EMS Pre-hospital Protocol

JORDAN

NAVIGATION

The Header color of each section defines the protocol type

A D U L T P R O T O C O L

Blue – Adult Protocols

P E D I A T R I C P R O T O C O L

Pink – Pediatric

O B E M E R G E N C I E S

Purple – OB Emergencies

M E D I C A L C O N T R O L

Gray – Reference or Policy

COLOR CODES	
YELLOW	EMT- Basic Skill and Assessment Level Interventions
GREEN	EMT – Intermediate Skill and Assessment Level Interventions
BLUE	EMT - Paramedic Advanced/ Specialist Skill and Assessment Level Interventions
RED	Medical Direction Contact /Authorization - Consult Required

Side Tabs

The side tabs highlight where you are in each protocol sub-section

The BLUE highlighted text shows which sub-section you are currently viewing

The GREY text shows the sub-sections before and after your current selection

INTRODUCTION

These protocols and procedures are to be used as guidelines for operation during EMS calls. They are also intended to be guidelines to ensure that personnel are trained in proper pre-hospital patient care.

Procedures are not considered rigid rules, but rather established standards against which EMS practice can be measured.

Treatment protocols are specific orders directing the actions pertaining to techniques and/or medications used by EMS personnel who are required to seek online medical direction and contact medical authority under supervision of a physician if indicated as per the protocol. Treatment protocols may be initiated without prior direct Online Medical Control contact, especially when the patient's condition and / or situation is life threatening. However, rely on the protocol guideline to know when to seek Online Medical Direction.

Please note that items in this manual are subject to continuous review for the sake of providing members with the most current emergency medical information. Updates to this material may be frequent to maintain a current standard of care to benefit both the patient and the provider of emergency medical care. Please replace older versions with newly updated material as soon as it is issued. Once updated, older versions are to be considered obsolete and are to be discarded to help eliminate confusion.

ONGOING IMPROVEMENT

In an effort to assure these protocols remain relevant and up-to-date, anyone with ideas for improvement should contact the international or Technical committee with their suggestions.

Please understand that protocol changes are an ongoing, progressive, process requiring involvement of many parties to bring to print. Not all suggestions can or will be used, but all will be reviewed by the protocol National Committee and the Technical Committee. We look forward to your suggestions and corrections to assure that we field the finest pre-hospital care protocol.

Index

CHAPTER 1

UNIVERSAL PATIENT CARE

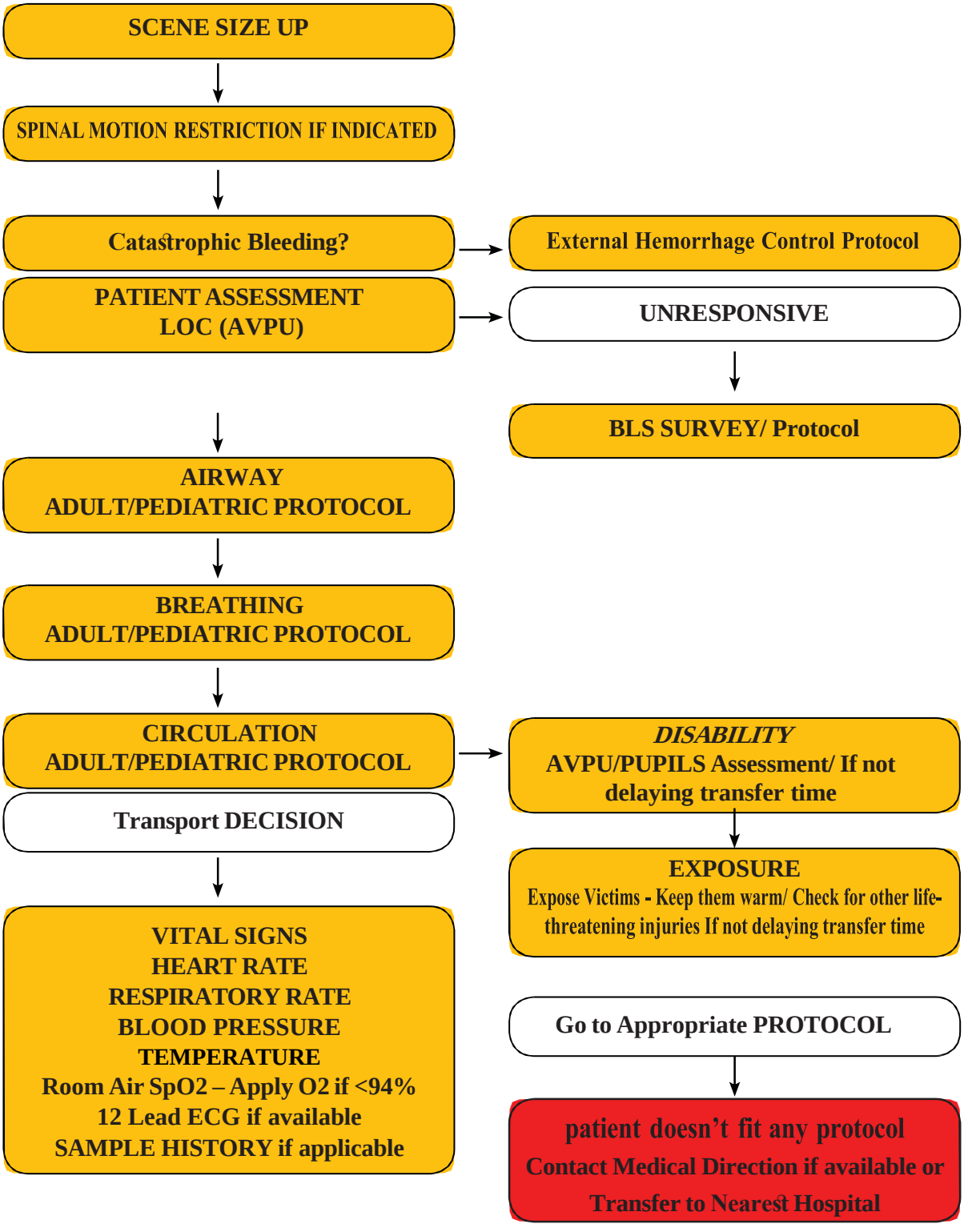
INTRODUCTION

Universal Care

1. The patient history should not be obtained at the expense of the patient. Life-threatening problems detected during the primary assessment must be treated first.
2. Cardiac arrest due to trauma is not treated by medical cardiac arrest protocols. Trauma patients should be transported promptly with CPR, control of hemorrhage, cervical spine immobilization, and other indicated procedures attempted en route.
3. In patients who require IV's, only two attempts at IV insertion should be attempted; additional attempts must be made using IO if available.
4. Patient transport, or other needed treatments, must not be delayed for multiple attempts at endotracheal intubation. Limit to two attempts pre-hospital.
5. Verbally repeat all orders received before their initiation.
6. Any adult medical patient or patients of any age with a cardiac history, irregular pulse, unstable blood pressure, dyspnea, chest pain, medication administration, or venous access must be placed on a cardiac monitor, a 12-lead ECG if available, and transmitted to the emergency department.
7. Describing initial patient presentation and care rendered to the point of transfer.
8. If the patient's condition does not seem to fit a protocol or protocols, contact Medical Direction for guidance if available. If not available; consider stabilizing the patient and transfer to the nearest hospital.
9. All trauma patients with a high-risk mechanism of injury or history of multiple system trauma should be transported as soon as possible. The scene time should be 10 minutes or less.
10. Medical patients will be transported in the most efficient manner possible considering the medical condition. Advanced life support therapy should be provided at the scene if it would positively impact patient care. Justification for scene times greater than 10 minutes should be documented.

INTRODUCTION

UNIVERSAL PATIENT CARE PROTOCOL



UNIVERSAL PATIENT CARE PROTOCOL

Universal Patient Care Protocol Includes Scene Safety, LOC, Assessment of the Airway, Breathing, And Circulation Protocols

This Should Be Done to All Pre-Hospital Patients; After Completing the Universal Patient Care Protocol, You Must Follow the Specific Patient's Appropriate Protocol

Universal Patient Care Key Points

- Any inappropriate contact with patient's secretions, blood, body, etc... Should be documented.
- Required vital signs on every patient include BP, pulse, respirations, and temperature and capillary refill.
- A pediatric patient is a patient who is between 1 years of age to Puberty (Around 13 years).
- An Infant patient is a patient who is less than 1 year of age.
- Timing of transport should be based on patient's clinical condition and the transport policy. However, the goal should be always to minimize on-scene time to less than 10 minutes.

General

- All patient care and documentation MUST be appropriate for your level of training and within the standard of care in Jordan.
- Use the standard guidelines mentioned for CPR and rescue breathing.
- Refer to the Post Resuscitation Cardiac Arrest Protocol for all resuscitated cardiac arrest patients.
- One provider can begin resuscitation and treatment while the other performs the assessment.
- It may be necessary to reference several protocols while treating a patient.
- Refer to the appropriate protocol and provide the required interventions as indicated depending on your level.
- Additional focus may be needed in specific areas as indicated by the patient's chief complaint.
- Airway management and oxygen administration should be initiated based upon the results of the patient assessment and the protocols.
- IV's should be initiated in all patients based upon the results of the patient assessment and the Intravenous Access Procedure. If more than two attempts fail, Consider IO if available and applicable.
- Connect the patient to a cardiac monitor and perform a 12-Lead ECG based upon the results of patient assessment or protocols if available.
- EMTs may apply the cardiac monitor, print a strip, and transfer the strip to the emergency department.

UNIVERSAL PATIENT CARE PROTOCOL

- If indicated and possible, perform a 12-Lead ECG prior to any medication administration.
- Check the patient's Blood Glucose Level based upon the patient's assessment and the protocols.
- Document pain if applicable, use a 0-10 pain scale; 0 = no pain; 10 = worst pain ever experienced.
- It is mandatory to document the reason why an intervention was not performed if it was indicated.
- If Medical Directions requests that a functioning paramedic perform an intervention outside of the protocol, the functioning paramedic may follow the orders if ALL of the following apply:
    - The patient's condition could be severely affected if the intervention is not performed.
    - The paramedic has documented & certified training and experience in the intervention within the last 3 years.
    - The intervention is in the recognized scope of practice for paramedics in Jordan.
    - The paramedic has received permission to perform the intervention from Medical Direction.
    - Medical Direction was notified that the intervention is not in the protocol or needs direct confirmation.

Adult

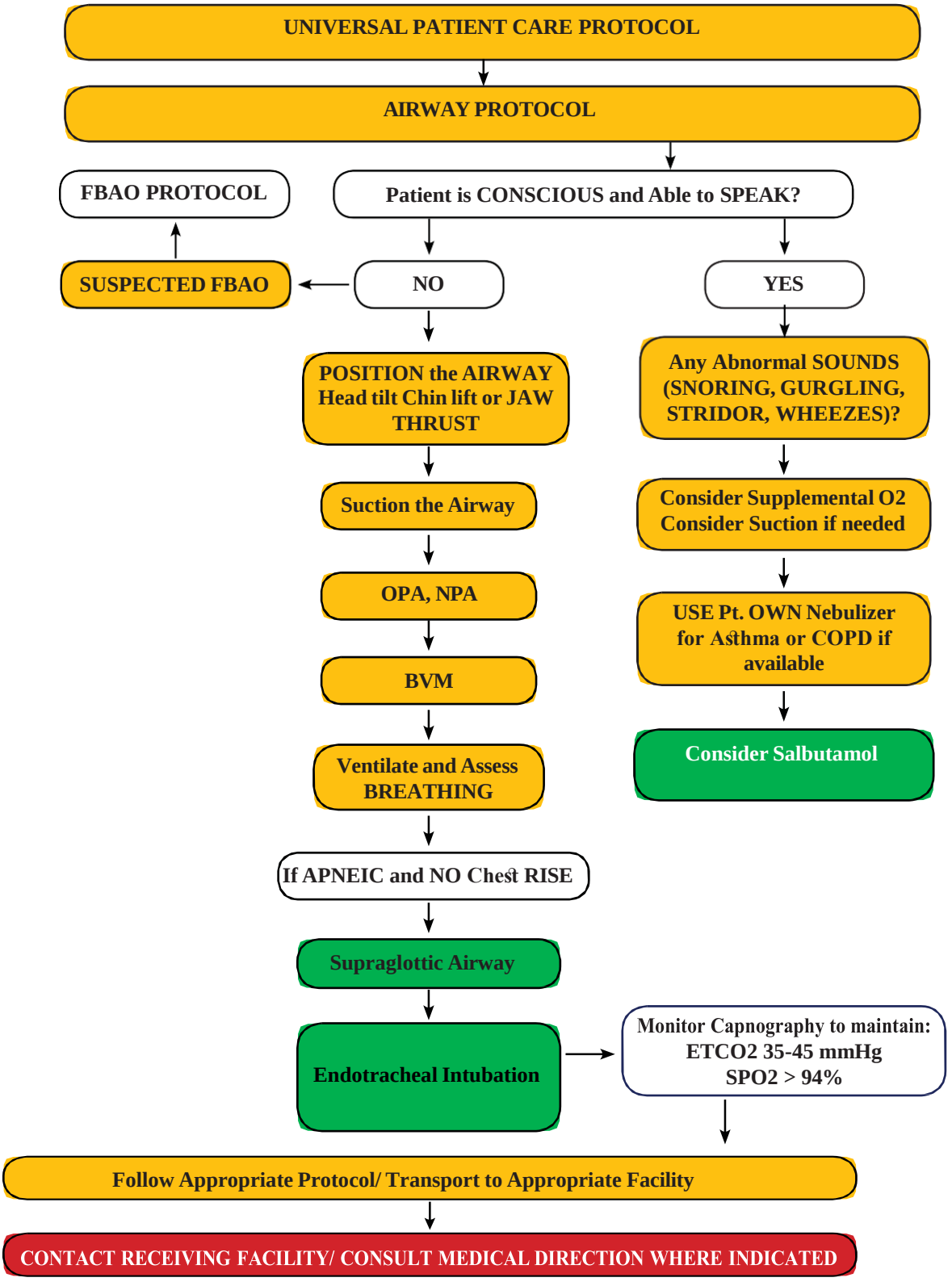
- Patients who are taking beta-blockers may not have an elevated heart rate, but may still be in shock.
- General weakness can be a symptom of a life-threatening illness.
- Hip fractures and dislocations in the elderly have a high mortality rate.
- What would be considered a minor or moderate injury in the adult patient can be life threatening in the elderly.
- Diabetic patients may have abnormal presentations of Myocardial Infarction and other conditions due to neuropathy.
- A medical cardiac arrest might be in the best interest of the patient to perform all initial interventions (Defib, CPR, IV) and 1-2 rounds of medications prior to transport if available.
- An adult patient is considered hypotensive if their systolic BP is 90 mmHg or less.
- Assess the patient after every 500 ml of normal saline, and continue with fluid resuscitation until it is no longer indicated.

Pediatric

- Assess the pediatric patient after every 20 ml/kg fluid bolus of normal saline, and continue with fluid resuscitation until it is no longer indicated.
- Refer to the Pediatric Intra-osseous Procedure, if indicated.
- It may be necessary to alter the order of the assessment (except for the Initial Assessment) based upon the developmental stage of the patient.
- A pediatric trauma patient is any trauma patient who is less than 13 years old.
- Refer to the Pediatric Vital Signs Chart, as needed.

ADULT PROTOCOL

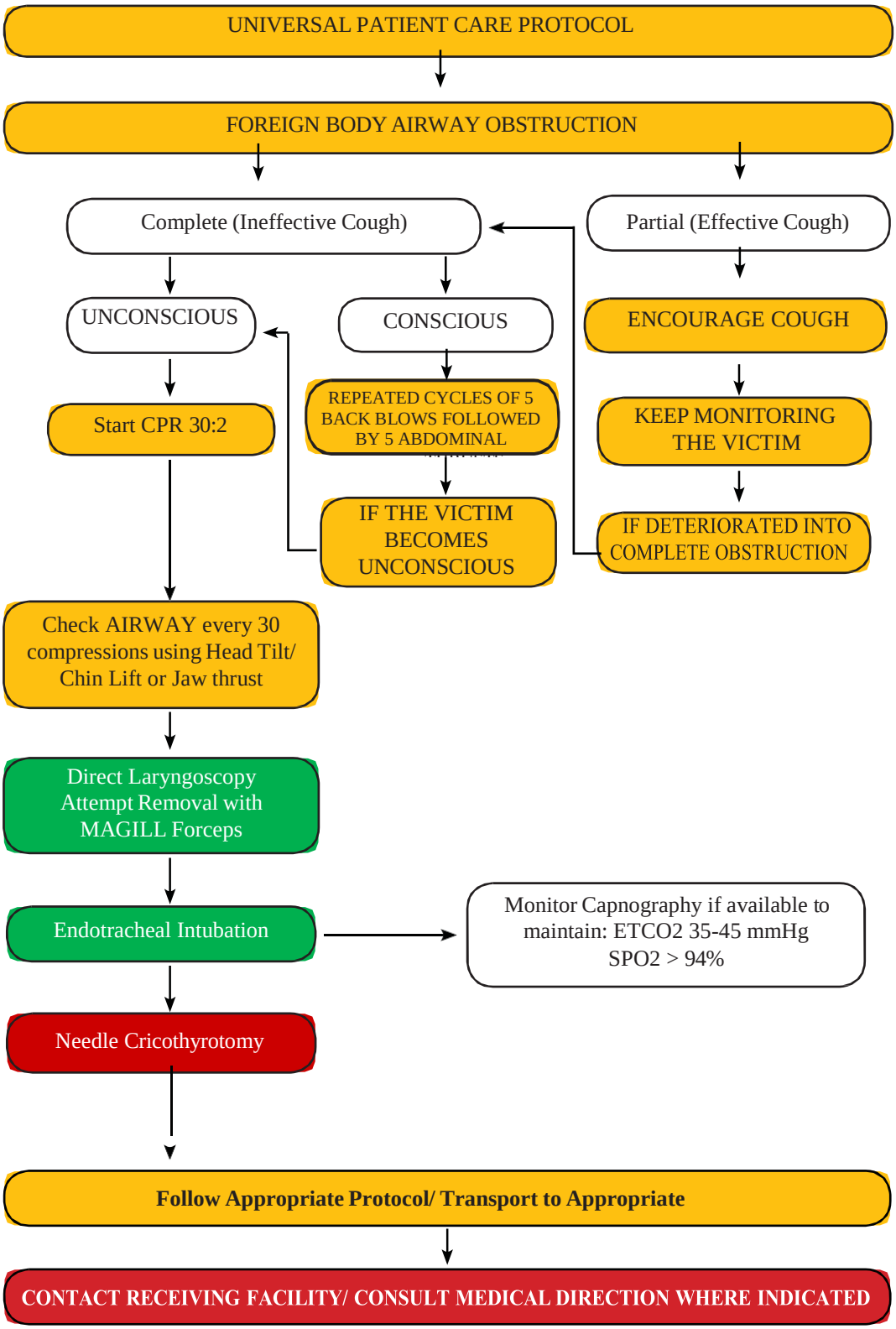
AIRWAY GUIDELINES



EMT-BASIC | EMT-INTERMEDIATE | EMT-Paramedic Advanced/ Specialist | MEDICAL DIRECTION

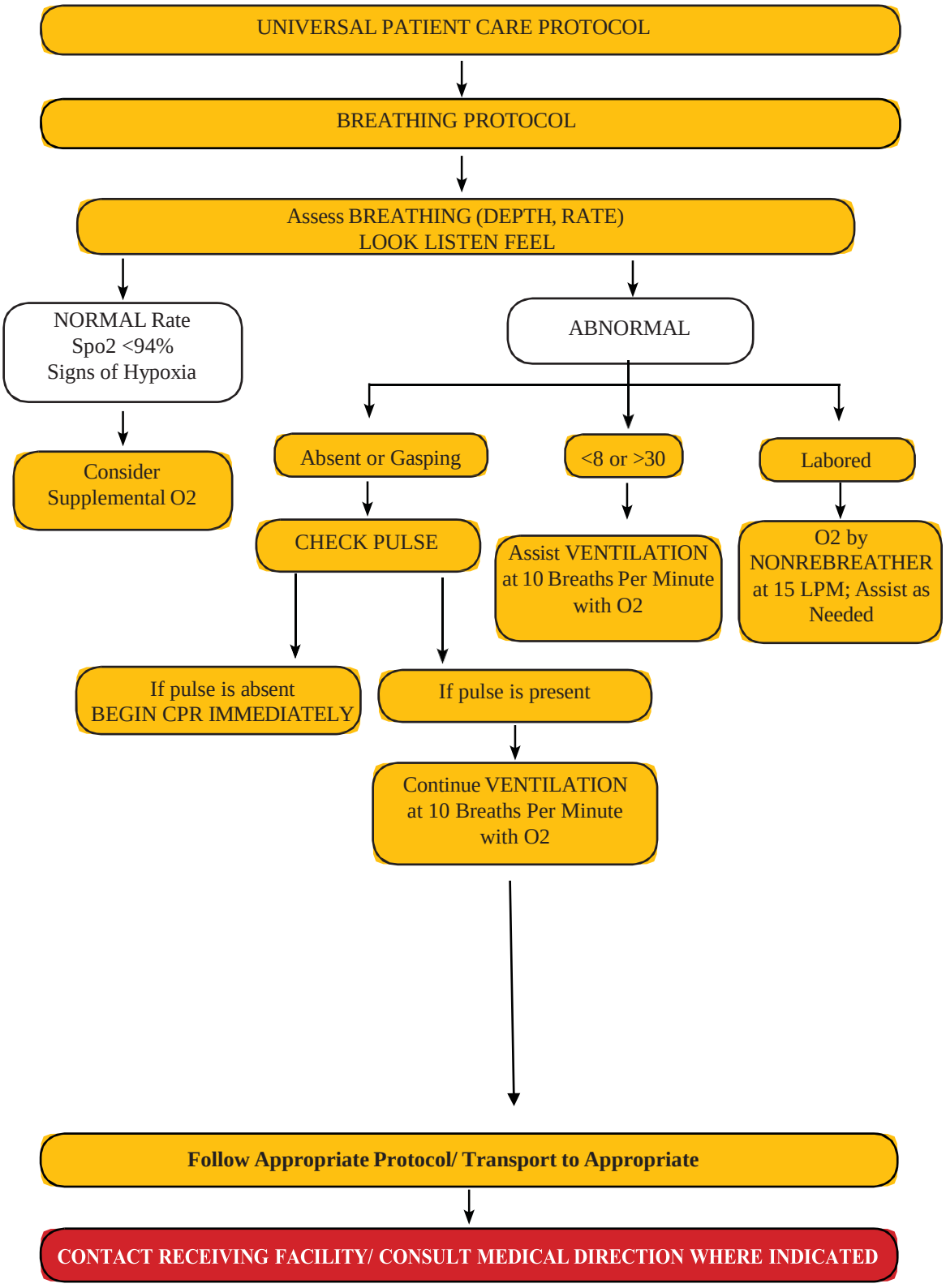
ADULT PROTOCOL

FOREIGN BODY AIRWAY OBSTRUCTION (FBAO)



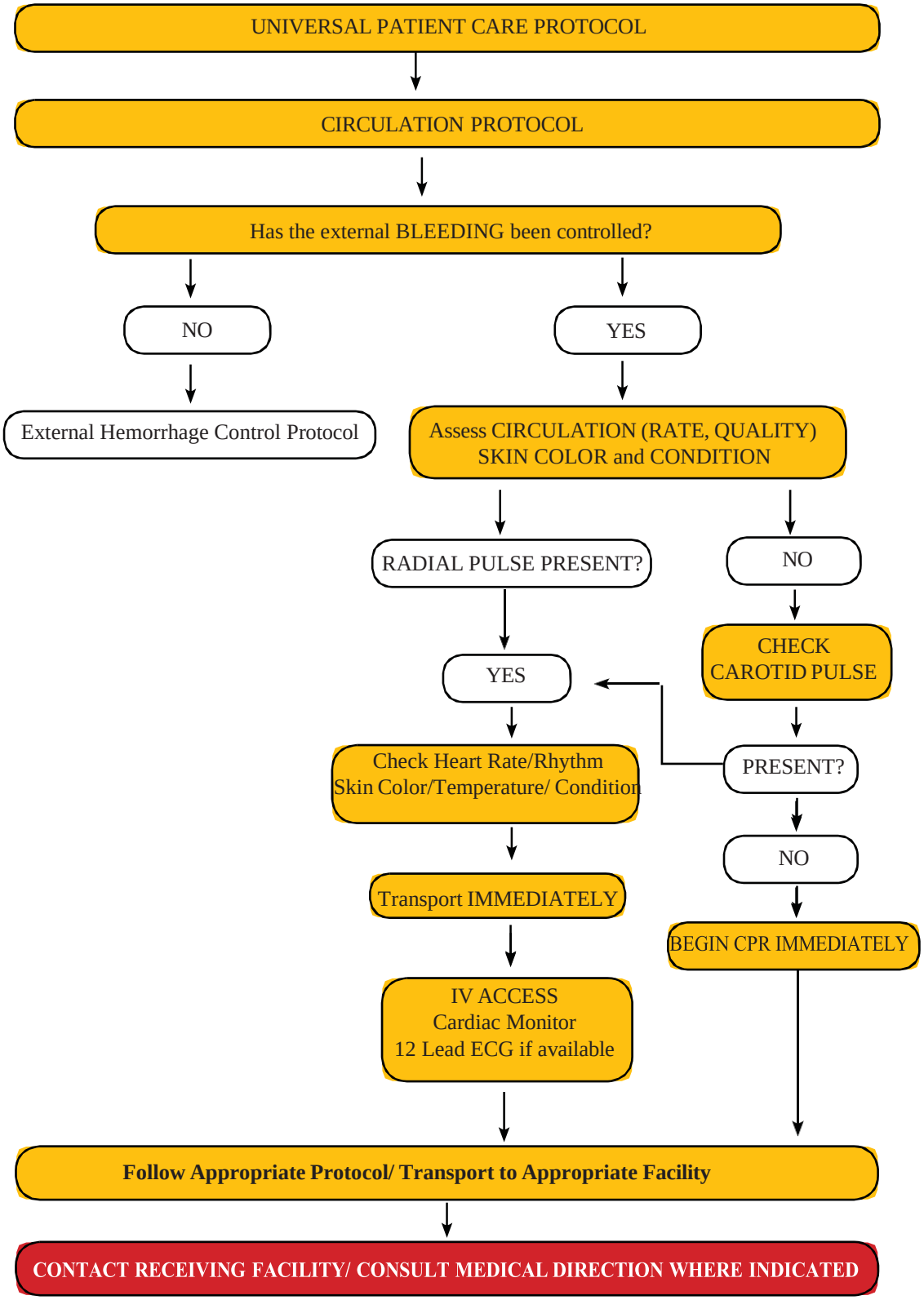
ADULT PROTOCOL

BREATHING GUIDELINES

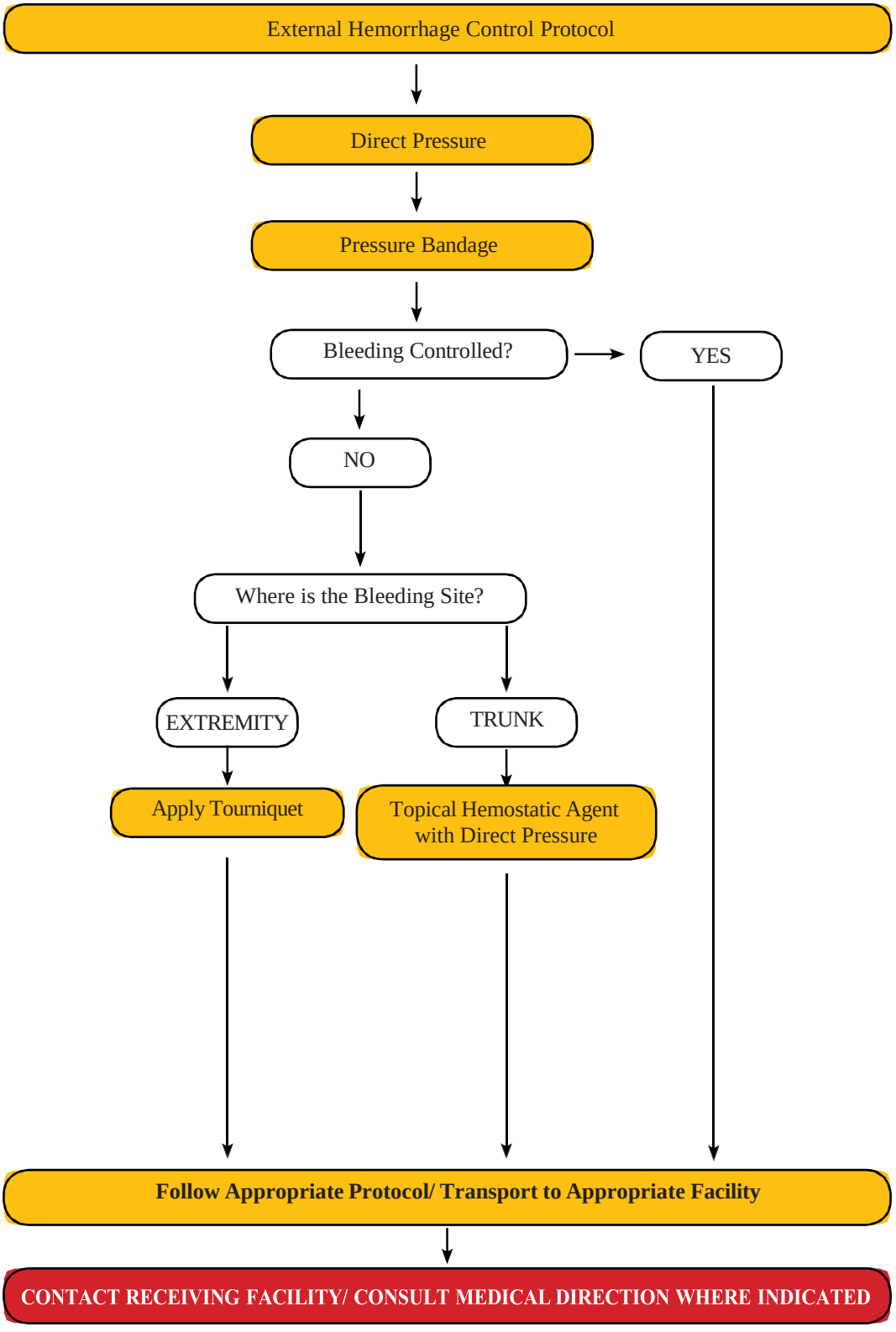


ADULT PROTOCOL

CIRCULATION GUIDELINES



CIRCULATION GUIDELINES



ADULT PROTOCOL

AIRWAY / BREATHING / CIRCULATION GUIDELINES

Airway Assessment:

- If you don't have an airway - you don't have anything!
- C-spine precautions must be considered prior to the insertion of airway adjunct. Provide manual stabilization prior to insertion.

Breathing Assessment:

- Be sure that the airway is open before assessing breathing.
- When assessing breathing, observe rate, quality, depth, and equality of chest movement.
- Always record vital signs when treating breathing problems.

Circulation Assessment:

- Consider life-threatening external bleeding controlling
- Check the rate and quality of the radial pulse – Carotid if radial is absent. In addition to this, check the skin color, condition, and temperature.
- Consider late shock if radial pulses are absent.
- Bradycardia might give a clue to spinal shock. Tachycardia might give a clue to hypovolemic shock.
- Consider cardiac monitor en-route.

CHAPTER 2

AIRWAY MANAGEMENT - ADULT

ADULT PROTOCOL

GUIDELINES OF AIRWAY / BREATHING ASSESSMENT

The following principles should be followed to allow optimum assessment and care of the airway without unnecessary intervention:

- Use the least invasive method of airway management appropriate to the patient.
- Use a method of airway management with which you are procedurally comfortable.
- Use meticulous suctioning to keep the airway clear of debris.
- Monitor continuously to be sure that oxygenation/ventilation is as effective as intended and as needed.
- Understand the difference between these various aspects of airway management:
- Patency: how open and clear is the airway, free of foreign substances, blood, vomitus, and tongue obstruction.
- Ventilation: the amount of air the patient is able to inhale and exhale in a given time, promoting exhalation of carbon dioxide. Use waveform capnography if equipped.
- Oxygenation: the amount of oxygen the patient is able to convey to the circulation for tissue/ organ perfusion. Use pulse oximetry when available.

PARTIAL OBSTRUCTION

- May include coughing with some air movement. Encourage the patient to cough. Monitor for changes. Be prepared for a total obstruction to develop and transport immediately.

COMPLETE OBSTRUCTION/ FOREIGN BODY AIRWAY OBSTRUCTIONS (FBAO)

- Should be removed immediately if possible. Visualize airway and either suction or sweep out liquids and other materials. If the victim is unable to cough or speak use abdominal thrusts immediately till the object is expelled out. A laryngoscope may be used for direct visualization of the airway. If unable to clear airway by these methods, use more advanced methods as directed by the protocol, if the victim loses consciousness begin CPR immediately.

STRIDOR

- High pitched crowing sound caused by obstruction of the upper airway.

WHEEZING

- A whistling or sighing sound, usually lower airway and found upon expiration.

RALES

- Fine to coarse crackles representing fluid in the lower airway.

RHONCHI

- Coarse upper airway sound representing various levels of upper airway obstruction.

COPD

- Pulmonary disease (as emphysema or chronic bronchitis) that is characterized by chronic typically irreversible airway obstruction resulting in prolonged exhalation.

CROUP

- Inflammation, edema, and subsequent obstruction of the larynx, trachea, and bronchi especially of infants and young children that is typically caused by a virus and is marked by episodes of difficulty breathing and hoarse metallic cough.

EPIGLOTTITIS

- Inflammation of the epiglottis usually caused by HIB microbes, now uncommon in children due to vaccination.

KEY POINTS

- **Advanced EMT's may only intubate unconscious patients.**
- **Advanced EMT's may only place extra-glottic (BIAD) airways in unconscious patients.**
- Capnography is mandatory with all methods of intubation. Document results.
- Maintain C-spine immobilization for patients with suspected spinal injury.
- Do not assume hyperventilation is psychogenic - use oxygen.
- Paramedics should consider using (BIAD) airway (King or LMA) if they are unable to Intubate twice.
- Don't waste your time trying to re-intubate the patient. Our goal is to ventilate the patient using BVM before trying ETT.
- Consider c-collar to maintain ETT placement for all intubated patients to maintain tube.
- Consider the use of intubation aids such as a bougie or video laryngoscope to facilitate intubation if available.

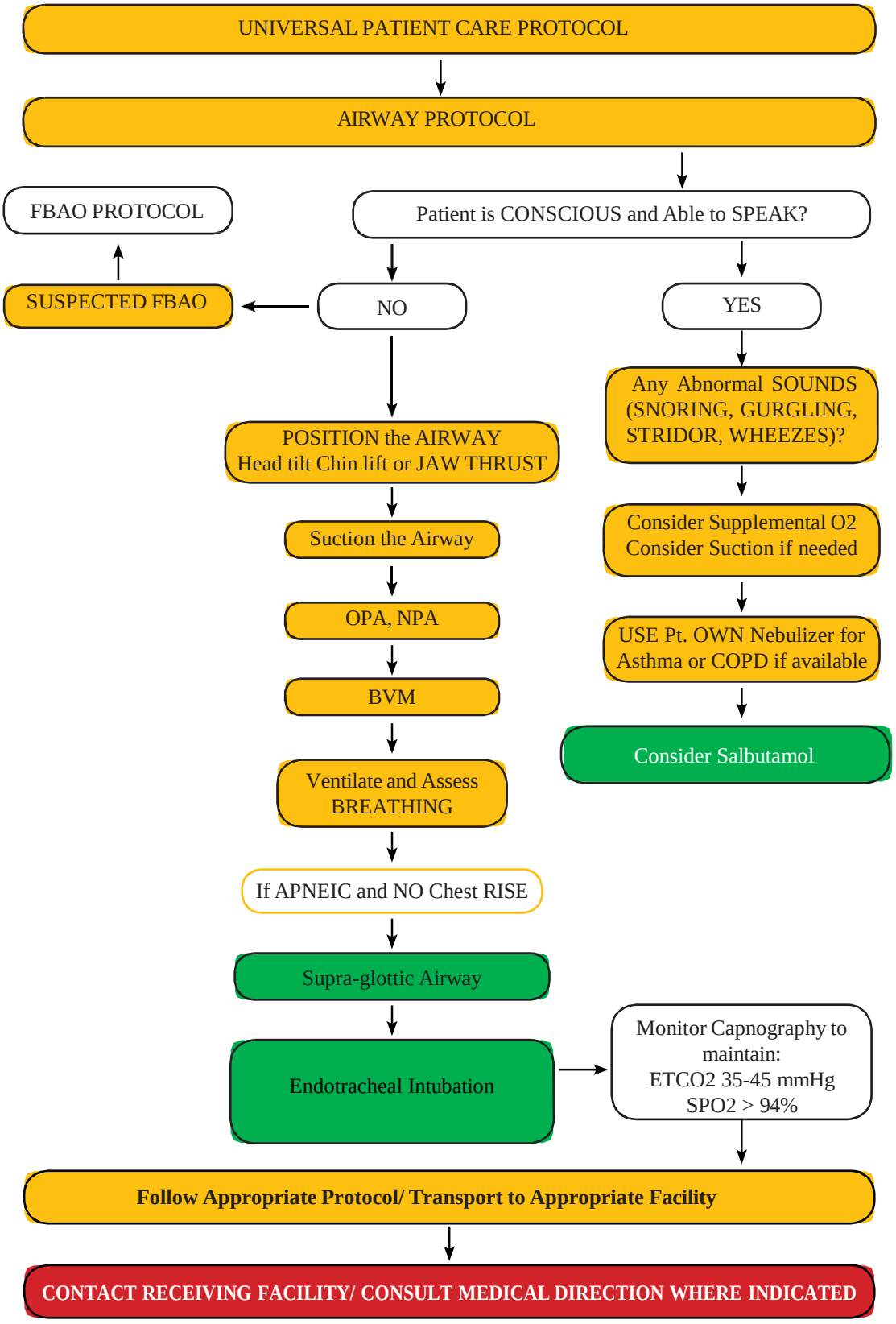
ADULT PROTOCOL

AIRWAY GUIDELINES

ADJUNCT	INDICATIONS	CONTRAINDICATIONS	COMMENTS
Suction	Indispensable for all patients with fluid or particulate debris in airway	NONE	Nomorethan15seconds per attempt
Modified jaw thrust	Initial airway maneuver for all trauma patients	NONE	None of these adjuncts protects against aspiration in patient with depressed consciousness
Head tilt/ Chin Lift	Opening airway of non-trauma patient	Potential cervical spine injury	None of these adjuncts protects against aspiration in patient with depressed consciousness
Nasal airway	Obstruction by tongue with gag reflex present	Potential mid-face injury Skull Fracture	None of these adjuncts protects against aspiration in patient with depressed consciousness
Oral airway	Obstruction to tongue, etc.	Positive gag reflex	None of these adjuncts protects against aspiration in patient with depressed consciousness
Oro-tracheal intubation	Failure of above; provides airway protection	NONE	Difficult in patients with severe maxillofacial injuries
King Airway (Extra-glottic Device) Blind Insertion Airway Device (BIAD)	Difficult airway Airway device for BLS providers	NONE	Primary salvage airway Size appropriately
LMA / iGel (Extra-glottic Device) Blind Insertion Airway Device (BIAD)	Difficult airway Airway device for BLS providers	NONE	Requires training prior to use Size appropriately
Needle cricothyrotomy If Trained	High obstructed airway – unable to clear. Unable to establish any other airway.	Must be able to identify cricoid ring. Not best for anterior neck trauma.	Provides route for temporary oxygenation only Requires special training prior to use

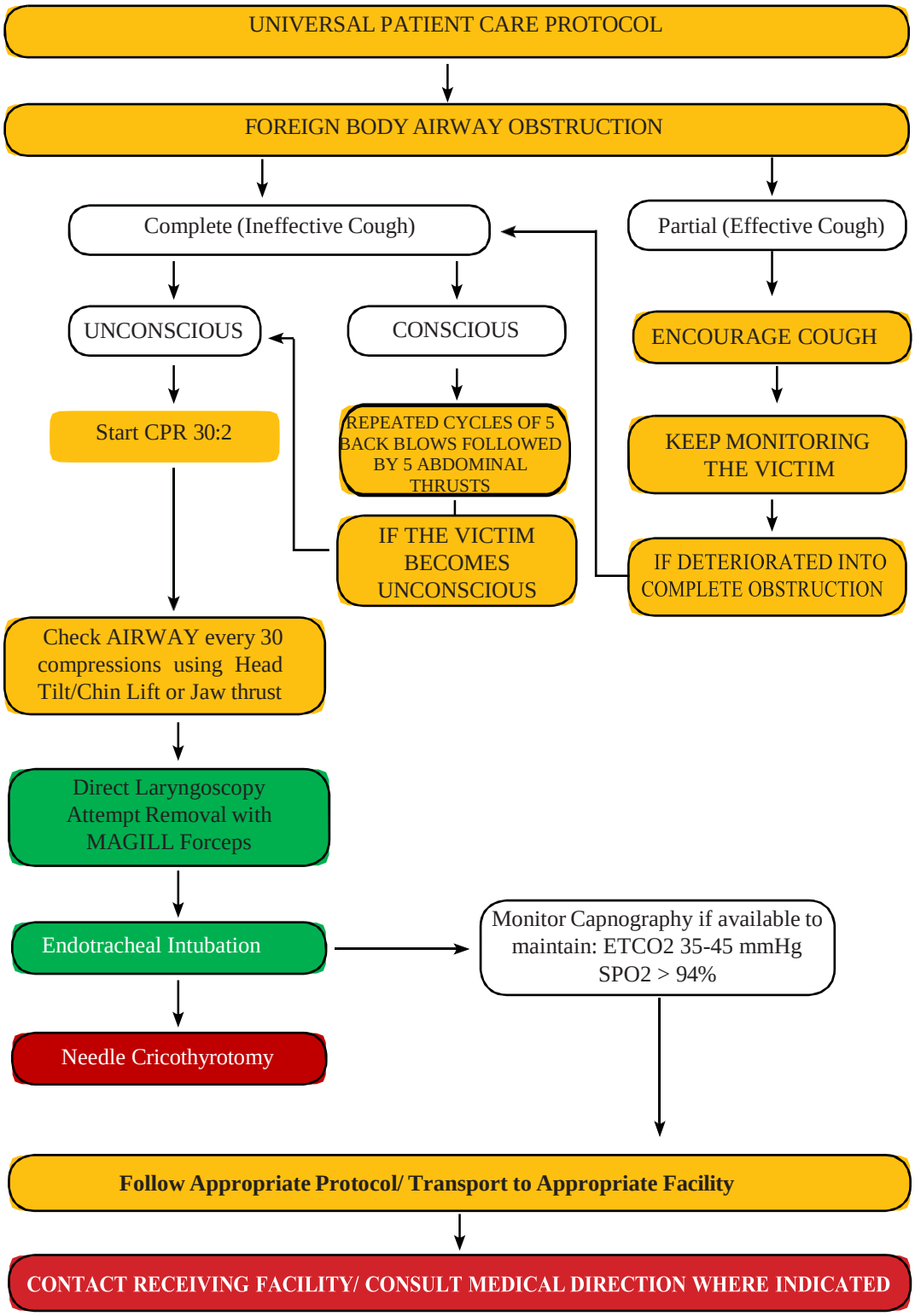
ADULT PROTOCOL

AIRWAY GUIDELINES



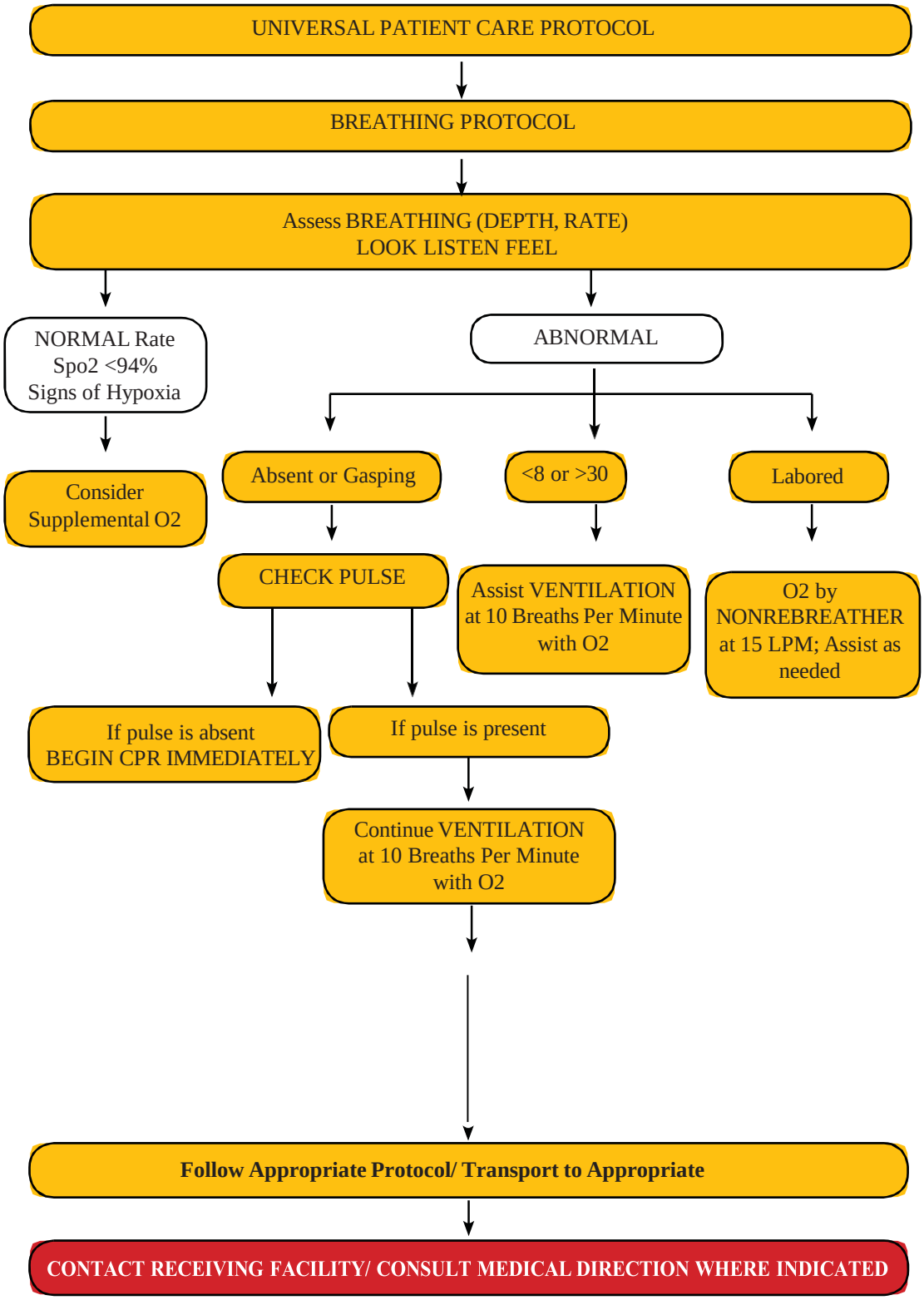
ADULT PROTOCOL

FOREIGN BODY AIRWAY OBSTRUCTION (FBAO)



ADULT PROTOCOL

BREATHING GUIDELINES



NOTES & EDUCATIONAL PEARLS

BASIC AIRWAY MANAGEMENT

Procedures:

Suctioning the Airway:

Indications:

- Trauma to the face and/or upper airway, with potential or actual airway obstruction.
- Vomitus, food boluses or other liquid foreign material in airway.
- Excess secretions or fluid in upper airway (or lungs with endotracheal tube in place).

Contraindications:

- Airway patency effective without additional suctioning assistance.

Techniques:

1. Attach the suction connecting tubing to the suction machine.
2. Turn the device on and test it.
3. Insert the suction tip through the nose (soft or whistle tip catheter) or mouth (soft or rigid) without activating the suction.
4. Open the patient's mouth, if needed, using a tongue blade. If using the scissors method, be aware that patients can still bite down as a reflex.
5. Activate the suction, and withdraw the suction tube. Do not insert a suction catheter with the suction functioning. Suction only on withdrawal of the catheter.
6. Repeat the procedure as necessary.

