GALLATIN COUNTY
EMS Patient Care Guidelines

EMS Medical Director: Bret M Birrer, MD FAAEM FACEP

Effective Date: October 20, 2025

These Gallatin County EMS Patient Care Guidelines were developed as a field guide for easy use by the Emergency Care Provider based on the NASEMSO National Model EMS Clinical Guidelines version 3.0 and Montana ECP Scope of Practice Document. This document is to be used by all agencies in Gallatin County under the medical direction of Bret M Birrer, MD FAAEM FACEP including:

American Medical Response
Amsterdam Fire Department
Big Sky Fire Department
Bozeman Fire Department
Bridger Canyon Fire Department
Central Valley Fire District
Clarkston Fire Service Area
Fort Ellis Fire/Rescue
Gallatin County 911
Gallatin County Sheriff Office – deputy EMT program
Gallatin County Sheriff Search and Rescue
Gallatin Gateway Rural Fire District
Gallatin River Ranch Fire Department
Hebgen Basin Rural Fire District
Hyalite Fire District
Manhattan Fire Department
Montage Big Sky
Mountain Western Medical, LLC
Three Forks Area Ambulance
Willow Creek Fire District
Yellowstone Club Ski Patrol
Yellowstone Mountain Club Rural Fire District

FOREWORD

These Patient Care Guidelines have been adapted from the National Association of State EMS Officials (NASEMSO) Model EMS Clinical Guidelines published online in March 2022. These algorithms include specific recommendations for evaluation and treatment.

The recommendations within each guideline are listed in order by provider level scope of practice. It is assumed that more advanced levels of ECPs will perform all recommended evaluations and treatments included in the preceding level of care.

The guidelines include specific pediatric recommendations, highlighted by the EMS for Children bear logo, where specific pediatric recommendations differ from those for adults. It is assumed that children will receive the evaluation and care recommended for all patients, unless specific pediatric recommendations are included in the algorithm.

A pediatric patient is defined as age less than 15 years. Pediatric treatment guidelines are to be used on children who have not yet experienced puberty. Signs of puberty include chest or underarm hair on males, and any breast development in females. Age 15 and above, or signs of puberty, is considered an adult patient in regard to treatment guidelines.

The General Adult Assessment and General Pediatric Assessment guidelines should be applied to all patient encounters. All initial patient care is included in this guideline to reduce the need for extensive reiteration of basic assessment and other considerations in every guideline.

Online medical direction may be utilized at any time during the patient encounter per local protocols.

The NASEMSO model guidelines include additional information that medical direction authorities may find helpful for education, training, and quality improvement activities, including patient safety considerations, educational pearls, performance measures, and literature references: nasemso.org.

General EMS Medical Director Expectations

Paramedics are expected to maintain National Registry.

All paramedics new to Gallatin County (newly licensed as well as experienced) will need to successfully complete an EMS Medical Director clearance meeting between completing their agency specific FTO time and being allowed to practice paramedicine independently in Gallatin County.

Failure to abide by the following cardinal rules will result in de-credentialling and inability to practice prehospital medicine in Gallatin County:

1. Don't intentionally harm a patient.
2. Don't intentionally withhold needed treatment.
3. Don't falsify the medical record.
4. Don't practice while intoxicated.
5. Failure to remediate.

Bret M Birrer, MD FAAEM FACEP
EMS Medical Director
Gallatin County

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PROCEDURES GUIDELINES (Conti)

Patient Care Guideline Key:

 Caution / Warning / Alert

 Pediatric Treatment Consideration (for patients ≤ 15 years of age)

 Online Medical Control

 Specific Guideline

FR EMR Licensed Attendant and above may perform these steps

E EMT Licensed Attendant and above may perform these steps

E* EMT with Endorsement(s) [airway, IV/IO initiation, IV/IO maintenance, medications] and above may perform these steps

A AEMT Licensed Attendant and above may perform these steps

P Paramedic Licensed Attendant

TERMS AND CONVENTIONS

AED	means Automated External Defibrillator
AMPLE	means Allergies; Medications; Prior history; Last meal eaten; Events leading up to injury/illness
AMS	means Altered Mental Status
ASA	means Acetylsalicylic Acid
BG	means Blood Glucose
BP	means Blood Pressure
BVM	means Bag-Valve-Mask
CCC	means Continuous Cardiac Compressions
CHF	means Congestive Heart Failure
COPD	means Chronic Obstructive Pulmonary Disease
CP	means Chest Pain
CPR	means Cardiopulmonary Resuscitation
CVA	means Cerebrovascular Accident
DCAP-BTLS	means Deformities; Contusions; Abrasions; Punctures/Penetrations; Burns; Tenderness; Lacerations; Swelling
DKA	means Diabetic Ketoacidosis
ECG	means Electrocardiogram
ETA	means Estimated Time of Arrival
ETT	means Endotracheal Tube
GCS	means Glasgow Coma Scale
GU	means Genitourinary
HEENT	means Head, Ears, Eyes, Nose, Throat
HPI	means History of Present Illness
HR	means Heart Rate
ICP	means Intracranial Pressure
IM	means Intramuscular
IN	means Intranasal
IO	means Intraosseous
IV	means Intravenous
IVP	means Intravenous Push
IVPB	means Intravenous Piggyback
JVD	means Jugular Venous Distention

MAD	means Mucosal Atomizer Device
MI	means Myocardial Infarction
MOI	means Mechanism of Injury
NRB	means Non-rebreather
NS	means Normal Saline
NV	means Nausea/Vomiting
OPQRST	means Onset; Provokes; Quality; Radiates; Severity; Time (used in evaluating localized pain)
PCI	means Percutaneous Coronary Intervention
PCR	means Patient Care Record/Report
PO	means By Mouth
PRN	means As Needed
q	means Every
ROSC	means Return of Spontaneous Circulation
RR	means Respiratory Rate
RUQ	means Right Upper Quadrant
SAMPLE	means Symptoms; Allergies; Medications; Prior history; Last meal eaten; Events leading up to injury/illness
SL	means Sublingual
SOB	means Shortness of Breath
S/P	means Status/Post
SQ	means Subcutaneous
S/S	means Signs/Symptoms
SVT	means Supraventricular Tachycardia
TCAs	means Tricyclic Antidepressants
TFTC	means Trauma Field Triage Criteria
TIA	means Transient Ischemic Attack
TKO/KVO	means To Keep Open/Keep Vein Open
VF	means Ventricular Fibrillation
VT	means Ventricular Tachycardia
VS	means Vital Signs
WPW	means Wolff-Parkinson-White Syndrome

ADULT TREATMENT GUIDELINES

General Adult Assessment

Scene Safety / Scene Size-Up
Nature of Illness / Mechanism of Injury
PPE / BSI
Bring all equipment to patient's side

MCI → S.T.A.R.T. Triage

- Level of Consciousness
  - Unresponsive → Check Pulse
    - None → Cardiac Arrest
- Airway
  - Signs of Compromise or Not Protecting → Ventilation Management
- Breathing
  - Inadequate or Respiratory Distress → Respiratory Distress
- Circulation
  - Bleeding → General Trauma
- Disability
  - Altered or Confused → Altered Mental Status/ Syncope

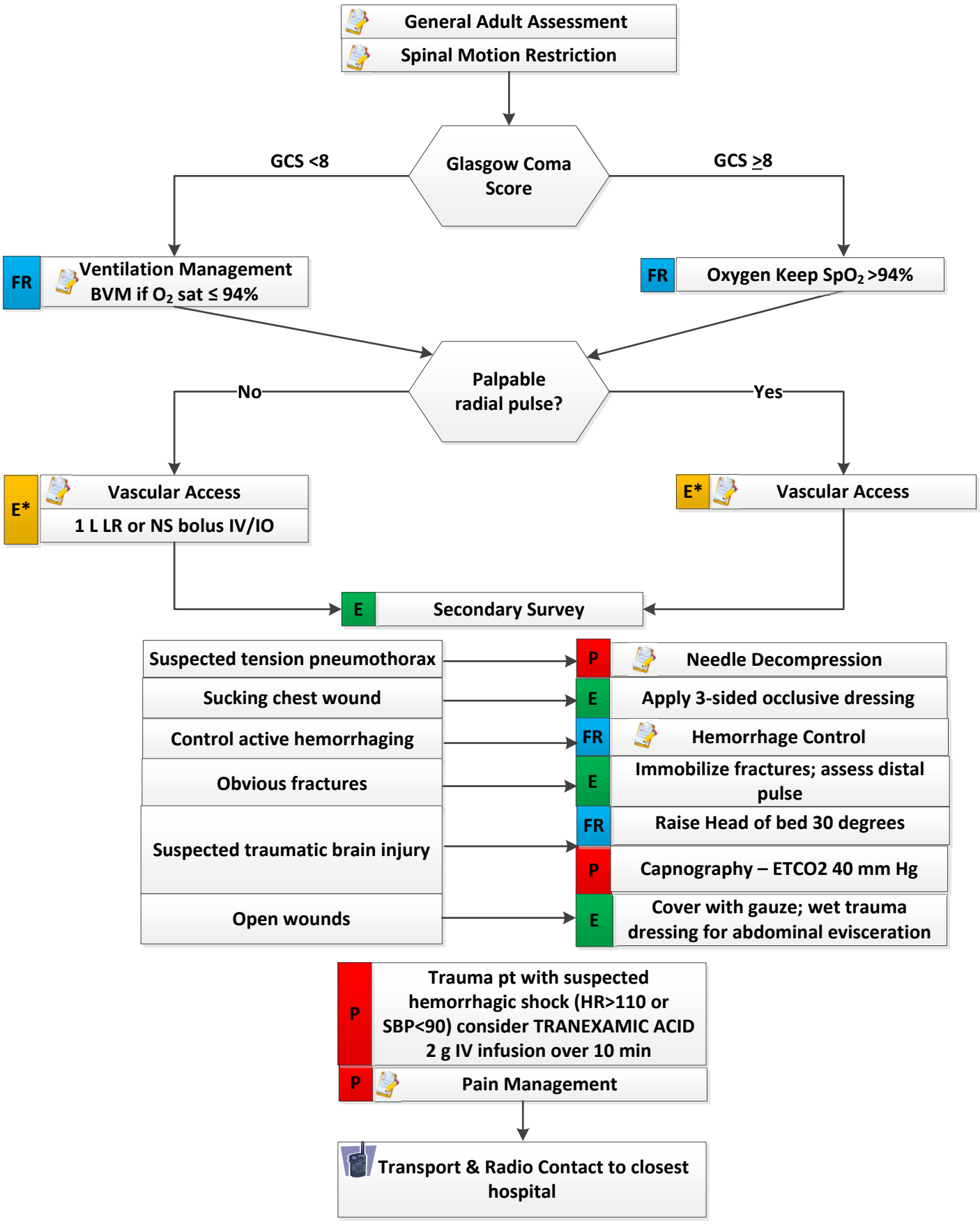
- History – HPI & SAMPLE
- Vital Signs & Physical Exam
- E — Blood glucose testing as indicated
- Specific treatment guideline as indicated
- Spinal motion restriction (SMR) as indicated
- Comfort measures (splint, position of comfort)
- P — Cardiac monitor as indicated
- E* — Vascular Access as indicated
- FR — Oxygen therapy to keep SpO_2 ≥94%
- P — Pain Management as indicated

Radio Contact as needed for online medical control & as per protocol

History

- **OPQRST**
  - **O**nset
  - **P**rovocation
  - **Q**uality
  - **R**adiation
  - **S**everity
  - **T**ime
- **SAMPLE**
  - **S**ymptoms
  - **A**llergies
  - **M**edications
  - **P**ast medical history
  - **L**ast oral intake
  - **E**vents leading to call

