversight prior to accessing a central catheter.

Procedure

1. Observe standard precautions.

2. If peripheral intravenous access cannot be obtained, proceed with central access. Do not delay transport to obtain vascular access.

3. Ask parents or caregivers for supplies and assistance at attempting central access.

4. Determine the type of central catheter present. This will usually be either a Tunneled Catheter (Broviac), Implanted Catheter (Medicport) or Peripherally Inserted Catheter (PICC)

5. Access the central catheter using the following techniques

   Tunneled Catheter (Broviac)

   A. Prepare the intended IV solution and tubing and necessary syringes (empty 10 cc syringe and 10 cc syringe filled with Normal Saline).
   B. Remove the cap on the end of the catheter. If there is more than one lumen available (Tunneled catheters can come as single, double or triple lumen), choose the largest diameter lumen based on the markings or if there are no markings choose any lumen.
   C. Clean the end of the selected lumen with alcohol.
   D. Attach an empty 10 ml syringe.
   E. Unclamp the selected lumen.
   F. Aspirate 3-5 ml of blood with the syringe. If unable to aspirate blood, immediately re-clamp the selected lumen and if present attempt to use another lumen beginning with step A. If clots are present immediately contact direct medical oversight.
   G. Re-Clamp the selected lumen.
   H. Attach the 10 ml syringe filled with Normal Saline and flush with 3-5 ml of Normal Saline. If the catheter does not easily flush, re-clamp the elected lumen and if present attempt to use another lumen beginning with step A.
   I. Attach the IV tubing and unclamp the selected lumen.
   J. Observe for free flow of the IV fluid.
   K. Adjust the flow rate.
   L. Tape the catheter and tubing in place.

   Implanted Catheter (Mediport)

   A. Prepare the intended IV solution and tubing, Haberman Needle and necessary syringes (empty 10 cc syringe and 10 cc syringe filled with Normal Saline).
   B. Attach an empty 10cc syringe to the tubing at the end of the Haberman Needle (in emergency, if Haberman needle is unavailable use a standard 20-21 gauge

needle)

C. Identify the access site. It will usually be located in the chest and can be found with palpation.
D. Clean the access site with Betadine.
E. Remove the Betadine with an alcohol swab.
F. Hold the access point under the skin firmly between two fingers.
G. Insert a Haberman Needle into the access site until it is felt to enter the lumen. This will be indicated by a lack of resistance and avoid inserting to deep and striking the base of the access point.
H. Unclamp the tubing and aspirate 3-5 ml of blood with the syringe. If unable to aspirate blood, immediately re-clamp the catheter and do not use further. If clots are present immediately contact direct medical oversight.
I. Re-Clamp the tubing.
J. Attach the 10 ml syringe filled with Normal Saline and flush with 3-5 ml of Normal Saline. If the catheter does not easily flush, re-clamp catheter and do not use further.
K. Attach the IV tubing and unclamp the tubing.
L. Observe for free flow of the IV fluid.
M. Adjust the flow rate.
N. Secure the needle in place.

Peripherally Inserted Central Catheter (PICC)

A. Prepare the intended IV solution and tubing and necessary syringes (empty 10 cc syringe and 10 cc syringe filled with Normal Saline).
B. Remove the cap on the end of the catheter. If there is more than one lumen available (PICC can come as single, double or triple lumen), choose the largest diameter lumen based on the markings or if there are no markings choose any lumen.
C. Clean the end of one lumen with alcohol.
D. Attach an empty 10 ml syringe.
E. Unclamp the selected lumen.
F. Aspirate 3-5 ml of blood with the syringe. If unable to aspirate blood, immediately re-clamp the lumen and if present attempt to use another lumen beginning with step A. If clots are present immediately contact direct medical oversight.
G. Re-Clamp the lumen.
H. Attach the 10 ml syringe filled with Normal Saline and flush with 3-5 ml of Normal Saline. If the catheter does not easily flush, re-clamp the selected lumen and if present attempt to use another lumen beginning with step A.
I. Attach the IV tubing and unclamp the selected lumen.
J. Observe for free flow of the IV fluid.
K. Adjust the flow rate.
L. Tape the tubing in place.

6. If shock is not present allow the fluid to run at a rate of 10 cc/hour to prevent the central catheter from clotting.

ALTERED MENTAL STATUS

This protocol is intended for patients with an altered mental status of unknown etiology.

1. Ensure scene safety.

2. Perform a scene survey to assess environmental conditions and mechanism of illness or injury.

3. Form a first impression of the patient's condition.

4. Observe standard precautions.

5. Establish patient responsiveness. If cervical spine trauma is suspected, manually stabilize the spine.

6. Assess the patient's airway for patency, protective reflexes and the possible need for advanced airway management. Look for signs of airway obstruction.

7. Open the airway using head tilt/chin lift if no spinal trauma is suspected, or modified jaw thrust if spinal trauma is suspected.

8. Suction as necessary.

9. Consider placing an oropharyngeal or nasopharyngeal airway adjunct if the airway cannot be maintained with positioning and the patient is unconscious.

10. Assess breathing. Obtain pulse oximeter reading.

11. If breathing is inadequate, assist ventilation using a bag-valve-mask device with high-flow, 100% concentration oxygen. If abdominal distention arises, consider placing a nasogastric tube to decompress the stomach.