- **Note that although the intent is to suction foreign matter, air and oxygen also are being suctioned out of the patient. Never suction for greater than 15 seconds. After suctioning, re-oxygenate the patient as soon as possible.**

Complications:

1. Hypoxia due to excessive suctioning time without adequate ventilation between attempts.
2. Persistent obstruction due to inadequate tubing size for removal of debris.
3. Lung injury from aspiration of stomach contents due to inadequate suctioning.
4. Asphyxia due to recurrent obstruction if airway is not monitored after initial suctioning.
5. Trauma to the posterior pharynx from forced use of equipment.
6. Vomiting and aspiration from stimulation of gag reflex.
7. Induction of cardio-respiratory arrest from vagal stimulation.

ADULT PROTOCOL
AIRWAY GUIDELINES

NOTES & EDUCATIONAL PEARLS

Inserting the Oropharyngeal Airway (OPA)

Indications:

- Maintain airway in patients without gag reflex, e.g. tongue obstruction.

Contraindications:

- Positive gag reflex.

Techniques:

1. Choose the size oropharyngeal airway (OPA) that is appropriate for the patient. The distance from the corner of the mouth to the lower part of the external ear or to the angle of the jaw is a good estimate.
2. In the unresponsive patient, open the patient's mouth with a scissor maneuver, a jaw lift or a tongue blade. If you are placing your fingers in the patient's mouth, use caution because broken teeth and biting can cause injury.
3. Insert the airway gently without pushing the tongue back into the pharynx.
    a. Insert the airway under direct vision, using a tongue blade. This is the preferred method and is safe for adults and children.
    b. Insert the airway upside down or sideways and rotate into place after tip of airway passes the tongue. This method should *not* be used for children.
4. If the OPA causes gagging, remove it and replace it with an NPA. The presence of a gag reflex is a contraindication to use of an OPA.

AIRWAY GUIDELINES

NOTES & EDUCATIONAL PEARLS

Inserting the Nasopharyngeal Airway (NPA)

Indications:

- The nasopharyngeal airway (NPA) is made to go into the right nostril to maintain airway in patients with gag reflex.

Contraindications:

- Consider using an alternative to the NPA if the patient has facial fractures or raccoon eyes.

Techniques:

To insert the NPA into the patient's right nostril follow these steps:

1. Choose the appropriate size. It should be as large as possible but still fit easily through the patient's external nares. The size of the patient's little finger can be used as a rough guide.
2. Measure the NPA from the nares to the tip of the ear lobe to ensure it is the correct length.
3. Lubricate the tube with a water-based lubricant.
4. Insert the tube straight back through the right nostril along the floor of the nose with the beveled edge of the airway toward the septum.
5. Gently pass it into the posterior pharynx with a slight rotating motion until the flange rests against the nares.

❖ Note that if resistance to passage of the NPA is felt, DO NOT FORCE the NPA in, as injury may occur. Remove NPA and attempt insertion in the other nostril.

To insert the NPA into the left nostril:

1. Turn the airway upside down so that the bevel is toward the septum.
2. Insert straight back through the nostril until you reach the posterior pharynx.
3. Turn the airway over 180 degrees and insert it down the pharynx.

❖ Note that if the tongue is occluding the airway, a jaw thrust or chin lift must be performed to allow the nasopharyngeal airway to go under the tongue.

ADULT PROTOCOL
AIRWAY GUIDELINES

NOTES & EDUCATIONAL PEARLS

Using a Pocket Mask with Supplemental Oxygen

Stabilize the patient's head in a neutral position.

1. Connect the oxygen tubing to the oxygen cylinder and the mask.
2. Open the oxygen cylinder, and set the flow rate to a minimum of 15 liters per minute.
3. Open the patient's mouth.
4. Insert an OPA or NPA, if available. Otherwise use the chin-lift or jaw-thrust maneuver to open the airway.
5. Place the mask on the face, and establish a good seal. Make sure the mask is the proper size for your patient. The mask should cover the nose and mouth and make a good seal. Facial hair, lack of teeth, obesity, or advanced age may make it difficult to get a good mask seal.
6. Ventilate mouth-to-mask with enough volume (8–10 mL per kg body weight) *to cause adequate chest rise*. Ventilate at a rate of 10 to 12 breaths per minute. The inspiratory phase should last 1.5 to 2 seconds. Let the patient exhale before giving the next breath.

Using the Bag-Valve Mask

1. Stabilize the patient's head in a neutral position.
2. Connect the oxygen, connecting tubing to the bag-valve-mask system and oxygen cylinder.
3. Attach the oxygen reservoir to the bag-valve mask.
4. Open the oxygen cylinder, and set the flow rate to minimum of 15 liters per minute.
5. Select the proper size mask, and attach it to the bag-valve-mask device. The mask should go from the bridge of the nose to the chin.
6. Open the patient's mouth.
7. Insert an OPA (or an NPA, if the patient has a gag reflex).
8. If available, apply a capnography cannula or attach an airway adapter between the bag and the mask.
9. Place the mask on the patient's face, and have your partner establish and maintain a good seal. Facial hair, lack of teeth, obesity, or advanced age might make it difficult to get a good mask seal.
10. Using both hands, ventilate at a rate of 10 to 12 breaths per minute. If you are getting good bilateral chest rise, you are giving adequate tidal volume. Calculated tidal volume is 8-10 mL per kg body weight. If you suspect Cerebral Herniation Syndrome hyperventilate at a rate of 20 breaths per minute.
11. Use capnography to ensure adequate ventilation and prevent inadvertent hyperventilation. As a general rule, keep the end-tidal CO2 (ETCO2) between 35 and 45 mmHg.
12. If you are forced to ventilate without the assistance of another emergency care provider, use one hand to maintain a face seal and the other hand to squeeze the bag. This may decrease the volume of ventilation because less volume is produced by only one hand squeezing the bag.
13. Watch for chest rise to ensure adequate ventilation volume. To make a proper seal, place the thumb on the mask over the nose and index finger on the mask over the chin while the rest of the fingers are in contact with the mandible.

AIRWAY GUIDELINES

NOTES & EDUCATIONAL PEARLS

Supra-glottic Airway Devices

Indications:

1. Hypoxia and/or hypoventilation refractory to non-invasive airway/ respiratory management.
2. Airway protection to reduce aspiration in the setting of sustained altered mental status with a Glasgow Coma Scale Score <8.
3. Two unsuccessful oral and/or nasal intubation attempts. An intubation attempt has occurred when the tip of the endotracheal tube is advanced beyond the gum line or into a nares. Attempts are counted per patient not per intubator. It is not necessary to first attempt intubation if a difficult airway is anticipated or visualized.

❖ A supra-glottic airway may be used as the first–line airway in these cases.

Contraindications:

1. Ability to maintain oxygenation and ventilation by less invasive methods, such as Bag-Valve Mask ventilation.
2. Intact gag reflex.
3. Known esophageal disease.
4. Ingestion of caustic substance (e.g. lye, acids) or extensive airway burns.
5. Tracheotomy or laryngectomy.
6. Suspected Foreign Body Airway Obstruction.

Precaution:

❖ Emerging medical literature indicates concerns regarding reduction in cerebral arterial flow and impedance of cerebral venous return due to pressure effects of supra-glottic airways. Supra-glottic airways should not be utilized when other methods of airway management are capable of achieving needed oxygenation/ventilation.

ADULT PROTOCOL

AIRWAY GUIDELINES

NOTES & EDUCATIONAL PEARLS

Inserting the King LT-D™ Airway

1. Select the correct size King LT-D airway™:
   a. Size 2 (green connector color) is for children 35 to 45 inches (90 to 115 cm) in height or who weigh 12 to 25 kg.
   b. Size 2.5 (orange connector color) is for children 41 to 51 inches (105 to 130 cm) in height or who weigh 25 to 35 kg.
   c. Size 3 (yellow connector color) is for adults 4 to 5 feet (122 to 155 cm) in height.
   d. Size 4 (red connector color) is for adults 5 to 6 feet (155 to 180 cm) in height.
   e. Size 5 (purple connector color) is for adults greater than 6 feet (>180 cm) in height.
2. Test the cuff inflation system for air leaks.
3. Apply a water-soluble lubricant to the distal tip.
4. Hold the airway at the connector with your dominant hand. With the neck stabilized in a neutral position, hold the mouth open, and apply a chin lift with your non-dominant hand. Using a lateral approach, introduce the tip into the mouth.
5. Advance the tip behind the base of the tongue while rotating the tube back to the midline so that the blue orientation line faces the chin of the patient.
6. Without exerting excessive force, advance the tube until the base of the connector is aligned with the patient's teeth or gums.
7. Hold the KLT 900™ cuff pressure gauge in the non-dominant hand, and inflate the cuffs of the King LT-D™ with air to a pressure of 60 cm H2O. If a cuff pressure gauge is not available and a syringe is being used to inflate the King LT-D™, inflate cuffs with the minimum volume necessary to seal the airway at the peak ventilatory pressure employed (just seal volume).
   Typical sizing and inflation volumes are as follows:
   a. Size 2 (green), 35 to 45 inches (90 to 115 cm), 25 to 35 mL.
   b. Size 3 (orange), 41 to 51 inches (105 to 130 cm), 30 to 40 mL.
   c. Size 3 (yellow), 4 to 5 feet (122 to 155 cm), 45 to 60 mL.
   d. Size 4 (red), 5 to 6 feet (155 to 180 cm), 60 to 80 mL.
   e. Size 5 (purple), greater than 6 feet (> 180 cm), 70 to 90 mL.
8. Attach the resuscitator bag to the airway. While bagging the patient, gently withdraw the tube until ventilation becomes easy and free flowing. Adjust cuff inflation if necessary to obtain a seal of the airway at the peak ventilatory pressure employed. You must see the chest rise, hear breath sounds, feel good compliance, and hear no breath sounds over the epigastrium to be sure that the King LT-D™ airway is correctly placed. However, capnography remains the most reliable way to confirm and monitor the position of the tube. Like the other BIADs, if the patient becomes conscious, you must remove the airway. Extubation is likely to cause vomiting, so be prepared to suction the pharynx and turn the backboard.
9. Document the time, provider, provider level and success for the procedure. Complete all applicable airway confirmation fields including chest rise, bilateral, equal breath sounds, absence of epigastric sounds and end-tidal CO2 readings.

AIRWAY GUIDELINES

NOTES & EDUCATIONAL PEARLS

Removing the King LT-D™ Airway

1. Once in correct position, the KING LT–D™ Airway should be well tolerated until return of airway reflexes.
2. Suction MUST always be available when a King LT–D™ Airway is removed. Anticipate Vomiting with removal, positioning patient in lateral recumbent position unless contraindicated.
3. Completely deflate cuffs prior to removal.

Additional Information:

1. If unable to place a King LT–D™ Airway in three attempts, utilize bag valve mask ventilation.
2. Ventilation portals of the King LT–D™ Airway must align with the laryngeal inlet for adequate oxygenation and ventilation. Insertion depth should be adjusted to optimize ventilation.
3. Ensure cuffs are not over inflated. Inflate the cuffs with the minimum volume necessary to seal the airway. If the patient becomes more alert, it may be helpful in retaining the tube to remove a slight amount of air from the cuffs.
4. Most unsuccessful insertion attempts relate to the failure to keep the tube in a midline position during insertion.
5. Do not force the tube during insertion; this may result in trauma to the airway or esophagus.
6. Document any complications as well as all methods used to ensure appropriate placement of the King LT–D™ Airway including auscultation of absence of epigastric sounds and presence of lung sounds, physiologic changes (chest rise and fall, improved oxygenation, condensation in King LT–D™ Airway with exhalations), and waveform capnography readings (if equipped).

ADULT PROTOCOL

AIRWAY GUIDELINES

NOTES & EDUCATIONAL PEARLS

Inserting the Esophageal Tracheal Combitube™

1. With the neck stabilized in a neutral position, insert the tube blindly, watching for the two black rings on the Combitube™ that are used for measuring the depth of insertion. The rings should be positioned between the teeth and the lips.
2. Use the larger syringe to inflate the pharyngeal cuff with the appropriate amount of air for the size being utilized 100~ ml of air. *Do not* hold the Combitube™ while inflating the pharyngeal balloon. As inflation occurs, the Combitube™ will seal itself in the posterior pharynx behind the hard palate.
3. Use the smaller syringe to fill the distal cuff with the appropriate amount of air for the size being utilized 15~ ml of air.
4. Initial ventilation is attempted through port #1. You must see the chest rise, hear breath sounds, feel good compliance, and hear no breath sounds over the epigastrium to be sure that you are ventilating the lungs.
5. If you do not see the chest rise, hear breath sounds, and feel good compliance, and if you hear breath sounds over the epigastrium, the tube has been placed in the trachea. In this case, change ventilation to the second port. Again, you must check to see the chest rise, hear breath sounds, feel good compliance, and hear no breath sounds over the epigastrium to be sure that you are ventilating the lungs. Use capnography to confirm and monitor correct placement. Like the other BIADs, if the patient becomes conscious, you must remove the Combitube™. Extubation is likely to cause vomiting, so be prepared to suction the pharynx upon removal.

Additional Information:

1. When Combitube patients are moved during EMS care, the capnograph must be rechecked for any changes. If the waveform continues to show a normal pattern of rapid upstroke with exhalation, exhalation plateau, and rapid downstroke with inhalation, no further repeat confirmation is required. If at any time, the capnograph waveform is abnormal, you must recheck if the tube is in place or not.
2. If at any time during patient care there is doubt as to correct Combitube placement, you must either reverify by this sequence or reattempt correct Combitube placement. While the Combitube placer may delegate confirmation steps to his/her colleagues, he or she is ultimately responsible to ensure that a complete confirmation sequence is performed.
3. Do NOT remove a properly functioning Combitube unless the patient's gag reflex returns.
4. Do NOT remove a properly functioning Combitube to attempt endotracheal intubation.
5. Document the time, provider, provider level and success for the procedure. Complete all applicable airway confirmation fields including chest rise, bilateral, equal breath sounds, absence of epigastric sounds and end-tidal CO2 readings.

AIRWAY GUIDELINES

NOTES & EDUCATIONAL PEARLS

Inserting the Laryngeal Mask Airway (LMA™)

1. With the neck stabilized in a neutral position, ventilate with a mouth-to-mask or bag-valve mask technique. Suction the pharynx before insertion of the airway.
2. Remove the valve tab and check the integrity of the LMA™ cuff by inflating with the maximum volume of air.
3. Using the syringe included with the LMA™, the cuff of the LMA™ should be tightly deflated, so that it forms a flat oval disk with the rim facing away from the aperture. This can be accomplished by pressing the mask with its hollow side down on a sterile flat surface. Use the fingers to guide the cuff into an oval shape and attempt to eliminate any wrinkles on the distal edge of the cuff. A completely flat and smooth leading edge facilitates insertion, avoids contact with the epiglottis, and is important to ensure success when positioning the device.
4. Lubricate the posterior surface of the LMA™ with a water-soluble lubricant just before insertion.
5. Preoxygenate (do not hyperventilate) the patient.
6. If there is no danger of spine injury, position the patient with the neck flexed and the head extended. If the mechanism of injury suggests the potential for spine injury, the patient's head and neck must be maintained in a neutral position.
7. Hold the LMA™ like a pen, with the index finger placed at the junction of the cuff and the tube. Under direct vision, press the tip of the cuff upward against the hard palate and flatten the cuff against it. The black line on the airway tube should be oriented anteriorly toward the upper lip.
8. Use the index finger to guide the LMA™, pressing upward and backward toward the ears in one smooth movement. Advance the LMA™ into the hypopharynx until definite resistance is felt.
9. Before removing the index finger, gently press down on the tube with the other hand to prevent the LMA™ from being pulled out of place.
10. Without holding the tube, inflate the cuff with just enough air to obtain a seal. The maximum volumes are shown in Table 5-1. When inflating, the LMA™ may move slightly as its seats. Holding the tube will prevent this movement and not allow a seal over the glottic opening.
11. Connect the LMA™ to the bag-valve mask and employ manual ventilation of less than 20 cm H2O. As with the supra-glottic airways (BIADs), you must see the chest rise, hear breath sounds, feel good compliance, and hear no breath sounds over the epigastrium to be sure that the LMA™ is correctly placed. However, this confirmation method can be unreliable, so use of capnography to confirm and monitor tube position is recommended.
12. Insert a bite block (not an oropharyngeal airway) if available, and secure the LMA™ with tape or a commercial tube holder. Remember that the LMA™ does not protect the airway from aspiration. If the patient becomes conscious, the LMA™ must be removed. Extubation is likely to cause vomiting, so be prepared to suction the pharynx and turn the backboard.
13. Document the time, provider, provider level and success for the procedure. Complete all applicable airway confirmation fields including chest rise, bilateral, equal breath sounds, absence of epigastric sounds and end-tidal CO2 readings.

ADULT PROTOCOL
AIRWAY GUIDELINES

NOTES & EDUCATIONAL PEARLS

ADVANCED AIRWAY MANAGEMENT

Procedures:

Laryngoscopic Orotracheal Intubation

Intubation in the trauma patient differs from the usual endotracheal intubation in that the patient's neck must be stabilized in the neutral position during the procedure. This does make it more difficult to visualize the vocal cords during laryngoscopy.

Techniques:

After ventilation and initial preparations, the following steps should be carried out:

1. An assistant stabilizes the head and neck, and counts slowly aloud to 30 (at your request).
2. In the supine patient, lift the chin, and slide the blade into the right side of the patient's mouth. Push the tongue to the left, and "inch" the blade down along the tongue in an attempt to see the epiglottis. A key maneuver must be performed here: The blade must pull forward (up) on the tongue to lift up the epiglottis and bring it into view.
3. Use the laryngoscope blade to lift the tongue and epiglottis up and forward in a straight line. "Levering" the blade is an error and can result in broken teeth and other trauma. The laryngoscope is essentially a "hook" to lift the tongue and epiglottis up and out of the way so that the glottic opening can be identified. Remember that the Miller (straight) blade is used to lift the epiglottis directly, whereas the Macintosh (curved) blade is inserted into the vallecula and lifts the epiglottis indirectly.
4. Advance the tube along the right side of the oropharynx once the epiglottis is seen. When the glottis opening (or even just the arytenoid cartilages) is identified, pass the tube through to a depth of about 5 cm beyond the cords. The mark on the tube that is even with the teeth should be three times the diameter of the ET tube. Thus, an 8.0 mm tube in an adult should be at 24 cm. While the tube is still held firmly, remove the stylet if used, inflate the cuff, attach a bag-valve mask, and check the tube for placement using the following confirmation protocol. Begin ventilation using adequate oxygen concentration and tidal volume. Maintain an ETCO2 level between 35 and 45 mmHg.

AIRWAY GUIDELINES

NOTES & EDUCATIONAL PEARLS

Confirmation of endotracheal tube placement:

The following sequence is to be used and documented to verify and maintain correct oral endotracheal placement without fail:

1. **Visualization** of endotracheal tube passage between the vocal cords.
2. **Detection of End-tidal carbon dioxide**: End-tidal carbon dioxide (EtC02) detection shall be confirmed within 60 seconds of endotracheal tube placement. The capnography adaptor is to be placed at the bag-valve device-endotracheal tube interface for the first normal waveform ventilation. The indicating correct endotracheal placement reflects a rapid upstroke with the beginning of exhalation, the exhalation plateau ending at the point of EtC02 measurement, and a rapid down stroke with the beginning of inhalation. Any waveform that does not show rhythmic rise and fall correlating with assisted ventilations indicates incorrect tube placement and the tube must be withdrawn.
3. **Auscultation**: Auscultate the epigastrium. If epigastric sounds are heard, intubation is to be reattempted. The endotracheal tube placed in the esophagus may be left in place, at the intubator's discretion, until another endotracheal tube is correctly placed and verified. If no epigastric sounds are heard, proceed to auscultation of the thorax bilaterally. Breath sounds are best auscultated in the anterior to mid axillary lines. If breath sounds are present on the right and absent on the left, this suggests a right main stem intubation. Withdraw the endotracheal tube 1cm and repeat breath sound auscultation. If necessary, the tube may be withdrawn an additional 1-2cm.
4. **Assessment of physiologic changes**: These include equal rise and fall of the chest, condensation in the endotracheal tube on exhalation, improvement in the patient's color, and improvement in the patient's respiratory distress or failure.
5. Secure the endotracheal tube with a tube holder and place a cervical collar.

NOTES & EDUCATIONAL PEARLS

Nasotracheal Intubation

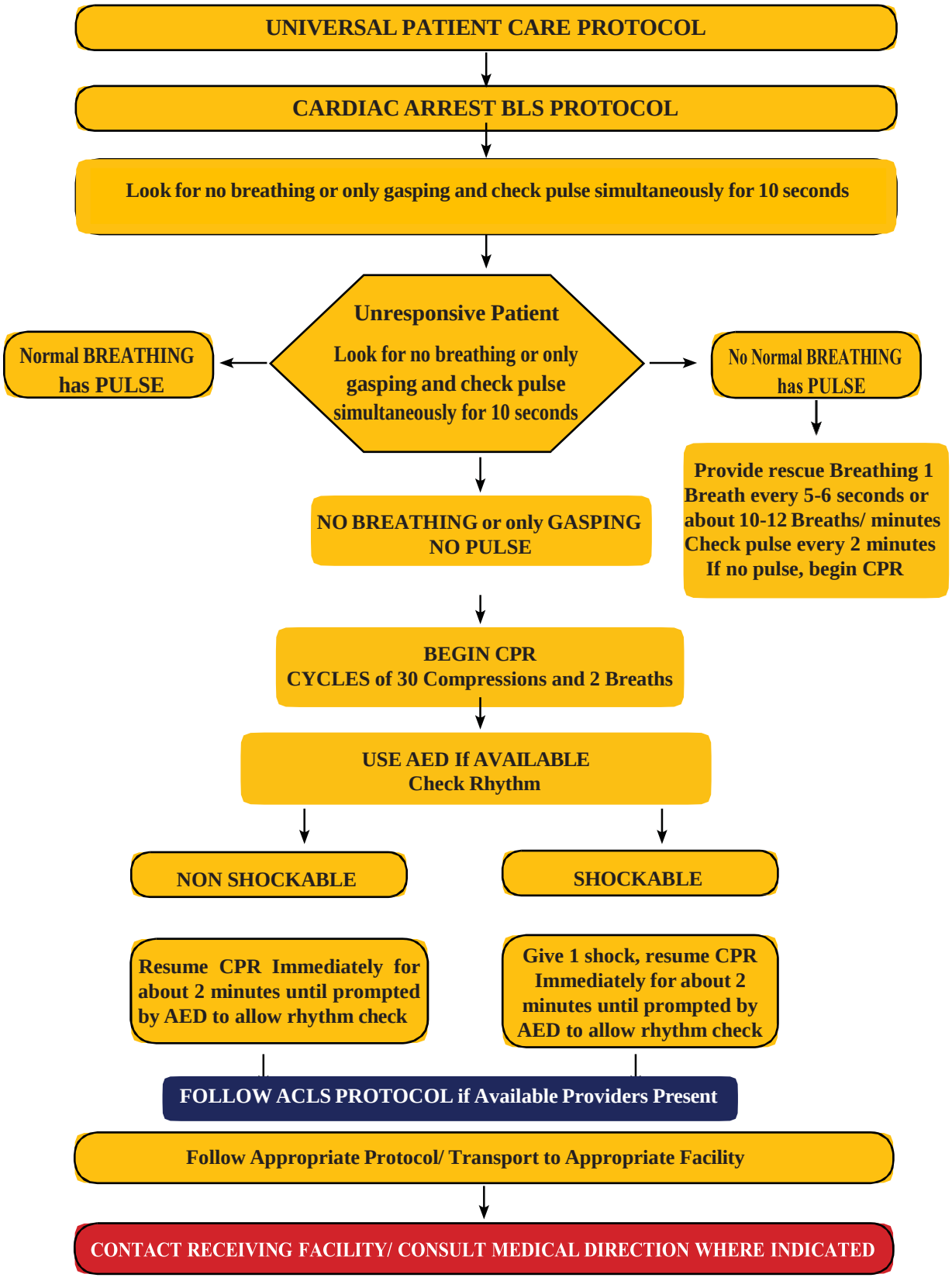
1. Perform routine preparation procedures.
2. Lubricate the cuff and distal end of a 7 mm or 7.5 mm ETT. With the bevel against the floor or septum of the nasal cavity, slip the tube distally through the largest naris. Insert along the floor of the nasal cavity at a 90-degree angle to the face.
3. When the tube tip reaches the posterior pharyngeal wall, take great care on "rounding the bend," and then direct the tube toward the glottic opening.
4. By watching the neck at the laryngeal prominence, you can judge the approximate placement of the tube. Tenting of the skin on either side of the prominence indicates that the tube is caught up in the pyriform fossa, a problem solved by slight withdrawal and rotation of the tube to the midline. Bulging and anterior displacement of the laryngeal prominence usually indicate that the tube has entered the glottic opening and has been correctly placed. At this point the patient, especially if not deeply comatose, will cough, strain, or both. This may be alarming to the novice emergency care provider, who might interpret this as laryngospasm or misplacement of the tube. The temptation may be to pull the tube and ventilate because the patient may not breathe immediately. Holding your hand or ear over the opening of the tube to detect airflow may reassure you that the tube is correctly placed, and you may inflate the cuff and begin ventilation.
5. Confirm tube placement using the confirmation

CHAPTER 3

CARDIAC EMERGENCIES - ADULT

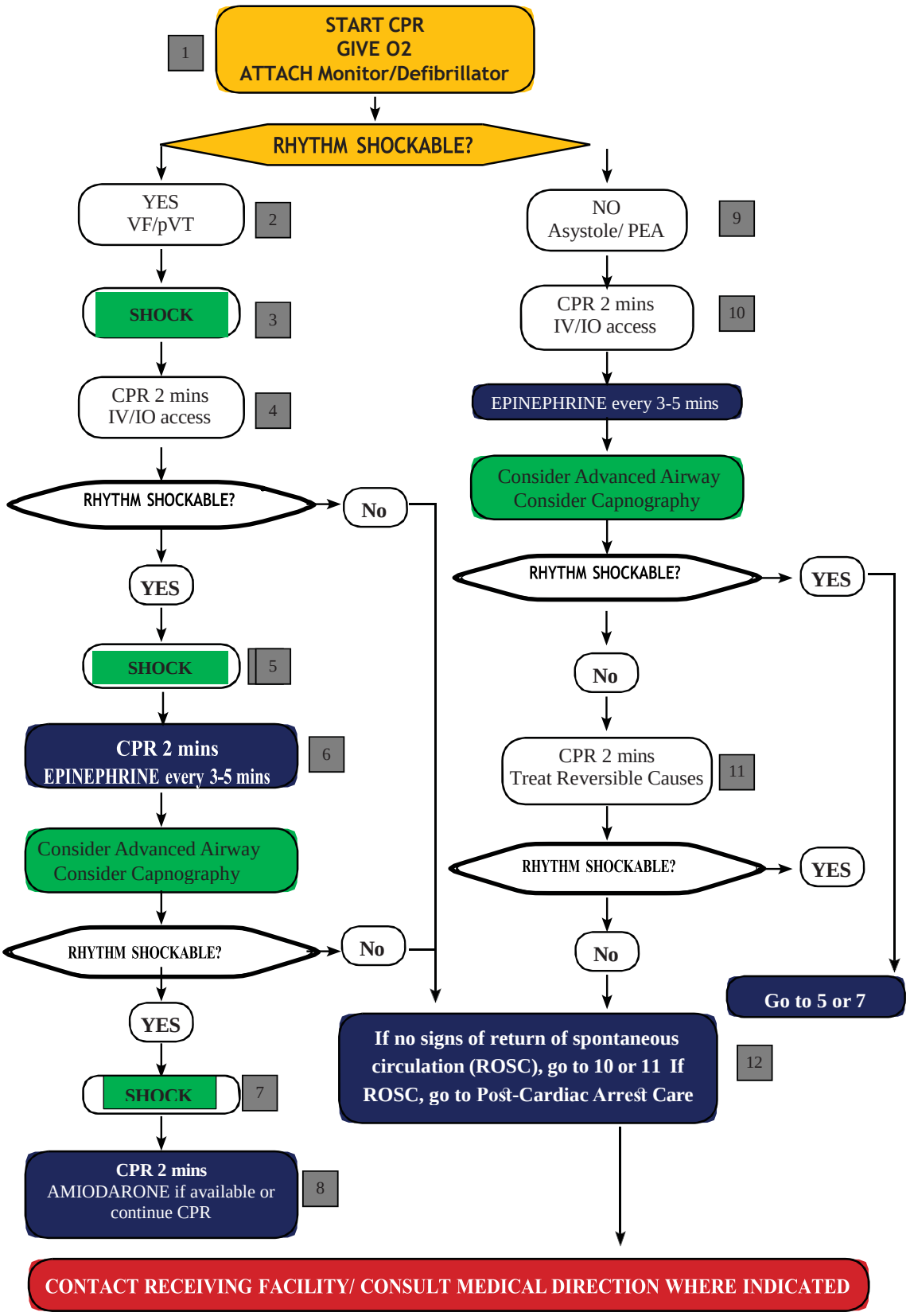
ADULT PROTOCOL

CARDIAC ARREST BLS PROTOCOL



ADULT PROTOCOL

CARDIAC ARREST ACLS



EMT-BASIC | EMT-INTERMEDIATE | EMT-Paramedic Advanced/ Specialist | MEDICAL DIRECTION

ADULT PROTOCOL

CARDIAC ARREST ACLS

CPR QUALITY

- **Push Hard (at least 2 inches 5cm) and Fast (100-120/Min) and allow complete chest recoil.**
- **If PETCO2 <10 mmHg, attempt to improve CPR quality.**

SHOCK ENERGY FOR DEFIBRILATION

- **Biphasic: Manufacturer recommendation (e.g. Initial dose of 120-200 J), if unknown; use maximum available. Second and subsequent doses should be equivalent, and higher doses may be considered.**
- **Monophasic: 360 J**
- **Use defibrillator pads if available**

DRUG THERAPY

- **Epinephrine IV/IO dose: 1mg every 3-5 mins**
- **Amiodarone IV/IO dose: First dose: 300mg bolus. Second dose: 150mg or**

ADVANCED AIRWAY

- **Endotracheal Intubation or supraglottic advanced airway**
- **Waveform capnography or capnometry to confirm and monitor ET tube placement.**
- **Once advanced airway in place, give 1 breath every 6 seconds (10 breaths/min) with continuous chest compressions**

RETURN OF SPONTANEOUS CIRCULATION (ROSC)

- **Pulse and blood pressure**
- **Abrupt sustained increase In PETCO2 (typically >40 mmHg)**

REVERSIBLE CAUSES

- **Hypovolemia, Hypoxia, Hydrogen Ion (acidosis), Hypo/Hyperkalemia, Hypothermia.**
- **Tension pneumothorax, Cardiac Tamponade, Toxins, Pulmonary Thrombosis, Coronary Thrombosis.**

ADULT PROTOCOL
CARDIAC ARREST ROSC

UNIVERSAL PATIENT CARE PROTOCOL

↓

ADULT IMMEDIATE POST CARDIAC ARREST PROTOCOL

↓

Return of Spontaneous Circulation
ROSC

↓

Optimize Ventilation and Oxygenation
Maintain SpO_2>94%
Consider Advanced Airway and Waveform Capnography
Do not Hyperventilate

↓

Treat Hypotension (SPB <90 mmHg)
IV/IO Bolus
Consider Treatable Causes

↓

12 Lead ECG

↓

Follow Appropriate Protocol/ Transport to Appropriate Facility

↓

CONTACT RECEIVING FACILITY/ CONSULT MEDICAL DIRECTION WHERE INDICATED

ADULT PROTOCOL

CARDIAC ARREST

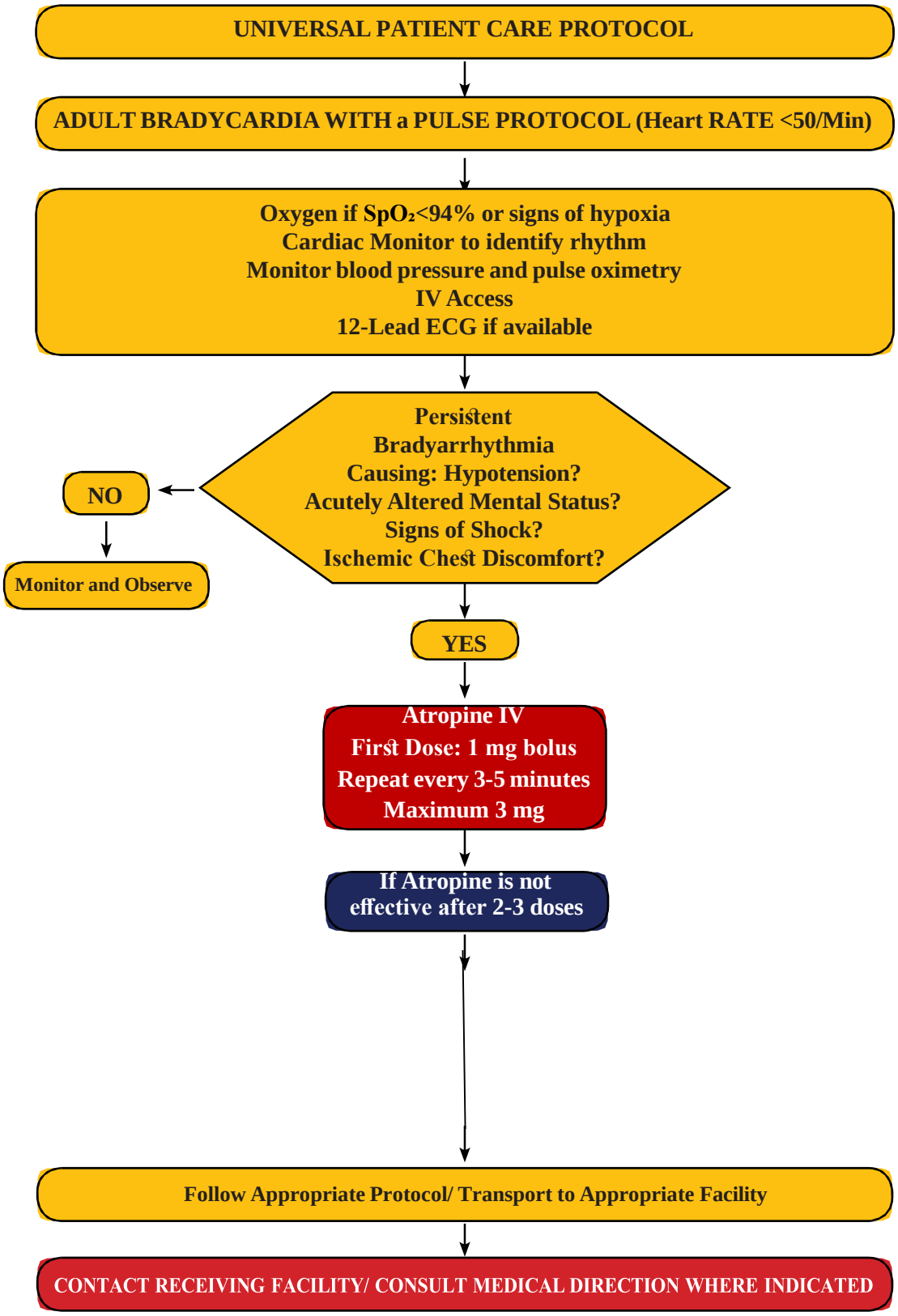
HISTORY	SIGNS AND SYMPTOMS	DIFFERENTIAL DIAGNOSIS
• Past medical history • Medications • Beta-blocker use • Calcium channel blocker use • Clonidine use • Digitalis use • Pacemaker	• HR < 50 / min • Chest pain • Respiratory distress • Hypotension or shock • Altered mental status • Syncope	• Acute myocardial infarction • Hypoxia • Hypothermia • Sinus bradycardia • Athletes • Head injury (elevated ICP) or stroke • Spinal cord lesion • Sick sinus syndrome • AV blocks (1°, 2°, or 3°)

KEY POINTS

- Always minimize interruptions to chest compressions.
- Success is based on proper planning and execution. Procedures require space and patient access, make room to work.
- Reassess airway frequently and with every patient move.
- Maternal arrest - Treat mother per appropriate protocol with immediate notification to Medical direction (if available) and rapid transport. The Pregnant mother should be tilted to the left manually (the uterus) or tilting the whole board before applying CPR to prevent Supine Hypotension Syndrome.
- Attempt to obtain patient history from family members or bystanders:
  - Estimated down time
  - Medical history
  - Complaints prior to arrest
  - Bystander CPR prior to EMS arrival
  - AED use prior to EMS arrival
- Administer Dextrose only if the patient has a blood glucose level < 60 mg / dl. Dextrose should be administered as soon as hypoglycemia is determined.
- Reassess the patient if the interventions do not produce any changes.
- If patient is pregnant and in cardiac arrest, manually manipulate the uterus to the left during CPR.

ADULT PROTOCOL

BRADYCARDIA



EMT-BASIC | EMT-INTERMEDIATE | EMT-Paramedic Advanced/ Specialist | MEDICAL DIRECTION

ADULT PROTOCOL

BRADYCARDIA

HISTORY	SIGNS AND SYMPTOMS	DIFFERENTIAL DIAGNOSIS
• Past medical history • Medications • Beta-blocker use • Calcium channel blocker use • Clonidine use • Digitalis use • Pacemaker	• HR < 50 / min • Chest pain • Respiratory distress • Hypotension or shock • Altered mental status • Syncope	• Acute myocardial infarction • Hypoxia • Hypothermia • Sinus bradycardia • Athletes • Head injury (elevated ICP) or stroke • Spinal cord lesion • Sick sinus syndrome • AV blocks (1°, 2°, or 3°)

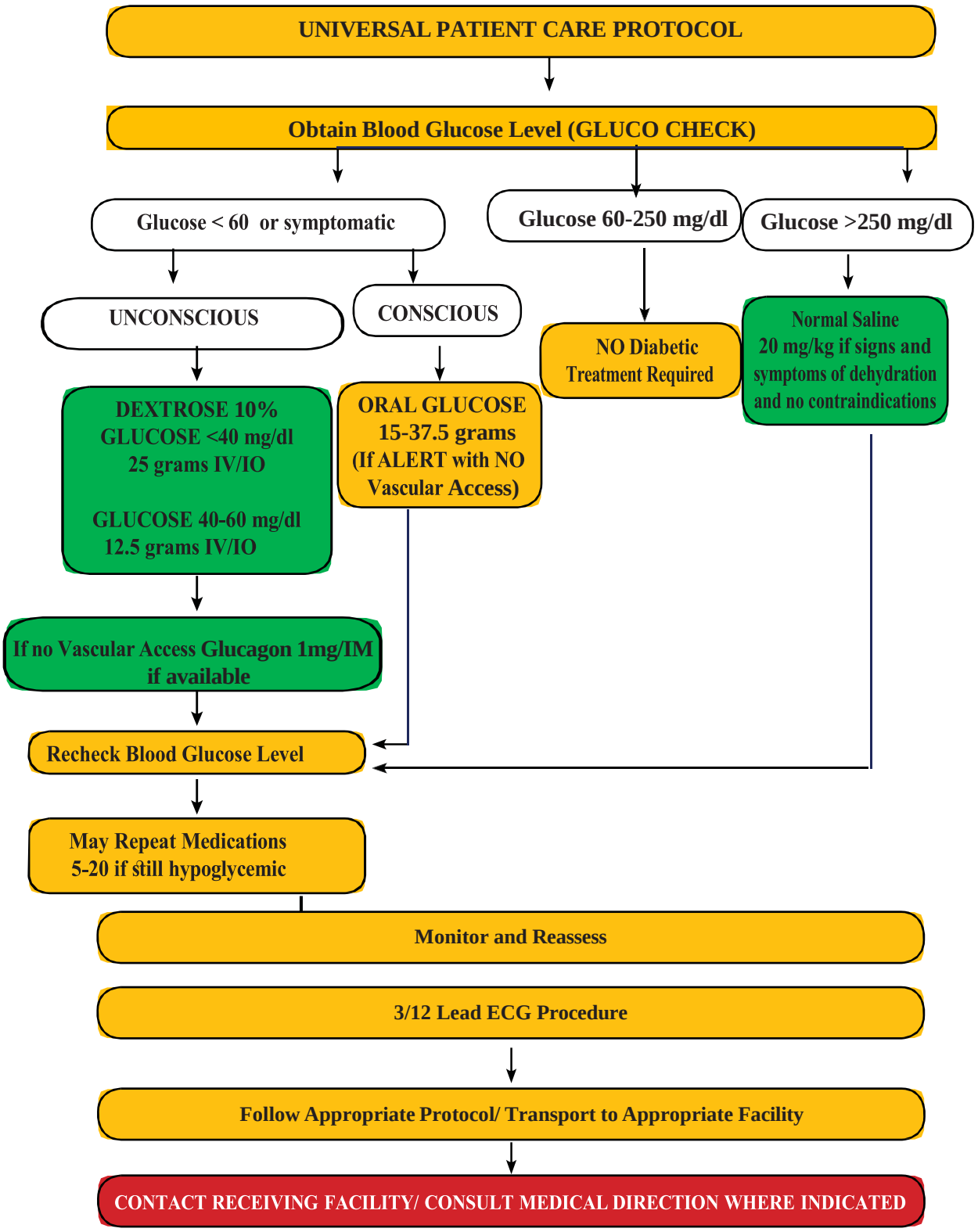
KEY POINTS
• The use of Amiodarone (Cordarone) in heart block can worsen bradycardia and lead to asystole. • Treatment of bradycardia is based upon the presence or absence of symptoms. • If hypotension exists, treat, If blood pressure is adequate, monitor only but have all treatment modalities immediately available if the patient decompensates. • If the patient converts to another rhythm, refer to the appropriate protocol and treat accordingly.

CHAPTER 4

MEDICAL EMERGENCIES - ADULT

ADULT PROTOCOL

DIABETIC EMERGENCIES



EMT-BASIC | EMT-INTERMEDIATE | EMT-Paramedic Advanced/ Specialist | MEDICAL DIRECTION

ADULT PROTOCOL
DIABETIC EMERGENCIES

HYPOGLYCEMIA

HISTORY	SIGNS AND SYMPTOMS	DIFFERENTIAL DIAGNOSIS
• Known diabetic, medic alert tag • Past medical history • Medications • Last meal • Recent Blood Sugar Analysis	• Altered level of consciousness • Dizziness • Irritability • Diaphoresis • Convulsions • Hunger • Confusion	• ETOH • Toxic Overdose • Trauma • Seizure • Syncope • CNS disorder • Stroke • Pre-existing condition

HYPERGLYCEMIA

HISTORY	SIGNS AND SYMPTOMS	DIFFERENTIAL DIAGNOSIS
• Known diabetic, medic alert tag • Past medical history • Medications • Last meal • Recent BGL check	• Altered level of consciousness / coma • Abdominal pain • Nausea / vomiting • Dehydration • Frequent thirst and urination • General weakness malaise • Hypovolemic shock • Hyperventilation • Deep / rapid respirations	• ETOH • Toxic overdose • Trauma • Seizure • Syncope • CSN disorder • Stroke • Diabetic ketoacidosis

Hypoglycemic patients who are receiving oral hypoglycemic should be STRONGLY urged to be transported to the hospital. The half-life of such oral medications is long and these patients will need to be closely monitored for recurrent hypoglycemia.

KEY POINTS

Hyperglycemia:

- Diabetic ketoacidosis (DKA) is a complication of diabetes mellitus. It can occur when insulin levels become inadequate to meet the metabolic demands of the body for a prolonged amount of time (onset can be within 12- 24 hours). Without enough insulin, the blood glucose increases, and cellular glucose depletes. The body removes excess blood glucose by dumping it into the urine.
- Patients can have hyperglycemia without having DKA.

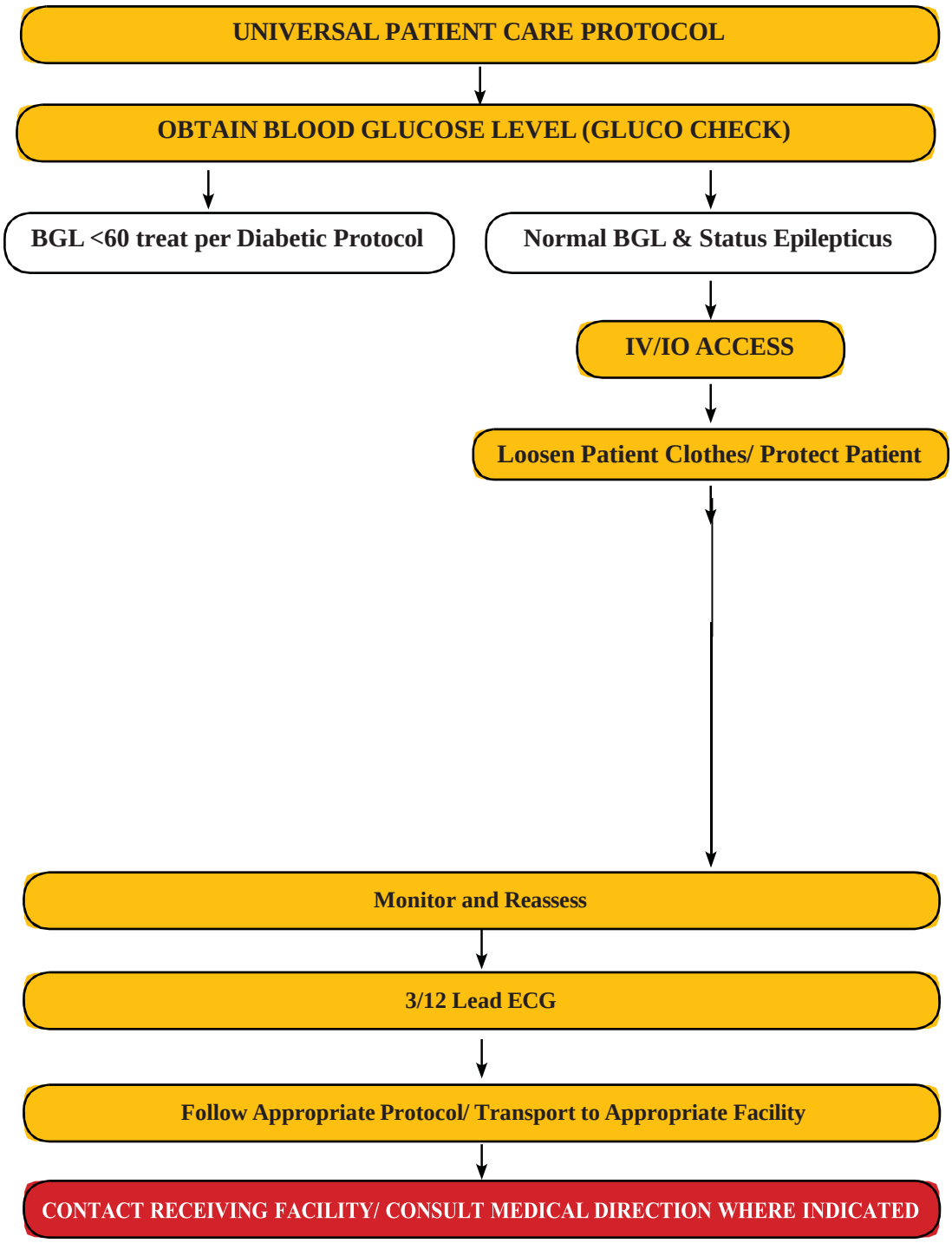
Hypoglycemia:

- Always suspect hypoglycemia in patients with an altered mental status.
- If a blood glucose analysis is not available, a patient with altered mental status and signs and symptoms consistent with hypoglycemia should receive Dextrose or Glucagon if available
- Dextrose is used to elevate BGL *but it will not maintain it.* The patient will need to follow up with a meal (Carbs), if not transported to a hospital.

Miscellaneous:

- If IV access is successful after Glucagon (Glucagen) IM and the patient is still symptomatic, Dextrose IV / IO can be administered.
- Shut off wearable insulin pumps if patient is hypoglycemic.
- Treat if the patients' blood glucose is 60 or less, or any level with signs and symptoms.

