

**STATE OF OHIO**  
**EMERGENCY MEDICAL, FIRE, AND TRANSPORTATION**  
**SERVICES BOARD**

**REGIONAL PHYSICIANS ADVISORY BOARD**

**EMERGENCY MEDICAL SERVICES**

**GUIDELINES AND PROCEDURES MANUAL**

**INTRODUCTION**

**Ohio emergency medical services (EMS) providers strive every day to deliver the highest standard of emergency medical services to the people of Ohio. On behalf of the State Board of Emergency Medical, Fire, and Transportation Services (EMFTS), the Regional Physician Advisory Board was charged with drafting proposed guidelines that EMS agencies could use in setting that standard.**

**Please note that the proposed guidelines are not mandatory for Ohio EMS agencies. The guidelines and procedures manual is meant to assist in the development of local protocols. It is the Board's hope that individual regions or agencies will review these guidelines with their medical directors and legal counsel when drafting their own individualized protocols. The guidelines were updated in 2012 and will be periodically reviewed by the Regional Physician Advisory Board in order to maintain the most current information available.**

**Reviewed & Approved by:**  
**Regional Physician Advisory Board Chairs**  
**Medical Oversight Committee**  
**State EMFTS Board**

**February 6, 2012**  
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REGIONAL PHYSICIAN'S ADVISORY BOARD  
EMERGENCY MEDICAL SERVICES BOARD  
PREHOSPITAL PATIENT CARE GUIDELINES AND PROCEDURES

All algorithms are color coded to denote procedures that may be performed by each level of certification. To perform procedures color-coded red, Medical Control must be contacted for permission.

Higher levels of certification will perform lower level evaluations and procedures when interpreting the algorithms.

KEY TO ALGORITHMS

EMERGENCY MEDICAL  
TECHNICIAN (EMT)

ADVANCED EMERGENCY  
MEDICAL TECHNICIAN (AEMT)

PARAMEDIC (P)

ON-LINE  
MEDICAL CONTROL

## ABDOMINAL PAIN

### GENERAL CONSIDERATIONS

- A. It is important to remember that abdominal pain can be caused by a large number of different disease processes. The organ systems that may be involved in abdominal pain include esophagus, stomach, intestinal tract, liver, pancreas, spleen, kidneys, male and female genital organs, bladder, as well as referred pain from the chest that can involve the heart, lungs or pleura. Abdominal pain may also be caused by muscular and skeletal problems.
- B. There are a limited number of problems that present with abdominal pain that are life-threatening or may become life-threatening.
1. Myocardial Infarction
  2. Perforated stomach, gallbladder, or bowel
  3. Gastrointestinal bleeding with pain - usually due to an ulcer
  4. Hemorrhagic pancreatitis
  5. Appendicitis
  6. Diabetic ketoacidosis
  7. Ruptured esophagus (this usually presents with chest pain)
  8. Dissecting or ruptured abdominal aortic aneurysm
  9. Certain toxic mushrooms ingestion and other toxic ingestion
  10. Ectopic pregnancy
- C. Abdominal pain emergencies are likely to lead to death due to blood or fluid loss with resultant shock. There may also be severe electrolyte abnormalities that can cause arrhythmias.
- Myocardial Infarction may present as abdominal pain especially in the diabetic and elderly.

### EMT

- A. Secure airway
1. Administer oxygen as needed to treat shock and/or respiratory distress
  2. Apply pulse oximeter and treat per pulse oximeter procedure, if available.
- B. Evaluate patient's general appearance, relevant history of condition and determine:
- |                       |  |
|-----------------------|--|
| <u>O</u> nset         | <u>A</u> llergies  |
| <u>P</u> rovokes      | <u>M</u> edication   |
| <u>Q</u> uality       | <u>P</u> ast Medical History - especially, recent surgery, any abnormal ingestion, previous trauma, related medical diseases |
| <u>R</u> adiates      |  |
| <u>S</u> everity      |  |
| <u>T</u> ime          | <u>L</u> ast Meal  |
| <u>I</u> nterventions | <u>E</u> vents leading to present illness  |
- C. Assess additional associated signs and symptoms:
1. Nausea / vomiting blood or coffee grounds
  2. Constipation / diarrhea - black, tarry or bloody bowel movements
  3. Problems with urination
  4. Menstrual abnormality
  5. Fever
  6. Tenderness, rigidity, and presence or absence of bowel sounds.
  7. Cardiac associated symptoms: Dyspnea, diaphoresis, shortness of breath (SOB)

Abdominal Pain (cont'd)

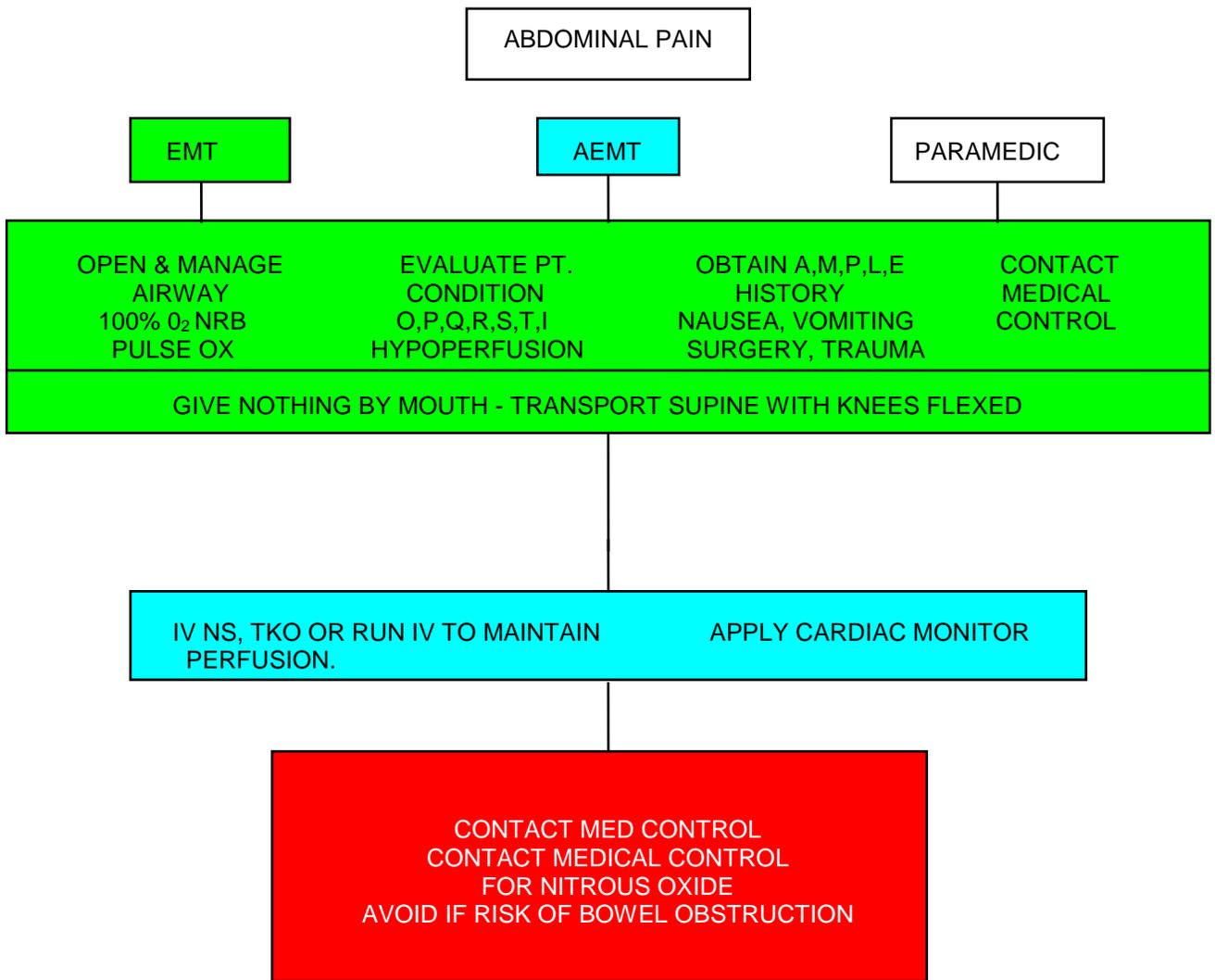
- D. Transport in position of comfort, preferable supine with knees flexed, unless there is respiratory distress
- E. Give nothing by mouth

AEMT

- A. If there is concern about the possibility of blood or fluid loss, start an IV of saline, and run at a keep open rate or saline lock. If hypotensive, administer IV fluids at a rate to maintain perfusion.
- B. Apply a cardiac monitor during transport if appropriate.

PARAMEDIC

- A. Obtain orthostatic vital signs and if hypotensive, administer IV fluids at a rate to maintain perfusion.
- B. Apply a cardiac monitor during transport if appropriate.



## ALTERED LEVEL OF CONSCIOUSNESS

### EMT

- A. Secure airway, and consider cervical spine injury
  - 1. Administer 100% oxygen by NRB mask
  - 2. Apply pulse oximeter and/or capnography device and use measurements to guide treatment
  - 3. Be prepared to hyperventilate and/or assist ventilations with an oral or nasal airway and bag valve mask (BVM) or positive pressure ventilation (PPV)
- B. Evaluate patient's general appearance, relevant history of condition and determine:

Onset  
Provokes  
Quality  
Radiates  
Severity  
Time  
Interventions

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

Assess the unresponsive patient using the Glasgow Coma Scale (GCS). Patients with GCSs of 8 or less have poor prognosis and need advanced life support (ALS) as soon as possible.

In possible stroke patients who are alert, assessment of language, motor responses and sensation must be completed to establish baselines for future changes.

Pulseless patients or those with a weak or slow pulse following a known or suspected opioid overdose should be managed as cardiac arrest patients. Standard resuscitative measures should be initiated immediately and should take priority over naloxone administration or waiting for a response from previously administered naloxone.

- C. Obtain a blood glucose measurement if the equipment is available. Consider administration of glucose with intact gag reflex.
- D. If an opioid overdose is suspected, administer naloxone 2 mg (Narcan®) intranasally (IN) or 0.4 mg via auto-injector (EVZIO®). Contact medical direction if the patient's mental status does not improve or if the patient's mental status deteriorates following transient improvement.
- E. Transport IMMEDIATELY unless an ALS unit is enroute and has an ETA of less than 5 minutes to the scene.

### AEMT

- A. Assist EMS professionals, obtain patient condition and circumstance
- B. If the patient does not have a secure, protected airway, intubate per Intubation Procedure
- C. Apply monitor and check rhythm
- D. Start IV saline, TKO, while enroute to hospital
- E. Consider determination of blood sugar level, if available.
  - 1. If blood sugar less than 80, administer IV bolus, 50 ml of 50% dextrose. May be repeated in 10 minutes if blood sugar remains below 80.
  - 2. If blood sugar greater than 400 and signs of hypoperfusion are present, administer IV fluid bolus of at least 250 ml of saline. May be repeated if no response in 10 minutes.

ALTERED LOC (cont'd)

3. If unable to check blood sugar and LOC is decreased administer IV bolus, 50 ml of 50% dextrose
- F. If respirations are impaired, or there is a high index of suspicion of narcotic overdose and patient does not respond to dextrose or fluid bolus, administer naloxone (Narcan®) 2 mg by IV push, endotracheal, nebulizer, IO, IM, IN, or SQ or administer naloxone 0.4 mg via auto-injector (EVZIO®). If patient improves somewhat with naloxone but is not fully awake, repeat dose

CONSIDER PATIENT RESTRAINT BEFORE ADMINISTRATION OF NARCAN®  
SEE RESTRAINT POLICY

- H. Re-evaluate patient condition, contact Medical Control, and transport to hospital  
Check blood sugar or draw blood chemistry tube.
- F. If blood sugar greater than 400 and signs of hypoperfusion are present, administer IV fluid bolus of at least 250 ml of saline. May be repeated if no response in 10 minutes.

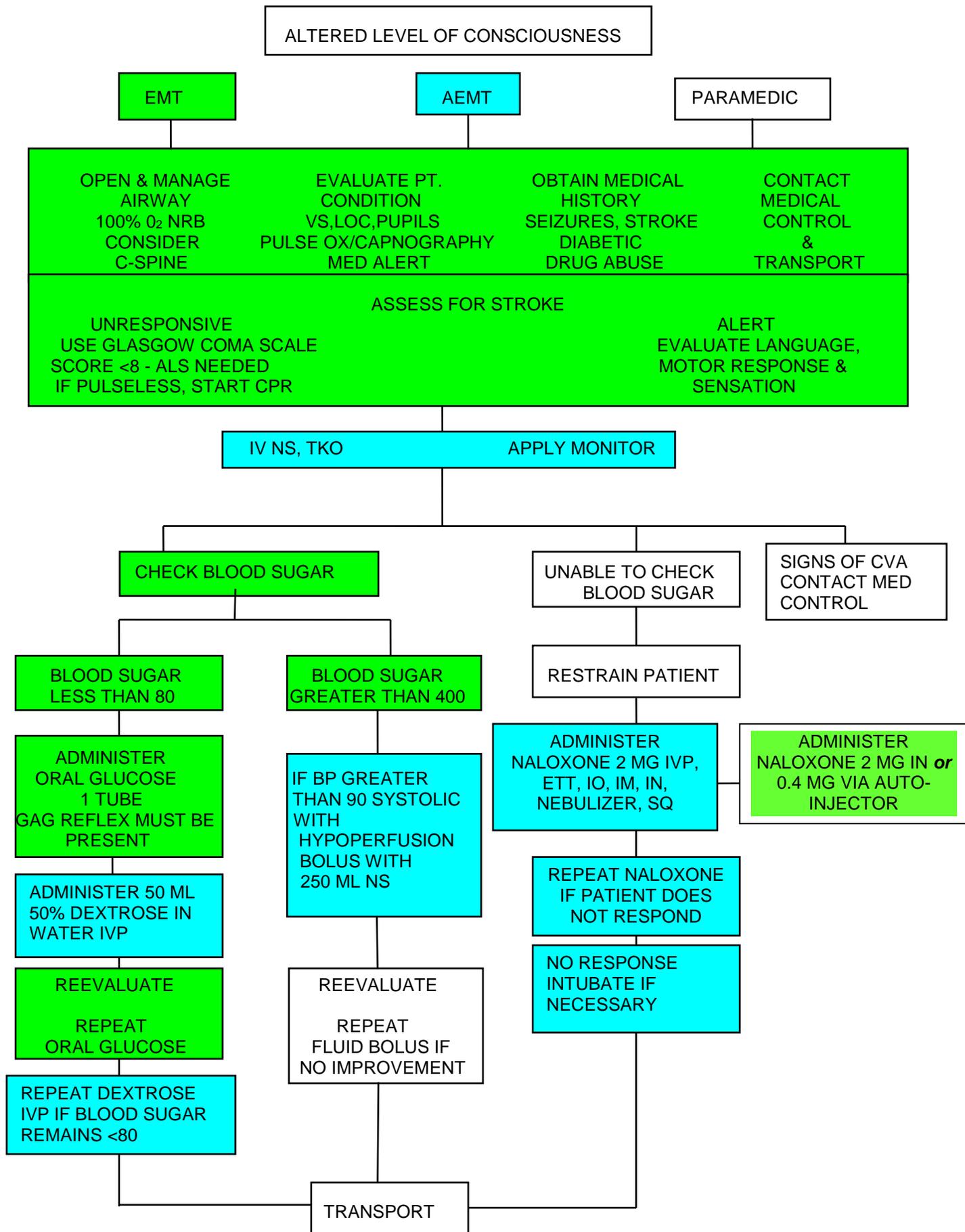
DO NOT DELAY TRANSPORT

PARAMEDIC

- A. Assume charge of situation and confer with EMS professionals about condition of patient and situation
- B. If patient does not have a secure, protected airway, intubate per Intubation Procedure
- C. Apply monitor and check rhythm
- D. Start IV saline TKO.
- E. If signs of CVA, contact Med Control.
- F. Consider determination of blood sugar level, if available.
  1. If blood sugar less than 80, administer IV bolus, 50ml of 50% dextrose. May be repeated in 10 minutes if blood sugar remains below 80.
  2. If blood sugar greater than 400 and signs of hypoperfusion are present, administer IV fluid bolus of at least 250 ml of saline. May be repeated if no response in 10 minutes.
  3. If unable to check blood sugar and LOC is decreased administer IV bolus, 50 ml of 50% dextrose
- G. If respirations are impaired, or there is a high index of suspicion of narcotic overdose and patient does not respond to dextrose or fluid bolus, administer naloxone (Narcan®) 2 mg by IV push, endotracheal, nebulizer, IO, IM, IN, or SQ or administer naloxone 0.4 mg via auto-injector (EVZIO®). If patient improves somewhat with naloxone but is not fully awake, repeat dose.

CONSIDER PATIENT RESTRAINT BEFORE ADMINISTRATION OF NALOXONE  
SEE RESTRAINT POLICY

- H. Re-evaluate patient condition, contact Medical Control, and transport to hospital



## ARRHYTHMIAS

### GENERAL CONSIDERATIONS

- A. In the treatment of cardiac arrhythmias, current American Heart Association guidelines were referenced for guideline development
- B. Always provide oxygen support, make the patient comfortable, and provide reassurance
- C. Transport is essential when Advanced Cardiac Life Support is not available within 10 minutes of receipt of the call

### EMT / AEMT

- A. Open and manage the airway and provide 100% oxygen by non-rebreather (NRB) mask. Apply pulse oximeter.
- B. Make patient comfortable and provide reassurance
- C. Evaluate patient's general appearance, relevant history of condition and determine:

Onset  
Provokes  
Quality  
Radiates  
Severity  
Time  
Interventions

Allergies  
Medication  
Past Medical History - especially CARDIAC  
Last Meal  
Events leading to present illness

- D. If patient is experiencing an unusual and/or irregular heart rate or pulse, if available, application of the cardiac monitor may be applied by the AEMT with assistance from the EMT if necessary. The AEMT may obtain a monitor strip for evaluation by the physician at the emergency department. This should only be done during transport, and you must advise the patient you are doing this for the physician and cannot provide the patient with your interpretation of the strip.
- E. Establish communications with medical control and advise them of patient condition. Transport IMMEDIATELY unless an advanced life support unit is enroute and has an ETA of less than 5 minutes to the scene

### PARAMEDIC

- A. Assume charge of situation and confer with EMS professionals about condition of patient and situation
- B. Apply cardiac monitor and determine arrhythmia
- C. Start IV/IO normal saline (NS)

## ARRHYTHMIAS (cont'd)

### D. Treat arrhythmia as follows:

#### 1. Bradycardia

If heart rate is < 60 beats per minute, assess patient's perfusion. Signs/symptoms of poor perfusion include:

- Hypotension
- Acutely altered mental status
- Signs of shock
- Ischemic chest discomfort
- Acute heart failure
- If patient is taking calcium channel blockers or is a possible beta blocker overdose, consider calling medical control for appropriate antidote.

##### a. Good perfusion

- i. Transport
- ii. If second degree heart block type II or third degree heart block, prepare patient for external pacing by applying external pacer pads. If the patient develops signs of poor perfusion, initiate external pacing.

##### b. Poor perfusion:

- i. Consider sedation Valium®/Versed® 3-5 mg IV
- ii. External pacemaker set at 80 beats per minute and start at 20 milliamps. Increase by 20 milliamps every ten seconds until mechanical capture is obtained;

NOTE: Atropine may be administered while preparing for pacing

- iii. Atropine 0.5 mg IVP, subsequent doses 0.5 mg every 3-5 minutes up to 3 mg (0.04 mg/kg), or until heart rate is 60 and an adequate systolic blood pressure (SBP) is obtained (SBP greater than 90 with adequate level of consciousness).
- iv. If perfusion is poor after maximum dose of atropine, initiate dopamine IV infusion of 2-10 mcg/kg/minute or epinephrine IV infusion of 2-10 mcg/minute titrated to a systolic BP of 90 or until the patient's level of consciousness improves.

#### 2. Narrow complex tachycardias:

If heart rate is < 150 beats per minute, assess patient's perfusion. Signs/symptoms of poor perfusion include:

- Hypotension
- Acutely altered mental status
- Signs of shock
- Ischemic chest discomfort
- Acute heart failure

##### a. Good Perfusion

- i. Vagal maneuver or carotid massage
- ii. Adenosine (Adenocard®) 6 mg rapid IV push followed immediately by a 20 ml bolus of saline
- iii. If no response in 1-2 minutes, adenosine 12 mg rapid IV push followed immediately by a 20 ml bolus of saline.
- iv. If the patient does not respond to adenosine, consider contacting medical control for orders for additional medications.
- v. If patient remains stable, observe and transport.

## ARRHYTHMIAS (cont'd)

NOTE: If at any time the patient becomes unstable with poor perfusion, go directly to synchronous cardioversion.

### b. Poor perfusion:

NOTE: Based on assessment findings, the Paramedic may choose to administer adenosine before attempting synchronized cardioversion if there is a regular narrow complex. If patient is unstable with poor perfusion, the Paramedic may omit adenosine administration and proceed directly to synchronized cardioversion immediately.

- i. Adenosine 6 mg rapid IV push followed immediately by a 20 ml NS bolus IV.
- ii. If no response in 1-2 minutes, adenosine 12 mg rapid IV push followed immediately by a 20 ml NS bolus IV.
- iii. Consider sedation Valium®/Versed® 5mg IV
- iv. Initial synchronized cardioversion:
  - (a) 50-100 J (monophasic or biphasic) for narrow regular complexes
  - (b) 200 J monophasic or 120-200 J biphasic for narrow irregular complexes

### 3. Wide complex tachycardias (with a pulse):

Assess patient's perfusion. Signs/symptoms of poor perfusion include

- Hypotension
- Acutely altered mental status
- Signs of shock
- Ischemic chest discomfort
- Acute heart failure

#### a. Good Perfusion

- i. Administer an antiarrhythmic.

Antiarrhythmics that are indicated for a wide complex tachycardia are amiodarone, sotalol, or procainamide. The choice of the antiarrhythmic to be administered should be predetermined by the medical director for your organization. Please follow these guidelines for the administration.

- Amiodarone 150 mg IVP over 2- 3 minutes
  - If the patient's condition is unchanged ten minutes after the first dose, a second dose of amiodarone and a maintenance infusion of 1 mg/minute may be administered by medical direction order.
  - If at any time the patient becomes unstable, prepare for immediate cardioversion.
- Sotalol 100 mg (1.5 mg/kg) IV over 5 minutes
  - Avoid administration for a prolonged QT interval
- Procainamide IV infusion of 20-50 mg/minute
  - Maximum dose is 17 mg/kg
  - Discontinue infusion if the arrhythmia becomes suppressed, hypotension or signs and symptoms of CHF develop, development of a prolonged QRS complex greater than 50%, or the maximum dose of 17 mg/kg has been administered.
  - Consider contacting medical control for orders to begin a maintenance IV infusion of 1-4 mg/minute.

**\*\*NOTE:** If at any time the patient becomes unstable with poor perfusion, go directly to synchronous cardioversion.

**\*NOTE: Do not administer more than one antiarrhythmic simultaneously to a patient. The choice of the antiarrhythmic to be administered should be predetermined by the medical director for your organization.**

- ii. Consider sedation Valium®/Versed® 5mg IV
- iii. Initial synchronized cardioversion:
  - (a) 100 J (monophasic or biphasic) for wide regular complexes

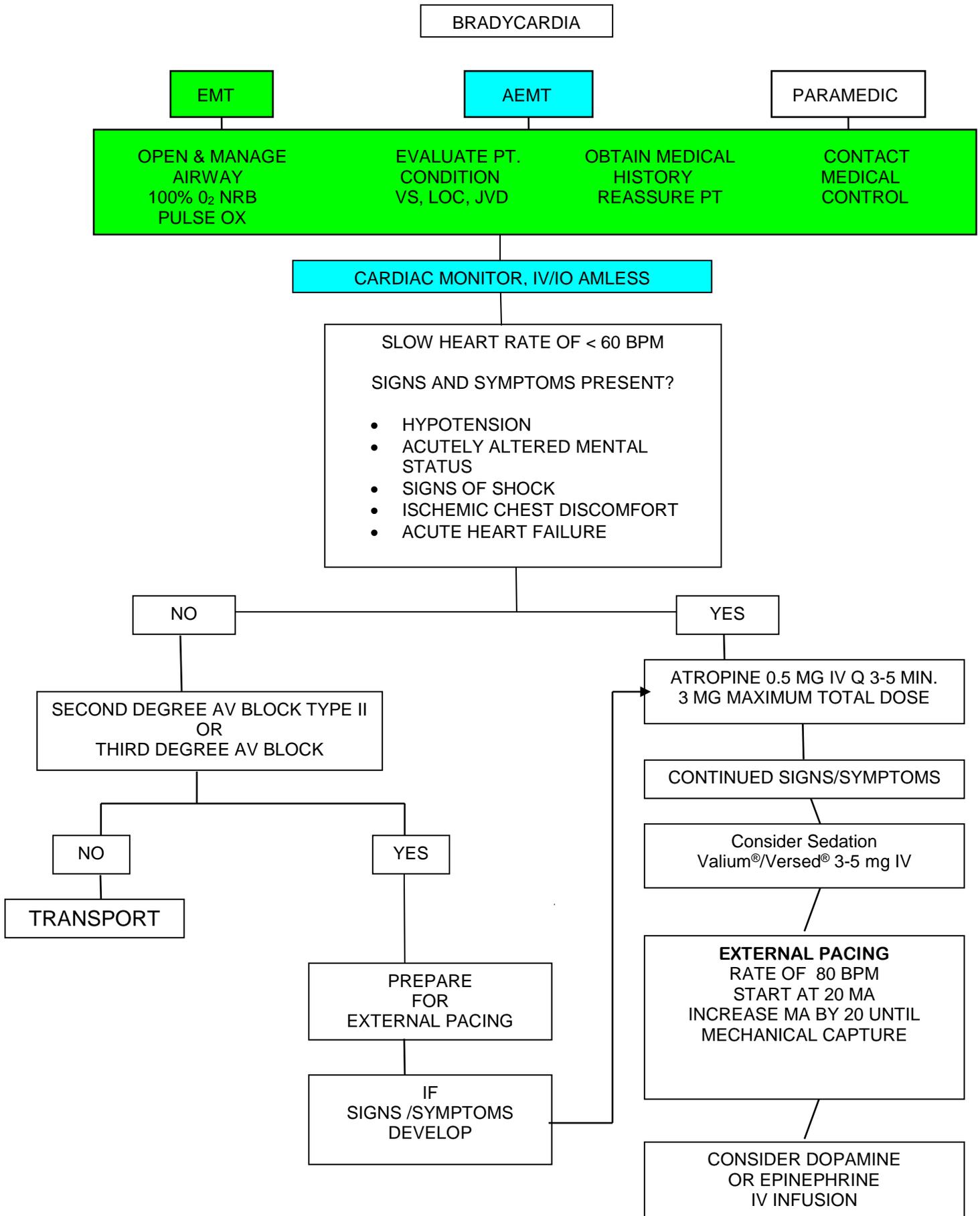
\*\*\* Wide irregular complexes are typically not associated with a stable patient with normal perfusion. Contact medical control for advise on these rare cases.

b. Poor perfusion (with a pulse):

- i. Prepare for immediate synchronized cardioversion
- ii. Consider sedation Valium®/Versed® 5mg IV
- iii. Synchronous cardioversion:
  - (a) 100 J (monophasic or biphasic) for wide regular complexes
  - (b) Defibrillation with high-energy UNSYNCHRONIZED shocks for wide irregular complexes
- iv. Administer an antiarrhythmic. Antiarrhythmics that are indicated for a wide complex tachycardia are amiodarone, sotalol, or procainamide. The choice of the antiarrhythmic to be administered should be predetermined by the medical director for your organization. Please follow these guidelines for the administration.
  - Amiodarone 150mg IVP over 2- 3 minutes
    - If the patient's condition is unchanged ten minutes after the first dose, a second dose of amiodarone and a maintenance infusion of 1 mg/minute may be administered by medical direction order.
    - If at any time the patient becomes unstable, prepare for immediate cardioversion.
  - Sotalol 100 mg (1.5 mg/kg) IV over 5 minutes
    - Avoid administration for a prolonged QT interval
  - Procainamide IV infusion of 20-50 mg/minute
    - Maximum dose is 17 mg/kg
    - Discontinue infusion if the arrhythmia becomes suppressed, hypotension or signs and symptoms of CHF develop, development of a prolonged QRS complex greater than 50%, or the maximum dose of 17 mg/kg has been administered.
    - Consider contacting medical control for orders to begin a maintenance IV infusion of 1-4 mg/minute

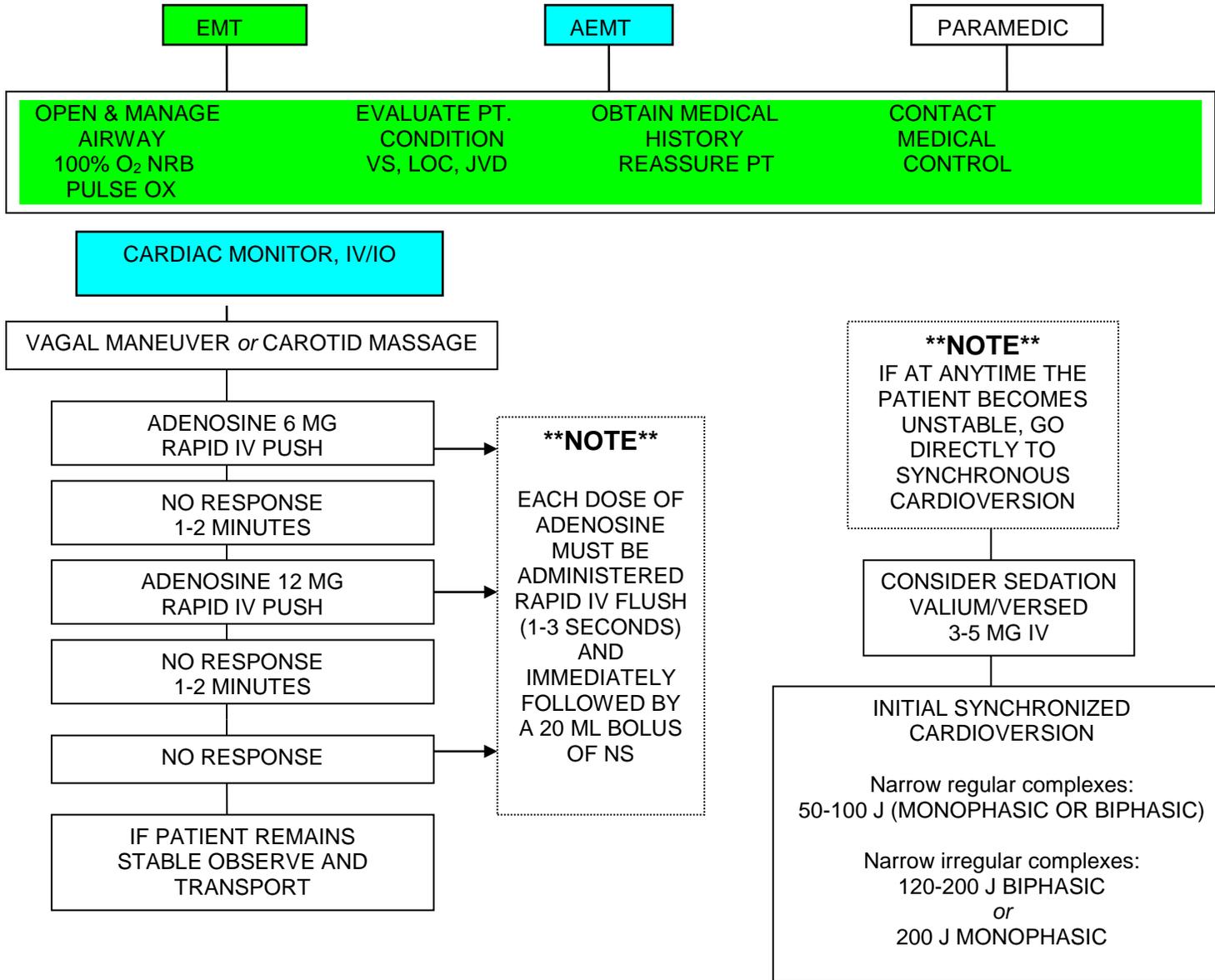
**\*\*NOTE: Do not administer more than one antiarrhythmic simultaneously to a patient. The choice of the antiarrhythmic to be administered should be predetermined by the medical director for your organization.**

- v. Repeat synchronized cardioversion



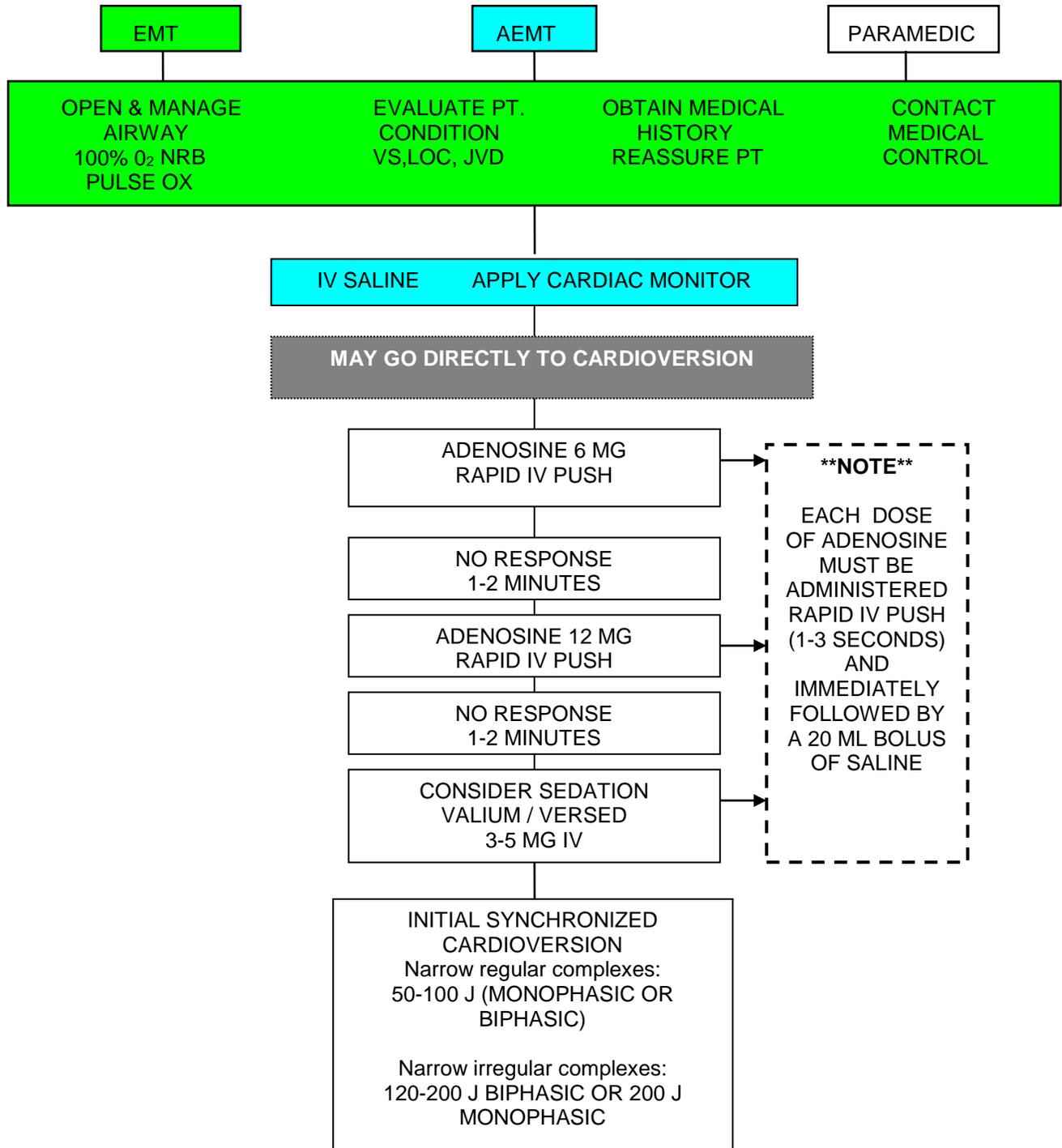
**STABLE NARROW COMPLEX TACHYCARDIA  
(Heart Rate Greater Than 150)**

**PATIENTS WITH A PULSE, GOOD PERFUSION AND ALERT AND ORIENTED ARE CONSIDERED STABLE.**



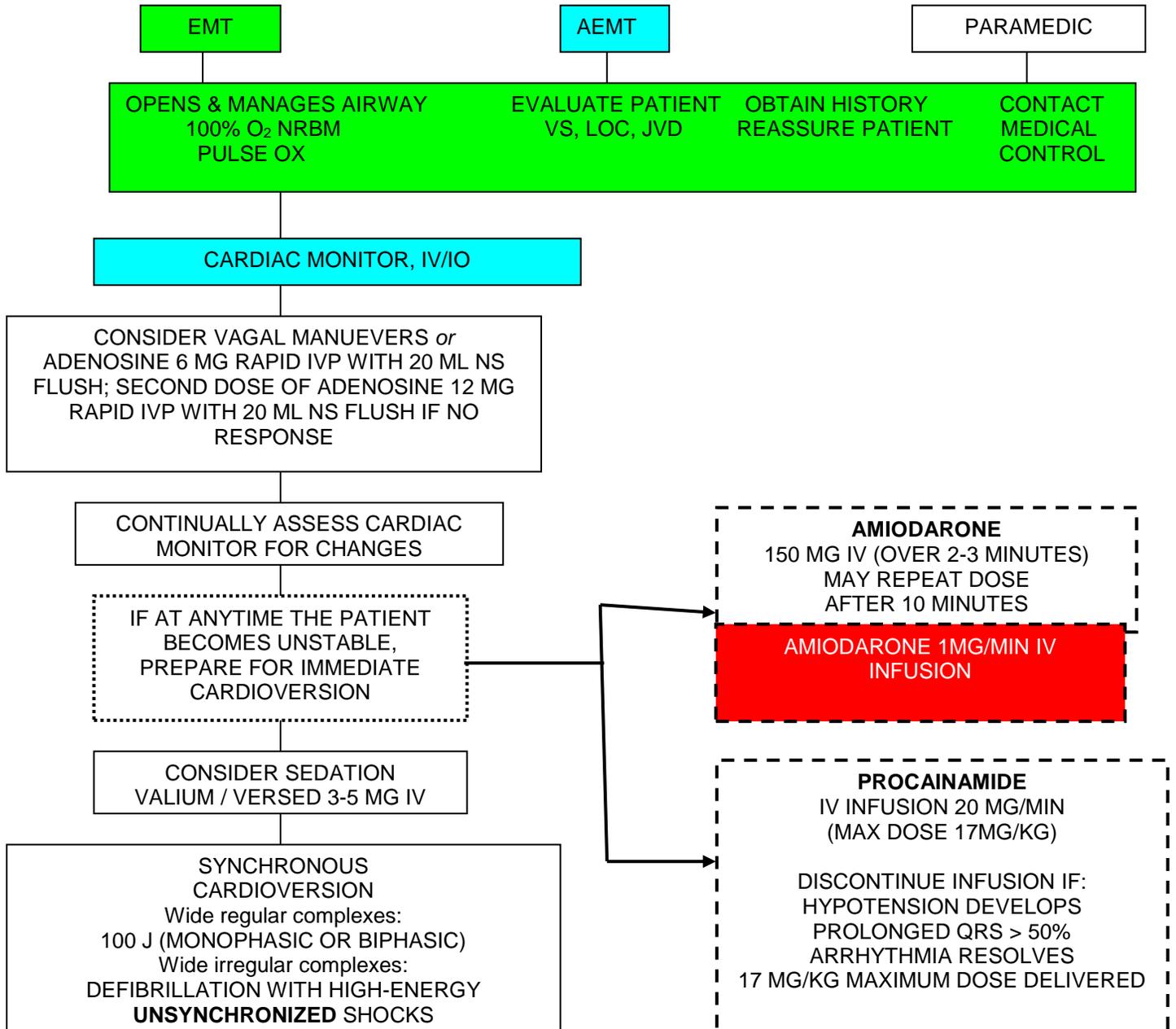
**UNSTABLE NARROW COMPLEX TACHYCARDIAS  
(Heart Rate Greater Than 150)**