12. If the airway cannot be maintained by other means, including attempts at assisted ventilation, or if prolonged assisted ventilation is anticipated, perform endotracheal intubation. Consider administration of pharmacological adjuncts, such as lidocaine, sedatives, and paralytic agents, to aid with intubation as permitted by medical direction. Confirm placement of endotracheal tube using clinical assessment and end-tidal CO_2 monitoring.

13. If breathing is adequate, place the child in a position of comfort and administer high-flow, 100% concentration oxygen as necessary. Use a nonrebreather mask or blow-by as tolerated.

14. If signs of respiratory distress, respiratory failure, or respiratory arrest are present, refer to the appropriate protocol for treatment options.

15. Assess circulation and perfusion.

16. Initiate cardiac monitoring.

17. Obtain vascular access. If intravenous access cannot be obtained, proceed with intraosseous access.

18. Determine blood glucose level.

19. If blood glucose level is lower than 80 mg/dl or cannot be determined, administer dextrose via intravenous or intraosseous route as follows:

    - $D_{50}W$ at 1.0 ml/kg for children older than two years
    - $D_{25}W$ at 2.0 ml/kg for children younger than two years
    - $D_{10}W$ at 5.0 ml/kg for neonates

    If vascular access is unavailable, administer 1.0 mg glucagon via intramuscular injection.

20. Repeat blood glucose determination 1 to 2 minutes after dextrose is administered.

21. Dextrose may be repeated once at the same dosage if blood glucose level remains lower than 80 mg/dl *or* if the blood glucose level cannot be determined and there is no change in the patient's mental status after the initial dose.

22. Administer naloxone at 0.1 mg/kg (maximum individual dose 2.0 mg) via intravenous or intraosseous route. Naloxone may be given via endotracheal tube or intramuscular injection at the same dose if vascular access is not available.

23. If there is evidence of shock or a history of dehydration, administer a fluid bolus of normal saline at 20 ml/kg set to maximum flow rate (at a minimum < 20 minutes). Reassess patient after bolus. If signs of shock persist, bolus may be repeated at the same dose up to two times for a maximum total of 60 ml/kg.

24. Assess mental status.

25. Expose the child only as necessary to perform further assessments. Maintain the child's body temperature throughout the examination.

26. If the child's condition is critical or unstable, initiate transport. Perform focused history and detailed physical examination en route to the hospital if patient status and management of resources permit.

27. If the child's condition is stable, perform focused history and detailed physical examination on the scene, then initiate transport.

28. Consider causes of altered mental status, such as chemical or drug intoxication, toxic exposure, head trauma, or seizure.

29. Reassess the patient frequently.

30. Contact direct medical oversight for additional instructions.

SEIZURES

This protocol is intended for patients who are experiencing status epilepticus. To manage seizures in patients who are not experiencing status epilepticus, contact direct medical oversight for instructions.

Definition

In status epilepticus, the patient will be experiencing an active seizure when rescuers arrive, with

- a single episode of seizure activity lasting longer than 5 minutes, *or*
- two or more episodes of seizure activity between which the patient does not regain consciousness

Procedure

1. Ensure scene safety.

2. Perform a scene survey to assess environmental conditions and mechanism of illness or injury.

3. Form a first impression of the patient's condition.

4. Observe standard precautions.

5. Establish patient responsiveness. Protect the patient from injury during involuntary muscular movements.

6. Assess the patient's airway for patency, protective reflexes and the possible need for advanced airway management. Look for signs of airway obstruction.

7. Open the airway using head tilt/chin lift if no spinal trauma is suspected, or modified jaw thrust if spinal trauma is suspected.

8. Suction as necessary.

9. Consider placing an oropharyngeal or nasopharyngeal airway adjunct if the airway cannot be maintained with positioning and the patient is unconscious.

10. Assess breathing. Obtain pulse oximeter reading.

11. If breathing is inadequate, assist ventilation using a bag-valve-mask device with high-flow, 100% concentration oxygen. If abdominal distention arises, consider placing a nasogastric tube to decompress the stomach.

12. If the airway cannot be maintained by other means, including attempts at assisted ventilation, or if prolonged assisted ventilation is anticipated, perform endotracheal intubation. Consider administration of pharmacological adjuncts, such as sedatives and paralytic agents, to aid with intubation as permitted by medical direction. The actively seizing patient should not be

intubated without the usage of pharmacological agents. Confirm placement of endotracheal tube using clinical assessment and end-tidal CO_2 monitoring.

13. If breathing is adequate, place the child in a position of comfort and administer high-flow, 100% concentration oxygen as necessary. Use a nonrebreather mask or blow-by as tolerated.

14. Assess circulation and perfusion.

15. Initiate cardiac monitoring.

16. Establish vascular access. Administer normal saline at a sufficient rate to keep the vein open.

17. Determine blood glucose level.

18. If blood glucose level is lower than 80 mg/dl or cannot be determined, administer intravenous dextrose as follows:

    - $D_{50}W$ at 1.0 ml/kg for children older than two years
    - $D_{25}W$ at 2.0 ml/kg for children younger than two years
    - $D_{10}W$ at 5.0 ml/kg for neonates

    If vascular access is unavailable, administer 1.0 mg glucagon via intramuscular injection.