ADULT PROTOCOL
SEIZURES



ADULT PROTOCOL

SEIZURES

HISTORY	SIGNS AND SYMPTOMS	DIFFERENTIAL DIAGNOSIS
• Reported / witnessed seizure activity • Previous seizure history • Medical alert tag information • Seizure medications • History of trauma • History of diabetes • History of pregnancy	• Decreased mental status • Sleepiness • Incontinence • Observed seizure activity • Evidence of trauma	• CNS (head) trauma • Tumor • Metabolic, hepatic, or renal failure • Hypoxia • Electrolyte abnormality (Na, Ca, Mg) • Drugs, medications, non-compliance • Infection /fever • Alcohol withdrawal • Eclampsia • Stroke • Hyperthermia

Categories of Seizures

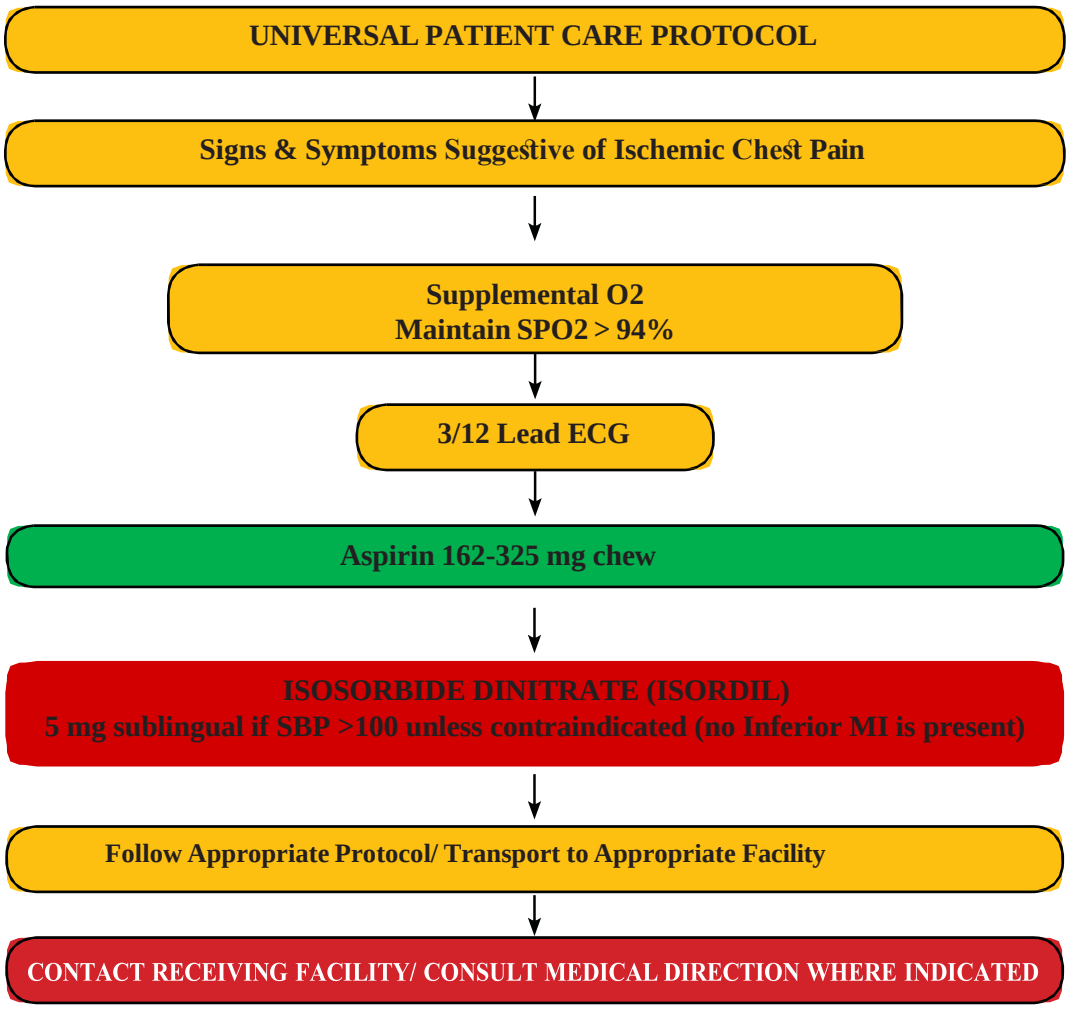
Complex = Unconscious	Focal = Partial, Localized
Simple = Conscious	Generalized = All Body

- Simple Focal
- Simple Generalized
- Complex Focal
- Complex Generalized

KEY POINTS

- Status epilepticus is a true emergency requiring rapid airway control, treatment, and transport.
- Grand mal seizures (generalized) are associated with loss of consciousness, incontinence, and possibly tongue trauma.
- Focal seizures (petit mal) effect only a part of the body and are not usually associated with a loss of consciousness.
- For any seizure in pregnant patient, follow the OB Emergencies Protocol and call Online Medical Control
- Be prepared to manage the airway and breathing of patients who have received benzodiazepines
- Be prepared for airway problems and continued seizures.
- Assess possibility of occult trauma and substance abuse.
- The seizure has usually stopped by the time the EMS personnel arrive and the patient will be found in the postictal state.
- There are many causes for seizures including; epilepsy, head trauma, tumor, overdose, infection, hypoglycemia, and withdrawal. Be sure to consider these when doing your assessment.
- Routinely assess the patient's airway.
- If the patient is combative and postictal, DO NOT use the Restraint Procedure before assessing or/treating hypoglycemia and hypoxia.
- If the patient is actively seizing, move any objects that may injure the patient. Protect, but do not try to restrain them.

ADULT PROTOCOL
ACUTE CHEST PAIN (ACS)



ADULT PROTOCOL

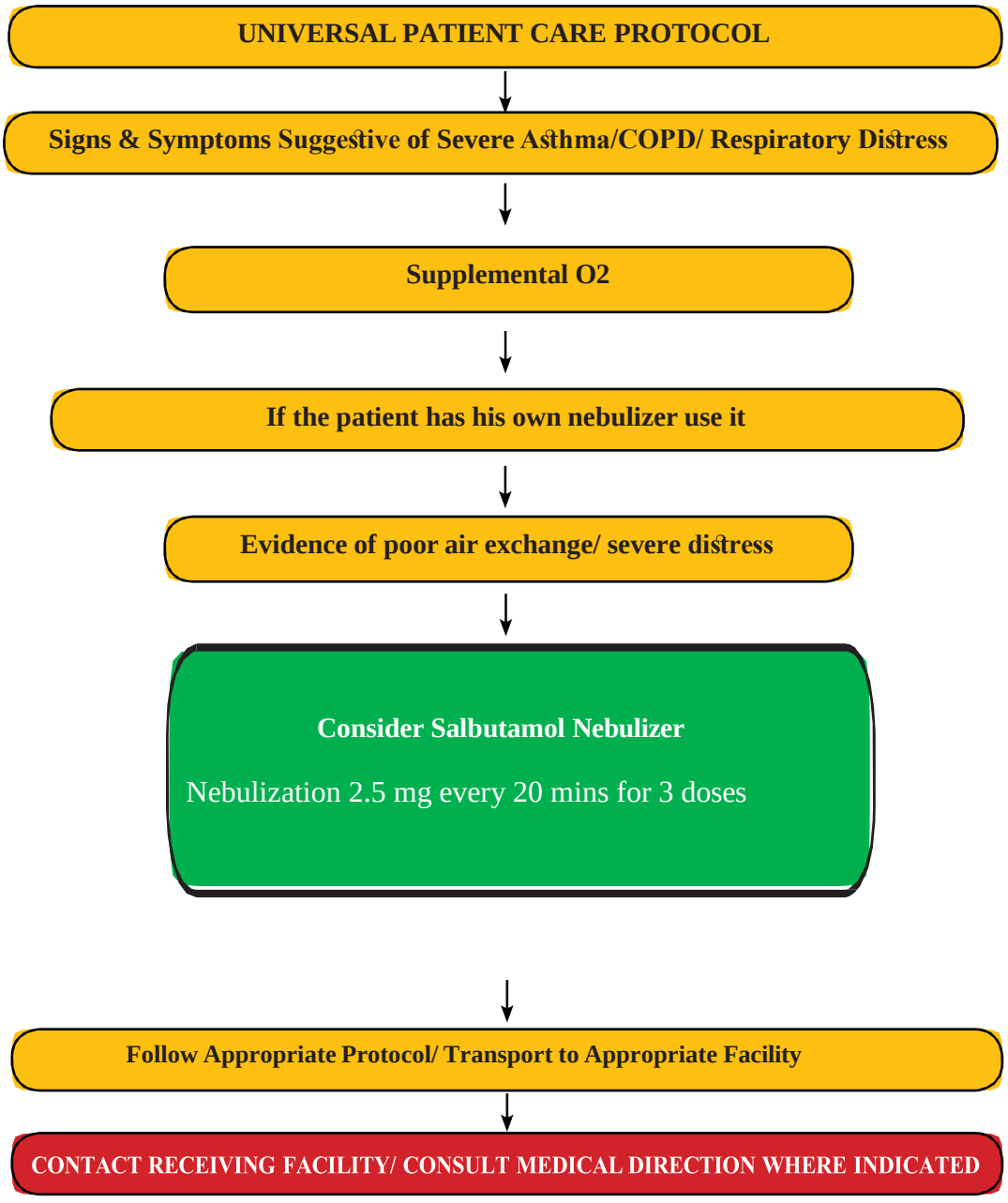
ACUTE CHEST PAIN (ACS)

HISTORY	SIGNS AND SYMPTOMS	DIFFERENTIAL DIAGNOSIS
• Age • Medications • Past medical history (MI, angina, diabetes) • Allergies • Recent physical exertion • Onset • Palliation/Provocation • Quality (crampy, constant, sharp, dull, etc.) • Region/Radiation Referred • Severity (1-10) • Time (duration/repetition)	• CP (pain, pressure, aching, tightness) • Location (substernal, epigastric, arm, jaw, neck, shoulder) • Radiation of pain • Pale, diaphoresis • Shortness of breath • Nausea, vomiting, dizziness	• Trauma vs. medical • Angina vs. myocardial infarction • Pericarditis • Pulmonary embolism • Asthma /COPD • Pneumothorax • Aortic dissection or aneurysm • GE reflux or hiatal hernia • Esophageal spasm • Chest wall injury or pain • Pleural pain

KEY POINTS

- Make the scene safe: All chest pain patients must have an IV and 12 Lead EKG.
- If positive ECG changes, establish a second IV while en route to the hospital.
- Aspirin can be administered to a patient on Coumadin (Warfarin), unless the patient's physician has advised them otherwise.
- If the patient took a dose of Aspirin that was less than 300 mg in the last (24) hours, then additional Aspirin can be administered to achieve a therapeutic dose of 300 mg.
- Pulse oximetry is not an indicator of myocardial perfusion.
- Only administer oxygen if the patient is hypoxic with a SpO_2 of less than 94. Do not withhold oxygen from patients that are short of breath regardless of SpO_2.
- Once applied to a known or suspected ACS patient do not remove a 12 lead EKG, even if the initial EKG is unremarkable. Some devices continue to look for ST segment changes and will alert if there are changes.

ADULT PROTOCOL
RESPIRATORY DISTRESS/ASTHMA/COPD



ADULT PROTOCOL

RESPIRATORY DISTRESS/ASTHMA/COPD

HISTORY	SIGNS AND SYMPTOMS	DIFFERENTIAL DIAGNOSIS
• Asthma; COPD -- chronic bronchitis, emphysema, congestive heart failure • Home treatment (oxygen, • nebulizer) • Medications (Theophylline, steroids, inhalers) • Toxic exposure, smoke inhalation	• Shortness of breath • Pursed lip breathing • Decreased ability to speak • Increased respiratory rate and effort • Wheezing, rhonchi • Use of accessory muscles • Fever, cough • Tachycardia • Tripod position	• Asthma • Anaphylaxis • Aspiration • COPD (emphysema, bronchitis) • Pleural effusion • Pneumonia • Pulmonary embolus • Pneumothorax • Cardiac (MI or CHF) • Pericardial tamponade • Hyperventilation • Inhaled toxin (Carbon monoxide, etc.)

KEY POINTS

- Status asthmaticus – severe prolonged asthma attack unresponsive to therapy- life threatening!
- If the patient is over 50 years of age, has a history of cardiac disease, or if the patient's heart rate is >120 Epinephrine (Adrenaline) may precipitate cardiac ischemia.
- Monitor pulse oximetry continuously during treatment and transport.
- A silent chest in respiratory distress is a pre - respiratory arrest sign.
- Be alert for respiratory depression in COPD patients on prolonged high flow oxygen administration.
- DO NOT withhold oxygen from hypoxic patients.
- Patient with known COPD, asthma and a history of steroid uses should receive IV Cortisone. Use with caution in diabetics (hyperglycemia), GI bleeds, and febrile patients (sepsis / infections).
- Assure sufficient expiration time when ventilating COPD or asthma patients to prevent breath stacking and CO2 elimination.

ADULT PROTOCOL

STROKE / CVA

UNIVERSAL PATIENT CARE PROTOCOL

↓

Identify signs and symptoms of possible stroke

↓

Oxygen if SpO_2 <94% or signs of hypoxia
Establish time of symptoms (last normal)
IV Access
3/12-Lead ECG if available
Check glucose if possible

↓

Perform Cincinnati Pre-hospital Stroke Assessment

↓

Facial Droop? Have the Patient show teeth or smile - Abnormal if one side of the face does not move as well as the other side

Arm Drift? Patient closes eyes and extends both arms straight out, with palms up, for 10 seconds – Abnormal if one arm does not move or one arm drifts down compared with the other

Abnormal Speech: Have Patient say a sentence – Abnormal if patient slurs words, uses the wrong words or is unable to speak

↓

Follow Appropriate Protocol/ Transport to Appropriate Facility

↓

CONTACT RECEIVING FACILITY/ CONSULT MEDICAL DIRECTION WHERE INDICATED

ADULT PROTOCOL

STROKE / CVA

HISTORY	SIGNS AND SYMPTOMS	DIFFERENTIAL DIAGNOSIS
• Previous CVA, TIA's • Previous cardiac /vascular surgery • Associated diseases: diabetes, hypertension, CAD • Atrial fibrillation • Medications (blood thinners) • History of trauma	• Altered mental status • Weakness /paralysis • Blindness or other sensory loss • Aphasia • Syncope • Vertigo /dizziness • Vomiting • Headache • Seizures • Respiratory pattern change • Hyper /hypotension	• See Altered Mental Status • TIA(transient ischemic attack) • Seizure • Hypoglycemia • Stroke • Thrombotic • Embolic • Hemorrhagic • Tumor • Trauma

Identify Last Time Known Normal and Document

KEY POINTS

- Onset of symptoms is defined as the last witnessed time the patient was symptom free. (i.e. awakening with stroke symptoms would be defined as an onset time of the previous night when patient was symptom free).
- Elevated blood pressure is commonly present with stroke.
- Be alert for airway problems (swallowing difficulty, vomiting, diminished or absent gag reflex).
- Hypoglycemia can present as a localized neurological deficit, especially in the elderly.
- Patients who experience transient ischemic attack (TIA) develop most of the same signs and symptoms as those who are experiencing a stroke. The signs and symptoms of TIA' s can last from minutes up to one day. Thus, the patient may initially present with typical signs and symptoms of a stroke, but those findings may progressively resolve. The patient needs to be transported, without delay, to the most appropriate hospital for further evaluation.
- Document the time of onset for the symptoms, or the last time the patient was seen "normal" for them.
- Reassess neurological deficit every 10 minutes and document the findings. Evidence of neurological deficit includes; confusion, slurred speech, facial asymmetry and focal weakness, coma, lethargy, aphasia, dysarthria, and seizure activity.
- Hypertensive emergencies are life threatening emergencies characterized by an acute elevation in blood pressure AND end-organ damage to the cardiac, CNS or renal systems. These crisis situations may occur when patients have poorly controlled chronic hypertension or stroke.
- Blood pressures MUST be taken bilaterally and be similar, contact Online Medical Control if they vary more than 20 mmHg.
- Verify automated BP readings with manual cuff.
- Document pts. GCS score.
- Check patient's pupils and rule out head trauma.
- All symptomatic patients with hypertension should be transported with their head elevated.

CHAPTER 5

TRAUMA MANAGEMENT

SHOCK GUIDELINES

TYPES OF SHOCK	SIGNS AND SYMPTOMS
CARDIOGENIC SHOCK	• Hypotension • Difficulty breathing • Cool, clammy skin • Weakness
HYPOVOLEMIC SHOCK	• Tachycardia • Weak, thready pulse • Hypotension with narrow pulse pressure • Hypotension or falling systolic BP • Pale skin • Clammy or dry skin • Dyspnea • Altered LOC / coma • Decreased urine output • Restlessness • Irritability • Decreased urine output
ANAPHYLACTIC SHOCK (Distributive Shock)	• Hypotension • Severe respiratory distress • Shock • Dyspnea • Wheezing • Hoarseness / stridor • Cyanosis • Facial / airway edema • Urticaria / hives • Warm burning feeling • Itching • Rhinorrhea • Altered LOC / coma • Pulmonary edema
NEUROGENIC SHOCK (Distributive Shock)	• Hypotension with a narrow pulse pressure • Evidence of trauma (lacerations, bruising, swelling, deformity) • Normal or bradycardic HR • Compromise in neurological function • Normal or flushed skin color
SEPTIC SHOCK (Distributive Shock)	• Hypotension with a narrow pulse pressure • Dyspnea • Febrile • Tachycardia • Signs of infection • Hx of UTI • Hypovolemia (Fever, Sweating) • Dehydration • Altered LOC / coma
OBSTRUCTIVE SHOCK	• Obstruction that interferes with preload / afterload • Commonly caused by tension pneumothorax / pulmonary embolism • Hypotension • Chest pain • Hypoxia • Absent lung sounds (tension pneumothorax) • Present lung sounds (pulmonary embolism)

ADULT PROTOCOL

SHOCK

HISTORY	SIGNS AND SYMPTOMS	DIFFERENTIAL DIAGNOSIS
• Blood loss - vaginal or gastrointestinal bleeding, AAA, ectopic • Fluid loss-vomiting, diarrhea, fever • Infection • Cardiac ischemia (MI, CHF) • Medications • Allergic reaction • Pregnancy	• Restlessness, confusion • Weakness, dizziness • Weak, rapid pulse • Pale, cool, clammy skin • Delayed capillary refill • Hypotension • Coffee-ground emesis • Tarry stools	• Shock • Hypovolemic • Cardiogenic • Septic • Neurogenic • Anaphylactic • Ectopic pregnancy • Dysrhythmias • Pulmonary embolus • Tension pneumothorax • Medication effect / overdose • Vasovagal hypotension • Physiologic (pregnancy)

KEY POINTS

- Exam: Mental Status, Skin, Heart, Lungs, Abdomen, Back, Extremities, Neuro.
- Hypotension can be defined as a systolic blood pressure of less than 90 systolic.
- Consider performing orthostatic vital signs on patients in non-trauma situations if suspected blood or fluid loss.
- Consider all possible causes of shock and treat per appropriate protocol.

Anaphylactic Shock

- Anaphylactic shock is the involvement to 2 or more body systems. Consider IM Epinephrine(Adrenaline).
- Do not confuse Epinephrine (Adrenaline) 1 mg/ml (1:1000) IM and 0.1 mg/ml (1:10,000) IV. Refer for Medications appendix for further information.
- Treat patients with a history of anaphylaxis aggressively.
- Routine assessment and supportive care of the patient's respiratory and cardiovascular systems is required.
- When possible, remove any stingers.

Cardiogenic Shock

- Circulatory failure is due to inadequate cardiac function.
- Be aware of patients with congenital defects.
- Cardiogenic shock exists in the pre-hospital setting when an MI is suspected and there is no specific indication of volume related shock.
- Pulmonary edema or CHF may cause cardiogenic shock. (Pediatrics with congenital heart defects may rarely have pulmonary edema)
- Marked, symptomatic tachycardia and bradycardia will also cause cardiogenic shock. Fix rate first.

Hypovolemic Shock

- Patients suffering from hemorrhagic shock secondary to trauma, should be treated under the Trauma Criteria, and should be rapidly transported to the nearest appropriate facility.
- Initiate a second large bore IV for all patients in hypovolemic shock, resuscitate to a MAP of at least 70 or a SBP of 90 (100 SBP if >70 years old) or radial pulses where NIBP is unavailable.

Neurogenic Shock

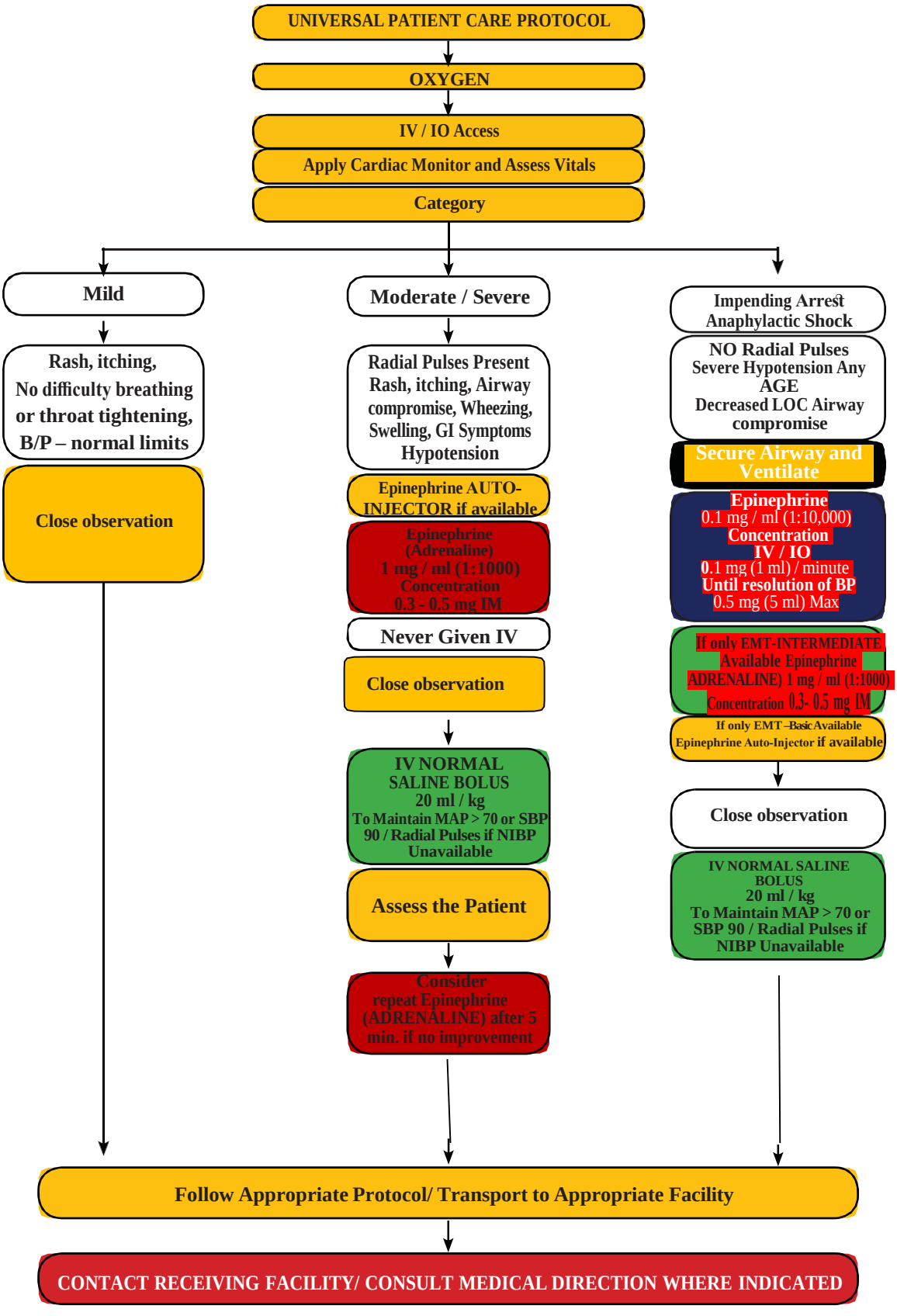
- Cushing's triad is a sign of increased ICP.
- Cushing's triad presents as high blood pressure, low pulse rate, and irregular respirations.

Septic Shock

- Hypotensive septic shock patients require aggressive fluid resuscitation and should receive vasopressor support if not responding to fluid challenges "if trained and available"
- Be alert for septic shock in the elderly.

ADULT PROTOCOL

ANAPHYLACTIC REACTION / SHOCK



EMT-BASIC | EMT-INTERMEDIATE | EMT-Paramedic Advanced/ Specialist | MEDICAL DIRECTION

ADULT PROTOCOL

ANAPHYLACTIC SHOCK

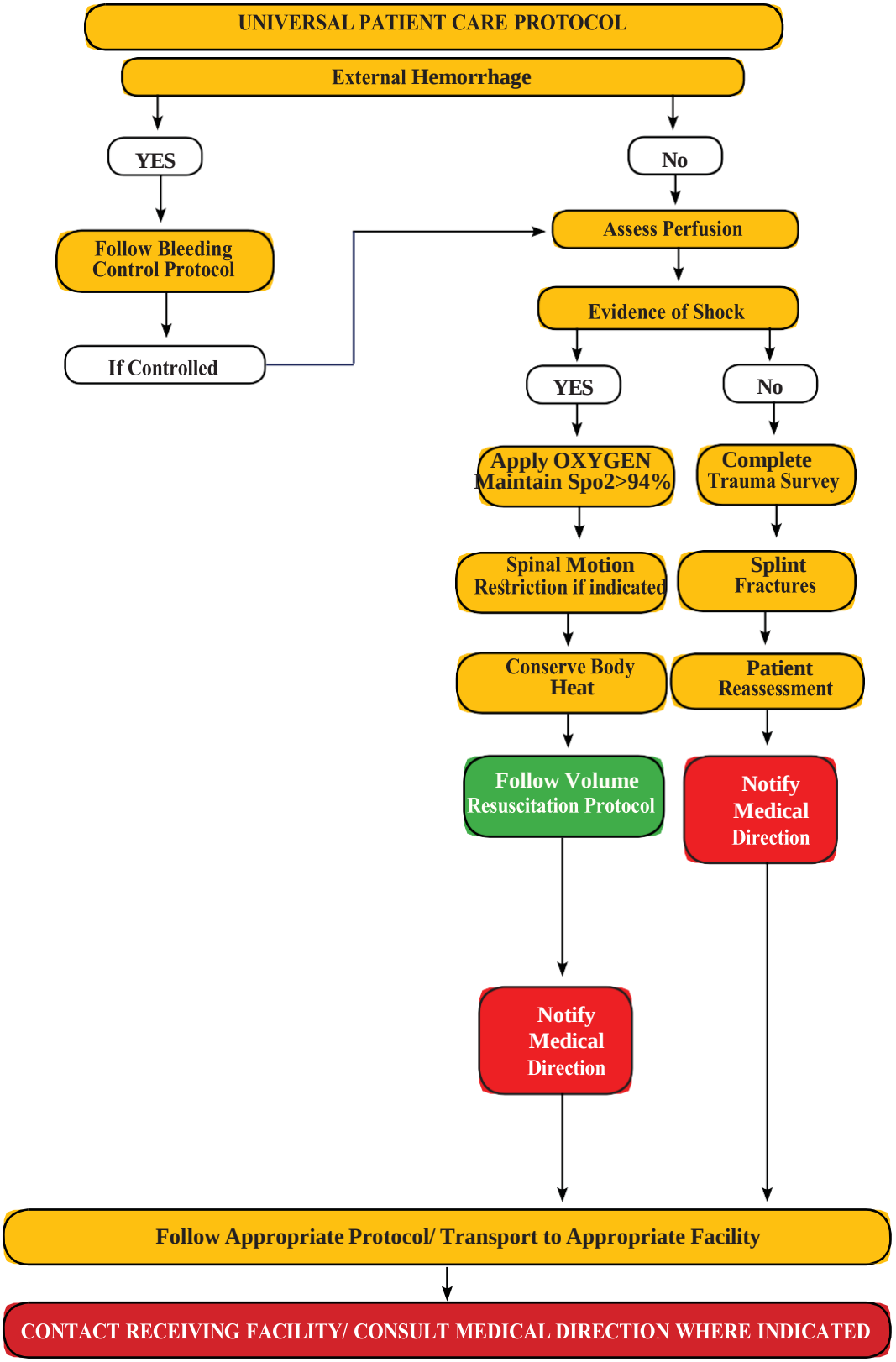
Notes/ Educational Pearls

1. Initiate universal patient care
2. Allergic reactions may range from mild to severe life-threatening anaphylactic reactions.
   - MILD: Local swelling and itching at the site
   - MODERATE: Hives and mild wheezing
   - SEVERE: Diffuse wheezing, pharyngeal swelling dyspnea, hypoperfusion, abnormal skin color, stridor, and/or loss of peripheral pulses.
3. If blood pressure normal:
4. If hypotensive (systolic <90 mmHg) and patient has moderate-severe respiratory distress:
   - Open IV and infuse fluid bolus (500 ml for adults or 20 ml/kg for children.)
   - Assist the patient experiencing moderate to severe symptoms or mild symptoms with a history of life-threatening allergic reaction with the patient's prescribed or EMS service's Epinephrine auto-injector.

5. Moderate to Severe Distress.
   - Administer Epinephrine. For further drug information refer to drug appendix. Medical Direction is mandatory.
   - Initiate IV LR fluid therapy 20 mL/kg bolus. Titrate to a systolic pressure of 90 mm Hg.
   - Administer diphenhydramine 50 mg slow IVP or IM.
   - Additional doses of diphenhydramine require medical consultation.
   - Patients with moderate to severe respiratory distress may require high flow oxygen via non-rebreather mask, or BVM while receiving medication via nebulizer.
   - Refer to Medication Appendix for further drug doses information.
6. Continue General Patient Care.
7. Transport.

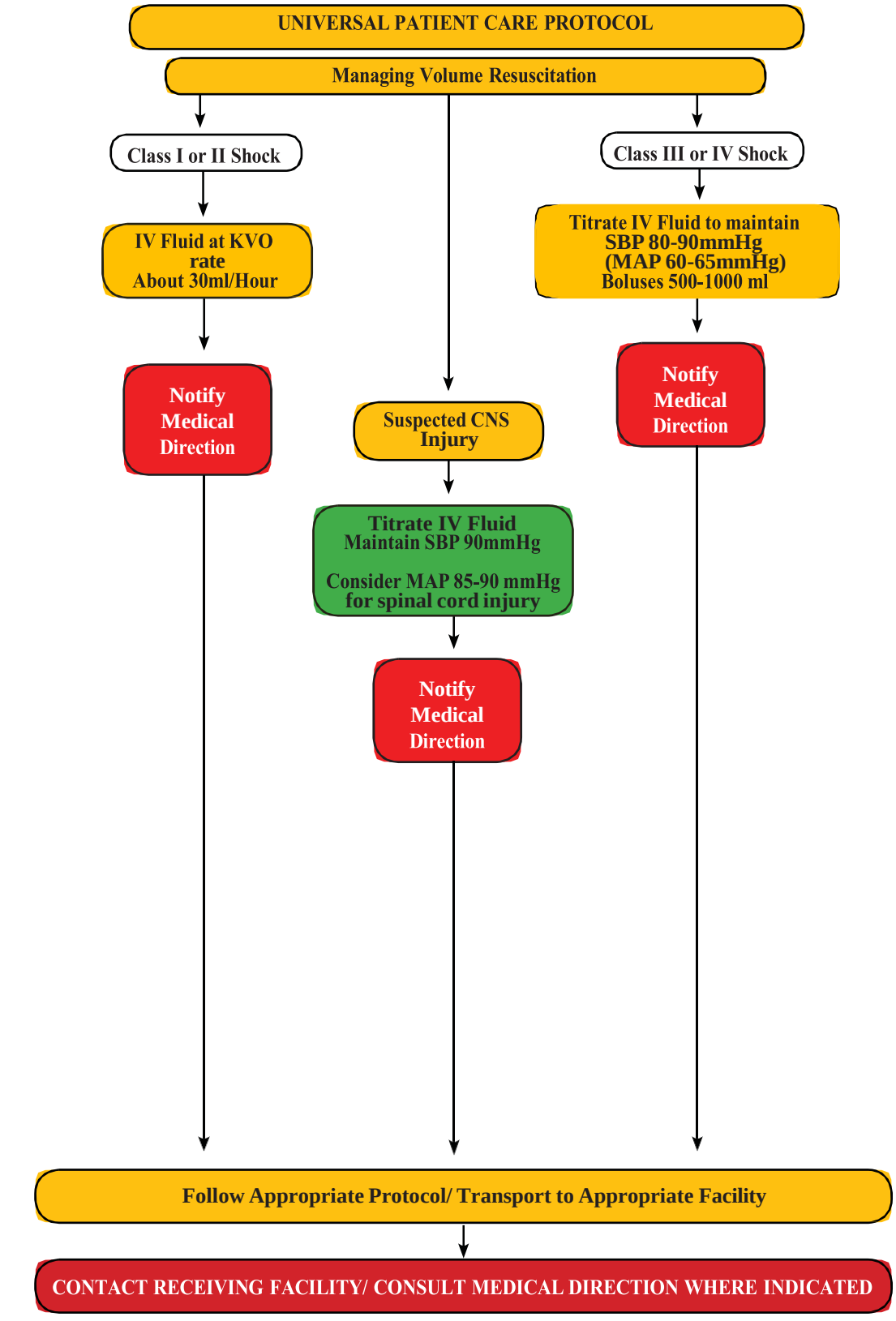
ADULT PROTOCOL

HYPOVOLEMIC - HEMORRHAGIC SHOCK



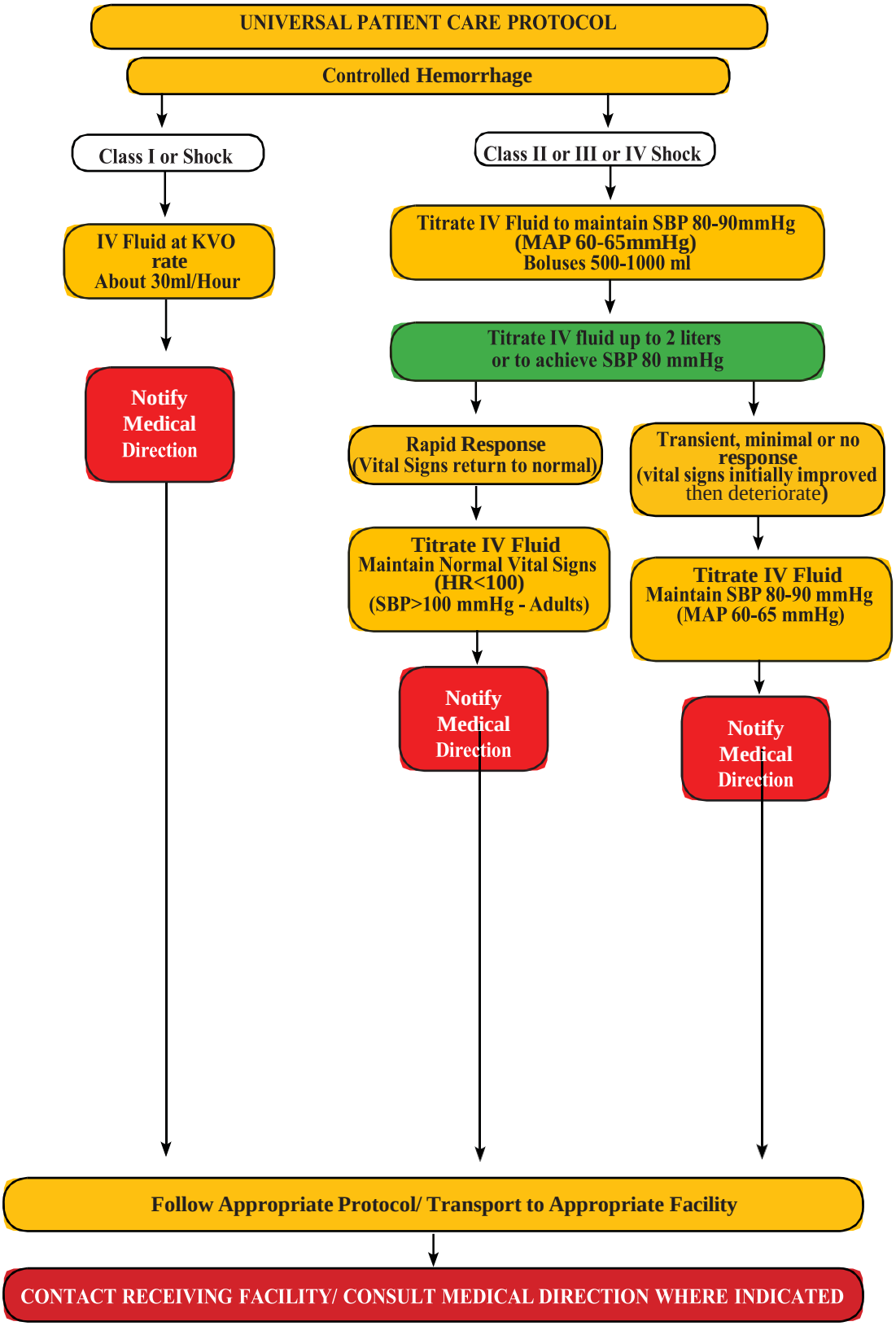
ADULT PROTOCOL

HYPOVOLEMIC - HEMORRHAGIC SHOCK



ADULT PROTOCOL

HYPOVOLEMIC - HEMORRHAGIC SHOCK



ADULT PROTOCOL

TRAUMATIC SHOCK

Notes/ Educational Pearls

- Follow Trauma Assessment and Management Protocol.

1. Assess airway and breathing, treat life-threatening emergencies. Use assistant to provide cervical stabilization while managing ABCs.
2. Control hemorrhage by direct pressure with clean dressing to wound. If needed, add tourniquet or hemostatic (Celox, Alufer, etc...) agents as per protocol and availability.
3. Obtain initial vital signs, neurologic assessment, including Glasgow Coma Score.
4. Immobilize cervical spine as appropriate in the spinal board, (relieve assistant performing cervical stabilization).
5. O2, high flow (10-15 L/min NRM). Titrate to pulse oximetry > 94% if possible.
6. Transfer patient to board.
7. IV – volume expander (NS or RL), 2 large bore IV cannulas.
8. If BP < 90 systolic and neck veins flat, transport rapidly and treat shock en route
   - Keep patient warm with blankets to prevent heat loss.
   - Elevating the foot of the backboard 10-12 inches or (legs only if no injury in the extremities or pelvis.
   - Consider fluid bolus of 20 ml/kg, or as directed. 500-1000
   - Monitor cardiac rhythm.
   - Look carefully for possible sources of bleeding (abdomen, pelvis, chest, scalp, back).
9. If BP < 90 systolic and signs of cardiogenic shock (distended neck veins), transport rapidly and consider
   - Tension pneumothorax if respiratory status markedly deteriorating, with clinical findings of pneumothorax
     i. Release occlusive dressings on open chest wounds.
     ii. Consider needle decompression.
   - Pericardial tamponade if wound suspect (may have distant heart sounds, narrow pulse pressure)
     i. Consider fluid bolus of 20 ml/kg.
   - Cardiac contusion with typical ischemic chest pain or severe chest wall contusion
     i. Monitor cardiac rhythm.
     ii. Consider cautious fluid bolus of 10 ml/kg en route or as directed.
10. If BP > 90, observe closely and transport.
    - Perform reassessment exam and record patient's problems.
    - Maintain IV to keep peripheral pulses open rate.
    - Stabilize and splint fractures.
    - Dress wounds as time allows.
11. Recheck vital signs and neurologic status en route – at least every 5 minutes with unstable patient.

TRAUMATIC SHOCK

Specific precautions:

1. Hypotension itself is a late sign of hypovolemic shock. Blood loss must be anticipated from the mechanism of injury. Often a patient may suddenly "go bad" if the subtle clues aren't noticed beforehand.
2. Hypertensive and elderly patients can have significant hypotension at pressures higher than 90 systolic. Look for the adrenergic signs – vasoconstriction, sweating, mental alterations, and agitation. Treat the entire picture and not just the blood pressure.
3. Neurogenic shock is caused by relative hypovolemia as blood vessels lose tone from spinal cord injury. Treat as for hypovolemia, and if hypotension persists, consider occult blood loss as an additional cause of shock. if there is no blood loss and you have high index of suspicion of neurogenic shock consider vasopressor drugs under medical direction after given fluid replacement, if trained and available.
4. Occasionally, pain or cardiac contusion will cause inappropriate bradycardia. Consider also if an MI or a primary dysrhythmia may have caused the trauma. Fluid resuscitation should be cautious. Pain medication may also normalize the pulse if there are no contraindications.
5. Another important and frequent cause of "relative" bradycardia (pulse < 100) in the face of hypovolemic shock is the patient on beta-blocker drugs (e.g., propranolol), who cannot respond to blood loss with a tachycardia. Patients with angina, prior MI, migraine, hypertension, dysrhythmias and other medical illnesses may be taking beta-blockers. Treatment is the same, but do not wait for the tachycardia!
6. Recent literature has thrown some doubt on the wisdom of administering a large fluid bolus to all trauma patients who present in shock. Particularly in the face of ongoing internal hemorrhage, patients may do better with IVs at keep peripheral pulses until the bleeding can be stopped in the OR.

ADULT PROTOCOL

TRAUMA EMERGENCIES

The Golden Period

EXAMPLES FOR LOAD AND GO TRAUMA TRANSPORTS INDICATIONS

- Uncorrectable airway obstruction
- Tension pneumothorax
- Pericardial tamponade
- Penetrating chest wounds with signs of shock
- Difficulty breathing with signs of shock, hypoxia (e.g. hemothorax)
- Head trauma with unilaterally dilated pupils
- Head trauma with rapidly deteriorating condition
- Unconsciousness
- signs of shock or any conditions that are likely to cause shock e.g: pelvic protocol

KEY POINTS

- A trauma victim is considered to be a pediatric patient if they are 13 years old or younger.
- Once the patient is determined to be an actual or potential major trauma / multiple system patient, personnel on scene and / or medical control must quickly determine the appropriate course of action.
- Major trauma patients are to be transported to the closest hospital.
- Contact the receiving hospital for all major trauma or critical patients.
- Cover open wounds, burns, and eviscerations.
- If the EMT is unable to access patient airway and ventilate, transport to the closest facility for airway stabilization.
- The-on scene time for major trauma patients should not exceed 10 minutes without a documented, acceptable reason for the delay.
- All major trauma patients should receive oxygen administration, an IV(s), and cardiac monitoring.
- Provide a documented reason if an intervention could not be performed.

Mass Casualty Incidents (MCI)

- Upon arrival at a MCI, the first arriving unit should notify their dispatch of the need to implement the mass casualty plan, call for additional resources, establish a safe staging area, and estimate the total number of victims.
- Each EMS service has a pre-defined coordinating facility based on their county's mass casualty plan. It is the responsibility of the responding jurisdiction to notify their appropriate coordinating hospital as soon as possible, giving a brief description of the incident and the estimated number of victims. The coordinating facility will then notify the receiving hospitals of the MCI. The transportation officer should maintain a constant contact with the coordinating facility until the scene has been cleared of salvageable victims.
- Refer to the county MCI protocol.

ADULT PROTOCOL

TRAUMA EMERGENCIES

THE GOLDEN PERIOD FOR THE PATIENT BEGINS WHEN THE TRAUMA HAPPENS DO NOT WASTE VALUABLE TIME ON SCENE

Patient assessment:

KEY POINTS

Scene size-up:

Standard Precautions, Hazards, Number of Patients, Need for Additional Resources, Mechanism of Injury

Before entering any trauma scene, ensure your personal safety. Do not attempt patient contact until hazards can be appropriately mitigated. In addition to scene safety, consider mechanisms of injury, number of patients, and special equipment/extrication needs.

All trauma patients should be assessed utilizing primary survey and reassessment exam, if time and patient condition permits conducts secondary survey.

The primary survey is to be conducted on all trauma patients. It is designed to rapidly identify life- threatening or potentially life-threatening injuries. The primary survey should be completed within 2 minutes of patient contact. The primary survey is only interrupted for life- threatening arterial bleeding, airway obstruction, or respiratory/cardiac arrest.

* The following are the steps of the primary survey:

1. Manually stabilize the cervical spine while assessing level of consciousness and the airway.
2. Evaluate breathing – present? Rapid? Normal? Slow? Shallow?
3. Evaluate circulation – carotid and radial pulses? Control external hemorrhage.
4. Exam the head for deformity, contusions, abrasions, penetrations, burns, lacerations, or swelling (“DCAP-BLS”).
5. Exam the neck for “DCAP-BLS” and/or subcutaneous emphysema.
6. Exam the chest for “DCAP-BLS-TIC” and auscultate the chest for breath sounds in the mid-axilla bilaterally – present? Equal?
7. Exam the abdomen and pelvis for “DCAP-BLS”.
8. Exam the extremities for “DCAP-BLS-TIC” and pulse, motor, sensation.

Primary survey interventions include: airway management (see Airway management protocol), sealing open chest wounds, needle thoracostomy for suspected tension pneumothorax (Needle decompression), oxygen administration and controlling any obvious external hemorrhage. Remember to expose the patient as needed to conduct an appropriate exam.

ADULT PROTOCOL

TRAUMA EMERGENCIES

Transport decision:
Any trauma patient with altered level of consciousness, abnormal respiration, abnormal circulation, or signs/conditions likely to lead to shock (distended abdomen, pelvic instability, bilateral femur fractures) should be rapidly immobilized and transported after completing the primary survey. These are "LOAD & GO" patients.

The **reassessment exam** is an abbreviated exam after interventions and done at least every **5 minutes** for unstable patients or every **15 minutes** for stable patients.

* The following are the steps of the **reassessment exam**:

1. Repeat the primary survey ABCs
2. Repeat vital signs
3. Repeat GCS score calculation
4. Check every intervention – proper placement of intubation? Proper placement of IV/IO?
5. Check results of every intervention – improved oxygenation/ventilation? Improved blood pressure?

The secondary survey is always done En route to critical patients. If no critical conditions are found in the primary survey, the secondary survey may be conducted on the scene and should be completed within 5 minutes after the primary survey is completed. However, it's always advised to delay the secondary survey as its not mandatory and primary survey with the reassessment exam remains the milestones of trauma patient's assessment.

* The following are the steps of the **secondary survey**:

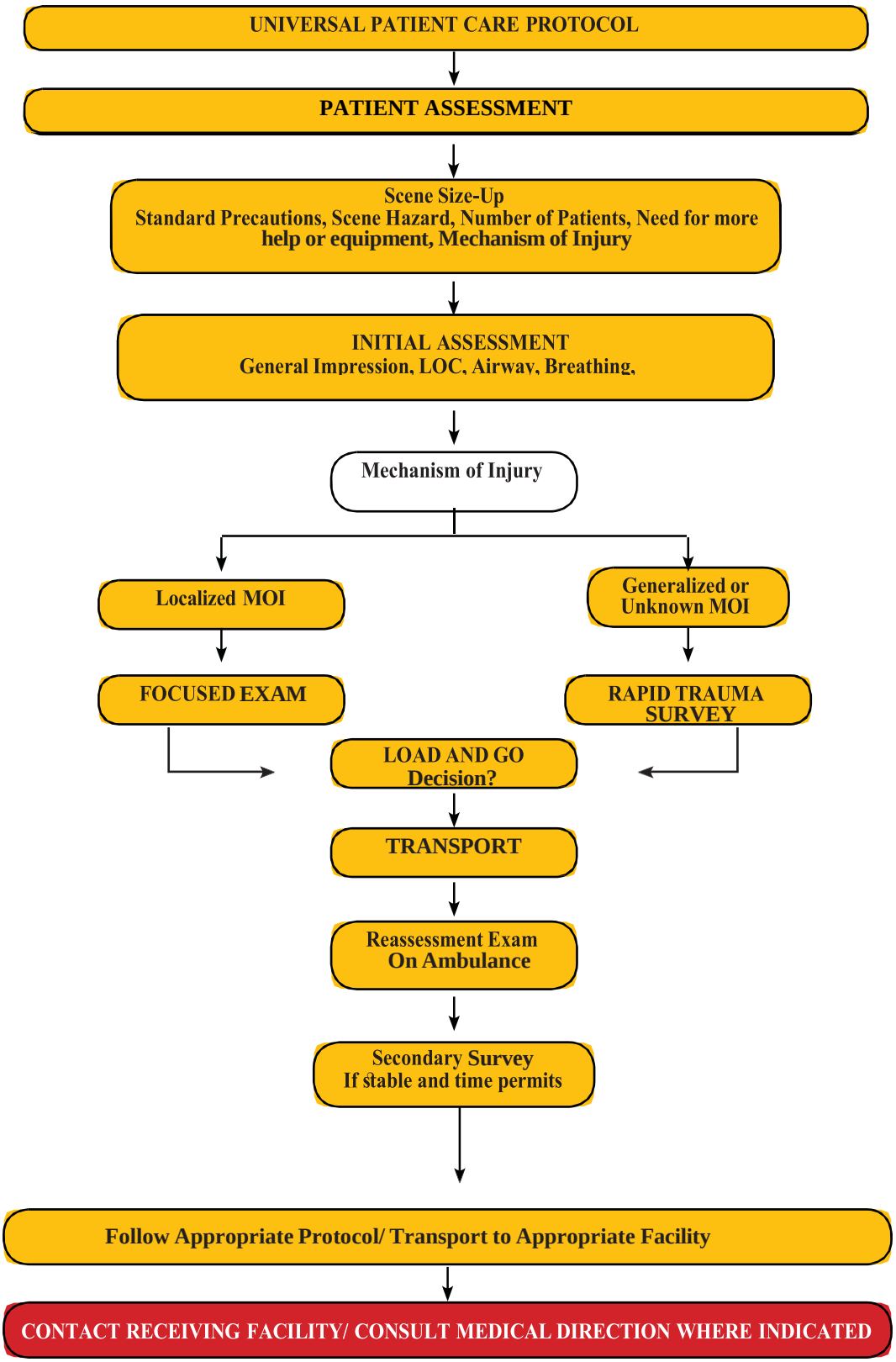
1. Obtain vital signs (pulse, respiratory rate, blood pressure, pulse oximetry)
2. Obtain history of traumatic event and pertinent patient medical history (allergies, medications, past illness/injury, last oral intake, Event lead to this condition.
3. Head to toe exam – look for "DCAP-BLS" and/or ''TIC'' in every body area. Calculate GCS score
4. Perform indicated bandaging and splinting.