General Adult Trauma Assessment



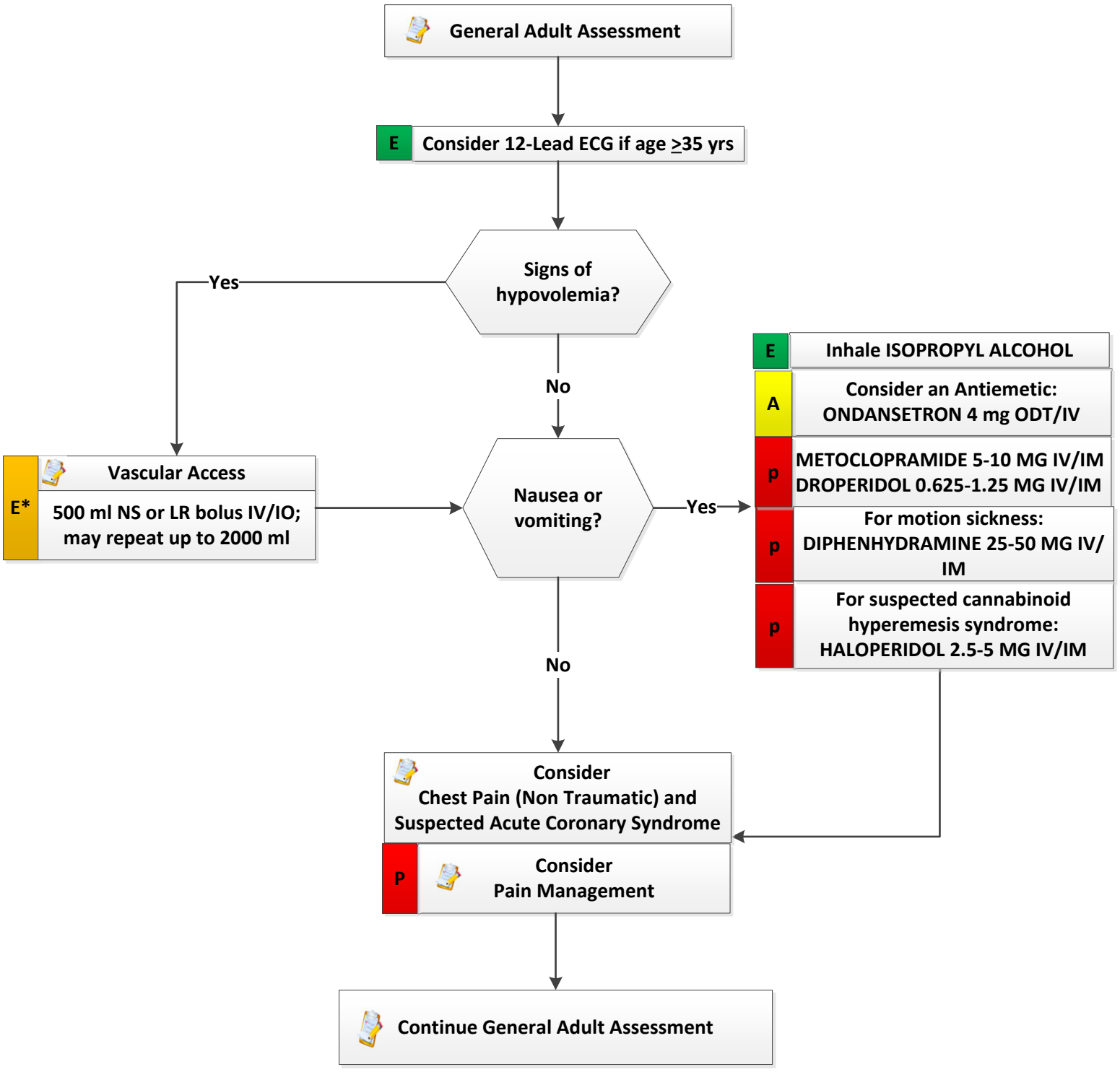
History
- Time and mechanism of injury
- Damage to structure or vehicle
- Location in structure or vehicle
- Others injured or dead
- Speed and details of MVC
- Restraints/protective equipment
- Past medical history
- Medications

Signs and Symptoms
- DCAP-BTLS
- AMS or unconscious
- Hypotension or shock
- Arrest

Differential (life threatening)
- Tension pneumothorax
- Flail chest
- Pericardial tamponade
- Open chest wound
- Hemothorax
- Intra-abdominal bleeding
- Pelvis/femur fracture
- Spine fracture/cord injury
- Head injury
- Extremity fracture
- HEENT (airway obstruction)
- Hypothermia

Pearls
- Recommended exam: Mental Status, Skin, HEENT, Heart, Lung, Abdomen, Extremities, Back, Neuro.
- Transport destination is based on the Trauma Field Triage Criteria Guideline.
- Transport should not be delayed for procedures; ideally procedures should be performed enroute when possible. Target scene time less than 10 minutes for unstable patients or those likely to need surgical intervention.
- BVM is an acceptable method of ventilating and managing an airway if pulse oximetry can be maintained ≥90%. Consider airway adjuncts as appropriate avoiding nasal airway adjuncts in patents with oral or other facial injuries.
- Head injury: target SBP greater than 110 mmHg. Hypotension should be avoided to maintain cerebral perfusion.
- TRANEXAMIC ACID (TXA) administration may be considered within three hours of injury and signs of hemorrhagic shock.
- If pelvis is unstable, place pelvic binder or sheet to stabilize pelvis .
- Geriatric patients should be evaluated with a high index of suspicion; occult injuries may be present and geriatric patients can decompensate quickly.

Abdominal / Flank Pain, Nausea & Vomiting



History
- Age
- Medical/surgical history
- Onset
- Quality
- Severity
- Fever
- Menstrual history

Signs and Symptoms
- Pain location
- Tenderness
- Nausea
- Vomiting
- Diarrhea
- Dysuria
- Constipation
- Vaginal bleeding/discharge
- Pregnancy

Differential
- Liver (Hepatitis)
- Gastritis, PUD
- Gallbladder
- MI
- Pancreatitis
- Kidney stone
- Abdominal aneurysm
- Appendicitis
- Bladder/prostate disorder
- Pelvic (PID, ectopic pregnancy, ovarian cyst)
- Spleen enlargement
- Bowel obstruction
- Gastroenteritis
- Ovarian and testicular torsion

Pearls
- Recommended Exam: Mental Status, Skin, HEENT, Heart, Lung, Abdomen, Back, Extremities, Neuro.
- Neuro disorders or signs of hypoperfusion/shock in the presence of abdominal pain may indicate an aneurysm.
- Document mental status and vital signs prior to administration of antiemetics & pain management.
- Repeat vital signs after each fluid bolus
- In patients ≥35 years old consider cardiac origin. Perform a 12-Lead ECG.
- Consider retroperitoneal palpation for kidney pain.
- Abdominal pain in women of childbearing age should be considered pregnancy until proven otherwise.
- Nausea and vomiting are symptoms of illness – in addition to treating the patient's nausea and vomiting a thorough history and physical are key to identifying what may be a disease in need of emergent treatment (e.g., bowel obstruction, myocardial infarction, pregnancy).
- For nausea/vomiting during pregnancy, preference is METOCLOPROMIDE and/or DIPHENYDRAMINE (both FDA pregnancy category B).
- Abdominal pain in older adults, patients with bleeding disorders, patients on anticoagulation medications, and patients that are immunocompromised may be a harbinger for severe illness.

Dystonic Reaction / Extrapyramidal Symptoms
- Condition causing involuntary muscle movements or spasms typically of the face, neck and upper extremities.
- Typically an adverse reaction to drugs such as METOCLOPROMIDE or DROPERIDOL.
- When recognized, administer DIPHENYDRAMINE 25-50 mg IM/IV.

Allergic Reaction

General Adult Assessment

Evidence of anaphylaxis?

No (Mild)

E* Vascular Access

E* A DIPHENHYDRAMINE 25-50 mg PO

P DIPHENHYDRAMINE 25-50 mg IM/IV

Reassess patient q 5 min

Yes (Moderate/Severe)

EPINEPHRINE

FR Patient prescribed EpiPen

E EPINEPHRINE 1:1000, 0.3 - 0.5 mg IM; may repeat q 15 min

BREATHING TREATMENT

E ALBUTEROL 2.5 mg in 3 ml SVN, repeat as needed +/- IPRATROPIUM 500 mcg SVN once

E* A DIPHENHYDRAMINE 50 mg PO

E* Vascular access 500 ml LR or NS bolus IV/IO; may repeat up to 2000 ml

P DIPHENHYDRAMINE 50 mg IM/IV

P Ventilation Management

Cardiac monitor

Pt in persistent shock? If Yes, then

P PUSH DOSE EPINEPHRINE 1:100,000 10 mcg IV/IO, may repeat q 2-5 min to maintain SBP>90 (1 ml of 1:100,000 solution) AND/OR EPINEPHRINE 0.5 mcg/kg/min IV drip

Allergic Reaction – mild immune response to an allergen with symptoms such as hives or local swelling/itching.

Anaphylaxis – moderate/severe reaction meeting either of these criteria:

- Exposure to known or likely allergen with hypotension OR respiratory compromise
- Two or more of the following after exposure to likely allergen: skin/mucosal changes (hives, flushing, edema); respiratory compromise (SOB, wheezing, stridor, hypoxia); hypotension or signs of shock; persistent GI symptoms (abdominal pain, vomiting)

Continue General Adult Assessment

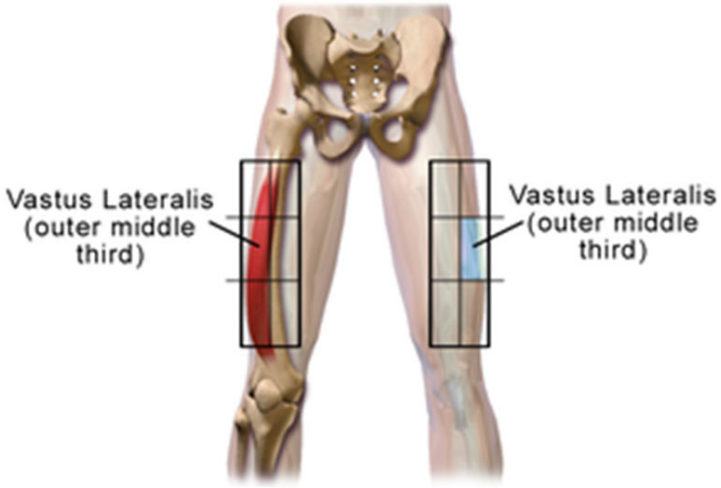
History
- Onset and location
- Insect sting or bite
- Food allergy/exposure
- Medication allergy/exposure
- New clothing, soap, detergent
- Past history of reactions
- Past medical history
- Medication history

Signs and Symptoms
- Itching or hives
- Coughing/wheezing or respiratory distress
- Throat or chest constriction
- Difficulty swallowing
- Hypotension/shock
- Edema
- Nausea/vomiting

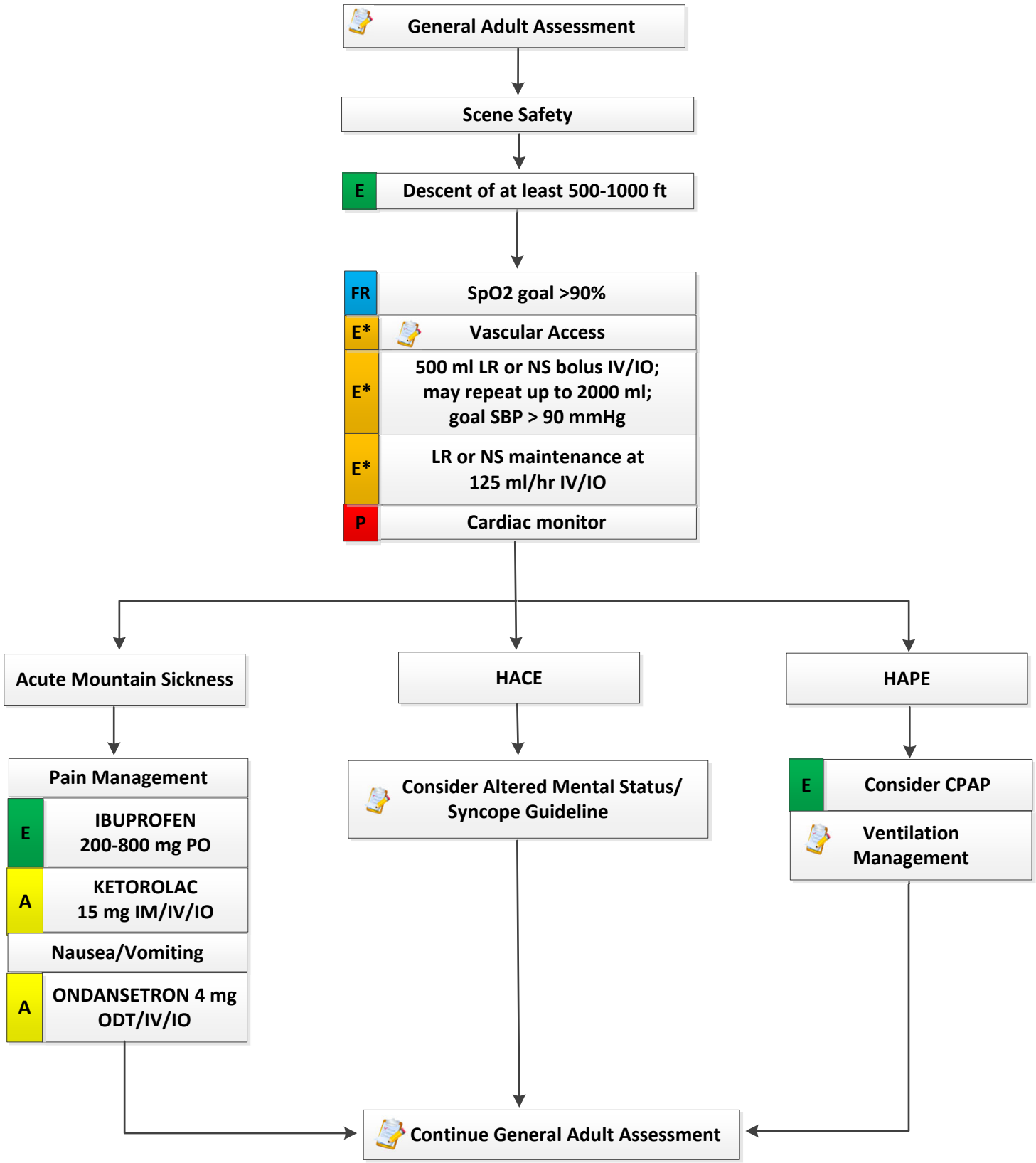
Differential
- Urticarial (rash only)
- Anaphylaxis (systemic effect)
- Shock (vascular effect)
- Angioedema (drug induced)
- Aspiration/airway obstruction
- Asthma/COPD
- CHF