19. Repeat blood glucose determination 1 to 2 minutes after dextrose is administered.

20. Dextrose may be repeated once at the same dosage if blood glucose level remains lower than 80 mg/dl *or* if the blood glucose level cannot be determined and the patient is still in status epilepticus after the initial dose.

21. Administer an anticonvulsant(s) as chosen by medical direction, all intravenous anticonvulsants should be given slowly (over 1-2 minutes) to avoid apnea:

    - Diazepam 01.- 0.2 mg/kg (maximum individual dose 10 mg) via intravenous route *or* 0.5 mg/kg (maximum individual dose 10 mg) via rectal route
    - Lorazepam 0.1 mg/kg (maximum individual dose 5.0 mg) via intravenous or intramuscular route
    - Midazolam 0.1-0.15 mg/kg (maximum individual dose 5.0 mg) via intravenous or intramuscular route
    - Fosphenytoin 20 phenytoin equivalents/kg (maximum individual dose 1000 phenytoin equivalents) via intravenous or intramuscular route

22. If seizures persist, repeat any listed anticonvulsant except fosphenytoin at the same dose or contact direct medical oversight for further instructions.

23. Assess mental status.

24. Expose the child only as necessary to perform further assessments. Maintain the child's body temperature throughout the examination.

25. If the child's condition is critical or unstable, initiate transport. Perform focused history and

detailed physical examination en route to the hospital if patient status and management of resources permit.

26. If the child's condition is stable, perform focused history and detailed physical examination on the scene, then initiate transport.

27. Reassess the patient frequently.

28. Contact direct medical oversight for additional instructions.

NON-TRAUMATIC HYPOPERFUSION (SHOCK)

Definition

Shock may be categorized as hypovolemic, distributive, obstructive, or cardiogenic. Manifestations of shock include

- altered mental status
- tachypnea
- tachycardia
- absent peripheral pulses
- cool, clammy, mottled skin
- capillary refill time longer than 2 seconds
- hypotension and/or bradycardia (late findings)

Procedure

1. Ensure scene safety.

2. Perform a scene survey to assess environmental conditions and mechanism of illness or injury.

3. Form a first impression of the patient's condition.

4. Observe standard precautions.

5. Establish patient responsiveness. If cervical spine trauma is suspected, manually stabilize the spine.

6. Assess the patient's airway for patency, protective reflexes and the possible need for advanced airway management. Look for signs of airway obstruction.

7. Open the airway using head tilt/chin lift if no spinal trauma is suspected, or modified jaw thrust if spinal trauma is suspected.

8. Suction as necessary.

9. Consider placing an oropharyngeal or nasopharyngeal airway adjunct if the airway cannot be maintained with positioning and the patient is unconscious.

10. Assess breathing. Obtain pulse oximeter reading.

11. If breathing is inadequate, assist ventilation using a bag-valve-mask device with high-flow, 100% concentration oxygen. If abdominal distention arises, consider placing a nasogastric tube to decompress the stomach.

12. If breathing is adequate, place the child in a position of comfort and administer high-flow, 100% concentration oxygen as necessary. Use a nonrebreather mask or blow-by as tolerated.

13. If the airway cannot be maintained by other means, including attempts at assisted ventilation, or if prolonged assisted ventilation is anticipated, perform endotracheal intubation. Consider administration of pharmacological adjuncts, such as sedatives and paralytic agents, to aid with intubation as permitted by medical direction. Confirm placement of endotracheal tube using clinical assessment and end-tidal CO_2 monitoring.

14. Assess circulation and perfusion.

15. Initiate cardiac monitoring.

16. Establish vascular access using an age-appropriate large-bore catheter with large-caliber tubing. If intravenous access cannot be obtained, proceed with intraosseous access. Do not delay transport to obtain vascular access.

17. If there is still evidence of shock, administer a fluid bolus of normal saline at 20 ml/kg set to maximum flow rate (at a minimum < 20 minutes). Reassess patient after bolus. If signs of shock persist, bolus may be repeated at the same dose up to two times for a maximum total of 60 ml/kg.

18. Assess mental status.

19. Expose the child only as necessary to perform further assessments. Maintain the child's body temperature throughout the examination.

20. Initiate transport. Perform focused history and detailed physical examination en route to the hospital if patient status and management of resources permit.

21. Reassess the patient frequently.

22. Contact direct medical oversight for additional instructions.

ANAPHYLACTIC SHOCK/ALLERGIC REACTION

The following protocol is intended for patients with allergic reaction or anaphylactic shock. For patients with generalized allergic manifestations that do not meet the criteria listed below, contact direct medical oversight prior to treatment.

Definitions

The patient with an allergic reaction will have

- generalized allergic manifestations, such as urticaria (hives)
- a history of allergic exposure

To meet the criteria for anaphylactic shock, the patient must have the findings listed above *plus* one of the following:

- partial or complete airway obstruction
- signs of shock, such as altered mental status, respiratory distress, weak or absent peripheral pulses, cyanosis

Procedure

1. Ensure scene safety.

2. Perform a scene survey to assess environmental conditions and mechanism of illness or injury.

3. Form a first impression of the patient's condition.

4. Observe standard precautions.

5. Establish patient responsiveness. If cervical spine trauma is suspected, manually stabilize the spine.

6. Assess the patient's airway for patency, protective reflexes and the possible need for advanced airway management. Look for signs of airway obstruction.