Abbreviations:
DCAP-BLS-TIC
• Deformities
• Contusions
• Abrasions
• Penetrations
• Burns
• Lacerations
• Swelling
• Tenderness
• Instability
• Crepitus

SAMPLE History:
• S Symptoms
• A Allergies
• M Medications
• P Past medical history
• L Last oral intake
• E Events preceding incident

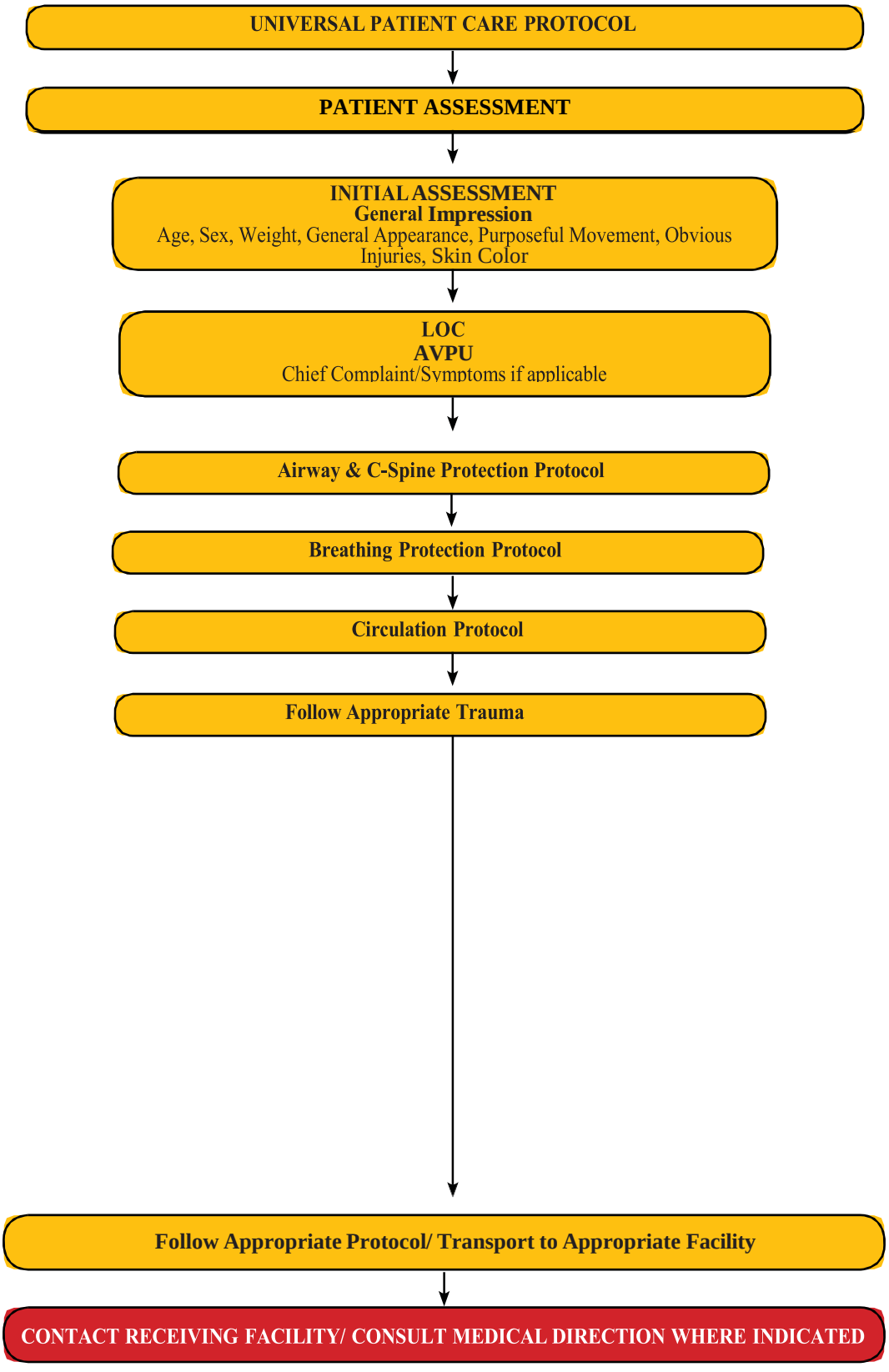
ADULT PROTOCOL

Traumatic Patients Assessment Protocol



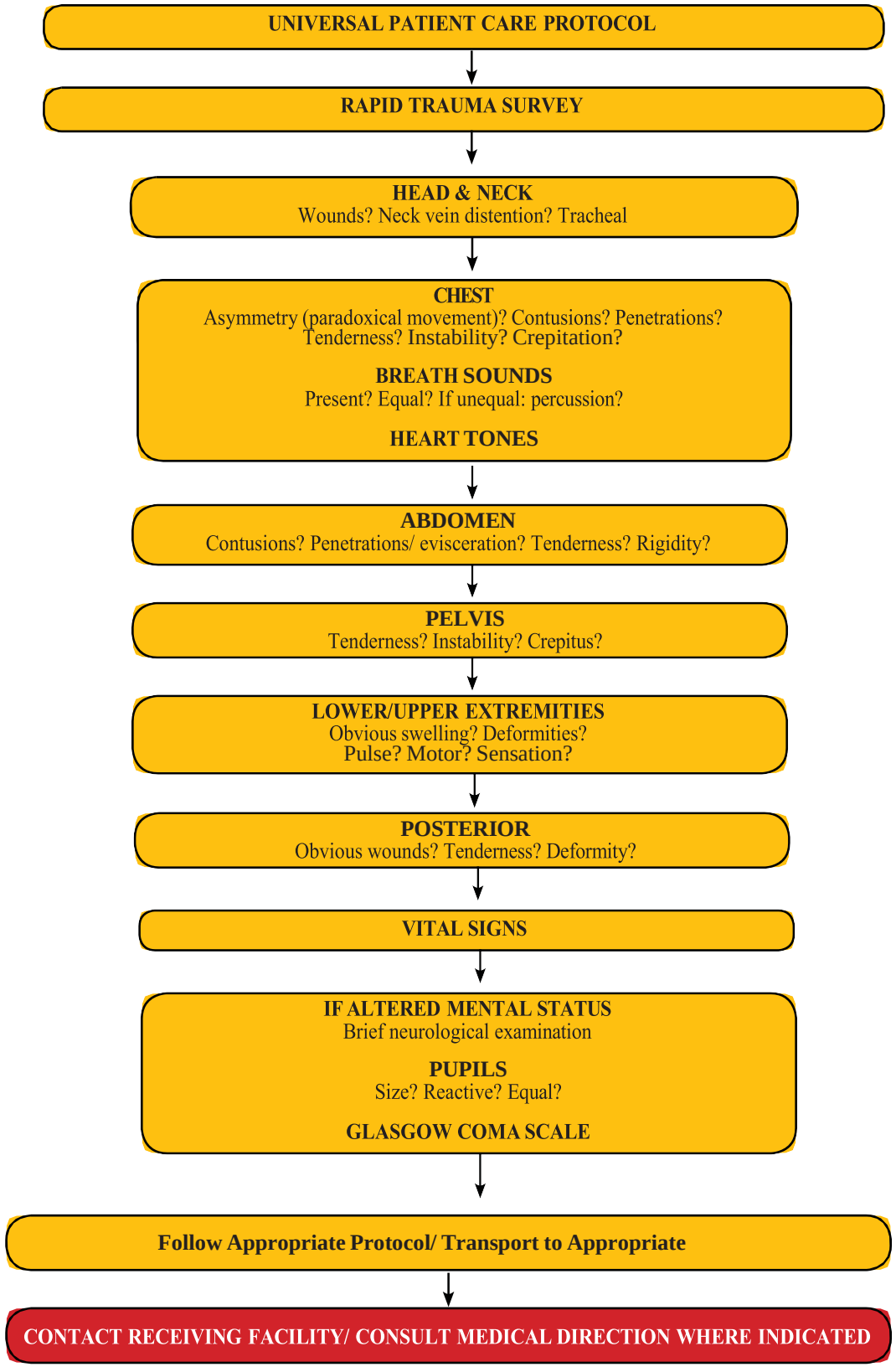
ADULT PROTOCOL

Traumatic Patients Assessment Protocol



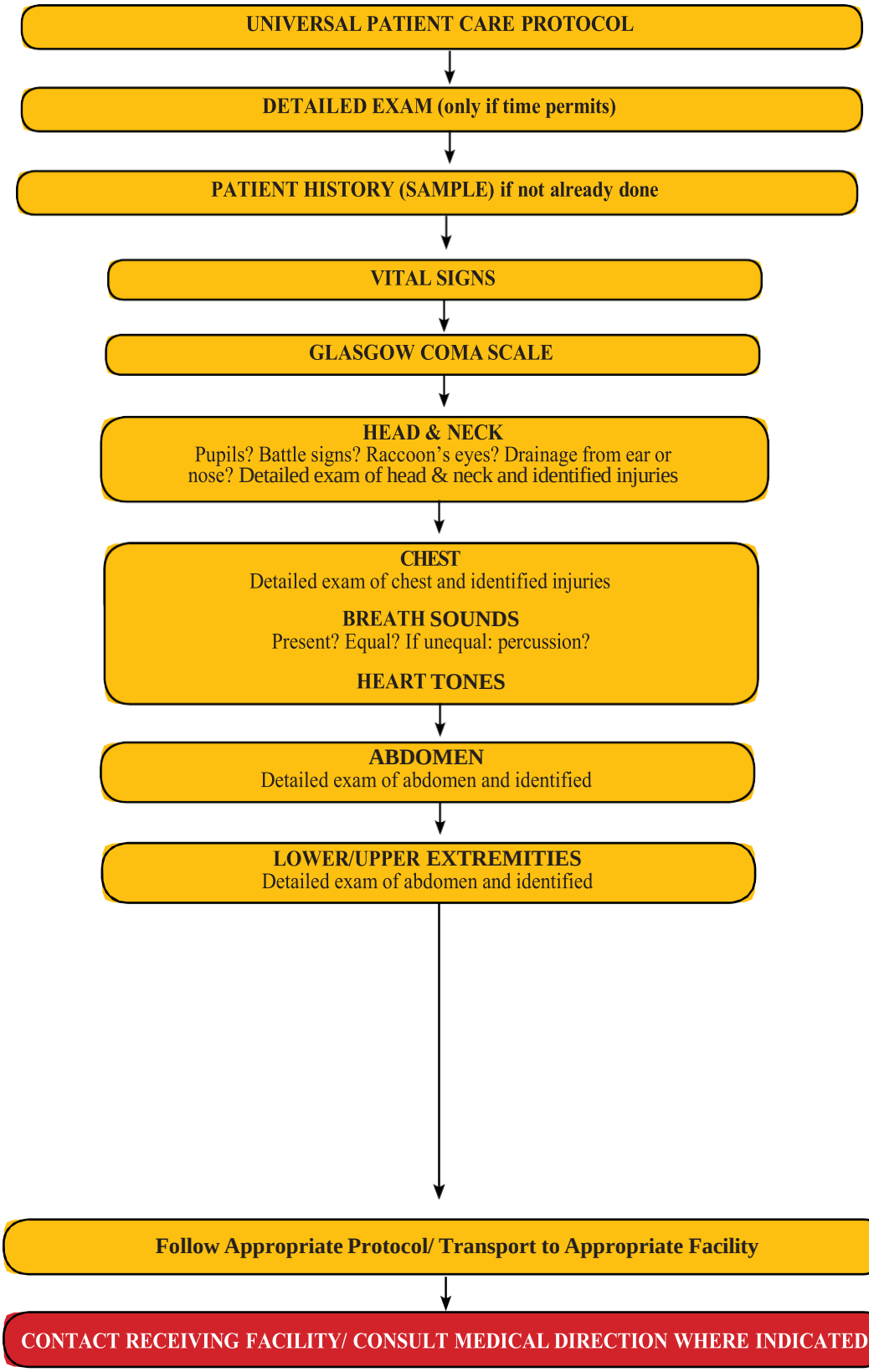
ADULT PROTOCOL

Traumatic Patients Assessment Protocol



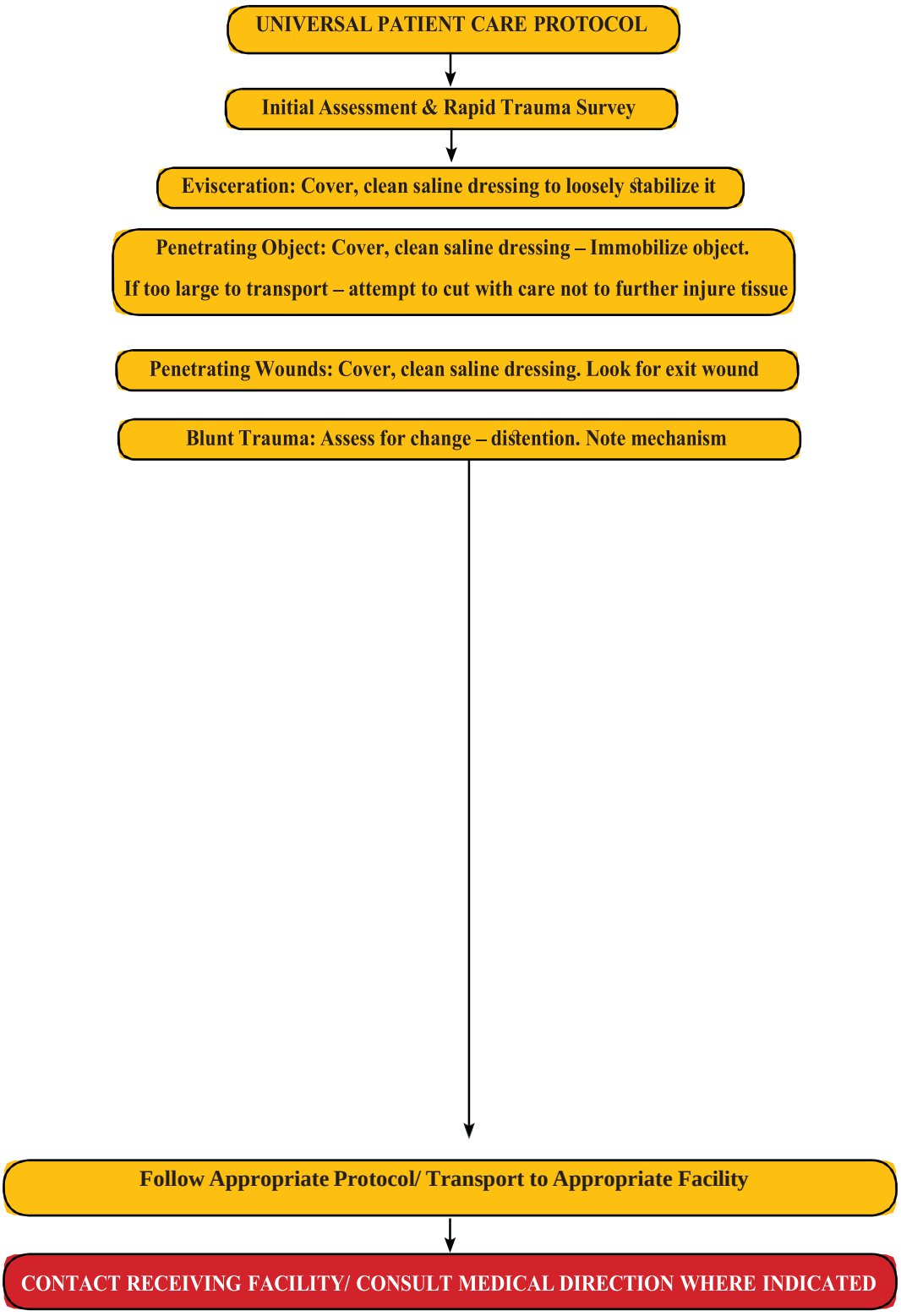
ADULT PROTOCOL

Traumatic Patients Assessment Protocol



ADULT PROTOCOL

ABDOMINAL TRAUMA



ADULT PROTOCOL

ABDOMINAL TRAUMA

MECHANISM	SIGNS & SYMPTOMS
• Blunt	• Altered mental status • Shock • Distention • Swelling • Bulging • Nausea and vomiting
• Penetrating	• Altered mental status • Bleeding • Tenderness • Pain • Distention • Evisceration • Discoloration • Entrance / exit wounds • Nausea & vomiting

KEY POINTS

Trauma to the abdomen is either Blunt or Penetrating. Blunt injuries are harder to detect and diagnose, and have a death rate twice that of penetrating wounds. Key signs and symptoms of blunt trauma include a patient in shock with no obvious injuries. Distention of the abdomen is an indication of internal hemorrhage. Pain may not be a significant factor. Many abdominal trauma injuries are Load & Go cases.

- Look for both an entrance and exit wound for all penetrating trauma, and treat accordingly.
- For all major trauma patients, the on scene time should be less than ten minutes.

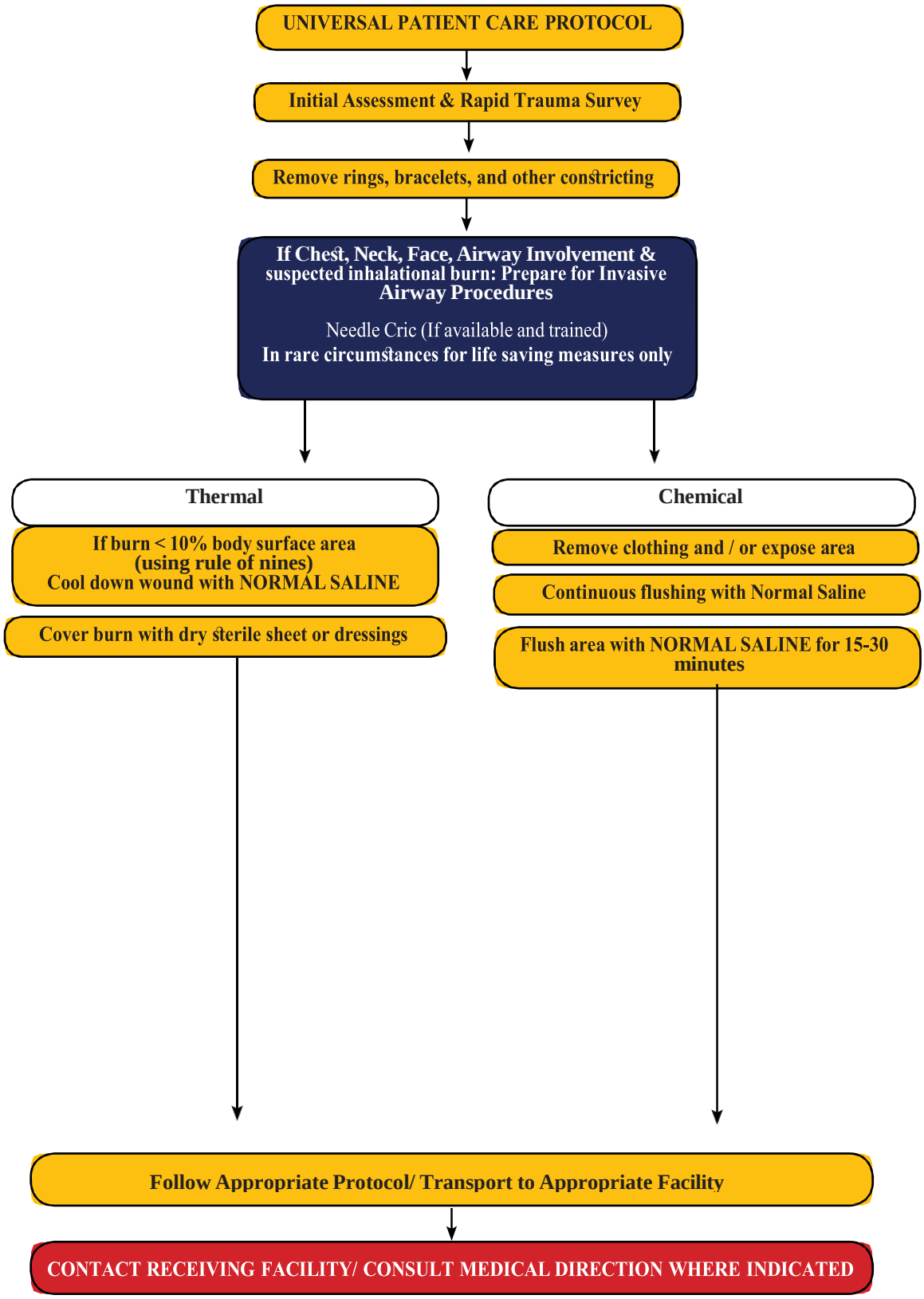
1. Follow Trauma Assessment and Management Protocol.
2. Stabilize life-threatening airway, breathing and circulatory problems first. Obtain vital signs.
3. IV – volume expander (NS or RL), large bore IV Cannulas.
4. For penetrating injuries – cover wounds and evisceration with moist saline gauze to prevent further contamination and drying. Do not attempt to replace.
5. Observe carefully for signs of blood loss. If BP < 90 systolic or significant signs of shock
   - Administer fluid bolus, 20 ml/kg, and further fluids as directed.
   - Monitor vital signs during transport.
6. Reassess patient frequently throughout transport, as a head injured patient may deteriorate rapidly. Changes in the ongoing exam can be more important than the initial exam.

Specific precautions:

1. The extent of abdominal injury is difficult to assess in the field. Be very suspicious; with significant blunt trauma, injuries to multiple organs are the rule.
2. Patients with spinal cord injury or altered sensorium due to drugs, alcohol, or head injury may not complain of tenderness and may lack guarding in the presence of significant intra-abdominal injury.

ADULT PROTOCOL

BURNS



ADULT PROTOCOL

BURNS

HISTORY	SIGNS AND SYMPTOMS	DIFFERENTIAL DIAGNOSIS
• Type of exposure (heat, gas, chemical) • Inhalation injury • Time of injury • Past medical history • Medications • Other trauma • Loss of consciousness • Tetanus / immunization status	• Burns, pain, swelling • Dizziness • Loss of consciousness • Hypotension / shock • Airway compromise / distress • Singed facial or nasal hair • Hoarseness / wheezing	• Superficial (1°) red and painful • Partial thickness (2°) superficial partial thickness, deep partial thickness, blistering • Full thickness (3°) painless and charred or leathery skin • Chemical • Thermal • Electrical • Radiation

KEY POINTS

- Exam: Mental Status, HEENT, Neck, Heart, Lungs, Abdomen, Extremities, Back, Neuro
- Early intubation is required in significant inhalation injuries with airway compromise.
- Critical Burns: >25% body surface area (BSA); full thickness burns >10% BSA; partial thickness superficial partial thickness, deep partial thickness and full thickness burns to face, eyes, hand or feet; electrical burns; respiratory burns; deep chemical burns; burns with extremes of age or chronic disease; and burns with associated major traumatic injury. These burns may require hospital admission or transfer to a burn center.
- Potential CO exposure should be treated with 100% oxygen.
- Circumferential burns to extremities are dangerous due to potential vascular compromise partial thickness to soft tissue swelling.
- Burn patients are prone to hypothermia – Never apply ice or cool burns that involve >10% body surface area.
- Do not overlook the possibility of multiple system trauma.
- Do not overlook the possibility of child abuse with children and burn injuries.
- See appendix for rule of nines.

1. Thermal (dry and moist):

a. Stop burning process: i.e. remove patient from heat source, cool skin, remove clothing
b. If patient starts to shiver or skin is cool, stop cooling process.
c. Estimate extent (%) and depth of burn (see chart). Determine seriousness (see chart) of burn, contact Medical Control and transport accordingly. Cover burn areas with sterile dressing.

2. Radiation Burns:

a. Treat as thermal burns except when burn is contaminated with radioactive source, then treat as chemical burn.
b. Wear appropriate protective clothing when dealing with contamination.

3. Chemical Burns:

a. Wear appropriate protective clothing and respirators.
b. Remove patient from contaminated area to decontamination site.
c. Determine chemicals involved; contact appropriate agency for chemical information.
d. Remove patient's clothing and flush skin.
e. Leave contaminated clothes at scene. Cover patient over and under before loading into squad.

f. Patient should be transported by personnel not involved in decontamination process.
g. Determine severity, contact Medical Control and transport accordingly.
h. Relay type of substance involved to Medical Control.

4. Electrical Burns:

a. Shut down electrical source; do not attempt to remove patient until electricity is CONFIRMED to be shut off.
b. Assess for visible entrance and exit wounds and treat as thermal burns.
c. Assess for internal injury, i.e., vascular damage, tissue damage, fractures, and treat accordingly.
d. Determine severity of burn, contact Medical Control and transport accordingly.

5. Inhalation Burns:

a. Always suspect inhalation burns when the patient is found in closed smoky environment and / or exhibits any of the following: burns to face / neck, singed nasal hairs, cough and / or stridor, soot in sputum.
b. Provide oxygen therapy, contact Medical Control and transport.

- Handle patients gently to avoid further damage of the patient's skin.
- If the patient is exposed to a chemical, whenever possible, get the name of the chemical, and document it on the patient run report. DO NOT transport any hazardous materials with the patient.
- Look for signs of dehydration and shock.
- Initiate early intubation for symptomatic patients with inhalation burns.
- Patients with major burns should be transported to the Burn Center.
- Patients with unstable airway or who are rapidly deteriorating should be transported to the closest appropriate facility.
- Patients with large surface burns lose the ability to regulate their body temperature. Avoid heat loss by covering the patient.

ADULT PROTOCOL

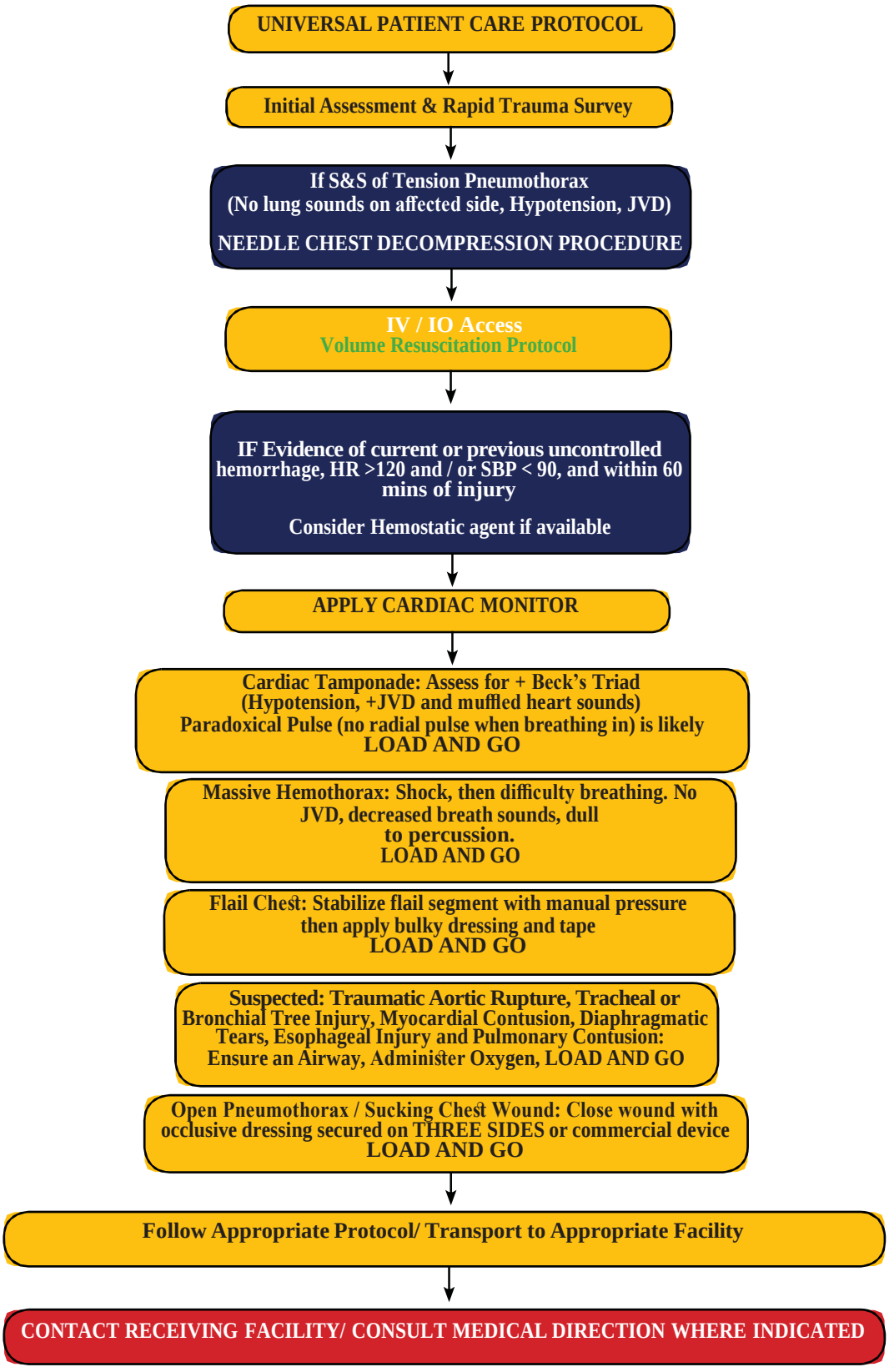
BURNS

KEY POINTS

- Follow Trauma Assessment and Management Protocol.
- When treating patients with chemical burns, it is imperative to ensure rescuer safety. Patients contaminated with chemicals should have their clothing removed. Do NOT transport patients prior to appropriate decontamination. Notify the receiving facility of a patient with chemical exposure to allow adequate time for preparation. All chemical burns should be flushed with copious amounts of water.
  - Brush dry chemicals off the skin before flushing.
  - For chemical burns of the eye, flush the eye immediately with at least one liter of normal saline or water (at least 10 to 20 minutes is preferred). More fluids may be beneficial, especially if the chemical is alkaline.
- Stop the burning process. If on scene quickly after the burn occurred, cooling affected parts (e.g. with cool water immersion) may limit the depth and extent of the burn. More than a few minutes after the burn, there is little benefit except pain relief. Note that with burns from tar, asphalt, paraffin or oils that retain heat (or when melted fabric adheres to skin) cooling may help for a longer period of time.
- If cooling for pain relief, do not cool or moisten more than 10% of the TBSA at any one time. This can cause hypothermia.
- Remove all clothing and jewelry in the area of the burn and distal to the injury.
- Administer high flow, 100% concentration oxygen by non-rebreather mask for potential inhalation injury or any serious burn. Consider the possibility of carbon monoxide or other toxic inhalation. Oxygen saturation readings may be falsely elevated.
- Assess circulation and perfusion. Circumferential burns of extremities can interfere with perfusion of that extremity.
- If spinal trauma is suspected, place a rigid cervical collar and immobilize the patient as appropriate.
- Consider ACLS intercept for patients with serious burns and electrical injuries; in electrical injuries there is a possibility of cardiac dysrhythmias.
- Estimate the TBSA involved. The "Rule of Nines" provides a rough estimate of TBSA involved (see following page).
- Apply dressings to burns as tolerated.
- In burns over 10% BSA, apply a dry sheet, a dry burn sheet or dry sterile dressings to burn areas. Insulate the patient over this dressing to lessen the chance of hypothermia.
- In burns less than 10% BSA, apply moist dressings (e.g. commercially available burn dressings or saline-soaked gauze), a vapor barrier may be useful in patients with longer transport times.
- Start two large bore IVs in patients meeting any of the burn criteria in the beginning of this section. These may be inserted through burn area, if necessary.
  - **Initial resuscitative fluid in a burn patient are calculated using the parkland formula:** 2-4cc× %burn area body× weight(Kg) = amount of LR or NS needed in the first 24 hours, half of this fluid is given in the first 8 hours and the reminder over the next 16 hours.
- Be alert for signs of inhalation injury (e.g. stridor, muffled voice, singed facial/nasal hairs, soot around nose or mouth, carbonaceous sputum, confinement in an enclosed space fire). Be prepared to secure the airway.
- If the injury involves an electrical burn, initiate cardiac monitoring. Treat cardiac dysrhythmias as directed.
- Consider Pain Management. Small doses IV titrated to effective pain control; monitor for respiratory depression.
- Give all medications intravenously.

ADULT PROTOCOL

CHEST TRAUMA



ADULT PROTOCOL

CHEST TRAUMA

SIGNS AND SYMPTOMS

SIMPLE PNEUMOTHORAX	OPEN PNEUMOTHORAX	TENSION PNEUMOTHORAX	HEMOTHORAX
• Shortness of breath • Dyspnea • Tachypnea • Cyanosis • Chest pain • Absent diminished Lung sounds on the affected side	• Shortness of breath • Dyspnea • Cyanosis • Sucking chest wound • Shock • Absent / diminished Lung sounds on affected side	• Shortness of breath • Cyanosis • Shock • Absent / diminished Lung sounds • Tracheal deviation • Hypotension • JVD • Tachycardia • Dyspnea (late sign)	• Shortness of breath • Dyspnea • Cyanosis • Dullness to Percussion sounds • Flat neck veins • Hypotension • Shock • Absent / diminished breath sounds • Tachycardia

CARDIAC TAMPONADE	TRAUMATIC ASPHYXIA	FLAIL CHEST
• Hypotension • Decreasing pulse pressure • Elevated neck veins • Muffled heart tones • Bruising over the sternum • Tachycardia	• Bloodshot, bulging eyes • Blue, bulging tongue • JVD • Cyanotic upper body	• Paradoxical chest wall movement • Asymmetric chest movement Upon inspiration • Dyspnea • Unstable chest segment • Significant chest wall pain

KEY POINTS

Thoracic injuries have been called the deadly dozen. The first six are obvious at the primary assessment.

1. Airway obstruction 4. Massive hemothorax
2. Flail chest 5. Open pneumothorax
3. Cardiac tamponade 6. Tension pneumothorax

The second six injuries may be more subtle and not easily found in the field:

7. Traumatic aortic rupture 10. Diaphragmatic tears
8. Esophageal injury 11. Tracheal / bronchial tree injury
9. Myocardial contusion 12. Pulmonary contusion

- A **sucking chest wound** is when the thorax is open to the outside. The occlusive dressing may be anything such as petroleum gauze, plastic, or a defibrillator pad. Tape only 3 sides down so that excess intra-thoracic pressure can escape, preventing a tension pneumothorax. May help respirations to place patient on the injured side, allowing unaffected lung to expand easier.
- A **flail chest** is when there are extensive rib fractures present, causing a loose segment of the chest wall resulting in paradoxical and ineffective air movement. This movement must be stopped by applying a bulky pad to inhibit the outward excursion of the segment. Positive pressure breathing via BVM will help push the segment and the normal chest wall out with inhalation and to move inward together with exhalation, getting them working together again. Do not use too much pressure to prevent additional damage or pneumothorax.
- A **penetrating object** must be immobilized by any means possible. If it is very large, cutting may be possible, with care taken not to move it about when making the cut. Place an occlusive and bulky dressing over the entry wound.
- A **tension pneumothorax** is life threatening, look for HYPOTENSION, unequal breath sounds, JVD, increasing respiratory distress, and decreasing mental status. The pleura must be decompressed with a needle to provide relief. Decompress between the 2nd and 3rd ribs, mid-clavicular placing the catheter over the 3rd rib. Once the catheter is placed, watch closely for re-occlusion. Repeat if needed to prevent re-occlusion. Decompress with 3.25" 14-gauge catheter or Chest Decompression Needle based on patient's size.

ADULT PROTOCOL

CHEST TRAUMA

KEY POINTS

1. Follow Trauma Assessment and Management Protocol (Examine the patient looking for distended neck veins. Look at the chest wall for asymmetry of movement, open wounds, and bruises. Expose the patient's chest, as needed, to inspect the entire chest wall, front and back, maintaining cervical immobilization and log rolling when indicated. Respiratory distress, despite an open airway, may suggest a tension pneumothorax, a flail chest, or an open chest wound).
2. Clear and open airway. Stabilize neck.
3. Assist breathing if patient is apneic or respirations depressed.
4. Apply O2, high flow (10-15 L/min) by mask. Titrate to pulse oximetry > 90% if possible.
5. Control exsanguinating hemorrhage with direct pressure.
6. If penetrating injury present, transport rapidly with further stabilization en route.
7. For open chest wound with air leak, use occlusive dressing (Vaseline-type gauze, plastic wrap, or aluminum foil) taped on three sides only, to allow air to escape but not enter the chest.
8. Observe chest for paradoxical movements. Treat lateral flail segment by splinting with sandbags or bags of IV fluid to minimize abnormal movement. If chest cannot be adequately stabilized by those means, consider intubation and positive pressure ventilation.
9. IV – volume expander (NS or RL), large bore, TKO.
10. Obtain baseline vital signs, neurologic assessment.
11. Evaluate neck veins and blood pressure
    A. If neck veins flat and patient's BP < 90, transport rapidly and treat hypovolemia enroute
        - Consider fluid bolus of 20 ml/kg, further fluids as directed.
        - Monitor cardiac rhythm.
    B. If patient BP < 90, neck veins distended, also transport rapidly, and consider:
        - Tension pneumothorax if respiratory status markedly deteriorating with clinical findings of pneumothorax
            - Release dressings on open chest wounds.
            - Consider needle decompression.
        - Pericardial tamponade if mechanism of injury suspicious (may have distant heart sounds and narrow pulse pressure)
            - Consider fluid bolus of 20 ml/kg.
        - Cardiac contusion with typical ischemic chest pain or severe chest wall contusion
            - Monitor cardiac rhythm.
            - Consider cautious fluid bolus of 10 ml/kg en route or as directed.
12. Immobilize impaled objects in place with dressings to prevent movement whenever possible, and not removed unless absolutely necessary for extrication or transport.
13. Monitor vitals and level of consciousness every five minutes.
14. Transport patient in the position of comfort unless otherwise contraindicated

Specific precautions

1. Chest trauma is treated with difficulty in the field and prolonged treatment before transport is NOT indicated. If patient is critical, transport rapidly and avoid treatment of non-emergent problems at the scene. Penetrating injury particularly should receive immediate transport with minimal intervention in the field.
2. Consider medical causes of respiratory distress such as asthma, pulmonary edema or COPD that have either caused trauma or been aggravated by it. Consider MI in single car crash.
3. Chest injuries sufficient to cause respiratory distress are commonly associated with significant blood loss. Look for hypovolemia.

ADULT PROTOCOL

EXTREMITY TRAUMA / AMPUTATION

UNIVERSAL PATIENT CARE PROTOCOL

↓

Initial Assessment & Rapid Trauma Survey

↓

Bleeding Control Protocol

↓

IV / IO Access
Volume Resuscitation

↓

IF Evidence of current or previous uncontrolled hemorrhage, HR >120 and / or SBP < 90, and within 60 mins of injury

Consider hemostatic agents if available

↓

Amputation?

Clean amputated part with normal saline irrigation

Wrap part in sterile dressing and place in plastic bag if able

Place on ice if available – no direct contact to tissue

↓

Follow Appropriate Protocol/ Transport to Appropriate Facility

↓

CONTACT RECEIVING FACILITY/ CONSULT MEDICAL DIRECTION WHERE INDICATED

ADULT PROTOCOL

EXTREMITY TRAUMA / AMPUTATION

HISTORY	SIGNS AND SYMPTOMS	DIFFERENTIAL DIAGNOSIS
• Type of injury • Mechanism: crush / penetrating / amputation • Time of injury • Open vs. closed wound fracture • Wound contamination • Medical history • Medications	• Pain, swelling • Deformity • Altered sensation / motor function • Diminished pulse / capillary refill • Decreased extremity temperature	• Abrasion • Contusion • Laceration • Sprain • Dislocation • Fracture • Amputation

KEY POINTS

• Exam: Mental Status, Extremity, Neuro
• In amputations, time is critical. Transport and notify medical control immediately, so that the appropriate destination can be determined.
• Hip dislocations and knee and elbow fracture / dislocations have a high incidence of vascular compromise.
• Urgently transport any injury with vascular compromise.
• Blood loss may be concealed or not apparent with extremity injuries.
• Lacerations must be evaluated for repair within 6 hours from the time of injury.

Extremity Trauma:
• DO NOT take the time to splint injured extremities in major trauma patients unless it does not delay the scene time or prevents you from performing more pertinent patient care.
• Splint the extremity if the patient has signs and symptoms of a fracture or dislocation.
• Treat all suspected sprains or strains as fractures until proven otherwise.
• Splint the joint above and below for all suspected fractures.
• Splint the bone above and below for all suspected joint injuries.
• Check and document the patient's PMS before and after splinting.
• A traction splint with a backboard is the preferred splint to use for femur fractures.

Traumatic Amputation:
• Care of the amputated extremity include:
  o Cleanse an amputated extremity with normal saline or sterile water.
  o DO NOT place any amputated tissue directly on ice or cold pack. Instead, place the amputated limb into a plastic bag. Put the bag into a container of cool water with a few ice cubes (if available).
• Contact the receiving hospital with the patient information and include the status of the amputated limb.
• Focus on patient care and not on the amputated extremity.
• Tourniquets should be applied early if there is a risk of exsanguination (bleeding out) from extremity injury.
• Remember to calm and reassure the patient. Do not give the patient or their family member's false hope of re-attachment of the affected limb. A medical team at the receiving hospital makes this decision.
• Delegate someone to do an on-scene search for the amputated part when it cannot be readily found and continue with patient care.

Amputation:
1. Follow Trauma Assessment and Management Protocol.
2. Control hemorrhage with direct pressure, and tourniquet as needed.
3. Resuscitate and treat airway, breathing, and circulatory problems.
4. If significant hypotension: IV – volume expander (NS or RL), 20 ml/kg, as directed.
5. Patient – gently cover stump with sterile dressing. Saturate with sterile saline. Cover with dry dressing.
6. Severed part – Wrap in sterile gauze. Moisten with sterile saline. Place in water-tight container in cooler with ice (do not freeze).
7. Consult base for instruction on optimum transport destination.

ADULT PROTOCOL

EXTREMITY TRAUMA / AMPUTATION

Specific precautions:

1. Partial amputations should be dressed and splinted in alignment with extremity to ensure optimum blood flow. Avoid torsion in handling and splinting.
2. Do not use dry ice to preserve severed part.
3. Control all bleeding by direct pressure only to preserve tissues. The most profuse bleeders may occur in partial amputations, where cut vessel ends cannot retract to stop bleeding. Never clamp bleeding vessels with hemostats.
4. Many factors enter into the decision to attempt re-implantation (age, location, condition of tissues, etc.). Treatment decisions cannot be made until the patient and part have been examined by the specialist – and may not be made at the primary care hospital. Try to help the family and patient understand this and does not falsely elevate hopes.

Extremity trauma:

1. Follow Trauma Assessment and Management Protocol.
2. Treat airway, breathing, and circulation as first priorities.
3. Immobilize cervical spine when appropriate.
4. Examine for additional injuries to head, face, chest, and abdomen. Treat problems with higher priority first.
5. If patient unstable, transport rapidly, treating life-threatening problems enroute. Splint patient by securing to long board to minimize fracture movement.
6. If patient stable, or isolated extremity injury exists

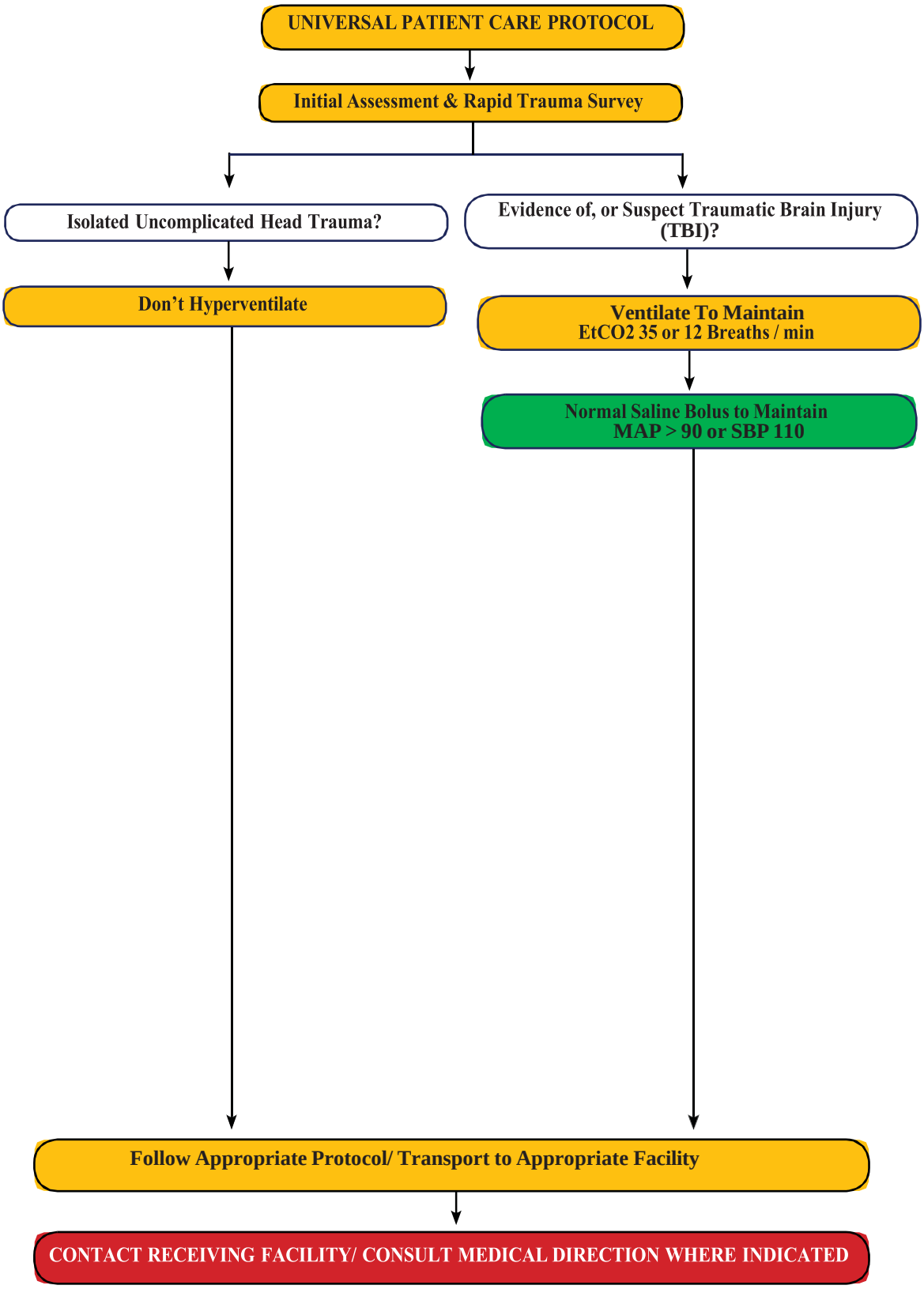
• Check distal pulses, motor, and sensation prior to immobilization of injured extremity.
• Apply sterile dressing to open fractures. Note carefully wounds that appear to communicate with bone, and initial position of bone in wound.
• Splint areas of tenderness or deformity – apply gentle traction throughout treatment and try to immobilize the joint above and below the injury when applying splint.
• Reduce fractures (including open fractures) by applying gentle axial traction once if indicated
– To restore circulation distally.
– To immobilize adequately.
• Check distal pulses and sensation after reduction and splinting.
• Elevate simple extremity injuries. Apply padded ice if time and extent of injuries allow.
• Consider pelvic wrap/sling for stabilization of pelvic fractures.
• Monitor circulation (pulse and skin temperature), sensation, and motor function distal to the site of injury during transport.
• Transport patient.