**PATIENTS WITH POOR PERFUSION, CHEST PAIN, SHORTNESS OF BREATH  
AND/OR ALTERED LEVEL OF CONSCIOUSNESS ARE CONSIDERED UNSTABLE.**



# STABLE WIDE COMPLEX TACHYCARDIA

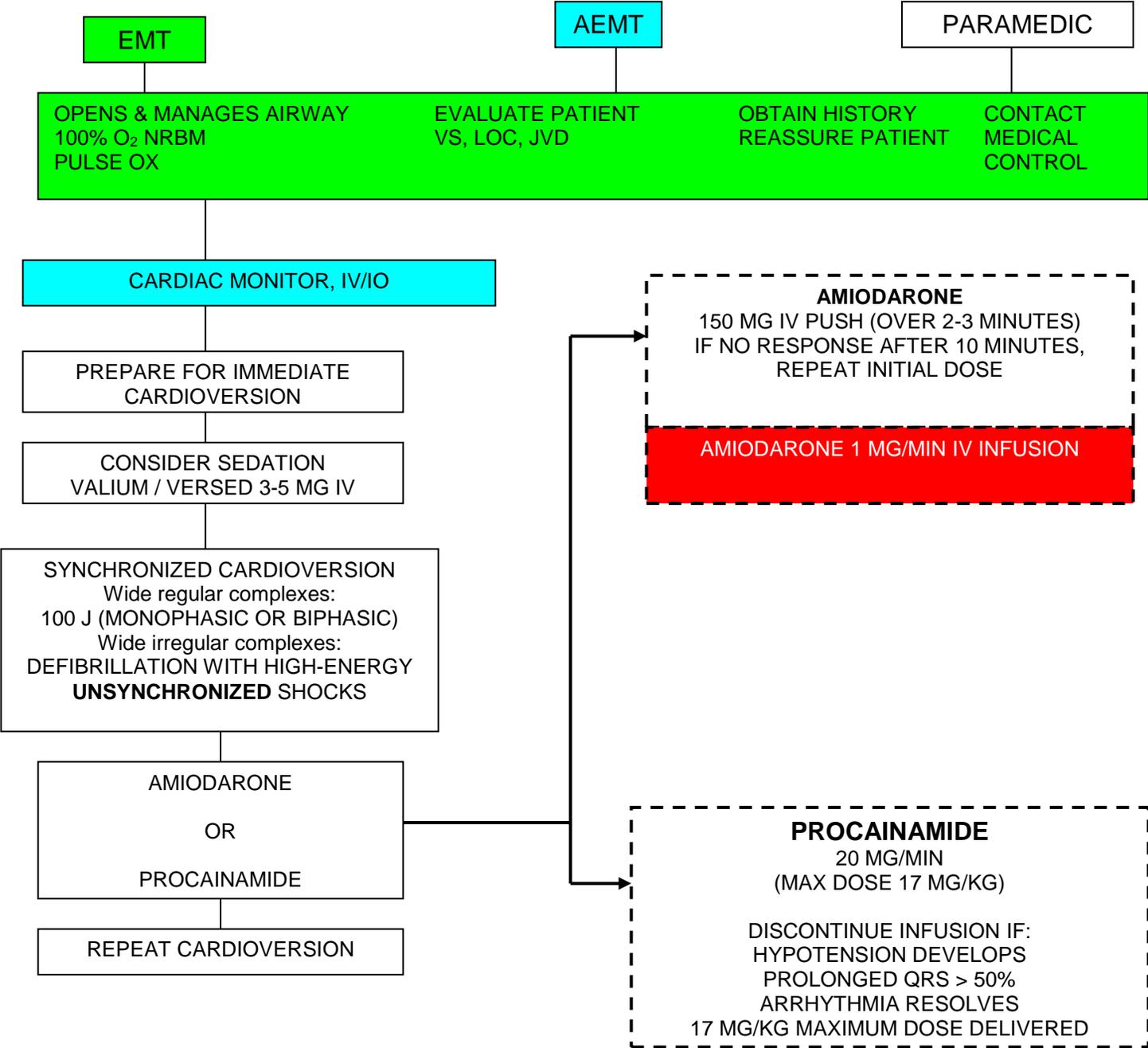
PATIENTS WITH A GOOD PULSE, GOOD PERFUSION, WHO ARE ALERT AND ORIENTED ARE CONSIDERED STABLE



**DO NOT ADMINISTER MORE THAN ONE ANTIARRHYTHMIC SIMULTANEOUSLY TO A PATIENT**

**UNSTABLE WIDE COMPLEX TACHYCARDIA**

**PATIENTS WITH HYPOTENSION, ACUTELY ALTERED MENTAL STATUS, SIGNS OF SHOCK, ISCHEMIC CHEST DISCOMFORT, OR ACUTE HEART FAILURE ARE CONSIDERED UNSTABLE**



**DO NOT ADMINISTER MORE THAN ONE ANTIARRHYTHMIC SIMULTANEOUSLY TO A PATIENT**

## BURNS

### GENERAL

- A. The first priority is to assure scene safety and then remove the patient from heat and flame, electrical or chemical exposure
- B. Airway, breathing, and circulation must be stabilized before attending to the burn
- C. Patient with extensive burns must be monitored for hypothermia and the use of ice and/or prolonged cold compresses should be avoided. When in doubt, always cover with dry dressing
- D. In caring for the burn, the EMS professional should:
  - 1. Stop the burning
  - 2. Reduce the pain
  - 3. Prevent contamination
- E. Patients with critical burns must be transported per local protocol.
- F. When dealing with contaminated environments, EMS professionals must have appropriate protective clothing. If not available, contact appropriate HazMat service for such equipment.
- G. Gross decontamination must be done at the scene. Advise receiving facility if complete decontamination was not done at the scene, and be prepared to transport to decontamination area.

### EMT

- A. Open and manage airway and provide oxygen as appropriate.
- B. Determine type of burn and treat as follows:
  - 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.
    - d. 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
    - c. Contact HAZMAT TEAM for assistance in contamination cases

BURNS (cont'd)

3. Chemical Burns:
  - a. EMS professionals must wear appropriate protective clothing and respirators
  - b. Remove patient from contaminated area and move the patient to the decontamination site (NOT TO THE SQUAD)
  - 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 (see chart), 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

AEMT

- A. Assist EMS professional with airway. Intubate if necessary per the Intubation procedure guidelines
- B. Assist in determining type of burn and its treatment
- C. For hypovolemia, start IV per shock protocol

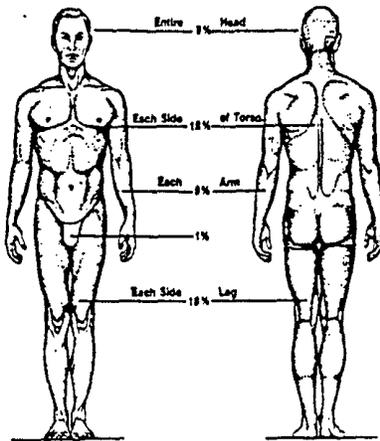
DO NOT DELAY TRANSPORT FOR IV

BURNS (cont'd)

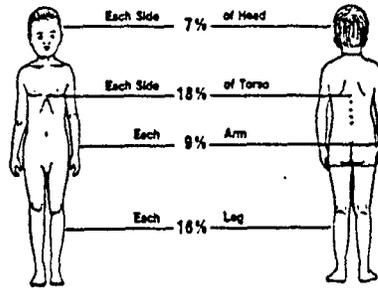
PARAMEDIC

- A. Assume charge - confer with EMS professionals about patient condition and circumstances
- B. Apply cardiac monitor and treat arrhythmia, especially with electrical burns
- C. Provide endotracheal intubation per procedure guidelines.
- D. Consider pain relief per local protocol.

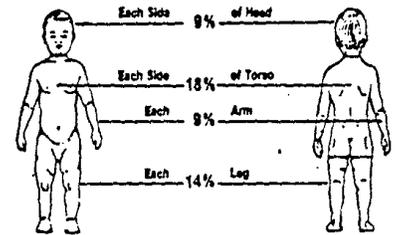
RULE OF NINES



Percentage of Adult Body Surface



Percentage of Child Body Surface



Percentage of Infant Body Surface

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

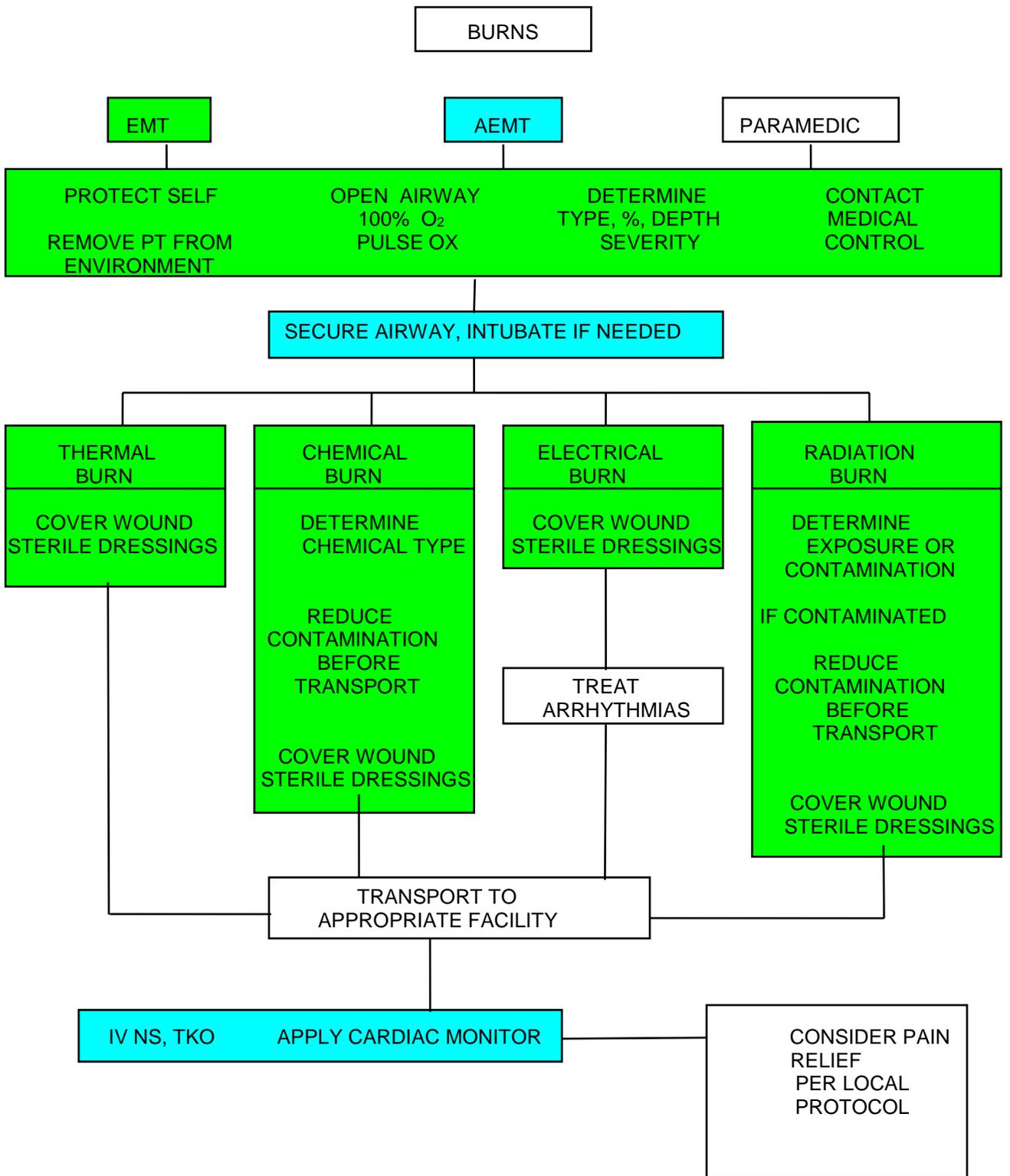
SERIOUSNESS OF BURNS

**MINOR**  
1st degree < 70%  
2nd degree < 10%  
+3rd degree < 2%

+ Only if hands, face, feet or genitalia are NOT involved.

**MODERATE**  
1st degree > 70%  
+2nd degree 10-30%

**CRITICAL**  
2nd degree > 30%  
3rd degree > 2%  
Any burns with trauma.  
Any burns with head, face, feet, genitalia involved.



## CARDIAC ARREST

### GENERAL INSTRUCTIONS

- A. Quality CPR should be initiated immediately and should not be interrupted for more than 15 seconds until spontaneous pulse is established.  
**Compression Ratio for Adult - 30:2**  
Consider administration of two minutes of quality CPR prior to defibrillation.
- B. Quantitative waveform capnography is recommended for monitoring the quality of CPR (with the goal of maintaining end tidal CO<sub>2</sub> (P<sub>ETCO2</sub>) greater than 10 mmHg), detection of the return of spontaneous circulation, and the confirmation of tracheal tube placement.
- C. If IV/IO cannot be established, epinephrine, and atropine may be administered through the endotracheal tube.
- D. When a defibrillator (automated or manual) is immediately available, a single shock should be delivered, if indicated after assessment and a shockable rhythm identified.
- E. If there is no response to an adequate trial of ALS on scene or if the end tidal CO<sub>2</sub> remains low (P<sub>ETCO2</sub> less than 10 mmHg) in an intubated patient after 20 minutes of CPR with other factors as determined by the medical director, termination of resuscitation should be considered (see Termination protocol).
- F. Each IV/IO push medication should be followed by a 20 ml NS or LR flush.
- G. The ideal defibrillation dose using a biphasic defibrillator is the dose at which the device waveform has been shown to be effective in terminating VF. The initial selected dose for attempted defibrillation using a biphasic manual defibrillator is 150 J to 200 J for a biphasic truncated exponential waveform or 120 J for a rectilinear biphasic waveform. The second dose should be the same or higher. If the rescuer does not know the type of biphasic waveform in use, a default dose of 200 J is acceptable.
- H. The induction of post-arrest hypothermia following a successful resuscitation with a target temperature between 32°C and 36°C may be considered if the patient can be transported to a facility that can continue this therapeutic measure. The infusion of cold IV fluids is not recommended.
- I. The acquisition and/or transmission of a 12-lead EKG, completed in accordance with the Ohio EMS scope of practice, following a successful resuscitation should be considered. If the 12-lead EKG demonstrates an acute ST segment myocardial infarction (STEMI), medical direction should be contacted immediately to facilitate the patient's transport to directly to a facility with percutaneous cardiac intervention (PCI) capability if possible.
- J. In patients who are comatose following an out-of-hospital cardiac arrest of suspected cardiac origin and have a 12-lead EKG that does not demonstrate a STEMI, medical direction should be contacted immediately to potentially facilitate the patient's transport directly to a facility with PCI capability.
- K. Pulseless patients or those with a weak or slow pulse following a known or suspected opioid overdose should be managed as cardiac arrest patients. Standard resuscitative measures should be initiated immediately and should take priority over naloxone administration or waiting for a response from previously administered naloxone.
- L. The provision of standard resuscitative measures are a top priority in pregnant patients in cardiac arrest. Relief of aortocaval compression can be achieved with manual uterine displacement to the left if the fundal height is at or above the umbilicus.

## EMT

- A. If an Automated External Defibrillator (AED) is available:
1. Assess patient for respiratory and cardiac arrest
  2. Immediately provide quality CPR
  3. Apply AED and activate device. Start verbal documentation which must include:
    - EMS unit delivering care and ID of EMT
    - Initial call information (i.e. man down, drowning, etc.)
    - Initial patient assessment, findings, and impression
    - Care given to this point
    - Ongoing outcomes of care delivered to patient
- a. “No Shock Advised”
- i. Resume quality CPR
  - ii. Ventilate with 100% oxygen by two-person BVM of oxygen-powered, manually-triggered ventilation device; and oral or nasal airway adjunct. Ventilation should be delivered over two seconds.
  - iii. Contact medical control and advise of cardiac arrest
  - iv. Transport IMMEDIATELY unless an advanced life support unit is enroute and has ETA less than 5 minutes
- b. “Shock Advised”
- i. Deliver single shock
  - ii. Resume quality CPR for two minutes. Manage airway and oxygenate.
  - iii. Contact medical control and advise of cardiac arrest
  - iv. After two minutes of quality CPR, analyze the rhythm with the AED and deliver a single shock, if indicated
    - Defibrillate 120-200 J biphasic or 360 J monophasic
  - v. Continue quality CPR and transport patient to ambulance

### “TURN AED OFF DURING MOVEMENT OF PATIENT”

- vi. Before transport – analyze the rhythm with the AED and deliver single shock, if indicated
  - Defibrillate 120-200 J biphasic or 360 J monophasic
- vii. Transport IMMEDIATELY, unless an advanced life support unit is enroute and has ETA less than 5 minutes

## AEMT

- A. Assume charge and confer with EMS professional as to patient condition and circumstances

**ALLOWS AED TO COMPLETE “SHOCK” SEQUENCE IF IN PROGRESS**

- B. Apply cardiac monitor and check rhythm

- C. If monitor shows ventricular fibrillation or pulseless ventricular tachycardia:

1. Defibrillate 120-200 J biphasic or 360 J monophasic

Cardiac arrest (cont'd)

2. Deliver two minutes of quality CPR.

3. Check rhythm

4. Defibrillate 120-200 J biphasic or 360 J monophasic

5. Resume quality CPR, manage the patient's airway and provide 100% oxygen, start NS IV/IO, contact medical control and advise of patient condition

6. Continue quality CPR

7. Assess rhythm and pulse

8. No change – defibrillate 120-200 J biphasic or 360J monophasic

9. Assess rhythm and pulse, no change

10. Resume quality CPR

11. No change – defibrillate 120-200 J biphasic or 360 J monophasic

- D. After an advanced airway is placed, rescuers no longer deliver “cycles” of CPR. Give continuous chest compressions without pauses for breaths. Give 10 breaths/minute. Check rhythm every two minutes.

## PARAMEDIC

- A. Assume charge and confer with EMS professional as to patient condition and circumstances

**ALLOWS AED TO COMPLETE “SHOCK” SEQUENCE IF IN PROGRESS  
ALLOWS AEMT TO COMPLETE MANUAL DEFIBRILLATION CYCLE IN  
PROGRESS**

- B. Apply cardiac monitor and check rhythm

## Cardiac arrest (cont'd)

- C. If monitor shows ventricular fibrillation or pulseless ventricular tachycardia:
1. Defibrillate 120-200 J biphasic or 360 J monophasic
  2. Deliver two minutes of quality CPR.
  3. Check rhythm
  4. Defibrillate 120-200 J biphasic or 360 J monophasic
  5. Resume quality CPR, manage patient's airway and provide 100% oxygen, start NS IV/IO, contact medical control, and advise of patient condition
  6. Administer epinephrine 1 mg 1:10,000 IV/IO every 3-5 min
  7. Resume quality CPR
  8. Assess rhythm and pulse
  9. If no change, defibrillate 120-200 J biphasic or 360 J monophasic
  10. Assess rhythm and pulse. If no change, continue quality CPR
  11. Administer antiarrhythmic
    - Amiodarone 300 mg IV/IO (second dose 150 mg IV/IO)
    - If amiodarone is not available, lidocaine 1-1.5 mg/kg IV/IO [(second dose 0.5 - 0.75 mg/kg IV/IO) max 3 mg/kg]
    - Magnesium 1-2 g IV/IO (only for torsades de pointes)
  12. Continue CPR
  13. Assess rhythm and pulse
  14. If no change, defibrillate 120-200 J biphasic or 360 J monophasic
- D. After an advanced airway is placed, rescuers no longer deliver "cycles" of CPR. Give continuous chest compressions without pauses for breaths. Give 10 breaths/minute. Check rhythm every two minutes.
- E. Consider reversible causes:
- Hypovolemia
  - Hypoxia
  - Hydrogen ion (acidosis)
  - Hypokalemia/Hyperkalemia
  - Hypothermia
  - Tension pneumothorax
  - Tamponade (cardiac)
  - Toxins
  - Thrombosis (pulmonary)
  - Thrombosis (coronary)

NOTE: Value of sodium bicarbonate has not been demonstrated during cardiac arrest, and it is not recommended for the routine cardiac arrest sequence. Consideration of its use is appropriate with during special resuscitation situations only, specifically when

## Cardiac arrest (cont'd)

preexisting metabolic acidosis, hyperkalemia, or tricyclic antidepressant overdose is suspected.

### **Pulseless Electrical Activity (PEA)/Asystole**

- a. Check pulse, immediately initiate quality CPR, and minimize any interruption in CPR
- b. Apply the cardiac monitor/defibrillator and reassess rhythm every 2 minutes
- c. Obtain IV/IO access
- d. Administer epinephrine 1:10,000 1 mg IVP immediately (with a goal of within 1 to 3 minutes) for patients who present with an initial nonshockable rhythm with repeat doses every 3 to 5 minutes. Administer epinephrine 1:10,000 1 mg IVP every 3 to 5 minutes to patients who present with an initial shockable rhythm
- e. Consider placement of an advanced airway
- f. Epinephrine 1:1,000 2 mg to 2.5 mg diluted with NS 10 ml may be administered via an ETT if IV/IO access has not been obtained or is delayed
- g. Consider treatable causes:
  - Hypovolemia
  - Hypoxia
  - Hydrogen ion (acidosis)
  - Hypokalemia/Hyperkalemia
  - Hypothermia
  - Tension pneumothorax
  - Tamponade (cardiac)
  - Toxins
  - Thrombosis (pulmonary)
  - Thrombosis (coronary)

**CARDIAC ARREST – AED**

**EMT**

**AEMT**

**PARAMEDIC**

**ASSESS FOR RESPIRATORY    BEGIN QUALITY CPR    ACTIVATE ACLS SYSTEM**

**APPLIES AED  
ANALYZE RHYTHM**

**DELIVER SINGLE SHOCK  
120-200 J BIPHASIC  
OR  
360 J MONOPHASIC**

**RESUME QUALITY CPR FOR TWO  
MINUTE CYCLES**

**ESTABLISH IV/IO**

**DELIVERS SINGLE SHOCK  
120-200 J BIPHASIC  
OR  
360 J MONOPHASIC**

**MANAGE AIRWAY  
MOVE PATIENT TO AMBULANCE  
DO NOT INTERRUPT CPR**

**DELIVERS SINGLE SHOCK  
120-200 J BIPHASIC  
OR  
(60 J MONOPHASIC**

**TRANSPORT WITH QUALITY CPR**

# CARDIAC ARREST VENTRICULAR FIBRILLATION/ PULSELESS VENTRICULAR TACHYCARDIA

EMT

AEMT

PARAMEDIC

ASSESS PATIENT FOR RESPIRATORY AND CARDIAC ARREST
ACTIVATE ACLS SYSTEM  
CONTACT MED CONTROL
BEGIN QUALITY CPR  
(2 MINUTE CYCLES)

CARDIAC MONITOR/DEFIBRILLATOR OR AED  
ASSESS/ANALYZE RHYTHM

DELIVER SINGLE SHOCK  
120-200 J BIPHASIC *or*  
360 J MONOPHASIC

QUALITY CPR FOR TWO MINUTES

DELIVER SINGLE SHOCK  
120-200 J BIPHASIC *or*  
360 J MONOPHASIC

ESTABLISH IV/IO  
MANAGE AIRWAY WITH 100% OXYGEN

AFTER AN ADVANCED AIRWAY IS PLACED  
RESCUERS NO LONGER DELIVER "CYCLES"  
OF CPR. GIVE CONTINUOUS CHEST  
COMPRESSIONS WITHOUT PAUSES FOR  
BREATHS. GIVE 10 BREATHS/MINUTE.  
CHECK RHYTHM EVERY TWO MINUTES.

MOVE PATIENT TO AMBULANCE WITH  
CONTINUOUS QUALITY CPR IN PROGRESS

EPINEPHRINE 1:10,000 1 MG IV/IO q 3 – 5 MINUTES  
(ET DOSE – 2 mg 1:1,000 IN 10ml NS)  
CONTINUE QUALITY CPR

DELIVER SINGLE SHOCK  
120-200 J BIPHASIC *or*  
360 J MONOPHASIC

TRANSPORT

DEFIBRILLATE 120-200 J BIPHASIC *or*  
360 J MONOPHASIC

**AMIODARONE**  
 300 MG IV/IO  
  
 AFTER 10 MIN: PATIENT REMAINS IN VT/VF OR  
 CONVERTS TO PERFUSING RHYTHM:  
 AMIODARONE 150 MG IV/IO  
  
 (CONSIDER LIDOCAINE IF  
 AMIODARONE IS NOT AVAILABLE)

AMIODARONE  
CONTINUE QUALITY CPR

DEFIBRILLATE 120-200 J BIPHASIC *or*  
360 J MONOPHASIC

CONTINUE QUALITY CPR, DEFIBRILLATION  
120-200 J BIPHASIC *or* 360 J MONOPHASIC,  
MEDICATION ADMINISTRATION

CONSIDER SODIUM BICARB ONLY FOR PREEXISTING  
METABOLIC ACIDOSIS, TRICYCLIC OVERDOSE,  
HYPERKALEMIA

**BIPHASIC EQUIVALENT BY WAVEFORM**  
 \* TRUNCATED EXPONENTIAL = 150 J - 200 J  
 \* RECTILINEAR = 120 J  
 \* BIPHASIC WAVEFORM UNKOWN = 200J

TRANSPORT WITH QUALITY CPR IN PROGRESS

DO NOT ADMINISTER MORE THAN ONE ANTIARRHYTHMIC TO A PATIENT

**PULSELESS ELECTRICAL ACTIVITY (PEA) /  
ASYSTOLE**

**EMT**

**AEMT**

**PARAMEDIC**

**ASSESS PATIENT FOR RESPIRATORY  
CARDIAC ARREST**      **BEGIN QUALITY CPR  
(2 MINUTE CYCLES)**      **ACTIVATE ACLS SYSTEM AND  
CONTACT MED CONTROL**

**APPLY CARDIAC MONITOR/DEFIBRILLATOR  
ASSESS RHYTHM EVERY 2 MINUTES**

**TRANSPORT**

**OBTAIN IV/IO ACCESS  
MANAGE AIRWAY WITH 100% OXYGEN**

**CONTINUE QUALITY CPR  
EPINEPHRINE 1 MG 1:10,000 IV/IO  
(IMMEDIATELY IF FOR AN INITIAL  
NONSHOCKABLE RHYTHM)  
REPEAT EVERY 3 – 5 MINUTES  
(ET DOSE 2 MG 1:1,000  
DILUTED WITH 10 ML NS)  
CONTINUE QUALITY CPR**

**CONSIDER TREATABLE CAUSES**

- HYPOVOLEMIA
- HYPOXIA
- HYDROGEN IO (ACIDOSIS)
- HYPOKALEMIA/HYPERKALEMIA
- HYPOTHERMIA
- TENSION PNEUMOTHORAX
- TAMPONADE (CARDIAC)
- TOXINS
- THROMBOSIS (PULMONARY)
- THROMBOSIS (CORONARY)

**TRANSPORT WITH QUALITY CPR**

**IF NO RESPONSE AFTER QUALITY CPR, ADEQUATE  
AIRWAY MANAGEMENT WITH 100% OXYGEN,  
IV ACCESS, AND MEDICATION ADMINISTRATION**

**CONTACT MED CONTROL FOR CONSIDERATION OF  
TERMINATION OF RESUSCITATION**

**AFTER AN ADVANCED AIRWAY IS PLACED  
RESCUERS NO LONGER DELIVER “CYCLES”  
OF CPR. GIVE CONTINUOUS CHEST  
COMPRESSIONS WITHOUT PAUSES FOR  
BREATHS. GIVE 10 BREATHS/MINUTE.  
CHECK RHYTHM EVERY TWO MINUTES.**

## SPECIAL RESUSCITATION SITUATIONS

Special resuscitation situations are cardiopulmonary arrest or other life-threatening emergency that require modification or extension of conventional life support techniques.

### NEAR DROWNING

#### GENERAL INFORMATION

- A. The key to success is the provision of early, effective pulmonary support
- B. It is essential that the EMS professional exercise caution and take steps to insure their own safety while retrieving the victim from the water
- C. Drowning is classified as trauma in Ohio. Victims of drowning or near drowning that could require admission to a hospital should be transferred to the appropriate trauma center.
- D. Maintenance of hypothermia in cold-water drowning may be recommended by local medical direction if the patient can be transported to a facility that is capable of continuing this therapeutic measure. A drowning that occurs in a body of water that is located outdoors or is not artificially heated should be classified as a cold-water drowning.

#### EMT

- A. Open airway and start rescue breathing as soon as possible, even if the victim has not been removed from the water
- B. Ventilate with 100% oxygen by two-person BVM or oxygen-powered, manually-triggered or automatic transport ventilation device with oral/nasal airway. Oxygen should be warmed to 42°C, if available. Ventilation should be delivered over two seconds and cricoid pressure should be considered to help reduce gastric distension
- C. Always consider the possibility of a cervical spine injury
- D. It is not recommended to drain fluid from lungs unless ventilations are impaired. If ventilation impairment should occur, suction airway for not more than 15 seconds
- E. Start quality CPR as soon as victim is removed from the water and onto hard surface
- F. Patient may show signs of hypothermia. Handle patient VERY gently; rough handling or movement can cause cardiac arrhythmia. Warm patient by removing wet clothes and cover with blankets
- G. Transport IMMEDIATELY

#### AEMT

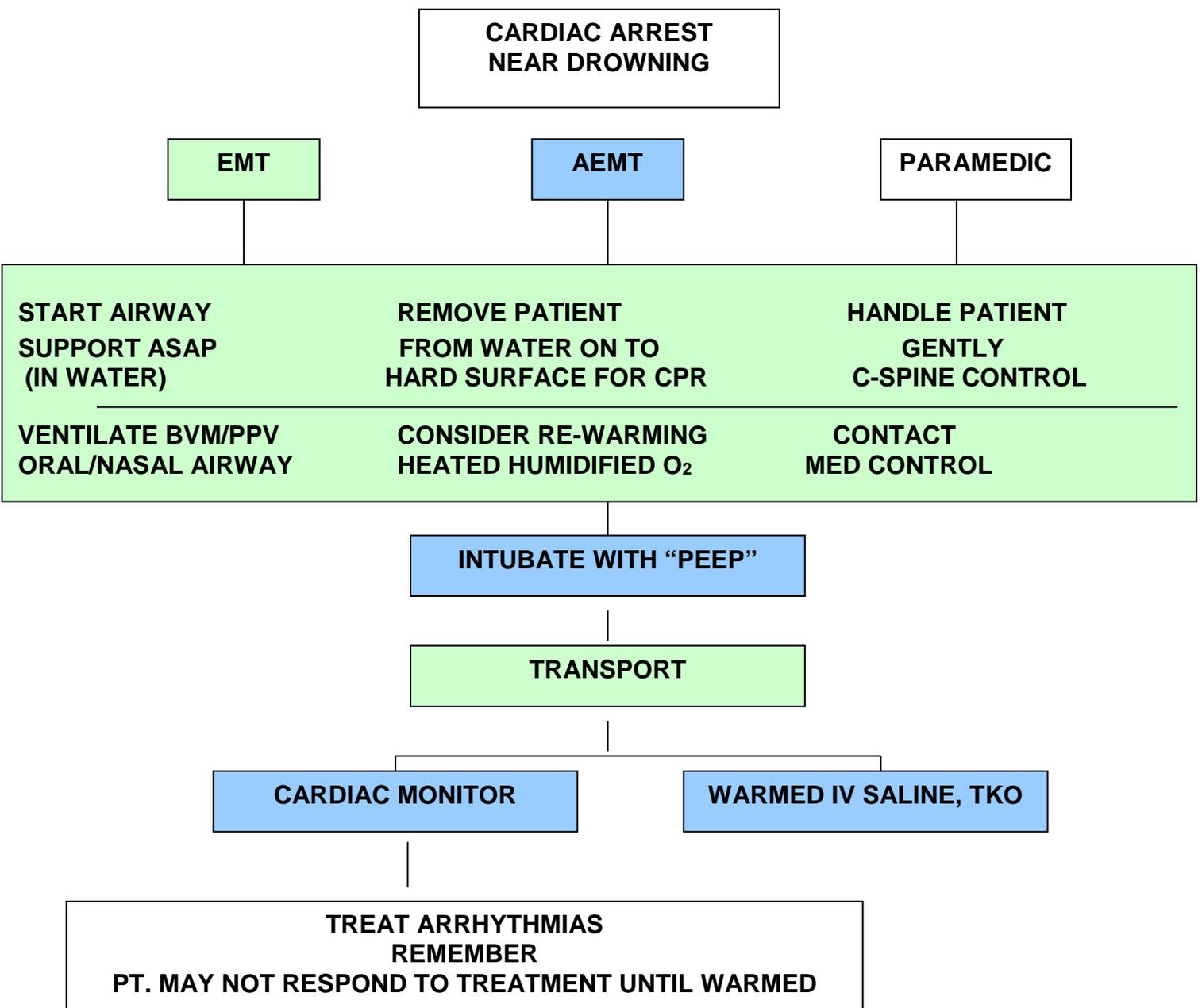
- A. Assume charge and confer with the EMS professional as to patient condition and circumstance
- B. Apply cardiac monitor and assess rhythm. Follow cardiac arrest protocol.

Special resuscitation (cont'd)

- C. Start IV of saline, warmed to 46° C if possible.
- D. Check pulse, intubate patient, suction airway and provide ventilation with positive end-expiratory pressure (PEEP). Continue quality CPR.

**PARAMEDIC**

- A. Assume charge and confer with the EMS professional as to patient condition and circumstance
- B. If EMS professional is in a cycle of defibrillation, allow to complete cycle before continuing
- C. Apply cardiac monitor and assess rhythm. Follow hypothermia cardiac arrest protocol



## CARDIAC CHEST PAIN

### EMT

- A. Open and manage the airway and provide oxygen by nasal cannula 4 l/minute and increase as needed for respiratory distress. Apply pulse oximeter and treat per procedure. Be prepared to provide CPR and defibrillation.
- B. Make patient comfortable and provide reassurance.
- C. Evaluate patient's general appearance, relevant history of current condition and determine:

Onset  
Provokes  
Quality  
Radiates  
Severity  
Time  
Interventions

Allergies  
Medication  
Past Medical History - especially cardiac, stroke, recent surgeries, bleeding problems CNS problems and/or pregnancy  
Last Meal  
Events leading up to present illness

- D. Assess the patient to determine if pain is cardiac in origin. For patients with pain of cardiac origin with one or more of the following, fibrinolysis may be contraindicated and medical control should be contacted:
  - Systolic BP > 180-200 mm Hg or diastolic BP > 100-110 mm Hg
  - Right versus left arm systolic BP difference > 15 mmHg
  - History of structural central nervous system disease
  - Significant closed head/facial trauma within the previous 3 weeks
  - Stroke > 3 hours or < 3 months
  - Recent (within 2-4 weeks) major trauma, surgery (including laser eye surgery), gastrointestinal/genitourinary bleed
  - Any history of intracranial hemorrhage
  - Bleeding, clotting problem, or blood thinners
  - Pregnant female
  - Serious systemic disease (e.g. advanced cancer, severe liver or kidney disease)

Additional criteria which classify a patient as high risk and considered for transfer to a PCI facility are:

- Heart rate  $\geq$  100 beats per minute and systolic BP < 100 mg Hg
- Pulmonary edema (rales)
- Signs of shock (cool, clammy)
- Contraindications to fibrinolytic therapy
- Required CPR

THIS ASSESSMENT SHOULD BE DONE DURING TRANSPORT

- D. May give 160 to 325 mg of aspirin per EMS stock drug procedure. Note true aspirin allergies as opposed to adverse side effects such as peptic distress.
- F. If patient is conscious and alert with previous history of angina pain and is taking nitroglycerin or Nitrostat®, administer 0.4 mg tablet or spray of nitroglycerin sublingually. Assure medication is prescribed for patient, is not out-of-date and contact medical control.

## CARDIAC CHEST PAIN (cont'd)

- G. Monitor patient's condition, especially blood pressure. Dosage may be repeated in 5 minutes if pain does not subside, blood pressure does not drop below 100 systolic and there is no change in level of consciousness.
- H. If patient is experiencing an unusual and/or irregular heart rate or pulse, if available, the AEMT or Paramedic may apply a cardiac monitor run a strip for evaluation by the physician at the emergency department. This should only be done during transport, and you must advise the patient you do not have the ability to interpret the strip; however, the emergency physician will.
- I. Establish communications with medical control and advise of patient condition. Transport IMMEDIATELY.
- J. If 12-lead EKG is applied and medical control or a Paramedic interprets this data as an acute ST segment myocardial infarction (STEMI), medical direction should be contacted immediately and the patient should be transported directly to a percutaneous cardiac intervention capability (PCI) center if possible.

AEMT
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- A. Assist EMT, obtain patient condition and circumstance.
- B. Apply monitor and check rhythm.
- C. Start IV, saline, TKO, while enroute to hospital. DO NOT DELAY TRANSPORT
- D. If patient is conscious and alert, administer 0.4 mg tablet or spray of nitroglycerin sublingually after establishment of an IV. Monitor patient's condition. Dosage may be repeated in 5 minutes intervals if pain does not subside and SBP is above 90mm Hg.
- E. If patient is alert, complaining of severe pain, systolic BP is above 90mm Hg and pain is not relieved by nitroglycerin, contact Medical Control, if required, and request nitrous oxide or morphine sulfate.
  - i. Morphine dosage: Small frequent titrated IV dose 5 mg every 5 minutes as needed until desired effect is achieved.
  - ii. Use caution when morphine is administered to patient with COPD or volume depletion.
  - iii. With morphine and nitrous oxide, monitor respiration and blood pressure every five minutes.