7. Open the airway using head tilt/chin lift if no spinal trauma is suspected, or modified jaw thrust if spinal trauma is possible.

8. Suction as necessary.

9. Consider placing an oropharyngeal or nasopharyngeal airway adjunct if the airway cannot be maintained with positioning and the patient is unconscious.

10. If patient meets criteria for anaphylactic shock, administer epinephrine 1:1000 solution at 0.01 mg/kg (maximum individual dose 0.3 mg) via subcutaneous injection or epinephrine 1:10,000 solution at 0.5 mcg/kg (maximum individual dose of 25 mcg) via intravenous or intraosseous route.

11. Assess breathing. Obtain pulse oximeter reading.

12. If breathing is inadequate, assist ventilation using a bag-valve-mask device with high-flow, 100% concentration oxygen. If abdominal distention arises, consider placing a nasogastric tube to decompress the stomach.

13. If the airway cannot be maintained by other means, including attempts at assisted ventilation, or if prolonged assisted ventilation is anticipated, perform endotracheal intubation. Consider administration of pharmacological adjuncts, such as sedatives and paralytic agents, to aid with intubation as permitted by medical direction. Confirm placement of endotracheal tube using clinical assessment and end-tidal CO_2 monitoring.

14. If breathing is adequate, place the child in a position of comfort and administer high-flow, 100% concentration oxygen as necessary. Use a nonrebreather mask or blow-by as tolerated.

26. If bronchospasm is present in a patient with adequate ventilation, administer one of the following inhaled beta-2 agonist bronchodilators:

    - Albuterol 2.5 mg via nebulizer over a 10- to 15-minute period or 4 Puffs via metered-dose inhaler (MDI) with spacing device
    - Levalbuterol 0.625-1.25 mg via nebulizer over a 10- to 15-minute period

15. Assess circulation and perfusion.

16. Reassess patient for signs of anaphylactic shock. If criteria are still present, repeat epinephrine 1:1000 solution at 0.01 mg/kg (maximum individual dose 0.3 mg) via subcutaneous injection or epinephrine 1:10,000 solution at 0.5 mcg/kg (maximum individual dose of 25 mcg) via intravenous or intraosseous route.

17. Initiate cardiac monitoring.

18. If the patient meets criteria for anaphylactic shock and intravenous or intraosseous access had not yet been obtained, establish vascular access using an age-appropriate large-bore catheter with large-caliber tubing. If intravenous access cannot be obtained, proceed with intraosseous access. Do not delay transport to obtain vascular access.

19. If evidence of shock persists, administer a fluid bolus of normal saline at 20 ml/kg set to maximum flow rate (at a minimum < 20 minutes). Reassess patient after bolus. If signs of shock persist, bolus may be repeated at the same dose up to two times for a maximum total of 60 ml/kg.

20. Administer diphenhydramine at 1.0 mg/kg (maximum individual dose 50 mg) via intravenous route or deep intramuscular injection.

21. Consider administering steroids (such as methylprednisolone at 2.0 mg/kg) via intravenous route as permitted by medical direction.

22. Assess mental status.

23. Expose the child only as necessary to perform further assessments. Maintain the child's body temperature throughout the examination.

24. If the child's condition is critical or unstable, initiate transport. Perform focused history and detailed physical examination en route to the hospital if patient status and management of resources permit.

25. If the child's condition is stable, perform focused history and detailed physical examination on the scene, then initiate transport.

26. Reassess the patient frequently.

27. Contact direct medical oversight for additional instructions.

ANAPHYLACTIC SHOCK TREATED WITH AUTO-INJECTOR DEVICE

The following protocol is intended for patients in anaphylactic shock and providers whose only epinephrine route is as an auto-injector. For other instances of patients with generalized allergic manifestations or anaphylaxis refer to Anaphylactic Shock /Allergic Reaction Protocol.

Definitions

The patient with anaphylactic shock will have evidence of an allergic reaction including

- generalized allergic manifestations, such as urticaria (hives)
- a history of allergic exposure

And evidence of airway or circulatory compromise as evidenced by:

- partial or complete airway obstruction
- signs of shock, such as altered mental status, respiratory distress, weak or absent peripheral pulses, cyanosis

Procedure

1. Ensure scene safety.

2. Perform a scene survey to assess environmental conditions and mechanism of illness or injury.

3. Form a first impression of the patient's condition.

4. Observe standard precautions.

5. Establish patient responsiveness. If cervical spine trauma is suspected, manually stabilize the spine.

6. Assess the patient's airway for patency, protective reflexes and the possible need for advanced airway management. Look for signs of airway obstruction.

7. Open the airway using head tilt/chin lift if no spinal trauma is suspected, or modified jaw thrust if spinal trauma is possible.

8. Suction as necessary.

9. Consider placing an oropharyngeal or nasopharyngeal airway adjunct if the airway cannot be maintained with positioning and the patient is unconscious.