Pearls
- Recommended Exam: Mental Status, Skin, Heart, Lung.
- Anaphylaxis is an acute and potentially lethal multisystem allergic reaction.
- EPINEPHRINE is the first-line drug that should be administered in acute anaphylaxis (moderate / severe symptoms).
- IM EPINEPHRINE (1:1,000) should be administered in priority before or during attempts at IV or IO access.
- Never give EPINEPHRINE 1:1000 (IM concentration) through IV/IO route.
- IM EPINEPHRINE should be administered in the anterolateral thigh (vastus lateralis) as produces the most rapid rise in serum level.
- There are no absolute contraindications to EPINEPHRINE. Use with caution in elderly patients, patients with known cardiovascular disease, or significant tachycardia or hypertension.
- Contact Medical Control for refractory anaphylaxis.
- Consider ETCO2 monitoring.
- Hypovolemia or distributive shock should be addressed with a fluid bolus prior to the administration of push-dose pressors.
- Remove trigger if still present (sting, food, etc)
- Always perform ECG monitoring when administering EPINEPHRINE.
- Contrary to common belief that all cases of anaphylaxis present with cutaneous manifestations, such as urticaria or mucocutaneous swelling, a significant portion of anaphylactic episodes may not involve these signs and symptoms on initial presentation.
- There is no proven benefit to using steroids in the management of allergic reactions and/or anaphylaxis

QI Metrics:
- EPINEPHRINE given appropriately.
- Airway assessment documented.



Altitude Illness



History
- Altitude of home residence
- Duration of ascent to elevation
- Prophylaxis against altitude (ibuprofen, acetazolamide, sildenafil)
- Past medical history

Signs and Symptoms
- Headache
- Anorexia
- Nausea, vomiting
- Fatigue, weakness
- Dizziness, lightheadedness
- Difficulty sleeping
- Dyspnea, cough
- Altered mentation
- Ataxia
- Stupor, coma

Differential
- Carbon monoxide poisoning
- Dehydration
- Exhaustion
- Hypoglycemia
- Hyponatremia
- Tension headache, migraine headache
- CHF
- Flash pulmonary edema
- Metabolic encephalopathy

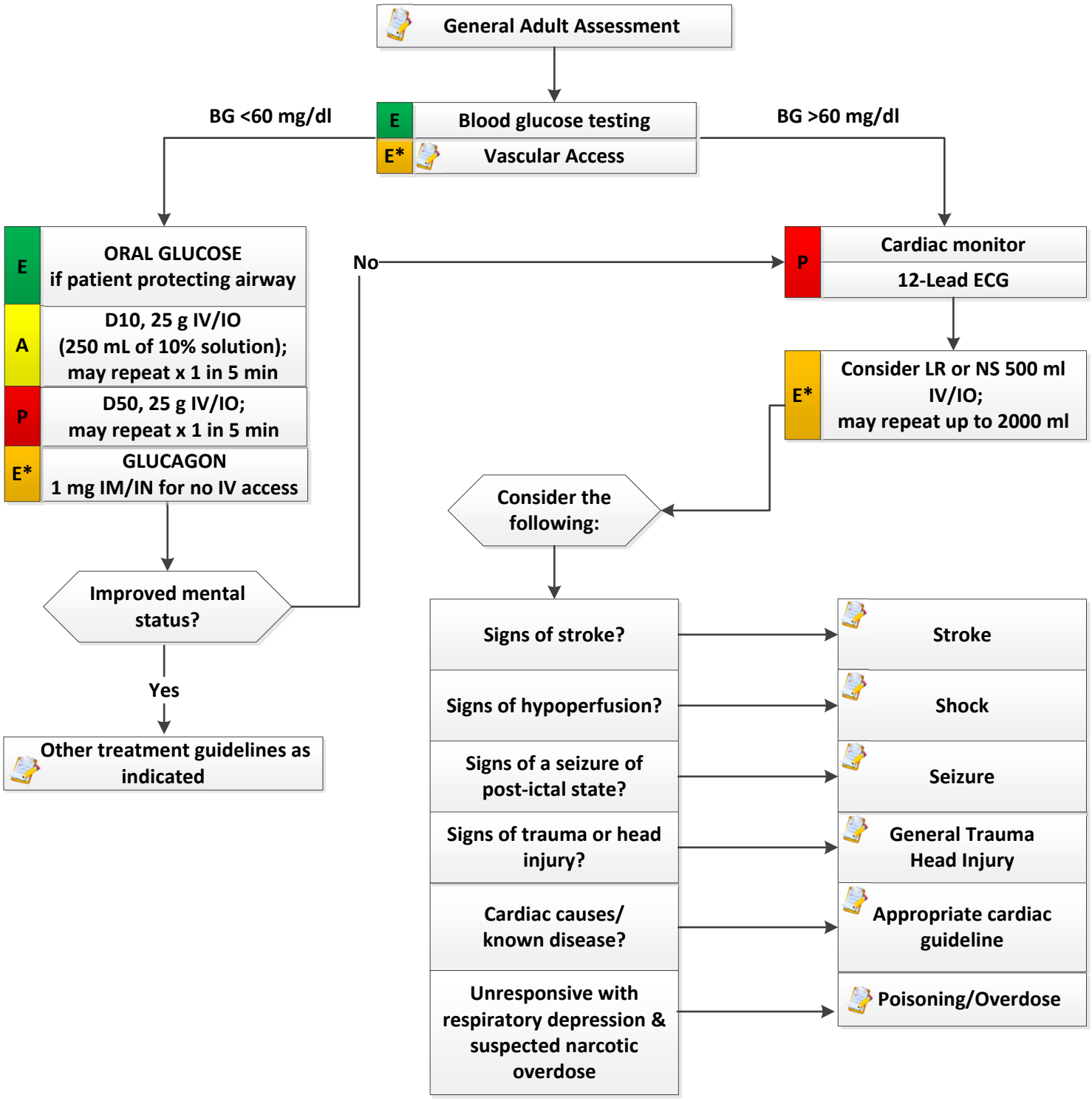
Pearls
- Recommended Exam: Mental Status, Heart, Lung, Neuro.
- Descent is the mainstay of therapy and is the definitive therapy for all altitude related illnesses.
- Descent should always be the primary treatment strategy for patients suffering from altitude illness, especially patients suffering from HACE and HAPE.
- Descent of 500–1000 feet is often enough to see improvements in patient conditions.
- The high-altitude environment is inherently dangerous. Rescuers must balance patient needs with patient safety and safety for the responders.
- Rapid descent by a minimum of 500–1000 feet is a priority, however rapidity of descent must be balanced by current environmental conditions and other safety considerations.
- Patients with HAPE are suffering from non-cardiogenic pulmonary edema and may benefit from positive pressure ventilation via either bag assisted ventilation, CPAP, or other means of positive pressure ventilation.
- Patients suffering from altitude illness are commonly dehydrated and require IV fluids — once resuscitation is complete and the patient requires no further fluid boluses, maintain IV fluids at 125 mL/hr.
- HAPE is the most lethal of all altitude illnesses.

Acute mountain sickness:
- Headache plus one or more of the following: anorexia, nausea or vomiting, fatigue or weakness, dizziness or lightheadedness or difficulty sleeping.
- In infants and young children, symptoms include pallor, fussiness, vomiting, decreased appetite, poor sleep, decreased playfulness.
- These symptoms must occur in the setting of recent arrival to high altitude (generally considered greater than 5000 – 7000 feet).

High altitude pulmonary edema (HAPE):
- Progressive dyspnea, cough, hypoxia, and weakness in high altitude environments (considered greater than 8000 feet).
- In infants and young children, symptoms again include pallor, fussiness, vomiting, decreased appetite, poor sleep, decreased playfulness.
- Patients may or may not exhibit new symptoms if acute mountain sickness precedes symptoms of HAPE.

High altitude cerebral edema (HACE):
- Heralded by mental status changes in patients with symptoms of acute mountain sickness including altered mentation, ataxia, or stupor and progressing to coma.
- Typically seen in high altitude environments (greater than 8000 feet).

Altered Mental Status / Syncope



History
- Known diabetic, Medic Alert tag
- Drugs or drug paraphernalia
- Report of drug use or toxic ingestion
- Past medical history
- Medications
- History of trauma
- Change in condition
- Changes in feeding or sleep habits

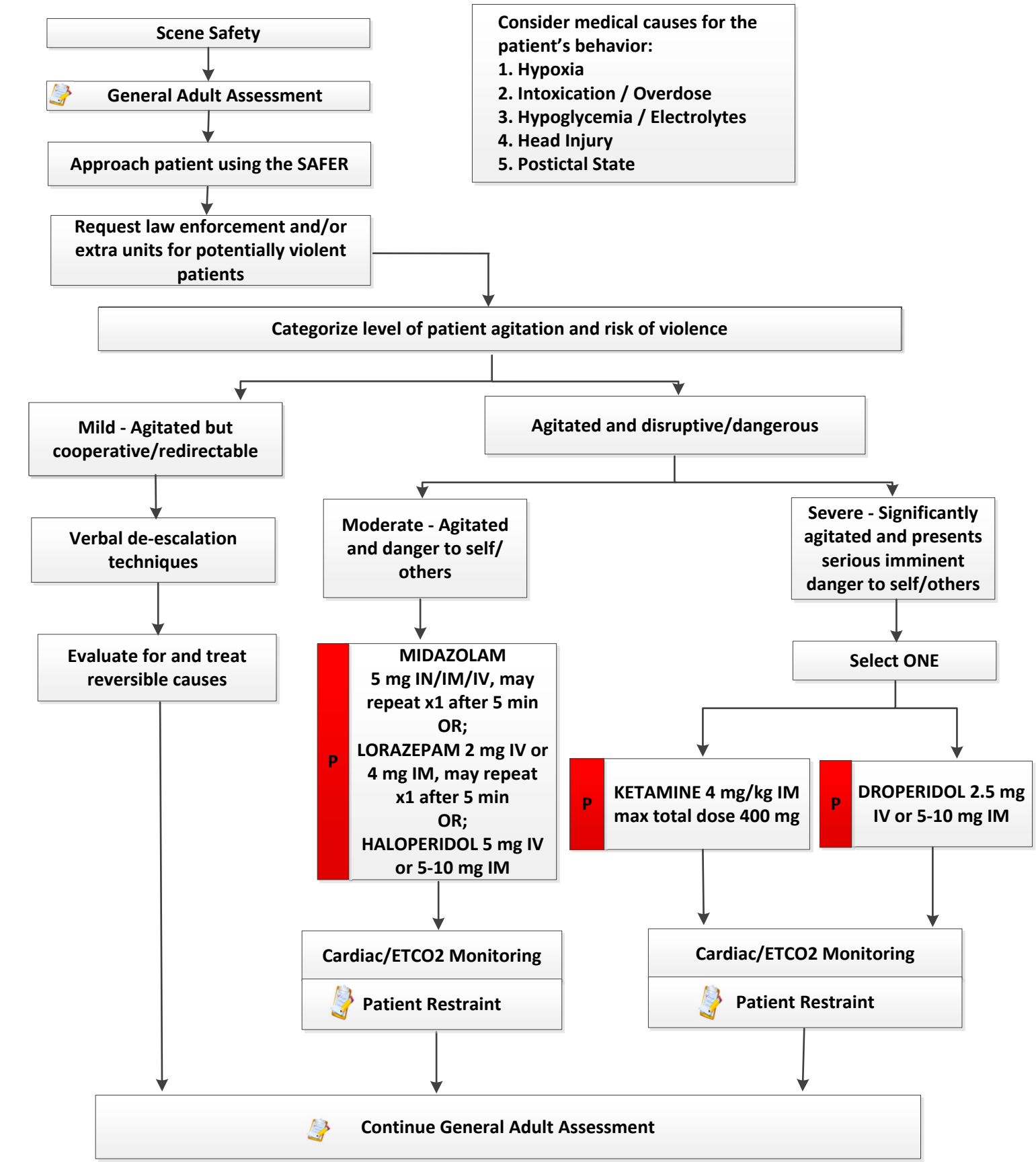
Signs and Symptoms
- Decreased mental status or lethargy
- Changes in baseline mental status
- Bizarre behavior
- Hypoglycemia
- Hyperglycemia
- Irritability
- Breath odor
- Track marks
- Evidence of trauma

Differential
- Head trauma
- CNS (stroke, tumor, seizure, infection)
- Cardiac (MI, CHF)
- Hypothermia
- Infection
- Thyroid
- Shock (septic, metabolic, traumatic)
- Diabetes
- Toxicological or ingestion
- Acidosis/Alkalosis
- Environmental exposure
- Hypoxia
- Electrolyte abnormality
- Psychiatric disorder

Pearls
- Recommended Exam: Mental Status, HEENT, Skin, Heart, Lung, Abdomen, Back Extremities, Neuro.
- Preference is to administer D10. May administer D50 if D10 is not available. DEXTROSE 50% can cause local tissue damage if it extravasates from vein and may cause hyperglycemia.
- Hypoglycemic patients who have had a seizure should be transported to the hospital regardless of their mental status and response to therapy.
- Sulfonylureas (e.g., glyburide, glipizide) have long half-lives ranging from 12–60 hrs. Patients with corrected hypoglycemia who are taking these agents are at particular risk for recurrent symptoms and frequently require hospital admission.
- Pay careful attention to the head exam for signs of injury.
- With depressed mental status, initial focus is on airway protection, oxygenation, ventilation, and perfusion.
- Be aware of AMS as presenting sign of an environmental toxin or Haz-Mat exposure, and protect personal safety and that of other responders.
- Do not let alcohol confuse the clinical picture; alcohol is not commonly a cause of total unresponsiveness to pain.
- If narcotic overdose or hypoglycemia is suspected, administer NARCAN 0.4-2mg or GLUCOSE prior to advanced airway procedures.