Special precautions:

1. Patients with multiple injuries have a limited capacity to recognize areas which have been injured. A patient with a femur fracture may be unable to recognize that he has other areas of pain. Be particularly aware of injuries proximal to the obvious ones (e.g., a hip dislocation with a femur fracture, or a humorous fracture with a forearm fracture).
2. Do not use ice or cold packs directly on skin or under air splints, pad with towels or leave cooling for hospital setting.
3. Do not attempt to reduce dislocations in the field. The only reasonable exception is a dislocated patella – if the diagnosis is clear and transport time is greater than 5 minutes – reduce dislocation by gently straightening the leg (after pain medication, if possible). Splint all dislocations in the position of comfort.
4. Fractures do not necessarily lead to loss of function. Impacted fractures may cause pain but little or no loss of function.
5. Do not allow severely angulated, open, bloody fractures to distract you from a less obvious pneumothorax with respiratory distress. Extremity injuries benefit from appropriate care, but are of low priority in a multiple-injured patient. Quick stabilization with a long board for the seriously injured patient.
6. Fractures near joints may become more painful and circulation may be lost with attempted reduction. If this occurs, stabilize the limb in the position of most comfort and with the best distal circulation.

ADULT PROTOCOL

HEAD TRAUMA



ADULT PROTOCOL

HEAD TRAUMA

HISTORY	SIGNS AND SYMPTOMS	DIFFERENTIAL DIAGNOSIS
• Time of injury • Mechanism: blunt /penetrating • Loss of consciousness • Bleeding • Medical history • Medications • Evidence of multi-trauma • Helmet use or damage to helmet	• Pain, swelling, bleeding • Altered mental status • Unconscious • Respiratory distress / failure • Vomiting • Significant mechanism of injury	• Skull fracture • Brain injury (concussion, contusion, hemorrhage, or laceration) • Epidural hematoma • Subdural hematoma • Subarachnoid hemorrhage • Spinal injury • Abuse

INFANT	Glasgow Coma Scale	ADULT
Birth to age 4 4 Spontaneously 3 To speech 2 To pain 1 No response	**Eye Opening**	Age 4 to Adult Spontaneously 4 To command 3 To pain 2 No Response 1
5 Coos, babbles 4 Irritable cries 3 Cries to pain 2 Moans, grunts 1 No response	**Best Verbal Response**	Oriented 5 Confused 4 Inappropriate words 3 Incomprehensible 2 No response 1
6 Spontaneous 5 Localizes pain 4 Withdraws from pain 3 Flexion (decorticate) 2 Extension (decerebrate) 1 No response = TOTAL	**Best Motor Response**	Obeys commands 6 Localizes pain 5 Withdraws from pain 4 Flexion (decorticate) 3 Extension (decerebrate) 2 No response 1 TOTAL =

KEY POINTS

• Exam: Mental Status, HEENT, Heart, Lungs, Abdomen, Extremities, Back, Neuro
•If GCS < 12 consider air / rapid transport and if GCS < 9 intubation should be anticipated.
• GCS < 8? Intubate!
•DO NOT allow patients to become hypoxic, maintain SpO2 > 94%, abandon intubation attempts if this cannot be maintained. Secure airway by other means.
•Increased intracranial pressure (ICP) may cause hypertension and bradycardia (Cushing's Reflex).
•Hypotension usually indicates injury or shock unrelated to the head injury and should be aggressively treated.
•Limit IV fluids unless patient is hypotensive (systolic BP < 90) fluid resuscitate if necessary to maintain BP, Do NOT allow patients to become hypotensive.
•DO NOT attempt to lower the blood pressure in hypertensive head injured patients with medications such as Nitroglycerine.
•Be alert for c-spine injuries with head trauma.
•Continually reassess the patient, including pupils, LOC, and neurological status.
•Any decrease in GCS suggests a TBI surgical emergency, transport to trauma center
•Capnography is critical! Maintain the CO2 ranges indicated in protocol, 1 point of CO2 change = 3% decrease in cerebral perfusion.
•The most important item to monitor, trend and document is a change in the level of consciousness / GCS.
- •Herniation may occur. Signs are:
  Cushing's reflex; Bradycardia, hypertension, widening pulse pressure
  oDecreasing level of consciousness progressing towards coma.
  oDilation of pupils – may be unilateral or bilateral
  oDecerebrate posturing (extension of arms and legs).
  oDecorticate posturing (flexion arms and legs).

• Concussions are periods of confusion or LOC associated with trauma, which may have resolved by the time EMS arrives

ADULT PROTOCOL

HEAD TRAUMA

KEY POINTS

• Follow Trauma Assessment and Management Protocol.

1. Assess airway and breathing. Treat life-threatening difficulties. Use assistant to provide cervical stabilization while managing respiratory difficulty.
2. Control hemorrhage. Stop scalp bleeding with direct pressure if possible. Continued pressure may be needed.
3. Apply O2, moderate flow (4-6 L/min), by mask or nasal cannula (high flow by mask for seriously injured patients). Titrate to pulse oximetry > 90% if possible.
4. Obtain initial vital signs, neurologic assessment, including Glasgow Coma Score.

5. If unconscious, or Glasgow Coma Score < 8
   - Assist ventilations.
   - Consider intubation.
   - Ventilate at 10 - 12 breaths per minute. If capnography is available, ventilate to maintain end tidal CO2 of 35-45.
   - Consider RSI.
6. Immobilize cervical spine by head-blocks (relieve assistant performing manual stabilization).
7. Immobilize patient on spine board. Be prepared to tilt for vomiting.
8. Transport rapidly if patient has multiple injuries, or unstable respiratory, circulatory, or neurologic status.
9. If signs of hypovolemic shock is present, initiate treatment en route.
   - Elevate legs, keep patient warm.
   - IV – volume expander (NS or RL), large bore to maintain systolic blood pressure >90.
   - Consider bleeding sources (abdomen, pelvis, and chest).
   - Stabilize and splint fractures, dress wounds if time allows.
10. If the patient has Cushing's triad (hypertension, bradycardia, abnormal respiratory pattern) maintain systolic blood pressure 110-120 mmHg in an attempt to maintain cerebral pressure.
11. If a TBI is suspected, hyperventilate the patient only if one or more of the following signs of brain herniation exists:
    - Dilation or sluggishness of the ipsilateral pupil.
    - Abnormal motor findings can also accompany herniation (Contralateral weakness, decorticate posturing, decerebrate posturing).
    - Cheyne-Stokes ventilations.

    • Hyperventilate at 20breaths per minute/adult, 25breaths per minute/children, and 30breaths per minute/infant. If capnography is available, ventilate to maintain end tidal CO2 of 35.
12. If patient stable (respiratory, circulatory, neurologically)
    - IV – volume expander (NS or RL), large bore, TKO.
    - Complete secondary survey.
    - Splint fractures and dress wounds if time permits.
13. Monitor airway, vitals, and level of consciousness repeatedly at scene and during transport. status changes are important.

ADULT PROTOCOL

HEAD TRAUMA

Specific precautions:

1. When head injury patients deteriorate, check first for airway, oxygenation and blood pressure. These are the most common causes of "neurologic" deterioration. If the patient has tachycardia or hypotension, look for hidden hypovolemia from associated injuries and do not blame the head injury.
2. The most important information you provide for the base physician is level of consciousness and its changes. Is the patient stable, deteriorating or improving?
3. Assume cervical spine injury in all patients with head trauma.
4. Restlessness can be a sign of hypoxia. Cerebral anoxia is the most frequent cause of death in head injury.
5. If active airway ventilation is needed, intubate and hyperventilate at 20/minute. If capnography is available ventilate to maintain end tidal CO2 of 30-35. Hypoventilation and excessive hyperventilation both compromise cerebral perfusion
6. Do not try to stop bleeding from nose and ears. Cover with clean gauze if needed to prevent further contamination.
7. Scalp lacerations can cause profuse bleeding, and are difficult to define and control in the field. If direct local pressure is insufficient to control bleeding, evacuate any large clots from flaps and large lacerations with sterile gauze and use direct hand pressure to provide hemostasis. If the underlying skull is unstable, pressure should be applied to the periphery of the laceration over intact bone.
8. Control seizure activity with benzodiazepine per protocol.

SPINAL TRAUMA

1. Follow Trauma Assessment and Management Protocol.
2. Assess airway and breathing. Treat life-threatening difficulties. Use controlled ventilation for high cervical cord injury associated with abdominal breathing. Use assistant to provide cervical stabilization while managing ABCs.
3. Control hemorrhage. Stop scalp bleeding with direct pressure if possible. Continued manual pressure may be needed.
4. Apply O2, titrate to pulse oximetry > 90% if possible.
5. Obtain initial vital signs, neurologic assessment, including Glasgow Coma Score.
6. Immobilize cervical spine with firm cervical collar. Maintain stabilization manually until securely immobilized on spine board.
7. Immobilize thoracic and lumbosacral spine with spine board. Move patient as little as possible and always move as a unit.
8. Secure patient to board following transfer. Secure trunk first, then cervical spine, then extremities.
9. IV – volume expander (NS or RL), large bore, TKO.
10. If patient BP < 90 mm systolic and signs of hypovolemic shock.
    - Keep patient warm with blankets to prevent heat loss.
    - Elevating the foot of the backboard 10-12 inches.
    - Examine for possible sources of bleeding (abdomen, pelvis, chest, scalp, back).
    - Administer fluid bolus of 20 ml/kg or as directed.
    - Consider Dopamine in shock unresponsive to fluids and thought to be neurogenic in nature.
11. Mark level of sensory deficit gently with pen on patient's skin to facilitate monitoring.

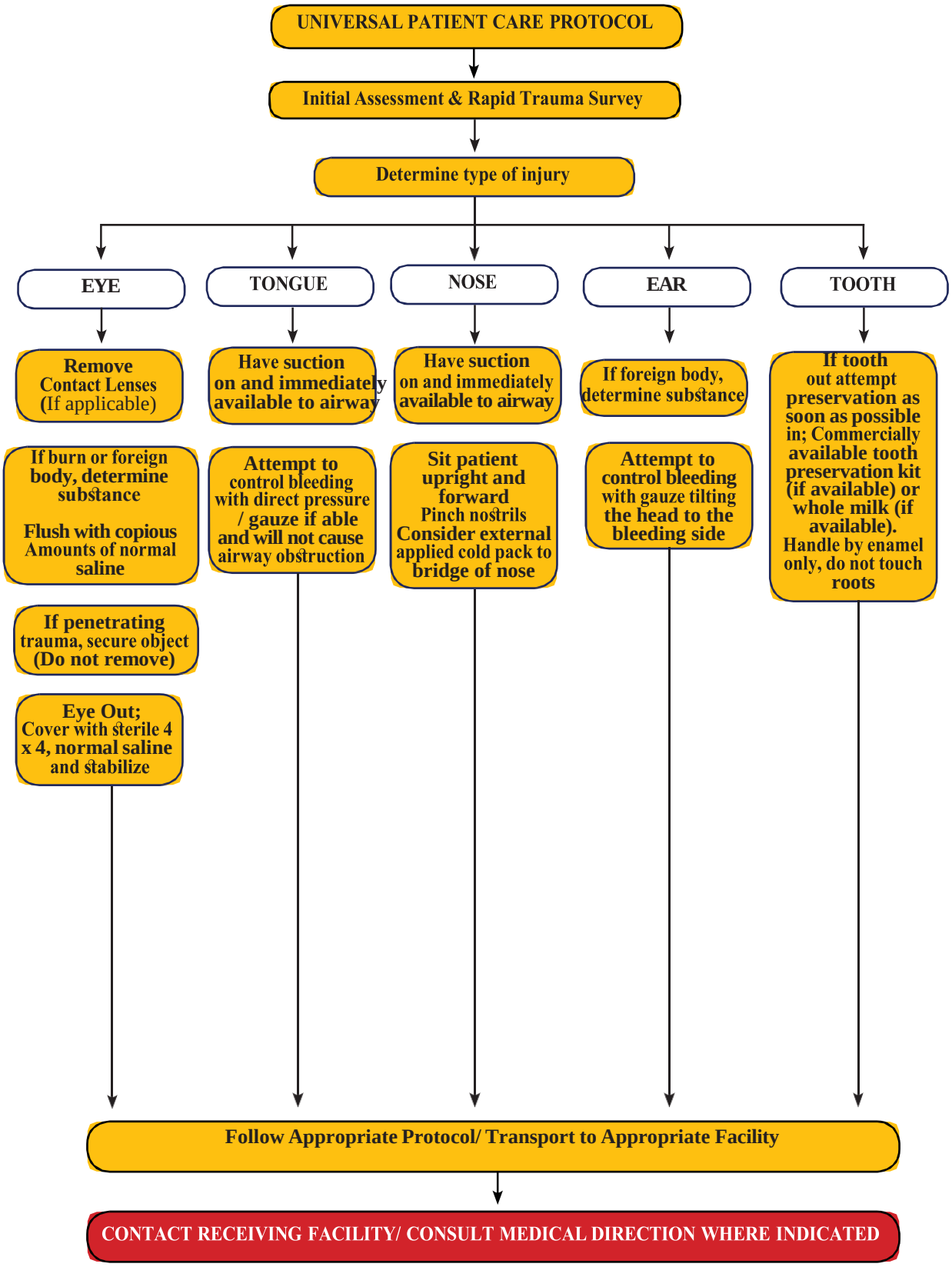
Monitor airway, vitals, and neurologic status frequently at scene and during transport.

Specific precautions:

1. Be prepared to tilt entire board on side if patient vomits (patient must be secured to spine board or scoop stretcher –wide tape or straps anchored to both sides of board preferred).
2. Neurogenic shock is likely with significant spinal cord injury. Elevating the foot of the backboard spine board or legs only (if no injury in the extremities or pelvis, whichever is easier logistically). Be sure respirations remain adequate.
3. If hypotension is unresponsive to simple measures, it is likely due to other injuries. Neurologic deficits make these other injuries hard to evaluate. Cord injury above the level of T-8 removes tenderness, rigidity, and guarding as clues to abdominal injury.
4. The patient with spinal trauma and normal neurologic function or only a partial deficit should not be treated carelessly then the patient with a complete deficit. Because this is the patient who can

ADULT PROTOCOL

MAXILLOFACIAL TRAUMA



MAXILLOFACIAL / EYE TRAUMA

benefit most from your splinting efforts and protection from further injury.

HISTORY	SIGNS AND SYMPTOMS	DIFFERENTIAL DIAGNOSIS
• Trauma of any type that results in injury to one or both eyes.	• Irritation to eye • Visual disturbances • Obvious penetrating injury • Burn (chemical, thermal) • Loss of vision • Dizziness • Loss of consciousness • Nausea	• Hypertension • Contact lens problem

KEY POINTS

- If unsure if something can be flushed with water, contact Medical Command.
- A garden hose can be used to help flush the patient's eye(s) if available. DO NOT use a high-pressure hose or at a high force. If needed, irrigate the patient's eyes for approximately 5 -15 minutes.
- Begin irrigating immediately, because irreversible damage can occur in a few minutes.

TRAUMA
- Do not allow eye injury to distract you from the basics of trauma care.
- Do not remove any foreign body imbedded in the eye or orbit. Stabilize any large protruding foreign bodies.
- With blunt trauma to the eye, if time permits, examine the globe briefly for gross laceration as the lid may be swollen tightly shut later. Sclera rupture may lie beneath an intact conjunctiva.
- Covering both eyes when only one eye is injured may help to minimize trauma to the injured eye, but in some cases the patient is too anxious to tolerate this.
- Transport patient supine unless other life threats prohibit this from being done. (This is based on physics, the goal of not letting the fluid within the eye drain out of the eye)

CHEMICAL BURNS
- When possible determine type of chemical involved first. The eye should be irrigated with copious amounts of water or saline, using IV tubing wide open for a minimum of 15 minutes started as soon as possible. Any delay may result in serious damage to the eye.
- Always obtain name and, if possible, a sample of the contaminant or ask that they be brought to the hospital as soon as possible.

CONTACT LENSES
- If possible, contact lenses should be removed from the eye; be sure to transport them to the hospital with the patient. If the lenses cannot be removed, notify the ED personnel as soon as possible.
- If the patient is conscious and alert, it is much safer and easier to have the patient remove their lenses.

ACUTE, UNILATERAL VISION LOSS
- When a patient suddenly loses vision in one eye with no pain, there may be a central retinal artery occlusion. Urgent transport and treatment is necessary.
- Patient should be transported flat.

Face and Neck Trauma:

A. Follow Trauma Assessment and Management Protocol.
B. Control airway
1. Open airway using jaw thrust, keeping neck in alignment with manual stabilization.
2. Use finger sweep to remove teeth or debris.
3. Suction blood and other debris, as able.
4. Note evidence of laryngeal injury and transport immediately if signs present.
5. With isolated non-significant facial injury, place patient left lateral recumbent position or sitting up and leaning forward to ensure airway as needed.

6. Intubate if bleeding severe or airway cannot be maintained otherwise. Avoid nasotracheal intubation with mid-face trauma. If using orotracheal approach, ensure cervical stabilization to prevent neck extension. Confirm tube position immediately after intubation.
7. If intubation cannot be performed due to severe facial injury, attempt to manage with suctioning and supportive care. Consider RSI or alternative airways.

8. If necessary, consider cricothyrotomy. Confirm tube position immediately after procedure.

C. Support breathing as needed. If mask fit cannot be maintained because of trauma, consider intubation or cricothyrotomy.

D. O2, high flow (10-15 L/min). Titrate to pulse oximetry > 90%.

E. Stop hemorrhage. Check pulse and circulation.

F. IV – volume expander (NS or RL), large bore
- TKO if stable.
- With signs of shock, administer 20 ml/kg fluid bolus, further fluids as directed.

G. Immobilize cervical spine (relieve assistant performing cervical stabilization).

H. Obtain vital signs, assess neurologic status.

I. Complete secondary survey if no life-threatening injuries present.

J. Cover injured eyes with protective shield or cup – avoid pressure or direct contact to eye.

K. Do not attempt to stop free drainage from ears, nose. Cover lightly with dressing to avoid contamination.

L. Transport avulsed teeth with the patient. Keep moist in saline-soaked gauze.

M. If airway secured and patient stable, splint fractures and manage non-emergent injuries at scene or en route.

N. Monitor airway closely during transport for development of obstruction or respiratory distress. Suction and treat as needed.

Specific precautions

1. Fracture of the larynx should be suspected in patients with respiratory distress, abnormal voice, and history of direct blow to neck from steering wheel, rope, fence, wire, etc. Both intubation and needle cricothyrotomy may be unsuccessful in the patient with a fractured larynx and attempts may precipitate respiratory arrest. Transport rapidly for definitive treatment, if you suspect this potentially lethal injury. Do not attempt intubation or cricothyrotomy unless the patient arrests.
2. Airway obstruction is the primary cause of death in persons sustaining head and face trauma. Meticulous attention to suctioning, and stabilization of tongue and mandible may be the most important treatment rendered.
3. Do not be concerned with contact lens removal in the field. The safest place for lenses is in the eye.
4. In penetrating neck trauma, avoid intubation unless absolutely essential.

ADULT PROTOCOL

TRAUMA ARREST

HISTORY	SIGNS AND SYMPTOMS	DIFFERENTIAL DIAGNOSIS
• Time of injury • Mechanism: blunt /penetrating • Loss of consciousness • Bleeding • Medications • Evidence of multi-trauma	• Excessive bleeding • Unresponsive; not breathing • Cardiac arrest • Significant mechanism of injury	• Obvious DOA • Death

KEY POINTS

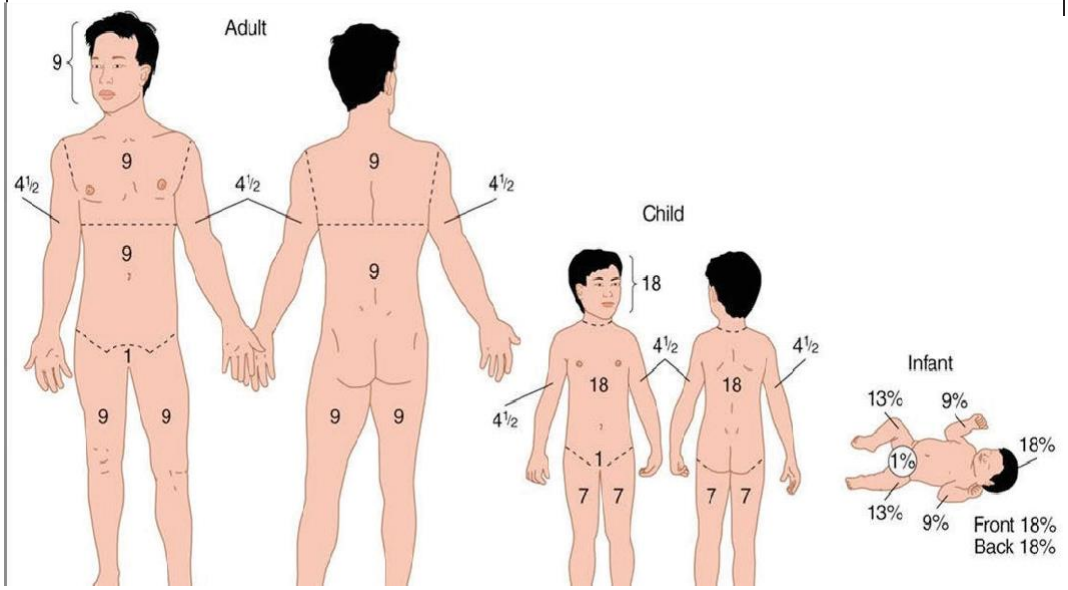
- Immediately transport traumatic cardiac arrest patients.
- Except for airway management, traumatic cardiac arrests are "load and go" situations.
- Resuscitation should not be attempted in trauma arrest patients with;
  1. Spinal transection
  2. Decapitation
  3. Total body burns
  4. Severe blunt trauma that are without vital signs
- Patients in cardiac arrest with deep penetrating cranial injuries and patients with penetrating cranial or truncal wounds associated with asystole and a transport time of more than 15 minutes to a definitive care facility are unlikely to benefit from resuscitative efforts.
- Extensive, time-consuming care of trauma victims in the field is usually not warranted. Unless the patient is trapped, they should be en route to a medical facility within 10 minutes after arrival of the ambulance on the scene.

TRAUMA ASSESSMENT CHARTS

GLASGOW COMA SCORE		GCS
EYES	SPONTANEOUSLY	4
	TO VERBAL COMMAND	3
	TO PAIN	2
	NO RESPONSE	1
BEST MOTOR RESPONSE	OBEYS VERBAL COMMAND	6
	PURPOSEFUL MOVEMENT TO PAIN	5
	FLEXION - WITHDRAWAL	4
	FLEXION - ABNORMAL	3
	EXTENSION	2
	NO RESPONSE	1
BEST VERBAL RESPONSE	ORIENTED & CONVERSES	5
	DISORIENTED & CONVERSES	4
	INAPPROPRIATE WORDS	3
	INCOMPREHENSIBLE SOUNDS	2
	NO RESPONSE	1

REVISED TRAUMASCORE		
		RTS
GLASGOW COMA SCALE	13 - 15	4
	9 - 12	3
	6 - 8	2
	4 - 5	1
	0 - 3	0
RESPIRATORY RATE	GREATER THAN 29	4
	10 - 29	3
	6 - 9	2
	1 - 5	1
	0	0
SYSTOLIC BLOOD PPRESSURE	GREATER THAN 89	4
	76 - 89	3
	50 - 75	2
	1 - 49	1
	0	0

RULE OF NINES



1% is equal to the surface of the palm of the patient›s hand. If unsure of %, describe injured area.

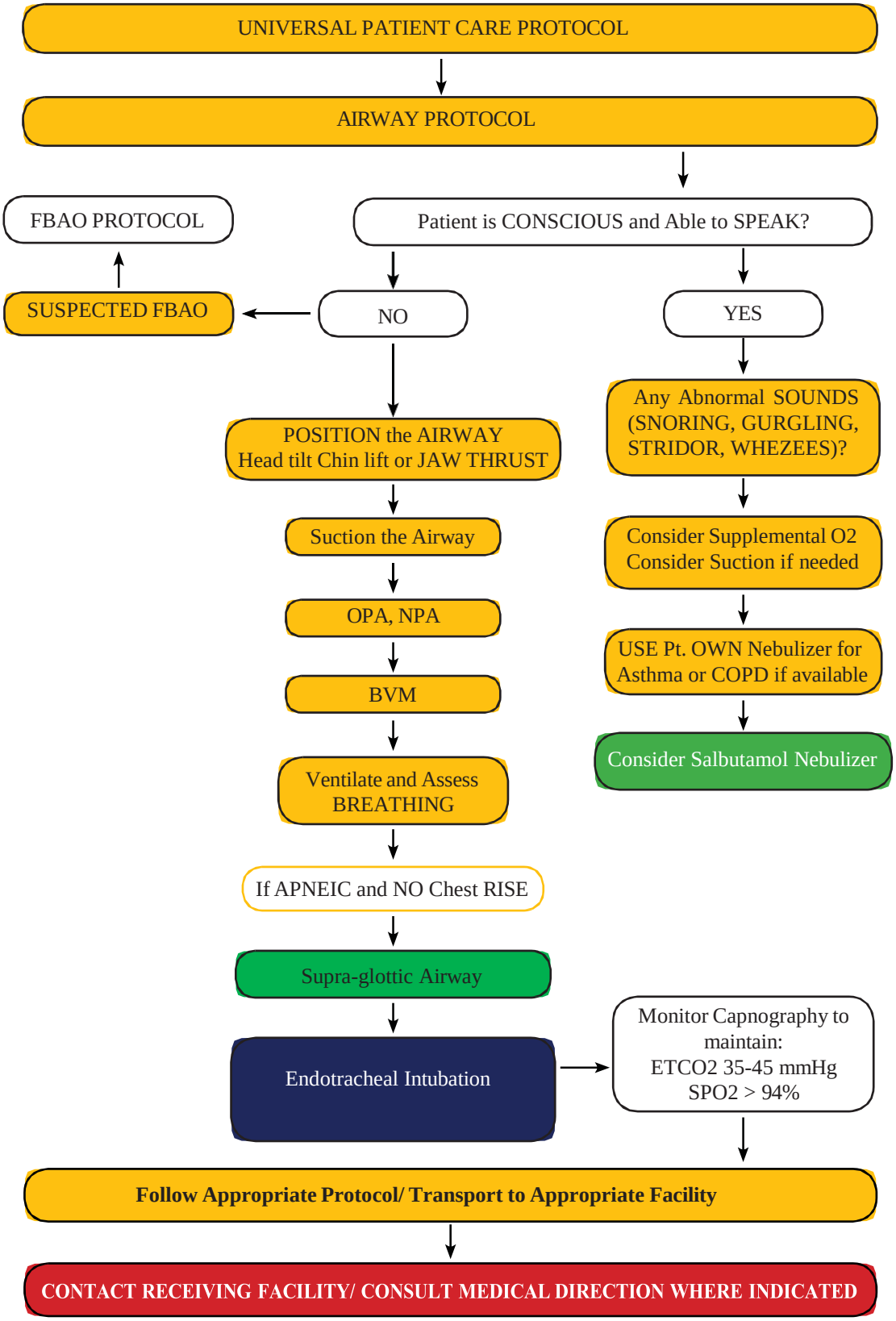
MAJOR BURN CRITERIA

- 2° and 3° burns > 10% surface area
- Burns of the face, hands feet genitalia
- Electrical shock with burn injury
- Burn with inhalation injury any burn with potential functional or cosmetic impairment

CHAPTER 6
AIRWAY MANAGEMENT PEDIATRIC

PEDIATRIC PROTOCOL

AIRWAY GUIDELINES

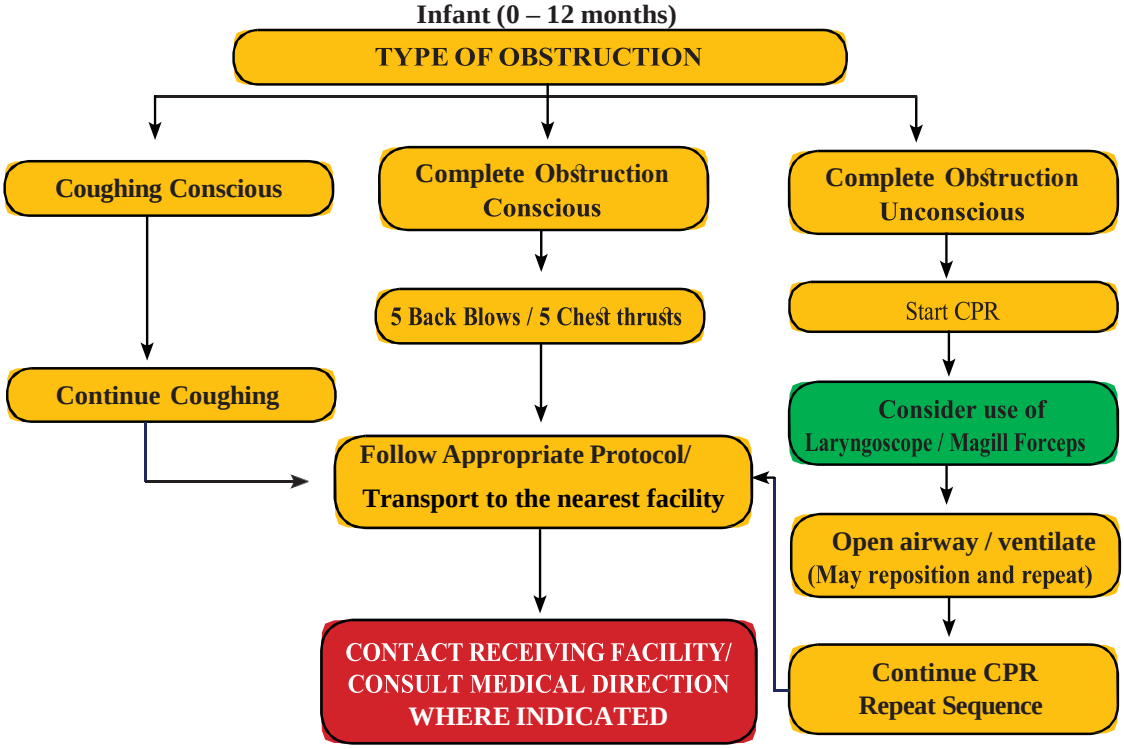


PEDIATRIC PROTOCOL

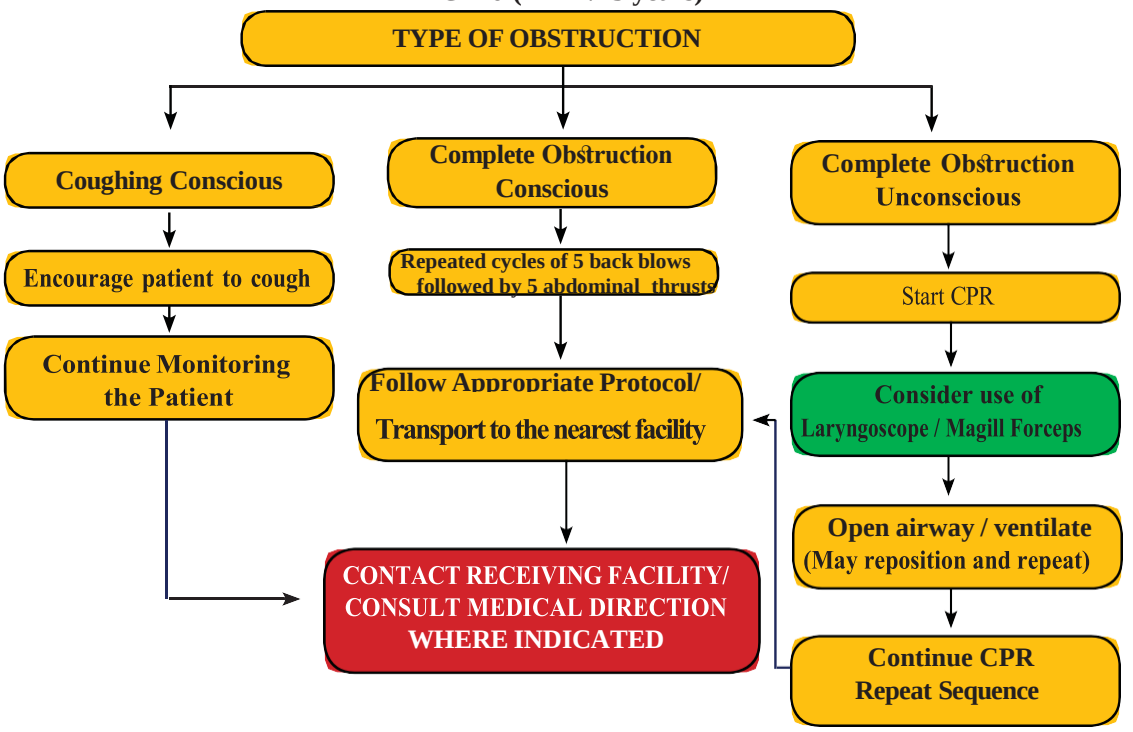
FOREIGN BODY AIRWAY FBAO

3-5 kg	6-7 kg	8-9 kg	10-11 kg	12-14 kg	15-18 kg	19-23 kg	24-29 kg	30-36 kg
6-11 lbs	13-15 lbs	18-20 lbs	22-24 lbs	26-31 lbs	33-37 lbs	42-51 lbs	53-64 lbs	66-81 lbs
18-24 in	24-26 in	26-29 in	29-33 in	33-38 in	38-43 in	43-48 in	48-52 in	52-57 in

Infant (0 – 12 months)



Child (1 – 12/13 years)



EMT-BASIC | EMT-INTERMEDIATE | EMT-Paramedic Advanced/ Specialist | MEDICAL DIRECTION

PEDIATRIC PROTOCOL

FOREIGN BODY AIRWAY OBSTRUCTION (FBAO)

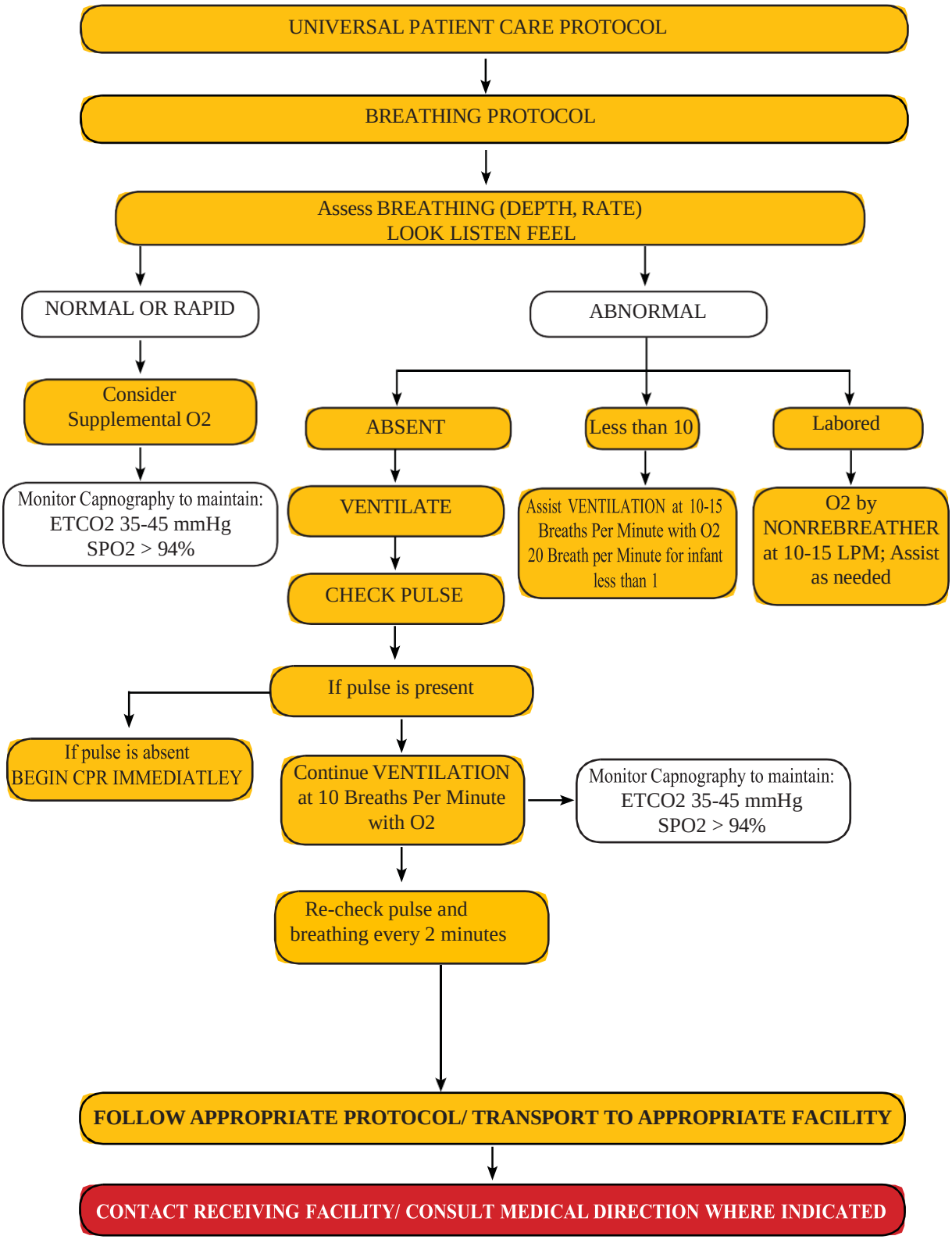
HISTORY	SIGNS AND SYMPTOMS	DIFFERENTIAL DIAGNOSIS
• Coughing • Choking • Inability to speak • Unresponsive	• Witnessed aspiration • Sudden episode of choking • Audible stridor • Change in skin color • Decreased LOC • Increased / decreased Respiratory rate • Labored breathing • Unproductive cough	• Cardiac arrest • Respiratory arrest • Anaphylaxis

KEY POINTS

- Infants 0 -12 months DO NOT receive abdominal thrusts. Use chest thrusts alternating with back blows.
- NEVER perform blind finger sweeps in infants or children.
- Attempt to clear the airway should only be made if foreign body aspiration is witnessed or very strongly suspected and there is complete airway obstruction.
- Even with a complete airway obstruction, positive-pressure ventilation is often successful.

PEDIATRIC PROTOCOL

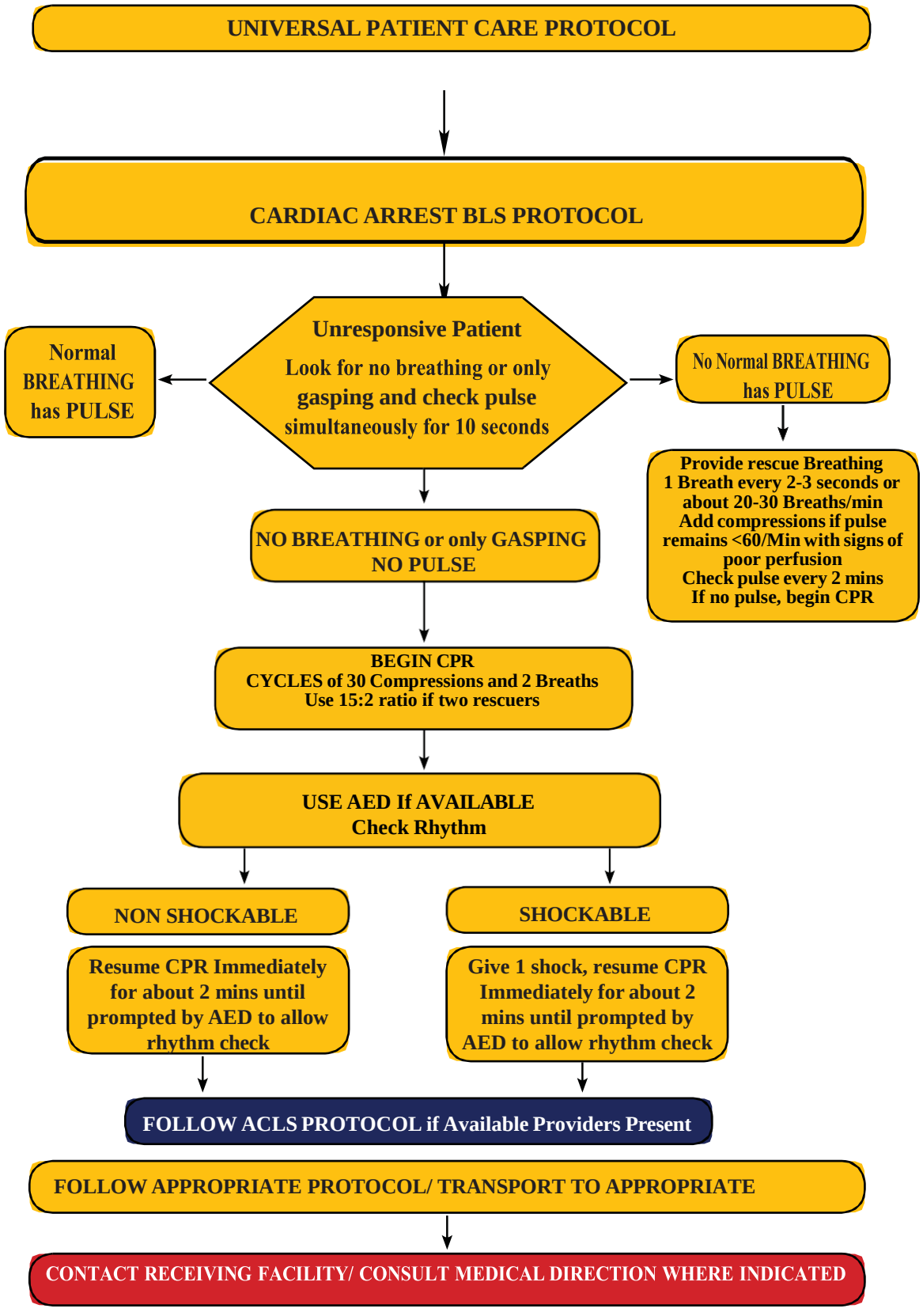
BREATHING GUIDELINES



CHAPTER 7
CARDIAC EMERGENCIES PEDIATRIC

PEDIATRIC PROTOCOL

CARDIAC ARREST BLS



PEDIATRIC PROTOCOL

CARDIAC ARREST BLS

CPR QUALITY
• Push Hard (1/3 of anterio-posterior diameter of the chest) and Fast (100-120/Min) and allow complete chest recoil. • Minimize interruptions in compression. • Avoid excessive ventilation. • Change compressor every 2 mins or sooner if fatigued. • If no advanced airway; 15-2 compression-ventilation ratio.

ADVANCED AIRWAY
• Endotracheal Intubation or supraglottic advanced airway. • Waveform capnography or capnometry to confirm and monitor ET tube placement. • Once advanced airway in place, give 1 breath every 6 seconds (10 breaths/min) with continuous chest compressions.

RETURN OF SPONTANEOUS CIRCULATION (ROSC)
• Pulse and blood pressure. • Abrupt sustained increase In PETCO2 (typically >40 mmHg).

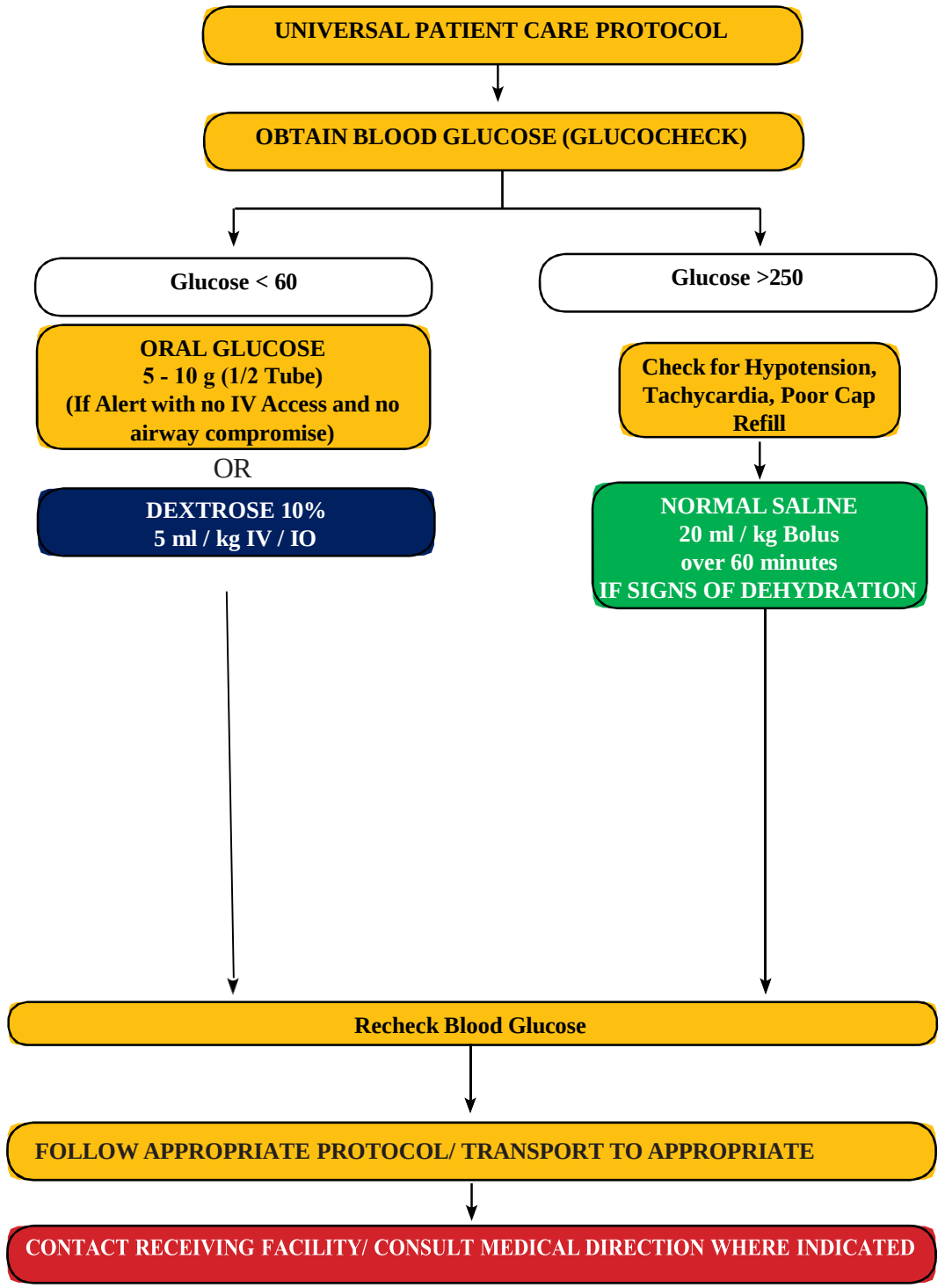
REVERSIBLE CAUSES
• Hypovolemia, Hypoxia, Hydrogen Ion (acidosis), Hypo/Hyperkalemia, Hypothermia. • Tension pneumothorax, Cardiac Tamponade, Toxins, Pulmonary Thrombosis, Coronary Thrombosis.