10. If patient meets criteria for anaphylactic shock, administer epinephrine via auto-injector device. Massage the injection site vigorously for 30 to 60 seconds. Use a 0.3 mg auto-injector for children over 30 kg and a 0.15 mg auto-injector for children less than 30 kg.

11. Assess breathing. Obtain pulse oximeter reading.

12. If breathing is inadequate, assist ventilation using a bag-valve-mask device with high-flow, 100% concentration oxygen. If abdominal distention arises, consider placing a nasogastric tube to decompress the stomach.

13. If the airway cannot be maintained by other means, including attempts at assisted ventilation, or if prolonged assisted ventilation is anticipated, perform endotracheal intubation. Consider administration of pharmacological adjuncts, such as sedatives and paralytic agents, to aid with intubation as permitted by medical direction. Confirm placement of endotracheal tube using clinical assessment and end-tidal CO_2 monitoring.

14. If breathing is adequate, place the child in a position of comfort and administer high-flow, 100% concentration oxygen as necessary. Use a nonrebreather mask or blow-by as tolerated.

15. Assess circulation and perfusion.

16. Reassess patient for signs of anaphylactic shock. If criteria are still present, repeat auto-injector at same dosage.

17. Assess mental status.

18. Expose the child only as necessary to perform further assessments. Maintain the child's body temperature throughout the examination.

19. If the child's condition is critical or unstable, initiate transport. Perform focused history and detailed physical examination en route to the hospital if patient status and management of resources permit.

20. If the child's condition is stable, perform focused history and detailed physical examination on the scene, then initiate transport.

21. Reassess the patient frequently.

22. Contact direct medical oversight for additional instructions.

TRAUMA

The priorities in pediatric trauma management are to prevent further injury, provide rapid transport, notify the receiving facility, and initiate definitive treatment. On-scene time for a traumatic injury should be no longer than 10 minutes unless there are extenuating circumstances, such as extrication, hazardous conditions, or multiple victims. Document these circumstances on the patient record. Inform the receiving hospital as early as possible about the patient's status and condition. This will allow hospital personnel extra time to mobilize resources.

1. Ensure scene safety.

2. Perform a scene survey to assess environmental conditions and mechanism of injury. If hazardous conditions are present (such as swift water, hazardous materials, electrical hazard, or confined space), contact an appropriate agency before approaching the patient. Wait for the designated specialist to secure the scene and patient as necessary.

3. Form a first impression of the patient's condition.

4. Observe standard precautions.

5. Establish patient responsiveness. Manually stabilize the spine.

6. Assess the patient's airway for patency, protective reflexes and the possible need for advanced airway management. Look for signs of airway obstruction.

7. Open the airway using a modified jaw thrust.

8. Suction as necessary.

9. Considering placing an oropharyngeal or nasopharyngeal airway adjunct if the airway cannot be maintained with positioning and the patient is unconscious. Note that the nasopharyngeal airway is contraindicated in the presence of facial trauma.

10. Evaluate breathing. Assess for symmetry of chest expansion, equal breath sounds, and adequate chest rise. Inspect the chest wall for signs of trauma. Obtain pulse oximeter reading.

11. If breathing is inadequate, assist ventilation using a bag-valve-mask device with high-flow, 100% concentration oxygen. If abdominal distention arises, consider placing a nasogastric tube to decompress the stomach. If facial trauma is present or a basilar skull fracture is suspected, use an orogastric tube instead.

12. If the airway cannot be maintained by other means, including attempts at assisted ventilation, respiratory failure is present or if prolonged assisted ventilation is anticipated, perform a Sellick maneuver followed by endotracheal intubation. Consider administration of pharmacological adjuncts, such as sedatives and paralytic agents, to aid with intubation as permitted by medical direction. Confirm placement of endotracheal tube using clinical assessment and end-tidal CO_2 monitoring.

13. If breathing is adequate, place the child in a position of comfort and administer high-flow,

100% concentration oxygen as necessary. Use a nonrebreather mask or blow-by as tolerated.

14. If absent breath sounds or signs of severe respiratory distress are noted together with a mechanism of injury that could cause a tension pneumothorax, perform needle decompression. Use an 18- or 20-gauge over-the-needle catheter. Insert the needle in the mid-clavicular line at the second intercostal space, just above the third rib (some protocols provide for an alternative insertion location of 5th intercostals space mid-axillary line).

15. Control hemorrhage using direct pressure or a pressure dressing.

16. Assess circulation and perfusion.

17. Initiate cardiac monitoring.

18. Assess mental status.

19. Continue manual stabilization while placing a rigid cervical collar. Immobilize the patient on a long backboard or similar device.

20. Expose the child only as necessary to perform further assessments. Maintain the child's body temperature throughout the examination.

21. Initiate transport to an appropriate trauma facility no more than 10 minutes after arriving on the scene unless extenuating circumstances exist or directed by medical direction.

22. Obtain vascular access using an age-appropriate large-bore catheter with large-caliber tubing and administer normal saline at a sufficient rate to keep the vein open. If extenuating circumstances delay transport, obtain vascular access on the scene, but do not delay transport to obtain vascular access.

23. If there is evidence of shock, initiate vascular access in two sites. If intravenous access cannot be obtained, proceed with intraosseous access. Administer a fluid bolus of normal saline at 20 ml/kg set to maximum flow rate (at a minimum < 20 minutes). Reassess patient after bolus. If signs of shock persist, bolus may be repeated at the same dose up to two times for a maximum total of 60 ml/kg.