CARDIAC CHEST PAIN (cont'd)

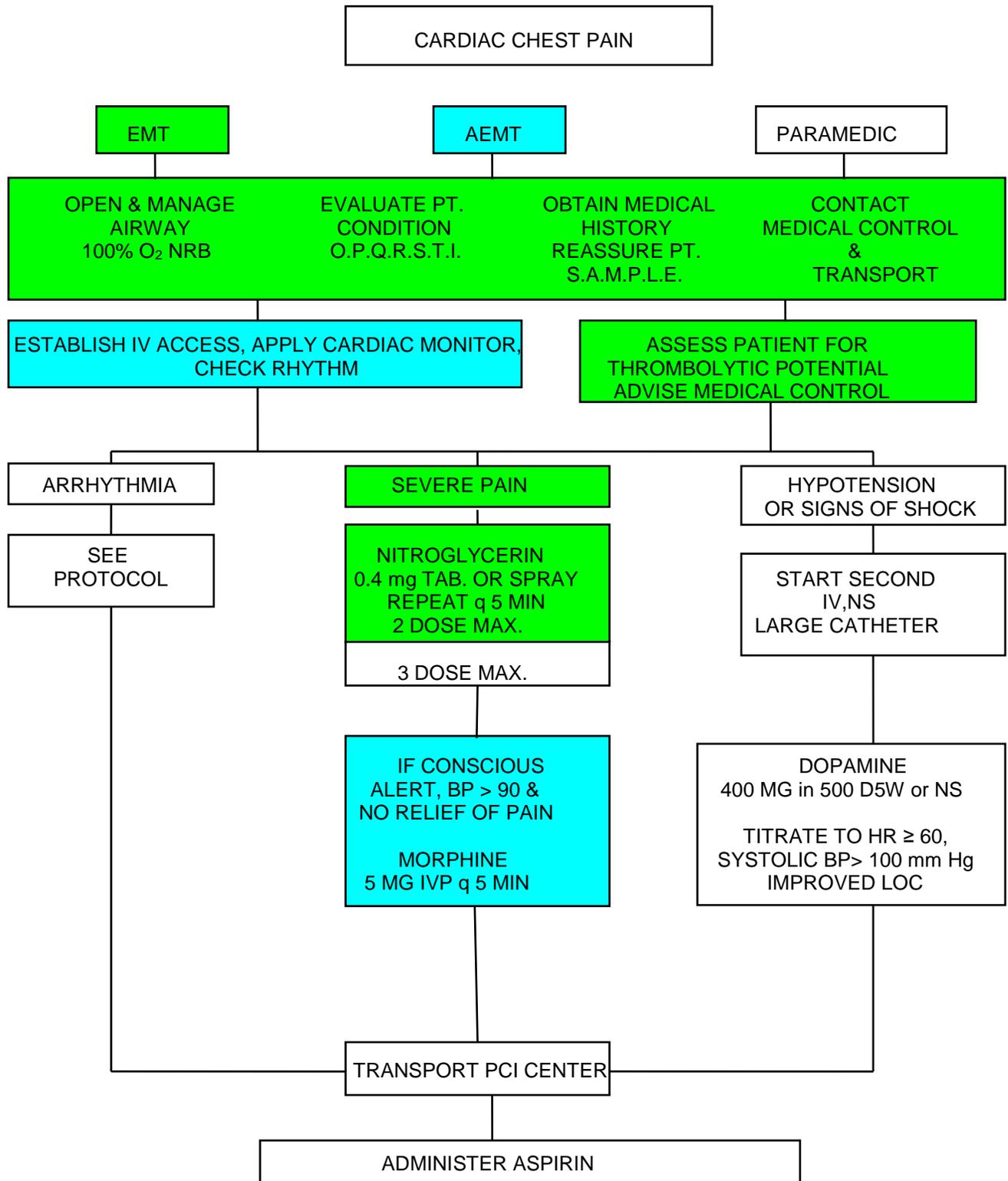
PARAMEDIC

- A. Assume charge of situation and confer with EMS professionals about condition of patient and situation.
- B. With chest pain, even if it clearly cannot be determined to be cardiac in origin, the Paramedic should:
  - 1. Support the airway and provide oxygen.
  - 2. Hypotension with signs of shock and patient is suspected of being in cardiogenic shock (BP less than 70-90 mm Hg systolic with poor perfusion):
    - a. Establish IV saline in large vein. Administer normal saline bolus until systolic BP >90 or signs of poor perfusion resolve. Auscultate for rales, observe patient for SOB, or tachypnea. Slow fluids to TKO if these occur.
    - b. Elevate feet
    - c. Establish second IV in large major vessel for dopamine administration, 400mg dopamine in 500 ml D5W to yield a solution of 800 mcg/ml;  
  
Start infusion at 5 mcg/kg/min (9 gtts/min) and titrate the infusion until heart rate is  $\geq$  60 or improved BP and LOC.

IF IV INFILTRATES OR IV ATTEMPT UNSUCCESSFUL,  
INFORM ED PERSONNEL AS SOON AS POSSIBLE.

- 3. Relieve pain
  - a. If patient is conscious and alert, administer 0.4 mg tablet or spray of nitroglycerin sublingually after establishment of an IV. Monitor patient's condition. Dosage may be repeated in 5 minutes intervals if pain does not subside and SBP is above 90 mm Hg.
  - b. If patient is alert, complaining of severe pain, systolic BP is above 90 mm Hg and pain is not relieved by nitroglycerin, contact medical control, if required, and request morphine sulfate.
    - i. Morphine dosage: Small frequent titrated IV dose 5 mg every 5 minutes as needed until desired effect is achieved.
    - ii. Do not use morphine on COPD or volume depletion.
    - iii. With morphine, monitor respiration and blood pressure every five minutes.
- 4. Correct cardiac arrhythmia - Arrhythmia protocol.
- 5. Start IV, saline, TKO, while enroute to hospital. DO NOT DELAY TRANSPORT.
- 6. When patient fits thrombolytic profile, administer aspirin.

BE SURE TO CHECK FOR TRUE ASPIRIN ALLERGY vs PEPTIC DISTRESS



## CHILDBIRTH/OBSTETRICAL EMERGENCIES

### GENERAL INSTRUCTIONS

- A. Unless delivery is imminent, transport to a hospital with obstetrical capabilities
- B. Imminent delivery is when the baby's head is visible in the vaginal opening during a contraction (crowning)
- C. A visual inspection of the perineal area should only be done when contractions are less than 5 minutes apart and/or there is bleeding or fluid discharge
- D. The EMS professional should not place a gloved hand inside the vagina except in the case of breech delivery with entrapped head or a prolapsed umbilical cord.
- E. During delivery, gentle pressure with a flat hand on the baby's head should be applied to prevent an explosive delivery
- F. A mother in active labor should be placed on the cot or floor to prevent the newborn from falling after delivery

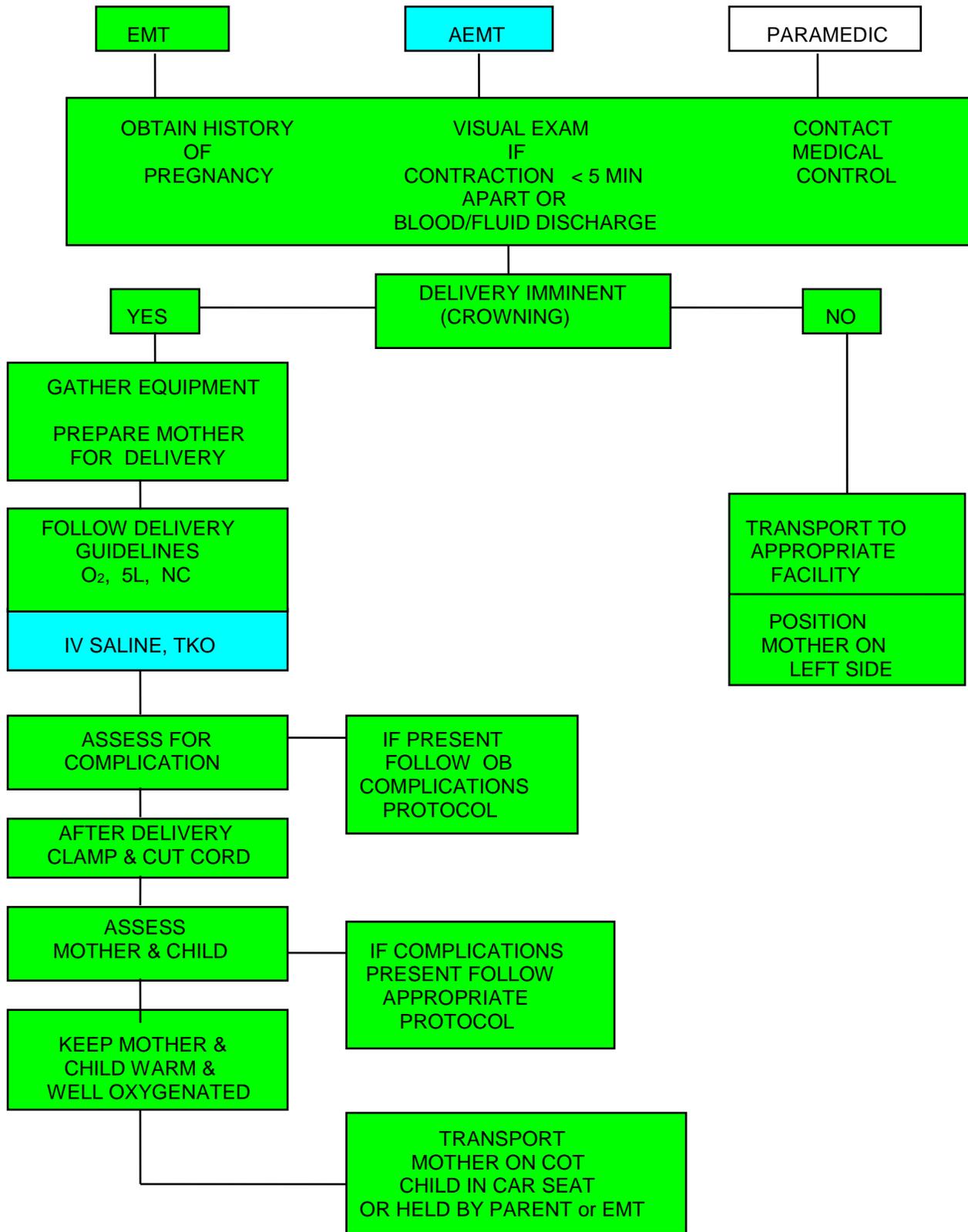
### EMT

- A. Obtain history of patient condition and pregnancy: Contraction duration and interval, due date, number of pregnancies and number of live children, prenatal care and possible complications.
- B. Determine transport or delivery. Transport unless crowning is present during a contraction; contact Medical Control
- C. Always try to transport mother to her hospital designated for delivery.  
  
Transport mother on left side with head slightly elevated to relieve pressure on mother's vena cava created by baby. Pressure could cause a decrease in mother's and baby's heart rate.
- D. If delivery is imminent, prepare equipment and follow guidelines for delivery.
  - 1. Equipment: OB Kit, oxygen and BVM, towels and blankets, cot, large dressings
- E. After delivery, transport mother on cot and baby in car seat if available, or have parent or EMS professional hold the baby during transport
- F. Keep mother and child warm and monitor airways and signs of shock

### AEMT / PARAMEDIC

- A. Assist EMS professional, obtain patient condition and circumstance
- B. Start IV saline if hypovolemic shock or excessive bleeding is present

EMERGENCY CHILDBIRTH  
NORMAL DELIVERY



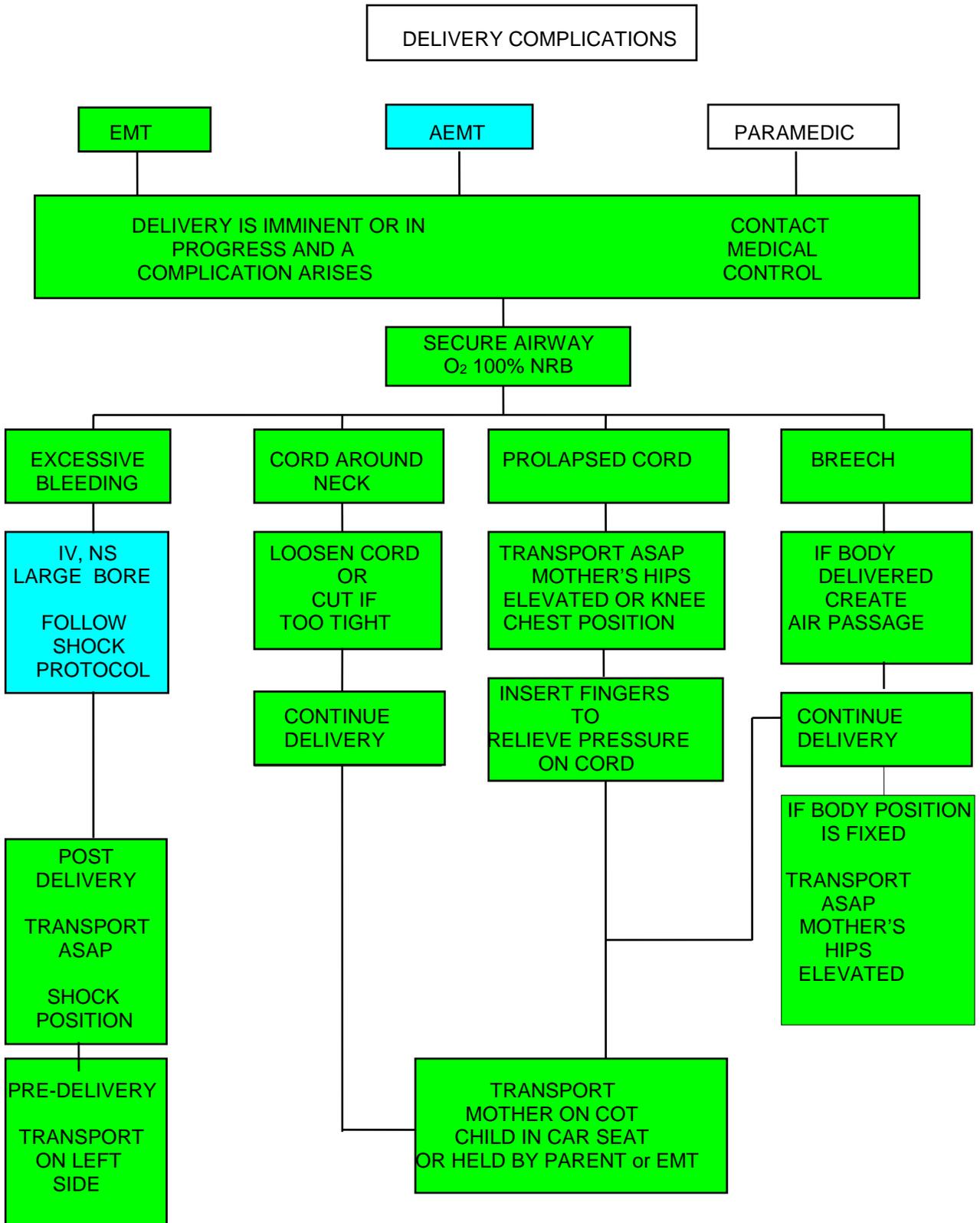
## DELIVERY COMPLICATIONS

CONTACT MEDICAL CONTROL AS SOON AS ANY COMPLICATION IS DISCOVERED

- A. Cord Around Baby's Neck:
1. As baby's head passes out the vaginal opening, feel for the cord. Initially try to slip cord over baby's head; if too tight, clamp cord in two places and cut between clamps.
- B. Breech Delivery:
1. Footling breech, which is one or both feet delivered first
  2. Frank breech, which is the buttocks first presentation
    - a. When the feet or buttocks first become visible, there is normally time to transport patient to nearest facility.
    - b. If upper thighs or the buttock have come out of the vagina, delivery is imminent.
    - c. If the child's body has delivered and the head appears caught in the vagina, the EMS professional must support the child's body and insert two fingers into the vagina along the child's neck until the chin is located. At this point, the two fingers should be placed between the chin and the vaginal canal and then advanced past the mouth and nose.
    - d. After achieving this position a passage for air must be created by pushing the vaginal canal away from the child's face. This air passage must be maintained until the child is completely delivered.
- C. Excessive Bleeding Pre-delivery:
1. If bleeding is excessive during this time and delivery is imminent, in addition to normal delivery procedures, the EMS professional should use the hypovolemic shock protocol.
  2. If delivery is not imminent, patient should be transported on her left side and shock protocol followed.
- D. Excessive Bleeding Post-delivery:
1. If bleeding appears to be excessive, start IV of saline.
  2. If placenta has been delivered, massage uterus and put baby to mother's breast.
  3. Follow hypovolemia shock protocol.
- E. Prolapsed Cord:
1. When the umbilical cord passes through the vagina and is exposed, the EMS professional should check cord for a pulse.
  2. The patient should be transported with hips elevated or in the knee chest position and a moist dressing around cord.
  3. If umbilical cord is seen or felt in the vagina, insert two fingers to elevate presenting part away from cord, distribute pressure evenly when occiput presents
  4. DO NOT attempt to push the cord back

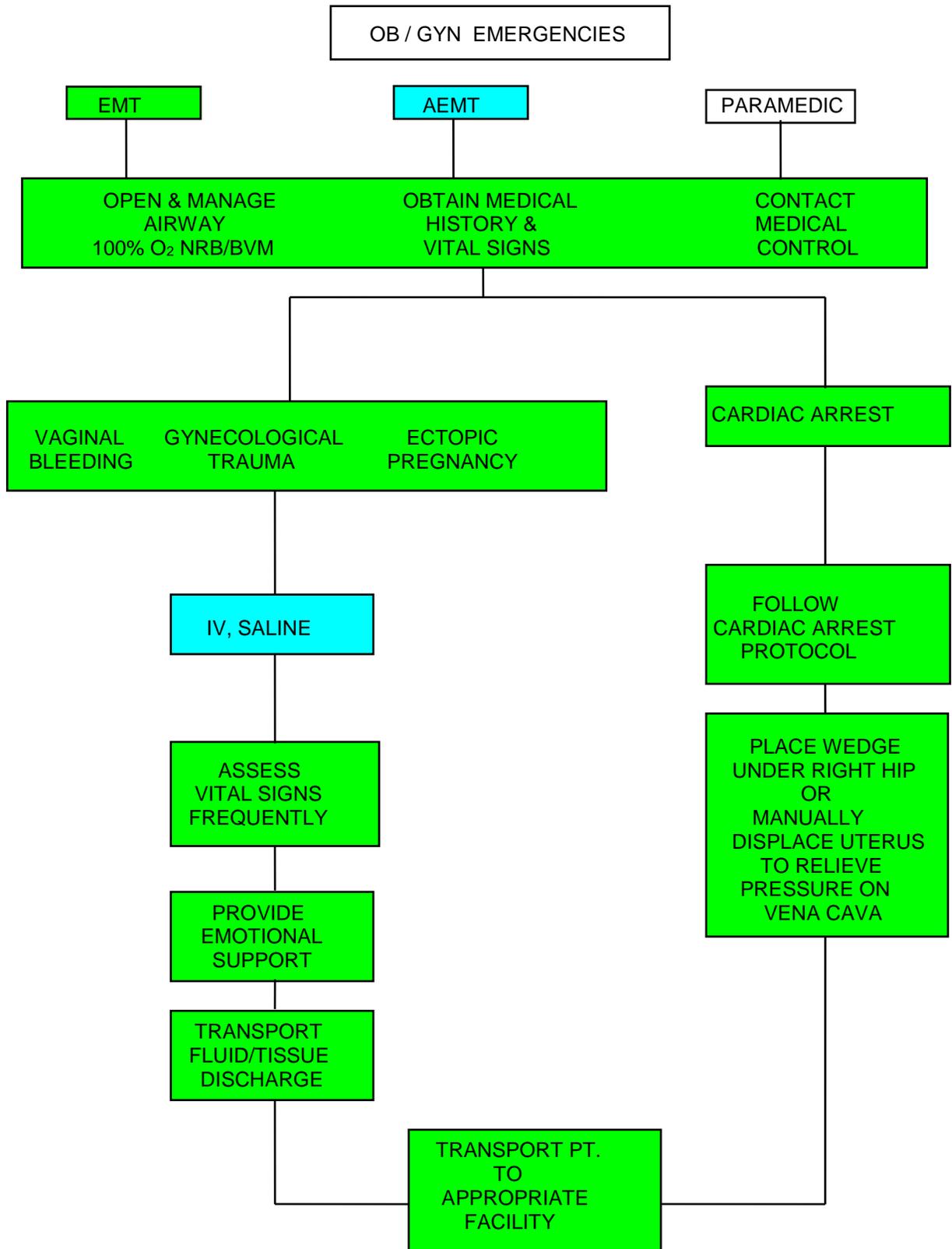
DELIVERY COMPLICATIONS (cont'd)

5. High flow oxygen and transport IMMEDIATELY



## OBSTETRICAL EMERGENCIES

- A. Miscarriage: Premature termination of a pregnancy
1. Assess for shock and treat per shock protocol.
  2. Give psychological support to patient and/or family
  3. Be sure to take all expelled tissue with you to the hospital
- B. Ectopic Pregnancy: When growth and development of a fertilized egg occurs outside the uterus
1. Patient may experience severe abdominal pain.
  2. May have intra-abdominal and/or vaginal bleeding and discharge.
  3. Patient may not know she is pregnant
  4. Treat for hypovolemic shock
  5. Transport supine with knees flexed
  6. Take any expelled tissue with you to the hospital
- C. Cardiac Arrest: Cardiac resuscitation of the expectant mother is unique due to the changes in the maternal cardiovascular and respiratory physiology
1. Precipitating events for cardiac arrest include pulmonary embolism, trauma, hemorrhage or congenital or acquired cardiac disease.
  2. Standard resuscitative protocol should be carried out.
  3. When the mother is supine, the fetus may compress the iliac vessels, the inferior vena cava, and the abdominal aorta. To minimize effects of the fetus pressure on venous return:
    - a. Place a wedge (pillow) under the right abdominal flank and hip, or
    - b. Apply continuous manual displacement of the uterus to the left
- D. Third Trimester Bleeding.
1. Abruptio placenta - premature separation of placenta from uterine wall and is characterized by abdominal pain and vaginal bleeding
    - a. Bleeding may be dark
    - b. Uterus tender
  2. Placenta previa - placenta partially or completely covers the cervical (birth) canal and is characterized by painless vaginal bleeding
    - a. Bleeding may be bright red
    - b. Uterus may be non-tender
  3. Never do vaginal exam



## DIABETIC EMERGENCIES

### EMT

- A. Secure and maintain airway. Support with 100% O<sub>2</sub> by NRB mask.
- B. Obtain relevant medical history: OPQRST
  - 1. Has patient eaten today?
  - 2. Has patient taken insulin?
  - 3. Onset
  - 4. Medication - Type and time taken
- C. Determine blood sugar level
  - 1. Blood sugar less than 80, administer oral glucose to conscious and alert patients only
  - 2. Unable to obtain blood sugar, transport and contact medical control for guidance
- B. Establish communications with medical control and advise of patient condition. Consider transport time if <5 minutes.

### AEMT

- A. Assist EMS professional, obtain patient condition and circumstance
- B. Apply monitor and check rhythm
- C. Start IV saline, TKO, while enroute to hospital.
- D. Determine blood sugar level
  - 1. Blood sugar less than 80, administer 50 ml D50 IV push immediately or glucagon 1 mg IM.
  - 2. Blood sugar greater than 400, and hypoperfusion is present, infuse patient with 250 ml bolus of saline
  - 3. Unable to obtain blood sugar, transport and contact medical control for guidance

DO NOT DELAY TRANSPORT

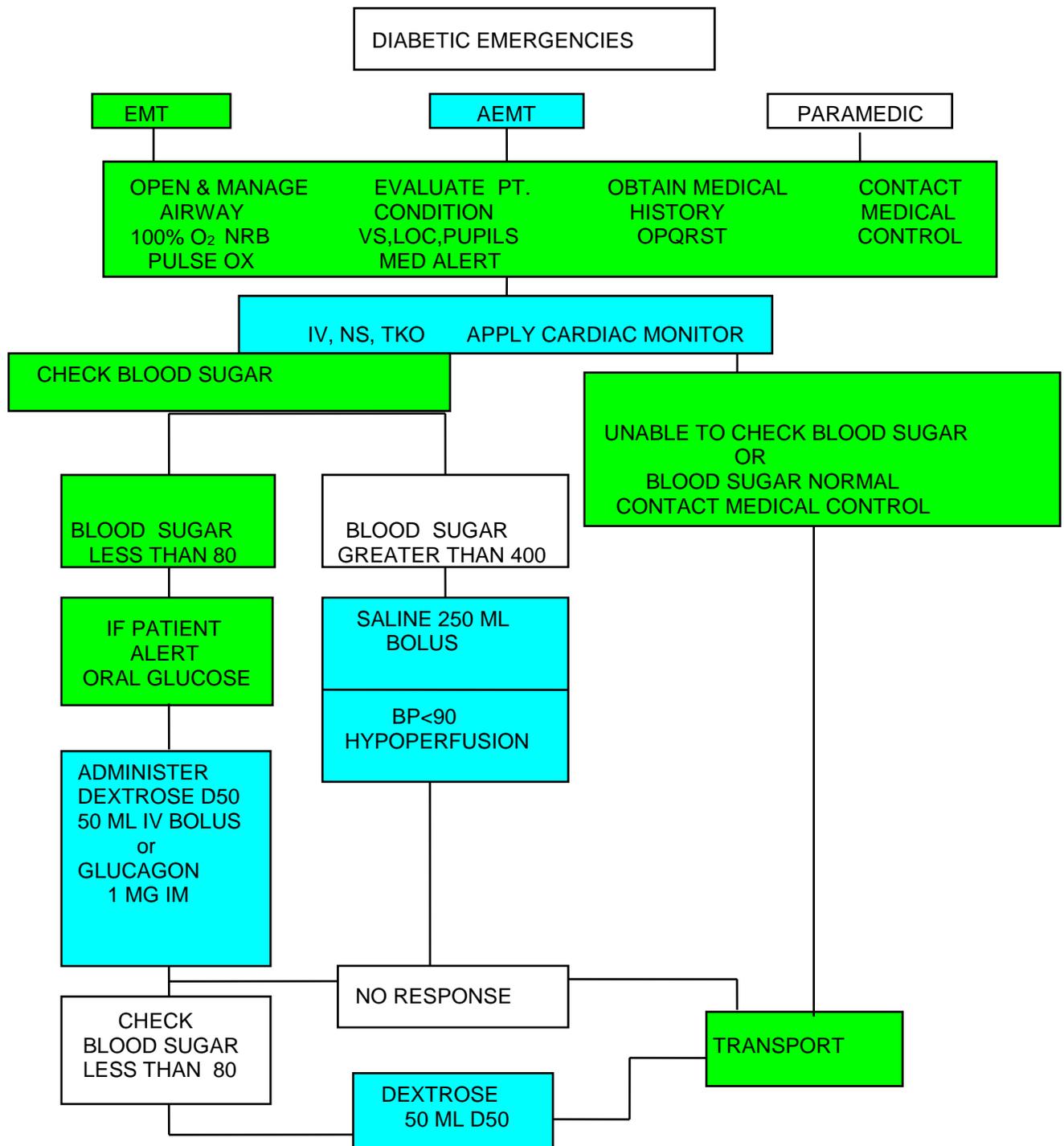
### PARAMEDIC

- A. Assume charge of situation and confer with EMS professionals about condition of patient and situation
- B. Apply monitor and check rhythm
- C. Start IV saline, TKO.
- D. Determine blood sugar level

DIABETIC EMERGENCIES (cont'd)

1. Blood sugar less than 80, administer 50 ml D50 IV push immediately or glucagon 1 mg IM.
2. Blood sugar greater than 400, and hypoperfusion is present, infuse patient with 250 ml bolus of saline
3. Unable to obtain blood sugar, transport and contact Medical Control for guidance

E. If patient has an altered level of consciousness, follow Altered LOC Protocol



## EYE INJURY

### GENERAL CONSIDERATIONS

#### TRAUMA

- A. Do not allow eye injury to distract you from the basics of trauma care
- B. Do not remove any foreign body imbedded in the eye or orbit. Stabilize any large protruding foreign bodies.
- C. 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. Scleral rupture may lie beneath an intact conjunctiva.
  - 1. Exert no pressure on the globe when doing the exam or when covering for transport
  - 2. A light sterile wet dressing may be used to cover the eye for transport - avoid pressure directly to the eye by covering with a protective shield, (metal patch, drinking cup)

Do not delay transport by covering the eye if the patient has other life-threatening injuries.
- D. 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
- E. Transport patient sitting upright unless other life threats prohibit this from being done.

#### CHEMICAL BURNS

- A. 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.
- B. A topical ophthalmic anesthetic should be placed in the eye prior to irrigation. Always check to determine if the patient has any allergy to anesthetic agents
- C. 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

- A. 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.
- B. If the patient is conscious and alert, it is much safer and easier to have the patient remove their lenses

#### ACUTE, UNILATERAL VISION LOSS

- A. 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.
- B. Patient should be transported flat.

## EYE INJURIES (cont'd)

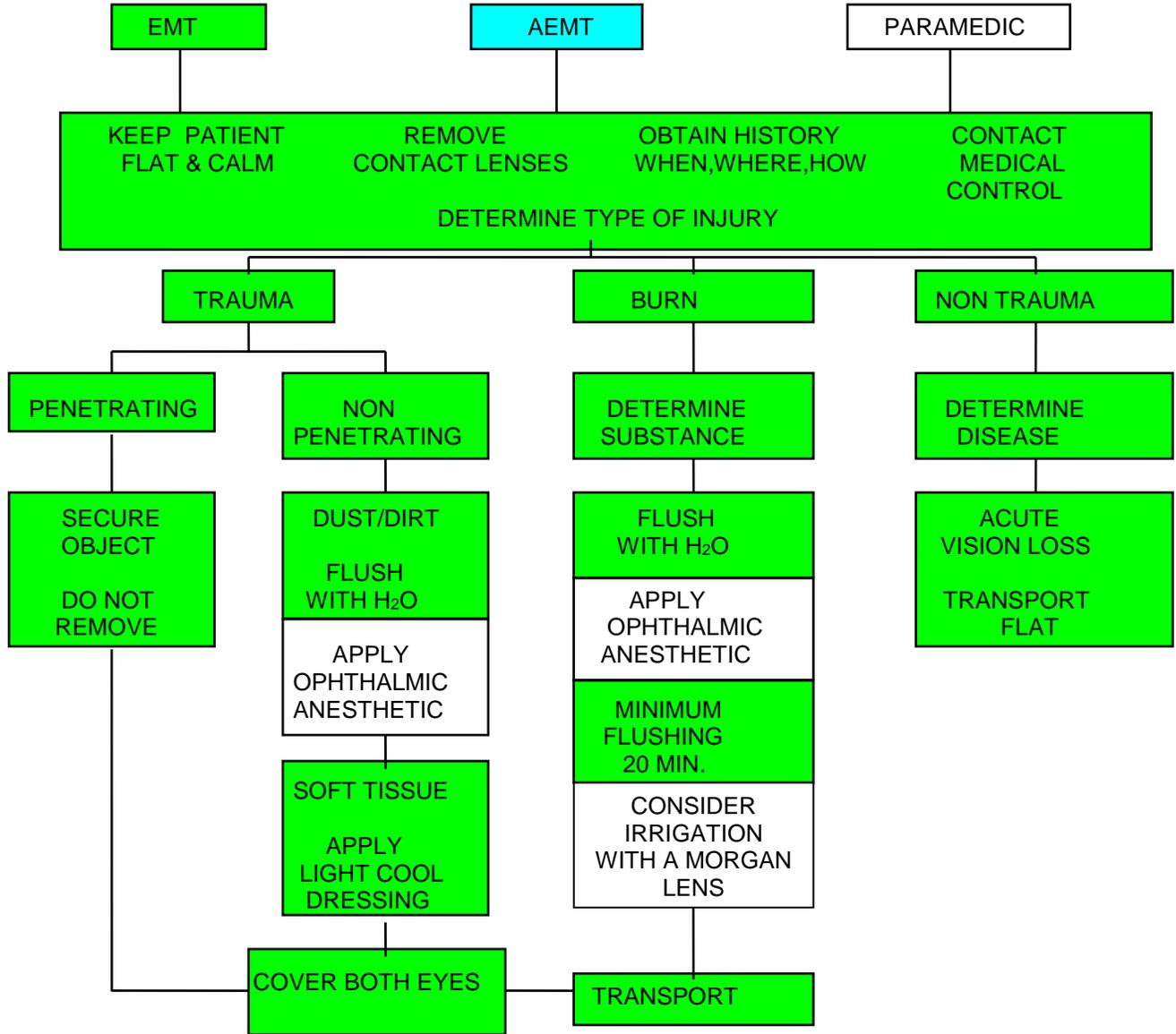
### EMT / AEMT

- A. Keep patient calm and lying flat, unless otherwise indicated
- B. Obtain history of injury: Type, Where, When, How.
- C. Establish communications with Medical Control and advise of patient condition. Transport immediately, unless an advanced life support unit is enroute and has an ETA of less than 5 minutes.

### PARAMEDIC

- A. Assume charge of situation and confer with EMS professional about condition of patient and situation.
- B. In cases where eyes may need irrigation, administer two (2) drops of topical ophthalmic anesthetic (i.e. tetracaine) in eyes and irrigate with copious amounts of water or saline using IV tubing wide open or a Morgan lens.

EYE INJURIES



## HYPOTHERMIA / FROSTBITE

### GENERAL CONSIDERATIONS

- A. This guideline was written to assist those instances of hypothermic injury involving long evacuation and transport time. When possible, all treatment should be left for a hospital setting.
- B. Generalized Hypothermia:
1. The most common mechanism of death in hypothermia is ventricular fibrillation (VF). If the hypothermia victim is in ventricular fibrillation, CPR should be initiated. If VF is not present, then all treatment and transport decisions should be tempered by the fact that VF 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.
  2. In the absence of monitor-confirmed V fib, the decision to initiate CPR must consider the following:
    - a. Hypothermia may produce profound bradycardia and the pulse should be taken for at least 60 seconds before concluding that the patient is pulseless.
    - b. Hypothermia can exert a protective effect on body tissues. The hypothermia victim's own cardiac activity, even when profoundly bradycardic may be preferred to CPR perfusion, especially in light of the fact that CPR may well precipitate VF.
  3. The heart is most likely to fibrillate between 85-88° F. (29°-31° C.) Defibrillate VF / VT up to a total of three shocks (200 J, 300 J, 360 J).
  4. Since fibrillation is so difficult to convert without rewarming, measures to rewarm should be instituted in any hypothermia victim with VF. The decision to rewarm should be made in consultation with Medical Control and should consider the following factors:
    - a. Method of rewarming available
    - b. Time / distance from hospital
    - c. Squad capability of treating VF (ALS or BLS)
  5. Shivering stops below 90° F. (32° C).
  6. Consider hypoglycemia in the hypothermic patient.
  7. Wet clothing robs heat from the body more than it insulates and should be removed, protecting victim from wind.
  8. Never give hot liquids by mouth.
  9. Generalized hypothermia can occur whenever the ambient temperature is less than body temperature and the body is not capable of maintaining that temperature. For example, an elderly debilitated patient sitting over night in a room which is at 66° F. may become hypothermic from that exposure alone. Suspect hypothermia in the injured, elderly, or debilitated patient.
- C. Local Hypothermia (frostbite):
1. Thawing should be done under controlled conditions. It is extremely painful.

HYPOTHERMIA/FROSTBITE (cont'd)

2. Complete rewarming requires active heating for prolonged period. Partial rewarming is worse than none. Therefore, rewarming should rarely be done in the field.

EMT

- A. Secure airway, and consider cervical spine injury
  1. Administer warmed 100% oxygen, if available, by NRB mask and or BVM.
- B. Move patient to warm environment, remove any wet clothing and cover with blankets.
- C. Evaluate patient's general appearance, relevant history of condition and determine:

<u>O</u> nset <u>P</u> rovokes <u>Q</u> uality <u>R</u> adiates <u>S</u> everity <u>T</u> ime <u>I</u> nterventions	<u>A</u> llergies <u>M</u> edication <u>P</u> ast Medical History - especially, length of exposure, unconsciousness, was the patient wet, drugs/alcohol ingestion, did injured areas thaw and freeze.  <u>L</u> ast Meal <u>E</u> vents leading to present illness
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- D. Assess vital signs, mental status, temperature of patient and environment and evidence of local injury.
- E. Generalized Hypothermia with Arrest
  1. CPR and Transport unless AED or ALS is available in less than 5 minutes.
  2. If an Automated External Defibrillator (AED) is available:
    - a. Assess patient for respiratory and cardiac arrest.
    - b. Apply AED and activate device. Start verbal documentation which must include:
      - \* EMS delivering care, unit number and ID of EMT
      - \* Initial call information (i.e. man down, drowning, etc.)
      - \* Initial patient assessment, findings and impression
      - \* Care given to this point
      - \* Ongoing outcomes of care delivered to patient
    - i. "No Shock Advised"
      - (a) Provide quality CPR as recommended by the American Heart Association.
      - (b) Establish communications with medical control and advise of cardiac arrest.
      - (c) Transport IMMEDIATELY unless an advanced life support unit is enroute and has an ETA of less than 5 minutes to the scene. )
    - ii. "Shock Advised"
      - (a) Defibrillate 120 J-200 J biphasic or 360 J monophasic

HYPOTHERMIA/FROSTBITE (cont'd)

- (b) Provide quality CPR for two minutes
- (c) Analyze rhythm and defibrillate again if shock advised

F. Generalized Hypothermia Without Arrest

1. Do not initiate CPR if there is any pulse present, no matter how bradycardic.
2. Use oxygen, high flow. Do not hyperventilate. Do not use adjunctive airway equipment unless absolutely necessary. If necessary, use least intrusive measures which will adequately assure airway and ventilation.
3. Avoid rough handling, unnecessary stimulation.
4. If rewarming is undertaken, rewarm rapidly by applying warm packs or hot water bottles to trunk, neck and groin only.
5. Do not allow conscious patients to ambulate, exercise or move about.

G. Local Hypothermia (frostbite):

1. Protect the injured areas from pressure, trauma, friction. Remove all covering from injured parts. Do not rub. Do not break blisters.
2. Do not thaw injured part with local heat in excess of 100-110° F. (water that is comfortably hot to the touch without burning).
3. Do not allow limb to thaw if there is a chance that limb may refreeze before evacuation is complete.
4. Maintain core temperature by keeping patient warm with blankets, warm fluids, etc.
5. Transport and contact medical control of situation

AEMT

- A. Confer with EMS professionals and confirm assessment.
- B. During Transport :
  1. Apply cardiac monitor, check rhythm and treat according to cardiac protocol. Provide quality CPR if pulseless and defibrillate per cardiac arrest protocol.
  2. Intubation, oxygenate with 100% O<sub>2</sub>, warm/humidified if available.
  3. IV / warm NS, if available. If hypotension, 200-300 NS ml push. Contact medical control.
  4. Evaluate blood sugar for possible dextrose administration.