CHAPTER 8
MEDICAL EMERGENCIES PEDIATRIC

PEDIATRIC PROTOCOL

DIABETIC EMERGENCIES

3-5 kg	6-7 kg	8-9 kg	10-11 kg	12-14 kg	15-18 kg	19-23 kg	24-29 kg	30-36 kg
6-11 lbs	13-15 lbs	18-20 lbs	22-24 lbs	26-31 lbs	33-37 lbs	42-51 lbs	53-64 lbs	66-81 lbs
18-24 in	24-26 in	26-29 in	29-33 in	33-38 in	38-43 in	43-48 in	48-52 in	52-57 in



PEDIATRIC PROTOCOL

DIABETIC EMERGENCIES

HYPOGLYCEMIA

HISTORY	SIGNS AND SYMPTOMS	DIFFERENTIAL DIAGNOSIS
• Known diabetic, medic alert tag • Past medical history • Medications • Recent BGL	• Altered level of consciousness • Dizziness • Irritability • Diaphoresis • Convulsions • Hunger • Confusion	• ETOH • Toxic overdose • Trauma • Seizure • Syncope • CSN disorder • Stroke • Tumor • Pre-existing condition

HYPERGLYCEMIA

HISTORY	SIGNS AND SYMPTOMS	DIFFERENTIAL DIAGNOSIS
• Known diabetic, medic alert tag • Past medical history • Medications • Recent BGL	• Altered level of Consciousness / coma • Abdominal pain • Nausea / vomiting • Dehydration • Frequent thirst and urination • General weakness malaise • Hypovolemic shock • Hyperventilation • Deep / rapid respirations	• ETOH • Toxic overdose • Trauma • Seizure • Syncope • CSN disorder • Stroke • Diabetic ketoacidosis

KEY POINTS

Hyperglycemia:

- Diabetic Ketoacidosis (DKA) is a complication of diabetes mellitus. It can occur when insulin levels become inadequate to meet the metabolic demands of the body for a prolonged amount of time (onset can be within 12 - 24 hours). Without enough insulin the blood glucose increases, and cellular glucose depletes. The body removes excess blood glucose by dumping it into the urine. Pediatric patients in DKA should be treated as hyperglycemic under the Pediatric Diabetic Emergencies Protocol.
- Patients can have Hyperglycemia without having DKA.

Hypoglycemia:

- Always suspect Hypoglycemia in patients with an altered mental status.
- If a blood glucose analysis is not available, a patient with altered mental status and signs and symptoms consistent with hypoglycemia should receive Dextrose.
    - o Dextrose is used to elevate BGL but it will not maintain it. The patient will need to follow up with a meal, if not transported to a hospital.
- If the patient is alert and has the ability to swallow; consider administering oral glucose, have patient drink orange juice with sugar or a sugar containing beverage, or have the patient eat a candy bar or meal.
- Check the patient's BGL after the administration of Dextrose, or after any attempt to raise the patient's BGL.

Miscellaneous:

- If IV access is successful and the patient is still symptomatic, Dextrose should be administered.

CHAPTER 9

OBSTETRIC, GYNECOLOGIC & NEONATAL EMERGENCIES

CHILDBIRTH/OBSTETRICAL EMERGENCIES

UNCOMPLICATED DELIVERY

Contact Receiving Facility to Notify of Delivery

Observed Head Crowning

UNIVERSAL PATIENT CARE PROTOCOL

Prepare Patient for Delivery Set-Up Equipment

↓

IV Lines
Normal Saline at KVO

↓

Delivery of Head
Firm, gentle pressure with flat of hand to slow expulsion Allow head to rotate normally, check for cord around neck, wipe face free of debris
Suction mouth and nose with bulb syringe

↓

Delivery of Body
Place one palm over each ear with next contraction gently move downward until upper shoulder appears Then lift up gently to ease out lower shoulder
Support the head and neck with one hand and buttocks with other

↓

Newborn and Cord
Keep newborn at level of vaginal opening Keep warm and dry
After 10 seconds, clamp cord in two places with sterile equipment at least 6 - 8" from newborn
Cut between clamps

↓

Allow placenta to deliver itself but do not delay transport while waiting
Take placenta to hospital with patient
DO NOT PULL ON CORD TO DELIVERY PLACENTA!
Perform APGAR Score 1 min and 5 min post delivery

↓

FOLLOW APPROPRIATE PROTOCOL/ TRANSPORT TO APPROPRIATE FACILITY

↓

CONTACT RECEIVING FACILITY/ CONSULT MEDICAL DIRECTION WHERE INDICATED

OBSTETRICAL EMERGENCIES

HISTORY	SIGNS AND SYMPTOMS	DIFFERENTIAL DIAGNOSIS
• Past medical history • Hypertension meds • Prenatal care • Prior pregnancies/births • Gravida (pregnancies) / para (live births)	• Vaginal bleeding • Abdominal pain • Seizures • Hypertension • Severe headache • Visual changes • Edema of hands and face	• Pre-eclampsia/eclampsia • Placenta Previa • Placenta abruptio • Spontaneous abortion

KEY POINTS

General Information

- May place patient in a left lateral position to minimize risk of supine hypotensive syndrome.
- Ask patient to quantify bleeding - number of pads used per hour.
- Any pregnant patient involved in a MVC should be seen immediately by a physician for evaluation and fetal monitoring.
- **DO NOT** apply packing into the vagina.
- Be alert for fluid overload when administering fluids.
- Consider starting a second IV if the patient is experiencing excessive vaginal bleeding or hypotension maintain BP90 systolic,
- Transport to an appropriate OB facility if the patient is pregnant.

Abortion / Miscarriage

- The patient may be complaining of cramping, nausea, and vomiting.
- Be sure to gather any expelled tissue and transport it to the receiving facility.
- Signs of infection may not be present if the abortion/miscarriage was recent.
- An abortion is any pregnancy that fails to survive over 20 weeks. When it occurs naturally, it is commonly called a ”miscarriage”.

Abruptio Placenta

- Usually occurs after 20 weeks.
- Dark red vaginal bleeding.
- May only experience internal bleeding.
- May complain of a “tearing” abdominal pain.

Ectopic Pregnancy

- The patient may have missed a menstrual period or had a positive pregnancy test.
- Acute unilateral lower abdominal pain that may radiate to the shoulder.
- Any female of childbearing age complaining of abdominal pain is considered to have an ectopic pregnancy until proven otherwise.

Pelvic Inflammatory Disease

- Be tactful when questioning the patient to prevent embarrassment.
- Diffuse back pain.
- Possibly lower abdominal pain.
- Pain during intercourse.
- Nausea, vomiting, or fever.
- Vaginal discharge.
- May walk with an altered gait do to abdominal pain.

Placenta Previa

- Usually occurs during the last trimester.
- Painless.
- Bright red vaginal bleeding.

Post Partum Hemorrhage

- Post-partum blood loss greater than 300 - 500 ml.
- Bright red vaginal bleeding.
- Be alert for shock and hypotension.

Uterine Inversion

- The uterine tissue presents from the vaginal canal. Cover with sterile saline dressing.
- Be alert for vaginal bleeding and shock.

Pre-Eclampsia / Eclampsia

- Severe headache, vision changes, or RUQ pain may indicate pre-eclampsia.
- In the setting of pregnancy, hypertension is defined as a BP greater than 140 systolic and greater than 90 diastolic, or a relative increase of 30 systolic and 20 diastolic from the patient’s normal (pre-pregnancy) blood pressure.

Uterine Rupture

- Often caused by prolonged, obstructed, or non-progressive labor.
- Severe abdominal pain.

Vaginal Bleeding

- If the patient is experiencing vaginal bleeding, DO NOT pack the vagina, pad on outside only.

CHILDBIRTH/OBSTETRICAL EMERGENCIES

UNCOMPLICATED DELIVERY

CONTACT RECEIVING FACILITY IMMEDIATLEY WHEN DELIVERY IS IMMINENT

HISTORY	SIGNS AND SYMPTOMS	DIFFERENTIAL DIAGNOSIS
• Due date • Time contractions started / how often • Rupture of membranes • Time / amount of any vaginal bleeding • Sensation of fetal activity • Past medical and delivery history • Medications	• Spasmodic pain • Vaginal discharge or bleeding • Crowning or urge to push • Meconium • Left lateral position • Inspect perineum (No digital vaginal exam)	• Abnormal presentation • Buttock • Foot • Hand • Prolapsed cord • Placenta Previa • Abruptio placenta

APGAR SCORING

SIGN	0	1	2
COLOR	Blue / Pale	Pink Body, Blue Extremities	Completely Pink
HEART RATE	Absent	Below 100	Above 100
IRRITABILITY (Response to Stimulation)	No Response	Grimace	Cries
MUSCLE TONE	Limp	Flexion of Extremities	Active Motion
RESPIRATORY EFFORT	Absent	Slow and Regular	Strong Cry

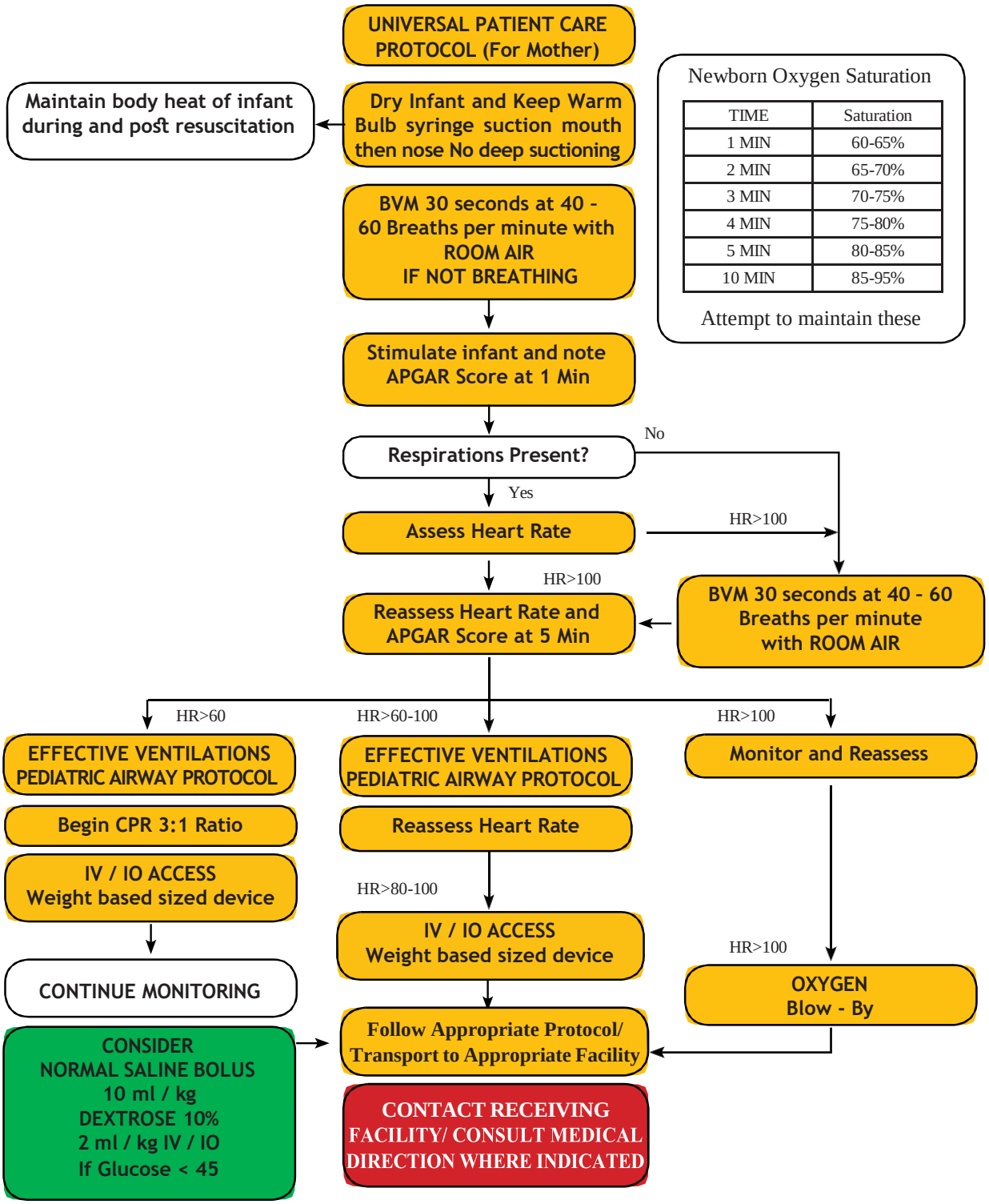
KEY POINTS

- Document all times (delivery, contraction frequency, and length).
- After delivery, massaging the uterus (lower abdomen) will promote uterine contraction and help to control post-partum bleeding.
- Some bleeding is normal with any childbirth. Large quantities of blood or free bleeding are abnormal.
- Prepare to deliver on scene (protecting the patient's privacy). If delivery becomes imminent while en route, stop the squad and prepare for delivery.
- Newborns are very slippery, so be careful not to drop the baby.
- There is no need to wait on scene to deliver the placenta.
- If possible, transport between deliveries if the mother is expecting twins.
- Allow the placenta to deliver, but DO NOT delay transport while waiting.

CHILDBIRTH/OBSTETRICAL EMERGENCIES

NEONATAL RESUSCITATION

3-5 kg	6-7 kg	8-9 kg	10-11 kg	12-14 kg	15-18 kg	19-23 kg	24-29 kg	30-36 kg
6-11 lbs	13-15 lbs	18-20 lbs	22-24 lbs	26-31 lbs	33-37 lbs	42-51 lbs	53-64 lbs	66-81 lbs
18-24 in	24-26 in	26-29 in	29-33 in	33-38 in	38-43 in	43-48 in	48-52 in	52-57 in



NEONATAL RESUSCITATION

HISTORY	SIGNS AND SYMPTOMS	DIFFERENTIAL DIAGNOSIS
• Due date and gestational age • Multiple gestation (twins etc.) • Meconium • Delivery difficulties • Congenital disease • Medications (maternal) • Maternal risk factors substance abuse smoking	• Respiratory distress • Peripheral cyanosis or mottling (normal) • Central cyanosis (abnormal) • Altered level of responsiveness • Bradycardia	• Airway failure • Secretions • Respiratory drive • Infection • Maternal medication effect • Hypovolemia • Hypoglycemia • Congenital heart disease • Hypothermia

KEY POINTS

- Newborn arrest is not a cardiac arrest, it is a respiratory arrest.
- Effective ventilation is key to successful resuscitation.
- Effective ventilation can be determined by; Cher rise, Bilateral breath sounds, and Increasing Heart rate.
- Term baby resuscitation should begin with room air.
- If preterm baby, resuscitate with oxygen, but reservoir removed from BVM.
- Hypothermia is a common complication of home and field deliveries. Keep the baby warm and dry.
- Consider hypoglycemia in infant. If the BGL is less than 45 mg / dl then administer Dextrose 10%.
- Document 1 and 5-minute APGAR scores, but do not use it to guide your resuscitation steps.
- If the patient is in distress, consider causes such as; hypovolemia. Administer a 10 ml / kg fluid bolus of normal saline.
- If drying and suction has not provided enough stimulation, try rubbing the infant's back or flicking their feet. If the infant still has poor respiratory effort, poor tone, or central cyanosis, consider them to be distressed, most distressed infants will respond quickly to BVM.
- Use caution not to allow newborns to slip from grasp.

APGAR SCORING

SIGN	0	1	2
COLOR	Blue / Pale	Pink Body, Blue Extremities	Completely Pink
HEART RATE	Absent	Below100	ABOVE 100
IRRITABILITY (Response to Stimulation)	No Response	Grimace	Cries
MUSCLE TONE	Limp	Flexion of Extremities	Active Motion
RESPIRATORY EFFORT	Absent	Slow and Regular	Strong Cry

NEONATAL RESUSCITATION

KEY POINTS

If delivery is determined to be imminent, follow the guidelines. Delivery may be imminent even though the bag of waters has not broken. If the mother is not at full term, or if signs of meconium stain are present, call for ALS.

A. Obtain the following information:
   1. Due date.
   2. Frequency of contractions.
   3. Number of pregnancies (gravida), number of children born (para)
   4. History of pre-term or post-term deliveries.
   5. Sensation of the need to move bowels (delivery is imminent).
   6. Presence of crowning (delivery is imminent).
   7. Previous C/S
   8. History of previous complications

B. Administer one of the following treatments:

C. If no crowning is present, begin transportation in the left lateral recumbent position. If crowning is present, prepare to deliver the infant.

D. Administer high flow oxygen to the mother.

E. Assist with the delivery.

   1. Guide and control but do not try to stop the delivery.
   2. Don't pull on infant or put traction on cord.
   3. If cord is around the neck of the infant, slip it over the head. If unable to slip the cord over the head, immediately clamp the cord in two places and cut between the clamps. Continue with delivery.
   4. Look for presence of meconium staining.
   5. After completion of delivery, vigorously stimulate the infant.
   6. Wait at least one minute before clamping the newborn's cord.
   7. Prevent explosive delivery by supporting head and perineum.

F. Provide post-partum care to the mother. After the placenta is delivered (or 5 minutes after the baby is born, whichever comes first), initiate patient transportation. Massage the fundus of the uterus after delivery of the placenta. Wrap up the delivered placenta and take it to the hospital.

G. Contact the receiving facility for early notification.

NEONATAL RESUSCITATION

KEY POINTS

Newborn Care

A. Stimulate, position and warm. Dry with towels, stimulate with gentle rubbing or heal flicks. Suction only if an obvious obstruction is seen or the neonate requires positive pressure ventilation.

Note – In premature infants with estimated gestational age < 32 weeks DO NOT towel dry. Instead, wrap in plastic or put infant in a plastic bag (not the head) and put on a hat if available.

B. If any of the following are present, immediately start newborn resuscitation protocol.

Non-vigorous newborn
Apneic or gasping
Heart rate < 100

If none of the above are present, continue below.

C. Keep baby at the same level of the perineum for at least 1 minute. Clamp and cut the cord. Place one clamp six inches from the infant, the second clamp three inches distal from the first clamp. Cut the cord between the clamps. If cord continues to bleed, apply additional clamps.

D. Record the time of birth. Determine APGAR scores at one and five minutes after birth. Normal respiratory rate is 40-60/minute and pulse is 120-160/minute.

E. Contact the receiving facility for early notification.

Targeted O2 Saturation After Birth	
1 min	60% - 65%
2 min	65% - 70%
3 min	70% - 75%
4 min	75% - 80%
5 min	80% - 85%
10 min	85% - 95%

CHILD BIRTH

KEY POINTS

Perform the following procedures in a stepwise fashion as indicated. Reassess after each step before proceeding to the next.

Specific information needed

- History of pregnancy(s) - due date (EDC), bleeding, swelling of face or extremities, prior problems with pregnancy, prenatal care.
- Current problems - if pain, where? Regular? Timing? Ruptured membranes? Vaginal fluid drainage? Urge to push?
- Medical history, medications, medical problems, patient's age, number of prior pregnancies, allergies.

Specific objective findings

- Vital signs, particularly any degree of hypertension.
- Swelling of face or extremities.
- Contraction and relaxation of uterus.
- Where privacy is possible, examine perineum for
  1. Vaginal bleeding or fluid - Color? Odor?
  2. Crowning (head visible during contraction)?
  3. Abnormal presentation (foot, arm, cord)?

If delivery occurs, APGAR score of child (1, 5, and 10 minutes after delivery).

Treatment

- If not pushing or bleeding, transport, position of comfort, avoid supine position.
- If bleeding is moderate to heavy
  1. O2, moderate flow (4-6 L/min). Titrate to pulse oximetry > 90%
  2. IV - volume expander (NS or RL), large bore, TKO or as needed.

Transport immediately - previous cesarean section, multiple births, abnormal presenting part, excess bleeding.

If question of imminent delivery, observe for 1 or 2 contractions, then transport unless delivery is in progress. Be prepared to stop ambulance if delivery occurs en route.

If delivering:

1. Use clean or sterile technique.
2. Guide and control but do not retard or hasten delivery.
3. Suction mouth (to back of mouth only, not throat), and then nose with bulb syringe after head is delivered. Endotracheal suction is preferred with meconium stained amniotic fluid. Keep infant level with perineum.
4. Suction again after delivery. Stimulate by drying. Keep warm.
5. Clamp cord in two places 6 to 8 inches from infant. Cut cord between clamps
6. Observe infant
   a. If the baby is limp, has poor color or vital signs (APGAR 7 or less), see Neonatal Resuscitation.
   b. If the baby is pink, crying and moving well (APGAR 8-10), dry completely, wrap in clean or sterile dry blanket, and place next to mother to conserve heat.
7. Give infant to mother and allow nursing to aid in uterine contraction.
8. IV - volume expander (NS or RL), large bore, TKO.
9. If excessive bleeding occurs postpartum
   a. Administer IV fluid bolus, 20 ml/kg.
   b. Massage fundus, if placenta has been delivered.
10. Transport. Do not wait for or attempt delivery of placenta. If placenta delivers spontaneously, take it to the hospital for inspection. Monitor vitals during transport.

CHILD BIRTH

KEY POINTS

Specific precautions

- It is safe to assume that any medical or trauma condition will be complicated by pregnancy. Conversely, pregnancy can be complicated by any trauma or medical condition. The abdominal pain complained of by a pregnant woman may not be uterine contractions. Consider other problems.
- Do not pull on cord. Premature delivery of the placenta is accompanied by tearing, partial separation, and occasionally severe bleeding.
- Patient with prolapsed cord should be placed in left lateral recumbent position in Trendelenburg. The knee-chest position is generally described as the preferred position, but seems difficult to perform safely in a moving vehicle. If adequate restraints are available to comfortably and safely restrain, knee-chest may be preferred. Gloved hand may be used to keep presenting part of infant from impinging on the cord (in either position).
- Eclampsia may complicate any pregnancy. Hypertension (often of mild degree) and peripheral edema are usually evident, and the patient may exhibit behavior changes or muscle irritability. Seizures occurring before or after the time of delivery may cause hypoxic risk to fetus or mother. Keep diazepam handy in case seizures occur, but do not administer prophylactically.
- Supine hypotension occurs after 20 weeks in some women, due to compression of the inferior vena cava by the gravid uterus. The left lateral recumbent position is optimum for avoiding this.
- Ask patient if she feels as though she's delivering. Particularly with prior deliveries, most mothers will know. Subsequent deliveries are frequently faster.
- Babies are slippery. It is considered poor form to drop one. The outside world is cold! Babies have poor temperature regulation and no clothes. Bundle,
- Preferably with mother. It will make them both feel better.
- Keep your cool. Women have been delivering babies for many years. In most cases you will do nothing more than preside at a natural event.

VAGINAL BLEEDING

KEY POINTS

Specific information needed

- Symptoms - cramping, passage of clots or tissue, dizziness, weakness, thirst
- Present history - duration, amount, last menstrual period (normal or abnormal), and birth control method. If pregnant - due date. If postpartum - time and place of delivery, current medications.
- Past history - medications, bleeding problems, pregnancies, sexual assault.

Specific objective findings

- Vital signs.
- Evidence of blood clots, or tissue fragments (bring tissue to ED).
- Signs of hypovolemic shock - altered mental status, hypotension, tachycardia, sweating, skin pallor, or rash (purpura).

Treatment

- O2, moderate flow (4-6 L/min). Titrate to pulse oximetry > 94%.
- If BP < 90 systolic and signs of hypovolemic shock

1. with early or no apparent pregnancy
   a. Elevate legs 10 inches and keep patient warm.
   b. IV - volume expander (NS or RL), large bore, wide open 20 ml/kg, further fluids as directed.
2. with mid or late pregnancy
   a. Position left lateral recumbent and keep patient warm.
   b. IV en route - volume expander (NS or RL), large bore, wide open 20 ml/kg, further fluids as directed.
   c. Transport rapidly if bleeding severe.
3. If patient postpartum (within 24 hours)
   a. Massage uterus.
   b. IV - as above for hypovolemic shock.

Specific precautions

- Amount of vaginal bleeding is difficult to estimate. Visual estimates from sheets or towels can be misleading. PELVIC EXAM IN THE FIELD IS NOT INDICATED.
- A patient in shock from vaginal bleeding should be treated like any patient with hypovolemic shock. Vaginal bleeding in late pregnancy, however, may make consideration of appropriate destination more pertinent. Any complication of pregnancy should be transported to the nearest facility that can appropriately manage those complications.
- If patient could be pregnant, bring in any tissue which has been passed. Laboratory analysis may be important in determining status of pregnancy.
- Consider possibility of sexual assault in the very young or infirm.
- Always consider pregnancy as a cause of vaginal bleeding. The history may contain inaccuracies, denial, or wishful thinking.

CHAPTER 10
ENVIRONMENTAL & HAZARDOUS EMERGENCIES ADULT & PEDIATRIC

ADULT PROTOCOL

HYPERTHERMIA / HEAT EXPOSURE

HISTORY	SIGNS AND SYMPTOMS	DIFFERENTIAL DIAGNOSIS
• Age • Exposure to increased temperatures and humidity • Past medical history / medications • Extreme exertion • Time and length of exposure • Poor PO intake • Fatigue and /or muscle cramping	• Altered mental status or unconsciousness • Hot, dry, or sweaty skin • Hypotension or shock • Seizures • Nausea	• Fever (infection) • Dehydration • Medications • Hyperthyroidism (storm) • Delirium tremens (DT›s) • Heat cramps • Heat exhaustion • Heat stroke • CNS lesions or tumors

Heat Exhaustion: Dehydration	Heat Stroke: Cerebral Edema
• Muscular / abdominal cramping • General weakness • Diaphoresis • Febrile • Confusion • Dry mouth / thirsty • Tachycardia • BP normal or orthostatic hypotension	• Confusion • Bizarre behavior • Skin hot dry, febrile • Tachycardia • Hypotensive • Seizure • Coma

KEY POINTS

- Extremes of age are more prone to heat emergencies (i.e. young and old).
- Predisposed by use of: tricyclic antidepressants, phenothiazines, anticholinergic medications, and alcohol.
- Cocaine, amphetamines, and salicylates may elevate body temperatures.
- Sweating generally disappears as body temperature rises
- Intense shivering may occur as patient is cooled.
- **Heat Cramps** consists of benign muscle cramping 2° to dehydration and is not associated with an elevated temperature.
- **Heat Exhaustion** consists of dehydration, salt depletion, dizziness, fever, mental status changes, headache, cramping, nausea and vomiting. Vital signs usually consist of tachycardia, hypotension, and an elevated temperature.
- **Heat Stroke** consists of dehydration, tachycardia, hypotension, elevated temperature, and altered mental status.
- Patients at risk for heat emergencies include neonates, infants, geriatric patients, and patients with mental illness. Other contributory factors may include heart medications, diuretics, cold medications and / or psychiatric medications.
- Heat exposure can occur either due to increased environmental temperatures or prolonged exercise or a combination of both. Environments with temperature>90°F and humidity>60% present the most risk.
- Heat stroke occurs when the cooling mechanism of the body (sweating) ceases due to temperature overload and/or electrolyte imbalances. Be alert for cardiac dysrhythmias for the patient with heat stroke.
- In patents with significant hyperthermia(temp>104°F) begin actively cooling with natural or chemical ice packs applied to the patients' groin, armpits (axilla), and back of neck.

ADULT PROTOCOL

HYPOTHERMIA

UNIVERSAL PATIENT CARE PROTOCOL

SUPPLEMENTAL OXYGEN

Remove wet clothing

Handle Patient Gently

Indirectly Apply Hot Packs and / or Blankets and Turn Up Vehicle Heat

OBTAIN BLOOD GLUCOSE

↓

IV / IO ACCESS

CARDIAC MONITOR/ 3/12 Lead ECG

Appropriate Protocol(s)
Based on Patient Signs and Symptoms

FOLLOW APPROPRIATE PROTOCOL/ TRANSPORT TO APRPOPRIATE FACILITY

↓

CONTACT RECEIVING FACILITY/ CONSULT MEDICAL DIRECTION WHERE INDICATED

ADULT PROTOCOL
HYPOTHERMIA / FROSTBITE

HISTORY	SIGNS AND SYMPTOMS	DIFFERENTIAL DIAGNOSIS
• Past medical history • Medications • Exposure to environment even in normal temperatures • Exposure to extreme cold • Extremes of age • Drug use: alcohol, barbiturates • Infections / sepsis • Length of exposure / wetness	• Cold, clammy • Shivering • Mental status changes • Extremity pain or sensory abnormality • Bradycardia • Hypotension or shock	• Sepsis • Environmental exposure • Hypoglycemia • CNS dysfunction • Stroke • Head injury • Spinal cord injury

KEY POINTS

- Hypothermic / drowning / near drowning patients that appear cold and dead are NOT dead until they are warm and dead, or have other signs of obvious death (petrification, traumatic injury unsustainable to life).
- Defined as core temperature < 93.2° F (34° C).
- Extremes of age are most susceptible (i.e. young and old).
- Patients with low core temperatures will not respond to ALS drug interventions. Maintain warming procedure and supportive care. Warming procedures includes removing wet clothing, limiting exposure, and covering the patient with warm blankets if available.
- Do not allow patients with frozen extremities to ambulate.
- Do not attempt to rewarm deep frostbite unless there is an extreme delay in transport, and there is a no risk that the affected body part will be refrozen. Contact medical direction prior to rewarming a deep frostbite injury.
- With temperature less than 86° F (30° C) ventricular fibrillation is common cause of death. Handling patients gently may prevent this.
- If the temperature is unable to be measured, treat the patient based on the suspected temperature.
- Hypothermia may produce severe bradycardia.
- Shivering stops below 90° F (32° C).
- Hot packs can be activated and placed in the armpit and groin area if available.
- Care should be taken not to place the packs directly against the patient's skin.
- Consider withholding CPR if patient has organized rhythm. Discuss with Online Medical Control.
- Patients with low core temperatures may not respond to ALS drug interventions. Discuss ACLS drug use with Online Medical Control in severely hypothermic patients.
- Maintain warming procedure and supportive care. Warming procedures includes removing wet clothing, limiting exposure, and covering the patient with warm blankets if available.
- The most common mechanism of death in hypothermia is ventricular fibrillation. If the hypothermia victim is in ventricular fibrillation, CPR should be initiated. If V-FIB is not present, then all treatment and transport decisions should be tempered by the fact that V-FIB can be caused by rough handling, noxious stimuli or even minor mechanical disturbances, this means that respiratory support with 100% oxygen should be done gently, including intubation, avoiding hyperventilation.
- The heart is most likely to fibrillate between 85 - 88° F (29 - 31° C.) Defibrillate VF / VT x1 if no change, perform CPR and defer repeat defibrillation attempts until patient has been rewarmed.
- Do not allow patients with frozen extremities to ambulate.
- Superficial frostbite can be treated by using the patient's own body heat.

PEDIATRIC PROTOCOL

HYPERTHERMIA / HEAT EXPOSURE

UNIVERSAL PATIENT CARE PROTOCOL

Document Patient Temperature

Remove Patient from Heat Source

Remove Patient Clothing

Apply Room Temperature Water to Patient Skin and Increase Air Flow around Patient

↓

Apply COLD PACKS to Patient
(Groin, Axilla, and Posterior Neck)
Consider Cooling Collar

↓

IV / IO ACCESS

Fever: Normal Saline 20 ml / kg Bolus

Heat Exhaustion: Normal Saline 20 ml / kg Bolus

Heat Stroke: Normal Saline TKO

↓

Cardiac Monitor / 3/12 Lead ECG

Monitor and Reassess

Appropriate Protocol Based on Patient Symptoms

↓

FOLLOW APPROPRIATE PROTOCOL/ TRANSPORT TO APPROPRIATE FACILITY

↓

CONTACT RECEIVING FACILITY/ CONSULT MEDICAL DIRECTION WHERE INDICATED

PEDIATRIC PROTOCOL

HYPERTHERMIA / HEAT EXPOSURE

HISTORY	SIGNS AND SYMPTOMS	DIFFERENTIAL DIAGNOSIS
• Age • Exposure to increased temperatures and humidity • Past medical history /medications • Extreme exertion • Time and length of exposure • Poor PO intake • Fatigue and / or muscle cramping	• Altered mental status or unconsciousness • Hot, dry or sweaty skin • Hypotension or shock • Seizures • Nausea	• Fever (infection) • Dehydration • Medications • Hyperthyroidism (storm) • Delirium tremens (DT's) • Heat cramps • Heat exhaustion • Heat stroke • CNS lesions or tumors

Heat Exhaustion: Dehydration	Heat Stroke: Cerebral Edema
• Muscular/abdominal cramping • General weakness • Diaphoresis • Febrile • Confusion • Dry mouth / thirsty • Tachycardia • BP normal or orthostatic hypotension	• Confusion • Bizarre behavior • Skin hot, dry, febrile • Tachycardia • Hypotensive • Seizure • Coma

KEY POINTS

- Extremes of age are more prone to heat emergencies (i.e. young and old).
- Predisposed by use of: tricyclic antidepressants, phenothiazines, anticholinergic medications, and alcohol.
- Cocaine, Amphetamines, and Salicylates may elevate body temperatures.
- Sweating generally disappears as body temperature rises above 104° F (40° C).
- Intensive shivering may occur as patient is cooled.
- Heat Cramps consists of benign muscle cramping secondary to dehydration and is not associated with an elevated temperature.
- Heat Exhaustion consists of dehydration, salt depletion, dizziness, fever, mental status changes, headache, cramping, nausea and vomiting. Vital signs usually consist of tachycardia, hypotension, and an elevated temperature.
- Heat Stroke consists of dehydration, tachycardia, hypotension, temperature > 104° F (40° C), and altered mental status.
- Patients at risk for heat emergencies include neonates, infants, geriatric patients, and patients with mental illness. Other contributory factors may include heart medications, diuretics, cold medications and / or psychiatric medications.
- Heat exposure can occur either due to increased environmental temperatures or prolonged exercise or a
- Combination of both. Environments with temperature > 90° F and humidity > 60% present the most risk.
- Heat stroke occurs when the cooling mechanism of the body (sweating) ceases due to temperature overload and / or electrolyte imbalances. Be alert for cardiac dysrhythmias for the patient with heat stroke.

PEDIATRIC PROTOCOL

HYPOTHERMIA / FROSTBITE

3-5 kg	6-7 kg	8-9 kg	10-11 kg	12-14 kg	15-18 kg	19-23 kg	24-29 kg	30-36 kg
6-11 lbs	13-15 lbs	18-20 lbs	22-24 lbs	26-31 lbs	33-37 lbs	42-51 lbs	53-64 lbs	66-81 lbs
18-24 in	24-26 in	26-29 in	29-33 in	33-38 in	38-43 in	43-48 in	48-52 in	52-57 in

UNIVERSAL PATIENT CARE PROTOCOL

Remove wet clothing

Evidence or decreased core temperature?

Handle patient gently

Apply hot packs indirectly to skin and / or blankets and turn up vehicle heat

↓

IV / IO ACCESS

↓

CARDIAC MONITOR/ 3/12 Lead ECG

↓

Appropriate Protocol
Based on Patient Signs and Symptoms

↓

FOLLOW APPROPRIATE PROTOCOL/ TRANSPORT TO APPROPRIATE

↓

CONTACT RECEIVING FACILITY/ CONSULT MEDICAL DIRECTION WHERE INDICATED

PEDIATRIC PROTOCOL

HYPOTHERMIA / FROSTBITE

HISTORY	SIGNS AND SYMPTOMS	DIFFERENTIAL DIAGNOSIS
• Past medical history • Medications • Exposure to environment even in normal temperatures • Exposure to extreme cold • Extremes of age • Drug use: Alcohol, barbiturates • Infections / sepsis • Length of exposure / wetness	• Cold, clammy • Shivering • Mental status changes • Extremity pain or sensory abnormality • Bradycardia • Hypotension or shock	• Sepsis • Environmental exposure • Hypoglycemia • CNS dysfunction • Stroke • Head injury • Spinal cord injury

KEY POINTS

- Hypothermic / drowning / near drowning patients that appear cold and dead are NOT dead until they are warm and dead, or have other signs of obvious death (petrification, traumatic injury unsustainable to life).
- Defined as core temperature < 95° F (35° C).
- Extremes of age are more susceptible (i.e. young and old).
- Patients with low core temperatures will not respond to ALS drug interventions. Maintain warming procedure and supportive care. Warming procedures includes removing wet clothing, limiting exposure, and covering the patient with warm blankets if available.
- Do not allow patients with frozen extremities to ambulate.
- Superficial frostbite can be treated by using the patient's own body heat.
- Do not attempt to rewarm deep frostbite unless there is an extreme delay in transport, and there is a no risk that the affected body part will be refrozen. Contact Medical Command prior to rewarming a deep frostbite injury.
- With temperature less than 88° F (31° C) ventricular fibrillation is common cause of death. Handling patients gently may prevent this. (Rarely responds to defibrillation).
- If the temperature is unable to be measured, treat the patient based on the suspected temperature.
- Hypothermia may produce severe bradycardia.
- Shivering stops below 90° F (32° C).
- Hot packs can be activated and placed in the armpit and groin area if available.
- Care should be taken not to place the packs directly against the patient's skin.
- Consider withholding CPR if patient has organized rhythm. Discuss with Online Medical Control.
- All hypothermic patients should have resuscitation performed until care is transferred, or if there are other signs of obvious death (petrification, traumatic injury unsustainable to life).
- The most common mechanism of death in hypothermia is ventricular fibrillation. If the hypothermia victim is in ventricular fibrillation, CPR should be initiated. If V fib is not present, then all treatment and transport decisions should be tempered by the fact that V fib can be caused by rough handling, noxious stimuli or even minor mechanical disturbances, this means that respiratory support with 100% oxygen should be done gently, including intubation, avoiding hyperventilation.
- Do not allow patients with frozen extremities to ambulate.
- Superficial frostbite can be treated by using the patient's own body heat.
- Do not attempt to rewarm deep frostbite unless there is an extreme delay in transport, and there is a no risk that the affected body part will be refrozen. Contact Online Medical Control prior to rewarming a deep frostbite injury.

ADULT PROTOCOL

TOXIC INGESTION / EXPOSURE / OVERDOSE

UNIVERSAL PATIENT CARE PROTOCOL

Decontaminate and remove clothes if patient is exposed to any dangerous or noxious substances

If Suspected Carbon Monoxide (CO) or Cyanide Poisoning, see Specific Protocol

SUPPLEMENTAL OXYGEN

IV / IO ACCESS

Apply Cardiac Monitor and Assess Vitals

Narcotic Overdose/ Respiratory Depression

- ASSURE BLS/ALS VENTILATION WITH BVM
- Support Hemodynamically Utilize Shock Protocol
- consider Advanced Airway and Support Hemodynamically

Beta Blocker / Calcium Channel Blocker

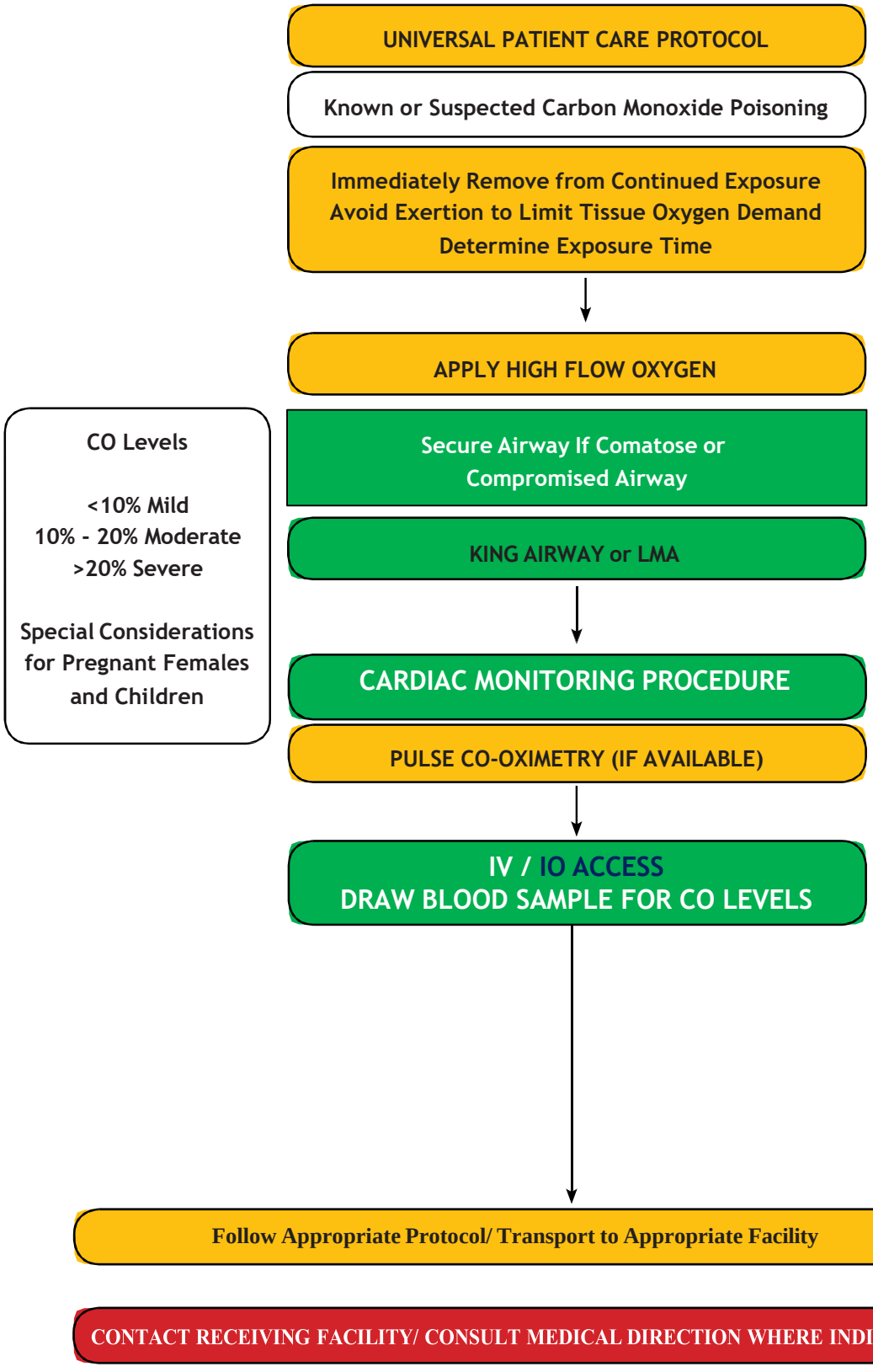
Organophosphates / Carbamates

- Atropine
  1 mg IV/IO
  Every 3-5 minutes as needed or to control secretions
  No Max Dose

FOLLOW APPROPRIATE PROTOCOL/ TRANSPORT TO APPROPRIATE FACILITY

CONTACT RECEIVING FACILITY/ CONSULT MEDICAL DIRECTION WHERE INDICATED

ADULT PROTOCOL
TOXIC INHALATION CARBON MONOXIDE



ADULT PROTOCOL

TOXIC INHALATION CARBON MONOXIDE

HISTORY	SIGNS AND SYMPTOMS	DIFFERENTIAL DIAGNOSIS
• Inhalation of potentially carbon monoxide containing atmosphere • Duration of exposure • Reason (suicidal, accidental, criminal) • Past medical history, medications	• Malaise, fatigue, drowsiness • Flu like symptoms • Headache • Dyspnea • Nausea / vomiting • Diarrhea • Abdominal pain • Dizziness • Visual disturbances • Memory disturbances • Syncope • Seizures • Coma • Incontinence	• Flu / severe cold • Chronic fatigue • Migraine • Myocardial infarction • Diabetic emergencies • Altitude sickness • Ingested toxins • Meningitis • Hypothyroidism

CO Levels

<10% Mild
10% - 20% Moderate
>20% Severe
Special Considerations for Pregnant Females and Children

KEY POINTS

- Consider CO poisoning with any patient exposed to products of combustion.
- Causes and exposure may include malfunctioning gas appliances, vehicle exhaust, improper use of gas burning heaters, animal dung, environmental waste and fires.
- Normal CO levels do not necessarily mean there was not CO poisoning. This is especially true if the patient has already received extensive oxygen therapy.
- Patients that show signs and symptoms at lower CO levels include: pregnant females, infants, children and the elderly.
- Vitals may be normal but could be tachycardia, hypo or hypertensive.
- Cherry red skin is rarely seen.
- PREGNANT patients are special circumstances as the affinity for fetal hemoglobin to carbon monoxide is very high and therapy including hyperbaric care is considered early on.
- Patients that demonstrate altered mental status may NOT sign refusals for treatment or transport.
- Known or suspected CO poisoning patients should receive high flow oxygen despite Spo2 readings.
- The use of a pulse oximeter is not effective in the diagnosis of carbon monoxide poisoning, as patients suffering from carbon monoxide poisoning may have a normal oxygen saturation level on a pulse oximeter.
- Pulse oximetry is still used on all CO Poisonings as hypoxia in addition to the CO represents serious compounding respiratory issues possibly from other causes.
- Pulse CO-oximeters estimate carboxyhemoglobin levels with a non-invasive finger clip similar to a pulse oximeter.

ENVIRONMENTAL EMERGENCIES

KEY POINTS

NERVE AGENT

Nerve agents are very toxic organophosphorus compounds that have biological activity similar to that of many insecticides. They cause biological effects by inhibiting acetylcholinesterase and, thereby, allowing acetylcholine to accumulate. Initial effects from small amounts of a nerve agent differ, depending on the route of exposure. There is usually an asymptomatic interval of minutes after liquid exposure before these occur. Effects from
vapor occur almost immediately.

Perform **Initial Treatment / Universal Patient Care Protocol** and follow the proper protocols for medical management based on clinical presentation.

B. The patient should be removed from the environment.
   1. Never attempt rescue unless trained, certified, and properly equipped.
   2. Never place yourself or your crew in danger.

C. Mild to moderate signs and symptoms (including dyspnea and nausea/vomiting):
   1. Administer one (1) MARK I Kit IM or **Atropine** 2 mg IM or IV (Adult: 2 mg / Peds: 0.02mg/kg). **Atropine** should be repeated every five (5) minutes until improvement is noted.
   2. Oxygen should be administered at 15 LPM via non-rebreather.
   3. Do not treat for isolated miosis (unless eye pain is severe) or rhinorrhea (unless severe).

D. Severe signs and symptoms (including loss of consciousness, seizures, or apnea):
   1. Administer three (3) MARK I Kits IM or **Atropine** 6 mg IM or IV. Repeat **Atropine** 2 mg IM or IV every five (5) minutes until:
      a. Secretions diminish; **or**
      b. Airway resistance is less or is normal.
   2. Secure airway. Refer to **Airway Management Protocol**.

Monitor patient via pulse oximeter and cardiac monitor.

F. Decisions regarding the transportation of patients should be made in consultation with **Medical Command** and the on-scene incident management system.

Note: EMT-Bs may administer MARK I Kits [up to total of three (3) kits] to symptomatic public safety personnel or when directed to do so by an ALS provider based on signs and symptoms in a mass casualty incident (MCI) or on-site chemical testing, confirming nerve or organophosphate agent presence in a mass casualty incident.

Medical Command consultation is not required in these situations.

ADULT PROTOCOL

ENVIRONMENTAL EMERGENCIES

KEY POINTS

INHALATION INJURY

Should be removed from the environment. **NEVER ATTEMPT TO REMOVE PATIENT FROM AN IMMEDIATELY DANGEROUS TO LIFE AND HEALTH (IDLH) ENVIRONMENT UNLESS TRAINED, CERTIFIED, AND PROPERLY EQUIPPED. NEVER PLACE YOURSELF OR YOUR CREW IN DANGER.** Decontamination, if necessary, should be done by appropriate certified personnel.

A. Perform **Initial Treatment / Universal Patient Care Protocol** and follow the proper Protocol for medical management based on clinical presentation.

B. Specific history and physical exam:

1. Type and amount of toxin, if known.
2. Duration of exposure.
3. History of loss of consciousness.
4. If thermal injury, assess nares and oropharynx for singeing and soot.
5. Assess lung sounds; if wheezing, refer to **Bronchospasm Protocol.**
6. If burns are present, treat per **Burn Protocol**.

C. Transport.

D. Notify **Medical** direction.

KEY POINTS

SNAKE BITE / ENVENOMATION

Not all venomous snakebites involve envenomation.
Envenomed patients will have one or more fang marks with ecchymosis, progressive edema, severe burning pain, and/or non-clotted oozing blood.

A. Upon arrival, make sure the patient and snake are not in close proximity. Retreat well beyond striking range. Persons are often bitten again while trying to capture or kill the snake.