24. Splint obvious fractures of long bones.

25. Perform focused history and detailed physical examination en route to the hospital if patient status and management of resources permit.

26. Reassess the patient frequently.

27. Contact direct medical oversight for additional instructions.

BURNS

1. Ensure scene safety.

2. Perform a scene survey to assess environmental conditions and mechanism of illness or injury. If hazardous conditions are present (such as swift water, hazardous materials, electrical hazard, or confined space), contact an appropriate agency before approaching the patient. Wait for the designated specialist to secure the scene and patient as necessary.

3. Form a first impression of the patient's condition.

4. Observe standard precautions.

5. Stop the burning process. If a dry chemical is involved, brush it off, then flush with copious amounts of water. If a caustic liquid is involved, flush with copious amounts of water. Remove all of patient's clothing prior to irrigation. Be prepared to treat hypothermia, which may arise secondary to these interventions. For chemical burns with eye involvement, immediately begin flushing the eye with normal saline. Continue flushing throughout assessment and transport.

6. Establish patient responsiveness. If cervical spine trauma is suspected, manually stabilize the spine. Remove the patient's clothing and jewelry in any affected area.

7. Assess the patient's airway for patency, protective reflexes and the possible need for advanced airway management. Look for signs of airway obstruction.

8. Open the airway using head tilt/chin lift if no spinal trauma is suspected, or modified jaw thrust if spinal trauma is suspected.

9. Suction as necessary.

10. Consider placing an oropharyngeal or nasopharyngeal airway adjunct if the airway cannot be maintained with positioning and the patient is unconscious.

11. Assess breathing. Obtain pulse oximeter reading. Refer to the appropriate protocol for management of respiratory distress.

12. If breathing is inadequate, assist ventilation using a bag-valve-mask device with high-flow, 100% concentration oxygen. If abdominal distention arises, consider placing a nasogastric tube to decompress the stomach.

13. If the airway cannot be maintained by other means, including attempts at assisted ventilation, or if prolonged assisted ventilation is anticipated, perform endotracheal intubation. This step should also be undertaken if inhalation injury is suspected. Consider administration of pharmacological adjuncts, such as sedatives and paralytic agents, to aid with intubation as permitted by medical direction. Confirm placement of endotracheal tube using clinical assessment and end-tidal CO_2 monitoring.

14. If breathing is adequate, place the child in a position of comfort and administer high-flow,

100% concentration oxygen as necessary. Use a nonrebreather mask for potential inhalation injury or any serious thermal burn.

15. Assess circulation and perfusion.

16. For electrical burns, initiate cardiac monitoring and determine rhythm. If a dysrhythmia is present, refer to the appropriate protocol for treatment options.

17. If there is evidence of shock in a patient with major thermal burns, obtain vascular access using an age-appropriate large-bore catheter with large-caliber tubing. If intravenous access cannot be obtained, proceed with intraosseous access. Administer a fluid bolus of normal saline at 20 ml/kg set to maximum flow rate. Reassess patient after bolus. If signs of shock persist, bolus may be repeated at the same dose up to two times for a maximum total of 60 ml/kg.

18. Assess mental status.

19. If spinal trauma is suspected, continue manual stabilization, place a rigid cervical collar, and immobilize the patient on a long backboard or similar device.

20. Expose the child only as necessary to perform further assessments. Maintain the child's body temperature throughout the examination.

21. Apply a burn sheet or dry sterile dressings to burned areas. To prevent hypothermia, avoid moist or cool dressings and do not leave wounds or skin exposed.

22. Initiate transport. Perform focused history and detailed physical examination en route to the hospital if patient status and management of resources permit.

23. Pain management is usually indicated. Refer to the appropriate protocol for treatment options.

24. Reassess the patient frequently.

25. Contact direct medical oversight for additional instructions.

TOXIC EXPOSURE

1. Ensure scene safety.

2. Perform a scene survey to assess environmental conditions and mechanism of illness or injury. If hazardous conditions are present (such as swift water, hazardous materials, electrical hazard, or confined space), contact an appropriate agency before approaching the patient. Wait for the designated specialist to secure the scene and patient as necessary.

3. Look for the source of the toxic exposure. Collect any containers or medication bottles to transport with the patient to the hospital. Consult a local poison control center as appropriate.

4. Form a first impression of the patient's condition.

5. Observe standard precautions.

6. Establish patient responsiveness. If cervical spine trauma is suspected, manually stabilize the spine.

7. Assess the patient's airway for patency, protective reflexes and the possible need for advanced airway management. Look for signs of airway obstruction.

8. Open the airway using head tilt/chin lift if no spinal trauma is suspected, or modified jaw thrust if spinal trauma is suspected.

9. Suction as necessary.

10. Consider placing an oropharyngeal or nasopharyngeal airway adjunct if the airway cannot be maintained with positioning and the patient is unconscious.

11. Assess breathing. Obtain pulse oximeter reading.

12. If breathing is inadequate, assist ventilation using a bag-valve-mask device with high-flow, 100% concentration oxygen. If abdominal distention arises, consider placing a nasogastric tube to decompress the stomach.