AMS differential – mnemonic **AEIOU-TIPS**:
A – Alcohol, Abuse, Atypical migraine
E – Epilepsy, Electrolytes
I – Insulin (hypoglycemia)
O – Oxygen, Overdose
U – Uremia (kidney failure)
T – Trauma, Tumor
I – Infection
P – Psych, Poisoning
S – Seizure, Subarachnoid hemorrhage, Sepsis

Behavioral Emergency



History
- Situational crisis
- Psychiatric illness/medications
- Injury to self or threats to others
- Medic Alert tag
- Substance abuse/overdose
- Diabetes
- Seizure history

Signs and Symptoms
- Anxiety, agitation, confusion
- Affect change, hallucinations
- Delusional thoughts, bizarre behavior
- Combative, violent
- Expression of suicidal/ homicidal thoughts

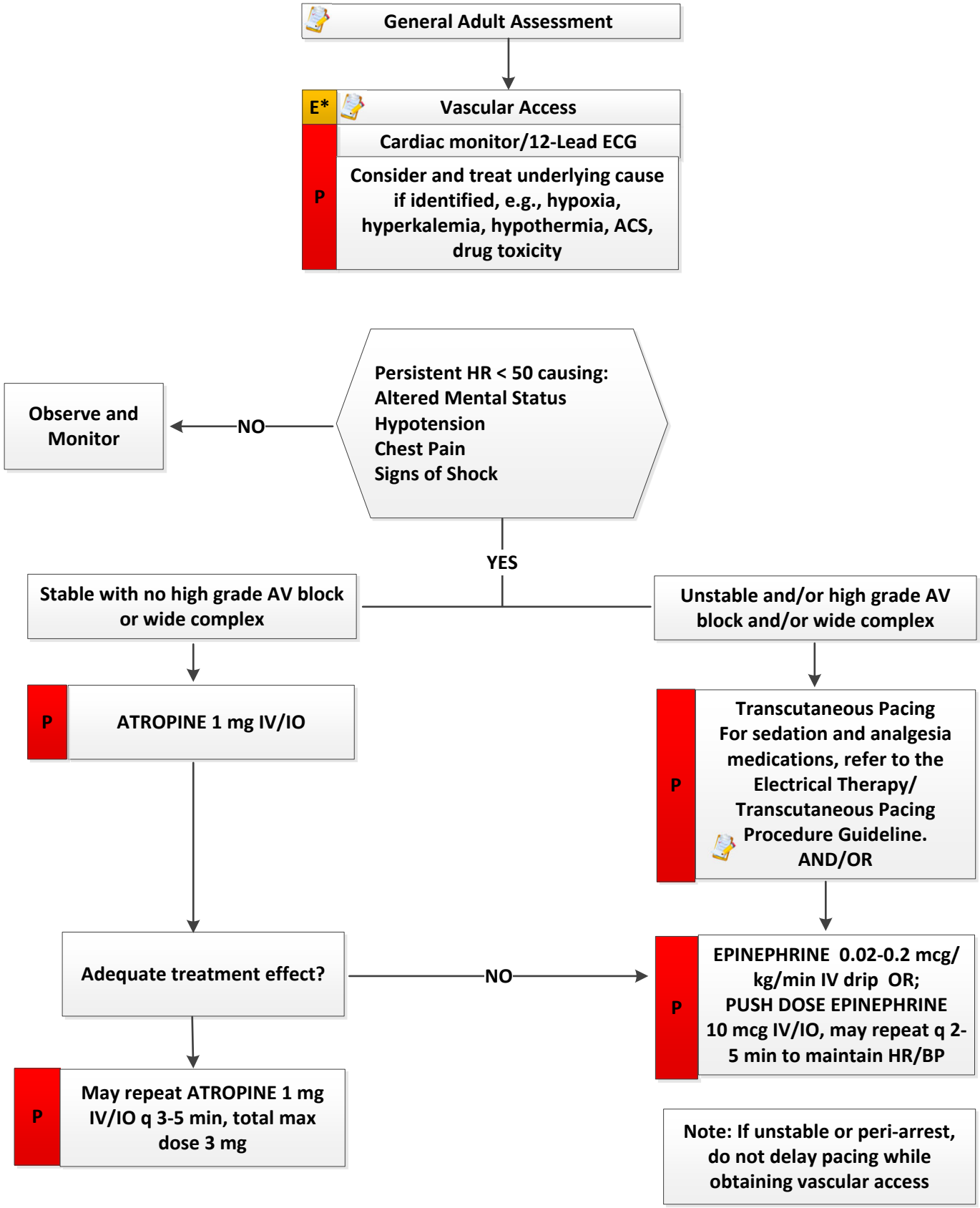
Differential
- AMS differential
- Hypoglycemia
- Postictal state
- Alcohol intoxication
- Toxin/substance abuse
- Medication effect or overdose
- Withdrawal syndromes
- Depression
- Bipolar
- Schizophrenia
- Anxiety disorder

Pearls
- **Pharmacological sedation is a medical procedure that results from a medical assessment. Sedation is never to be utilized to control behavior for the purpose of law enforcement initiatives or assistance.**
- **Law enforcement assistance should be requested on all calls involving potentially violent patients.**
- **Under no circumstances are patients to be transported restrained in the prone position.**
- **Patients may not be transported with their arms restrained behind their back or in an ankle-to-wrist (hog-tied) manner.**
- The clinician should be ready to resuscitate the patient in case of inadvertent changes in respiratory or hemodynamic status. Patients should be continuously monitored with all available adjuncts when possible, including HR, ECG, RR, SpO2, BP, ETCO2, perfusion state, mental state.
- Physical restraints, including gurney straps, should never restrict chest wall movement.
- Law enforcement MUST accompany the patient in the back of the ambulance if in handcuffs and/or The Wrap.
- Patients expressing suicidal or homicidal ideation or who are otherwise a danger to themselves or others may not refuse transport. Contact law enforcement if necessary to initiate legal hold.
- EMS providers are not to remove taser darts unless there is a need to do so to administer medical care. Dart removal is part of the education to use the device and is the responsibility of the person or agency who deploys the device.

Dystonic Reaction
- Condition causing involuntary muscle movements or spasms typically of the face, neck and upper extremities.
- Typically an adverse reaction to drugs such as HALOPERIDOL (may occur with administration).
- When recognized, administer DIPHENYDRAMINE 50 mg IM/IV/IO.

S.A.F.E.R.
- **S**tabilize the situation by containing and lowering the stimuli.
- **A**ssess and acknowledge the crisis.
- **F**acilitate the identification and activation of resources (chaplain, family, friends or police).
- **E**ncourage patient to use resources and take actions in his/her best interest.
- **R**ecovery or referral – leave patient in care of responsible person or professional, or transport to appropriate facility.

Bradycardia



History
- Past medical history
- Medications (AV nodal blockers)
- Pacemaker

Signs and Symptoms
- HR <60/min with hypotension, acute AMS, chest pain, acute CHF, seizures, syncope, or shock secondary to bradycardia
- Respiratory distress

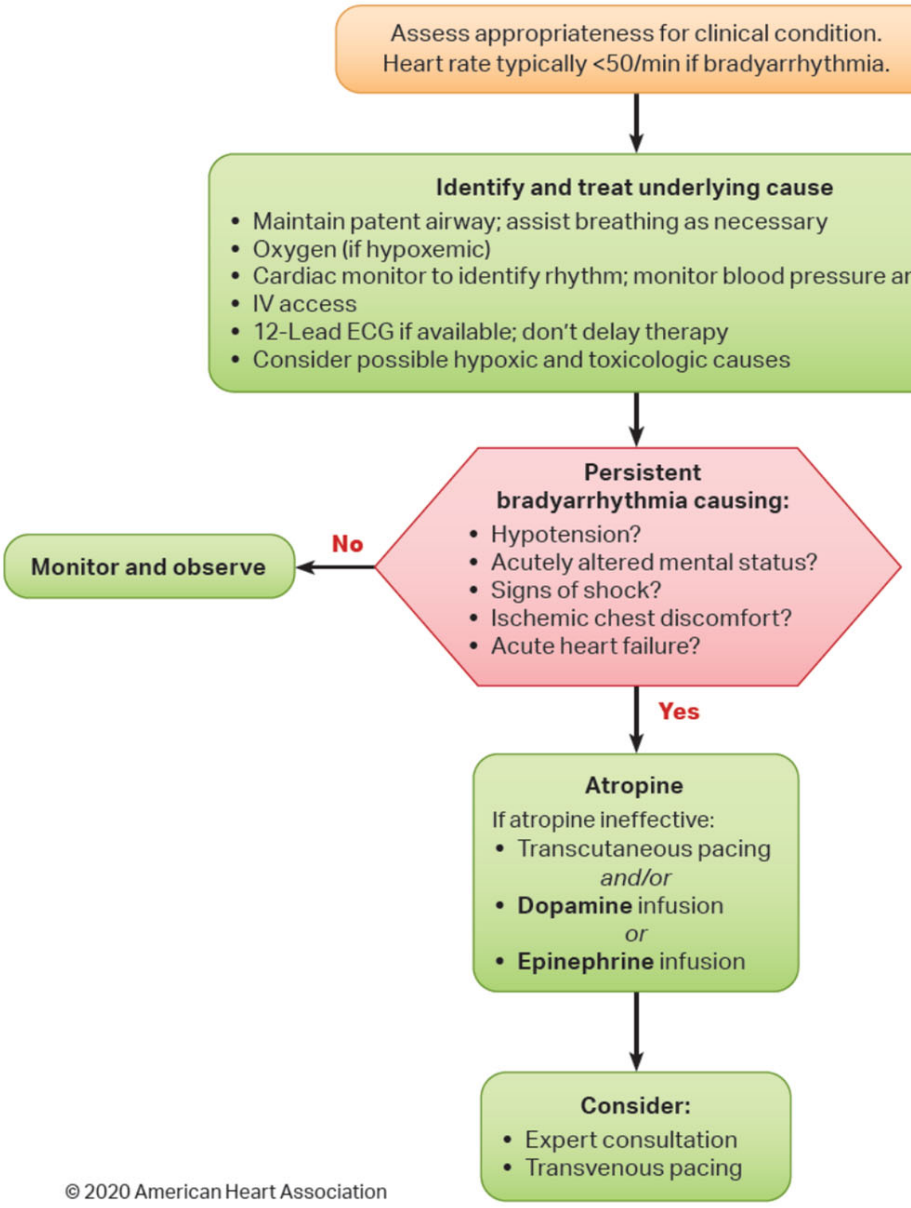
Differential
- Acute myocardial infarction
- Hypoxia
- Pacemaker failure
- Hypothermia
- Sinus bradycardia
- Athletic
- Head injury (elevated ICP) or stroke
- Spinal cord lesion
- Sick sinus syndrome
- AV block
- Overdose / Toxin exposure
- Shock
- Electrolyte disorder

Pearls
- Recommended Exam: Mental Status, HEENT, Heart, Lung, Neuro.
- Identifying signs and symptoms of poor perfusion caused by bradycardia are paramount. Treatment should only be given when patient is symptomatic due to bradycardia. Athletes, patients on beta blockers, and young healthy patients may have a slow resting heart rate at baseline.
- Do not delay pacing while waiting for IV access.
- Ensure adequate oxygenation and provide ventilatory support as needed.
- Consider hyperkalemia in patients with wide complex bradycardia.
- Atropine is unlikely to be effective and should be avoided in patients who have had a heart transplant.