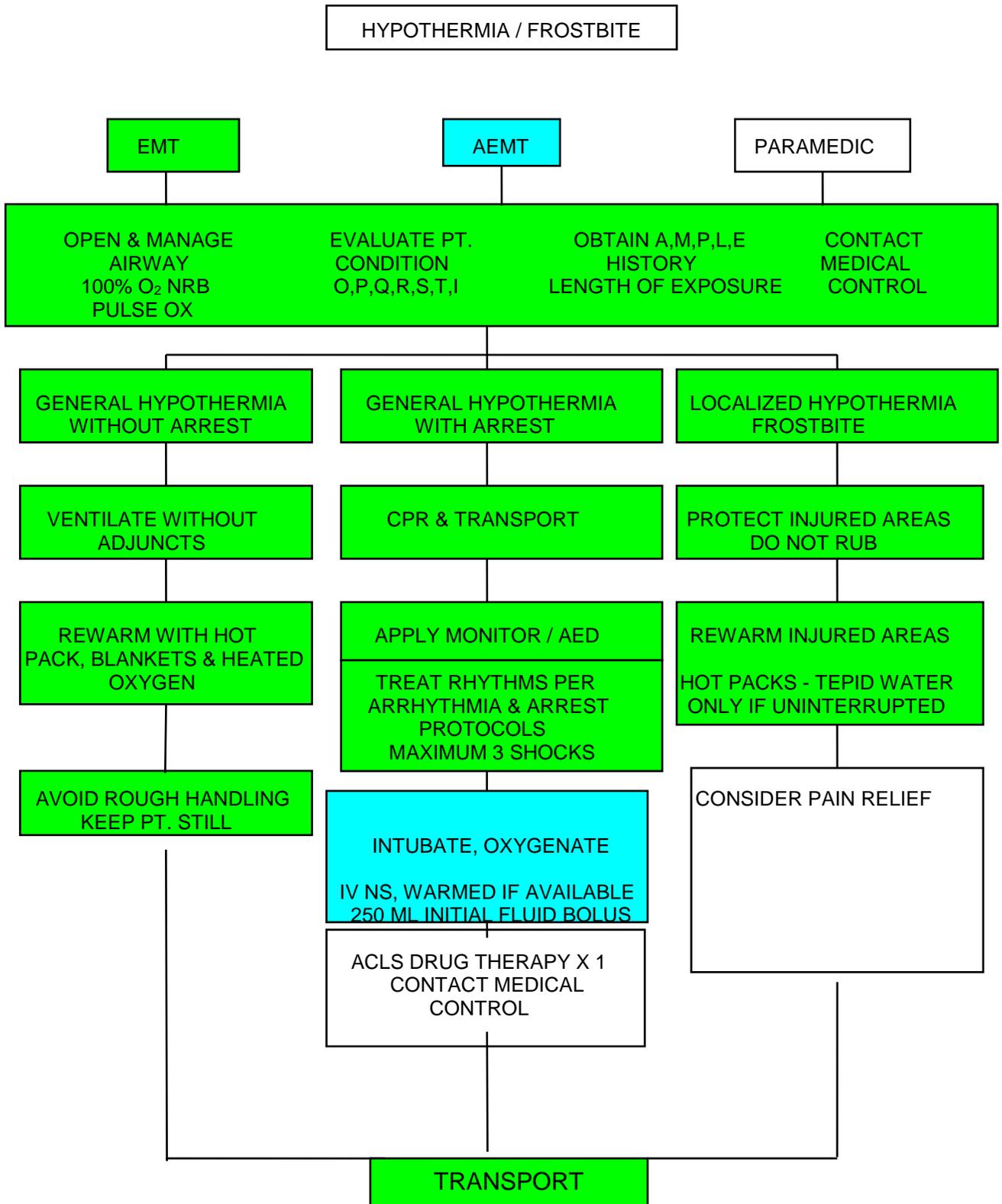
PARAMEDIC

- A. Confer with EMS professionals and confirm assessment.

## HYPOTHERMIA/FROSTBITE (cont'd)

### B. During Transport :

1. Apply cardiac monitor, check rhythm and treat according to cardiac protocol.
2. Intubation, oxygenate with 100% O<sub>2</sub>, warm/humidified if available.
3. IV / warm NS, if available. If hypotension, 250 ml NS IVP.
4. Evaluate blood sugar for possible dextrose administration
5. One round of ACLS medication
6. When rewarming patients consider pain relief.



## HEAT EXPOSURE

### GENERAL CONSIDERATIONS

- A. Recognize that the very old, very young and patients with a history of spinal injury are the ones most likely to suffer related illness. Other contributory factors may include heart medications, diuretics, cold medications and/or psychiatric medications.
- B. Heat exposure can occur either due to increased environmental temperatures or prolonged exercise or a combination of both. Environments with temperature above 90°F and humidity over 60% present the most risk.
- C. Types of heat related illness:
  - 1. Heat Stroke-The most serious type of exposure illness, usually due to prolonged exposure to heat, inadequate fluid replacement and deficient thermoregulatory function. The patient will often experience inadequate perspiration with body temperatures reaching 105°F or greater. The skin is usually hot and dry and there may be an altered LOC and/or coma. Seizures may also occur. Cardiovascular collapse is the usual cause of death.
  - 2. Heat Exhaustion – a more moderate form of heat exposure associated with dehydration combined with overexertion. The skin is cooler and the core temperature is below 105°F. The patient may experience syncope with orthostatic hypotension.
  - 3. Heat Cramps – The mildest form of heat exposure caused by dehydration, overexertion and electrolyte abnormalities. The skin is moist with muscle cramps, usually affecting large muscle groups.
- D. When altered mental status is present consider other causes such as hypoglycemia, stroke and/or shock.

### EMT

- A. Secure airway, and consider cervical spine injury.
  - 1. Administer oxygen, maintaining a 95% SpO<sub>2</sub> or BVM.
- B. Move patient to cool environment, remove any tight clothing.
- C. Evaluate patient's general appearance, relevant history of condition and determine:

Onset  
Provokes  
Quality  
Radiates  
Severity  
Time  
Interventions

Allergies  
Medication  
Past Medical History – especially, length of exposure, unconsciousness,  
Drugs/alcohol ingestion  
Last Meal  
Events leading to present illness

## HEAT EXPOSURE (cont'd)

- D. Assess vital signs every 15 minutes, mental status, temperature of patient and environment.
- E. Determine type of exposure:
  - 1. Heat stroke (hot and insufficient sweating)
    - a. Patient alert and oriented, may give fluid orally if there is no nausea and/or vomiting.
    - b. Patient with altered LOC, transport and:
      - i. cool with mist or cool wet sheet with fan, air conditioning and/or open windows.
      - ii. apply cold packs to axilla, groin, and neck. (Avoid shivering)
  - 2. Heat Exhaustion (pale, moist, may be orthostatic)
    - a. Patient alert and oriented, may give fluid orally if there is no nausea and/or vomiting.
    - b. Patient with altered LOC, transport and:
      - i. apply cold packs to axilla, groin and neck. (Avoid shivering)
  - 3. Heat Cramps
    - a. Patient alert and oriented, may give fluid orally if there is no nausea and/or vomiting.

### AEMT

- A. Confer with EMS professionals and confirm assessment.
- B. During transport:
  - 1. Apply cardiac monitor, check rhythm and treat according to cardiac protocol.
  - 2. IV NS if hypoperfusion is present, 250 ml NS IVP. Contact medical control.

### PARAMEDIC

- A. Confer with EMS professionals and confirm assessment.
- B. During transport:
  - 1. Apply cardiac monitor, check rhythm and treat according to protocol.
  - 2. Intubation, oxygenate with 100% O<sub>2</sub>, if indicated.
  - 3. IV NS if hypoperfusion is present, 250 ml NS IVP. Contact medical control.
  - 4. Treat seizures per seizure protocol.

## POISONING

### GENERAL CONSIDERATIONS

EMS professionals should consider the possibility of accidental or self-poisoning under the following conditions:

- A. History of observed or admitted accidental or intentional ingestion
- B. Coma
- C. History of known suicide gesture
- D. Suggestive intoxicated behavior (hyperactive, hypoactive, unstable walk, lethargic)

### EMT

- A. Establish airway
- B. Obtain relevant history
  - 1. What, when, why taken (if known)
  - 2. Quantity taken (if known)
  - 3. Victim's age and weight
- C. Take whatever container the substance came from to the hospital along with readily obtainable samples of medication unless this results in an unreasonable delay of transport
- D. Evaluate the patient's:
  - 1. Breath sounds (rales)
  - 2. Level of consciousness
  - 3. Pupil size
  - 4. Evidence of head injury
- E. Depending on route poison entered body apply the following:
  - 1. Ingested Poisons - Transport (contact Medical Control for prolonged transports, >30 minutes or for recommendation for charcoal administration)
  - 2. Inhaled Poisons
    - a. Remove from toxic area
    - b. Secure airway, support with 100% oxygen
    - c. Assist in ventilation if necessary
  - 3. Absorbed Poisons
    - a. Remove victim's clothing
    - b. Identify substance
    - c. Flush skin with water before and during transport if possible - at least 10-15 minutes
    - d. If eyes are involved flush with water or saline for 10-15 minutes
  - 4. Injected Poisons
    - a. Secure and maintain airway
    - b. Find substance and introduction system, if possible

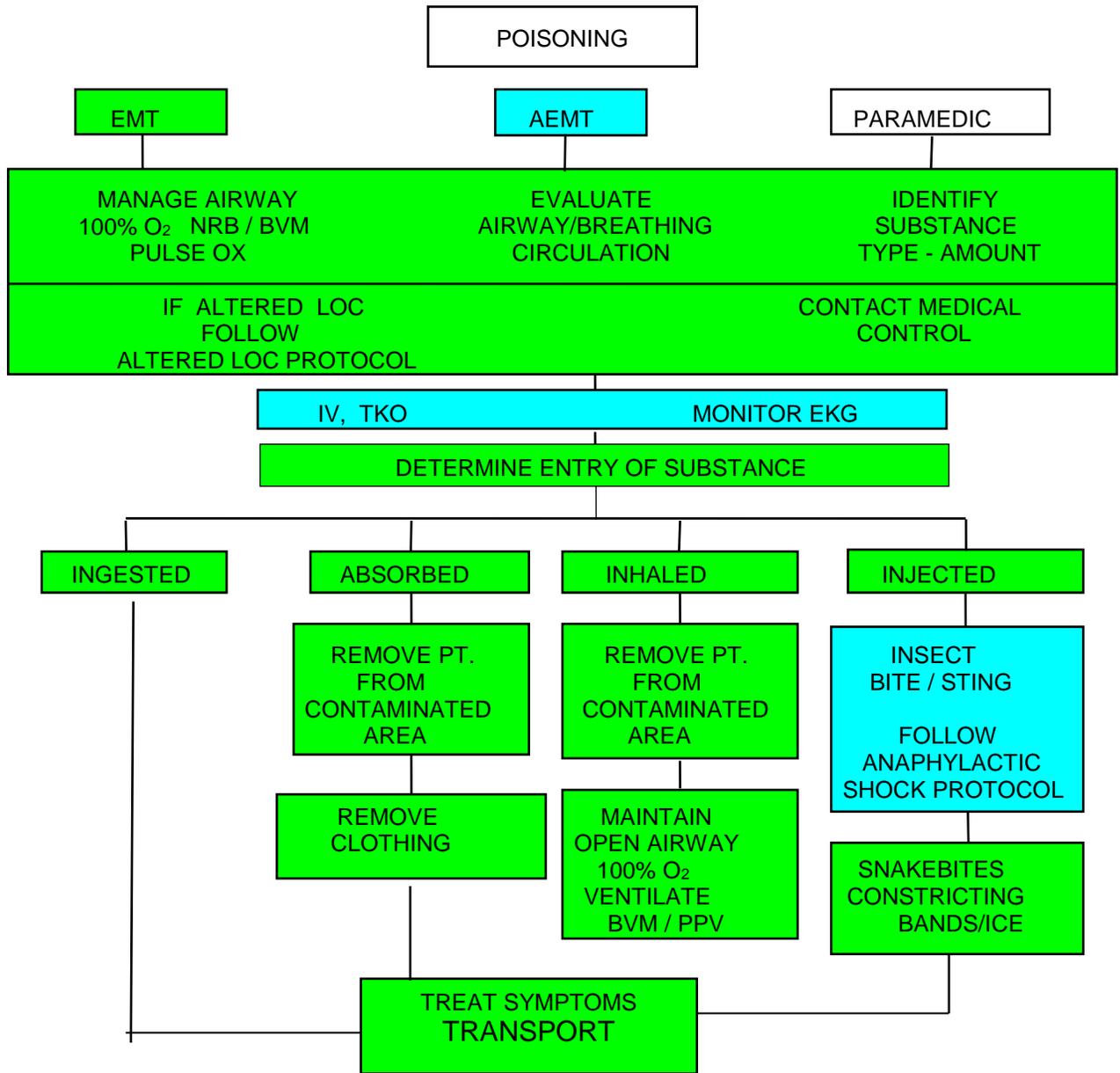
POISONING (cont'd)

AEMT

- A. Assist EMS professionals, obtain patient condition and circumstance
- B. Apply monitor and check rhythm
- C. Start IV saline, TKO, while enroute to hospital. DO NOT DELAY TRANSPORT

PARAMEDIC

- A. Assume charge of situation and confer with EMS professionals about condition of patient and situation
- B. If patient has an altered level of consciousness, follow the Altered Level of Consciousness Protocol
- C. Start IV saline, TKO
- D. Contact Medical Control for prolonged transports, >30 minutes or for recommendation for charcoal administration.



## PSYCHIATRIC EMERGENCIES

### EMT / AEMT / PARAMEDIC

- A. Obtain relevant history:
  - 1. Previous psychiatric hospitalization, when and where
  - 2. Where does patient receive psychiatric care?
  - 3. What drugs does patient take (including alcohol)?
- B. Calm the patient
- C. Evaluate the patient's:
  - 1. Vital signs
  - 2. General appearance
- D. Contact Medical Control and advise of patient condition
- E. Transport patients to appropriate facility.
- F. Contact local law enforcement for assistance with violent, homicidal, or suicidal patients

NOTE: Restraints may be used to protect the patient, technicians, and bystanders.  
See restraint policy.

- G. ALL patients who are not making rational decisions should be transported for medical evaluation.\*  
Threat of suicide, overdose of medication, drugs, or alcohol, and/or threats to the health and well being of others are NOT considered rational.  
\*Refer to Refusal Protocol

## RESPIRATORY DISTRESS

### EMT

- A. Open airway and check for breathing
1. Airway obstructed:
    - a. Manual clearing
    - b. Abdominal or chest thrust
    - c. Suction orally or endotracheally through an established airway or a stoma
    - d. If airway cannot be cleared in 60 seconds:
      - i. Transport immediately to nearest hospital
      - ii. Do not take history
      - iii. Do not make further physical assessment
  2. Airway is open, breathing absent, pulse present:
    - a. Ventilate patient 100% oxygen by two person bag valve mask or oxygen powered, manually triggered or automatic transport ventilation device with nasal or oral airway once every five seconds
    - b. Ventilation should be delivered over two seconds and cricoid pressure should be considered to help reduce gastric distention
  3. Airway is open and patient is in distress:
    - a. Administer 100% O<sub>2</sub> by NRB mask and consider continuous positive airway pressure (CPAP-see Special Procedures)
    - b. Be prepared to assist ventilations;
    - c. Evaluate breath sounds:
      - i. Clear breath sounds: Treat cause - (MI, pulmonary embolism, metabolic disturbance, hyperventilation). Transport.
      - ii. Wheezes present:
        - (a) Minor allergic reaction: Support with oxygen, observe patient carefully. Transport
        - (b) Severe allergic reaction (allergy, asthma)
          - (i) Secure airway and support with oxygen
          - (ii) Ask patient or bystanders if epinephrine 1:1,000 by auto-injector has been prescribed for these situations and do they have the medication with them
          - (iii) IF MEDICATION IS NOT AVAILABLE - Transport immediately, unless ALS unit is enroute and has an ETA of less than 5 minutes (consider transport time)

RESPIRATORY DISTRESS (cont'd)

- (iv) IF MEDICATION IS AVAILABLE:
  - (aa) Assure medication is prescribed for patient
  - (bb) Check medication - cloudiness, expiration date, administration method
  - (cc) Contact Medical Control, if possible
  - (dd) Administer medication in mid-thigh and hold injector firmly against leg for at least ten seconds to assure all medication is injected
  - (ee) Record patient reaction to medication and relay to Medical Control - be sure to have vital signs
  - (ff) Transport immediately
- (c) Patient with COPD (emphysema, asthma, bronchitis)
  - (i) Minor distress;
    - (aa) Put patient in position of comfort, support with LOW flow oxygen
  - (ii) Severe distress;
    - (aa) Set patient up, assist ventilations with HIGH flow O<sub>2</sub>, consider CPAP
    - (bb) Ask patient or bystanders if a bronchodilator by inhaler has been prescribed for these situations and do they have the medication with them
    - (cc) IF MEDICATION IS NOT AVAILABLE - Transport immediately, unless ALS unit is enroute and has an ETA of less than 5 minutes (consider transport time)
    - (dd) IF MEDICATION IS AVAILABLE:
      - (i) Assure medication is prescribed for patient
      - (ii) Check medication - expiration date, administration method
      - (iii) Contact Medical Control, if possible
      - (iv) Administer medication by having the patient exhale, then activate spray during inhalation, and have patient hold breath for ten seconds so medication can be absorbed. Use a spacer if available. If the patient has a nebulizer, the EMT may assist the patient with the patient's self-administration of nebulized medications.
      - (v) Record patient reaction to medication and relay to Medical Control - be sure to have vital signs
      - (vi) Transport immediately

## RESPIRATORY DISTRESS (cont'd)

- iii. Rales present (pulmonary edema)
  - (a) Sit patient upright, administer high flow oxygen by NRB, BVM or CPAP and transport
- iv. Breath sounds absent
  - (a) Treat cause: pneumothorax, hemothorax, lower airway obstruction
- B. Pulse oximeter and/or capnography device and monitor patient condition and treat accordingly
- C. Evaluate patient's general appearance, relevant history of condition and determine:
  - Onset
  - Provokes
  - Quality
  - Radiates
  - Severity
  - Time
  - Interventions
  - Allergies
  - Medication
  - Past Medical History - especially RESPIRATORY
  - Last Meal
  - Events leading to present illness
- D. Contact Medical Control, advise of patient condition, and TRANSPORT

AEMT
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- A. Assist EMT; obtain patient condition and circumstance
- B. Reassess breath sounds and treat as follows:
  - 1. Airway open, breath sounds absent
    - a. Endotracheal intubation
    - b. Provide 100% O<sub>2</sub> by BVM or PPV
    - c. Treat cause and transport
  - 2. Airway obstructed:
    - a. Try to visualize obstruction with laryngoscope if basic procedures are unsuccessful
      - I. Remove foreign body with Magill forceps if possible
  - 3. Wheezes present:
    - i. Severe systemic allergic reaction
      - (a) Give epinephrine 1:1,000 0.3 mg by intramuscular injection
      - (b) May be repeated during transport if patient condition does not improve and Medical Control has been contacted
      - (c) If caused by sting or bite, apply constricting band between bite and heart, apply ice pack to slow swelling and spread of poison

RESPIRATORY DISTRESS (cont'd)

- (d) Apply monitor and check rhythm
  - (e) Start IV saline, TKO, while enroute to hospital DO NOT DELAY TRANSPORT
  - (f) Administer Benadryl® (diphenhydramine) 1 mg/kg (maximum dose of 50 mg) IVP or IM.
- ii. Patient with asthma:
- (a) Minor distress:
    - (i) Put patient in position of comfort, support with oxygen
    - (ii) Consider Proventil® (albuterol) breathing treatment: 2.5 mg of Proventil® (albuterol) in 3 ml NS aerosol unit with oxygen flow at 8 liters per minute
  - (b) Severe distress:
    - (i) Sit patient up, assist ventilations with high flow oxygen, consider continuous positive airway pressure (CPAP-see Special Procedures)
    - (ii) Proventil® (albuterol) breathing treatment: 2.5 mg in 3 ml NS of Proventil® in aerosol unit with oxygen flow at 8 liters per minute
    - (iii) Contact Medical Control for possible administration of epinephrine or glucagon.
  - (c) Start IV saline
- iii. Patient with COPD:
- (a) Minor distress:
    - (i) Put patient in position of comfort, support with low flow oxygen
    - (ii) Proventil® (albuterol) breathing treatment: 2.5 mg of Proventil (albuterol) in 3 ml aerosol unit with oxygen flow at 8 lpm.
  - (b) Severe distress:
    - (i) Sit patient up, assist ventilations with high flow oxygen, consider continuous positive airway pressure (CPAP-see Special Procedures)
    - (ii) Proventil® (albuterol) breathing treatment: 2.5mg of Proventil® (albuterol) in 3 ml NS aerosol unit with oxygen flow at 8 lpm.
    - (iii) Start IV saline

## RESPIRATORY DISTRESS (cont'd)

### 4. Rales present:

#### i. Pulmonary edema:

- (a) Look for and note cyanosis, hypotension, coughing, wheezing, labored breathing, diaphoreses, pitting edema, tachypnea, apprehension, and inability to talk
- (b) Patient has normal blood pressure or is hypertensive:
  - (i) Administer sublingual nitroglycerin 0.4 mg three times at five minute intervals (tablet or spray)

Maintain BP above 100 systolic
  - (ii) Consider morphine sulfate for analgesia as well as hemodynamic response. Morphine sulfate is of considerable usefulness in both AMI and acute pulmonary edema
    - (aa) Dosage: Small frequent titrated IV doses 5 mg every 5 minutes needed until desired effect is achieved
    - (bb) Do not use on COPD or volume depletion
    - (cc) Monitor vital signs, especially respirations and blood pressure, every 5 minutes
  - (iii). Transport patient

PARAMEDIC

- A. Assume charge of situation and confer with EMS professionals about condition of patient and situation
- B. Reassess breath sounds and treat as follows:
  - 1. Airway open, breath sounds absent
    - a. Endotracheal intubation per protocol.
    - b. Provide 100% O<sub>2</sub> by BVM or PPV
    - c. Treat cause and transport
  - 2. Airway obstructed:
    - a. Try to visualize obstruction with laryngoscope if basic procedures are unsuccessful
      - I. Remove foreign body using Magill Forceps if possible
    - b. If airway cannot be cleared, perform a cricothyrotomy
  - 3. Spontaneous breathing with breath sounds:
    - a. Clear breath sounds:
      - i. Treat cause - (MI, pulmonary embolism, metabolic disturbance, hyperventilation)
    - b. Wheezes present:

## RESPIRATORY DISTRESS (cont'd)

- i. Severe systemic allergic reaction
  - (a) Start IV saline
  - (b) Give epinephrine 1:1,000 0.3 mg by intramuscular injection
  - (c) Consider seeking Medical Control
  - (d) If patient is hypotensive and IV has been established, epinephrine 1:10,000 0.5 mg IVP, SLOWLY
  - (e) If caused by sting or bite, apply constricting band between bite and heart, apply ice pack to slow swelling and spread of poison
  - (f) In patients with hypertension, CVA, CAD, pregnancy, consider glucagon 1 mg IM or IV instead of epinephrine.
  - (g) Benadryl® (diphenhydramine) administered 1 mg/kg (50 mg max) IM or
- IV.
  - NOTE: This is especially indicated when drug reactions are suspected and systolic blood pressure is above 90.
  - (h) Proventil® (albuterol) breathing treatment: 2.5 mg of Proventil® in 3 ml NS aerosol unit with oxygen flow at 8 liters per minute
- ii. Patient with asthma:
  - (a) Minor distress:
    - (i) Put patient in position of comfort, support with oxygen
    - (ii) Consider Proventil® (albuterol) breathing treatment: 2.5 mg of Proventil® (albuterol) in 3 ml NS aerosol unit with oxygen flow at 8 liters per minute
  - (b) Severe distress:
    - (i) Sit patient up, assist ventilations with high flow oxygen, consider continuous positive airway pressure (CPAP-See Special Procedures)
    - (ii) Proventil® (albuterol) breathing treatment: 2.5 mg of Proventil® in 3 ml NS aerosol unit with oxygen flow at 8 liters per minute
    - (iii) Contact Medical Control for possible administration of epinephrine or glucagon.
  - (c) Start IV saline
- iii. Patient with COPD:
  - (a) Minor distress:
    - (i) Put patient in position of comfort, support with low flow oxygen
    - (ii) Proventil® (albuterol) breathing treatment: 2.5 mg of Proventil® (albuterol) in 3 ml NS aerosol unit with oxygen flow at 8 l/min.

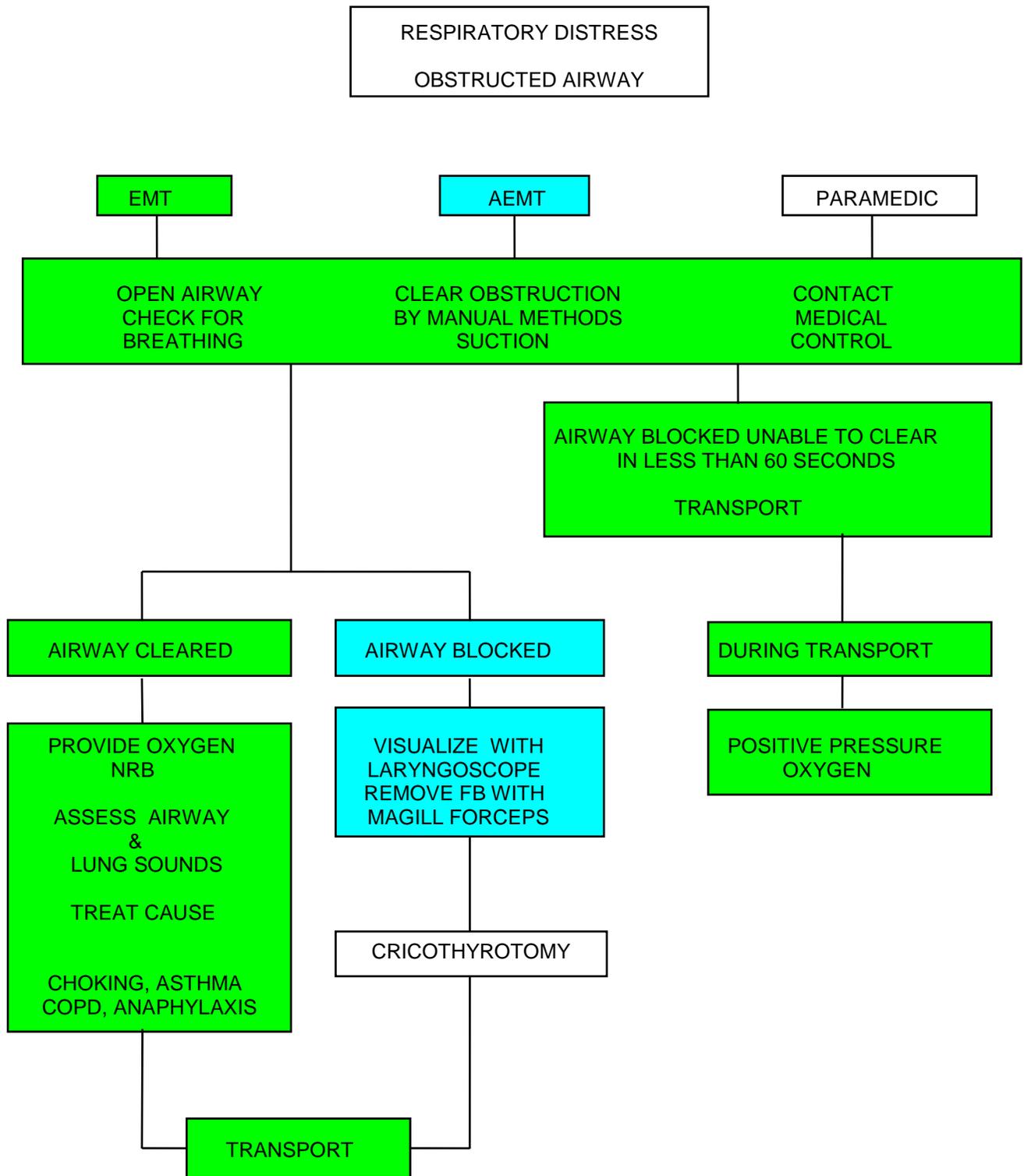
RESPIRATORY DISTRESS (cont'd)

- (b) Severe distress:
  - (i) Sit patient up, assist ventilations with HIGH flow oxygen, consider CPAP
  - (ii) Proventil® (albuterol) breathing treatment: 2.5 mg of Proventil® (albuterol) in 3ml NS aerosol unit with oxygen flow at 8 l/min.
  - (iii) Start IV saline
  
- c. Rales present:
  - i. Pulmonary edema:
    - (a) Look for and note cyanosis, hypotension, coughing, wheezing, labored breathing, diaphoreses, pitting edema, tachypnea, apprehension, and inability to talk
    - (b) Patient has normal blood pressure or is hypertensive:
      - (i) Administer sublingual nitroglycerin 0.4mg three times at five minute intervals (tablet or spray)

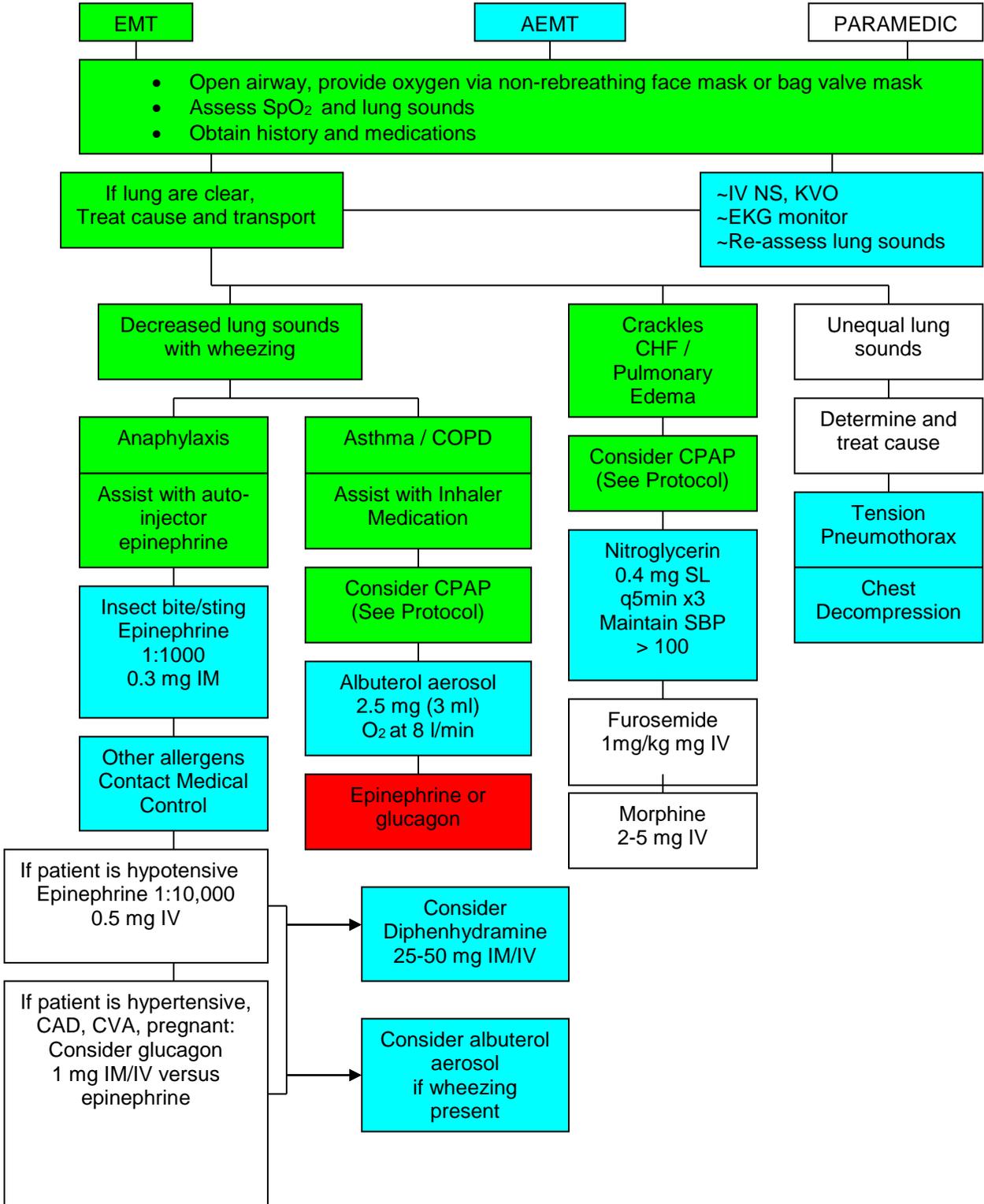
Maintain BP above 100 systolic
      - (ii) Establish IV and administer furosemide (Lasix®) 1 mg/kg IV over one to two minutes.
      - (iii) Transport patient.
      - (iv) Consider morphine sulfate for analgesia as well as hemodynamic response. Morphine sulfate is of considerable usefulness in both AMI and acute pulmonary edema
        - (aa) Dosage: Small frequent titrated IV doses 5 mg every 5 minutes needed until desired effect is achieved
        - (bb) Do not use on COPD or volume depletion
        - (ml) Monitor vital signs, especially respirations and blood pressure, every 5 minutes
  
- d. Breath sound asymmetrical or absent:
  - i. Spontaneous Pneumothorax:
    - (a) Transport in position of comfort.
  - ii. Sucking chest wound:
    - (a) Seal open wound, 3 sides, monitor for tension situation
  - iii. Tension pneumothorax
    - (a) Pleural decompression
  - iv. Lower airway obstruction

RESPIRATORY DISTRESS (cont'd)

- (a) Place in position of comfort
- (b) 100% humidified O<sub>2</sub> by NRB



RESPIRATORY DISTRESS  
SPONTANEOUS BREATHING



## SEIZURES

### GENERAL CONSIDERATIONS

- A. The seizure has usually stopped by the time the EMS professionals arrive (postictal state)
- B. The basic rule with seizures is to "protect and support" the patient. If trauma, consider cervical immobilization.
- C. Aspiration precautions include:
  - 1. Coma position: a side lying position with the head lowered 15 to 30 degrees
  - 2. Suction readily available
  - 3. If possible, mouth cleared of foreign bodies (food, gum, dentures)

### EMT

- A. Place patient away from objects on which they might injure themselves; protect but do not restrain them
- B. Clear and maintain airway, consider cervical spine injury
- C. Administer 100% oxygen with NRB mask
- D. Obtain history from bystanders:
  - 1. Seizure history
  - 2. Description of onset of seizure
  - 3. Medications
  - 4. Other known medical history (especially head trauma, diabetes, drugs, alcohol, stroke, heart disease)
- E. Evaluate:
  - 1. Evidence of head trauma
  - 2. Substance abuse
- F. Bring medication with patient if available
- G. Establish communications with medical control and advise of patient condition. Transport immediately, unless an Advanced Life Support unit is enroute and has an ETA of less than 5 minutes.

### AEMT

- A. Assist EMS professionals, obtain patient condition and circumstance
- B. Apply monitor and check rhythm
- C. Establish IV access with NS TKO while enroute to hospital if seizures are persistent or recurrent.  
DO NOT DELAY TRANSPORT

## SEIZURES (cont'd)

- D. Determine blood sugar level
  - 1. Blood sugar < 80, administer 50 ml of 50% dextrose IV push immediately or 1 mg glucagon IM.
- E. In repeated seizure activity administer Valium® (diazepam) IV
  - 1. Initial bolus of 5 mg and titrate to patient's condition up to a 10 mg maximum
- F. After Valium® monitor airway; be prepared to intubate and assist ventilation with BVM or PPV

PARAMEDIC
-----------

- A. Assume charge of situation and confer with EMS professionals about condition of patient and situation
- B. Make sure patient has good airway, if status epilepticus, nasotracheal intubation may be necessary
- C. Establish IV access with NS TKO if seizures are persistent or recurrent.
- D. Determine blood sugar level
  - 1. Blood sugar < 80, administer 50 ml of 50% dextrose IV push immediately or 1 mg glucagon IM.
- E. In repeated seizure activity administer Valium® (diazepam) IV/PR or consider Versed® (midazolam) IV/IM
  - 1. Initial dose of Valium® 5 mg IVP and titrate to patient's condition up to a 10 mg maximum
  - 2. Initial dose of Versed® 2-5 mg IVP with repeated doses every 2 minutes as needed or Versed® 10 mg intranasal
- F. After Versed® or Valium® monitor airway; be prepared to intubate and assist ventilation with BVM or PPV  
In status epilepticus, nasotracheal intubation may be necessary

SEIZURE

EMT

AEMT

PARAMEDIC

OPEN AIRWAY PROVIDE OXYGEN NRB/BVM CONSIDER C-SPINE	EVALUATE PT. CONDITION PULSE OX, LUNG SOUNDS, LOC, VS	OBTAIN HISTORY SEIZURES DIABETIC DRUG ABUSE	CONTACT MEDICAL CONTROL
--	--	--	-------------------------------

IV NS, TKO  
IF SEIZURES ARE PERSISTENT  
OR RECURRENT

MONITOR EKG

TRANSPORT

ACTIVE SEIZURE

INTUBATE IF AIRWAY  
IS COMPROMISED

VALIUM® 5 MG SLOW IVP

VALIUM® 5 MG IV/PR or VERSED® 2-5 MG IV or 10 MG IN

POSTICTAL

TREAT CAUSE  
HYPOXIA, FEVER  
HYPOGLYCEMIA  
OVERDOSE  
HEAD INJURY

CHECK BLOOD SUGAR  
LESS THAN 80

ORAL GLUCOSE

DEXTROSE 50% 50 ML IVP  
or  
GLUCAGON 1 MG IM

HYPOTENSIVE  
IV FLUID BOLUS  
SALINE

TRANSPORT

## SHOCK

### GENERAL CONSIDERATIONS

- A. Shock is the failure of the body to circulate blood and oxygen properly and perfuse body tissue
- B. Shock can be due to:
  - 1. Hypovolemic - fluid loss
  - 2. Cardiogenic - pump failure
  - 3. Neurogenic - vasodilation
  - 4. Anaphylactic - allergic reaction
  - 5. Septic - infection, vasodilatation
  - 6. Respiratory - lack of oxygen
- C. Priorities of care in shock situations are:
  - 1. Provide an adequate airway and oxygenation
  - 2. Recognize the type of shock present and its treatment
  - 3. Replace body fluids

### EMT

- A. Establish airway; administer 100% oxygen by NRB mask. Assist ventilation as required with oral or nasal airway and BVM. Obtain pulse ox reading and treat accordingly.
- B. Obtain relevant medical history: CAUSE
- C. Place patient in proper shock position:
  - 1. Hypotension - lying flat with feet elevated
  - 2. Respiratory difficulty - head elevated
- D. Maintain body temperature:
  - 1. Patient cold - Warm them up
  - 2. Patient hot - Cool them down
- E. Treat the cause
- F. Anaphylaxis from any cause (insect bite or sting, food, medication, unknown agent):
  - 1. Breathing difficulty, hives, itching, and/or swelling with low blood pressure: Give epinephrine 1:1,000 0.3 mg via auto-injector
  - 2. Hives, itching, and/or swelling with a normal blood pressure: Contact Medical Control as soon as possible.

## SHOCK (cont'd)

- G. Evaluate the patient's:
  - 1. Respiratory status
  - 2. Circulatory status - pulse, B/P
  - 3. Level of consciousness
  - 4. Evidence of trauma to abdomen, chest, head
- H. Establish communications with medical control and advise of patient condition. Transport immediately, unless an advanced life support unit is enroute and has an ETA of less than 5 minutes.