13. If the airway cannot be maintained by other means, including attempts at assisted ventilation, or if prolonged assisted ventilation is anticipated, perform endotracheal intubation. Consider administration of pharmacological adjuncts, such as sedatives and paralytic agents, to aid with intubation as permitted by medical direction. Confirm placement of endotracheal tube using clinical assessment and end-tidal CO_2 monitoring.

14. If breathing is adequate, place the child in a position of comfort and administer high-flow, 100% concentration oxygen as necessary. Use a nonrebreather mask or blow-by as tolerated.

15. Assess circulation and perfusion.

16. Initiate cardiac monitoring.

17. Obtain vascular access as indicated.

18. If respiratory depression is present and a narcotic overdose is suspected, administer naloxone at 0.1 mg/kg (maximum individual dose 2.0 mg) via intravenous, intraosseous, or intramuscular route.

19. Treatment for other toxic exposures may be instituted as permitted by medical direction, including the following:

    - High-dose atropine for organophosphates
    - Sodium bicarbonate for tricyclic antidepressants
    - Glucagon for calcium channel blockers or beta-blockers
    - Diphenhydramine for dystonic reactions
    - Dextrose for insulin overdose

    Contact direct medical oversight for specific information about individual toxic exposures and treatments.

20. Assess mental status.

21. Expose the child only as necessary to perform further assessments. Maintain the child's body temperature throughout the examination.

22. If the child's condition is critical or unstable, initiate transport. Perform focused history and detailed physical examination en route to the hospital if patient status and management of resources permit.

23. If the child's condition is stable, perform focused history and detailed physical examination on the scene, then initiate transport.

24. Reassess the patient frequently.

25. Contact direct medical oversight for additional instructions.

NEAR-DROWNING

Hypothermia may offer some degree of cerebral protection in a near-drowning incident, but it also increases cardiac irritability. Refractory dysrhythmias may arise during assessment and treatment. Contact direct medical oversight as early as possible.

1. Ensure scene safety.

2. Perform a scene survey to assess environmental conditions and mechanism of illness or injury. If hazardous conditions are present (such as swift water, hazardous materials, electrical hazard, or confined space), contact an appropriate agency before approaching the patient. Wait for the designated specialist to secure the scene and patient as necessary.

3. Form a first impression of the patient's condition.

4. Observe standard precautions.

5. Establish patient responsiveness. If cervical spine trauma is suspected, manually stabilize the spine.

6. Assess the patient's airway for patency, protective reflexes and the possible need for advanced airway management. Look for signs of airway obstruction.

7. Open the airway using head tilt/chin lift if no spinal trauma is suspected, or modified jaw thrust if spinal trauma is suspected.

8. Suction as necessary.

9. Consider placing an oropharyngeal or nasopharyngeal airway adjunct if the airway cannot be maintained with positioning and the patient is unconscious.

10. Assess breathing. Obtain pulse oximeter reading.

11. If breathing is inadequate, assist ventilation using a bag-valve-mask device with high-flow, 100% concentration oxygen. If abdominal distention arises, consider placing a nasogastric tube to decompress the stomach.

12. If the airway cannot be maintained by other means, including attempts at assisted ventilation, or if prolonged assisted ventilation is anticipated, perform endotracheal intubation. Consider administration of pharmacological adjuncts, such as sedatives and paralytic agents, to aid with intubation as permitted by medical direction. Confirm placement of endotracheal tube using clinical assessment and end-tidal CO_2 monitoring.

13. If breathing is adequate, place the child in a position of comfort and administer high-flow, 100% concentration oxygen as necessary. Use a nonrebreather mask or blow-by as tolerated.

14. Assess circulation and perfusion.

15. Initiate cardiac monitoring and determine rhythm. Consult the appropriate protocol for

treatment of specific dysrhythmias.

16. Obtain vascular access. Administer normal saline at a sufficient rate to keep the vein open.

17. Assess mental status.

18. If spinal trauma is suspected, continue manual stabilization, apply a rigid cervical collar, and immobilize the patient on a long backboard or similar device.

19. Expose the child only as necessary to perform further assessments. Maintain the child's body temperature throughout the examination.

20. If the child's condition is critical or unstable, initiate transport as quickly as possible. Perform focused history and detailed physical examination en route to the hospital if patient status and management of resources permit.

21. If the child's condition is stable, perform focused history and detailed physical examination on the scene, then initiate transport.

22. Reassess patient frequently.

23. Contact direct medical oversight for additional instructions.

PAIN MANAGEMENT

This protocol is intended for patients who require pain management in addition to other clinical interventions. Pain medication often causes sedation and affects a patient's mental status. As a result analgesia should not be administered in a patient with head trauma.

1. Ensure scene safety.

2. Perform a scene survey to assess environmental conditions and mechanism of illness or injury.

3. Form a first impression of the patient's condition.

4. Observe standard precautions.

5. Establish patient responsiveness. If cervical spine trauma is suspected, manually stabilize the spine.

6. Assess the patient's airway for patency, protective reflexes and the possible need for advanced airway management. Look for signs of airway obstruction.

7. Open the airway using head tilt/chin lift if no spinal trauma is suspected, or modified jaw thrust if spinal trauma is suspected.