QI Metrics
- High degree blocks correctly identified.
- Pacer pads on patient if ATROPINE given.
- Patient paced if appropriate.

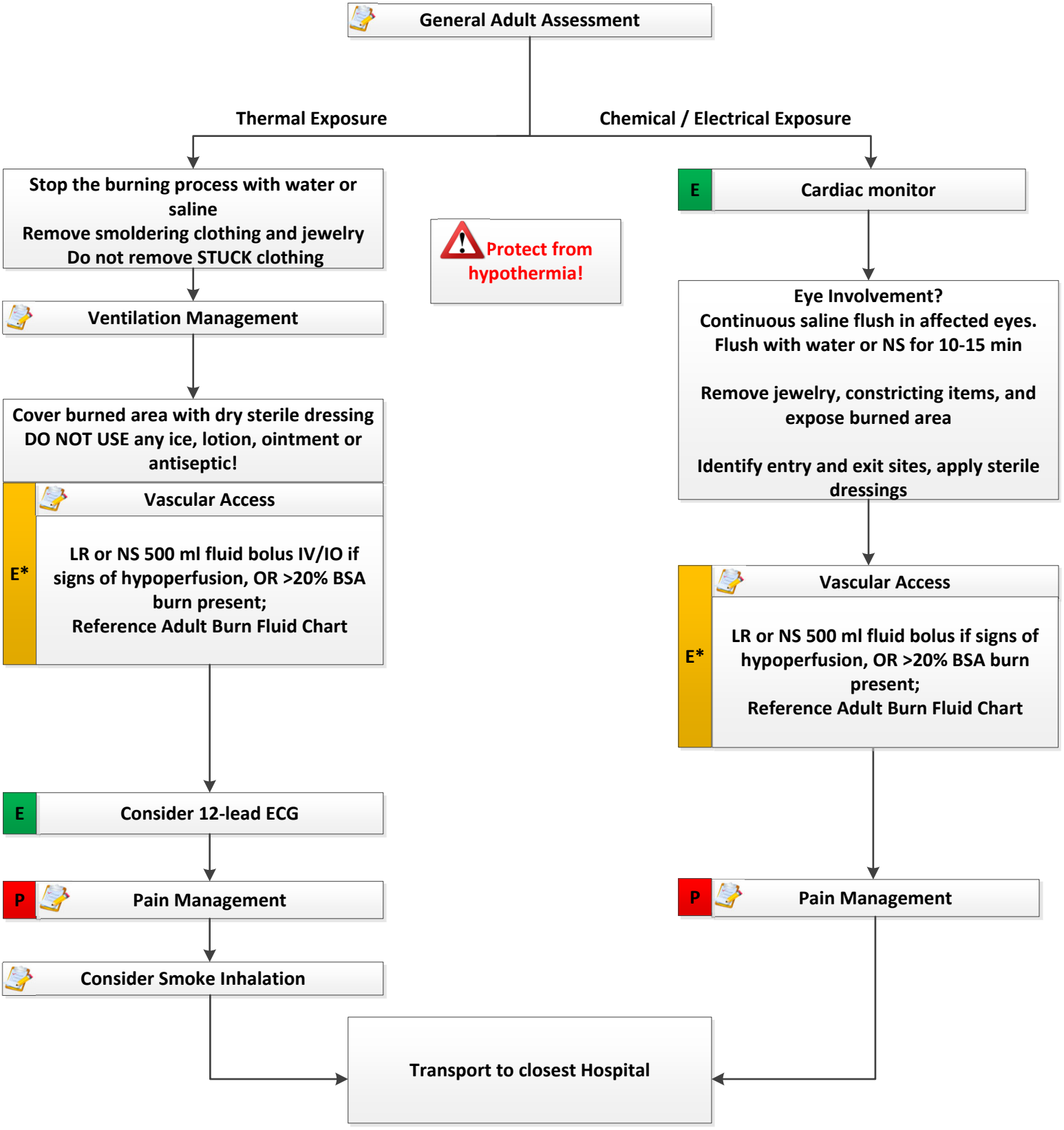
Adult Bradycardia Algorithm

Adult Bradycardia Algorithm



Doses/Details
Atropine IV dose: First dose: 1 mg bolus. Repeat every 3-5 minutes. Maximum: 3 mg.
Dopamine IV infusion: Usual infusion rate is 5-20 mcg/kg per minute. Titrate to patient response; taper slowly.
Epinephrine IV infusion: 2-10 mcg per minute infusion. Titrate to patient response.
Causes: • Myocardial ischemia/ infarction • Drugs/toxicologic (eg, calcium-channel blockers, beta blockers, digoxin) • Hypoxia • Electrolyte abnormality (eg, hyperkalemia)

Burns

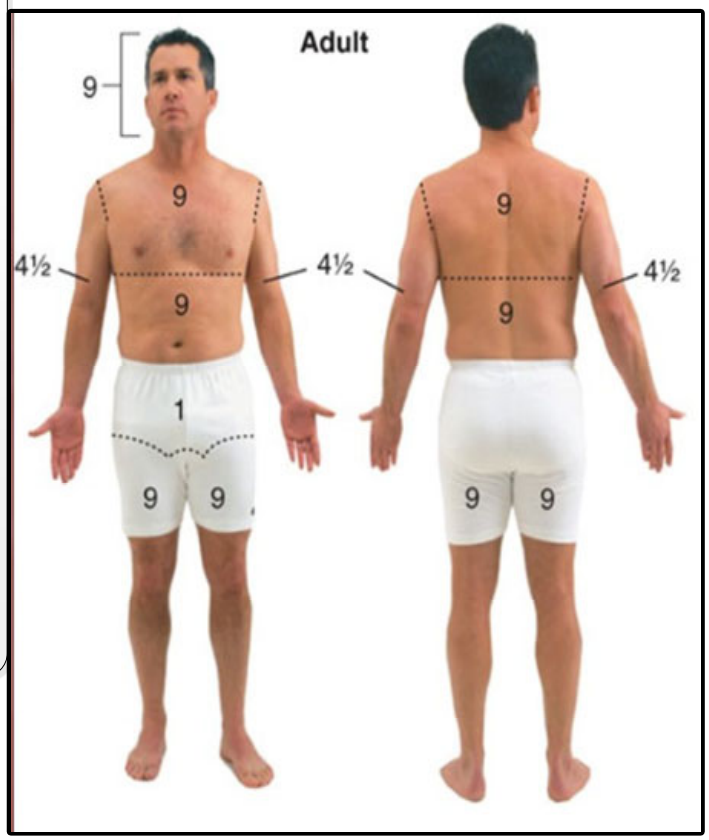

General Adult Assessment
Thermal Exposure
Chemical / Electrical Exposure
Stop the burning process with water or saline
Remove smoldering clothing and jewelry
Do not remove STUCK clothing
Protect from hypothermia!
E
Cardiac monitor
Ventilation Management
Eye Involvement?
Continuous saline flush in affected eyes. Flush with water or NS for 10-15 min
Remove jewelry, constricting items, and expose burned area
Identify entry and exit sites, apply sterile dressings
Cover burned area with dry sterile dressing
DO NOT USE any ice, lotion, ointment or antiseptic!
E*
Vascular Access
LR or NS 500 ml fluid bolus IV/IO if signs of hypoperfusion, OR >20% BSA burn present;
Reference Adult Burn Fluid Chart
E*
Vascular Access
LR or NS 500 ml fluid bolus if signs of hypoperfusion, OR >20% BSA burn present;
Reference Adult Burn Fluid Chart
E
Consider 12-lead ECG
P
Pain Management
P
Pain Management
Consider Smoke Inhalation
Transport to closest Hospital

History
- Type of exposure (heat, gas, chemical)
- Inhalational injury
- Time of injury
- Past medical history & medications
- Other trauma
- Loss of consciousness
- Tetanus/immunization status

Signs and Symptoms
- Burns, pain, swelling
- Dizziness
- Loss of consciousness
- Hypotension/shock
- Airway compromise/distress
- Wheezing
- Singed facial or nasal hair
- Hoarseness or voice changes

Differential
- Superficial (1st degree) – red and painful
- Partial Thickness (2nd degree) – blistering
- Full Thickness (3rd degree) – painless/charred or leathery skin
- Thermal
- Chemical
- Electrical
- Radiation
- Lightning

Pearls
- Burn patients are trauma patients; evaluate for multisystem trauma.
- Assure whatever has caused the burn, is no longer contacting the injury. (Stop the burning process!)
- Recommended Exam: Mental Status, HEENT, Neck, Heart, Lungs, Abdomen, Extremities, Back, Neuro.
- Consider early intubation with patients experiencing significant inhalation injuries. Consider air ambulance for airway management needs beyond the scope of the responding ground medic.
- Potential CO exposure should be treated with 100% oxygen. Pulse oximetry may not be accurate. (For patients in which the primary event is CO inhalation, transport to a hospital equipped with a hyperbaric chamber is indicated [when reasonably accessible].)
- Circumferential burns to extremities are dangerous due to potential vascular compromise secondary to soft tissue swelling. Elevate extremity.
- Burn patients are prone to hypothermia - never apply ice or cool burns; must maintain normal body temperature.
- Consider $ETCO_2$ monitoring.
- Have a high index of suspicion for cyanide poisoning in a patient with depressed GCS, respiratory difficulty, and cardiovascular collapse in the setting of an enclosed-space fire. Give antidote (hydroxocobalamin), if available, in this circumstance



Early Intubation Indications
- Signs of Airway Obstruction
- Hoarseness, Stridor, Dysphagia
- Extensive Deep Facial Burns
- Significant Risk of Edema
- Burns in Mouth
- Total BSA ≥ 40%
- Signs of Respiratory Compromise
  - Accessory Muscle Use
  - Inability to Clear Secretions
  - Poor Oxygenation
- Altered Mentation

Patients meeting the following criteria shall be transported to the closest appropriate Burn Care Center:
1. Second degree burns >10% body surface area (BSA).
2. Any Third degree burns.
3. Burns that involve the face, hands, feet, genitalia, perineum, or major joints.
4. Electrical burns including lightning injury.
5. Chemical burns.
6. Circumferential burns.
7. Inhalation burns.
8. Burn injury with concomitant trauma

Pearls (Electrical)
- Do not contact the patient until you are certain the source of the electric shock has been disconnected.
- Attempt to locate contact points, (entry wound where the AC source contacted the patient; an exit at the ground point); both sites will generally be full thickness.
- Cardiac monitor; anticipate ventricular or atrial irregularity to include V-Tach, V-Fib, heart blocks, etc.
- Attempt to identify the nature of the electrical source (AC vs DC), the amount of voltage and the amperage the patient may have been exposed to during the electrical shock.