AEMT
------

- A. Assist EMS professionals; obtain patient condition and circumstance
- B. Hypovolemic, Neurogenic, or Septic Shock:
  - 1. During transport to the hospital, start IV saline. DO NOT DELAY TRANSPORT
- C. Anaphylaxis from any cause (insect bite or sting, food, medication, unknown agent):
  - 1. Breathing difficulty with low blood pressure:
    - a. Start IV of normal saline and initiate a bolus until the hypotension resolves
    - b. Give epinephrine 1:1,000 0.3 mg intramuscularly or via auto-injector
  - 3. Hives, itching, and/or swelling with a normal blood pressure: Contact Medical Control for as soon as possible.
- D. Apply monitor and check rhythm

PARAMEDIC
-----------

- A. Assume charge of situation and confer with EMS professionals about condition of patient and situation
- B. Apply monitor and follow protocol for arrhythmias
- C. Identify type of shock and treat as follows:
  - 1. Hypovolemic, Neurogenic, Septic:
    - a. Start IV of normal saline. Infuse until systolic blood pressure is above 100.
    - b. If transport will be prolonged, or if entrapment exists, contact Medical Control
    - c. If hypovolemic shock persists despite above measures start second saline IV
  - 2. Cardiogenic:
    - a. Treat cause by following the appropriate arrhythmia, chest pain, or cardiac arrest protocols.
    - b. If patient has BP of less than 70-90 mm Hg systolic with poor perfusion:

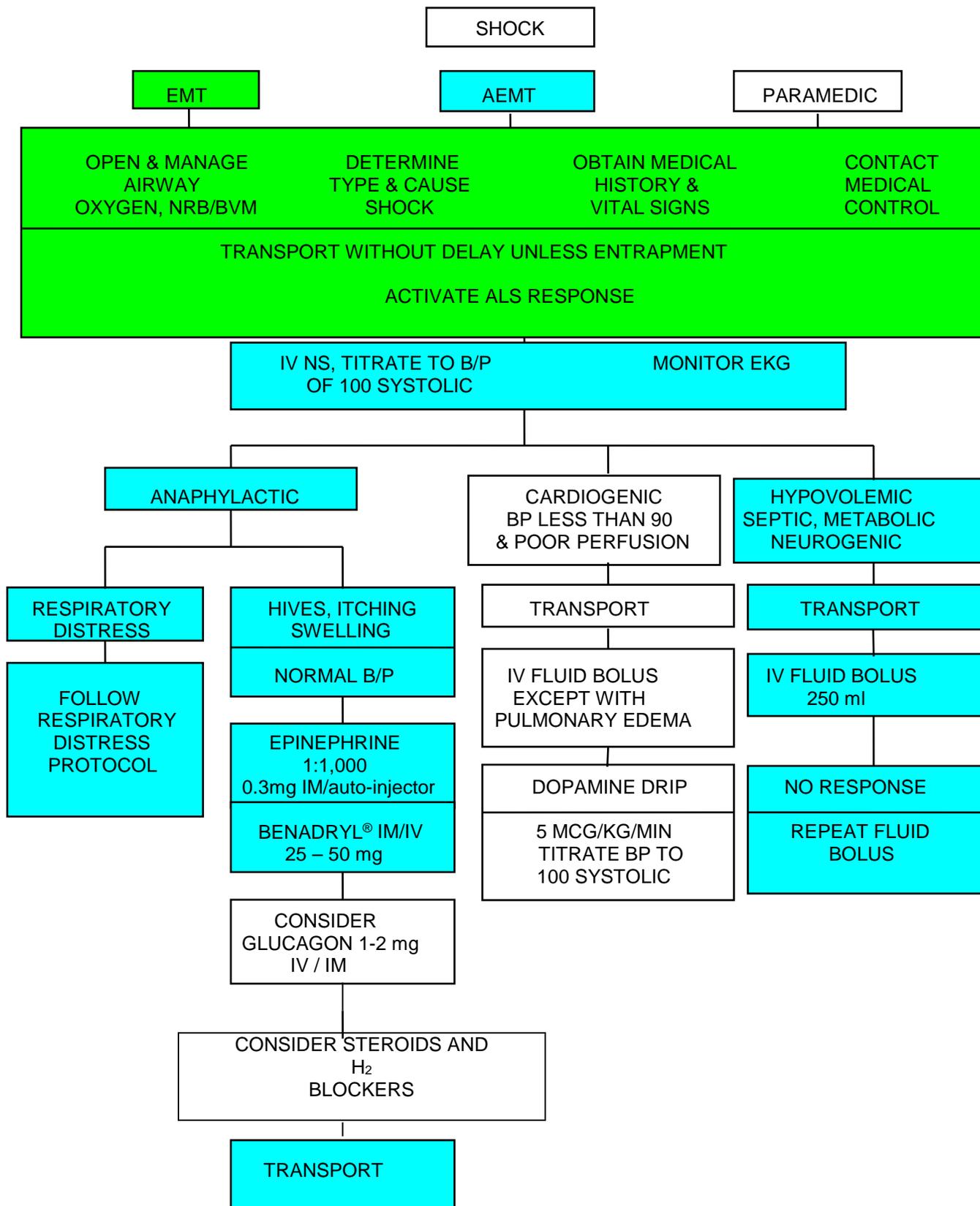
SHOCK (cont'd)

- i. Establish second IV in large peripheral vessel for dopamine administration:
  - (a) Dopamine 400 mg in 500 ml D5W or NS
  - (b) Start infusion at 5 mcg/kg/min and titrate the infusion until adequate heart rate, blood pressure, and level of consciousness are achieved.
- ii. Establish second IV normal saline TKO in large peripheral vein if time permits

NOTE: If IV infiltrates, report to the ED physician as soon as possible
---

3. Anaphylactic:

- a. Respiratory distress, follow Respiratory Distress Protocol
- b. Hives, itching, and/or swelling normal B/P: Contact Medical Control for possible administration of epinephrine and/or Benadryl®
- c. If patient is on beta blocking medication, hypertensive, has known coronary artery disease and/or is pregnant, consider administering glucagon 1-2 mg IV or IM.



## ACUTE STROKE

### GENERAL CONSIDERATIONS

- A. 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.
- B. Some patients who have had a stroke may be unable to communicate but can understand what is being said around them.
- C. Place the patient's affected or paralyzed extremity in a secure and safe position during patient movement and transport.
- D. Hypertension in stroke patients routinely should not be treated in the prehospital setting.  
Any treatment of hypertension should be completed with on-line medical direction.  
Nitroglycerin should not be used unless signs and symptoms consistent with AMI are present.
- E. New therapies for stroke are now available. However, successful use is only possible during a short time window after the start of symptoms. Early notification of the receiving hospital and minimizing scene time are important parts of a strategy to treat patients quickly.
- F. Time of onset of signs and symptoms must always be obtained, documented and relayed to the receiving facility.  
Time of symptom onset needs to be accurately determined for consideration of thrombolytic therapy.  
In patients whose symptoms were present upon awakening, their symptom onset is estimated from the last time that the patient' s neurological status was known to be normal, or the time just prior to going to sleep.
- G. A simple method of physical exam for the stroke patient is:  
1. ask the patient to say " the sky is blue in Ohio",  
2. ask the patient to smile or show their teeth,  
3. ask the patient to hold their arms straight up in front with palms up, have the patient close their eyes and watch arm drift. (palms turns down)  
a. if only one palm turns down the test is positive  
b. if both arms drift down, the result are unclear
- H. Assessment should also include Glasgow Coma Score. Patients with scores of 8 or less have poor prognosis and need ALS as soon as possible.
- I. Patients for whom the onset of stroke symptoms can be confirmed within three hours or less of initiation of the emergency response system should be transported directly to a primary stroke center if possible or as a second option, to a hospital with a functioning CT scanner and emergent radiology services available.

ACUTE STROKE (cont'd)

EMT

- A. Open and manage the airway and provide oxygen by nasal cannula 4 l/min and increase as needed with respiratory distress.

Apply pulse oximeter and treat per procedure. Maintain 95% SpO<sub>2</sub>.

Be prepared to hyperventilate and/or assist ventilations with oral or nasal airway and BVM or PPV

- B. Evaluate patient's general appearance, relevant history of condition and determine:

Onset  
Provokes  
Quality  
Radiates  
Severity  
Time  
Interventions

Allergies  
Medication (i.e. Blood thinners; Coumadin®, warfarin, heparin)  
Past Medical History - especially, diabetic, seizures, stroke, TIA, head injury, drug abuse, hypertension, arrhythmias.  
Last Meal  
Events leading to present illness

- C. Determine blood sugar level.

1. For a blood sugar < 80, administer 1 tube of oral glucose. May be repeated in 10 minutes if blood sugar remains below 80.

PATIENT MUST HAVE A GAG REFLEX.

2. Blood sugar ≥ 80, begin IMMEDIATE TRANSPORT.

- D. If unable to check blood sugar, with signs of stroke, establish communications with Medical Control and advise of patient condition.

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

AEMT

- A. Assist EMS professionals, obtain patient condition and circumstance

- B. Apply monitor and check rhythm

- C. Start saline lock or IV saline TKO, while enroute to hospital  
DO NOT DELAY TRANSPORT

- D. Determine blood sugar level.

1. If blood sugar less < 80, administer IV bolus, 50 ml of 50% dextrose or glucagon 1 mg IM/IV may be repeated in 10 minutes if blood sugar remains below 80.

DO NOT DELAY TRANSPORT

ACUTE STROKE (cont'd)

PARAMEDIC

- A. Assume charge of situation and confer with EMS professionals about condition of patient and situation
- B. If patient does not have a secure, protected airway, intubate per Intubation Procedure
- C. Apply monitor and check rhythm
- D. Establish saline lock or IV saline TKO.
- E. Determine blood sugar level.
  - 1. If blood sugar < 80, administer IV bolus, 50 ml of 50% dextrose or glucagon 1mg IM/IV may be repeated in 10 minutes if blood sugar remains below 80.
- H. Re-evaluate patient condition, contact medical control, and transport to hospital

## TRAUMA EMERGENCIES

### GENERAL CONSIDERATIONS

- A. Assure scene is safe, determine mechanism of injury determine number of patients and request additional help if needed.
- B. Rapid assessment and recognition of major trauma/multiple system trauma is essential to the subsequent treatment
- C. 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 including:
  - 1. Requesting aeromedical evacuation from scene (See Aeromedical Evacuation Procedure)
  - 2. Ground transportation directly to an appropriate facility. (When requesting bypass of nearest facility, this action must be approved by Medical Control)
- D. In cases where the victim must be transported by ground units, because of transport times every effort should be made to limit on-scene time to 10 minutes or less

**THIS CANNOT BE STRESSED ENOUGH!!!**

- E. If patient is entrapped or inaccessible, contact Medical Control and advise of condition and circumstances
- F. If time permits, each patient should be evaluated by the Glasgow Coma Scale and the score relayed to Medical Control

### EMT

- A. Trauma Assessment
  - 1. Initial assessment - establish life threats, chief complaints, assess airway and initiate appropriate therapies, assess circulation and control major bleeding, establish a general impression of patient condition and prioritize patient for transport
  - 2. Urgent patient
    - a. Rapid trauma assessment - quick head to toe survey utilizing DECAP BTLS. Obtain baseline vital signs and SAMPLE history.
    - b. TRANSPORT IMMEDIATELY
    - c. Detailed physical exam and ongoing assessment - during transport, evaluate patient head to toe and assess effectiveness of treatments to this point.
  - 3. Non-urgent patient - single or non-life threatening injury
    - a. Focused physical exam of injured area and management of the situation.
    - b. Detailed physical exam and ongoing assessment - evaluate patient head to toe and assess effectiveness of treatments to this point.

## TRAUMA EMERGENCIES (cont'd)

- c. Transport patient

### B. Urgent trauma treatment

1. Establish airway, breathing and circulation; maintain cervical spine immobilization
2. Administer 100% oxygen and apply Oximeter
3. Control hemorrhage
4. TRANSPORT immediately unless ALS arrival on-scene is less than 5 minutes.
5. During transportation
  - a. Splint individual fracture
  - b. Evaluate the patient's:
    - i. Pulses distal to the fracture site
    - ii. Distal skin color, temperature, neurological status
  - c. Obtain relevant history:
    - i. Where, When, How
    - ii. Mechanism of injury
6. Establish communications with Medical Control and advise of patient condition and need for Trauma Team.

### C. Non-urgent trauma treatment

1. Establish airway, breathing and circulation; maintain cervical spine immobilization
2. Administer 100% oxygen and apply pulse oximeter
3. Control hemorrhage
4. Splint all fracture(s) (IN NON-LIFE THREATENING SITUATION ONLY)
  - a. Evaluate patient's:
    - i. Pulses distal to the fracture site
    - ii. Distal skin color, temperature, neurological status
5. Obtain relevant history:
  - a. Where, When, How
  - b. Mechanism of injury

- H. Establish communications with Medical Control and advise of patient condition.

AEMT
------

- A. Assist EMS professionals; obtain patient condition and circumstance

## TRAUMA EMERGENCIES (cont'd)

- B. Secure the airway and administer 100% oxygen. If the patient is apneic, intubate with cervical spine control
- C. Start IV saline to maintain perfusion and systolic BP  $\geq$  90.  
ESTABLISHING AN IV MUST NOT DELAY TRANSPORTATION
- D. Apply cardiac monitor and check rhythm
- E. If the patient is conscious and alert and complaining of severe pain, administer morphine sulfate as follows:
  - 1. Small frequent doses of 5 mg every 5 minutes and titrate to patient condition
  - 2. DO NOT USE ON HEAD TRAUMA, CHEST INJURY, RESPIRATORY DISTRESS DUE TO TRAUMA, OR ON ANY PATIENT WITH VOLUME DEPLETION OF ANY CAUSE.
  - 3. Consider morphine or other analgesic per local protocols

### PARAMEDIC

- A. Assume charge of situation and confer with EMS professionals about condition of patient and situation
- B. Treat for shock per Shock Protocol
- C. If the patient is conscious and alert and complaining of severe pain, administer morphine sulfate as follows:
  - 1. Small frequent doses of 5 mg every 5 minutes and titrate to patient condition
  - 4. DO NOT USE ON HEAD TRAUMA, CHEST INJURY, RESPIRATORY DISTRESS DUE TO TRAUMA, OR ON ANY PATIENT WITH VOLUME DEPLETION OF ANY CAUSE.
  - 5. Consider morphine or other analgesic per local protocols

### SPECIFIC INJURIES

- A. Chest Wounds:
  - 1. For sucking chest wounds or an open pneumothorax, always cover the wound with a non-porous dressing and seal 3 sides.
  - 2. Stabilize flail chest with trauma dressing
- B. Evisceration:
  - 1. Cover organs with sterile dressing moistened with saline
  - 2. Lay the patient flat and elevate the knees
- C. Complete Amputations:
  - 1. Control bleeding by the most appropriate method; consider tourniquet if appropriate

## TRAUMA EMERGENCIES (cont'd)

2. Always take time to find the avulsed part, but do not delay patient transport, and transport it to the hospital as follows:

- a. Put part in a cool, dry sterile dressing

D. Pneumothorax / Hemothorax / Tension Pneumothorax:

1. Transport patient in position of comfort and watch for signs of a tension pneumothorax

2. Symptoms of tension pneumothorax:

- a. Chest pain or evidence of trauma
- b. Tachypnea
- c. Tachycardia
- d. JVD
- e. May initially exhibit hypertension progressing to hypotension
- f. Hyperresonance on affected side
- g. Diminished or absent breath sounds of affected side
- h. Audible wheeze
- a. Tracheal deviation away from affected side (latent sign)

NOTE: Significant tension pneumothorax may present exhibiting any or all of the above symptoms
--

3. Pleural decompression per procedure

E. Head Injury:

1. Evaluate patient condition:

- a. Level of Consciousness
- b. Pupillary size and reaction
- c. Glasgow Coma Scale results

2. Transport with head elevated 8 to 10 inches by tilting backboard, and C-spine immobilized

3. Maintain airway, support with 100% oxygen by NRB mask and/or BVM

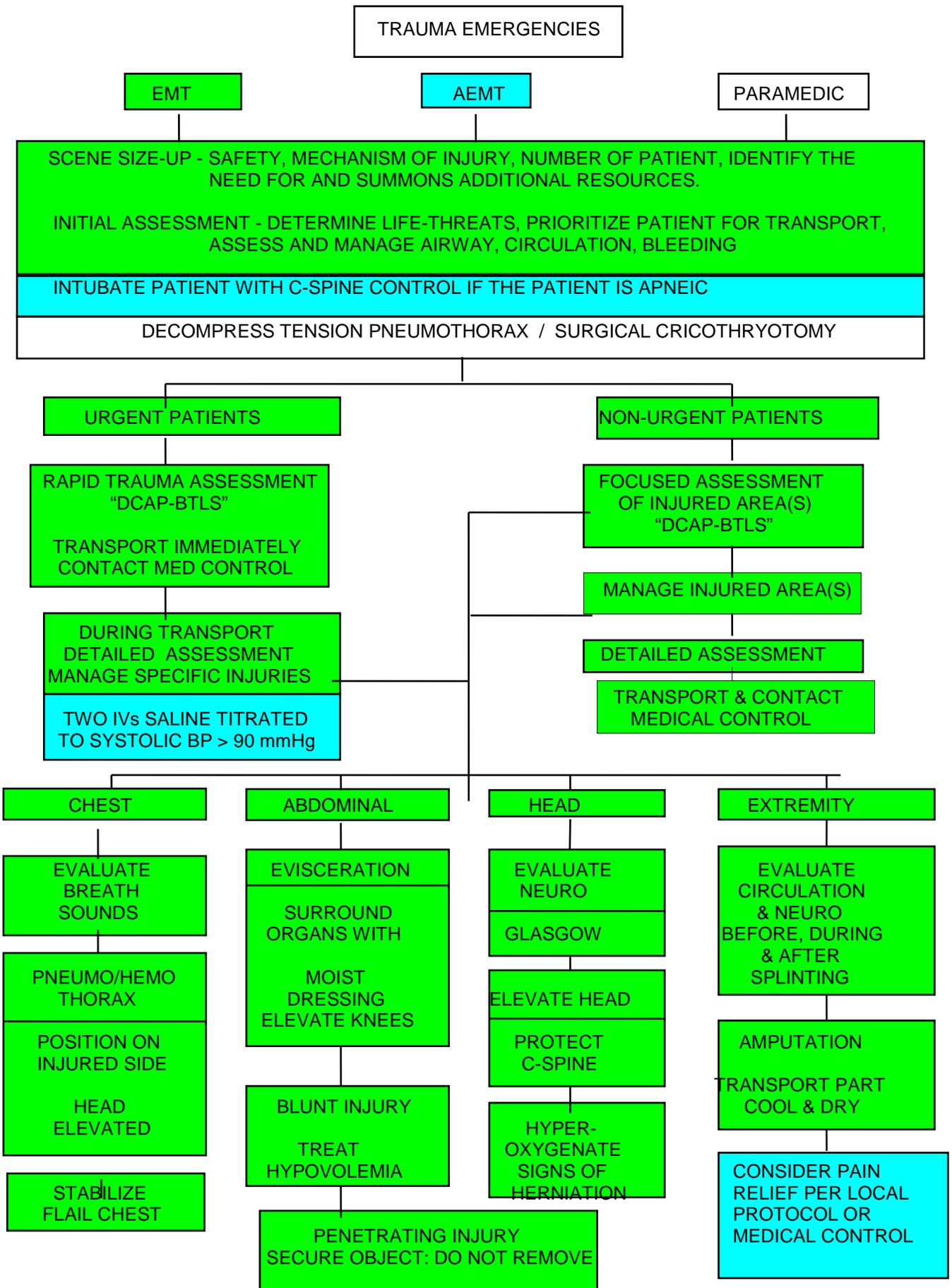
- a. Orotracheal, nasotracheal, or digital intubation may be indicated if the patient is apneic and should be accomplished gently maintaining in-line cervical spine immobilization
- b. Do not hesitate to take control of airway
- c. Hyperoxygenate when there are signs of cerebral herniation:
  - i. Blown pupils, bradycardia, posturing

F. Spinal Injuries:

1. Immobilize spine - See Cervical Immobilization Assessment Protocol

## TRAUMA EMERGENCIES (cont'd)

2. Cervical Immobilization Assessment
  - a. Cervical immobilization should be used if the following criteria are met.
    - i. The patient complains of neck pain
    - ii. The patient has pain on palpation of the neck
    - iii. The patient complains of neurologic deficits or is found upon physical exam to have neurologic deficits. (subjective: numbness, tingling, weakness) (objective: loss or diminished sensation or motor weakness)
    - iv. The patient with altered LOC and impaired competence whether from drugs, alcohol or head injury and suggestive mechanism of injury for neck injury (refer to Refusal of Service for impaired competence criteria)
    - v. The patient with suggestive mechanism of injury for neck injury and the patient has other major distracting injuries.
    - vi. The patient has neck pain with any head motion
  - b. All patients that meet the above criteria should have full cervical immobilization.
3. If patient is wearing a helmet, see Helmet Removal Protocol in the Special Procedures Section
4. Always contact medical control and relay information regarding patient to the hospital. Spinal cord injury patients may need to be delivered to another facility if the hospital initially contacted cannot handle this injury.
5. If patient is alert and complaining of severe pain consider pain relief per local protocol.



## TRAUMA ARREST

### GENERAL INFORMATION

- A. Resuscitation should not be attempted in cardiac arrest patients with hemicorporectomy, decapitation, or total body burns, nor in patients with obvious, severe blunt trauma who are without vital signs, pupillary response, or an organized or shockable cardiac rhythm at the scene. 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.

Trauma victims who are initially found by EMS professionals in cardiac arrest or found at the scene without vital signs may be considered dead and follow the DOA policy.

- B. Extensive, time-consuming care of trauma victims in the field is usually not warranted. Unless the patient is trapped, they should be enroute to a medical facility within 10 minute after arrival of the ambulance on the scene

### EMT

- A. Ventilate with 100% oxygen by two-person bag valve mask or oxygen powered, manually triggered or automatic transport ventilation device with an oral or nasal airway

Ventilation should be delivered over two seconds and cricoid pressure should be considered to help reduce gastric distention

Always consider cervical spine injury

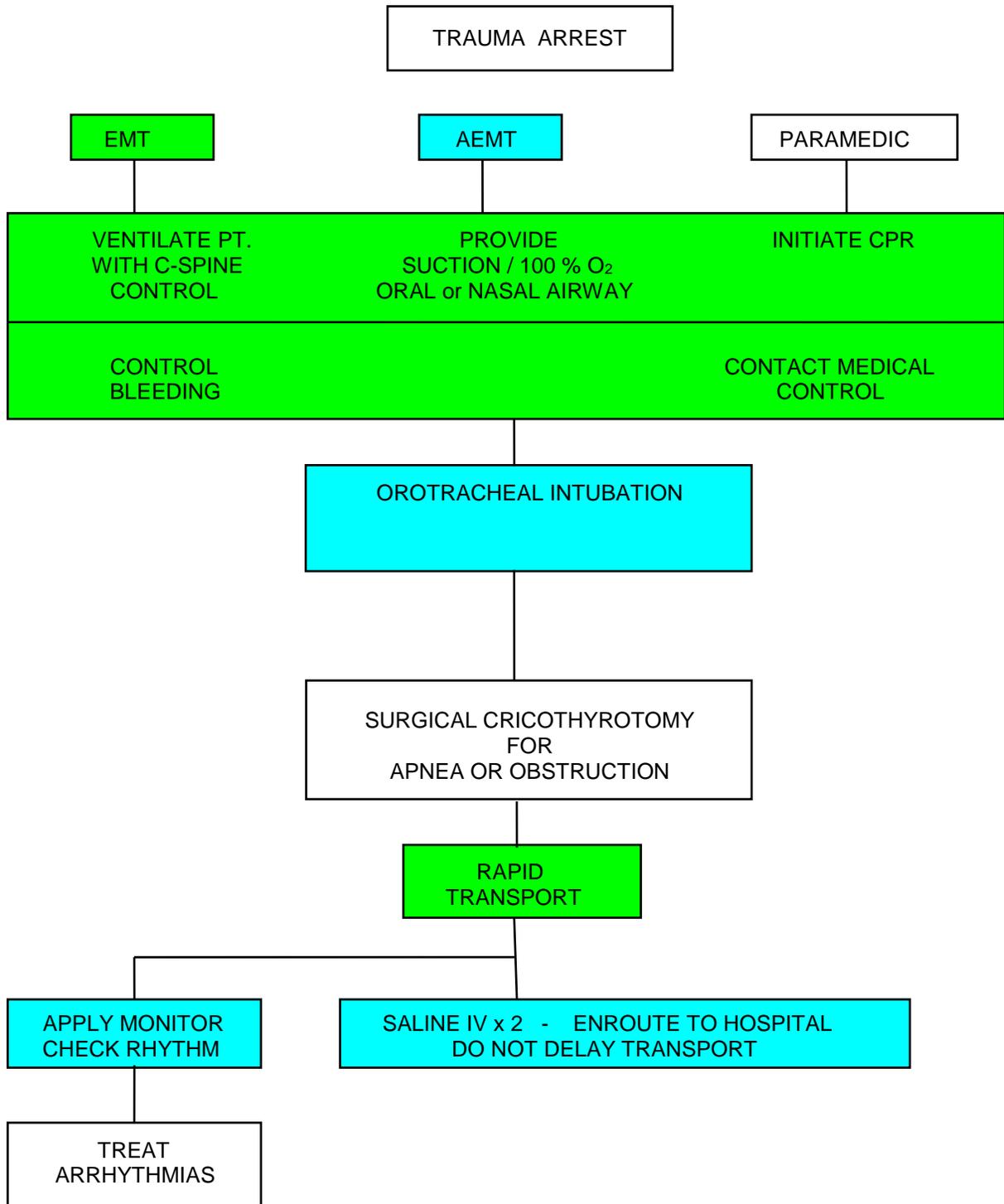
- B. Basic CPR with consideration of cervical spine
- C. Immobilize cervical spine and TRANSPORT IMMEDIATELY

### AEMT

- A. Assist EMS professionals, obtain patient condition and circumstance
- B. Start two IVs of normal saline and transport to the hospital
- C. Check pulse, intubate patient, contact medical control and advise of patient condition, while continuing CPR

### PARAMEDIC

- A. Assume charge and confer with EMS professionals as to patient condition and circumstances
- B. Intubate patient:
  - 1. Patients should be intubated orotracheally without movement of the cervical spine
  - 2. If orotracheal intubation is not possible, or an obstruction is present, then a cricothyrotomy may be necessary per local protocol.
- C. Assess cause of patient's condition and treat according to appropriate guidelines.



**GLASGOW COMA SCALE**

		<b>GCS</b>
<b>EYES</b>	<b>SPONTANEOUSLY</b>	<b>4</b>
	<b>TO VERBAL COMMAND</b>	<b>3</b>
	<b>TO PAIN</b>	<b>2</b>
	<b>NO RESPONSE</b>	<b>1</b>
<b>BEST MOTOR RESPONSE</b>	<b>OBEYS VERBAL COMMAND</b>	<b>6</b>
	<b>PURPOSEFUL MOVEMENT TO PAIN</b>	<b>5</b>
	<b>FLEXION - WITHDRAWAL</b>	<b>4</b>
	<b>FLEXION - ABNORMAL</b>	<b>3</b>
	<b>EXTENSION</b>	<b>2</b>
	<b>NO RESPONSE</b>	<b>1</b>
<b>BEST VERBAL RESPONSE</b>	<b>ORIENTED &amp; CONVERSES</b>	<b>5</b>
	<b>DISORIENTED &amp; CONVERSES</b>	<b>4</b>
	<b>INAPPROPRIATE WORDS</b>	<b>3</b>
	<b>INCOMPREHENSIBLE SOUNDS</b>	<b>2</b>
	<b>NO RESPONSE</b>	<b>1</b>

**REVISED TRAUMA SCORE**

		<b>RTS</b>
<b>GLASGOW COMA SCALE</b>	<b>13 - 15</b>	<b>4</b>
	<b>9 - 12</b>	<b>3</b>
	<b>6 - 8</b>	<b>2</b>
	<b>4 - 5</b>	<b>1</b>
	<b>0 - 3</b>	<b>0</b>
<b>RESPIRATORY RATE</b>	<b>10 - 29</b>	<b>4</b>
	<b>LESS THAN 29</b>	<b>3</b>
	<b>6 - 9</b>	<b>2</b>
	<b>1 - 5</b>	<b>1</b>
	<b>0</b>	<b>0</b>
<b>SYSTOLIC BLOOD PRESSURE</b>	<b>LESS THAN 89</b>	<b>4</b>
	<b>76 - 89</b>	<b>3</b>
	<b>50 - 75</b>	<b>2</b>
	<b>1 - 49</b>	<b>1</b>
	<b>0</b>	<b>0</b>

## AEROMEDICAL TRANSPORT

- 1) Rotor wing air medical services may be requested directly to the scene by:
  - a) an on-scene EMS organization
  - b) hospitals and healthcare facilities
- 2) A request for rotor wing air medical service response may be initiated when one or more of the following conditions exists:
  - a) The patient's airway, breathing, or hemorrhage/circulation can not be controlled by conventional means and the estimated arrival time of the air medical service is less than the time required for ground transport to the nearest hospital.

### OR

- b) Air transport to a medical facility/the most appropriate trauma center will occur in a shorter time than ground transport to a medical facility/them most appropriate trauma center.
  - a. Time estimation should be made from the time the patient is ready for transport to arrival at the medical facility/the most appropriate trauma center. This should include aircraft response to the scene.

### Destinations

- a) An appropriate medical facility/the most appropriate trauma center based upon, but not limited to the following factors:
  - i) Time to definitive care
  - ii) Capabilities of receiving hospitals
  - iii) Patient wishes and family continuity
  - iv) Maximizing utilization of resources

## COMMUNICATIONS

A member of the prehospital care team must contact medical control at the earliest time conducive to good patient care. This may be a brief early notification or “heads up”. It may mean that the hospital is contacted from the scene if assistance is needed in the patient's immediate care or permission is required for part of the patient care deemed necessary by the EMS professional in charge.

When possible, the member of the team most knowledgeable about the patient should be the one calling in the report.

Although all EMS professionals have been trained to give a full, complete report, this is often not necessary and may interfere with the physician's duties in the emergency department. Reports should be as complete but concise as possible to allow the physician to understand the patient's condition. It is not an insult for the physician to ask questions after the report is given. This is often more efficient than giving a thorough report consisting mostly of irrelevant information.

If multiple victims are present on the scene, it is advisable to contact medical control with a preliminary report. This should be an overview of the scene, including the number of victims, seriousness of the injuries, estimated on-scene and transport times to the control hospital or possible other nearby facilities. This allows preparation for receiving the victims and facilitates good patient care.

When contacting the receiving facility or medical direction, the patient report it should begin with the identification of the squad calling, and the highest level of care which is able to be provided to the patient (i.e., EMT, AEMT, or Paramedic), and the nature of the call (the physician or nurse to whom you need to speak directly).

### CODE THREE PATIENTS – MOST SERIOUSLY ILL

This category is for the most seriously ill or injured patients.

1. Type of Squad: EMT, AEMT, Paramedic
2. Age and Sex of Patient:
3. Type of Situation: Injury and/or Illness
4. Specific Complaint: Short and to the point (i.e., chest pain, skull fracture)
5. Mechanism: MVA / MCA / Fall
6. Vital Signs: BP / Pulse / Resp. / LOC / EKG
7. Patient Care: Airway Management, Circulatory Support, Drug Therapy
8. General Impression: Stable / Unstable
9. ETA to Medical Facility

### CODE TWO PATIENTS –SIGNIFICANTLY ILL

This category is for individuals who have significant signs or symptoms of illness or injury, and at this time are stable.

1. Type of Squad: EMT, AEMT, Paramedic
2. Age and Sex of Patient:
3. Type of Situation: Injury and/or Illness
4. Specific Complaint: Short and to the point (i.e. 10% 2nd degree burn to leg)
5. Mechanism: MVA / MCA / Fall

COMMUNICATIONS (cont'd)

6. Vital Signs: BP / Pulse / Resp. / LOC / EKG
7. ETA to Medical Facility

CODE ONE PATIENTS—MINOR ILLNESSES

This category covers all minor illness or injury circumstances and the patient is in no danger of developing any significant signs or symptoms.

1. Type of Squad: EMT, AEMT, Paramedic
2. Age and Sex of Patient:
3. Type of Situation: Injury and/or Illness
4. Specific Complaint: Short and to the point (i.e., abdominal pain for the last two weeks)

Code I (non-transport) for minors

If after evaluation of a minor, the EMS professional and medical control agree that the patient is a Code I, that minor can be left in the care of a responsible adult that is not the parent or legal guardian. The responsible adult may be a family friend, neighbor, school bus driver, teacher, school official, police officer, social worker, or other person at the discretion of medical control and the EMS professional.

Once the above information is given, wait for further requests and/or orders from Medical Control.

If the patient requires special care; (i.e., security; interpreter; additional people for lifting, isolation for infection, vermin infestation, or hazardous material) this information should also be relayed.

TYPES OF PATIENTS ACCORDING TO TRIAGE PRIORITY

CODE THREE PATIENTS

- |  |                    |
|--|--------------------|
| Airway and/or Breathing Difficulty             | Unconsciousness    |
| Cardiac Arrest                                 | Severe Head Injury |
| Circulation Difficulty (Bleeding and/or Shock) | Severe Burns       |
| Open Chest and Abdominal Injury                | Severe Poisoning   |
| Complicated Childbirth                         | Status Epilepticus |
| Chest Pain                                     | Altered LOC        |
|  | Multiple Fractures |

CODE TWO PATIENTS

- |                       |                                  |
|-----------------------|----------------------------------|
| Cervical Spine Injury | Normal Childbirth                |
| Acute Abdominal Pain  | Violent and/or Combative Patient |
| Moderate Burns        | Psychiatric                      |

CODE ONE PATIENTS

- Minor Injury
- Minor Illness

## PROTOCOL FOR DOA

### GENERAL STATEMENT

- A. When a DOA is encountered, the squad members should avoid disturbing the scene or the body as much as possible, unless it is necessary to do so in order to care for and assist other victims. Once it is determined that the victim is, in fact, dead the squad members should move as rapidly as possible to transfer responsibility or management of the scene to the police department and/or Coroner's Office. It is the squad member's responsibility to notify the Coroner's Office directly or to ensure that the Coroner's Office has been notified by a police officer on the scene.

A determination that the victim is dead rests with the squad members. Any of the following may be used as guidelines to support the determination that a victim is deceased:

1. There is an injury which is incompatible with life (i.e., decapitated, or burned beyond recognition).
  - a. Cardiac arrest, secondary to massive blunt trauma without signs of exsanguinating hemorrhage (i.e. limb amputation).
2. The victim shows signs of decomposition, rigor mortis, or extremely dependent lividity.
3. If the patient is an adult with an unwitnessed cardiac arrest, has a history of an absence of vital signs for greater than 20 minutes, and is found in asystole, not secondary to hypothermia or cold water drowning.
4. If there are valid DNR (Do Not Resuscitate) orders, see DNR Protocol.
5. If the patient has a history of terminal disease, the family refuses resuscitation and permission to pronounce the patient dead is given by Medical Control.

**CAUTION: IF ANY DOUBT EXISTS THAT THE VICTIM IS DEAD AT THE TIME OF ARRIVAL OF THE SQUAD, RESUSCITATIVE MEASURES SHOULD BE INSTITUTED IMMEDIATELY. WHENEVER RESUSCITATIVE MEASURES ARE INSTITUTED, THEY MUST BE CONTINUED UNTIL ARRIVAL AT A HOSPITAL OR UNTIL A PHYSICIAN HAS PRONOUNCED THE VICTIM DEAD OR A VALID DNR IS PRONOUNCED.**

## DO NOT RESUSCITATE/SUPPORT CARE GUIDELINES

### BACKGROUND

In 1999, the Ohio Department of Health successfully established a Do-Not-Resuscitate Comfort Care (DNR Comfort Care) Protocol within the Ohio Revised Code. In the past, do-not-resuscitate (DNR) orders could not be honored without contacting medical direction when EMS or the 911 system was activated. The DNR Comfort Care Protocol will permit EMS to honor DNR orders without immediately contacting medical direction and provides guidelines for the prehospital management of these patients.

A DNR Comfort Care patient has completed a living will or has been issued a DNR order. The DNR Comfort Care protocol can be performed immediately by EMS for these patients. There is a subset of patients who are DNR Comfort Care-Arrest patients. This protocol is to be activated only in the event of a cardiac or respiratory arrest for these patients. EMS should follow the State of Ohio EMS Guidelines for these cases unless they present as a cardiac or respiratory arrest. In the event of a cardiac or respiratory arrest in a DNR Comfort Care-Arrest patient, the patient care should then be diverted to the Do Not Resuscitate (Comfort Care) Protocol. For the purposes of this protocol, a cardiac arrest is defined as the absence of a palpable pulse, and a respiratory arrest is defined as the absence of spontaneous respirations or presence of agonal respirations. The patient's DNR order or DNR identification should be checked very carefully to distinguish between the DNR Comfort Care and the DNR Comfort Care-Arrest classifications.

A DNR Comfort Care designation does not imply that the patient does not want to be treated for illnesses or injuries unrelated to a terminal disease process. For example, if the patient sustained a bee sting and was developing anaphylaxis, EMS providers should follow the anaphylaxis protocol. Medical direction should be contacted as soon as possible for further guidance and potential temporary revocation of the DNR Comfort Care order.

A reasonable effort should be made to positively identify the patient with DNR orders, but it is not required for the performance of this protocol. Patients of health care facilities do not require verification of identity when the DNR order is present on the patient chart. Acceptable methods of patient identification verification include a driver's license, passport, picture ID, institution identification band, or personal identification by a family member, caregiver, friend, or health care worker.

A patient's DNR Comfort Care or DNR Comfort Care-Arrest status can be confirmed by one of the following:

1. A DNR Comfort Care card or form completed for the patient.
2. A completed State of Ohio living will (declaration) form that states that the patient does not want CPR (in the case of a patient who has been determined by two doctors to be in a terminal or permanently unconscious state).
3. A DNR Comfort Care necklace or bracelet bearing the DNR Comfort Care official logo.



4. A DNR order signed by the patient's attending physician or, when authorized by section 2133.211 of the Ohio Revised Code, a certified nurse practitioner (CNP) or clinical nurse specialist (CNS).
5. A verbal DNR order is issued by the patient's attending physician, CNP, or CNS.

EMS providers are not required to search a patient to locate DNR identification. Copies of the documents listed under items 1, 2, or 4 are sufficient. The EMS provider must verify the identity of a physician or CNP/CNS issuing a verbal DNR order. Acceptable methods of verification include personal knowledge of the physician or CNP/CNS, a return telephone call to verify the information provided, or a list of practitioners with other identifying information such as addresses.

## DO NOT RESUSCITATE/SUPPORT CARE GUIDELINES (cont'd)

A DNR order is considered current if it is present in a health care facility's records or patient chart. A DNR order for a patient outside of a health care facility is considered current unless it is revoked by the patient or by the patient's attending physician or CNP/CNS. EMS providers are not required to research whether a DNR order that appears to be current has been discontinued.

The DNR Comfort Care patient always retains the right to request resuscitation even if the protocol has been activated. A request for resuscitation by the patient revokes the DNR Comfort Care status and the EMS providers should immediately follow the resuscitation procedures in the State of Ohio EMS Guidelines.

Once the DNR Comfort Care protocol has been activated, the wishes of family members or bystanders demanding or requesting resuscitation should not be honored. Any and all resuscitative measures should continue to be withheld. Attempts should be made to help the family understand the dying process and the patient's choice not to be resuscitated.

When the DNR Comfort Care Protocol has been activated, EMS personnel will provide the following care as clinically indicated:

1. Suction the airway.
2. Administer oxygen.
3. Position for comfort.
4. Splint or immobilize.
5. Control bleeding.
6. Provide pain medication.
7. Provide emotional support.
8. Contact medical direction
9. Contact other appropriate health care providers such as hospice, home health, attending physician, CNP/CNS as time or patient scenario permits.