B. Perform **Initial Treatment / Universal Patient Care Protocol** and follow the proper protocol for medical management based on clinical presentation.

C. Keep patient calm. Movement can increase venom absorption.

D. Remove all jewelry and constrictive clothing on affected extremity.

E. Do not place IV in bitten extremity.

F. Locate fang puncture(s) and mark progression of erythema (redness around bite mark) and swelling at the initial assessment and every five (5) minutes thereafter.

G. Immobilize the extremity at the level of the heart.

H. Transport and notify **Medical direction**.

I. **Contact Medical direction** for further treatment orders

Note:

1. Do not bring a live snake to ER. If experienced personnel are available to properly kill and transport snake, then do so.
2. Patients previously envenomed are at risk of anaphylactic reaction. Be prepared to treat per **Anaphylaxis Protocol.**

ADULT PROTOCOL

DROWNING / NEAR DROWNING

HISTORY	SIGNS AND SYMPTOMS	DIFFERENTIAL DIAGNOSIS
• Submersion in water regardless of depth • Possible trauma i.e.; fall, diving board • Duration of immersion • Temperature of water • Salt vs. fresh water	• Period of unconsciousness • Unresponsive • Mental status changes • Decreased or absent vital signs • Vomiting • Coughing	• Trauma • Pre-existing medical problem • Barotrauma (diving) • Decompression sickness

Remove from water as rapidly as possible while protecting C-Spine
Perform universal patient care and follow appropriate protocol
Transport and notify medical direction

KEY POINTS

- Drowning due to suffocation from submersion in water.
- 2 causes – breath holding which leads to aspiration of water; & laryngospasm which closes the glottis.
- Both causes lead to profound hypoxia and death.
- Fresh water drowning ventricular fibrillation may be likely.
- Salt water drowning may cause pulmonary edema in time.
- Pulmonary edema can develop within 24 - 48 hours after submersion.
- All victims should be transported for evaluation due to potential for worsening over the next several hours.
- Drowning is a leading cause of death among would-be rescuers.
- Allow appropriately trained and certified rescuers to remove victims from areas of danger.
- All hypothermic / hypothermic / near-drowning patients should have resuscitation performed until care is transferred, or if there are other signs of obvious death (petrification, traumatic injury unsustainable to life).
- A drowning patient is in cardiac arrest after the submersion.
- Consider a c-spine injury in all drowning cases. Always immobilize a drowning patient.
- Patients with low core temperatures will not respond to ACLS drug interventions. Maintain warming procedures and supportive care.
- DO NOT perform the Heimlich maneuver to remove water from the lungs prior to resuscitation.

KEY POINTS

NEAR DROWNING / DROWNING

With near-drowning or drowning, always look for associated problems such as airway obstruction, cardiac arrest, heart attack, hypothermia, or substance abuse. Also be alert to associated injuries especially to the head and neck. **Do not** attempt a rescue in which you must enter deep water or swim unless trained to do so.

A. Remove patient from water as rapidly as possible while protecting C-spine.

B. Perform **Initial Treatment / Universal Patient Care Protocol** and follow the proper protocol for medical management based on clinical presentation.

C. If cold water drowning (< 70° F at recovery depth), refer to **hypothermia Protocol**

D. Expedite transport and notify **Medical direction.**

Note:

1. If patient is unconscious, assume spinal injury and fully immobilize patient on long backboard.

APPENDIX 1

MEDICATIONS

MEDICATIONS

ASPIRIN

PREGNANCY CLASS	C
ACTIONS	Blocks platelet aggregation
INDICATIONS	1. Chest pain suggestive of a MI 2. 12-Lead EKG indicating a possible MI 3. Patients with Acute coronary symptoms
CONTRAINDICATIONS	4. Known hypersensitivity 5. Active ulcer disease 6. Signs of stroke
PRECAUTIONS	7. 1. GI bleeds
SIDE EFFECTS	8. Heartburn 9. Nausea and vomiting
SUPPLIED	80mg /100 mg chewable tablet
ADULT DOSAGE	**Acute Coronary Symptoms:** 162-325 mg chewable tablet
PEDIATRIC DOSAGE	Not recommended in the pre-hospital setting
KEY POINTS	• If patient has already taken ASA in the last 24 hours, give ASA to equal 325 mg total

MEDICATIONS

AMIODARONE (Cordarone, Pacerone)

ONLY FOR TRAINED PERSONNEL

PREGNANCY CLASS	X
ACTIONS	Prolongs the refractory period and action potential duration
INDICATIONS	1. Ventricular fibrillation 2. Pulseless ventricular tachycardia 3. Wide complex tachycardia with a pulse (with consultation)
CONTRAINDICATIONS	1. Known hypersensitivity 2. If lidocaine was previously used, Do Not use amiodarone 3. Second / third degree AV blocks
SIDE EFFECTS	1. Hypotension 2. Prolonged QT interval
SUPPLIED	150 mg / 3 ml vial VERIFY ACTUAL CONCENTRATION ON HAND BEFORE ADMINISTRATION
ADULT DOSAGE	**PULSELESS - Ventricular Fibrillation / Ventricular Tachycardia:** 300 mg IV Push (May be repeated one time at 150 mg IV push in 3-5 minutes if no change)
	Post Arrest: 150 mg diluted in 100 ml of D5 over 10 minutes
	PULSE PRODUCING - Wide Complex Tachycardia: 150 mg diluted in 100 ml of D5 over 10 minutes
PEDIATRIC DOSAGE	**PULSELESS - Ventricular Fibrillation / Ventricular Tachycardia:** 5 mg / kg IV / IO Push If the rhythm converts to a perfusing rhythm, then administer 2.5 mg / kg IV / IO mixed in 100 ml D5 over 20 - 60 minutes Max 300 mg
	Post Arrest: 5 mg / kg IV / IO mixed in 100ml D5 over 20 - 60 minutes Max 150 mg
	PULSE PRODUCING - Wide Complex Tachycardia: 2.5 mg / kg mixed in 100 ml D5 IV / IO over 20 - 60 minutes Max 150 mg
	See PEDIATRIC DRUG ADMINISTRATION CHART for weight-based administration

3-5 kg	6-7 kg	8-9 kg	10-11 kg	12-14 kg	15-18 kg	19-23 kg	24-29 kg	30-36 kg
6-11 lbs	13-15 lbs	18-20 lbs	22-24 lbs	26-31 lbs	33-37 lbs	42-51 lbs	53-64 lbs	66-81 lbs
18-24 in	24-26 in	26-29 in	29-33 in	33-38 in	38-43 in	43-48 in	48-52 in	52-57 in

KEY POINTS	• Amiodarone is the preferred antiarrhythmic medication to treat life threating PULSELESS ventricular arrhythmias • Avoid excessive movement and shaking of the medication • Do not administer concurrently with other medications that prolong QT interval • Ideally mixed in 100 ml bag of D5 for administration to patients with perfusing rhythms.

MEDICATIONS

ATROPINE SULFATE

PREGNANCY CLASS	C
ACTIONS	1. Blocks acetylcholine (parasympathetic nervous system) 2. Increases conduction through the SA node by blocking vagal activity
INDICATIONS	1. Symptomatic sinus bradycardia 2. Organophosphate poisoning 3. Nerve agent exposure
CONTRAINDICATIONS	1. Known hypersensitivity 2. Second degree AV Blocks (Mobitz type II) 3. Third degree AV Blocks
PRECAUTIONS	1. Avoid use in atrial flutter or atrial fibrillation with a rapid ventricular response 2. May increase myocardial oxygen demand – use caution if possible acute MI 3. May trigger tachydysrhythmias 4. Avoid in hypothermic bradycardia
SIDE EFFECTS	1. Dry mouth 2. Blurred vision 3. Flushed skin 4. Headache 5. Tachycardia 6. Pupillary dilation
SUPPLIED	1 mg / 10 ml
ADULT DOSAGE	**Bradycardia:** 1mg IV / IO every 3 - 5 minutes (max dose 3 mg)
	Organophosphate Poisoning: 1 mg IV repeat every 3 - 5 minutes until resolution of symptoms *No max dose. Extremely large doses will likely be required*
PEDIATRIC DOSAGE	**Bradycardia:** 0.02 mg / kg IV / IO repeated in 5 minutes one time Minimum dose is 0.1 mg Max dose 0.5 mg
	Useful in pediatrics only if evidence of vagal stimulation, use Epinephrine first in pediatric bradycardia
	Organophosphate Poisoning: 0.05 mg / kg IV Max 1 mg per dose Repeat every 3 - 5 minutes until resolution of symptoms. *No max dose. Extremely large doses will likely be required.*
	See PEDIATRIC DRUG ADMINISTRATION CHART for weight-based administration

3-5 kg	6-7 kg	8-9 kg	10-11 kg	12-14 kg	15-18 kg	19-23 kg	24-29 kg	30-36 kg
6-11 lbs	13-15 lbs	18-20 lbs	22-24 lbs	26-31 lbs	33-37 lbs	42-51 lbs	53-64 lbs	66-81 lbs
18-24 in	24-26 in	26-29 in	29-33 in	33-38 in	38-43 in	43-48 in	48-52 in	52-57 in

MEDIC ATIONS

DEXTROSE 5%, 10%, 25%, AND 50%

PREGNANCY CLASS	C
ACTIONS	Restores blood sugar
INDICATIONS	1. Treatment of altered mental status due to hypoglycemia 2. Adult BGL less than 60 mg / dl or signs and symptoms of hypoglycemia 3. Coma with associated hypoglycemia 4. Delirium tremens with associated hypoglycemia 5. Seizure or status epilepticus with associated hypoglycemia 6. Cardiac arrest with associated hypoglycemia
CONTRAINDICATIONS	1. Known hyperglycemia 2. Intracranial / intraspinal hemorrhage
PRECAUTIONS	1. Use with caution with stroke or head injury patients 2. A blood glucose level should be determined prior to and post dextrose administration
SIDE EFFECTS	1. Extravasation of Dextrose may cause necrosis 2. Hyperglycemia
SUPPLIED	**5%** IV bags 5 grams / 100 ml FOR MIXING DRIP MEDICAIONS ONLY **10%** IV bags 10 grams / 100 ml (250 ml = 25 g of dextrose) **50%** Prefilled syringes or vials containing 50 ml of Dextrose 50% (50 ml = 25 g of dextrose)
ADULT DOSAGE	**Diabetic Emergencies / Hypoglycemia:** If glucose < 40 / 25 g (250 ml of 10% or 50 ml of 50%) IV / IO - may repeat as required If glucose 40 – 60 / 12.5 g (125 ml of 10% or 25 ml of 50%) IV / IO - may repeat as required
PEDIATRIC DOSAGE	**Diabetic Emergencies / Hypoglycemia: PEDIATRICS Dextrose 10% (D10)** 5 ml / kg IV / IO - may repeat as required **PEDIATRICS MAKE Dextrose 25% (D25)** Waste 25ml of D50 and replace with 25ml normal saline to create Dextrose 25% (D25) 2 ml / kg IV / IO - may repeat as required **NEONATE Dextrose 10% (D10)** Dextrose 10% (D10) 2 ml / kg IV / IO – may repeat as required **NEONATE MAKE Dextrose 10% (D10) from 50%** Waste 40 ml of D50 and replace with 40ml normal saline to make Dextrose 10% (D10) 2 ml / kg IV / IO – may repeat as required **See PEDIATRIC DRUG ADMINISTRATION CHART for weight-based administration**

3-5 kg	6-7 kg	8-9 kg	10-11 kg	12-14 kg	15-18 kg	19-23 kg	24-29 kg	30-36 kg
6-11 lbs	13-15 lbs	18-20 lbs	22-24 lbs	26-31 lbs	33-37 lbs	42-51 lbs	53-64 lbs	66-81 lbs
18-24 in	24-26 in	26-29 in	29-33 in	33-38 in	38-43 in	43-48 in	48-52 in	52-57 in

KEY POINTS	• 5% Dextrose is used as a base solution for mixing specific drips in the field • Dextrose should not be routinely given through IO, use other methods first. Use as a last resort in peri-arrest arrest patients only. Extravasation of Dextrose can cause tissue necrosis Attempt to use a large vein to administer Dextrose • It might cause phlebitis, flushing with normal saline is recommended after administering it

MEDICATIONS

Epinephrine (Adrenaline)

PREGNANCY CLASS	C
ACTIONS	1. Alpha and beta-adrenergic agonist 2. Bronchodilation 3. Increase heart rate and automaticity 4. Increases cardiac contractility 5. Increases myocardial conduction velocity 6. Increases blood pressure
INDICATIONS	1. Cardiac arrest 2. Anaphylactic reaction 3. Anaphylactic shock 4. Respiratory distress
CONTRAINDICATIONS	Known hypersensitivity
PRECAUTIONS	Blood pressure, pulse, and ECG must be routinely monitored for all patients receiving Epinephrine
SIDE EFFECTS	1. Palpitations 2. Anxiety 3. Headache 4. Trembling 5. Nausea / vomiting
SUPPLIED	1 mg / 10 ml – 0.1 mg / ml **(1:10,000)** 1 mg / 1ml **(1:1000)** Autoinjector Adult 0.3 mg Epinephrine >30kg (66 lbs) Autoinjector Jr. Peds 0.15 mg Epinephrine 15-30kg lbs (33-66)
ADULT DOSAGE	**Cardiac Arrest:** 1 mg of Epinephrine 1 mg / ml **(1:1000)** IV / IO every 3 - 5 minutes
	Anaphylactic Reaction / Shock: 0.3 - 0.5 mg of Epinephrine 1mg / ml **(1:1000)** IM **EMT MUST USE EPINEPHRINE AUTO-INJECTOR (0.3 mg) >30kg (66 lbs).**
	Respiratory Distress – Stridor: 5 mg of Epinephrine 1 mg / ml **(1:1000)** Nebulized Undiluted Dose
	Respiratory Distress: (Unresponsive to aerosols) 0.3 - 0.5 mg of Epinephrine 1mg / ml **(1:1000)** IM
	Anaphylactic Shock: (Impending Arrest) **Start with 0.3 -0.5 mg epinephrine IM, repeat if no response. Switch to IV infusion if no response.** 0.1 ml per minute of Epinephrine 1 mg / ml **(1:1000)** IV / IO until resolution of blood pressure. Max dose 0.5 mg
PEDIATRIC DOSAGE	**Cardiac Arrest:** 0.01 mg / kg of Epinephrine 0.1 mg / ml **(1:10,000)** - IV / IO every 3 - 5 minutes. Max 1mg per dose
	Anaphylactic Reaction / Shock: mg / kg of Epinephrine 1mg / ml **(1:1000)** IM - Max dose 0.5 mg **EMT MUST USE EPINEPHRINE AUTO-INJECTOR JR (0.15 mg) 33 – 66 lbs.**
	Croup: (If Racemic Epinephrine Not Available) <10 kg 3 ml of Epinephrine 1 mg / ml **(1:1000)** nebulized >10 kg 5 ml of Epinephrine 1 mg / ml **(1:1000)** nebulized
	Respiratory Distress: (Unresponsive to Aerosols) 0.01 mg / kg of Epinephrine 1mg / ml **(1:1000)** IM - Max dose 0.5 mg
	Anaphylactic Shock: (Impending Arrest) 0.01 mg / kg of 0.1 mg / ml **(1:10,000)** IV / IO until resolution of blood pressure – Max dose 0.5 mg
	See PEDIATRIC DRUG ADMINISTRATION CHART for weight-based administration

3-5 kg	6-7 kg	8-9 kg	10-11 kg	12-14 kg	15-18 kg	19-23 kg	24-29 kg	30-36 kg
6-11 lbs	13-15 lbs	18-20 lbs	22-24 lbs	26-31 lbs	33-37 lbs	42-51 lbs	53-64 lbs	66-81 lbs
18-24 in	24-26 in	26-29 in	29-33 in	33-38 in	38-43 in	43-48 in	48-52 in	52-57 in

KEY POINTS	**Do Not Confuse Epi 1 mg / ml (1:1000) IM and 0.1 mg / ml (1:1-0,000) IV**
EPI DRIP	**Backup for Dopamine if Unavailable** **MIX 1 mg Epinephrine (Any available concentration, with preference to 1mg / ml (1:1000) if possible) into** **D5 or Saline** **Utilize small volumes of base solution Ex. 100ml bag or 250ml bag wherever possible.** **If larger bags are only size available; Remove volume to make 100ml or 250ml base solution volume (Last Resort, no other options.)** **Cardiogenic, Neurogenic, Septic Shock, Post Resuscitation – Adult or Peds** 0.1 - 0.5 micrograms / kg / minute IV infusion titrated to MAP 70 / SBP 90 (Adult)

	If mixed in 100 ml = 10 mcg / ml Use macro drip set Needed dose x weight (kg) x drip set / 10 Example: 0.1 mcg / kg / min x 100 kg x 10 gtt set / 10 = 10 drops per min	If mixed in 250 ml = 4 mcg / ml Use macro drip set Needed dose x Weight (kg) x drip set / Example: 0.1 mcg / kg / min x 100 kg x 10 / 4 = 25 drops per min	If mixed in 500 ml = 2 mcg / ml Use macro drip set Needed dose x Weight (kg) x drip set / Example: 0.1 mcg / kg / min x 100 kg x 10 / 2 = 50 drops per min

MEDIC ATIONS

GLUCAGON (Glucagen)

PREGNANCY CLASS	**B**
ACTIONS	**1. Causes breakdown of glycogen to glucose increasing blood glucose level**
INDICATIONS	**1. Correction of hypoglycemia when vascular access is not able to be established and oral glucose is contraindicated**
CONTRAINDICATIONS	**Known hypersensitivity**
PRECAUTIONS	**1. Glucagon is only effective in patients with sufficient stores of glycogen (glycogen stored in liver)** **2. Glucagon can be administered on scene, but do not wait for it to take affect**
SIDE EFFECTS	**1. Nausea and vomiting** **2. Hyperglycemia**
SUPPLIED	**Vials of 1mg Glucagon with 1ml of diluting solution**
ADULT DOSAGE	**Hypoglycemia without Vascular Access:** **1 mg IM. Reconstitute 1 mg of glucagon with 1 mg of water for injection.** **Beta Blocker Overdose:** **IV 3-10 Mg bolus, if no clinical response may repeat bolus dose.** **Calcium Channel Blocker Overdose:** **IV 3-10 Mg bolus, if no clinical response may repeat bolus dose.**
PEDIATRIC DOSAGE	**Hypoglycemia Without Vascular Access:** **0.5 mg IM < 20kg 1 mg IM > 20kg** **Reconstitute 1 mg of glucagon with 1 mg of water for injection.**

KEY POINTS	• Response is usually noticed in 5 - 20 minutes. If response is delayed, dose may be repeated • If IV is established after Glucagon (Glucagen) is given and patient is still hypoglycemic, administer Dextrose

MEDICATIONS

ISOSORBIDE DINITRATE (ISORDIL)

ACTIONS	Antianginal agent, Vasodilator
INDICATIONS	1. Suspected ischemic chest pain 2. Hypertensive emergency with signs and symptoms of ACS
CONTRAINDICATIONS	Known hypersensitivity Systolic BP <100 mmHg Concurrent use with Phosphodiesterase inhibitors (sildenafil)
PRECAUTIONS	1. Use caution in patients with inferior wall MI or right ventricular involvement (Elevation in leads II, III, AVF or V4R) 2. Avoid use in patients with increased Intracranial pressure or glaucoma 3. If the patient becomes hypotensive after Nitroglycerine administration, then place the patient in a semi-reclined position with legs elevated and give IV normal saline bolus
SIDE EFFECTS	1. Hypotension 2. Throbbing headache 3. Lightheadedness /dizziness 4. Syncope
ADULT DOSAGE	Suspected Angina Pectoris: Sublingual 5-10 mg

MEDIC ATIONS

LACTATED RINGERS

ACTIONS	Isotonic Crystalloid Solution
INDICATIONS	1. Inadequate tissue perfusion/Shock 2. Hypovolemia 3. Significant Burns >20% surface area 4. Fluid boluses
CONTRAINDICATIONS	Non in emergency cases
PRECAUTIONS	1. Use with caution with heart failure patients 2. Use with caution with renal failure patients
SIDE EFFECTS	3. Excess fluid might result in fluid overload
ADULT DOSAGE	**Inadequate tissue perfusion/Shock** 500ml bolus IV/IO and Titrate according to indication and patient physiological response to treatment.
PEDIATRIC DOSAGE	**Inadequate tissue perfusion/Shock** 20 ml/kg/ bolus/IV/IO may be repeated twice following assessment of patients' needs and physiological response to treatment. Total max dose 60 ml/kg

See PEDIATRIC DRUG ADMINISTRATION CHART for weight-based administration

3-5 kg	6-7 kg	8-9 kg	10-11 kg	12-14 kg	15-18 kg	19-23 kg	24-29 kg	30-36 kg
6-11 lbs	13-15 lbs	18-20 lbs	22-24 lbs	26-31 lbs	33-37 lbs	42-51 lbs	53-64 lbs	66-81 lbs
18-24 in	24-26 in	26-29 in	29-33 in	33-38 in	38-43 in	43-48 in	48-52 in	52-57 in

KEY POINTS	Hypotension with concurrent brain injury is associated with poor outcome. In such settings, you should administer fluids to maintain systolic blood pressure of 110 mmHg. Too rapid infusion of fluid in patient without fluid deficit or with underlying cardiac problems may cause pulmonary edema or congestive heart failure. Adult patients must be reassessed after 500 ml of fluid administration. Pediatric patients must be reassessed after 20ml/kg fluid administration.

MEDICATIONS

OXYGEN (O_2)

PREGNANCY CLASS	B
ACTIONS	1. Increases oxygen content of blood 2. Improves tissue oxygenation 3. Decreases energy expended for respirations
INDICATIONS	1. Cardiac chest discomfort / ACS 2. Suspected stroke 3. Hypoxemia 4. Cardiopulmonary emergencies 5. Trauma 6. Shortness of breath / dyspnea 7. Sedative drug administration 8. Unknown oxyhemoglobin saturation
CONTRAINDICATIONS	None in the pre-hospital setting
PRECAUTIONS	Be aware for respiratory depression in COPD patients on prolonged high flow oxygen "consider Venturi Mask if available"
SIDE EFFECTS	High concentrations of oxygen may reduce the respiratory drive in some COPD patients; these patients should be carefully monitored
SUPPLIED	As a compressed gas in cylinders of varying sizes
ADULT DOSAGE	12 - 15 lpm via NRB mask or 2 - 6 lpm via nasal cannula, 6 - 10 lpm via small volume nebulizer, unless otherwise indicated
PEDIATRIC DOSAGE	12 - 15 lpm via NRB mask or 2 - 6 lpm via nasal cannula, or 6 - 10 lpm via unit dose nebulizer, unless otherwise indicated
KEY POINTS	• Never withhold oxygen to those who need it • All sedative medication administration must have oxygen administration

MEDICATIONS

ORAL GLUCOSE (Instant Glucose/Gluco Gel)

PREGNANCY CLASS	B
ACTIONS	Raises blood glucose level
INDICATIONS	Treatment of hypoglycemia
CONTRAINDICATIONS	1. Known hypersensitivity to corn products 2. Unconscious patients
PRECAUTIONS	1. Patient must be alert and able to sufficiently swallow 2. Monitor patient for difficulty swallowing or choking due to the thick consistency of agent
SUPPLIED	Squeeze tube containing 24 grams of flavored oral dextrose gel
ADULT DOSAGE	One complete tube (15 g – 37.5 g) by mouth
PEDIATRIC DOSAGE	Half a tube by mouth (7.5-18.75 g – Approximately) by mouth
KEY POINTS	**The patient must be alert and have the ability to swallow!**

MEDICATIONS

Salbutamol (Ventolin) Nebulizer

PREGNANCY CLASS	**A**
ACTIONS	Beta2 Agonist
INDICATIONS	1. Asthma Acute Symptoms Relief 2. COPD Acute Symptoms Relief
CONTRAINDICATIONS	1. Known hypersensitivity
PRECAUTIONS	1. Cardiovascular Disease 2. Renal Impairment
SIDE EFFECTS	1. Tremors 2. CNS Excitement, Nervousness 3. Tachycardia
SUPPLIED	2.5 mg
ADULT DOSAGE	Acute Exacerbation of Asthma: Nebulization 2.5 mg every 20 mins for 3 doses
PEDIATRIC DOSAGE	Acute Exacerbation of Asthma: Nebulization 0.15 mg/kg/dose (minimum dose 2.5mg/dose) every 20 minutes for 3 doses

APPENDIX 2
PROCEDURES

ADULT PATIENTASSESSMENT

INDICATIONS

• Any MEDICAL or TRAUMA patient 13 years or older.

PROCEDURE

1. Scene size-up, including universal precautions, scene safety, environmental hazards assessment, need for additional resources, by-stander safety, and patient / caregiver interaction.
2. Assess need for additional resources.
3. Establish spinal immobilization if suspicion of spinal injury.
4. Initial assessment includes a general impression as well as the status of a patient's airway, breathing, and circulation and Assess mental status (e.g., AVPU) and disability (e.g., GCS).
5. Control major hemorrhage and assess overall priority of patient.
6. Perform a focused history and physical based on patient's chief complaint.
7. Assess need for critical interventions.
8. Complete critical interventions and perform a complete secondary exam to include a baseline set of vital signs as directed by protocol.
9. Maintain an on-going assessment throughout transport, to include patient response/ possible complications of interventions, need for additional interventions, and assessment of evolving patient complaints/conditions.

KEY POINTS

Dealing with the family:

• **REMAIN CALM**. Show efficiency and competence, even if you don't really feel it.

• Show a caring a concerned manner for both the family and the patient. If you have negative feelings about the situation (for example if it is an injury because of neglect or abuse), try not to let them show. This will only increase hostility between yourself and the family.

• Honestly inform them of what you are doing and what you think is wrong with the patient.

• Reassurance is important for the family as well. Involve them in the care (for example, holding the oxygen or talking to the patient to calm them). This will help develop some trust between you and the family.

PEDIATRIC PATIENT ASSESSMENT

INDICATIONS

• Any MEDICAL patient less than 13 years old, or any TRAUMA patient less than 13 years old

PROCEDURE

1. Scene size-up, including universal precautions, scene safety, environmental hazards assessment, need for additional resources, by-stander safety, and patient / caregiver interaction.
2. Assess patient using the pediatric triangle of ABCs:
   - Airway and appearance: speech / cry, muscle tone, inter-activeness, look / gaze, movement of extremities
   - Work of breathing: absent or abnormal airway sounds, use of accessory muscles, nasal flaring, body positioning
   - Circulation to skin: pallor, mottling, cyanosis
3. Establish spinal immobilization if suspicion of spinal injury.
4. Establish responsiveness appropriate for age. (AVPU, GCS, etc.)
5. Color code using weight-based tape / treatment chart.
6. Assess disability. (pulse, motor function, sensory function, papillary reaction)
7. Perform a focused history and physical exam. Recall that pediatric patients easily experience hypothermia and thus should not be left uncovered any longer than necessary to perform an exam.
8. Record vital signs (BP > 3 years of age, cap refill < 3 years of age)
9. Include immunizations, allergies, medications, past medical history, last meal, and events leading up to injury or illness where appropriate.
10. Treat chief complaint as per protocol.
11. Perform a focused history and physical based on patient's chief complaint.
12. Assess need for critical interventions.
13. Complete critical interventions and perform a complete secondary exam to include a baseline set of vital signs as directed by protocol.
14. Maintain an on-going assessment throughout transport, to include patient response / possible complications of interventions, need for additional interventions, and assessment of evolving patient complaints / conditions.

KEY POINTS

· Illness and injuries in children can cause significant anxiety for pre-hospital personnel as well as panic in the patient, family, and bystanders. It is important for the EMT to remain calm and take control of the patient and situation.

Dealing with the child:

· Tell them what's happening. It is important to remember to communicate with the child.

· Relate and speak one their developmental level.

· Be honest with them. Don't say, "This won't hurt", if it will. Explain actions.

· Try to enlist their cooperation, if possible.

· Do not separate child from the parent unless they are ill enough to require significant interventions like airway positioning and ventilation.

· Reassure the child frequently.

Dealing with the family:

· **REMAIN CALM**. Show efficiency and competence, even if you don't really feel it.

· Show a caring a concerned manner for both the family and the patient. If you have negative feelings about the situation (for example if it is an injury as a result of neglect or abuse), try not to let them show. This will only increase hostility between yourself and the family.

· Honestly inform them of what you are doing and what you think is wrong with the patient.

· Reassurance is important for the family as well. Involve them in the care (for example, holding the oxygen or talking to the patient to calm them). This will help develop some trust between you and the family.

AIRWAY/BREATHING

END TIDAL CO2 / CAPOGRAPHY

INDICATIONS	SIGNS AND SYMPTOMS	CONTRAINDICATIONS
• The End-Tidal CO2 shall be measured on all intubated patients, or with placements of King Airway/LMA	• Cardiac Arrest/Shock • Intubated Patients • Respiratory Failure • COPD • Hyper/Hypoventilation/Seizures • Sedated Patients	This device is not to be used for: • Detection of mainstem bronchial intubation

Capnography vs. Capnometry

Capnography comprises the continuous analysis and recording of carbon dioxide concentrations (CO2) in respiratory gases. Although the terms capnography and capnometry are sometimes considered synonymous, capnometry suggests measurement (ie, analysis alone) without a continuous waveform.

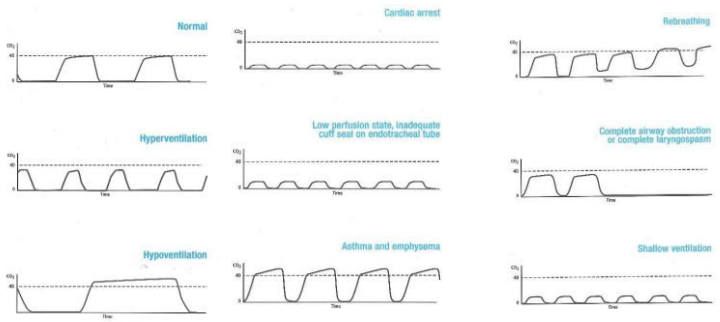
PROCEDURE – **Capnography (Intubated Patient)**

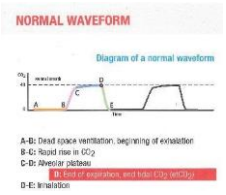
Capnography is required for all patients requiring ventilation through an ET tube, King Airway / LMA.

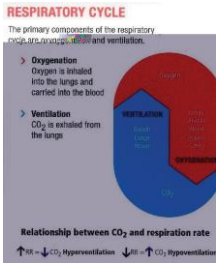
1. Turn on recording instrumentation (usually part of a cardiac monitor in the pre-hospital setting).
2. Place CO2 Sampling device in between ventilation device (BVM / Ventilator) and the ET / BIAD.
3. Attach sampling device to recording instrumentation and ventilate to a CO2 of 35 – 45
4. If ResQPOD is used, place ResQPOD directly on tube, followed by intubated CO2 sampling device, then BVM.

PROCEDURE – **Capnography (Non-Intubated, spontaneously breathing patient)**

1. Turn on recording instrumentation (usually part of a cardiac monitor in the pre-hospital setting)
2. Place the sampling cannula on the patient
3. Attach sampling device to recording instrumentation record results and treat per results







INTUBATION - ENDOTRACHEAL

INDICATIONS	SIGNS AND SYMPTOMS	PRECATUTIONS
• A patient without a gag reflex, is apneic, or is demonstrating inadequate respiratory effort • Any patient medicated or rapid sequence intubation	• Unstable airway • Respiratory arrest • Cardiac arrest • GCS less than 8 without a treatable cause (for example, hypoglycemia)	• Patient intolerance is only a relative contraindication to this procedure

EMT ADVANCED EMT PARAMEDIC

PROCEDUR

1. Cervical immobilization should be applied to the patient when indicated by mechanism of injury or when it is deemed necessary.
2. Prepare all equipment and have suction ready.
3. Hyperoxygenate the patient (one breath every three seconds) for at least one minute before attempting endotracheal intubation, if possible.
4. Suction the pharynx as needed.
5. Open the patient's airway and holding the laryngoscope in the left hand, insert the blade into the right side of the mouth and sweep the tongue to the left.
6. Use the blade to lift the tongue and epiglottis (either directly with the straight blade or indirectly with the curved blade).
7. Once the glottic opening is visualized, slip the tube through the cords and continue to visualize until the cuff is past the cords.
8. No more than 30 seconds may be used per attempt.
    a. Re-ventilation for at least 30 seconds after each attempt.
    b. Some situations such as copious vomiting or bleeding may require suction attempts longer than 30 seconds. These are the exception; not the norm.
9. Remove the stylet.
10. Inflate the cuff of the endotracheal tube with 10 ml of air.
11. Attach the bag-valve device to the ET tube and ventilate the patient.
12. Assess for tube placement:
    a. Watched tube pass through cords.
    b. Waveform Capnography
    c. Confirmation of lung sounds in the apices and bases bilaterally.
    d. Absence of epigastric sounds.
    e. Chest rise with ventilation.
    f. Good compliance with bag-valve ventilation
    g. Patent color improves.
    h. SpO_2 improves. (If distal perfusion is present to create a reading)

If at any time placement cannot be confirmed or obtained, the ETT shall be removed, an alternate airway placed, and the patient shall be ventilated. **If there is any doubt about proper placement, the tube shall be removed.**

13. If proper placement is confirmed, the cm markings on the tube at the level of the teeth shall be noted and secure the tube with a commercial tube holder.
14. Document ETT size, time, result, and placement location by the centimeter marks either at the patient's teeth or lips on the patient care report (PCR). Document all devices used to confirm initial tube placement. Also document breath sounds before and after each movement of the patient.
15. Routinely reassess for proper tube placement. The initial tube placement and all reassessments must be documented.

KEY POINTS
· It is essential to have complete and detailed documentation concerning the placement of the endotracheal tube. The documentation MUST include: Methods used, success / failure, pre-oxygenation, suction, SpO_2, CO_2, medications used, visualization, tube size, lip line, all confirmation techniques, securement of tube, and repeat assessments of placement.
· Placement - direct visualization of the tube passing through the vocal cords.
· Applying c-collar may assist in minimizing ETT movement after placement.
· It is the responsibility of the practitioner to be familiar with the proper technique of using the different laryngoscope blades.
· Tube placement must be confirmed; after it was initially placed, after every movement, any significant change inpatient status, and prior to entering the emergency department.
· Continually monitor the patient's SpO_2, $EtCO_2$, ease of ventilation, heart rate, and presence of JVD.
· A complication of endotracheal intubation and/or manual ventilation is a pneumothorax and tension pneumothorax. Refer to the chest decompression procedure if this occurs.
· Only functioning paramedics and AEMT may intubate. AEMT'S may only intubate patients who are apneic.
· Intubation does NOT have to be attempted if their airway can be effectively managed with BVM ventilations.
· Have tube placement confirmed immediately upon entering the ER by a Physician prior to moving patient to ER bed.

BOUGIE ASSISTED INTUBATION

1. Prepare patient as described above for standard orotracheal intubation.
2. Use laryngoscope to lift mandible and displace tongue as normal.
3. Use the gum rubber Bougie with the bent end up in place of an ETT.
4. Pass the Bougie through the cords, this works as a place keeper to an ETT can be slide over the Bougie and into the trachea.
5. Pass a generously lubricated tube over the Bougie and into the trachea. Do not use force to advance the tube past the vocal cords.
6. Pull the Bougie out once the tube has been passed to the desired depth, inflate the ETT cuff, and verify tube placement using all standard methods.

VIDEO LARYNGOSCOPY - OTHER DEVICES

Video laryngoscopes are permitted to be substituted for standard laryngoscopes during intubation procedures. The user must have previous training specific to the make and model

of laryngoscope being used and have and must have a standard laryngoscope set available in the event of device failure. Manufacturer's recommendations must be followed on use, sizing, disposal or cleaning, indications and contraindications for the device. A BIAD device must still be available if unable to pass an endotracheal tube with either video or standard laryngoscopy.

PEDIATRIC TUBE SIZING

The size of tube that can be passed easily into most adults is 8.0 mm (id). Therefore, this tube should be tried first on the average adult. The size of tube is judged by the size of the adult, not by age.

For children, the proper tube is usually equal to the size of the child's little finger. The following guide will also help in determining the proper size tube:

Premature..... 3mm (id)	18-24 months....5-6mm (id)
14-24 weeks.... 4mm (id)	2-4 years..... 6mm (id)
6-12 months.. ..4-5mm (id)	4-7 years.....6-7mm (id)
12-18 months.. 5mm (id)	7-10 years. ..... 7mm (id)

KEY POINTS

- All the above tube sizes are still dependent on the child's size rather than consideration of age.
- Children before puberty should have a cuffless tube, or if the tube has a cuff it should not be inflated after insertion.

TUBE REMOVAL

If the patient begins to breathe spontaneously and effectively and is resisting the presence of the tube, removal of the tube may be necessary. The following procedures will be followed:

1. Explain procedure to victim.
2. Prepare suction equipment with large-bore catheter and suction secretions from endotracheal tube, mouth and pharynx.
3. The lungs should be completely inflated so that the patient will initially cough or exhale as the tube is taken from the larynx. This is accomplished in 2 ways:
   a. The patient is asked to take the deepest breath they possibly can and, at the very peak of the inspiratory effort, the cuff is **deflated and the tube removed rapidly; or**
   b. Positive pressure is administered with a hand-held ventilator and, at the end of deep inspiration, the cuff is deflated and the tube rapidly removed.
4. Prepare to suction secretions and gastric content if vomiting occurs.
5. Appropriate oxygen is then administered.
6. The patient's airway is immediately evaluated for signs of obstruction, stridor or difficulty breathing. The patient should be encouraged to take deep breaths and to cough.

KING AIRWAY DEVICE (BIAD)

INDICATIONS

• Emergent airway management of pulseless and apneic patients (EMT Provider)

• Emergent salvage airway management of apneic patients (AEMT and PARAMEDIC Provider)

CONTRAINDICATIONS

• Responsive patients with an intact gag reflex.

• Patients with known esophageal disease. (varices)

• Patients who have ingested caustic substances.

PROCEDURE

1. Hold the King Airway at the connector, using the dominant hand.
2. With non-dominant hand, hold mouth open and apply chin lift.
3. Using a lateral approach, introduce device into corner of mouth.
4. Advance tip behind the base of the tongue, while rotating tube back to midline so that the blue orientation line faces the chin of the patient.
5. Without exerting excessive force, advance tube until base of connector is aligned with teeth or gums.
6. Attach the syringe and inflate the cuffs to the appropriate volume:
   - SIZE 2 = 25-35 ml (LT or LTS-D)
   - SIZE 2.5 = 30-40 ml (LT or LTS-D)
   - SIZE 3 = 40-55 ml (LT or LTS-D)
   - SIZE 4 = 50-70 ml (LT or LTS-D)
   - SIZE 5 = 60-80 ml (LT or LTS-D)
7. Attach a bag-valve device to the connector. While gently bagging the patient to assess ventilation, gently withdraw the tube until ventilation is easy and free flowing (large tidal volume with minimal airway pressure).
8. Adjust cuff inflation, if necessary, to obtain a seal of the airway.
9. After placement, perform standard checks for breath sounds and utilize an appropriate carbon dioxide detection device, as required by protocol.

REMOVAL OF DEVICE (if indicated):

1. Confirm need for removal of the device.
2. Suction above cuffs in the oral cavity.
3. FULLY deflate both cuffs before removal of the device. (may require multiple attempts of air removal with syringe to fully evacuate air).
4. Remove the device when protective reflexes have returned.

KEY POINTS

1. The key to insertion is to get the distal tip of KING around the corner in the posterior pharynx, under the base of the tongue. Experience has indicated that a lateral approach, in conjunction with a chin lift, facilitates placement of the KING. Alternatively, a laryngoscope or tongue depressor can be used to lift the tongue anteriorly to allow easy advancement of the KING into position.
2. Insertion can also be accomplished via a midline approach by applying a chin lift and sliding the distal tip along the palate and into position in the hypopharynx. In this instance, head extension may also be helpful.
3. As the KING is advanced around the corner in the posterior pharynx, it is important that the tip of the device is maintained at the midline. If the tip is placed or deflected laterally, it may enter the piriform fossa and the tube will appear to bounce back upon full insertion and release. Keeping the tip at the midline assures that the distal tip is placed properly in the hypopharynx / upper esophagus.
4. Depth of insertion is key to providing a patent airway. Ventilatory openings of the KING must align with the laryngeal inlet for adequate oxygenation / ventilation to occur. Accordingly, the insertion depth should be adjusted to maximize ventilation. Experience has indicated that initially placing the KING deeper (proximal opening of gastric access lumen aligned with teeth or gums), inflating the cuffs and withdrawing until ventilation is optimized results in the best depth of insertion for the following reasons:
    - It ensures that the distal tip has not been placed laterally in the piriform fossa (see item#3 above).
    - With a deeper initial insertion, only withdrawal of the tube is required to realize a patent airway. A shallow insertion will require deflation of the cuffs to advance the tube deeper.
    - As the KING is withdrawn, the initial ventilation opening exposed to or aligned with the laryngeal inlet is the proximal opening. Since the proximal opening is closest to and is partially surrounded by the proximal cuff, airway obstruction is less likely, especially when spontaneous ventilation is employed.
    - Withdrawal of the KING with the balloons inflated results in a retraction of tissue away from the laryngeal inlet, thereby encouraging a patent airway.
5. Ensure that the cuffs are not over-inflated. If a cuff pressure gauge is not available, inflate cuffs with the minimum volume necessary to seal the airway at the peak ventilatory pressure employed. (just seal volume)
6. Removal of the KING is well tolerated until the return of protective reflexes. For later removal, it may be helpful to remove some air from the cuffs to reduce the stimulus during wake-up.
7. King Airway Kit Includes:
    - King Airway
    - 60-80 cc Syringe
    - Lubricant
    - Instructions for use

DO NOT GIVE MEDICATIONS DOWN THE KING AIRWAY

Color	Tube Size	Patient Size	Weight	Cuff Volume
Transparent	0	See Weight	< 5 kg	10 ml Verify on Tube
White	1	See Weight	5-12 kg	20 ml Verify on Tube
Green	2	35-40 Inches	12-25 kg	25-35 ml Verify on Tube
Orange	2.5	41-51 Inches	25-35 kg	30-40 ml Verify on Tube
Yellow	3	4-5 Feet	NA	40-55 ml Verify on Tube
Red	4	5-6 Feet	NA	50-80 ml Verify on Tube
Purple	5	>6 Feet	NA	60-90 ml Verify on Tube

NEEDLE CRICOTHYROTOMY (Only if Trained)

INDICATIONS	SIGNS AND SYMPTOMS	COMPLICATIONS
• Management of an obstructed airway when standard airway procedures cannot be accomplished or have failed. • Unable to intubate by another route. • Cervical spine injuries • Maxillo facial trauma • Laryngeal trauma / edema	Airway obstruction from: • Edema from infection, caustic ingestion, allergic reaction, and or inhalation injuries • Foreign body • Mass lesion	• Post procedure bleeding • Cellulitis of neck • Subcutaneous emphysema • Voice change • Feeling of lump in throat • Persistent stoma • Obstructive problems • Misplacement of the airway

This procedure buys TIME only. It is not a definitive airway. It will provide OXYGENATION only, not appropriate VENTILATION.

PROCEDURE

EMT PARAMEDIC

1. If time permits, prep with appropriate antiseptic solution.
2. Have suction supplies available and ready.
3. Locate the cricothyroid membrane utilizing anatomical landmarks (in the midline between thyroid cartilage and cricoid cartilage).
4. Secure larynx laterally between thumb and forefinger.
5. Relocates the cricothyroid membrane.
6. Using the syringe attached to a short 10 to 14-gauge catheter-over-needle device if needed, insert the needle through the cricothyroid membrane at a 45 to 60-degree angle caudally (towards feet).
7. Confirm entry of needle in trachea by aspirating air through the syringe.
8. If air is present, change the angle of insertion to 60 degrees.
9. Advance the catheter to the level of the hub.
10. Carefully remove the needle and syringe.
11. Secure the cannula to patient.
12. Attach the cannula to a 15 mm adapter. (3.0 – 3.5 pediatric ET tube adapter)
13. Attach a BVM to the airway adapter and begin oxygenation.
14. Make certain ample time is used not only for inspiration but expiration as well.
15. If unable to obtain an adequate airway, resume basic airway management and transport the patient as soon as possible.
16. **Regardless of success or failure of needle cricothyrotomy, notify the receiving hospital at the earliest possible time of a surgical airway emergency.**
17. Document procedure on the patient care record (PCR).

KEY POINTS

- Use needle cricothyrotomy as a bridge to more invasive surgical airways. (Tracheotomy, surgical cricothyrotomy)
- If placement is required due to foreign body obstruction, removal attempts should continue after performing needle cric procedure.
- Use procedure early to prevent ongoing hypoxia if foreign body is not easily removed.
- QuickTrach device provides a better airway and ventilation if device is available and provider has undergone specific training for that device. See Cricothyrotomy / QuickTrach Procedure.

CRICOTHYROTOMY – QUICKTRACH (Only if trained)

INDICATIONS	SIGNS AND SYMPTOMS	COMPLICATIONS
•Management of an obstructed airway when standard airway procedures cannot be accomplished or have failed • Unable to intubate by another route • Cervical spine injuries • Maxillo facial trauma • Laryngeal trauma/edema	Airway obstruction from: • Edema from infection, caustic ingestion, allergic reaction, and / or inhalation injuries • Foreign body • Mass lesion	• Post procedure bleeding • Cellulitis of neck • Subcutaneous emphysema • Voice change • Feeling of lump in throat • Persistent stoma • Obstructive problems • Misplacement of the airway

EMT PARAMEDIC

This procedure will provide OXYGENATION and life sustaining VENTILATION in an emergency.

PROCEDURE

1. If time permits, prep with appropriate antiseptic solution.
2. Have suction supplies available and ready.
3. Locate the cricothyroid membrane utilizing anatomical landmarks.
4. Secure larynx laterally between thumb and forefinger.
5. Relocate the cricothyroid membrane (in the midline between thyroid cartilage and cricoid cartilage).
6. Using the syringe and the finder needle supplied in the QuickTrach kit, insert the needle through the cricothyroid membrane at a 45 to 60-degree angle caudally (toward the feet).
7. Confirm entry of needle in trachea by aspirating air through the syringe.
8. If air is present, change the angle of insertion to 60 degrees.
9. Advance the device to the level of the stop guide.
10. Remove the stop guide and slide the plastic cannula along the needle into the trachea until the flange rest against the neck.
11. Carefully remove the needle and syringe.
12. Secure the cannula with the provided anchoring device.
13. Attach the connecting tube to the 15mm connection.
14. Attach a BVM to the connecting tube.
15. Confirm placement by auscultation and observing patient for adequate chest rise. Make certain ample time is used not only for inspiration but expiration as well.
16. If unable to obtain an adequate airway, resume basic airway management and transport the patient as soon as possible.
17. Regardless of success or failure of the placement of QuickTrach, notify the **receiving hospital at the earliest possible time of a surgical airway emergency.**
18. Document procedure on the patient care record (PCR).

KEY POINTS

<u>Guidelines for Sizing</u>

- Adult (4.0 mm) QuickTrach: Any patient greater than 100 pounds (45kg) and greater than 8 years in age.
- Use a scalpel to make a VERTICLE MIDLINE incision over the cricothyroid membrane if the landmarks are difficult to identify. Once identified, use the QuickTrach as noted above.

NEEDLE CHEST DECOMPRESSION

INDICATIONS	SIGNS AND SYMPTOMS	PRECAUTIONS
• Tension pneumothorax with significant dyspnea	• Tachypnea/ tachycardia • Hyperresonance • Absent breath sounds on the affected side • Possibly diminished breath sounds on the unaffected side • Cyanosis • Hypotension • Distended neck veins • Chest pain • Extreme anxiety • Altered LOC/coma	• Insufficient training

EMT ADVANCED | EMT PARAMEDIC

PROCEDURE

1. Confirm presence of a tension pneumothorax or identify strong clinical evidence in a rapid deteriorating patient in the setting of major trauma. Consider in the setting of refractory PEA / Traumatic arrest.
2. Locate the insertion site at the second intercostal space at the mid-clavicular line on the affected side of the chest.
3. Prep the insertion site. Use sterile gloves and utilize aseptic procedure to the fullest extent possible under the circumstances.
4. Remove rear cap of IV catheter.
5. Insert the 3 – 3.25 inch, 12 - 14-gauge IV catheter (1 inch, 18-gauge IV catheter in patients less than 8 years) by directing the needle just over the top of the third rib (2nd intercostal space) to avoid intercostal nerves and vessels which are located on the inferior rib borders.
6. Advance the catheter 1 - 2 inches (3/4 - 1 inch in patients less than 8 years) through the chest wall. Tension should be felt until the needle enters the pleural space. A pop or give may also be felt. Do not advance the needle any further.