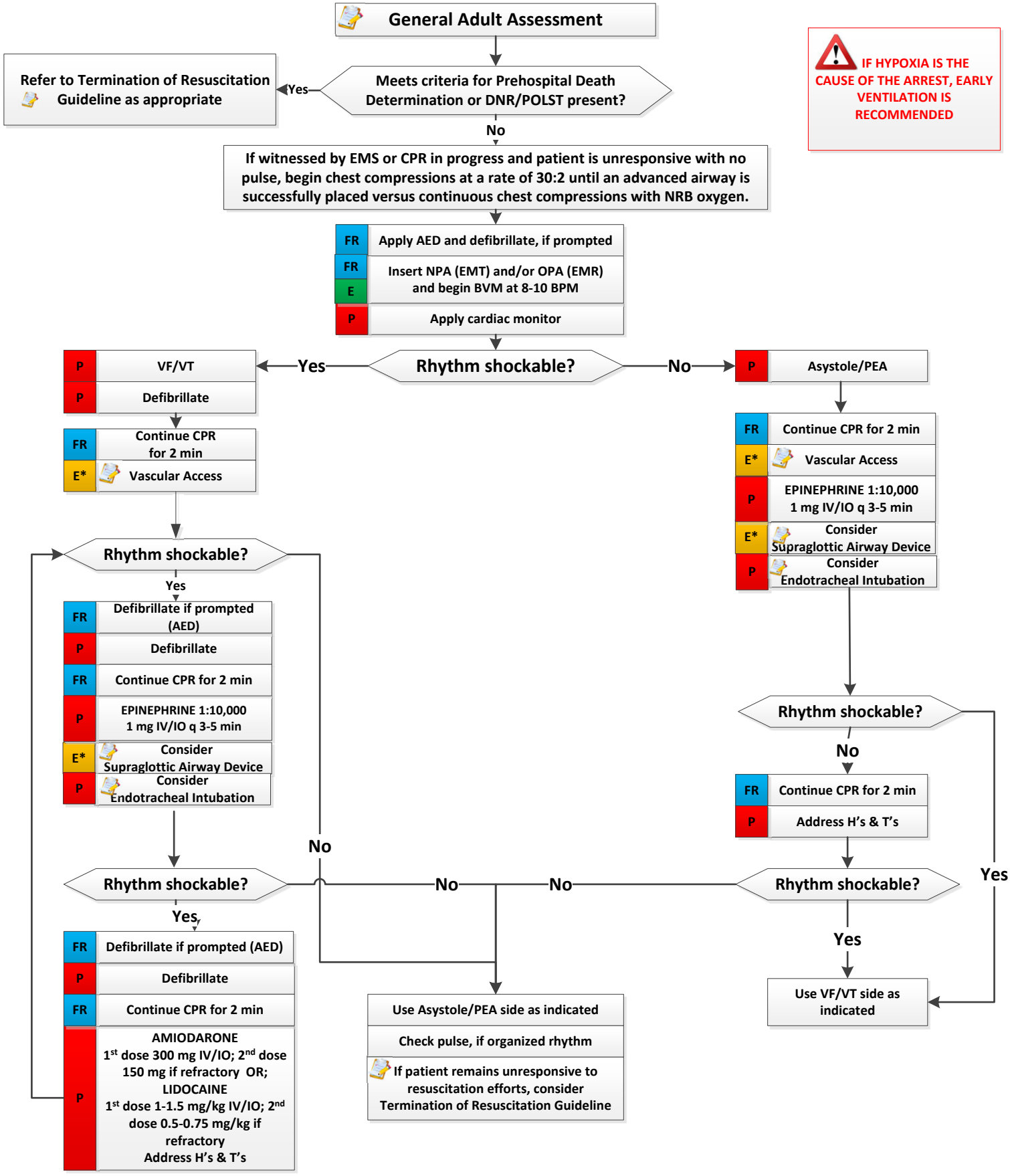
Pearls (Chemical)
- Certainly 0.9% NaCl Sol'n or Sterile Water is preferred; however if it is not readily available, do not delay; use tap water for flushing the affected area or other immediate water sources. Flush the area as soon as possible with the cleanest, readily available water or saline solution using copious amounts of fluids.

Burn Injury IV Fluid Rates
Infusion Rate > 30 KG
Parkland Formula

*Fluid of choice LR/NS, DO NOT use dextrose containing fluids

Wt (lbs)	Wt (kg)	% TBSA	/Hr for 1st 8 Hrs of care	60 gtt set, gtt/min	20 gtt set, gtt/min	15 gtt set, gtt/min	10 gtt set, gtt/min
66	30	10	75	75	25.0	18.8	12.5
66	30	20	150	150	50.0	37.5	25.0
66	30	30	225	225	75.0	56.3	37.5
66	30	40	300	300	100.0	75.0	50.0
66	30	50	375	375	125.0	93.8	62.5
66	30	60	450	450	150.0	112.6	75.0
88	40	10	100	100	33.3	25.0	16.7
88	40	20	200	200	66.7	50.0	33.3
88	40	30	300	300	100.0	75.0	50.0
88	40	40	400	400	133.3	100.0	66.7
88	40	50	500	500	166.7	125.00	83.3
88	40	60	600	600	200.0	150.0	100.0
110	50	10	125	125	41.7	31.3	20.8
110	50	20	250	250	83.3	62.5	41.7
110	50	30	375	375	125.0	93.8	62.5
110	50	40	500	500	166.7	125.0	83.3
110	50	50	625	625	208.3	156.3	104.2
110	50	60	750	750	250.0	187.6	125.0
132	60	10	150	150	50.0	37.5	25.0
132	60	20	300	300	100.0	75.0	50.0
132	60	30	450	450	150.0	112.5	75.0
132	60	40	600	600	200.0	150.0	100.0
132	60	50	750	750	250.0	187.5	125.0
132	60	60	900	900	300.0	225.0	150.0
154	70	10	175	175	58.3	43.8	29.2
154	70	20	350	350	116.7	87.5	58.3
154	70	30	525	525	175.0	131.3	87.5
154	70	40	700	700	233.3	175.0	116.7
154	70	50	875	875	291.7	218.8	145.8
154	70	60	1050	1050	350.0	262.6	175.0
176	80	10	200	200	66.7	50.0	33.3
176	80	20	400	400	133.3	100.0	66.7
176	80	30	600	600	200.0	150.0	100.0
176	80	40	800	800	266.7	200.0	133.3
176	80	50	1000	1000	333.3	250.0	166.7
176	80	60	1200	1200	400.0	300.0	200.0
198	90	10	225	225	75.0	56.3	37.5
198	90	20	450	450	150.0	112.5	75.0
198	90	30	675	675	225.0	168.8	112.5
198	90	40	900	900	300.0	225.0	150.0
198	90	50	1125	1125	375.0	281.3	187.5
198	90	60	1350	1350	450.0	337.6	225.0
220	100	10	250	250	83.3	62.5	41.7
220	100	20	500	500	166.7	125.0	83.3
220	100	30	750	750	250.0	187.5	125.0
220	100	40	1000	1000	333.3	250.0	166.7
220	100	50	1250	1250	416.7	312.5	208.3
220	100	60	1500	1500	500.0	375.0	250.0
242	110	10	275	275	91.6	68.7	45.9
242	110	20	550	550	183.4	137.5	91.6
242	110	30	825	825	275	206.2	137.5
242	110	40	1100	1100	366.6	275.0	183.4
242	110	50	1375	1375	458.4	343.7	229.1
242	110	60	1650	1650	550.0	412.4	275
264	120	10	300	300	99.9	74.9	50.1
264	120	20	600	600	200.1	150.0	99.9
264	120	30	825	825	300.0	224.9	150.0
264	120	40	1200	1200	399.9	300.0	200.1
264	120	50	1500	1500	500.1	374.9	249.9
264	120	60	1650	1650	600.0	449.8	300

Cardiac Arrest (Non-Traumatic)



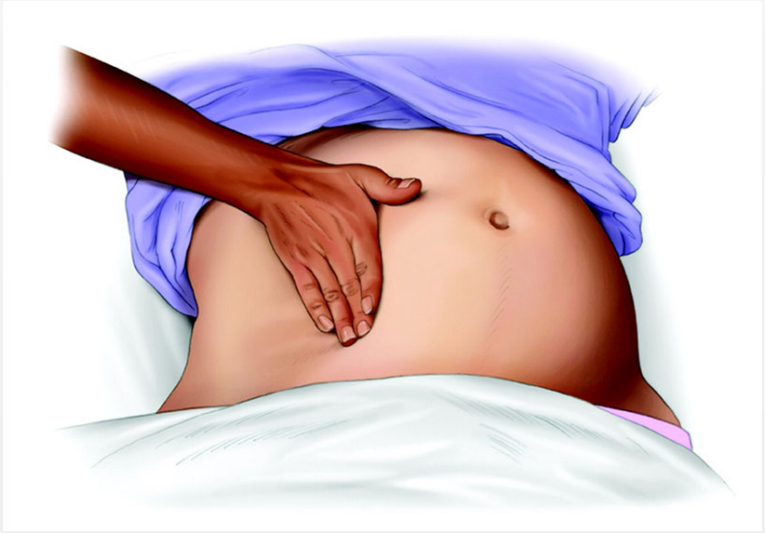
History
- Events leading to arrest
- Estimated down time
- Past medical history
- Medications
- Existence of terminal illness

Signs and Symptoms
- Unresponsive
- Apneic
- Pulseless

Differential
- Medical vs. Trauma
- VF vs. Pulseless VT
- Asystole
- PEA
- Primary cardiac event vs. respiratory or drug overdose

Pearls

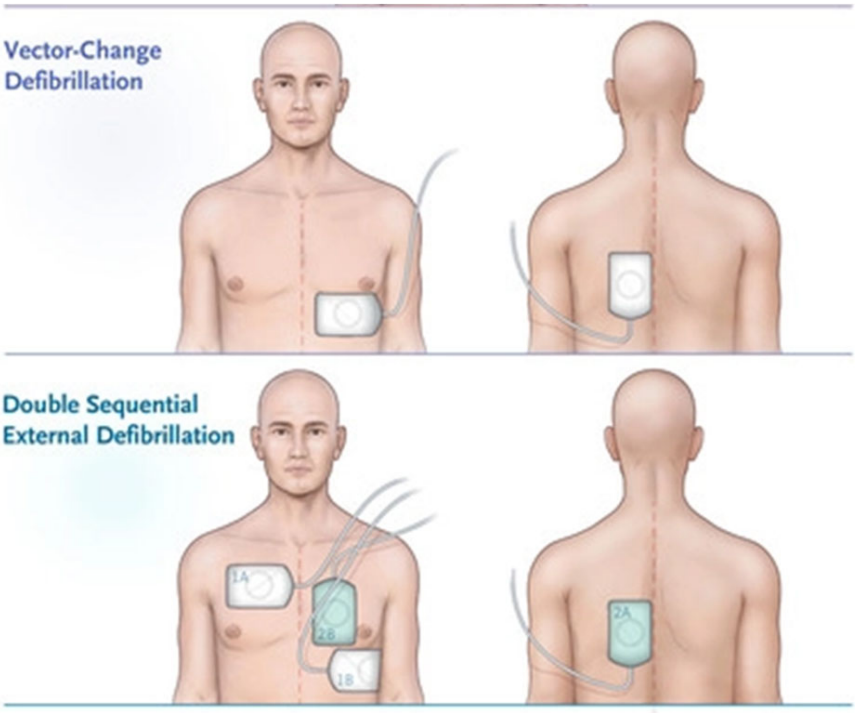
- Efforts should be directed at high quality and continuous compressions with limited interruptions and early defibrillation when indicated. Crews should consider using a "pit crew" approach with predefined roles and crew resource management principles. Strongly consider initial anterior-posterior pad placement due to superior rates of successful defibrillation.
- Consider early IO placement if IV is difficult.
- Ventilation rate should be 8-10 breaths per minute. Hyperventilation can worsen patient outcomes.
- Continuous waveform capnography should be monitored throughout resuscitation for confirmation and monitoring of advanced airways (when present), as well as monitoring effectiveness of chest compressions.
- Mechanical chest compression devices may be utilized if available. If utilized, the mechanical CPR device should be applied in a manner that minimizes interruptions in compressions, keeping breaks in CPR to less than 10 seconds. Use mechanical CPR devices per manufacturer's guidelines. Manual CPR must be initiated before the application of a CPR device. Ideally, complete 2 rounds of manual compressions before application.
- **Do not give further doses of EPINEPHRINE beyond 3 mg in cardiac arrest.**
- Consider vector change or dual sequential defibrillation for refractory v-fib. See diagragm on next page.
- If obtain ROSC, take a moment to stabilize the patient (i.e. NOREPINEPHRINE drip, advanced airway, IV access, etc.) before initiating transport.
- If obtain ROSC in v-fib/v-tach arrest PRIOR to giving first dose of AMIODARONE, administer AMIODARONE 150 mg IV infusion over 10 minutes to decrease risk of recurrent v-fib/v-tach.
- If a patient is pregnant at or over 20 weeks estimated gestational age OR if the fundus is palpable above the umbilicus, apply the following interventions: During CPR, an additional rescuer should apply continuous manual leftward lateral displacement of the uterus to reduce pressure on the inferior vena cava and improve venous return. Vascular access should be obtained above the diaphragm. If no ROSC after two rounds of BLS/ACLS, consider immediate transport to the nearest Emergency Department for possible Resuscitative Cesarean Delivery (RCD).



H's & T's (reversible causes)

- Hypovolemia – Volume infusion
- Hypoxia – Oxygenation & ventilation, CPR
- Hydrogen ion (acidosis) – Ventilation, CPR
- Hypokalemia
- Hyperkalemia – Calcium, sodium bicarbonate, albuterol
- Hypothermia – Warming
- Tension pneumothorax – Needle decompression
- Tamponade, cardiac – Volume infusion
- Toxins – Agent specific antidote
- Thrombosis, pulmonary – Volume infusion
- Thrombosis, coronary – Emergent PCI

ENVIRONMENTAL EXPOSURE EXCEPTION:
All victims of electrocution and lightning strikes should have resuscitative efforts begun. Any decision to determine death in the field in these cases should be made **ONLY** after consultation with online medical control.



High Performance CPR

1 **IMMEDIATELY UPON ARRIVAL (or arrest, if witnessed) verify circulatory arrest by the absence of:**
- **consciousness**
- **carotid pulse**
- **normal/regular respiration (ignore agonal respirations)**

2 CHOOSE 2

If the cardiac arrest **IS NOT WITNESSED** by EMS providers:
- **PROVIDE 2 MIN OF CHEST COMPRESSIONS**
- **Compression Person** will immediately begin
- Continuous chest compressions for 2 minutes at a rate of 100-120 compressions/minute.
- **Do NOT interrupt chest compressions.**

If the cardiac arrest **IS WITNESSED** by EMS providers:
- **Compression Person** begin immediate chest compressions while **AED Person** attaches defibrillator.
- Once defibrillator is connected STOP CPR and push "ANALYZE" button.
- Continue starting as step 4 below.