When the DNR Comfort Care Protocol has been activated, EMS personnel will not perform the following:

1. Administer chest compressions.
2. Insert an artificial airway.
3. Administer resuscitative drugs.
4. Defibrillate or cardiovert.
5. Provide respiratory assistance other than the methods listed above.
6. Initiate resuscitative IV access.
7. Initiate cardiac monitoring.

**NOTE:** If any of these actions have been initiated prior to confirmation of the patient's DNR Comfort Care status, discontinue them when the DNR Comfort Care protocol is activated. Any and all respiratory assistance, IV medications, or other therapies that have been part of a patient's ongoing course of treatment for an underlying disease may be continued.

When the DNR Comfort Care protocol is performed, the suggested documentation on the patient care report should include the following information:

1. The document identifying the DNR Comfort Care status of the patient.
2. The method of verification of the patient's identity, if any was found through reasonable efforts.
3. DNR Comfort Care or DNR Comfort Care-Arrest classification.
4. All actions taken to implement the DNR Comfort Care protocol.
5. Any and all unusual events occurring enroute or on scene including interactions with family members, bystanders, or health care providers.

Any and all questions or concerns that arise during the management of DNR Comfort Care patients may be directed to and discussed with medical direction for assistance and guidance.

## PROTOCOL FOR PATIENT REFUSAL

### GENERAL STATEMENT

A. Competent adult patients have the right to give consent for, or refuse, any or all treatments. EMS professionals should attempt to obtain vital signs on all patients. Competent adult patients also have the right to give consent for, or refuse ambulance transport. Each agency should have established guidelines for patient consent and refusal. A performance improvement (PI) process should be in place to review these runs.

#### 1. Consent

a. When waiting to obtain lawful consent from the person authorized to make such consent would present a serious risk of death, serious impairment of health or would prolong severe pain or suffering of the patient, treatment may be undertaken to avoid those risks without consent. In no event should legal consent procedures be allowed to delay immediately required treatment.

#### b. Adults

A competent patient may withdraw consent for treatment at any time.

1. Prior to discontinuing or withdrawing treatment, the EMS professionals should determine if the patient is competent

#### 2. Mental Competence - Decision Making Capability

a. A person is mentally competent if he:

1. Is capable of understanding the nature and consequences of the proposed treatment.
2. Has sufficient emotional control, judgment, and discretion to manage his own affairs.

b. Ascertaining that the patient is oriented, has an understanding of what happened and may possibly happen if treated or not treated, and a plan of action - such as whom he will call for transportation home - should be adequate for these determinations.

#### 3. Impairment

a. Patients may be considered incompetent to refuse care and/or transportation when they appear impaired. Patients who appear impaired include:

Suicidal Patients

Patients impaired by alcohol

Patients impaired by illicit drugs

Patients impaired by prescription or nonprescription drugs

Patients impaired by medical conditions such:

Hypoglycemia

Hypoxemia

Hypoperfusion

Head trauma

Psychiatric conditions

## PROTOCOL FOR PATIENT REFUSAL (cont'd)

### c. Pediatric

1. A critically ill or injured child should be treated and transported immediately
2. In non-emergency cases involving minors, consent should be obtained from the parent or legal guardian prior to undertaking any *treatment*. All children must be evaluated for acuity of illness, regardless of obtaining parental consent.
3. Each agency should have policies which delineate situations in which children may be left at the scene, emancipated status, and instances when medical control should be contacted.

PROCEDURE FOR REFUSAL
-----------------------

- A. If a patient wishes to refuse treatment, examination or transportation, each agency should have steps which will be followed and optimally all of these runs will be reviewed as part of the PI process.
- B. The completion of a Patient Refusal Checklist by the EMS professional is suggested (see enclosed example)
  1. The patient must be advised of the benefits of treatment and transport as well as the specific risks of refusal of treatment and transport.
  2. The patient must be able to relate to the EMS professional in his or her own words what the risks and benefits of refusal of transport.
  3. The patient will be provided with a refusal information sheet, also attached. A copy of this refusal information sheet or the refusal section of the check list will be signed by the patient, dated, and both will be kept with the patient's file.



**REFUSAL INFORMATION SHEET**

**PLEASE READ AND KEEP THIS FORM**

This form has been given to you because you have refused treatment and/or transport by the Emergency Medical Service. Your health and safety are our primary concern, so even though you have decided not to accept our advice, please remember the following:

1. The evaluation and/or treatment provided to you by EMS professionals is not a substitute for medical evaluation and treatment by a doctor. We advise you to get medical evaluation and treatment.
2. Your condition may not seem as bad to you as it actually is. Without treatment your condition or problem could become worse. If you are planning to get medical treatment, a decision to refuse treatment or transport by the EMS may result in a delay which could make your condition or problem worse.
3. Medical evaluation and/or treatment may be obtained by calling your doctor, if you have one, or by going to any hospital emergency department in this area, all of which are staffed 24 hours a day by emergency physicians. You may be seen at these emergency departments without an appointment.
4. If you change your mind or your condition becomes worse and you decide to accept treatment and transport by the Emergency Medical Service, please do not hesitate to call us back. We will do our best to help you.
5.  **If the box at the left has been checked**, it means that your problem or condition has been discussed with an emergency physician at the medical control hospital by radio or telephone, and the advice given to you by the Emergency Medical Service has been issued or approved by the emergency physician.

\*\*\* I have been informed of the dangers of my not being treated and/or transported by the Emergency Medical Services, for my condition, for treatment by an emergency department or private physician. I release \_\_\_\_\_ and consulting hospital their employees and officers from all liability for any adverse results caused by my decision.

I have received a copy of this information sheet.

Signature: \_\_\_\_\_

Circle one:                  Patient                  Spouse                  Parent                  Guardian

Print Name: \_\_\_\_\_

Signature of EMS professional: \_\_\_\_\_ Witness: \_\_\_\_\_

Print Name: \_\_\_\_\_

Report Number: \_\_\_\_\_ Date: \_\_\_\_\_

## NON-TRANSPORTS

A number of EMS calls result in non-transport of the patient or victim. If an individual is not transported by the squad, the following guidelines will apply:

1. In the event of a patient assist call and no Emergency Medical Services are rendered, a report should be made but Medical Control need not be contacted.
2. If the patient refuses treatment or transport, the patient refusal procedure should be followed.
2. If the patient is requesting transport and the EMS professionals in charge does not feel it is necessary to transport the patient, Medical Control must be contacted and approve the EMS refusal. This includes any case that might be transported by car or private ambulance.
  - a. A Code I Advisory Sheet should be initiated and given to the patient. (See Code I Advisory Sheet)
4. Code I (non-transport) for minors

If after evaluation of a minor, the EMS professional and medical control agree that the patient is a Code I, that minor can be left in the care of a responsible adult that is not the parent or legal guardian. The responsible adult may be a family friend, neighbor, school bus driver, teacher, school official, police officer, social worker, or other person at the discretion of medical control and the EMS professional.

**CODE I ADVISORY SHEET**

You have been evaluated by an EMS professional in communication with a physician over a radio. It has been determined that you do not need an ambulance at this time. **THIS DOES NOT MEAN THAT YOU SHOULD NOT BE SEEN BY A PHYSICIAN. THE EVALUATION AND TREATMENT YOU RECEIVED WAS TO DETERMINE THE SEVERITY OF YOUR PROBLEM AND WHETHER OR NOT YOU NEEDED AN AMBULANCE; IT IS NOT A SUBSTITUTE FOR FINAL EVALUATION AND TREATMENT BY A PHYSICIAN.**

We advise you to see a physician at this time. You may decide that you don't need to see a physician now, but if you don't then you must take the risk that you will not receive treatment that you need and that this may cause problems for you later on. The following may help you decide:

1. If you have a cut, only a physician should decide whether or not you need stitches. Most physicians recommend stitches within 8 hours because after that the risk of an infection becomes much greater.
2. If you have a cut, scrape or burn and have not had a tetanus (lockjaw) shot within 5 years, you may need one. You do not need to get a tetanus shot immediately, but you should not delay this more than 24 hours.
3. Many burns do not appear to be as bad as they really are. Also, serious problems can develop from some burns which may be prevented by early medical treatment.
4. If the pain or other discomfort you had has gone away, it does not necessarily mean the problem that caused it has gone away.
5. If you decide you don't need to see a physician and then change your mind, don't wait. The longer you wait, the more problems you may have.

**USE COMMON SENSE!!!**

**"IF I DON'T HAVE A PHYSICIAN, OR CAN'T SEE MY PHYSICIAN NOW, WHAT CAN I DO?"**

**GO TO THE NEAREST EMERGENCY DEPARTMENT OR CALL BACK EMERGENCY MEDICAL SERVICES.**

Patient Signature \_\_\_\_\_ Date \_\_\_\_\_

EMS Professional's Signature \_\_\_\_\_

Report # \_\_\_\_\_

## HEAVY PATIENTS

### GENERAL CONSIDERATIONS

Less than one percent of the population has a weight in excess of 300 pounds. This means that in any community there may be one or more individuals who fall into this extreme. As patients, these individuals are frequently classed as high risk because of the increased medical complications associated with their excess weight. In the EMS system they present the additional problem of movement and transportation. These individuals have the right to expect prompt and expert emergency medical care. Therefore, in order to facilitate the care of these individuals without risking the health of EMS professionals, the following protocol is established.

- A. In managing a patient with weight over 300 pounds, at no time should the patient be moved without at least 6 individuals to assist. At the scene, as many EMS professionals as can be mobilized may be supplemented by police or other safety personnel as appropriate. If 6 individuals are not available, mutual aid will be required.
- B. It may be necessary to remove doors, walls or windows. The situation is no different than extrication from a vehicle, although property damage may be higher. At all times the patient's life must be the first priority.
- C. The patient is to be placed on at least 2 (double) backboards or other adequate transfer device for support.
- D. The patient is to be loaded on a cot that is in the down position, and the cot is to be kept in the down position at all times.
- E. Three (3) EMS professionals are to accompany the patient during transport. If additional personnel are available they are to travel in a separate vehicle.
- F. The patient will be loaded directly from the squad onto a special hospital bed for this type of patient, which will be brought to the ED entrance.
- G. It is **NECESSARY TO NOTIFY THE HOSPITAL WELL IN ADVANCE** of arrival so that preparations can be completed in a timely fashion.
- H. If individuals in the community are known to fall within this special category it is appropriate to inform them in advance of the type of assistance they can expect from the EMS system, and help them make plans well in advance to assist you. When calling for the squad, and if they identify themselves and their special needs, it will promote the timeliness of your efforts.

## PATIENTS WITH FUNCTIONAL NEEDS

In 1980, the World Health Organization created a classification called the International Classification of Impairments, Disabilities, and Handicaps (ICHDH) to identify populations with health components of special needs and/or disability. The list of conditions cited under this classification has been expanded several times over the years and remains in a fluid state. In 2001, the World Health Assembly amended the title of this classification to the International Classification of Functioning, Disability, and Health (ICF), and over time, the term “special needs” has been replaced with “functional needs”. In the United States, the Americans with Disabilities Act of 1990 (ADA) was the initial broad civil rights law to address individuals with disabilities. Many states, including Ohio, passed similar legislation to support individuals with disabilities and patients with functional needs. Per the ADA, disability is defined as “a physical or mental impairment that substantially limits a major life activity”.

EMS professionals must be cognizant of the protocols provided by the EMS medical director for the prehospital management of functional needs patients as well as the existing state and federal legislation. Most importantly, the quality of medical care should not intentionally be diminished or adversely altered during the triage, treatment, and transport of functional needs patients. Although your EMS medical director may provide additional parameters and protocols, the following provides a basic overview of the patient management scenarios most frequently seen by EMS professionals.

### Communication Barriers

**Language Barriers:** EMS professionals may accept the assistance of family members or bystanders during communication with a patient who has expressive and/or receptive aphasia, is nonverbal, or who speaks a different language than the EMS professional. Documentation of the identification of the person assisting with the communication and, if possible, transport of this individual to the hospital with the patient is advised. For differences in language, there are a number of products on the market (translation cards, symbols, telephone-accessible services with live interpreters, etc.) specifically created for the medical environment to assist EMS professional in obtaining a patient’s chief complaint, medical history, medication, allergies, and other critical information. The methods through which the patient augments their communication skills (eye blinking, nodding, etc.) should be noted and communicated to the receiving facility.

**Sensory Barriers:** Sensory barriers, i.e. visual or auditory impairment, may present challenges in the prehospital setting, particularly during the acquisition of a patient history and the completion of patient assessment. The methods through which the patient augments their communication skills (use of Braille, sign language, lip reading, etc.) should be noted and communicated to the receiving facility. Written communication between the patient and the EMS professional is part of the medical record, even if it is on a scrap sheet of paper, and it should be retained with the same collation, storage, and confidentiality policies and procedures that are applicable to the written or electronic patient care report.

### Assistance Adjuncts

**Assistance devices:** The devices that facilitate the activities of life for the patient with functional needs should be noted. These devices include, but are not limited to, magnifiers, white or sensory canes, hearing aids, tracheostomy speaking valves, or extremity prostheses. These devices should accompany the patient if possible during transport as their availability to the patient can facilitate the interaction between the patient and the healthcare provider and enhance the patient’s safety and overall well-being.

**Service Animals:** A service animal, usually a dog, is not classified as a pet and should, by law, always be permitted to accompany the patient. A service animal as defined by the ADA is “any guide dog, signal dog, or other animal individually trained to do work or perform tasks for the benefit of an individual with a disability, including, but not limited to guiding individuals with impaired vision, alerting individuals with impaired hearing to intruders or sounds, providing minimal protection or rescue work, pulling a wheelchair, or fetching dropped items.” The service animal is not required to wear a vest or a leash, and it is illegal to make a request for special identification or documentation from the service animal’s partner. EMS professionals may only ask the patient if the service animal is required because of a disability and the form of assistance the animal has been trained to perform. EMS professionals are not responsible for the care of service animals. If the patient is incapacitated and cannot personally care for the service animal, a decision can be made whether or not to transport the animal in this situation. Animals that provide emotional support, comfort, or companionship do not qualify as service animals.

## ON SCENE EMS INTERVENER

On an EMS run where an unknown EMS professional from outside the responding EMS agency wishes to intervene in the care of patients, the following steps should be initiated:

1. Ideally, if no further assistance is needed, the offer should be declined.
2. If the EMS intervener's assistance is needed or may contribute to the care of the patient:
  - a. An attempt should be made to obtain proper identification and confirm the possession of a valid Ohio EMS certificate. Acceptance of borderline states' EMS certification or licensure documents is at the discretion of individual EMS services. Notation of the EMS intervener's name, address and certification numbers must be documented on the run report.
3. Significant involvement with patient care or variance from protocols will require the EMS intervener to accompany the patient to the hospital.

## PHYSICIAN AT THE SCENE

### GOOD SAMARITAN PHYSICIAN

This is a physician with no previous relationship to the patient, who is not the patient's private physician, but is offering assistance in caring for the patient. The following criteria must be met for this physician to assume any responsibility for the care of the patient:

1. Medical Control must be informed and give approval.
2. The physician must have proof they are a physician. They should be able to show you their medical license. Notation of physician name, address, and certification numbers must be documented on the run report.
3. The physician must be willing to assume responsibility for the patient until relieved by another physician, usually at the emergency department.
4. The physician must not require the EMS professional to perform any procedures or institute any treatment that would vary from protocol and/or procedures outlined in the protocols provided by the medical director of the EMS agency or is not within the Ohio EMS scope of practice.

If the physician is not willing or able to comply with all the above requirements, his assistance must be courteously declined.

### PHYSICIAN IN HIS/HER OFFICE, OR URGENT CARE CENTER

1. EMS should perform its duties as usual under the supervision of medical control or by protocol.
2. The physician may elect to treat the patient in his office.
4. The EMS professional should not provide any treatment under the physician's direction that varies from protocols provided by the medical director of the EMS agency or is not within the Ohio EMS scope of practice. If asked to exceed these boundaries, the EMS professional should decline the request until contact is made with Medical Control.
4. Once the patient has been transferred into the squad, the patient's care becomes entirely under medical control.

## RESTRAINTS

### GENERAL GUIDELINES

- A. Soft restraints are to be used only when necessary in situations where the patient is potentially violent and may be of danger to themselves or others. Patients who are clinically competent retain a right to refuse transport. EMS professionals must remember that aggressive violent behavior may be a symptom of medical conditions such as but not limited to:
1. Head trauma
  2. Alcohol/drug related problems
  3. Metabolic disorders (i.e., hypoglycemia, hypoxia, etc.)
  4. Psychiatric/stress related disorders
- B. Patient health care management remains the responsibility of the EMS professional. The method of restraint shall not restrict the adequate monitoring of vital signs, ability to protect the patient's airway, compromise peripheral neurovascular status or otherwise prevent appropriate and necessary therapeutic measures. It is recognized that evaluation of many patient parameters requires patient cooperation and thus may be difficult or impossible.
- C. All restraints should have the ability to be quickly released, if necessary.
- D. The person who was responsible for applying a restraining device that requires a key or special releasing device must physically remain with the patient regardless of the vehicle of transport in the interest of the patient's safety. This policy is not intended to negate the need for law enforcement personnel to use appropriate restraint equipment to establish scene control.
- E. Patients should be transported in the supine or decubitus position to ensure adequate respiratory and circulatory monitoring and management. The prone position should be a position of last resort and rarely used. All restrained patients should be placed on a stretcher with adequate foam padding particularly underneath the head if the patient is positioned in the prone position. Extremity restraints should be secured to the stationary portion of the stretcher frame in a fashion where they can be removed quickly in the event of an emergency. Stretcher straps should be placed on all patients as these are analogous to seatbelts during transport. Restraint of the extremities in a spread eagle fashion significantly reduces the strength the patient can generate from the large muscle groups. Restraints that use multiple knots or that may restrict chest wall motion are unacceptable.
- F. Restrained extremities should be monitored for color, nerve and motor function, pulse quality, and capillary refill at the time of application and frequently thereafter. The patient's ventilatory status, pulse oximetry, or waveform capnography should be monitored during transport.
- G. After addressing and/or treating metabolic causes of aggressive or violent behavior, administration of a benzodiazepine and/or antipsychotic as a chemical restraint should be considered.

## RESTRAINTS (cont'd)

- H. Restraint documentation on the EMS report shall include:
  - 1. Reason for restraint
  - 2. Agency responsible for restraint application (i.e., EMS, Police)
  - 3. Documentation of serial cardio-respiratory status and peripheral neurovascular status
  
- I. Prehospital care providers reserve the right to refuse elective transport of patients who are deemed too violent or uncooperative to be controlled by the restraint methods and devices permitted by their prehospital protocols. The safety of prehospital care providers will be maintained at all times during transport. The prehospital care provider reserves the right to request completion of transport by law enforcement personnel. The prehospital care provider may administer an appropriate dose of a benzodiazepine and/or antipsychotic as a pharmacological restraint prior to transport of the patient. The prehospital care provider reserves the right to suggest to medical facilities the use of adequate pharmacological restraints prior to acceptance of the patient. A decision to refuse elective transport of a violent or uncooperative patient may be made by any member of the prehospital care team or its supervisor. Medical direction may be contacted at any time for advice or for pharmacological orders.

## TRANSPORT TO FREE-STANDING EMERGENCY/URGENT CARE CLINICS

EMS units should not transport patients to free-standing emergency care clinics (***free-standing emergency departments are acceptable destinations***), urgent care facilities, or private physicians' offices in response to emergency calls except:

1. When directed by Medical Control.
2. If specifically authorized by on-line medical direction.
3. When the EMS unit is following protocols approved by medical control.
4. When the EMS unit is a private service responding to a call in which the patient and/or the family requests transport to such facility and the patient is clearly in stable condition.
5. During a declared emergency disaster as directed by medical control, a public health authority, or the governor.

## NON-HOSPITAL TRANSFER POLICY

### GUIDELINES FOR TRANSFER FROM A NON-HOSPITAL LOCATION TO A NON-HOSPITAL LOCATION: HOME TO HOSPICE; HOSPICE TO HOME

- A. On occasion, the out-of-hospital EMS professional(s) will be called upon to transport a patient from a non-hospital location to another non-hospital facility such as hospice center or from hospice to home or a doctor's office. The provider(s) will follow the written or pre-existing orders of the patient's physician or physician approved hospice center orders for the transport. At times, a hospice nurse may arrive or already be at the scene. He/she should be able to help review orders and/or advance directives such as DNR or "Support Care" orders to enable transport in accordance with the wishes of the patient and his/her family. A hospice patient by definition is DNR.

Medical Control does not need to be contacted unless the DNR is revoked. However, if the EMS professional(s) feels the need to contact Medical Control for advice or direction, the professional(s) will clearly advise Medical Control of the patient's terminal condition and DNR status.

If medication(s) needs to be "wasted", e.g., morphine, Valium® or Versed®, then the receiving hospice supervisor, nurse or EMS supervisor may witness and document appropriate disposal of the said medication(s) and administration equipment, e.g., needle(s), syringe(s), IV catheter(s), heparin or saline lock(s) or IV lines and/or solutions. Medications or equipment should never be transported to an emergency department to be disposed of or wasted. Any and all waste materials will be disposed into approved and appropriately labeled containers.

## INTERFACILITY PATIENT TRANSPORT GUIDELINES

The transportation of patients from one healthcare facility to another should be carried out in an orderly and expeditious manner. Regardless of origin or destination, patients remain the responsibility of the transferring physician until received by the accepting physician or his/her agent. The transfer papers and accompanying record must document the reason for transfer as well as the time of contact and the name of the receiving facility, physician and/or accepting agent in accordance with nationally recognized standards and federal regulations.

The decision regarding the level and scope of practice of the out-of-hospital transporting agency and the individual providers should be made in consultation with the receiving physician and must be appropriate to the stability of the patient and their medical and equipment needs. The provider will be responsible for carrying out the orders of the transferring physician during the transfer unless acting as the agent of the receiving facility with superseding medical control, or if a physician accompanies the patient. Any questions or concerns regarding those orders, including but not limited to Do Not Resuscitate (DNR) orders, medications or treatments, must be answered or clarified prior to departure. The route(s) of travel, possible diversionary medical facilities and their phone or radio call numbers should also be determined.

If unanticipated problems or concerns arise during transport, direct, on-line medical control will be obtained. If for technical or logistical reasons this is not possible, the transporting agent should follow written protocols or standing orders until the transferring, receiving or nearest diversionary facility can be contacted on-line.

## TERMINATION OF RESUSCITATION EFFORTS

"Resuscitation may be discontinued in the prehospital setting when the patient is nonresuscitable after an adequate trial of ACLS."

In accordance with the Journal of American Medical Association's guidelines for cardiopulmonary resuscitation and emergency cardiac care, the above statement encourages local medical directors to develop guidelines for prehospital care providers to terminate resuscitation efforts when the patient's survivability is questionable.

A trial of ACLS, according to the guidelines, occurs when:

- 1) adequate BLS has been provided for a reasonable length of time;
- 2) endotracheal intubation has been successfully accomplished and the end tidal CO<sub>2</sub> has remained below 10 mm Hg by waveform capnography for greater than 20 minutes;
- 3) intravenous access has been achieved and rhythm-appropriate medications and countershocks for ventricular fibrillation have been administered according to protocol; and
- 4) persistent asystole or agonal electrocardiographic patterns are present and no reversible causes are identified.

The State of Ohio Regional Physician Advisory Board has adopted the following criteria for termination of resuscitation efforts at the scene following unmonitored, out of hospital, adult, primary cardiac arrest.

Paramedic personnel under local medical control authority may terminate resuscitation when:

- 1) adult cardiopulmonary arrest (not associated with trauma, body temperature aberration, respiratory etiology, or drug overdose);
- 2) standard ACLS in accordance with American Heart Association guidelines has been carried out for over 20 minutes;
- 3) no restoration of circulation (spontaneous pulse rate of greater than 60 beats per minute for at least a 5 minute period); and
- 4) absence of persistent, recurring, or refractory ventricular fibrillation/tachycardia or any continuous neurological activity (e.g., spontaneous respirations, eye opening or motor response).

When the above conditions have been met, the Paramedic should contact medical control and request termination of resuscitation.

Documentation should be completed and forwarded to the appropriate medical control authority within 48 hours of the run.

## CENTRAL LINE MONITORING

1. All fluids, medications, modified total parenteral nutrition (TPN), and hyperalimentation can be administered via central lines.
2. Central sites should be monitored for bleeding, swelling, redness, pain or leaking of the infusing fluid. If any of these complications occur, the infusion should be discontinued immediately. Firm pressure should be applied on the entrance site if bleeding or fluid leakage persists.
3. Do not remove central venous catheters.
4. Common central venous sites include the internal jugular, subclavian, femoral, and antecubital veins.
5. Central catheters may have single or multiple lumens. Medications can be administered simultaneously using one continuous medication per lumen.
6. Swan-Ganz catheters are used to measure cardiac output and pulmonary artery and central venous pressure as well as to infuse fluids.
  - a. Disconnect the Swan-Ganz catheter from the transducer.
  - b. Continue fluid infusion through the catheter port or have the nurse close the port with a cap or heplock port.
  - c. Have the nurse check the balloon port to insure that it is deflated.

## CHEST DECOMPRESSION

### GENERAL CONSIDERATIONS

The treatment of tension pneumothorax involves decompression of the affected chest cavity to release the pressure that has developed.

Decompression can be achieved, with minimal risk, by the insertion of a 14 or 16 gauge needle into the second inter-costal space at the midclavicular line. Also an approach in the mid-axillary line between the fifth and sixth rib is possible, and considered safer by some physicians.

The needle must be inserted superior to the rib because the intercostal artery, vein and nerve follow the inferior portion of the rib.

### INDICATION

Tension pneumothorax indicated by:

- A. Diminished or absent lung sounds
- B. Cyanosis and difficulty breathing
- C. Distended neck veins
- D. Tachycardia, tachypnea, hypotension, narrow pulse pressure
- E. Tracheal shift to the unaffected side (May not always be present)

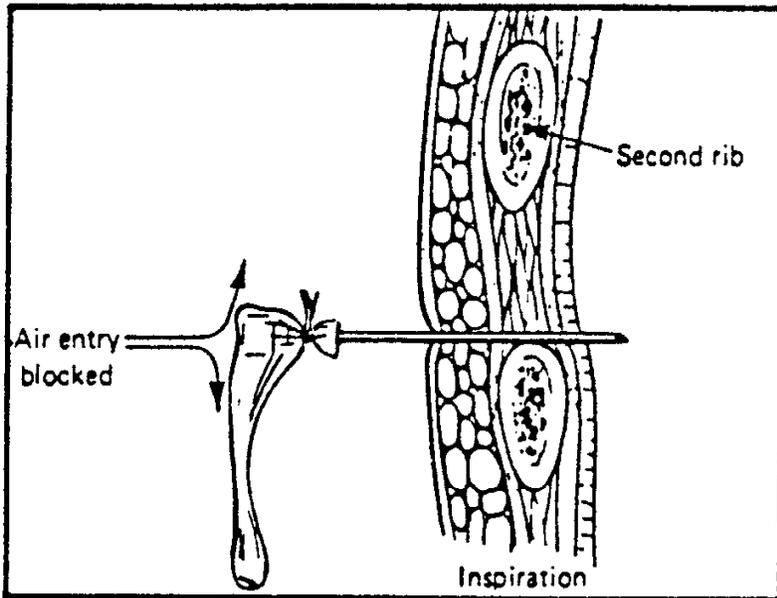
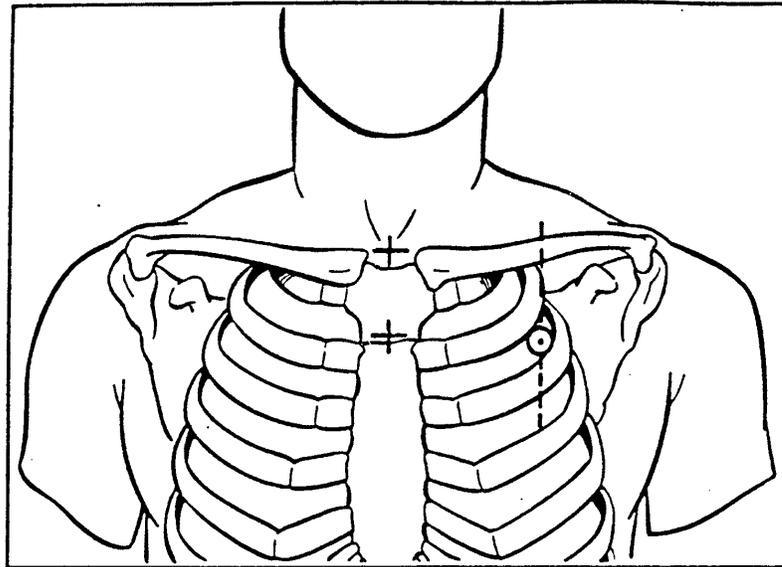
### PROCEDURE

- A. Prepare equipment: 14 or 16 gauge needle, antiseptic solution (Intracath<sup>®</sup> needle with stylet removed is preferred, because sheath provides one-way valve.)
- B. Locate site:
  - 1. Second or third intercostal space, midclavicular
  - 2. Fourth intercostal space between the fourth and fifth rib, midaxillary
- C. Prep site, if time permits
- D. Insert the needle just superior to the rib until a rush of air is felt and/or heard
- E. Secure needle in place
- F. Support patient with 100% oxygen and transport without delay

### CONTRAINDICATIONS

Insufficient training.

CHEST DECOMPRESSION (cont'd)



## CHEST TUBE MONITORING

Chest tubes, which drain intrathoracic air or fluid, are positioned in the fourth or fifth intercostal space at the mid-axillary line or the second or third intercostal space at the mid-clavicular line. They are secured with sutures and tape and the entrance site covered with a clean, sterile dressing.

Chest tubes are connected to suction via a drainage system. The transferring nurse should check the suction control and record its pressure on the transfer form. The collection chamber of the drainage system contains the intrathoracic fluid if present. The collection chamber should be emptied by the nurse prior to transfer. The water seal chamber of the drainage system prevents reentry of air or fluid into the intrathoracic space. Bubbles in the water may be seen and may vary with the patient's respirations. Chest tubes usually require 15 to 20 cm of water pressure in the suction chamber to drain properly.

Prior to transfer of the patient, inspect for and remove all kinks and loops in the tubing. The connection between the chest tube and drainage system should be secure and taped. The drainage system is to be placed in the upright position below the level of the patient's chest.

If a chest tube comes out during transfer, treat as a sucking chest wound. Cover the entrance site with an occlusive dressing, preferably Vaseline<sup>®</sup> gauze. If Vaseline<sup>®</sup> gauze is unavailable, cover the entrance site with sterile gauze and apply firm, continuous pressure with the hand.

Call medical direction immediately for:

- Deterioration of respiratory status
- Chest tube fluid drainage greater than 100 ml/hour
- New onset of bloody fluid drainage from chest tube

## CONTINUOUS POSITIVE AIRWAY PRESSURE (CPAP)

Continuous positive airway pressure (CPAP) has been shown to rapidly improve vital signs, gas exchange, the work of breathing, decrease the sense of dyspnea, and decrease the need for endotracheal intubation in the patients who suffer from shortness of breath from congestive heart failure and acute cardiogenic pulmonary edema. CPAP is also shown to improve dyspnea associated with pneumonia, chronic obstructive pulmonary disease (asthma, bronchitis, emphysema). In patients with CHF, CPAP improves hemodynamics by reducing preload and afterload.

### Indications:

Dyspnea and/or hypoxemia secondary to congestive heart failure, acute cardiogenic pulmonary edema, pneumonia, chronic obstructive pulmonary disease (asthma, bronchitis, emphysema) and:

- A. Any patient who is complaining of shortness of breath for reasons other than pneumothorax or chest trauma
- B. Is awake and oriented
- C. Has the ability to maintain an open airway (GCS>10)
- D. Has a respiratory rate greater than 25 breaths per minute
- E. Has a systolic blood pressure above 90 mmHg
- F. Uses accessory muscles during respirations

### Contraindications:

1. Pneumothorax
2. Respiratory arrest
3. Agonal respirations
4. Unconscious
5. Shock associated with cardiac insufficiency
6. Penetrating chest trauma
7. Persistent nausea/vomiting
8. Facial anomalies / stroke obtundation / facial trauma
9. Has active upper GI bleeding or history of recent gastric surgery

### Procedure:

1. Assess patient for signs / symptoms of pneumothorax
2. Place patient in a sitting position
3. Assess vital signs and SpO<sub>2</sub> frequently
4. AEMT and Paramedic: Attach ECG monitor
5. If BP <90 systolic contact Medical Control prior to beginning CPAP
6. Begin at lowest level of positive pressure available
  
7. Explain the procedure to the patient:
  - i. Patient requires reassurance to be used effectively.
    - a. Example: "You are going to feel some pressure from the mask but this will help you breath easier."
  - ii. Place delivery device over mouth and nose.
  - iii. Instruct patient to breath in through their nose slowly and exhale through their mouth as long as possible (count slowly and aloud to four then instruct to inhale slowly).

## CONTINUOUS POSITIVE AIRWAY PRESSURE (cont'd)

8. For CHF/Pulmonary Edema, titrate to 10 cm H<sub>2</sub>O. For all other SOB, titrate to 5 cm H<sub>2</sub>O
9. Check for air leaks
10. Treatment should be given continuously throughout transport to the emergency department.
11. Continue to coach patient to keep mask in place and readjust as needed
12. If respiratory status or level of consciousness deteriorates, remove device and begin bag valve mask ventilation.
13. Documentation on the patient care record should include:
  - a. CPAP level
  - b. Frequent SpO<sub>2</sub> and vital sign assessment
  - c. Response to treatment
  - d. Any adverse reactions

### Special Notes:

1. CPAP should not be used in children under 12 years of age
2. Advise receiving hospital as soon as possible so they can prepare for the patient's arrival
3. Do not remove CPAP until transfer of care has taken place at receiving hospital
4. Continuous reassessment of patient airway

## CRICOTHYROTOMY

### INDICATIONS

Unable to intubate by another route. This may be seen with:

- A. Cervical spine injuries
- B. Maxillofacial trauma
- C. Laryngeal trauma
- D. Oropharyngeal obstruction from:
  - 1. Edema from infection, caustic ingestion, allergic reaction, and/or inhalation injuries
  - 2. Foreign body
  - 3. Mass lesion
- E. Orotracheal or nasotracheal intubation is contraindicated for any reason

### COMPLICATIONS

- A. Postoperative bleeding
- B. Late bleeding
- C. Abscess behind packing
- D. Cellulitis of neck
- E. Subcutaneous emphysema
- F. Voice change
- G. Feeling of lump in throat
- H. Persistent stoma
- I. Obstructive problems
- J. Misplacement of the airway

## CRICOTHYROTOMY (cont'd)

### NEEDLE CRICOTHYROTOMY PROCEDURE

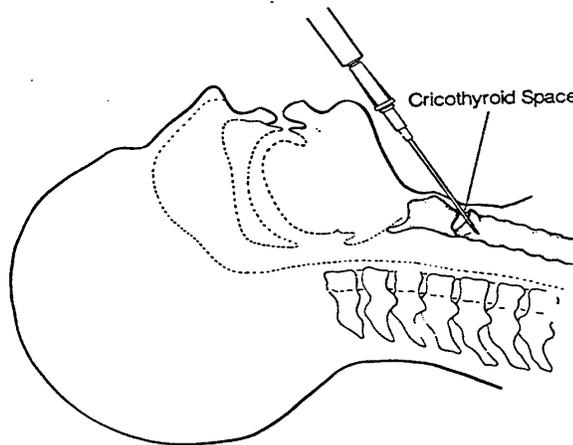
If time permits, prep the area with appropriate antiseptic solution. Attach a large angiocath (14-16 ga) to a syringe, and insert the needle through the cricothyroid membrane (CTM) and aspirate. Aspiration of air indicates proper placement.

If the intention is to use this as a temporary means of oxygenation then the catheter should then be slid into place.

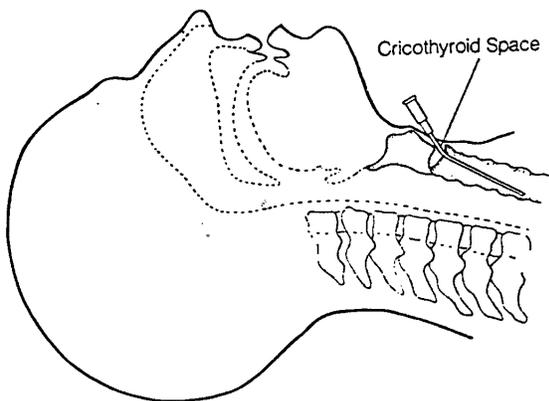
If the needle is going to be used as a guide for formal cricothyrotomy then the catheter should not be used in order to prevent the possibility of shearing off the catheter when the scalpel is used.

A jet ventilator should be used to provide sufficient volume of oxygen at a pressure of no more than 30 psi.

Needle cricothyrotomy is the preferred method in children less than 11 years of age.



**14 Gauge Catheter Insertion**



SURGICAL CRICOTHYROTOMY PROCEDURE

Make a 2 to 4 cm vertical skin incision over cricothyroid membrane. Once the membrane has been exposed, make a 1.5 to 2 cm horizontal incision into the membrane and through to the trachea. Maintain a slight caudal direction, with the blade, to avoid damage to vocal cords.

Use forceps or dilator to spread the aperture in the cricothyroid membrane. Again, caution against vocal cord injury by angling instruments caudally.

If time does not allow or equipment is not available, the blunt end of the scalpel can be placed in the incision and twisted to open the aperture.

Insert an appropriate size endotracheal tube (6 cm tube). Advance caudally and inflate balloon. When the tube is in place, check breath sounds and secure the tube.



## ENDOTRACHEAL INTUBATION

### INDICATION

Endotracheal intubation is to be utilized for any victim with respiratory arrest and/or insufficiency to achieve complete control over the airway. It protects the airway from aspiration of foreign material and it allows for intermittent positive pressure ventilation to be achieved with 100% oxygen. It makes the trachea and the respiratory tract available for suctioning, and also eliminates the problem of gastric distention.

**NOTE:** Orotracheal intubation is outside of the Ohio EMS scope of practice for EMTs effective **January 13, 2013**.

### HAZARDS

- A. Esophageal intubation
- B. Tracheal rupture
- C. Right mainstem bronchus intubation
- D. Broken teeth
- E. Laryngospasms
- F. Trauma to the oropharynx
- G. Trauma or puncture of trachea due to misplacement of stylet

### OROTRACHEAL INTUBATION

- A. Always begin artificial ventilation as soon as possible using mouth-to-mouth, nose-to-nose, bag-valve-mask or oxygen powered manually triggered or automatic transport ventilation device.
- B. Assemble and ready equipment:
  - 1. Endotracheal tubes of various sizes
  - 2. Laryngoscope and blades
  - 3. Malleable stylet
  - 4. Magill forceps
  - 5. 10 ml syringe
  - 6. Suction apparatus and catheters
  - 7. Water soluble lubricant
  - 8. ET tube tape
  - 9. Oropharyngeal airway
- C. Check cuff on tube for leaks and lubricate tube. First attempt should be without stylet. Insert stylet into tube, if necessary.
- D. Assemble laryngoscope and check bulb
- E. Put victim's head in sniffing position. Do not allow the head to hang over the end of the table or bed; the occiput of the head should be on the same horizontal plane as the back of the shoulders, with the neck somewhat elevated.