In a tension pneumothorax, air under pressure should be released when the needle enters the pleural cavity. This will be heard as a rush of air through an open catheter-over-the-needle. If you are using a syringe attached to the catheter-over-the-needle you should be able to withdraw air by pulling out on the barrel of the syringe.

7. Withdraw the needle and advance the catheter until flush with the skin. Listen for a gush or hiss of air which confirms placement and diagnosis. This is frequently missed due to ambient noise.

8. Dispose of the needle properly and **never reinsert into the catheter**.

9. Once the presence of a tension pneumothorax has been confirmed:

   a. Remove the needle, leaving the catheter in place.

   b. Tape the catheter in place.

10. Secure the catheter and rapidly transport the patient providing appropriate airway assistance.

11. Be prepared to re-needle the chest next to original site if catheter kinks or becomes occluded.

KEY POINTS

- A tension pneumothorax can occur in any situation in which a simple pneumothorax occurs.
- Some patients who are at risk of developing a tension pneumothorax; include those receiving positive pressure ventilation, or any patient with blunt or penetrating trauma, and those with pre-existing lung diseases such as COPD.
- Cover all penetrating chest trauma with an occlusive dressing taped on three sides.
- In some cases of penetrating chest trauma, placing an occlusive dressing on the wound will convert an open pneumothorax to a closed tension pneumothorax. In these cases, treatment consists of removing the dressing and converting the wound back to an open pneumothorax. This may be the only treatment needed.
- DO NOT perform a chest decompression, if the patient is not in significant respiratory distress and is otherwise stable.
- Major trauma victims should have catheter-over-the-needles placed on both sides of the chest, if all of the following are present:

1. Obvious chest trauma
2. Difficulty bagging, and absent breath sounds on one / both sides
3. Hypotensive or pulseless

- Needle decompression is a temporary lifesaving procedure only. Patients requiring decompression will require chest tube placement for long term maintenance.
- Catheters may kink or become occluded, always be prepared to re-needle the chest next to the original site. BE ALERT FOR SIGNS OF CONTINUEING OR RECURRING TENSION PNEUMOTHORAX.

PULSE OXIMETERY

INDICATIONS	SIGNS AND SYMPTOMS	PRECAUTIONS
• Patients with suspected hypoxemia. • All cases of respiratory distress • For the treatment of primary respiratory or cardiac disease • All cases of altered or depressed level of consciousness • Drug overdoses • Any patient requiring intubation or BVM support • Major trauma • Smoke Inhalation (may not be accurate due to CO) • Any patient on home oxygen, home ventilator, or BiPAP	• Dyspnea • Tachypnea • Tachycardia • Bradycardia (late sign in adults) • Altered mental status • Pallor, cyanosis • Diaphoresis • Prolonged capillary refill • Accessory muscle use • Abnormal breath sounds	• Poor perfusion; must be applied with good perfusion • Patients with history of anemia • Patients with suspected high carboxyhemoglobin / methemyglobin (CO poisoning, smoke inhalation, heavy cigarette smokers)

PROCEDURE

1. Turn the machine on and allow for self-tests.
2. Apply probe to patient's finger or any other digit as recommended by the device manufacturer.
3. Allow machine to register saturation level.
4. Record time and initial saturation percent on room air if possible on the patient care report (PCR).
5. Verify pulse rate on machine with actual pulse of the patient.
6. Monitor critical patients continuously until arrival at the hospital. If recording a one-time reading, monitor patients for a few minutes as oxygen saturation can vary.
7. Document percent of oxygen saturation every time vital signs are recorded and in response to therapy to correct hypoxemia.
8. In general, normal saturation is 97 - 99%. Below 94%, suspect a respiratory compromise.
9. Use the pulse oximetry as an added tool for patient evaluation. Treat the patient, not the data provided by the device.
10. The pulse oximeter reading should never be used to withhold oxygen from a patient in respiratory distress or when it is the standard of care to apply oxygen despite good pulse oximetry readings, such as chest pain.
11. Factors which may reduce the reliability of the pulse oximetry reading include:
    - Poor peripheral circulation. (blood volume, hypotension, hypothermia)
    - Excessive pulse oximeter sensor motion.
    - Fingernail polish. (may be removed with acetone pad or sensor turned 90 degrees)
    - Carbon monoxide bound to hemoglobin.
    - Irregular heart rhythms. (Atrial fibrillation, SVT, etc.)
    - Jaundice.
    - High ambient light. (washes out the sensors light)

All patients who require vital signs to be taken should have oxygen saturation measured and recorded as part of the vital signs.

Measure oxygen saturation before applying oxygen and repeat the measurement after oxygen has been applied. Do not delay oxygen administration inpatients experiencing severe respiratory distress.

TREATMENT GUIDELINES		
SPO2 READING	**INTERPRETATION**	**ACTION**
>94%	Ideal Range	No supplemental oxygen is needed if no distress noted
93% TO 90%	Mild to Moderate Hypoxemia	Check airway start oxygen therapy via nasal cannula @ 2 - 6 lpm
90% TO 85%	Severe Hypoxemia	Check airway start aggressive oxygen therapy, high flow oxygen via nonrebreather mask @ 15 lpm. Consider bag valve mask ventilation with 100% oxygen if the patient does not have adequate ventilations. Consider CPAP if indicated.
85% OR LESS	Respiratory Failure	Prepare to intubate or assist ventilations with 100% oxygen and bag valve mask

KEY POINTS

- 100% oxygen should be administered to all patients despite a good SpO2 if they are hypoxic.
- Make sure that all dirt and nail polish or any obstructive covering is removed to prevent the unit from giving a false reading.
- Attempt to obtain a room air reading and a reading with supplemental oxygen.
- DO NOT read while BP being taken. May give false readings.
- Oxygen saturation measurements must routinely be recorded as part of the run report. Include those measurements taken as part of routine vital signs and those measurements taken before and after oxygen administration.
- Although the pulse oximeter displays the heart rate, the unit should not be used in place of a physical assessment of the heart rate.
- Oxygen saturation readings may be inaccurate in any situation where the flow of blood through the finger is impaired, such as:
- Hypotension or shock with poor peripheral perfusion
- Peripheral vascular disease
- Extremity injury with restriction of peripheral perfusion
- Cold extremities
- Oxygen saturation readings may be incorrectly high in situations such as carbon monoxide poisoning.
- Many patients with COPD have chronic low oxygen readings and may lose their respiratory drive if administered prolonged high oxygen therapy. Routinely assess pulse oximetry as well as respiratory drive when administering oxygen to these patients. Do not withhold oxygen from any patient that requires it.
- The room air pulse oximetry reading is NOT required if the patient has been placed on supplemental oxygen prior to EMS arrival.
- Pulse oximetery is NOT and indicator of myocardial or cerebral perfusion.

SUCTIONING

INDICATIONS	SIGNS AND SYMPTOMS	PRECAUTIONS
• Any patient who is having trouble maintaining an airway and fluid is noted in the oropharynx, endotracheal tube, or tracheotomy • Tracheal suctioning should also be performed when rhonchi is heard in the intubated patient or tracheotomy patients.	• Obstruction of the airway (secondary to secretions, blood, or any other substance) in a patient currently being assisted by an airway adjunct such as a naso- tracheal tube, endotracheal tube, tracheostomy tube, or a cricothyrotomy tube.	• The patient must be well oxygenated before attempting this procedure.

PROCEDURES

ORAL SUCTIONING

1. Body substance isolation procedures must be used.
2. Assess the need for suctioning.
3. Oxygenate the patient for 30 seconds prior to suctioning.
4. Select an appropriate size suction catheter.
   a. A soft flexible suction catheter or a "whistle tip" can be used if only fluids need to be removed.
   b. A yankauer or "tonsil tip" should be used for thick fluids, small particles, or large volumes.
5. Prepare a cup of sterile water or saline to flush the catheter after suctioning and in between attempts.
6. Quickly insert the catheter into the patient's mouth until it is at the desired depth.
7. Apply suction and withdraw the catheter. Suction no more than 15 seconds per attempt.
8. Immediately after each suction attempt, oxygenate the patient for thirty seconds with 100% oxygen.
9. Repeat this procedure as needed until the airway is clear.

TRACHEAL SUCTIONING (Trach tube or endotracheal tube)

1. Body substance isolation procedures must be used.
2. Assess the need for suctioning.
3. Oxygenate the patient prior to suctioning.
4. Select an appropriate size suction catheter.
   a. A soft flexible suction catheter or a "whistle tip" should be used.
   b. A yankauer or "tonsil tip" should NOT be used.
5. Prepare a cup of sterile water or saline to flush the catheter after suctioning and in between attempts.

6. While maintaining aseptic technique, quickly insert the catheter into the endotracheal or tracheal tube until it is at the desired depth.

7. Apply suction and withdraw the catheter using a gentle rotating motion. Suction no more than 15 seconds per attempt.

8. Immediately after each suction attempt, oxygenate the patient for thirty seconds with 100% oxygen.

9. Repeat this procedure as needed until the airway is clear.

KEY POINTS

General

- To maintain aseptic technique, keep the distal end of the catheter in the wrapper when not being used.
- If the suction catheter needs to be set down between suction attempts, place it back inside its wrapper.
- Patients who require assisted ventilations should be hyperventilated before and after every suction attempt.
- DO NOT suction for more than 15 seconds per attempt.
- DO NOT insert farther than the desired depth.
- If a back boarded patient vomits, turn the board on its side and then suction.

Oral Suctioning

- If using a soft flexible suction catheter, determine the length by holding it against the patient's face. Measure from the edge of the patient's mouth to the tip of the ear lobe.
- Patients with clenched teeth may need to be suctioned via the naso-tracheal route. Use a soft suction catheter only.

Tracheal Suctioning

- Even though endotracheal tubes isolate the trachea, if there is fluid present in the lower airway, oxygenation will be reduced.
- There are many patients at home with tracheotomy tubes. These tubes tend to become obstructed because the patient cannot cough normally. EMS is often called when these tubes become obstructed.
- This procedure should be performed with aseptic technique. Use a nun opened sterile catheter for every patient.
- Use the largest sized suction catheter that will fit down the endotracheal tube.
- Estimate the length by looking at the distance between the end of the tube and the sternal notch. This approximates the level of the carina.
- If tracheal secretions are extremely thick and unable to be removed, administer 2 - 3 ml of saline followed by 2 BVM ventilations and then perform suctioning.

PERIPHERAL INTRAVASCULAR ACCESS (IV)

INDICATIONS	SIGNS AND SYMPTOMS	CONTRAINDICATIONS
• Any patient where intravenous access is indicated (significant trauma or mechanism, emergent or potentially emergent medical condition)	• Dehydration • Hypovolemia • Need for drug therapy	• Hypersensitivity to IV catheter

EMT ADVANCED EMT PARAMEDIC

PROCEDURES

1. Universal precautions. Gloves.
2. Prepare equipment.
3. Inspect the IV solution for expiration date, cloudiness, discoloration, leaks, or the presence of particles.
4. Connect IV tubing to the solution in a sterile manner. Fill the drip chamber half full and then flush the tubing bleeding all air bubbles from the line.
5. Place a tourniquet around the patient's extremity to restrict venous flow only.
6. Select a vein and an appropriate gauge catheter for the vein and the patient's condition.
7. Prep the skin with an antiseptic solution.
8. Insert the needle with the bevel up into the skin in a steady, deliberate motion until the blood flashback is visualized in the catheter.
9. Advance the catheter into the vein. **Never** reinsert the needle through the catheter.
10. Dispose of the needle into the proper container without recapping.
11. Draw blood samples when appropriate.
12. Remove the tourniquet and connect the IV tubing or saline lock.
13. Open the IV to assure free flow of the fluid and then adjust the flow rate as per protocol or as clinically indicated.
14. Secure IV using appropriate measures to insure stability of the line.
15. Check for signs of infiltration.
16. Adjust flow rate.
17. Document the procedure, time and result on the patient care report (PCR).

Attempt to draw lab work on all patients when the IV is started, unless the draw will compromise the access site or the patient is in extremis.
Label all blood draws with patient name and DOB

KEY POINTS

- IVs will be started by the Advanced EMT and / or the Paramedic as allowed by each patient care protocol.
- IV placement must not delay transport of any critical patient involved in trauma.
- Generally, no more than two (2) attempts or more than two minutes should be spent attempting an IV. If unable to initiate IV line, transport patient and notify hospital IV was not able to be started.
- IVs may be started on patients of any age providing there are adequate veins and patient's condition warrants an IV.
- Use 1000 ml bags of normal saline for trauma patients and 500 - 1000 ml bags of normal saline for medical patients.
- Any pre-hospital fluids or medications approved for IV use may be given through intraosseous access.
- All IV rates should be at KVO (minimal rate to keep vein open) unless administering fluid bolus.
- Extreme care should be made to discard of all IV sharps in the appropriate sharps container immediately after cannulation. No sharps should be found on patient / sheets after transport to the hospital.
- Any venous catheter which has already been accessed prior to EMS arrival may be used.
- Upper extremity IV sites are preferable to lower extremity sites.
- Lower extremity IV sites are relatively contraindicated in patients with vascular disease or diabetes.
- In post-mastectomy patients, avoid IV, blood draw, injection, or blood pressure in arm on affected side.
- Use IV catheters appropriately sized for the patient and their condition.

PROCEDURE FOR STARTING SALINE LOCK

1. Prepare equipment: Flush saline lock with saline (approx. 1 ml) leave saline syringe attached device.
2. The initial attempt should be the dorsum of hand. Further attempts should proceed to the forearm; the antecubital fossa should not be used for saline locks.
3. Apply tourniquet.
4. Cleanse site with alcohol.
5. Use appropriately sized catheter for all saline locks. Perform venipuncture.
6. Attach IV tubing and push remaining saline through tubing and catheter. Remove syringe.
7. Secure IV using appropriate measures to insure stability of the line.
8. Check for signs of infiltration.

KEY POINTS

- Saline lock is preferred for patients who do not need immediate IV medication or fluids.
- Saline locks can be used whenever a patient requires an IV primarily for medication administration, or for any patient where the IV would be run at a TKO rate.
- A saline lock should not be used with a 14 -16-gauge IV unless attached to IV tubing and a bag or normal saline.
- Extreme care should be made to discard of all IV sharps in the appropriate sharps container immediately after cannulation. No sharps should be found on patient or in sheets after transport to the hospital.
- External jugular. (> 12 years of age).

Blood Draws

- Blood specimen drawing should be performed whenever the patient has a medical condition requiring an IV.
- Blood draws are not required if the IV site may become compromised, trauma, or the patient's condition dictates otherwise.
- Blood tubes should be labeled with the patient's name and initialized by the drawer of the specimen, and placed in a biohazard bag.
- If the tube does not draw a vacuum, discard tube and try another of the same color.
- Tube should be rotated upright, not shaken, when mixing additives and blood.

INTRAOSSEOUS INFUSION

ADULT INTRAOSSEOUS INFUSION:

EMT ADVANCED | EMT PARAMEDIC

INDICATIONS	SIGNS AND SYMPTOMS	CONTRAINDICATIONS
• Unable to access peripheral IV	• Altered level of consciousness • Arrhythmias • Burns • Cardiac / respiratory arrest • Dehydration • Head Injury • Hypotension • Seizures • Traumatic Injuries / shock • Other medical conditions when immediate vascular access is required	• Fracture of the tibia or humerus • Previous orthopedic procedures • Pre-existing medical condition • Infection at the insertion • Inability to locate landmarks • Excessive tissue over the insertion site

PROCEDURE: EZ IO Adult Device: (For providers trained in technique)

1. Select site:
2. **Humoral head, outer aspect (use the 45 mm yellow needle) OR Tibia medial to the tibial tuberosity on flat plane of tibia (use 25mm blue or 45 mm yellow).**
3. Locate the anatomical site and prep with betadine and / or alcohol.
4. Load the needle onto the driver.
5. Firmly stabilize the leg near (not under) the insertion site.
6. Firmly press the needle against the site at a 900 angle and operate the driver. Use firm, gentle pressure.
7. As the needle reaches the bone, stop and be sure that the 5 mm marking on the needle is visible; if it is, continue to operate the driver.
8. When a sudden decrease in resistance is felt and the flange of the needle rests against the skin, remove the driver and remove the stylet from the catheter.
9. Do not attempt to aspirate bone marrow. (may clog needle and tubing)
10. Use a syringe to infuse 0.9% normal saline.
11. If no S/S of infiltration are found, attach the IV line and infuse fluids and medications as normal. (IV bag will need to be under pressure)
12. Secure the needle and dress the site.
13. Manage IO pain with LIDOCAINE (XYLOCAINE) through the IO 20 – 40 mg. Allow to dwell in IO space. Approved for AEMT

Consider use of 45 mm length IO needle for patients with excessive tissue over the insertion site. *Use the 45 mm needle for all humeral head insertions.*

PROCEDURE: Adult IO Manual Placement:

1. Expose the lower leg.
2. Identify the tibial tubercle (bony prominence below the knee cap) on the proximal tibia.
3. The insertion location will be 1 - 2 cm (2 finger widths) below this and medially.
4. Prep the site as per peripheral IV site.
5. Insert needle at 90-degree angle to the skin surface, approximately one to two finger breadths distal to the tibial tuberosity. With a straight steady push and / or rotary motion, push needle through subcutaneous tissue and bone until a drop or pop is felt.
6. Remove the trocar and attach the IV.
7. Once the needle has reached the bone marrow, saline should be injected via syringe to clear needle.
8. Observe for signs of subcutaneous infiltration.
9. The needle should feel firm in position and stand upright without support.
10. Stabilize and secure the needle.
11. Infusion via this route is the same as venous access without limit to rate of administration, drugs pushed or fluid type infused, pressure infuser may be necessary to facilitate flow.
12. Document the procedure, time, and result (success) on the patient care report (PCR).

13. Manage IO pain with LIDOCAINE (XYLOCAINE) through the IO 20 – 40 mg. Allow to dwell in IO space. Approved for AEMT

PEDIATRIC INTRAOSSEOUS INFUSION:

INDICATIONS	SIGNS AND SYMPTOMS	CONTRAINDICATIONS
• Life threatening illness or injury in a child	• Unresponsive • Cardiopulmonary arrest • Decompensated shock •This procedure is indicated primarily in children less than 8 years old	• A pediatric patient who is conscious or responsive to pain • A pediatric patient who is 7 years old or older • Gross infection, osteomyelitis, or cellulitis at the intended site (use the other leg if possible) • Fracture at or above the intended site (use the other leg if possible) • Unsuccessful IO attempt (use the other leg if possible)

PROCEDURE: May use manual IO Device or EZ IO Pediatric Device

1. Select site.
2. Identify the tibial tubercle (bony prominence below the knee cap) on the proximal tibia or the humeral head. The insertion location will be 1-2 cm (2 finger widths) below this and medially.
3. Prep the site as per peripheral IV site.
4. Stabilize leg / shoulder as needed.
5. Needle insertion varies between 70- and 90-degree angle to the skin surface, approximately one to two finger breadths distal to the tibial tuberosity. With a straight steady push and / or rotary motion, push needle through subcutaneous tissue and bone until a drop or pop is felt.
6. Remove the trocar and attach the IV.
7. Once the needle has reached the bone marrow, saline should be injected via syringe to clear needle
8. Observe for signs of subcutaneous infiltration.
9. The needle should feel firm in position and stand upright without support.
10. Stabilize and secure the needle.
11. Infusion via this route is the same as venous access without limit to rate of administration, drugs pushed or fluid type infused, pressure infuser may be necessary to facilitate flow.
12. Document the procedure, time, and result on the patient care report (PCR).
13. Manage IO pain with LIDOCAINE (XYLOCAINE) through the IO 0.5 mg / kg, not to exceed 40 mg. Allow to dwell in IO space. Approved for AEMT

KEY POINTS

- An IO can administer any medication or fluid that can be administered by an IV.
- Consider using a three-way stopcock, and a syringe with the IV tubing. Use the "pull-push" method to infuse fluid for small bolus in infants / children.
- A blood pressure cuff or pressure infuser may have to be used to apply pressure to the IV bag to maintain an adequate flow rate.
- An IO may be attempted prior to attempting an IV if the patient is in cardiac arrest or is in decompensated shock and requires immediate access.
- If attempt unsuccessful remove needle and apply pressure to site for 5 minutes.
- Intraosseous infusions of fluids may cause subcutaneous infiltration, osteomyelitis, or subcutaneous infections if not placed properly.

INTRAOSSEOUS INFUSION – Humeral Head

	Adult or Pediatric Place the patient's hand over the abdomen (elbow adducted and humerus internally rotated) Place your palm on the patient's shoulder anteriorly • The area that feels like a "ball" under your palm is the general target area • You should be able to feel this ball, even on obese patients, by pushing deeply
	Place the ulnar aspect of one hand vertically over the axilla Place the ulnar aspect of the opposite hand along the midline of the upper arm laterally.
	Place your thumbs together over the arm. • This identifies the vertical line of insertion on the proximal humerus
	Palpate deeply as you climb up the humerus to the surgical neck. • It will feel like a golf ball on a tee – the spot where the "ball" meets the "tee" is the surgical neck • The insertion site is on the most prominent aspect of the greater tubercle, 1 to 2 cm above the surgical neck
	**Insertion:** • Prepare the site by using antiseptic solution of your choice • Use a clean, "no touch" technique • Remove the needle cap • Point the needle set tip at a 45-degree angle to the anterior plane and posteromedial • Push the needle tip through the skin until the tip rests against the bone • The 5mm mark must be visible above the skin for confirmation of adequate needle length • Gently drill into the humerus 2cm or until the hub reaches the skin in an adult. o The hub of the needle set should be perpendicular to the skin • Hold the hub in place and pull the driver straight off • Continue to hold the hub while twisting the stylet off the hub with counter clockwise rotations o The needle should feel firmly seated in the bone (1st confirmation of placement) • Place the stylet in a sharps container • Place the EZ-StabilizerTM dressing over the hub • Attach a primed EZ-Connect® extension set to the hub, firmly secure by twisting clockwise • Pull the tabs off the EZ-Stabilizer dressing to expose the adhesive, apply to the skin • Aspirate for blood/bone marrow (2nd confirmation of placement) • Secure the arm in place across the abdomen

AUTOMATED EXTERNAL DEFIBRILATOR (AED)

INDICATIONS	SIGNS AND SYMPTOMS	CONTRAINDICATIONS
• Non-traumatic cardiac arrest in patients > 8 years of age	The patient must meet ALL of the following criteria: • Unresponsive • Apneic • Pulseless • Weighs greater than 55 lbs • Pediatric patients >8 years	• If patient is found in water, remove from water and dry patient thoroughly. Do not use an AED in an explosive atmosphere, extremely wet atmosphere, or on a metal surface • If a medication patch is found, remove patch and wipe clean before applying defibrillation pads • Do not place defibrillation pads directly over patient's implanted defibrillator • Patients < 8 years of age require specific pediatric defibrillation equipment

PROCEDURE

Establish that the patient is pulseless and apneic.

1. Perform CPR for (2) minutes.
2. Attach the defibrillation pads to the patient's chest and connect the cables to the AED.
3. The sternum pad is to be attached to the patient's upper right chest, to the right of the sternum on the mid- clavicular line.
4. The apex pad is to be attached to the patient's lower left rib cage, laterally and beneath the left nipple.
5. Turn the unit ON and follow the voice prompts.
6. Rhythm analysis:

Do not have any patient contact while the AED analyzes. Rhythm analysis should take approximately 9 - 13 seconds.

7. If the AED unit's voice prompts advise that "no shock advised": Check for a pulse, if no pulse, continue CPR.
8. Visually check that no one is in contact with the patient and announce CLEAR.
9. Press the SHOCK button when advised to by the unit's voice prompts:
10. Continue CPR for 2 minutes.
11. If the patient's pulse has returned:

Insure that the patient has a patent airway and treat accordingly.

12. If the patient remains pulseless, continue use of CPR and AED.

KEY POINTS

- Do not use the AED in cases of traumatic or hypovolemic cardiac arrest (unless driver involved in MVA is in cardiac arrest and is suspected of having an acute MI while driving).
- Resuscitation should be withheld in all cases where such efforts would be futile. Patients should be considered DOA and resuscitation should not be attempted in the following situations:
- Refer to the Dead-on Arrival (DOA) Policy.
- A valid (within the last 2 years) Do Not Resuscitate (DNR). Refer to the Advanced Directives – Do Not Resuscitate (DNR) Policy.
- Defibrillation cables should be inspected for damage and / or wear.
- Defibrillation pads should be routinely inspected to assure that they are within their expiration and are not opened.
- Assure that batteries are charged, and spares are available.

CARDIAC DEFIBRILLATION (MANUAL)

INDICATIONS	SIGNS AND SYMPTOMS	CONTRAINDICATIONS
• Cardiac arrest with ventricular fibrillation or pulseless ventricular tachycardia	The patient must meet ALL of the following criteria • Unresponsive • Apneic • Pulseless	• If patient is found in water, remove from water and dry patient thoroughly. Do not use an AED in an explosive atmosphere, extremely wet atmosphere, or on a metal surface • If medication patch found, remove patch and wipe clean before applying defibrillation pads • Do not place defibrillation pads directly over patient's implanted defibrillator • Pediatric patients < 8 years of age require specific pediatric monitoring equipment

PROCEDURES

EMT ADVANCED EMT PARAMEDIC

1. Establish that the patient is pulseless and apneic.
2. Provide (2) minutes of CPR.
3. Attach defibrillation pads and cables. Plug cable into EKG monitor.
4. Recognize EKG findings as ventricular fibrillation or pulseless ventricular tachycardia.
5. Charge the device to 360 J or recommended charge.
6. Visually check that no one is in contact with the patient and announce CLEAR.
7. Press the SHOCK button and deliver the shock.
8. Resume CPR for (2) minutes.
9. Check monitor for changes in rhythm. Check pulse.
10. If no change in rhythm repeat steps 5 - 8.
11. If EKG reveals change in findings, treat with the appropriate ACLS Protocol.

Double Sequential Defibrillation

For situations where a second defibrillator is immediately available and AT LEAST 4 previous defibrillations have failed.

1. Apply 2 defibrillators per typical measures.
2. One set of pads standard apex / sternum placement.
3. One set of pads anterior / posterior placement.
4. Charge BOTH defibrillators to highest joule setting.
5. ONE PERSON clears patient and SIMULTANEOUSLY presses shock buttons on BOTH defibrillators.

12 - LEAD CARDIAC MONITORING

INDICATIONS	SIGNS AND SYMPTOMS	CONTRAINDICATIONS
• Suspected cardiac patient • Suspected tricyclic overdose • Electrical injuries	• Any complaint of pain or discomfort between the nose and the navel • Chest pain / tightness • Chest discomfort • Chest discomfort relieved prior to arrival • Pulmonary edema • Palpitations • Irregular heartbeat • Syncope • Dizziness • Unexplained diaphoresis • Dyspnea • Weakness / numbness • HR< 50 or > 120 • Hypotension / hypertension	• Insufficient training

Placement of the "V" Leads LEFT SIDE EKG	Placement of the "V" Leads RIGHT SIDE EKG
V1: 4th ICS – right of the sternum **V2**: 4th ICS – left of the sternum **V3**: Between V2 and V4 **V4**: 5th ICS midclavicular LEFT **V5**: Between V4 and V6 **V6**: Even with V4 midaxillary	**V1**: 4th ICS – right of the sternum **V2**: 4th ICS – left of the sternum **V3**: Between V2 and V4 **RV4**: 5th ICS midclavicular RIGHT **V5**: Between V4 and V6 **V6**: Even with V4 midaxillary

1. Follow the Universal Patient Care Protocol.
2. Place the patient in a position of comfort and explain the procedure.
3. Apply the Limb and V Leads to the patient, protecting patient privacy.
4. Enter patient information.
5. Avoid patient movement and disturbance of EKG Leads.
6. Press 12 – LEAD button. Allow monitor to analyze, interpret, and print rhythm strip.
7. Make appropriate connections to transmission device and press TRANSMIT button to send EKG rhythm strip to hospital. Any adult medical patient or patients of any age with a cardiac history, irregular pulse, unstable blood pressure, dyspnea, chest pain, medication administration, or venous access ***must*** be placed on a cardiac monitor, a 12 lead obtained, and transmitted to the emergency department. The transmission must include the patient's last name.

KEY POINTS

- A 12-Lead EKG should be performed on any patient with a complaint that may be cardiac in origin.
- Protect the patient's modesty.
- The 12-Lead ECG should be acquired **prior** to medication administration (except oxygen) and extrication of the patient.
- If the patient is having an acute MI, contact the receiving hospital as soon as possible.
- The paramedic should give one copy of the12-Lead EKG to the ED physician / nurse immediately upon your arrival, and attach a second copy to the run report.
- EKG adhesive patches should remain on the patient for consistent lead placement with follow up EKGs, but should be removed before defibrillation patches are applied if necessary.
- The monitor should remain on the patient for continuous cardiac monitoring enroute.

TREATMENT DECISIONS ARE NOT TO BE BASED ON COMPUTERIZED EKG INTERPETATIONS

Any adult medical patient or patients of any age with a cardiac history, irregular pulse, unstable blood pressure, dyspnea, chest pain, medication administration, or venous access must be placed on a cardiac monitor, a 12 lead obtained, and transmitted to the emergency department. The transmission must include the patient's last name.

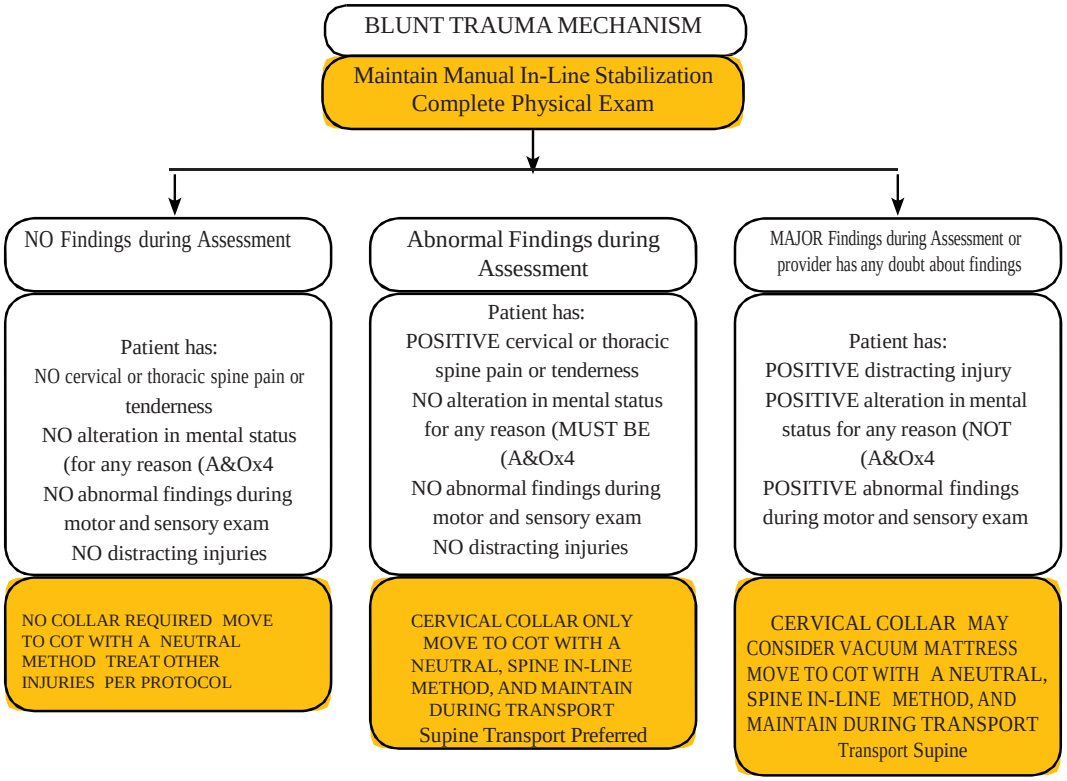
EMTS AND AEMTS ARE EXPECTED TO PLACE LEADS ON THE PATIENT TO OBTAIN AND TRANSMIT A 12-LEAD EKG TO THE HOSPITAL IN THE ABSENCE OF A PARAMEDIC.

EMT AND AEMTS ARE NOT PERMITTED TO INTERPET THE EKG.

INTERPETATIONS

TRAUMA

SPINAL MOTION RESTRICTION – ADULT AND PEDIATRIC



KEY POINTS

- **Vacuum mattresses may be used for major findings patients, but backboards alone may be harmful. Neutral placement on a cot mattress or a Reeves stretcher with a cervical collar is sufficient if a vacuum mattress unavailable.**
- Backboards and KED's can still be used for extrication.
- If a backboard is used for extrication, the patient may be left on the board during transport as situationally required.
- If a vacuum mattress is used, place a sheet over the mattress prior to placement of the patient on the device.
- If a vacuum mattress is used, a backboard may be used underneath to provide additional support as required.
- Never leave patients alone if they are collared and supine. Be prepared to turn the patient while maintaining manual in line stabilization of the spine if the patient begins to vomit to maintain their airway.
- **Penetrating trauma does not require cervical motion restriction unless there is evidence of focal neurological deficits.**
- Document thoroughly the decision process and the assessment findings for treatment decision(s).
- Patients shall not be aided to stand then sit on a backboard during extrication. Non-ambulatory patients shall be properly extricated to a backboard or with the use of a KED.
- Mental Status (AVPU), Glasgow Coma Scale (GCS), and thorough documentation of Motor, Sensory, and Pulses (MSP'S) are required to support treatment decisions.
- Mental status defects despite origin will be treated as equal, whether drug, alcohol, traumatic, chronic brain dysfunction, or otherwise

HELMET REMOVAL

REMOVAL OF HELMET	LEAVE HELMET IN PLACE
• Inability to access, assess and maintain airway and breathing • Improperly fitted helmet allowing for excessive head movement within helmet • Proper C-spine alignment and immobilization cannot be achieved • Cardiac arrest • EMTs are trained in technique	• Helmet fits well with little or no movement of head in helmet • No impending airway or breathing problems • Removal may cause further injury • Proper C-spine alignment and immobilization can be achieved with helmet in place • There is no interference with the ability to assess and reassess airway and breathing

KEY POINTS

Helmet Types:

1. Sport (Football, Ice Hockey, Field Hockey, Fencing, Baseball)
   - Typically, open anteriorly
   - Easier to access airway
   - If shoulder pads are used in conjunction with helmet and helmet is removed, then shoulder pads need to be removed simultaneously for proper C-spine alignment.

2. Motorcycle / Bike / Skateboarding
   - When full-faced, airway is harder to access and maintain.
   - Face shield may be removed for airway access.

SPORTS HELMETS PROCEDURE:

1. Most fit athlete tightly, especially football. They should be left in place.
2. All are equipped to have face piece removed separate from helmet. In most cases, removal of facemask is all that is needed, as the alignment of c-spine can be done with shoulder pads and helmet in place.
3. Removal of facemask may be done by cutting snubber straps that hold it in place to access airway.

Removal:

- If helmet must be removed due to unusual circumstances, at least 4 people are needed.
- Shoulder pads need to simultaneously be removed. (When shoulder pads are involved is to use forearms to stabilize helmet and place hands at base of neck grasping the shoulder area).
- Lift patient flat up for removal of equipment. Helmet should be grasped and tilted slightly to remove – **DO NOT SPREAD SIDES OR BACK EDGE OF HELMET, WILL IMPINGE UPON NECK.**
- At same lift, pull off shoulder pads and clothing.
- Lower patient down and apply c-collar.

MOTORCYCLE / BIKE / SKATEBOARDING HELMETS PROCEDURE:

1. Usually do not fit tightly and may allow movement of head inside helmet.
2. If head can move, no c-spine immobilization is possible.
3. Some have separate face piece that can be moved for airway access.

4.Some have full face design that is not moveable where chin section is a rigid continuation of the helmet.

5.C-spine alignment difficult due to no shoulder padding. Must create pad to form straight alignment.

6. If unable to secure c-spine of airway, the helmet should be removed at the scene.

Removal:

- Take eyeglasses off before removal of the helmet.
- One EMT stabilizes the helmet by placing hands on each side of the helmet with fingers on mandible to prevent movement.
- Second EMT removes any straps by cutting them.
- Second EMT places one hand on the mandible at the angle of the jaw and the other hand posteriorly at the occipital region.
- The EMT holding the helmet pulls the sides of the helmet outwards away from the head and gently slips the helmet halfway off and stops.
- The EMT maintaining stabilization of the neck repositions hold by sliding the posterior hand superiorly to secure to head from falling back after complete helmet removal.
- Helmet is then completely removed.

BLEEDING / HEMORRHAGE CONTROL

TOURNAQUET

INDICATIONS

• The tourniquet is a device which is used for life threatening appendage hemorrhage that cannot be controlled with direct pressure and conventional bandaging techniques.

PROCEDURE

1. Place the device around the injured appendage above the level of bleeding. Place two tourniquets around lower extremities, one above the other.
2. Pull strap tight.
3. Turn windlass rod or knob to tighten to control bleeding.
4. Monitor the site, distal pulses should be absent if properly tightened.

Apply tourniquet proximal to the bleeding site. Route the band around the limb and pass the tip through the inside slit of the buckle. Pull the band tight.

Pass the tip through the outside slit of the buckle. The friction buckle will lock the band in place.

Pull the band very tight and securely fasten the band back on itself.

Twist the rod **until bright red bleeding has stopped and the distal pulse is eliminated.**

Place the rod inside the clip; locking it in place. **Check for bleeding and distal pulse.** If bleeding is not controlled, consider additional tightening or applying a second tourniquet proximal side by side to the first and reassess.

Secure the rod inside the clip with the strap. **Prepare the patient for transport and reassess.** Record the time of application.

KEY POINTS

• Apply directly to the skin 2-3 inches above wound.

• A distal pulse check should be accomplished. If a distal pulse is still present, consider additional tightening of the tourniquet or the use of a second tourniquet side by side and proximal to the first, to eliminate the distal pulse.

• Apply two tourniquets to lower extremity wounds. Tighten both.

• Expose and clearly mark all tourniquet sites with the time of tourniquet application.

• Use tourniquets to control life-threatening external hemorrhage that is possible to apply a tourniquet to for any traumatic amputation.

BLEEDING / HEMORRHAGE CONTROL

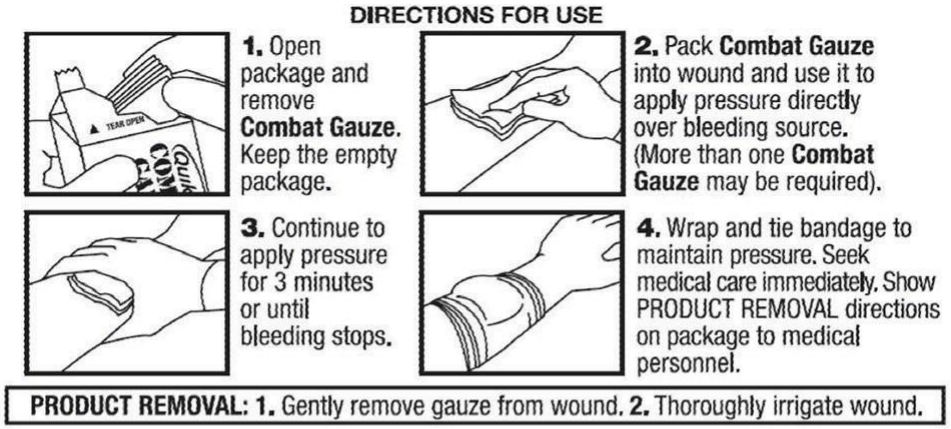
HEMOSTATIC GAUZE

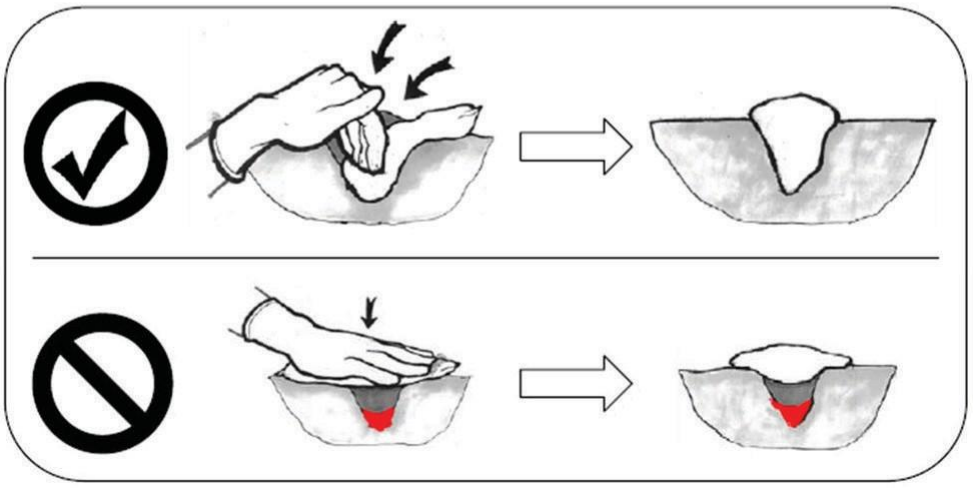
INDICATIONS

• Hemostatic gauze is indicated for supplemental bleeding control in addition to direct pressure where other methods of hemorrhage control are unable to be utilized due to location and direct pressure with standard gauze product has or is likely to fail.

PROCEDURE

1. Open hemostatic gauze package
2. Pack wound with contents
3. Apply pressure for at least 3 minutes
4. Apply standard bandaging over hemostatic gauze to maintain pressure
5. Take hemostatic gauze package with instructions for removal to ER



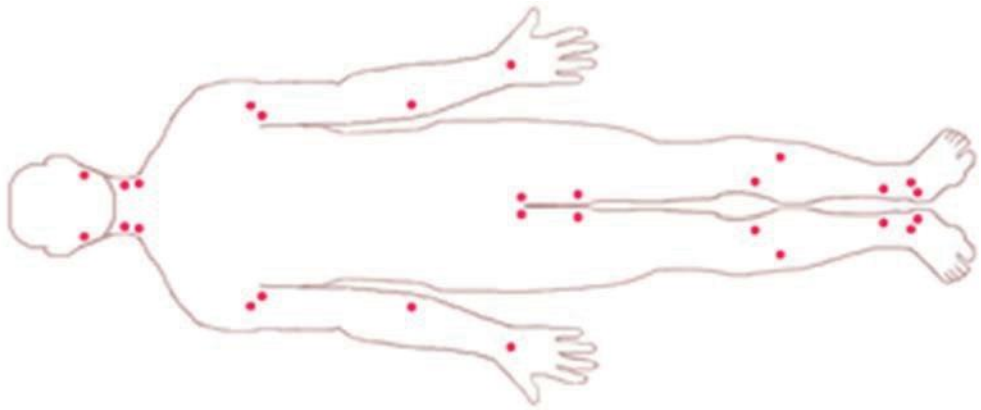


BLEEDING / HEMO RRHAGE CONTROL

Direct pressure / Gauze

Placing pressure on the wound will constrict the blood vessels manually, helping to stem any blood flow. When applying pressure, the type and direction of the wound may have an effect, for instance, a cut lengthways on the hand would be opened up by closing the hand into a fist, whilst a cut across the hand would be sealed by making a fist. A patient can apply pressure directly to their own wound, if their consciousness level allows. Direct pressure can be used with some foreign objects protruding from a wound; padding is applied from each side of the object to push in and seal the wound - objects are never removed. Use available gauze products to cover wounds and roll gauze products and / or tape to provide continued pressure

Pressure points



The arterial pressure points

In situations where direct pressure and elevation are either not possible or proving ineffective the use of pressure points to constrict the major artery which feeds the point of the bleed is indicated. This is usually performed at a place where a pulse can be found, such as in the femoral artery. There is particularly high danger if constricting the carotid artery in the neck, as the brain is sensitive to hypoxia and brain damage can result within minutes of application of pressure. Pressure on the carotid artery can also cause vagal tone induced bradycardia, which can eventually stop the heart. Other dangers in use of a constricting method include rhabdomyolysis, which is a buildup of toxins below the pressure point, which if released back into the main bloodstream may cause renal failure.

Wound Packing

Step 1: Stop the bleeding. Now! Immediately apply direct pressure to the wound, using gauze, clean cloth, elbow, knee-whatever it takes to slow or stop the hemorrhage-until you have time to get out your wound packing supplies.

Step 2: Pack the wound with gauze. Tightly! Your goal is to completely and tightly pack the wound cavity to stop hemorrhage. Begin packing the gauze into the wound with your finger, while simultaneously maintaining pressure on the wound.

When no more gauze can be packed inside the wound, hold direct pressure on the wound for 3 minutes

It's critical that the gauze be packed as deeply into the wound as possible to put the gauze into direct contact with the bleeding vessel.

Step 3: Keep packing! The key to successful wound packing is that the wound be *very* tightly packed, applying as much pressure as possible to the bleeding vessel. This pressure against the vessel is the most important component of hemorrhage control. This explains why plain gauze (without an impregnated hemostatic agent), when tightly packed, is also quite effective.

Step 4: Apply very firm pressure to the packed wound for 3 minutes. This step pushes the packing firmly against the bleeding vessel and aids in clotting.

Step 5: Secure a snug pressure dressing and transport. After applying pressure for 3 minutes, place a snug pressure dressing over the wound. You may consider splinting or immobilizing the area, if possible because movement during transport can dislodge the packing and allow hemorrhage to restart.

PELVIC STABILIZATION DEVICE

INDICATIONS

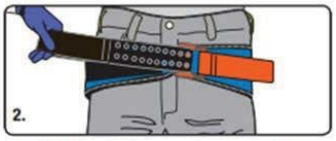
• Suspected adult pelvic fractures and dislocations.

PROCEDURE

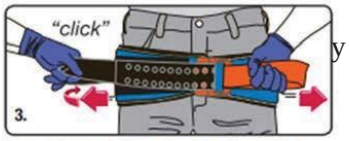
1. Unfold Pelvic Sling with white surface facing up.
2. Place white side of Pelvic Sling beneath patient at level of buttocks.
3. Firmly close Pelvic Sling by placing black Velcro side of flap down on the black Velcro strip (fold material and center at midline).
4. Grab orange handle on outer surface of flap and release from flap by pulling upward.
5. Firmly pull both orange handles in opposite directions to tighten the Pelvic Sling.
6. Keep pulling free handle until you feel or hear the buckle click.
7. As soon as the buckle clicks, maintain tension and firmly press orange handle onto the black Velcro strip.

TO REMOVE PELVIC SLING

Remove objects from patient's pocket or pelvic area. Place SAM Pelvic Sling II black side up beneath patient at level of trochanters (hips).



Place **BLACK STRAP** through buckle and pull completely through.



Hold **ORANGE STRAP** and pull **BLACK STRAP** in opposite direction until you hear and feel the buckle click. Maintain tension and immediately press **BLACK STRAP** onto surface of SAM Pelvic Sling II to secure. You may hear a second click as the sling secures.

KEY POINTS

1. Of 120,000 pelvic fractures reported in the U.S. in a typical year, 21,000 were pelvic ring fractures.
2. The mortality rate of pelvic fractures is reported to be more than 25%.
3. The combination of pelvic ring fractures with other injuries increases the mortality rate.
4. Stabilizing pelvic fractures reduces blood loss.
5. Victims are often confused or unconscious making it difficult to diagnose pelvic fractures without X-rays or CT scans. Physical examination is inaccurate approximately 90% of the time.
6. Trauma surgeons and emergency department physicians have recognized the benefits of circumferential pelvic compression.
7. At the time of initial evaluation, the exact type of facture is usually unknown. In some cases, too little force will not close or stabilize the fracture, in others, too much force can collapse the pelvic ring.
8. Because of the potentially devastating hemorrhage associated with pelvic fractures, standard first aid protocol has included applying some type of circumferential binder around the victim's hips.
9. Cannot be over-tightened. The force applied is safe and correct. 10. Standard size fits 95% of the population without cutting or trimming.