3 **DEFIBRILLATION**

Designated AED Person will:
1. TURN ON the AED as soon as cardiac arrest has been verified.
2. Cut clothing as necessary.
3. Place the AED pads on the patient in the appropriate locations:
- Preferrable anterior-posterior placement
- Alternatively anterior-lateral placement

Do NOT interrupt chest compressions

4 CHOOSE 4

If "SHOCK ADVISED":
- AED will charge.
- Deliver shock and immediately begin 2 min of CPR.
- Do NOT check for a pulse after shock.

If "NO SHOCK ADVISED":
- Check for a pulse (<10 seconds)
- If no pulse, immediately begin 2 min of CPR

5 **AIRWAY / VENTILATION**

The **Designated Ventilation Person** will begin ventilations.
- Ventilate the patient at a rate of 30 compressions to 2 breaths (peds 15:2) unless an advanced airway is in place.
- Prepare suction equipment.
- Do NOT interrupt chest compressions.

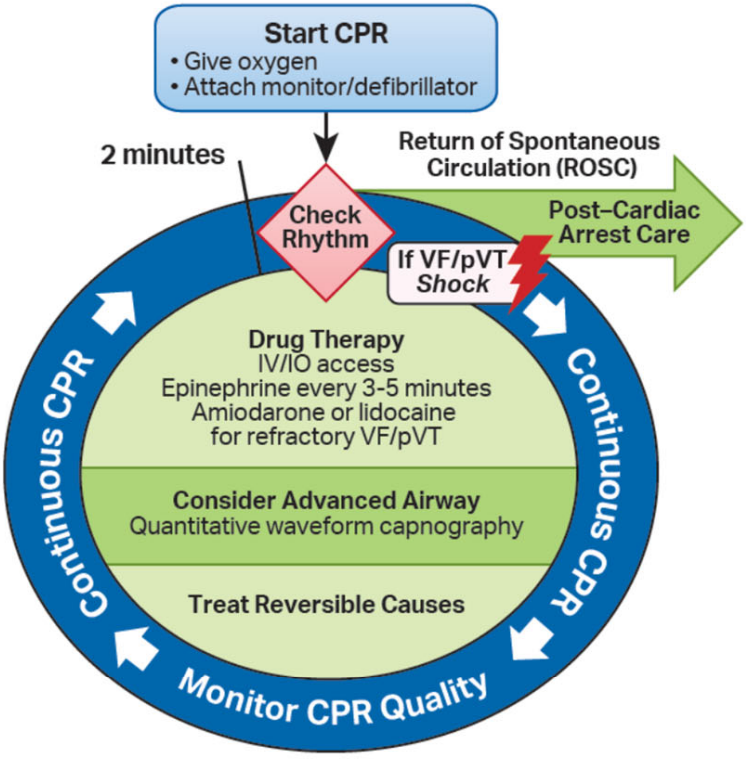
If there is no **Designated Ventilation Person available, the **Designated AED Person** will immediately assume the responsibilities of the **Designated Ventilation Person** after the AED is operational.

6 **IV/IO PLACEMENT**
- If ALS personnel or BLS personnel with an IV/IO initiation endorsement are available, the **IV Person** will prepare the patient for IV/IO placement and begin to assemble the IV set.
- Consider IO access as this has less risk of interfering with chest compressions.

7 **ALS ARRIVAL**
- Upon arrival of ALS, continue the current 2 min CPR cycle.
- Paramedics will pre-charge defibrillator and analyze/ shock at the end of 2 min of CPR.
- After each 2 min CPR cycle paramedics should analyze or treat in <10 seconds.
- Continue cycles of 2 min CPR with breaks <10 seconds for analysis and/or treatment by paramedics.

Adult Cardiac Arrest Algorithm

Adult Cardiac Arrest Circular Algorithm



CPR Quality

- Push hard (at least 2 inches [5 cm]) and fast (100-120/min) and allow complete chest recoil.
- Minimize interruptions in compressions.
- Avoid excessive ventilation.
- Change compressor every 2 minutes, or sooner if fatigued.
- If no advanced airway, 30:2 compression-ventilation ratio.
- Quantitative waveform capnography
  - If P_{ETCO_2} is low or decreasing, reassess CPR quality.

Shock Energy for Defibrillation

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

Drug Therapy

- **Epinephrine IV/IO dose:** 1 mg every 3-5 minutes
- **Amiodarone IV/IO dose:** First dose: 300 mg bolus. Second dose: 150 mg.
  or
- **Lidocaine IV/IO dose:** First dose: 1-1.5 mg/kg. Second dose: 0.5-0.75 mg/kg.

Advanced Airway

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

Return of Spontaneous Circulation (ROSC)

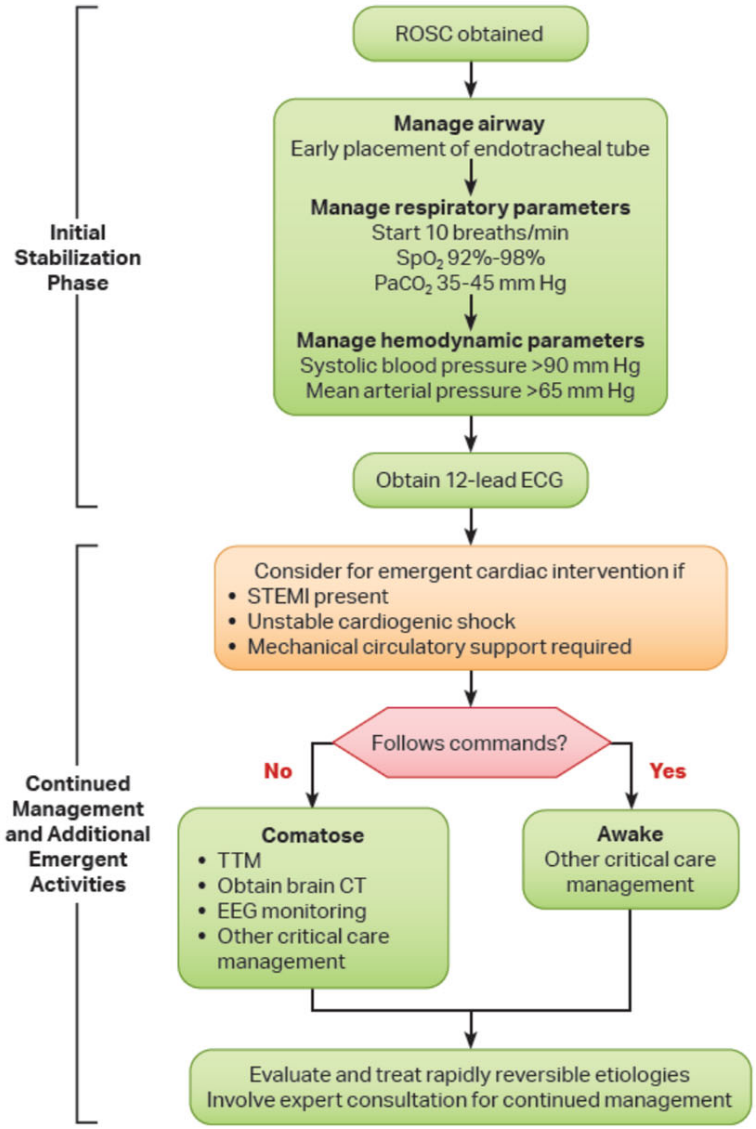
- Pulse and blood pressure
- Abrupt sustained increase in P_{ETCO_2} (typically ≥40 mm Hg)
- Spontaneous arterial pressure waves with intra-arterial monitoring

Reversible Causes

- **H**ypovolemia
- **H**ypoxia
- **H**ydrogen ion (acidosis)
- **H**ypo-/hyperkalemia
- **H**ypothermia
- **T**ension pneumothorax
- **T**amponade, cardiac
- **T**oxins
- **T**hrombosis, pulmonary
- **T**hrombosis, coronary

Post-Cardiac Arrest Care Algorithm

ACLS Healthcare Provider
Post–Cardiac Arrest Care Algorithm



Initial Stabilization Phase

Resuscitation is ongoing during the post-ROSC phase, and many of these activities can occur concurrently. However, if prioritization is necessary, follow these steps:

- Airway management: Waveform capnography or capnometry to confirm and monitor endotracheal tube placement
- Manage respiratory parameters: Titrate FIO_2 for SpO_2 92%-98%; start at 10 breaths/min; titrate to $PaCO_2$ of 35-45 mm Hg
- Manage hemodynamic parameters: Administer crystalloid and/or vasopressor or inotrope for goal systolic blood pressure >90 mm Hg or mean arterial pressure >65 mm Hg

Continued Management and Additional Emergent Activities

These evaluations should be done concurrently so that decisions on targeted temperature management (TTM) receive high priority as cardiac interventions.

- Emergent cardiac intervention: Early evaluation of 12-lead electrocardiogram (ECG); consider hemodynamics for decision on cardiac intervention
- TTM: If patient is not following commands, start TTM as soon as possible; begin at 32-36°C for 24 hours by using a cooling device with feedback loop
- Other critical care management
  - Continuously monitor core temperature (esophageal, rectal, bladder)
  - Maintain normoxia, normocapnia, euglycemia
  - Provide continuous or intermittent electroencephalogram (EEG) monitoring
  - Provide lung-protective ventilation

H's and T's

Hypovolemia
Hypoxia
Hydrogen ion (acidosis)
Hypokalemia/**h**yperkalemia
Hypothermia
Tension pneumothorax
Tamponade, cardiac
Toxins
Thrombosis, pulmonary
Thrombosis, coronary

Chest Pain (Non Traumatic) and Suspected Acute Coronary Syndrome

General Adult Assessment

E — 12-Lead ECG within 10 minutes of patient contact

Non-Diagnostic 12-Lead ECG

E — ASPIRIN 324 mg PO

E* — Vascular Access

FR — Oxygen Keep SpO2 >94%

NITROGLYCERIN

E — Assist pt with own medication as prescribed; may repeat q 5min X2

E* — 0.4 mg SL; may repeat q 5min X2

P — Consider NITROPASTE 0.5-1" transdermal

P — Pain Management for continued pain

A — Consider antiemetic for nausea/ vomiting: ONDANSETRON 4 mg ODT/IV/IO

p — METOCLOPRAMIDE 5-10 MG IV/IM
DROPERIDOL 0.625-1.25 MG IV/IM

Transport to closest Hospital

STEMI

Refer to STEMI (Suspected)

NITROGLYCERIN is contraindicated in any patient with hypotension (SBP<100 mmHg), bradycardia, tachycardia (HR>100 bpm) in the absence of heart failure, evidence of a right ventricular infarction, and use of erectile dysfunction medications within the last 48-72 hours. Caution is advised in patients with Inferior Wall STEMI, consider a right-sided ECG to evaluate for RV infarction or withhold NITRO.

Refer to Arrhythmia and Shock Guidelines as needed

History

- Age
- Medications: Viagra, Levitra, Cialis, Revatio, Staxyn, etc
- Past medical history: MI, angina, diabetes, HTN, HLD
- Allergies
- Recent physical exertion
- Smoking history
- Time of onset, duration, repetition

Signs and Symptoms

- CP, pressure, ache, vise-like pain, tight
- Location: substernal, epigastric, arm, jaw, neck, shoulder
- Radiation of pain
- Pale, diaphoresis
- Shortness of breath
- Nausea, vomiting
- Dizziness, lightheadedness

Differential

- Trauma versus medical
- Anginal versus MI
- Pericarditis
- Pulmonary embolism
- Asthma, COPD
- Pneumothorax
- Aortic dissection or aneurysm
- GE reflux or hiatal hernia
- Esophageal spasm
- Chest injury or pain
- Pleural pain
- Drug overdose (cocaine, methamphetamine)

Pearls

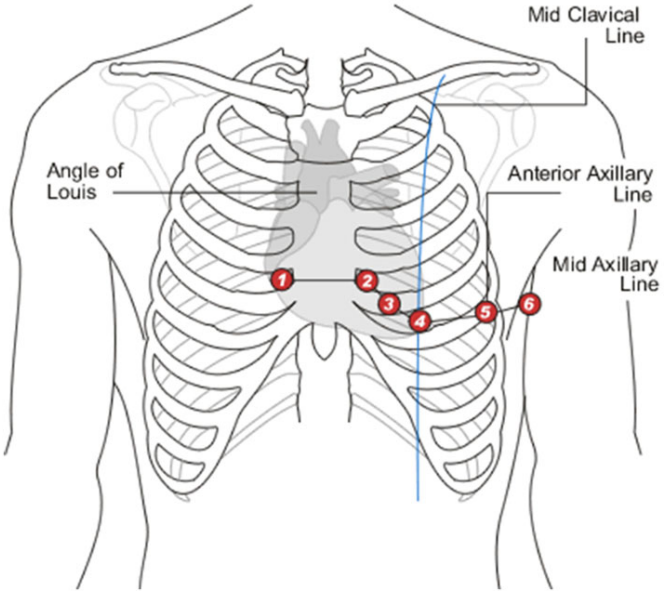
- Recommended exam: Mental Status, Skin, HEENT, Heart, Lungs, Abdomen, Back, Extremities, Neuro.
- Diabetics, geriatrics, and female patients often have atypical pain. Have a high index of suspicion.
- Perform a 12-Lead ECG on all patients 35 years old or older experiencing vague jaw/ chest/ abdominal discomfort.
- Perform a 12-Lead ECG within 10 minutes of patient contact. EMT and AEMT acquire and transmit for interpretation by a physician.
- Performance of serial ECGs is encouraged for symptomatic patients with initial ECG nondiagnostic for STEMI.
- The administration of NITROGLYCERIN is contraindicated for any patient who has used erectile dysfunction medications within the last 48-72 hours.
- NITROGLYCERIN is contraindicated in any patient with hypotension, bradycardia, or tachycardia in the absence of heart failure and evidence of a right ventricular infarction.
- Avoid the use of NITROGLYCERIN in patients with a suspected aortic dissection.
- MORPHINE should be used with caution in unstable angina (UA)/non-STEMI due to an association with increased mortality.
- A complete medication list should be obtained from each patient. It is especially important for the treating physician and healthcare providers to be informed if the patient is taking beta-blockers, calcium channel blockers, clonidine, digoxin, blood thinners (anticoagulants), and medications for the treatment of erectile dysfunction or pulmonary hypertension.