## ENDOTRACHEAL INTUBATION (cont'd)

- F. Holding the laryngoscope in the left hand, insert the blade to the right of the midline, moving the tongue up and to the left, with the blade ending up in the midline, giving clear visualization of the glottic opening
- G. Suction the mouth and the pharynx
- H. Visualize the epiglottis and vocal cords
- I. Select the proper size tube and insert in with the right hand, starting at the corner of the mouth down into the trachea, past the vocal cords approximately 2 inches
- J. Remove laryngoscope and stylet (if used), holding the tube securely with the right hand
- K. Attempt to ventilate with mouth-to-tube or bag-valve-mask and check for breath sounds in BOTH lungs
- L. If breath sounds are heard, inflate the tube's cuff with 4-6 ml of air and secure the tube in place with oropharyngeal airway used as bite block. Confirm tube placement with end tidal CO<sub>2</sub> assessment.
- M. Maintain ventilation until adequate respirations resume or victim is delivered to an emergency department
- N. Recheck lungs sounds and verify tube placement each time patient is moved or every 10 minutes
- O. Document the intubation by noting the following:
  - 1. Number of attempts
  - 2. Person(s) making attempts
  - 3. Size of tube used
  - 4. Type of laryngoscope blade used on each attempt
  - 5. Lung sounds before intubation
  - 6. Lung sounds after intubation and time of each check
  - 7. Measurement on tube at lips of patient when lung sounds are present
  - 8. Any complications

## NASOTRACHEAL INTUBATION

- A. Nasotracheal intubation of the airway may be used when the patient has an unprotected, inadequate airway creating hypoxia
- B. Nasotracheal intubation is indicated in:
  - 1. Patients with spontaneous breathing when all other methods of airway control and oxygenation proved to be inadequate.
  - 2. Trauma patients when cervical spine manipulation must be kept to a minimum and all other methods of airway control and oxygenation prove to be inadequate.
- C. Nasotracheal intubation is contraindicated in patients with fractures in the base of the skull or face, and in any patients who are apneic
- D. Hazards of nasotracheal intubation include:
  - 1. Nasal hemorrhage
  - 2. Laryngeal damage due to increased manipulation
  - 3. Rupture of cuff balloon from use of Magill forceps

## ENDOTRACHEAL INTUBATION (cont'd)

### E. When attempting nasotracheal intubation:

1. Always begin basic airway control and oxygenation as soon as possible.
2. Assemble and ready equipment:
  - a. Endotracheal tubes of various sizes with directional distal tip control
  - b. Laryngoscope and blades
  - c. Magill forceps
  - d. 10 ml syringe
  - e. Water soluble lubricant
3. Determine size of tube based on size of nasal opening.
4. Check tube cuff for leaks and lubricate tube; seat 15 mm connector firmly into tube
5. Holding tube in dominant hand, place thumb against the 15 mm connector and index finger in the ring loop
6. Insert the tube into the right nostril and advance tube gradually, anterior to posterior, avoiding superior movement which will be met with resistance and could cause injury
7. As the tube enters the pharynx, listen for breathing and pull on the tip control ring loop to turn the tube anterior towards the trachea
8. When the patient takes a breath, advance the tube into the trachea.
9. Listen for lung sounds, inflate the tube's cuff, maintain ventilation and oxygenation. Confirm tube placement with breath sounds, fogging of tube and end tidal CO<sub>2</sub> monitoring.
10. Intubation attempt should not take longer than 30 seconds.
11. If any resistance is encountered during insertion, abandon procedure and utilize another method of airway control and oxygenation
12. Recheck lungs sounds and verify tube placement each time patient is moved or every 10 minutes
13. Document the intubation by noting the following:
  - a. Number of attempts
  - b. Person(s) making attempts
  - c. Size of tube used
  - d. Lung sounds before intubation
  - e. Lung sounds after intubation and time of each check
  - f. Measurement on tube at nose of patient when lung sounds are present
  - g. Any complications

## ENDOTRACHEAL INTUBATION (cont'd)

### 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:

- A. Explain procedure to victim
- B. Prepare suction equipment with large-bore catheter and suction secretions from endotracheal tube, mouth and pharynx
- C. 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:
  1. 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
  2. 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
- D. Prepare to suction secretions and gastric content if vomiting occurs
- E. Appropriate oxygen is then administered
- F. 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.
- G. The patient is not to be left unattended until there is no doubt of their ability to function without the artificial airway.

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

All the above tube sizes are still dependent on the child's size in 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.

ADMINISTRATION OF MEDICATION THROUGH ENDOTRACHEAL TUBE

In the event an intravenous or intraosseous route for administration of medication cannot be established, but an endotracheal tube (ETT) has been properly put in place, medications such as Narcan®, atropine, epinephrine and lidocaine can effectively be administered through the tube.

EMS personnel under this protocol administer the medication via the lumen of the ETT. ETTs with an integral injection port that delivers the medication to the distal end of the tube are preferred as they allow the care providers to administer medications without interrupting CPR or disconnecting the ETT from the BVM. For medications that are delivered via a catheter that is inserted into the lumen of the ETT, the catheter should be passed beyond the tip of the endotracheal tube, compressions stopped, and the medication sprayed quickly into the lower airway.

Medications should be administered at two (2) times the IV dosage and diluted with 10 ml of saline or sterile water before administration.

If ETTs without integral injection ports are used or when medication injection catheters are not available, the following procedure should be followed:

1. Remove needle from syringe
2. Hyperventilate patient and make sure ETT and airway are clear of mucous
3. Disconnect ventilation device from tube and squirt medication rapidly into tube
4. Reconnect ventilation device and rapidly ventilate patient to assure passage of medication down tube and airway

**SPECIAL NOTE:** Do not take longer than 15 seconds to administer medication in order to prevent hypoxia of the patient.

CAPNOGRAPHY

Capnography allows the EMS professional to measure and monitor a patient's concentration or partial pressure of end tidal carbon dioxide ( $P_{ETCO_2}$ ). In addition to the use of capnography in the post-arrest patient, the continuous monitoring of end tidal carbon dioxide facilitates early detection of displaced ETTs and allows the EMS professional to detect hypoventilation and/or hypercarbia.

Although quantitative capnography is acceptable, the use of waveform capnography is preferred in intubated patients. EMS professionals should apply and utilize these capnography devices according to the manufacturer's recommendations.

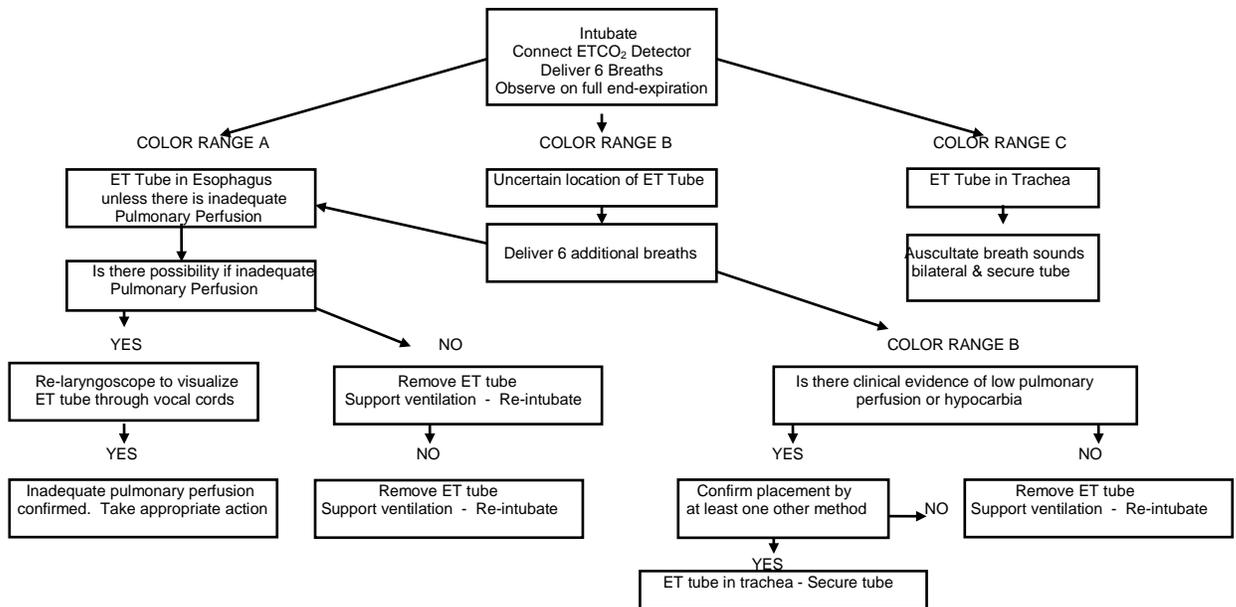
## ENDOTRACHEAL INTUBATION (cont'd)

### END TIDAL CO<sub>2</sub> MONITORING

In order to assure placement of the ET tube into the trachea after intubation, end tidal CO<sub>2</sub> monitoring is highly suggested. This can be achieved through the use of an end tidal CO<sub>2</sub> detector after each intubation attempt.

Procedure for use:

- A. Remove the end tidal CO<sub>2</sub> detector from package (Do not remove end caps until ready to use device)
- B. Remove end caps immediately before use and shake device to introduce room air
- C. Match initial color of the indicator to the purple color labeled "CHECK" on the product dome. If the purple indicator color is not the same or darker, do not use.
- D. Insert endotracheal tube (Inflate cuff if tube is equipped with one)
- E. Firmly attach the end tidal CO<sub>2</sub> detector between the endotracheal tube and the breathing device
- F. Ventilate patient with six breaths of moderate tidal volume (may be done quickly). Interpreting result with less than six breaths can yield false results.
- G. Compare color of indicator on full end-expiration to color chart on product dome. SEE ALGORITHM
- H. If initial intubation attempts fail, the end tidal CO<sub>2</sub> detector can be used for re-intubation on the same patient provided the indicator color still matches the "CHECK" color standard on product dome
- I. The end tidal CO<sub>2</sub> detector may left in place during ventilation to assist in monitoring tube placement
- J. This device is not to be used for:
  1. Detection of hypercarbia
  2. Detect mainstem bronchial intubation
  3. During mouth to tube ventilations



## EXTERNAL PACEMAKER

### INDICATIONS

An external pacemaker may be used in the following situations:

- A. Bradycardia: External pacemakers are indicated as first line therapy associated with second degree heart block Mobitz II and third degree heart block when a pulse is present. External pacing may also be indicated for the treatment of sinus bradycardia or ventricular rhythms <60 beats per minute unresponsive to atropine if the patient symptomatic with chest pain, shortness of breath or hypotension when a pulse is present.
  
- B. External pacing is not effective for asystole or pulseless electrical activity that is bradycardic in any situation and should not be used to treat asystole or pulseless electrical activity. Specifically, do not delay other therapies such as airway control, medication and CPR to institute external pacing.
  
- C. Additional patients at the discretion of the on-line Medical Control Physician

### APPLICATION

For conscious patients with bradycardia, set the rate at 70 beats per minute and current at 20 milliamperes initially. Increase the amperage by 20 milliamperes every 10 seconds till capture is obtained.

For unconscious patients with bradycardia, set the rate at 100 beats per minute and 200 milliamperes.

Once electrical capture is obtained, check for mechanical capture (a pulse).

On-line medical consultation is indicated for all pediatric patients prior to using an external pacemaker.

Remove nitroglycerin patches prior to using an external pacemaker.

## IV PROCEDURES

### GENERAL CONSIDERATIONS

IVs will be started by the Advanced Emergency Medical Technician 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 five 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

Blood draws for hospital laboratory testing will not be required under this protocol.

### IV SOLUTION

Normal saline (0.9% sodium chloride) will be the only fluid used in the pre-hospital setting under this protocol. Normal saline is provided in 250 ml bags and 3 ml syringes for TKO IVs and 1000 ml bag for fluid replacement.

The normal saline is to be infused as directed by specific treatment protocols.

### IV TUBING

The following tubing will be used for this protocol:

- A. For all adult fluid lines, use regular administration set (15 drop/min) tubing.
- B. For child and infant patients, use 15 gtt/min set with 3-way stopcock and extension tubing.
- C. For all patients needing TKO lines, use extension tubing with pre-pierced adapter as saline lock.

### MECHANICS FOR STARTING PERIPHERAL IV

- A. Prepare equipment
- B. The initial attempt should be the dorsum of hand. Further attempts should proceed to the forearm; do not use the antecubital fossa unless necessary
- C. Apply tourniquet
- D. Cleanse site with Betadine® solution and alcohol. (The only time Betadine® is not required is when the patient has an allergy to Betadine® type solutions)
- E. First attempt at insertion on an adult patient should be:
  - 1. 16 ga IV catheter for trauma patients
  - 2. 18 ga IV catheter for medical patients

## IV PROCEDURES (cont'd)

- G. Attach IV tubing
- H. Secure IV using appropriate measures to insure stability of the line
- I. Check for signs of infiltration
- J. Adjust flow rate
- K. Document IV procedure on run sheet.

### MECHANICS FOR STARTING EXTERNAL JUGULAR IV LINE

- A. Locate external jugular vein
- B. Cleanse site with Betadine® solution and alcohol. (The only time Betadine® is not required is when the patient has an allergy to Betadine® type solutions)
- C. Select IV catheter
  - 1. On adults, a large bore (16ga or 18ga) may be used
  - 2. Use 2" IV catheter when available
- D. Position yourself at patient's head
- E. Turn patient's head so as to maximally expose vein and minimize interference of jaw
- F. Cannulate the vein by directing the needle caudal at an angle nearly parallel to the neck
- G. Attach IV tubing
- H. Secure IV using appropriate measures to insure stability of the line
- I. Check for signs of infiltration
- J. Adjust flow rate
- K. Document IV procedure on run sheet.

### MECHANICS OF STARTING SALINE LOCK

- A. Prepare equipment: Attach pre-pierced adapter to extension tubing, Inject saline (approx. 1 ml) in to tubing and leave syringe attached to tubing
- B. 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.
- C. Apply tourniquet
- D. Cleanse site with Betadine® solution and alcohol. (The only time Betadine® is not required is when the patient has an allergy to Betadine® type solutions)

## IV PROCEDURES (cont'd)

- E. A 20 ga IV catheter should be used for all saline locks.
- G. Attach IV tubing and push remaining saline through tubing and catheter. Remove syringe.
- H. Secure IV using appropriate measures to insure stability of the line
- I. Check for signs of infiltration
- J. Document IV procedure on run sheet.

DOCUMENTATION
---------------

ALL IV attempts must be recorded on run sheet and include the following:

- A. When successful:
  - i. time IV was started
  - ii. type and amount of solution hung and infused during run
  - iii. flow rate
  - iv. size of catheter or needle used
  - v. location of IV site
  - vi. Initials of all EMS professionals who attempted and/or started IV
  - vii. Signature of EMS professionals in-charge of run
- B. When unsuccessful:
  - i. time IV was attempted
  - ii. type of solution
  - iii. size of catheter or needle used
  - iv. location of attempted site
  - v. Initials of all EMS professionals who attempted and/or started IV
  - vi. Signature of EMS professionals in-charge of run
- C. Record all IV medications given
  - i. Name of medication
  - ii. Dosage and amount given
  - iii. Time ordered (if applicable)
  - iv. Time given
  - v. Initial of all EMS professionals who administered medication
  - vi. Signature of EMS professionals in-charge of run

## INTRAOSSIOUS INFUSION

### INDICATIONS

- A. To establish parenteral means to administer fluids, blood products and parenteral medications, and to draw blood (except for CBCs)
- B. May be used in any instance that an IV route would be appropriate
- C. Its use should be considered after two IV attempts have failed or if no peripheral IV sites are found
- D. This procedure is indicated primarily in children

### CONTRAINDICATIONS

- A. Osteomyelitis or cellulitis over the proposed site
- B. Fracture at or above the proposed site
- C. Previous IO attempt at the proposed site

### EQUIPMENT

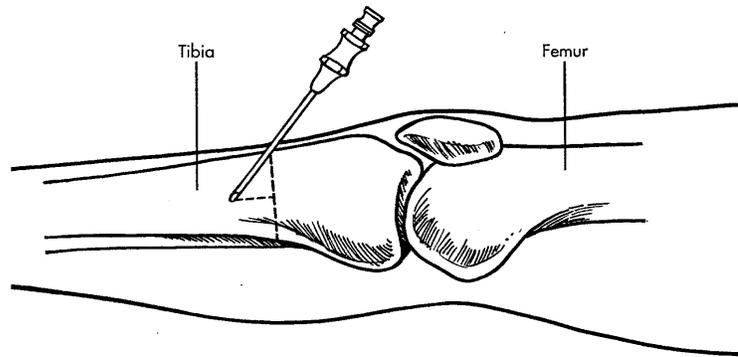
- A. 16ga intraosseous Needle
- B. Betadine® and Alcohol
- C. IV setup
- D. Syringe for aspiration
- C. Lidocaine prn

### PROCEDURE

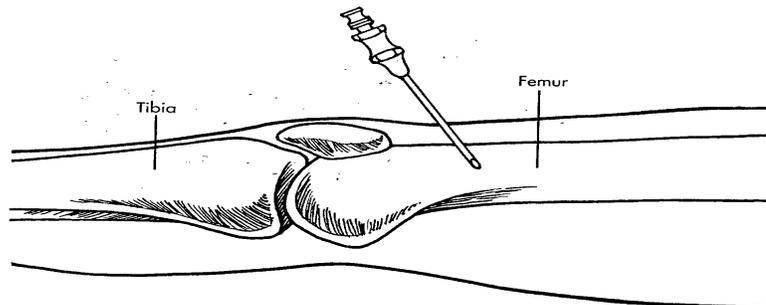
- A. Prepare as for a surgical procedure, using sterile technique
- B. Attempt to have feet in flexed position against board or sandbag
- C. If the patient is alert, consider using a local anesthetic
- D. The preferred site is the proximal anteromedial tibia, 1-3 cm below the tibial tuberosity  
Secondary site is the distal femur, midline, 3 cm above condyle
- E. Needle insertion varies between seventy and ninety 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.
- F. Once the needle has reached the bone marrow, saline should be injected via syringe to clear needle and then aspiration should be attempted. The infusion should flow freely without evidence of subcutaneous infiltration.

## INTRAOSSUEOUS INFUSION (cont'd)

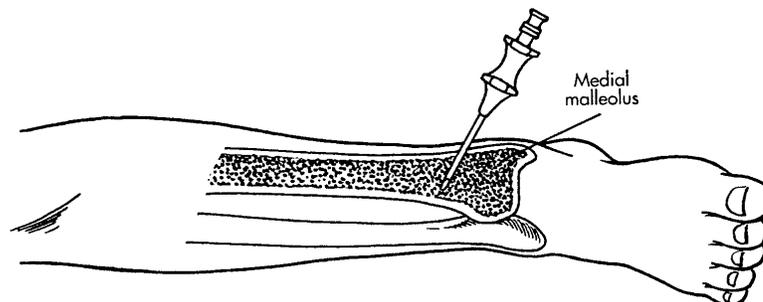
- G. The needle should feel firm in position and stand upright without support.
- H. Infusion via this route is the same as venous access without limit to rate of administration, drugs pushed or fluid type infused.
- I. After removing needle (for successful or unsuccessful attempt), apply pressure to area for five minutes and apply dressing to area.
- J. Intraosseous infusions of fluid may cause subcutaneous infiltration, osteomyelitis or subcutaneous infections.



Proximal tibial site for intraosseous infusion.



Distal femur site for intraosseous infusion.



Distal tibial site for intraosseous infusion.

## MAINTENANCE OF BLOOD ADMINISTRATION

Blood products may be infusing into patients that require interfacility transport. Blood contains hemoglobin, the protein that carries oxygen to the vital organs and tissues of the body. Blood administration is indicated for hypovolemic shock that is unresponsive to crystalloid fluid bolus or when the estimated blood loss is obviously significant. The packed red blood cells that are most commonly available in the hospital setting has all of the other elements (plasma, serum antibodies, etc.) separated and removed.

The prehospital care provider must be able to recognize the clinical complications that may occur with blood administration. Blood is typically classified using two major blood groups systems, the ABO system and the Rh system. The classifications are based upon antigens and antibodies present in blood on a genetic level.

The ABO system includes four blood groups: A, B, AB, and O. The letter classification describes the presence of a genetic antigen present on the **red blood cell**. Antibodies to the other genetic antigens are present in the **serum**. Antibodies will destroy incompatible antigens. In other words, antibodies will destroy a red blood cell that has a conflicting antigen.

For example, a person with group A blood will have serum antibodies that destroy the B antigen. If a person with group A blood receives group B or AB blood, the anti-B serum antibodies will attack and destroy the group B or AB red blood cell causing a massive intravascular hemolysis (transfusion reaction). Therefore, a person with group A blood should never receive group B or AB blood.

Group O red blood cells are the only blood group that has no antigens. A person with group O blood has anti-A and anti-B serum antibodies in the serum. A person with group O blood will have a transfusion reaction if they receive group A, B, or AB blood. Individuals with group A, B, or AB blood can receive group O blood because it there are no antigens on the group O red blood cell.

Packed red blood cells are gathered by taking whole blood and removing all other blood components, including serum and the antibodies they contain. Group O packed red blood cells are inherently antigen-free and have all serum antibodies removed.

The Rh system is based on the presence or absence of the D (Rh) antigen. The red blood cells of the majority of the population have the D antigen and are classified as Rh-positive. Individuals who lack the D (Rh) antigen on the red blood cell are classified as Rh-negative.

Patients with Rh-negative blood will develop antibodies against the Rh-positive antigen if they receive Rh-positive blood. Once the antibodies against the Rh-positive antigen are formed, the patient with Rh-negative blood will develop a severe transfusion reaction and hemolytic anemia if they receive Rh-positive blood again. A small amount of exposure to Rh-positive blood is required to form antibodies in the serum of an Rh-negative patient. The small amount of placental blood exchange during the delivery of a baby places the Rh-negative mother at risk for having a “blue baby” if a subsequent fetus is Rh-positive.

**Blood type** is described by stating the ABO group and the Rh group, i.e. A-positive, AB-negative. The blood type of packed red blood cells which is essentially free of major antigens is O-negative. Thus, O-negative is considered the “universal donor” as all patients may receive this blood type with minimal chance of a transfusion reaction.

## MAINTENANCE OF BLOOD TRANSFUSIONS (cont'd)

Packed red blood cells from the blood bank are stored under refrigeration and have a blood bank tag attached to the fluid bag. There are blood bank identification numbers on the blood bank tag as well as the requisition sheet accompanying the fluid bag. The nursing staff will check the identification numbers to insure that the numbers on the blood bag correspond to the numbers on the requisition sheet. They will document these identification numbers on the patient's record. The prehospital care provider should confirm that the blood bank identification numbers are included in the copies of the chart that accompanies the patient before the interfacility transfer is initiated.

Blood should be administered through an IV catheter that is 20 gauge or larger. The intravenous access for blood administration must be a dedicated IV line through which no other medication or solution other than normal saline may be infused. If medications have been administered through an IV, the IV should be flushed well prior to the initiation of the blood administration.

The patient should be constantly observed for clinical signs of a transfusion reaction or intravascular hemolysis. A transfusion reaction will occur if the patient's serum contains antibodies against an antigen in the transfused blood. Administration of type O-negative blood significantly reduces the risk of this event; however, there are several less significant blood types and antigen classifications genetically present in blood. Also, if the patient has had a prior remote blood transfusion, antibodies against the more minor blood antigens are more likely to be present in the patient's serum.

Symptoms of a transfusion reaction include nausea, flushing of the skin, chest and/or lumbar pain, anxiety, restlessness, tachypnea, tachycardia, and dark or bloody urine. If a patient develops a transfusion reaction, the blood administration should be terminated and medical direction should be notified **immediately**. The remaining packed blood cells should be secured and transported with the patient for further investigation. Documentation of the onset of symptoms, vital signs, and the blood bank identification numbers on the prehospital care report is imperative. Maintenance of kidney function after a transfusion reaction is imperative. Crystalloid fluids should be given liberally to maintain an adequate urine output.

**NITRONOX®**  
(Nitrous Oxide - Oxygen Administration)

Nitronox® is a self-administered analgesic gas containing a mixture of 50% oxygen and 50% nitrous oxide. Nitronox® is supplied in a carrying case containing two cylinders; one of nitrous oxide and one containing oxygen, with a mixing valve and supply tubing. These agents are mixed on administration to deliver a 50% concentration of each to the patient. Negative pressure is required to open the valve, so the patient must have an airtight seal at the face mask.

**INDICATIONS**

Nitronox® should be given to any patient who is alert and complaining of severe pain.

Examples:      Abdominal pain  
                    Chest pain secondary to infarction or angina  
                    Acute urinary retention  
                    Fractures  
                    Severe burns  
                    Kidney stones  
                    Musculoskeletal trauma

**CONTRAINDICATIONS**

Nitronox® is not to be used in patients with these conditions:

Altered level of consciousness  
Head injuries  
Chest injuries (blunt or penetrating)  
Intoxication  
Maxillofacial injuries  
Psychiatric problems  
COPD (because of the 50% oxygen mixture)  
Pediatric patients under 12 years of age  
Pregnancy  
Respiratory distress

**APPLICATION**

- A.      Instruct patients to administer Nitronox® to themselves by placing the mask tightly against their face and breathing deeply and slowly
- B.      Allow mask to fall away from face spontaneously when effects are felt
- C.      Check Blood Pressure - Nitronox® may cause the blood pressure to drop in some cases

SPECIAL CONSIDERATIONS

- A. Nitronox® should never be administered by the EMT, AEMT, or Paramedic. Only self-administration by the patient is to be used.
- B. Upon administration of Nitronox®, constantly monitor patient to see he does not fall asleep with mask in place.
- C. The side effects of nitrous oxide, in addition to analgesia, include light-headedness, drowsiness, and very occasionally nausea and vomiting. Changes in heart rate and respiratory rate are minimal.
- D. Nitrous oxide and oxygen are both non-flammable gases, but both support combustion. For this reason do not use Nitronox® in areas where there is a combustion hazard.
- E. SPECIAL NOTE TO EMTs, AEMTs, AND PARAMEDICS:

There is an increased risk of liver cancer and birth defects to individuals who are exposed to repeated applications of nitrous oxide. For this reason, Nitronox® should be used in a well-ventilated environment.

SAFETY ISSUES

- A. The Nitronox® unit must be stored in the EMS vehicle with its gas cylinders in an "OFF" position when not in use
- B. The unit must not be used in any environment where:
  - 1. There are possible ignition sources
  - 2. Other patients are in close proximity (less than 10 ft. away)
  - 3. The room is small and no nitrous oxide alarm is monitoring the gas concentration in ambient air
- C. The unit should not be used if the mixture pressure is not in the 30-35 PSI range
- D. Any problem with the mechanical status of the apparatus shall be immediately reported to the person in charge, so appropriate evaluation and/or repair can be made before further use

## PULSE OXIMETRY

### GENERAL CONSIDERATIONS

Pulse oximetry is used in conjunction with other assessment processes to determine the actual available oxygen in the blood for use by body tissue. Pulse oximetry measures the oxygen saturation of the red blood cells, (%SpO<sub>2</sub>).

Studies have shown that EMS personnel are fairly accurate in the assessment and treatment of patients in profound hypoxia. However in mild to moderate hypoxic states, EMS personnel sometimes do not react until the patient has progressed to profound hypoxia. Signs of progressive hypoxia need to be identified rapidly and the condition treated before profound hypoxia occurs.

Use of pulse oximetry in conjunction with other assessment processes may sometimes identify those patients in mild to moderate hypoxia, and with proper intervention profound hypoxia can be prevented.

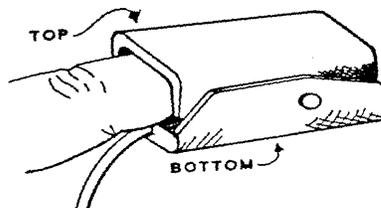
If available, pulse oximetry should be used on all patients. Pulse oximetry should be maintained and evaluated until the patient is delivered to the Emergency Department.

REMEMBER, INITIATE NORMAL AIRWAY AND OXYGENATION SUPPORT REGARDLESS OF THE AVAILABILITY OF PULSE OXIMETRY.

NEVER BASE ANY TREATMENT OR OXYGEN THERAPY SOLELY ON THE READING FROM THE PULSE OXIMETER.

### PROCEDURE

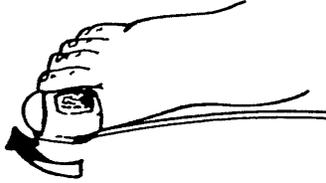
- A. Select sensor and apply according to manufacturer's recommendations. The following should be noted:
1. Finger Clip Sensors - These are designed for spot-check monitoring of older pediatric and adult patients and/or continuous monitoring less than 30 minutes where patient movement is not expected.
    - a. Insert finger (preferably left or right index finger) completely into sensor, keeping fingernail side facing the sensor top. It is specifically recommended that the thumb not be used in the finger clip sensor.
    - b. For best results when using the finger clip in longer term monitoring or with active patients, secure the sensor cable independently from the sensor, preferably around the base of the finger. Make sure blood supply to the finger is not impaired by the application of the tape.



Finger Clip Sensor Positioning

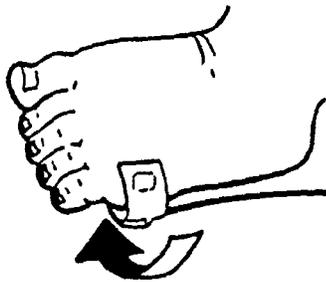
## PULSE OXIMETRY (cont'd)

2. Flex Sensor - This sensor is designed for monitoring pediatric and adult patients in which moderate patient movement is expected.
  - a. Position the sensor on the top and bottom of the end of the finger or toe. Place the light emitter portion on the finger/toe-nail side and the detector of the side opposite of the nail, making sure to align the emitter and detector through the tissue.
  - b. Secure the sensor with 3M Micropore® tape, making sure not to restrict blood flow. Attach the sensor cable independently at the base of the finger, again being careful not to restrict blood flow.



**Infant Sensor Placement on Big Toe**

3. Infant and Neonatal Sensors - These sensors are designed for continuous monitoring of infants and neonates since fingertip monitoring is impractical.
  - a. The infant sensor is designed for application on the big toe of infants greater than 2 kilograms (5 pounds).
  - b. The neonatal sensor is designed for application on the foot of infants less than 2 kilograms in weight.
  - c. Apply and secure these sensors as described for the flex sensor, being sure not to restrict blood supply to the monitored area.



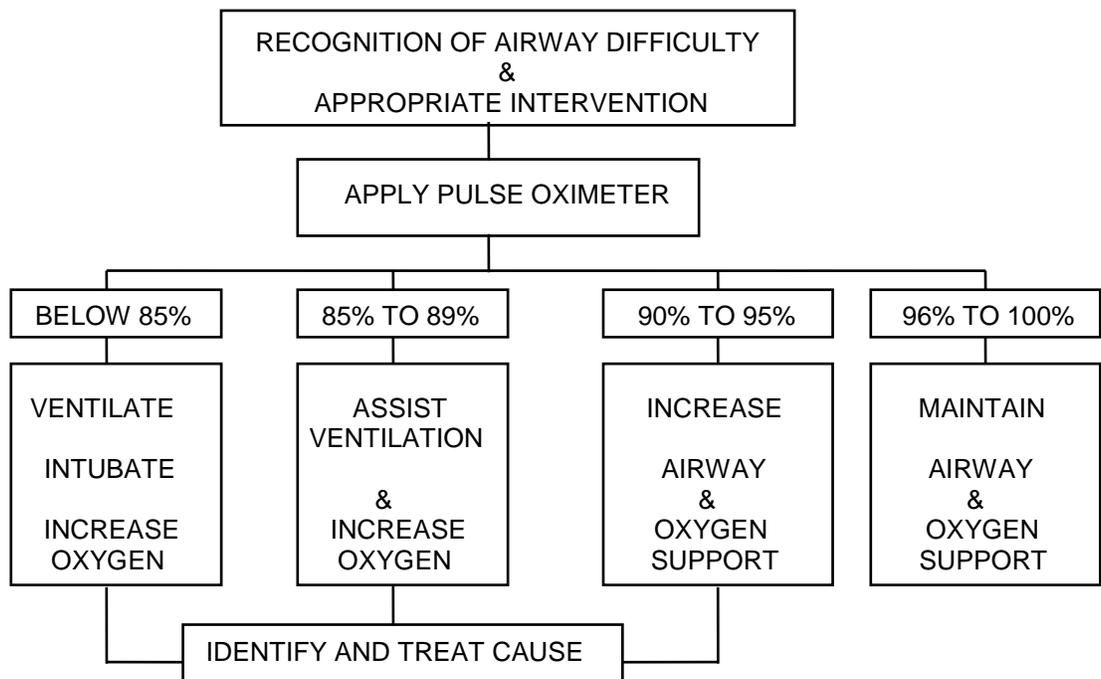
**Infant and Neonatal Sensor Placement on Foot**

PULSE OXIMETRY (cont'd)

4. Ear Clip Sensor - This sensor is used when finger clip sensing is not possible. Be sure to clean the ear lobe with alcohol before applying the sensor. Be aware pierced ears may allow some light to pass directly to the detector and result in an accurate reading.
  5. Reflectance Sensor - This sensor is used on well vascularized skin surfaces in adult patients only. This method is not preferred in the pre-hospital setting.
- B. Turn oximeter on and verify operation according to manufacturer's operating procedure.
  - C. A relative operation check can be achieved by applying the sensor to your own finger.
  - D. Always cleanse sensor site of blood and dirt for reliable reading. Some fingernail polishes may have to be removed to obtain a reading.
  - E. Apply sensor to patient and obtain reading.

Interpretation of Reading:

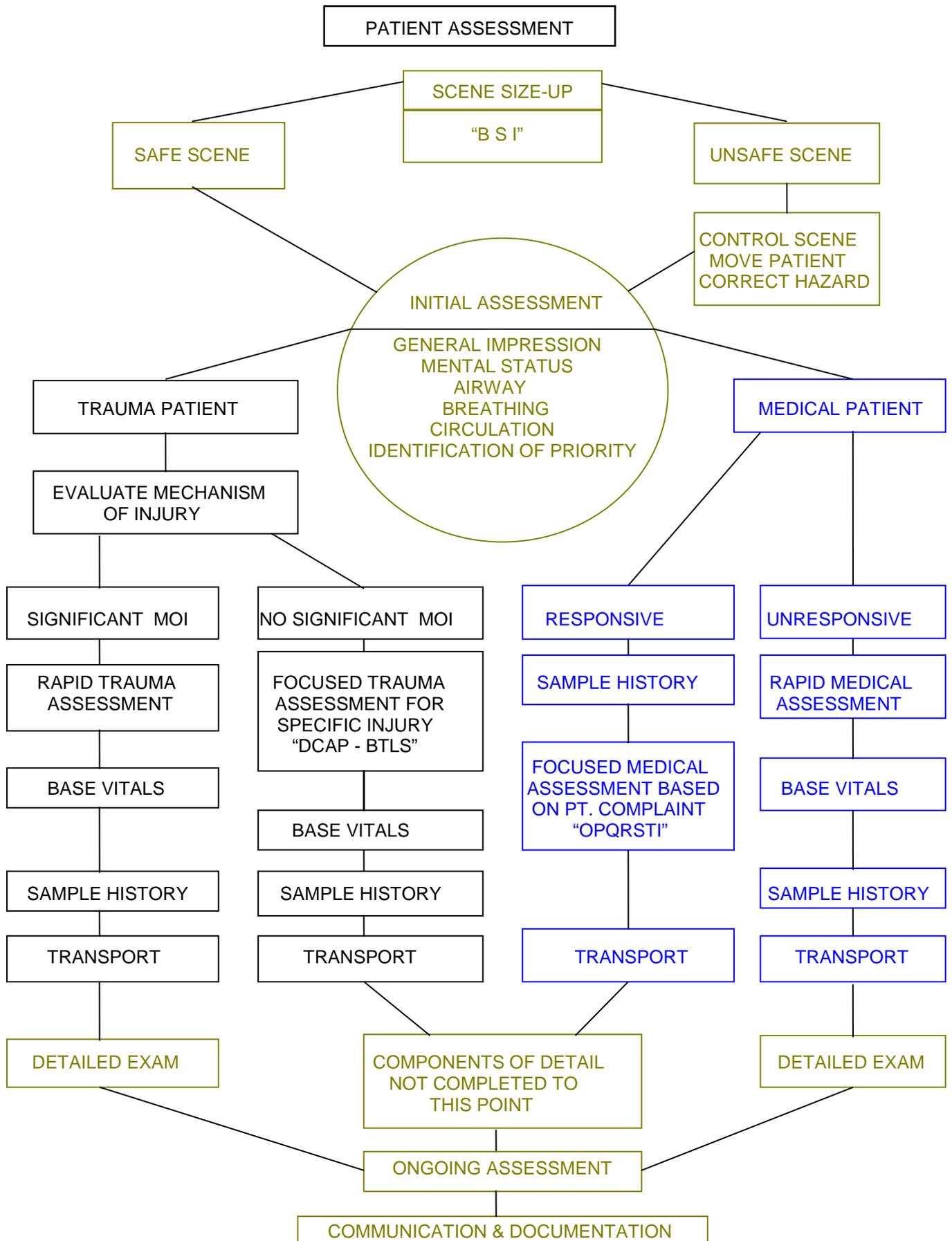
100% to 96%	Ideal Range - Maintain oxygen and airway support methods being used
95% to 90%	Mild to Moderate Hypoxemia - Check airway and increase oxygen support until ideal range is achieved
89% to 85%	Severe Hypoxemia - Aggressive airway and oxygen support is essential Look for and treat cause: i.e. COPD, metabolic imbalance, peripheral vascular shutdown
Below 85%	<b>BE PREPARED TO INTUBATE AND/OR ASSIST VENTILATION</b>



## PULSE OXIMETRY (cont'd)

CONSIDERATIONS
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- A. Hypovolemic, hypothermic, and peripheral vascular disease patients may not be suitable candidates for pulse oximetry due to peripheral shutdown
- B. Be aware that there may be a 30 to 60 second delay between changes in %SpO<sub>2</sub> conditions and pulse oximetry readings
- C. A pulse must be detected by the oximeter to determine the %SpO<sub>2</sub>
- D. Pulse oximetry is not indicated in carbon monoxide poisoning
- E. COPD patients will normally have a low %SpO<sub>2</sub> and should not be treated in accordance with this guideline



# MEDICATION APPENDIX

## MEDICATION LIST

Adenosine (Adenocard®)  
Amiodarone  
Aspirin  
Atropine Sulfate  
25% Dextrose (D25)  
50% Dextrose (D50)  
Diazepam (Valium®)  
Diphenhydramine (Benadryl®)  
Dopamine (Inotropin®)  
Epinephrine (Adrenalin®)  
Furosemide (Lasix®)  
Glucagon  
Lidocaine (Xylocaine®) 2%  
Methylprednisolone (Solumedrol®)  
Midazolam (Versed®)  
Morphine Sulfate  
Naloxone (Narcan®, EVZIO®)  
Nitroglycerin  
Oxygen (O<sub>2</sub>)  
Procainamide  
Proventil®/Ventolin® (Albuterol)  
Sodium Bicarbonate  
Sotalol (Betapace®)  
Vasopressin (Pitressin®)

# PHARMACOLOGY REVIEW

- I. ACTIONS OF DRUGS
  - A. Local effects
  - B. Systemic effects
  
- II. EFFECTS DEPENDS UPON
  - A. Age of patient
  - B. Condition of patient
  - C. Dosage
  - D. Route of administration
  
- III. ROUTE OF ADMINISTRATION
  - A. Intravenous (IV)
    - \* Most rapidly effective
    - \* Most dangerous
    - \* Give SLOWLY through an established IV line
  - B. Intramuscular (IM)
    - \* Takes longer to act
    - \* Longer duration of action
    - \* Deltoid or gluteus maximus Site
    - \* Absorption VERY dependent on blood flow
  - C. Subcutaneous (SQ)
    - \* Slower and more prolonged absorption
    - \* Under skin of upper arms, thigh, abdomen
  - D. Inhalation
    - \* Bronchodilators
    - \* Steroids
  - E. Endotracheal
    - \* Epinephrine, atropine, lidocaine, Narcan®
    - \* Dilute usual IV dose with 10 ml of sterile water
  - F. Sublingual (SL)
    - \* Rapid absorption

- G. Oral
  - \* Ipecac
  - \* Charcoal
- H. Rectal
  - \* Rapid but unpredictable absorption
- I. Intracardiac
  - \* Dangerous
  - \* No advantage over IV or endotracheal routes
  - \* Dilute usual IV dose with 10ml of sterile water

#### IV. RATES OF ABSORPTION

- A. "Directly related to route of administration"
  - \* IV -- Fastest
  - \* IM
  - \* SQ
  - \* Oral -- Slowest

#### V. ELIMINATION

- A. Many methods
- B. Usually metabolized by the liver
- C. Eliminated by the kidneys, lungs, skin

#### VI. TERMS

- A. Indications - Conditions for which the drug is used
- B. Contraindications - Conditions for which the drug should not be used
- C. Depressants - Lessens / decreases activity
- D. Stimulant - Increases activity
- E. Physiologic Action - Action from the body from a normal dose of the drug
- F. Therapeutic Action - Beneficial action expected
- G. Untoward Reaction - Harmful side effect
- H. Irritation - Damage to tissue
- I. Antagonism - Opposition between effects of drugs
- J. Cumulative Action - Increased action after several doses
- K. Tolerance - Decreased effects after repeated doses

- L. Synergism - Combined effects greater than sum of parts
- M. Potentiation - Enhancement of one drug by another
- N. Habituation - Drug necessary for feeling of "well being"
- O. Idiosyncrasy - Unexpected, abnormal response to a drug
- P. Hypersensitivity - Exaggerated response, allergy

VII. AUTONOMIC NERVOUS SYSTEM

Controls Automatic or Involuntary Actions

- A. Parasympathetic - Controls vegetative functions
- B. Sympathetic - "Flight or fight"

VIII. PARASYMPATHETIC NERVOUS SYSTEM

- A. Mediated by vagus nerve
- B. Acetylcholine is transmitter (cholinergic)
- C. Atropine is acetylcholine blocker

IX. SYMPATHETIC NERVOUS SYSTEM

- A. Mediated by nerves from sympathetic chain
- B. Norepinephrine is transmitter (adrenergic)
- C. Epinephrine is released from adrenals

X. SYMPATHETIC RECEPTORS

- A. Alpha ( $\alpha$ )
- B. Beta ( $\beta$ )

XI. COMMON SYMPATHETIC AGENTS

- A. Isoproterenol (Isuprel<sup>®</sup>) - pure BETA
- B. Epinephrine (Adrenalin<sup>®</sup>) - predominately BETA
- C. Dobutamine (Dobutrex<sup>®</sup>) - predominately BETA, slight ALPHA
- D. Norepinephrine (Levophed<sup>®</sup>) - predominately ALPHA
- E. Dopamine (Intropin<sup>®</sup>) - BETA at low dose: ALPHA at high dose
- F. Metaraminol (Aramine<sup>®</sup>) - predominately ALPHA

G. Phenylephrine (Neo-Syneprine®) - pure ALPHA

XII. SYMPATHETIC BLOCKERS

A. Propranolol (Inderal®) - BETA BLOCKER

XIII. DRUG ADMINISTRATION

Appropriate:

1. Indication
2. Order
3. Dose
4. Observation
5. Dilution
6. Route
7. Rate

# ADENOSINE (ADENOCARD®)

**THERAPEUTIC EFFECTS:** Adenosine slows tachycardias associated with the AV node via modulation of the autonomic nervous system without causing negative inotropic effects. It acts directly on sinus pacemaker cells and vagal nerve terminals to decrease chronotropic and dromotropic activity. Adenosine is the drug of choice for paroxysmal supraventricular tachycardia (PSVT) and can be used diagnostically for stable, wide-complex tachycardias of unknown type after two doses of lidocaine.