8. Suction as necessary.

9. Consider placing an oropharyngeal or nasopharyngeal airway adjunct if the airway cannot be maintained with positioning and the patient is unconscious.

10. If the airway cannot be maintained by other means, including attempts at assisted ventilation, or if prolonged assisted ventilation is anticipated, perform endotracheal intubation. Consider administration of pharmacological adjuncts, such as sedatives and paralytic agents, to aid with intubation as permitted by medical direction. Confirm placement of endotracheal tube using clinical assessment and end-tidal CO_2 monitoring.

11. Assess breathing. Carefully note adequacy of ventilation. Obtain pulse oximeter reading.

12. If breathing is inadequate, assist ventilation using a bag-valve-mask device with high-flow, 100% concentration oxygen. If abdominal distention arises, consider placing a nasogastric tube to decompress the stomach.

13. If breathing is adequate, place the child in a position of comfort and administer high-flow, 100% concentration oxygen as necessary. Use a nonrebreather mask or blow-by as tolerated.

14. Assess circulation and perfusion. Obtain baseline blood pressure.

15. Obtain vascular access. Administer normal saline at a sufficient rate to keep the vein open.

16. Assess mental status.

17. Expose the child only as necessary to perform further assessments. Maintain the child's body temperature throughout the examination.

18. If the child's condition is critical or unstable, initiate transport. Perform focused history and detailed physical examination en route to the hospital if patient status and management of resources permit.

19. If the child's condition is stable, perform focused history and detailed physical examination on the scene, then initiate transport.

20. Assess the patient's pain using a numerical scale or visual analogue scale as appropriate to child's abilities.

21. Administer an analgesic agent(s) from the following:

    - Morphine 0.1 mg/kg (maximum individual dose 10 mg) via intravenous or subcutaneous route
    - Fentanyl 1.0 mcg/kg (maximum individual dose 100 mcg) via intravenous route
    - Ketoralac 1.0 mg/kg (maximum individual dose of 30 mg) via intravenous route
    - Nitrous oxide via inhalation system

22. After drug administration, reassess the patient using the appropriate pain scale. Carefully note adequacy of ventilation and perfusion.

23. Reassess the patient frequently.

24. Contact direct medical oversight for further instructions.

DEATH OF A CHILD

There is no normal parental reaction to the death of a child. Individual responses may range from emotional outbursts to apparent withdrawal. ***Rescuers should not make any assumptions or judgments.*** *Maintain a professional demeanor at all times. Perform the initial assessment, environmental assessment, and focused history as part of the clinical process. Observe, assess, and document accurately and objectively.*

1. Ensure scene safety.

2. Perform a scene survey to assess environmental conditions and mechanism of illness or injury.

3. Form a first impression of the patient's condition.

4. Observe standard precautions.

5. Establish patient responsiveness.

6. Assess airway and breathing. Confirm apnea.

7. Assess circulation and perfusion.

8. Initiate cardiac monitoring. Confirm absent pulse.

9. Determine whether to perform further resuscitation measures:

   - If patient does not exhibit lividity or rigor, proceed with cardiopulmonary resuscitation as permitted by medical direction, following the protocol for non-traumatic cardiac arrest. During resuscitation, perform steps 11 and 12 below. Initiate transport.

   - If patient exhibits lividity and rigor, do not resuscitate as permitted by medical direction. Proceed with step 10. Note: Lividity can be mistaken for bruising and evidence of abuse. **Do not make any assumptions or judgments.**

10. Provide supportive measures for parents and siblings:

    - Explain the resuscitation process, transport decision, and further actions to be taken by hospital personnel or the medical examiner.
    - Reassure parents that there was nothing they could have done to prevent death.
    - Allow the parents to see the child and say goodbye.
    - Maintain a supportive, professional attitude no matter how the parents react.
    - Whenever possible, be responsive to parental requests. Be sensitive to ethnic and religious needs or responses and make allowances for them.

11. Obtain patient history using a nonjudgmental approach. Ask open-ended questions as follows:

    - Has the child been sick?
    - Can you describe what happened?
    - Who found the child? Where?
    - What actions were taken after the child was discovered?
    - Has the child been moved?
    - When was the child last seen before this occurred, and by whom?
    - How did the child seem when last seen?
    - When was the last feeding provided?

12. Reassess the environment. Document findings, noting the following:

    - Where the child was located upon arrival
    - Description of objects located near the child upon arrival
    - Unusual environmental conditions, such as a high temperature in the room, abnormal odors, or other significant findings

13. If the parents interfere with treatment or attempt to alter the scene, initiate the following actions:

    - Remain supportive, sympathetic, and professional
    - Avoid arguing with the parents or exhibiting anger
    - Do not restrain the parents or request that they be restrained unless scene safety is clearly threatened

14. Document the emergency call, including the following information:

    - Time of arrival
    - Initial assessment findings and basis for resuscitation decision
    - Time of resuscitation decision
    - Time of arrival at hospital if resuscitation and transport were initiated
    - Parental support measures provided if resuscitation was not initiated
    - History obtained (note who provided the information)
    - Environmental conditions
    - Time law enforcement personnel arrived on scene
    - Time that scene responsibility was turned over to law enforcement personnel