**INDICATIONS:** Conversion of PSVT to sinus rhythm

**CONTRAINDICATIONS:** Second or third degree AV block, or sick-sinus syndrome  
Hypersensitivity to adenosine

**SIDE EFFECTS:**

Facial flushing	Chest pain
Lightheadedness	Hypotension
Paresthesia	Shortness of breath
Headache	Nausea
Diaphoresis	Metallic taste
Palpitations	

**HOW SUPPLIED:** 6 mg/2 ml and 12 mg/4 ml vials or prefilled syringes

**ADULT DOSAGE:**

**Initial Dose:** 6 mg rapid IVP (over 1-3 sec.) immediately followed with a 20 ml saline flush

**Repeat Dose:** If no response is observed after 1-2 min., administer 12 mg rapid IVP (over 1-3 sec.) immediately followed with a 20 ml saline flush

**PEDIATRIC DOSAGE:**

**Initial Dose:** 0.1 mg/kg rapid IVP followed with a 10 ml saline flush

**Repeat Dose:** If no response is observed after 1-2 min., administer 0.2 mg/kg rapid IVP followed with a 10 ml saline flush

# AMIODARONE

THERAPEUTIC ACTIONS:	Amiodarone prevents or suppresses cardiac arrhythmias by prolongation of the myocardial action potential duration and refractory period and via non-competitive alpha- and beta-adrenergic inhibition.
INDICATIONS:	Recurrent ventricular fibrillation Recurrent hemodynamically unstable ventricular tachycardia
CONTRAINDICATIONS:	Severe sinus node dysfunction Marked sinus bradycardia Second-degree or third-degree atrio-ventricular heart block Bradycardia resulting in syncope (except for patients with pacemakers) Known allergy or hypersensitivity to amiodarone
SIDE EFFECTS:	Hypotension, particularly with repeated doses Hypotension, heart block and/or severe bradycardia if administered with other Drugs that prolong the QT interval (i.e. procainamide)
HOW SUPPLIED:	150 mg and 300 mg vials
ADMINISTRATION:	Can be administered via IV or IO routes
DOSAGE:	ADULT: 300 mg IV or IO (150 mg IV or IO for second dose) PEDIATRIC: 5 mg/kg IV or IO

# ASPIRIN

THERAPEUTIC EFFECTS:	Aspirin exhibits analgesic, anti-inflammatory and antipyretic activity. Due to aspirin's ability to inhibit platelet aggregation and cause vasodilation, there is a decreased likelihood of thrombosis.
INDICATIONS:	Cardiac related chest pain
CONTRAINDICATIONS:	Aspirin hypersensitivity Active or history of GI lesions Impaired renal function Pregnancy Trauma
SIDE EFFECTS:	GI bleeds Mucosal lesions Bronchial spasm in some asthma patients
HOW SUPPLIED:	325 mg coated tablets
ADMINISTRATION:	Orally
ADULT DOSAGE:	160-325 mg upon onset of cardiac signs and symptoms

# ATROPINE SULFATE

**THERAPEUTIC EFFECTS:** By blocking parasympathetic (vagal) action on the heart, atropine increases the rate of discharge by the sinus node, enhances conduction through the AV junction, and accelerates the heart rate, thereby improving cardiac output. In addition, by speeding up a slow heart to a normal rate, atropine reduces the chances of ectopic activity in the ventricles and thus of ventricular fibrillation.

Atropine is most effective in reversing bradycardia due to increased parasympathetic tone or to morphine; it is less effective in treating bradycardias due to actual damage to the AV or SA node.

**INDICATIONS:** SINUS BRADYCARDIA when accompanied by hypotension  
SECOND and THIRD DEGREE HEART BLOCK when accompanied by bradycardia  
In some cases of ASYSTOLE to remove any type of heart block  
As an antidote in ORGANOPHOSPHATE POISONING (mega doses)

**CONTRAINDICATIONS:** Atrial flutter or atrial fibrillation where there is a rapid ventricular response  
Glaucoma - narrow angle  
Use with caution in myocardial infarction

**SIDE EFFECTS:** The patient should be warned that they may experience some of the following side effects and that these side effects are part of the drug's usual and expected actions:

- \* Blurred vision, headache, pupillary dilatation
- \* Dry mouth, thirst
- \* Flushing of the skin

**HOW SUPPLIED:** Prefilled syringes containing 1 mg in 10 ml

**ADMINISTRATION:** In the field, atropine is usually given intravenously for bradycardia  
For organophosphate poisoning, a combination of intravenous and intramuscular administration is commonly used  
In resuscitation from cardiac arrest, if an intravenous route cannot be established, atropine may be given through the endotracheal tube

## ATROPINE SULFATE (cont)

ADULT DOSAGE: In bradycardia: 0.5 mg IV, repeated at 5-minute intervals until the desired heart rate is achieved

The total dose should not, however, exceed 3 mg. (Except in organophosphates)

Doses smaller than 0.5 mg, or a dose given too slowly, may slow rather than speed up the heart rate

Excessive doses may precipitate ventricular tachycardia or fibrillation

\* For asystole, 1mg IV, repeated in 5 minutes if asystole persists.

\* For organophosphate poisoning: 2 mg IM and 1 mg IV.

The IV dose may be repeated every 5 to 10 minutes as needed until a decrease in secretions is observed

Endotracheal Dosage: 1.0-2.0 mg diluted in 10ml NS

PEDIATRIC DOSAGE: In bradycardia: 0.02 mg/kg; may be repeated one time

Minimum dose - 0.1 mg

Maximum dose - 0.5 mg in child/1.0mg in adolescent

Endotracheal Dosage: 0.02 mg/kg diluted in 10ml NS

# 25% DEXTROSE (D25)

THERAPEUTIC EFFECTS:	Restores circulating blood sugar level to normal in states of hypoglycemia. Acts transiently as an osmotic diuretic.
INDICATIONS:	When blood sugar reading is below 70 with Glucometer in symptomatic patients: to treat coma caused by HYPOGLYCEMIA; to treat COMA OF UNKNOWN CAUSE; to treat STATUS EPILEPTICUS OF UNCERTAIN CAUSE; and some cases of REFRACTORY CARDIAC ARREST
CONTRAINDICATIONS:	Avoid in cases of presumed intracranial hemorrhage
SIDE EFFECTS:	Will cause tissue necrosis if it infiltrates; should therefore be given only through a good, rapidly flowing IV line
HOW SUPPLIED:	Prefilled syringes and vials containing 10 ml of 25% dextrose (2.5 gm of dextrose)
ADMINISTRATION:	Given intravenously, <u>through a free-flowing intravenous line</u> , preferably in a large vein. If possible, draw blood for serum glucose determinations before administering the dextrose.
PEDIATRIC DOSAGE:	2 ml/kg in children under 50 pounds Newborn dose: 1 ml/kg

# 50% DEXTROSE (D50)

THERAPEUTIC EFFECTS:	Restores circulating blood sugar level to normal in states of hypoglycemia. Acts transiently as an osmotic diuretic.
INDICATIONS:	When blood sugar reading is below 70 with glucometer in symptomatic patients: Treatment of coma caused by HYPOGLYCEMIA; Treatment of COMA OF UNKNOWN CAUSE; Treatment of STATUS EPILEPTICUS OF UNCERTAIN CAUSE; and Treatment of some cases of REFRACTORY CARDIAC ARREST
CONTRAINDICATIONS:	Avoid in cases of presumed intracranial hemorrhage
SIDE EFFECTS:	May precipitate severe neurologic symptoms in alcoholics  For this reason, when given to a known alcoholic, should be accompanied by <u>thiamine</u> , 50 mg IV and 50 mg IM, which will prevent this neurologic syndrome  Will cause tissue necrosis if it infiltrates; should therefore be given only through a good, rapidly flowing IV line
HOW SUPPLIED:	Prefilled syringes and vials containing 50 ml of 50% dextrose (25 gm of dextrose)
ADMINISTRATION:	Given intravenously, <u>through a free-flowing intravenous line</u> , preferably in a large vein  If possible, draw blood for serum glucose determinations before administering the dextrose
ADULT DOSAGE:	50 ml of 50% dextrose (25 g) as a bolus IV
PEDIATRIC DOSAGE:	1 ml/kg in children over 50 pounds

# DIAZEPAM (VALIUM®)

THERAPEUTIC EFFECTS:	Through its depressant action on the central nervous system, can terminate some seizures.  Also has a calming effect in anxiety or violent behavior.
INDICATIONS:	Status epilepticus  Sedation (e.g. prior to cardioversion in conscious patients)
CONTRAINDICATIONS:	Allergy to benzodiazepines  Dangerous with prior ingestion of alcohol or other sedative drug  Respiratory depression from any source  Hypotension
SIDE EFFECTS:	Hypotension  Confusion, unconsciousness  In some patients, especially the elderly, the critically ill, and those with pulmonary disease, may cause respiratory arrest and/or cardiac arrest.
HOW SUPPLIED:	In prefilled syringes and ampules of 2 ml and in vials of 10 ml, frequently in a concentration of 5 mg/ml.
ADMINISTRATION:	Intravenously in slow titrated doses or rectally. Although it can be given IM, the absorption is poor and unpredictable.
ADULT DOSAGE:	2-5 mg IV or per rectum, titrate additional doses up to a total of 10 mg.
PEDIATRIC DOSAGE:	0.2-0.3 mg/kg IV to a maximum dose of 10 mg. 0.5 mg/kg per rectum to a maximum dose of 10 mg.

# DIPHENHYDRAMINE (BENADRYL®)

THERAPEUTIC EFFECTS:	Blocks histamine effects in allergic reactions Sedative Reverses side effects of some phenothiazines.
INDICATIONS:	Allergic reactions As an adjunct to epinephrine in the treatment of anaphylactic shock Extrapyramidal reactions (Parkinson-like movements) secondary to phenothiazines
CONTRAINDICATIONS:	Narrow angle (acute) glaucoma Prostate enlargement Ulcer disease with symptoms of obstruction
SIDE EFFECTS:	Drowsiness, confusion Blurring of vision Dry mouth Thickening of bronchial secretions
HOW SUPPLIED:	In vials of 10 or 30 ml, containing 10 mg/ml In vials of 10 ml containing 50 mg/ml In ampules of 1 ml containing 50 mg/ml In prefilled syringes containing 50 mg in 1 ml
ADULT DOSAGE:	25-50 mg IVP or IM
PEDIATRIC DOSAGE:	1 mg/kg IV or IM to a maximum dose of 50 mg

# DOPAMINE (INTROPIN®)

THERAPEUTIC EFFECTS:	<p><math>\beta</math>-sympathetic drug causes an increase in the force and rate of cardiac contractions as well as dilation of renal and mesenteric arteries.</p> <p>This latter effect promotes urine flow, and for this reason, dopamine is sometimes preferred over norepinephrine (which constricts renal arteries) in shock.</p> <p>Dopamine causes less increase in oxygen consumption by the myocardium than does isoproterenol.</p> <p>At low doses, the <math>\beta</math> effects of dopamine predominate. At high doses, dopamine has <math>\alpha</math> effects as well and thus will cause vasoconstriction.</p>
INDICATIONS:	<p>To increase cardiac output in cardiogenic shock while maintaining good renal perfusion</p>
CONTRAINDICATIONS:	<p>Should not be used as first-line therapy in hypotension caused by hypovolemia (e.g., hemorrhagic shock), where volume replacement should precede the use of vasopressors</p> <p>Pheochromocytoma (a tumor that produces epinephrine and/or related substances)</p> <p>Should not be given in the presence of uncorrected tachyarrhythmia or ventricular fibrillation</p> <p>Do not mix with bicarbonate since dopamine may be inactivated by alkaline solutions</p>
SIDE EFFECTS:	<p>Ectopic beats, palpitations, tachycardia Nausea, vomiting Dyspnea, angina Headache</p>
HOW SUPPLIED:	<p>400 mg in 250 ml D5W</p>
ADMINISTRATION:	<p>Given by titrated intravenous infusion (microdrip infusion set)</p>
ADULT DOSAGE:	<p>Start the infusion at a rate of 5 mcg/kg/min and titrate the infusion until adequate heart rate, blood pressure, and level of consciousness are achieved.</p>

# EPINEPHRINE (ADRENALIN®)

THERAPEUTIC EFFECTS:	<p>In cardiac arrest, may restore electric activity in asystole; increases myocardial contractility; and decreases the threshold for defibrillation--all through its actions as a beta sympathetic agent.</p> <p>In addition, the alpha effects of epinephrine, causing vasoconstriction, elevate the perfusion pressure and may thus improve coronary blood flow during external cardiac compressions.</p> <p>In anaphylaxis, acts as a bronchodilator (beta effect) and helps maintain blood pressure (alpha effect).</p>
INDICATIONS:	<p>In CARDIAC ARREST, to restore electric activity in asystole or to enhance defibrillation potential in ventricular fibrillation; also to elevate systemic vascular resistance and thereby improve perfusion pressure during resuscitation.</p> <p>To treat the life-threatening symptoms of ANAPHYLAXIS</p> <p>To treat acute attacks of ASTHMA</p>
CONTRAINDICATIONS:	<p>Must be used with caution in patients with angina, hypertension, or hyperthyroidism</p> <p>THERE ARE NO CONTRAINDICATIONS TO THE USE OF EPINEPHRINE IN THE SITUATION OF CARDIAC ARREST OR ANAPHYLACTIC SHOCK</p>
SIDE EFFECTS:	<p>In a conscious patient, may cause <u>palpitations</u>, from tachycardia or ectopic beats, and <u>elevations of blood pressure</u> (which may not be desirable if the patient is already hypertensive)</p> <p>The asthmatic with preexisting heart disease may experience <u>dysrhythmias</u> if treated with epinephrine</p>
HOW SUPPLIED:	<p>Prefilled syringes containing 1 mg in 10 ml (1:10,000 solution)</p> <p>Ampules containing 1 mg in 1 ml (1:1,000 solution)</p> <p>Multi-dose vial: 30 mg in 30 ml (1:1,000 solution)</p>
ADMINISTRATION:	<p>In <u>cardiac arrest</u>, epinephrine is given intravenously every 3 minutes (consider escalating dose in beta blocker or calcium channel blocker overdose)</p> <p>If an IV route cannot be established quickly, the drug may be instilled in the tracheo-bronchial tree via catheter through an endotracheal tube</p> <p>For <u>anaphylactic reactions</u>, epinephrine is given via the intramuscular route</p>

## EPINEPHRINE (ADRENALIN®) (Continued)

### ADULT DOSAGE:

#### Cardiac arrest:

Initial Dose: 1.0 mg (10 ml of 1:10,000 solution) IVP

Additional Doses: 1.0 mg (10 ml of 1:10,000). Consider up to 0.2 mg/kg for beta blocker or calcium channel blocker overdose.

Endotracheal dose: 2 mg (1:1,000) diluted with 10 ml normal saline given via catheter during ventilation

#### Anaphylactic Reactions:

Mild reactions: 0.3 mg intramuscular, (0.3 ml of a 1:1,000 solution)  
(Do not, however, inject fingers or toes)

Another 0.3 ml is given SQ can be administered on another extremity

Severe reactions, with shock: 0.5 mg slow IV. (5 ml of a 1:10,000 solution)

For mild to moderate asthmatic attacks: 0.3 to 0.5 ml of a 1:1,000 solution, SQ

### PEDIATRIC DOSAGE:

Bradycardia: 0.01 mg/kg 1:10,000 every 3 minutes

#### Cardiac Arrest:

Initial Dose: 0.01 mg/kg 1: 10,000 IVP or IO push

Additional Doses: 0.1 mg/kg 1:1000 IVP or IO push

Endotracheal dose: 0.1 mg/kg 1:1,000 diluted with 2 ml of NS

Newborn Cardiac Arrest: 0.02 mg/kg 1:10,000 every 5 min. By IV, IO

Allergic Reaction/Asthma: 0.01 mg/kg 1:1,000 SQ Max 0.3 mg. No response and IV in place, 0.1 mg/kg 1:10,000 IVP

# FUROSEMIDE (LASIX<sup>®</sup>)

**THERAPEUTIC EFFECTS:** Potent diuretic, causing the excretion of large volumes of urine within 5 to 30 minutes of administration, thus useful in ridding the body of excess fluid in conditions such as congestive heart failure (CHF).

However, furosemide may be useful in long range transports of patients in marked heart failure (especially catheterized patients) where there is a need to begin definitive therapy before the patient arrives at the hospital.

**INDICATIONS:** To reverse fluid overload associated with CONGESTIVE HEART FAILURE and PULMONARY EDEMA

**CONTRAINDICATIONS:** Should not be given to pregnant women

Hypokalemia may be suspected in a patient who has been on chronic diuretic therapy or whose EKG shows prominent P waves, diminished T waves, and the presence of U waves

**SIDE EFFECTS:** Immediate side effects may include nausea and vomiting, potassium depletion (with attendant cardiac dysrhythmias), and dehydration

**HOW SUPPLIED:** Pre-filled syringes of 10 ml in a concentration of 10 mg/ml

**ADMINISTRATION:** In the field, furosemide is given intravenously

**ADULT DOSAGE:** 1 mg/kg slowly IV push. If a response is not obtained, a second dose may be given in 30 minutes.

# GLUCAGON

<b>THERAPEUTIC EFFECTS:</b>	<p>Accelerates the breakdown of glycogen to glucose in the liver, causing an increase in blood glucose level.</p> <p>Glucagon also relaxes the smooth muscle of the GI tract</p> <p>Glucagon is helpful, in hypoglycemia only if the liver glycogen is available. Because glucagon is of little or no help in states of starvation, adrenal insufficiency, or chronic hypoglycemia, glucose should be considered for the treatment of hypoglycemia.</p>
<b>INDICATIONS:</b>	<p>For the treatment of hypoglycemia when IV Dextrose is not available</p> <p>Anaphylaxis</p>
<b>CONTRAINDICATIONS:</b>	<p>Glucagon is contraindicated in patients with known hypersensitivity to it or in patients with pheochromocytoma</p>
<b>SIDE EFFECTS:</b>	<p>Glucagon is relatively free of adverse reactions except for occasional nausea and vomiting which may also occur with hypoglycemia</p> <p>Generalized allergic reactions including urticaria, respiratory distress and hypotension, have been reported in patients who receive glucagon by injection</p>
<b>HOW SUPPLIED:</b>	<p>Vials of 1 mg glucagon with 1 ml of diluting solution</p>
<b>ADMINISTRATION:</b>	<p>For adults and for children weighing more than 20 kg, administration may be by subcutaneous intramuscular or intravenous injection</p> <p>Glucagon must be reconstituted with dilution solution provided and used immediately. If dose is higher than 2 mg, reconstitute with sterile water for injection and use immediately</p> <p>Glucagon is compatible with dextrose solutions, but precipitates may form in solutions of sodium chloride, potassium chloride or calcium chloride</p>
<b>ADULT DOSAGE:</b>	<p>In hypoglycemia, 0.5 to 1.0 mg IV, SC or IM injection. Response is usually seen in 5 to 20 minutes. If response is delayed, dose may be repeated 1 to 2 times</p>
<b>PEDIATRIC DOSAGE:</b>	<p>In hypoglycemia for children weighing more than 20 kg, 0.5 to 1.0 mg IV, SC or IM injection. Response is usually seen in 5 to 20 minutes. If response is delayed, dose may be repeated 1 to 2 times</p>

# LIDOCAINE (XYLOCAINE®) 2%

THERAPEUTIC EFFECTS:	Suppresses ventricular ectopic activity by decreasing the excitability of heart muscle and the cardiac conduction system.
INDICATIONS:	Lidocaine is the drug of first choice:  To SUPPRESS PREMATURE VENTRICULAR CONTRACTIONS (PVCs) in the appropriate setting  To PREVENT RECURRENCE OF VENTRICULAR FIBRILLATION after electric conversion  To treat VENTRICULAR TACHYCARDIA  To suppress reflex rise in ICP during intubation
CONTRAINDICATIONS:	Known history of allergy to lidocaine or local anesthetics (e.g., Novocaine®)  Second or third degree heart block  Sinus bradycardia or sinus arrest  Idioventricular rhythm
SIDE EFFECTS:	By decreasing the force of cardiac contractions as well as decreasing peripheral resistance, may cause a <u>fall in cardiac output and blood pressure</u>  May cause <u>numbness, drowsiness, or confusion</u> when given in high doses, especially to the elderly or to patients in heart failure, may cause <u>seizures</u>
HOW SUPPLIED:	Ampules and prefilled syringes containing 100 mg in 5 ml (20 mg/ml) for bolus injection
ADMINISTRATION:	Given by intravenous bolus  Reduce the dosage (both bolus and infusion) by half for patients in congestive heart failure or shock and for patients over 70 years old  If an intravenous route cannot be established, lidocaine may be given via catheter through an endotracheal tube
ADULT DOSAGE:	1.5 mg/kg IV push, followed by 50 mg bolus every 20 minutes 1 mg/kg IV push prior to intubation of head injured patient
PEDIATRIC DOSAGE:	Ventricular fibrillation: 1 mg/kg IVP, IO push or ET

# METHYLPREDNISOLONE (SOLUMEDROL®)

THERAPEUTIC EFFECT:	Methylprednisolone is a synthetic glucocorticoid that is used as an anti-inflammatory or immunosuppressive agent. Glucocorticoids are naturally occurring hormones that prevent or suppress inflammation and immune responses when administered at pharmacological doses. These drugs have very little mineralocorticoid activity and are therefore not used to manage adrenal insufficiency.
INDICATIONS:	Wheezing
CONTRAINDICATIONS:	Corticosteroid hypersensitivity Fungal infection
SIDE EFFECTS:	Hypertension Impaired wound healing Fluid retention Increased risk of infection Muscle weakness Osteoporosis
HOW SUPPLIED:	Injectable solution: 40 mg, 80 mg, 125 mg, 500 mg, 1g, 2g, 20 mg/ml, 40 mg/ml, 80 mg/ml
ADMINISTRATION:	IV or IM
ADULT DOSE:	125 mg IV or IM .
PEDIATRIC DOSE:	0.5-1 mg/kg IV or IM

# MIDAZOLAM (VERSED®)

THERAPEUTIC EFFECTS:	May potentiate the effects of GABA, depress the CNS, and suppress the spread of seizure activity.
INDICATIONS:	Seizures Sedation
CONTRAINDICATIONS:	Hypersensitivity to the medication Narrow angle glaucoma
SIDE EFFECTS:	Hypotension Respiratory depression Amnesia
HOW SUPPLIED:	5 mg/2 ml
ADMINISTRATION:	Intravenous Intramuscular Intranasal
ADULT DOSAGE:	2-5 mg IVP every 5 minutes as needed 10 mg IN
PEDIATRIC DOSAGE:	0.1m mg/kg IV, IO, or IM

# MORPHINE SULFATE

THERAPEUTIC EFFECTS:	Primary use is as an analgesic  Helps to allay the anxiety associated with pulmonary edema.
INDICATIONS:	To treat the anxiety associated with PULMONARY EDEMA in CONGESTIVE HEART FAILURE  To RELIEVE PAIN in myocardial infarction and other, selected conditions
CONTRAINDICATIONS:	Marked hypotension.  Respiratory depression, except that caused by pulmonary edema, where the drug may be used if ventilatory support is provided.
SIDE EFFECTS:	<u>Hypotension</u> (most likely in volume depleted patients).  Increased vagal tone, leading to <u>bradycardia</u> . (This effect can be reversed with atropine.)  <u>Respiratory depression</u> . (This effect can be reversed with naloxone.)  <u>Nausea and vomiting</u> .
HOW SUPPLIED:	Prefilled (Tubex®) syringes containing 10mg.
ADMINISTRATION:	Given by titrated intravenous injection.  If hypotension occurs, keep the patient flat, and do not give more of the drug.  Watch for respiratory depression.
ADULT DOSAGE:	2 to 5 mg by IV push every 5 to 30 minutes until the desired therapeutic effect is achieved. Do not exceed 15 mg in the field.

# NALOXONE (NARCAN<sup>®</sup>, EVZIO<sup>®</sup>)

THERAPEUTIC EFFECTS:	<p>Specific antidote for narcotic agents.</p> <p>Reverses the actions of all narcotic drugs including heroin, morphine, methadone, codeine, Demerol<sup>®</sup>, Dilaudid<sup>®</sup>, Darvon<sup>®</sup>, paregoric, and Percodan<sup>®</sup>.</p> <p>Naloxone is thus effective in counteracting the effects of overdose from any of these agents, although large doses are required to reverse the effects of Darvon overdose.</p> <p>Naloxone will reverse stupor, coma, respiratory depression, etc. when these are due to narcotic overdose.</p>
INDICATIONS:	<p>To treat known NARCOTIC OVERDOSE or coma suspected to be due to narcotic overdose.</p>
CONTRAINDICATIONS:	<p>None</p>
SIDE EFFECTS:	<p>Too rapid administration may precipitate <u>projectile vomiting</u> and <u>ventricular dysrhythmias</u>.</p> <p>Administration to people who are physically dependent on narcotics may cause an acute withdrawal syndrome.</p> <p>For this reason, naloxone should be given very slowly, using improvement of respiratory status as an end point.</p> <p>In general, the duration of action of naloxone is shorter than that of the narcotics it is used to counteract.</p> <p>Thus, the patient who has been successfully roused with naloxone may fall back into stupor or coma as the naloxone wears off.</p> <p>These patients must therefore be watched closely, and the dose of naloxone should be repeated as necessary.</p> <p>Has been reported to cause pulmonary edema and sudden death in rare cases.</p>
HOW SUPPLIED:	<p>2 mg in 2 ml prefilled syringe 0.4 mg in an auto-injector</p>

## NALOXONE (NARCAN®) (cont'd)

**ADMINISTRATION:** In the field, given slowly by slow intravenous injection, intramuscular, intranasal, or via auto-injector.

As soon as there is improvement in the respirations, stop giving the drug.

It is preferable that the patient NOT wake up fully in the field, as these patients may be violent when brought abruptly out of coma.

**USE RESPIRATIONS AS A GUIDE.**

If there is no response to two doses, suspect overdose with another, non-narcotic drug.

**ADULT DOSAGE:** Initial dose: 2 mg Administer this solution VERY SLOWLY IV while monitoring the rate and depth of the patient's respirations. This dose can also be Administered ETT, IM, IN, via nebulizer, or SQ.

Initial dose via auto-injector: 0.4 mg

If there is no response to the full dose of naloxone, it may be repeated in 5 minutes in the same fashion.

**PEDIATRIC DOSAGE:** 0.1 mg/kg

NOTE: The manufacturer of EVZIO® recommends pinching the thigh prior to administration of naloxone via auto-injector at this injection site.

Newborn dose (narcotic dependent with decreased respiration):  
0.1 mg/kg every 3 minutes until respiration is improved.

# NITROGLYCERIN

THERAPEUTIC EFFECTS:	<p>The primary pharmacologic effect of nitroglycerin and related drugs is to relax smooth muscle, and the effects of nitroglycerin on the cardiovascular system are chiefly due to relaxation of <u>vascular</u> smooth muscle (hence vasodilatation).</p> <p>Nitroglycerin provides relief of pain in angina, probably by dilating coronary arteries and thereby increasing blood flow through them as well as by decreasing myocardial oxygen demand.</p> <p>Through its vasodilatation action on peripheral vessels, nitroglycerin promotes pooling of the blood in the systemic circulation and decreases the resistance against which the heart has to pump (the afterload); these effects may be useful in treating congestive heart failure.</p>
INDICATIONS:	<p>To relieve the pain of ANGINA.</p> <p>To treat selected cases of PULMONARY EDEMA due to LEFT HEART FAILURE</p>
CONTRAINDICATIONS:	<p>Use with caution in presumed right ventricular myocardial infarction.</p>
SIDE EFFECTS:	<p>Transient, throbbing <u>headache</u>.</p> <p><u>Hypotension</u></p> <p><u>Dizziness, weakness</u></p>
HOW SUPPLIED:	<p>Many forms, including ointment, spray, tablets, sustained release capsules.</p> <p>For use in the field, tablets or spray of 0.4 mg strength are preferred.</p>
ADMINISTRATION:	<p>Given sublingually (under tongue).</p> <p>The patient should be semi-sitting or recumbent.</p> <p>Monitor blood pressure and be prepared for hypotension.</p>
ADULT DOSAGE:	<p>One 0.4 mg tablet or spray under the tongue.</p> <p>May repeat once every 5 minutes as long as blood pressure remains normal.</p>

# OXYGEN (O<sub>2</sub>)

THERAPEUTIC EFFECTS:	Reverses the deleterious effects of hypoxemia on the brain, heart, and other vital organs.
INDICATIONS:	Any condition in which global or local hypoxemia may be present:  CARDIAC or RESPIRATORY ARREST (given with artificial ventilation). DYSPNEA or RESPIRATORY DISTRESS from any cause. CHEST PAIN. SHOCK. COMA from any cause. CHEST TRAUMA. NEAR-DROWNING. PULMONARY EDEMA. TOXIC INHALATIONS (smoke, chemicals, carbon monoxide). ACUTE ASTHMATIC ATTACK. ACUTE DECOMPENSATION OF COPD. STROKE, HEAD INJURY. REPEATED SEIZURES. Any patient in CRITICAL CONDITION.
CONTRAINDICATIONS:	None.  May depress respirations in rare patients with chronic obstructive pulmonary disease. This is <u>not</u> a contraindication to its use, but simply means that such patients must be watched closely and assisted to breathe if the respiratory rate declines.
SIDE EFFECTS:	None when given for short periods to adults (less than 24 hrs)
HOW SUPPLIED:	As a compressed gas in cylinders of varying sizes.
ADMINISTRATION:	Administered by inhalation from a dosage mask, nasal cannula, endotracheal tube, etc.  A patent airway and adequate ventilation must be ensured.
ADULT DOSAGE:	Depends on the condition being treated. For cardiac arrest and other critical conditions, 100% oxygen should be given as soon as possible.

# PROCAINAMIDE

**THERAPEUTIC EFFECTS:** Suppresses diastolic repolarization by reducing the automaticity of all myocardial pacemakers and slowing intraventricular conduction.

**INDICATIONS:** Ventricular fibrillation or pulseless ventricular tachycardia that reoccurs after periods of non-ventricular fibrillation rhythms.

**CONTRAINDICATIONS:** Complete or first degree heart block, presence of congestive heart failure, torsades de pointes, patients with lupus or myasthenia gravis, patients taking quinidine or disopyramide.

**SIDE EFFECTS:** Hypotension, widening of the QRS complex, heart block.

**HOW SUPPLIED:** 1000 mg/10 ml

**ADMINISTRATION:** Intravenously as an infusion.

**ADULT DOSAGE:** Infuse at 20 mg/min up to a total dose of 17 mg/kg to load the patient with procainamide, then infuse at 1 to 4 mg/min for patients with normal renal function. For patients with renal failure, the total loading dose is 12 mg/kg followed by an infusion of 1 mg/min.

# PROVENTIL<sup>®</sup> / VENTOLIN<sup>®</sup> (ALBUTEROL)

THERAPEUTIC EFFECTS:	Beta-2 agonist (stimulator), dilates smooth muscle, bronchodilator
INDICATIONS:	Shortness of breath caused by bronchoconstriction May help transiently decrease potassium levels in patients with hyperkalemia
CONTRAINDICATIONS:	* Allergy to drug * Excessive prior use of beta stimulants * Shortness of breath not from bronchoconstriction
SIDE EFFECTS:	* Nervousness * Weakness * Tremor * Increased heart rate
HOW SUPPLIED:	Unit dose 2.5 mg vials (3 ml)
ADMINISTRATION:	By inhalation through a breathing aerosol device.
ADULT DOSAGE:	2.5 mg in NS via aerosol device with oxygen at 8 liters per minute.
PEDIATRIC DOSAGE:	2.5 mg (3 ml) in aerosol device with oxygen at 8 liters per minute

# SODIUM BICARBONATE

THERAPEUTIC EFFECTS:	By neutralizing excess acid, helps return the blood towards a physiologic pH, in which normal metabolic processes and sympathomimetic agents (such as epinephrine) work more effectively.
INDICATIONS:	To treat severe METABOLIC ACIDOSIS  To treat HYPERKALEMIA (high serum potassium)  To promote the excretion of some types of drugs taken in OVERDOSE.
CONTRAINDICATIONS:	None
PRECAUTIONS:	Because each meq of bicarbonate comes along with a meq of sodium, sodium bicarbonate has the same effect as any other salt-containing infusion, i.e., it increases the vascular volume.  Three 50 ml syringes of sodium bicarbonate (1 meq/ml) contain approximately the same amount of salt as 1 liter of normal saline.  Patients in borderline heart failure cannot tolerate salt loads of this magnitude.
SIDE EFFECTS:	Administration of sodium bicarbonate lowers serum potassium.  In some cases, this is the desired effect, as when bicarbonate is used to treat hyperkalemia.  However, in cardiac patients, if the potassium falls too low, the heart becomes irritable, and dysrhythmias may occur.  This is especially likely in patients taking diuretics.  Sodium bicarbonate administration transiently raises the arterial carbon dioxide level, and thus its administration must be accompanied by adequate ventilation.
HOW SUPPLIED:	Vials and prefilled syringes of 50 ml, containing 1 meq/ml.
ADMINISTRATION:	Given by intravenous bolus injection

**SODIUM BICARBONATE (cont'd)**

**ADULT DOSAGE:**

For cardiac arrest:

If used at all, 1 meq/kg after the first 10 minutes of CPR.

Acidosis should thereafter be prevented with adequate ventilation.

Do not give bicarbonate in the same syringe with epinephrine or calcium.

For other conditions: As ordered by physician.

**PEDIATRIC DOSAGE:**

Cardiac Arrest:

1 meq/kg diluted with 1 ml/kg NS

Newborn: 0.5 meq/kg diluted with .5 ml/kg NS

# **SOTALOL (BETAPACE®)**

**THERAPEUTIC EFFECTS:** Sotalol is a  $\beta$ -blocker that also inhibits potassium channels at the cellular level resulting in prolongation of PR and QT intervals.

**INDICATIONS:** Wide complex ventricular tachycardia.

**CONTRAINDICATIONS:** Asthma, congestive heart failure, COPD, second or third degree AV block

**SIDE EFFECTS:** Bradycardia, prolongation of QT intervals, dizziness, dyspnea

**HOW SUPPLIED:** Injectable solution 15 mg/ml

**ADMINISTRATION:** Intravenous

**ADULT DOSAGE:** 1.5 mg/kg (to a maximum of 100 mg) IV over 5 minutes.

# VASOPRESSIN (PITRESSIN®)

**THERAPEUTIC EFFECTS:** Vasoconstriction, as an  $\alpha$  agonist, with shunting of the blood to the brain and the heart.

**INDICATIONS:** Ventricular fibrillation, pulseless ventricular tachycardia

**CONTRAINDICATIONS:** Known hypersensitivity. This is a naturally occurring substance in the body; hence, adverse or allergic reactions are extremely rare.

**SIDE EFFECTS:** Mesenteric or limb ischemia secondary to arterial vasospasm, nausea, vomiting, diarrhea

**HOW SUPPLIED:** 20 units/1 ml

**ADMINISTRATION:** Intravenous

**ADULT DOSAGE:** 40 units IVP