QI Metrics

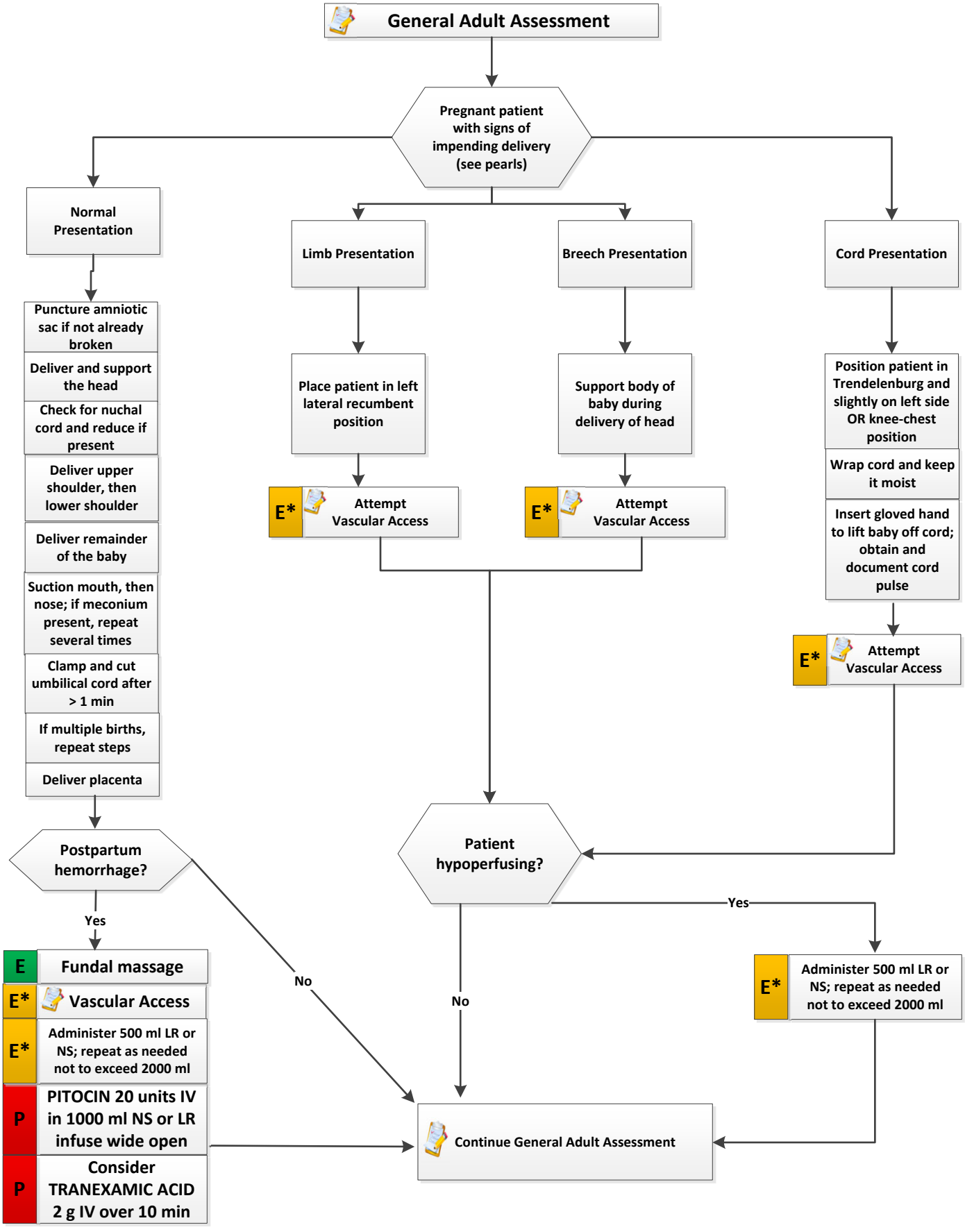
- 12-Lead ECG within 10 minutes of patient contact.
- Pain reassessed after every intervention.
- Pain control documented.

12-Lead ECG Lead Placement

- V1 – 4th ICS R-side
- V2 – 4th ICS L-side
- V3 – straight line between V2 and V4
- V4 – 5th ICS MCL
- V5 – same level as V4 at AAL
- V6 – same level as V4 at MAL



Childbirth / Labor



History
- Due date
- Time contractions started/ duration/frequency
- Rupture of membranes (meconium)
- Time and amount of any vaginal bleeding
- Sensation of fetal movement
- Pre-natal care
- Past medical and delivery history
- Medications
- Gravida/Para status
- High risk pregnancy

Signs and Symptoms
- Spasmodic pain
- Contractions
- Vaginal discharge or bleeding
- Crowning, urge to push, or urge to move bowels
- Meconium

Differential
- Abnormal presentation (breech, limb)
- Prolapsed cord
- Placenta previa
- Abruptio placenta
- Shoulder distocia

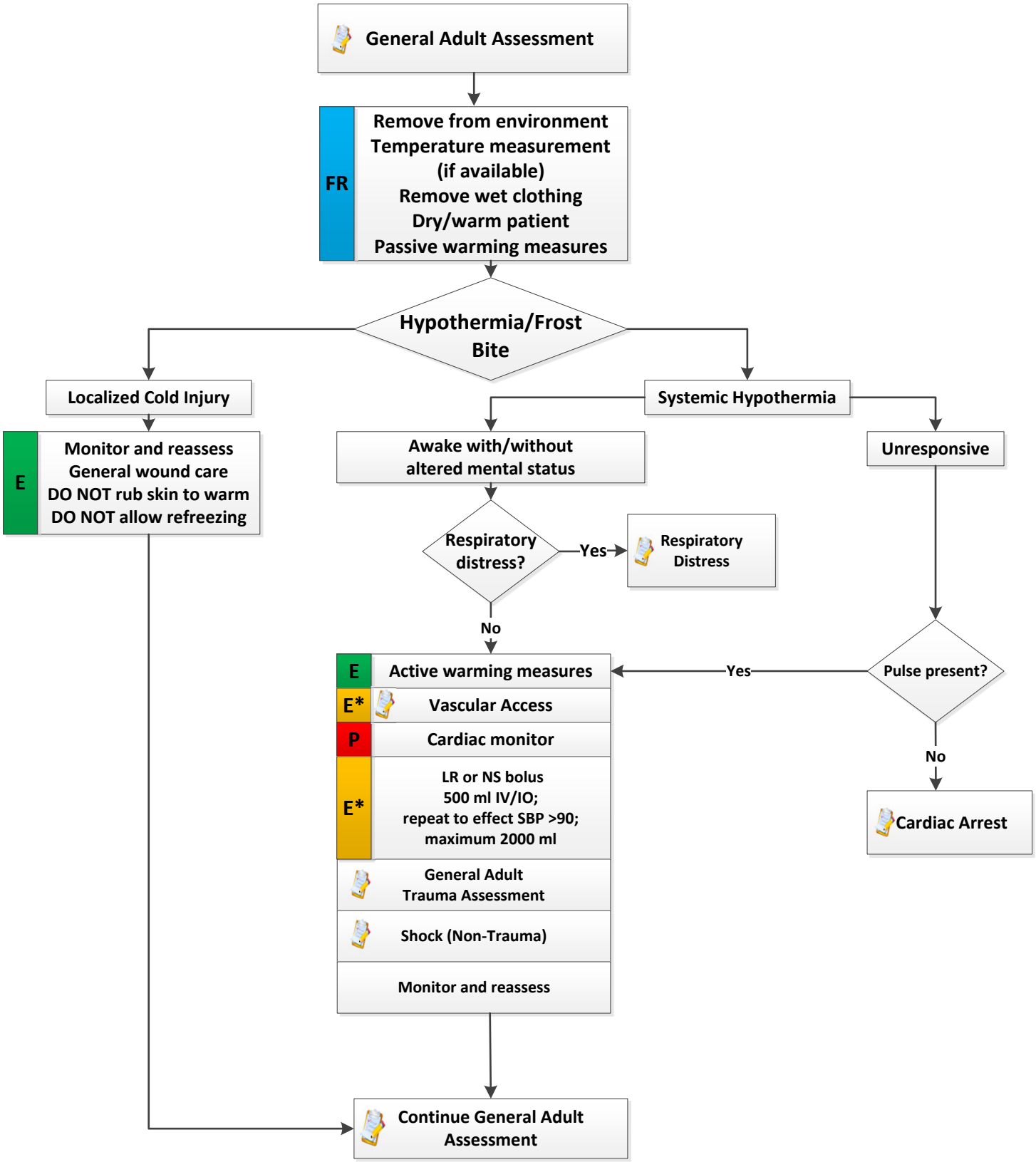
Pearls
- Recommended exam (of mother): Mental Status, Heart, Lungs, Abdomen, Neuro.
- Document all times (delivery, contraction duration and frequency).
- Some bleeding is normal; copious amounts of blood or free bleeding is abnormal. Deliveries complicated by maternal bleeding (placenta previa, vas previa, or placental abruption) place the infant at risk for hypovolemia secondary to blood loss.
- Resuscitation takes priority over recording APGAR scores. Record APGAR at 1 and 5 minutes after birth.
- APGAR of 7-10 is normal, while 4-7 requires resuscitative measures.
- Supine Hypotension Syndrome: if mother has hypotension before delivery, place patient in left lateral recumbent position or manually displace gravid uterus to the left in supine position.
- Do not routinely suction the infant's airway (even with a bulb syringe) during delivery.
- Dry, warm and stimulate all newborns to facilitate respirations and prevent hypothermia.
- Hypothermia is common in newborns and worsens outcomes of nearly all post-natal complications.
  - Ensure heat retention by drying the infant thoroughly, covering the head, and wrapping the baby in dry cloth.
  - When possible utilize "kangaroo care" (i.e., placing the infant skin-to-skin directly against mother's chest and wrapping them together) as an effective warming technique.

APGAR	Score=0	Score=1	Score=2
Activity/Muscle Tone	Absent	Arms/legs flexed	Active movement
Pulse	Absent	Below 100	Above 100
Grimace/Reflex Irritability	No response	Grimace	Sneeze, cough, pulls away
Appearance/Skin Color	Blue-Grey, pale all over	Normal, except extremities	Normal over entire body
Respiration	Absent	Slow, irregular	Good, crying

Shoulder dystocia

If delivery fails to progress after head delivers, quickly attempt the following:
- Hyperflex mother's hips to severe supine knee-chest position (i.e., McRoberts' maneuver).
- Apply firm suprapubic pressure to attempt to dislodge shoulder. This often requires two EMS clinicians to perform and allows for delivery in up to 75% of cases.
- Attempt to angle baby's head as posteriorly as possible but NEVER pull.
- Continue with delivery as normal once the anterior shoulder is delivered.

Cold-Related Illness



History
- Age, very young and old
- Exposure to decreased temperatures, but may occur in normal temperatures
- Past medical history/medications
- Drug or alcohol use
- Time of exposure/wetness/wind chill

Signs and Symptoms
- AMS/coma
- Cold, clammy
- Shivering
- Extremity pain
- Bradycardia
- Hypotension or shock
- Decreased respirations

Differential
- Sepsis
- Environmental exposure
- Hypoglycemia
- Stroke
- Head injury
- Spinal cord injury
- Trauma

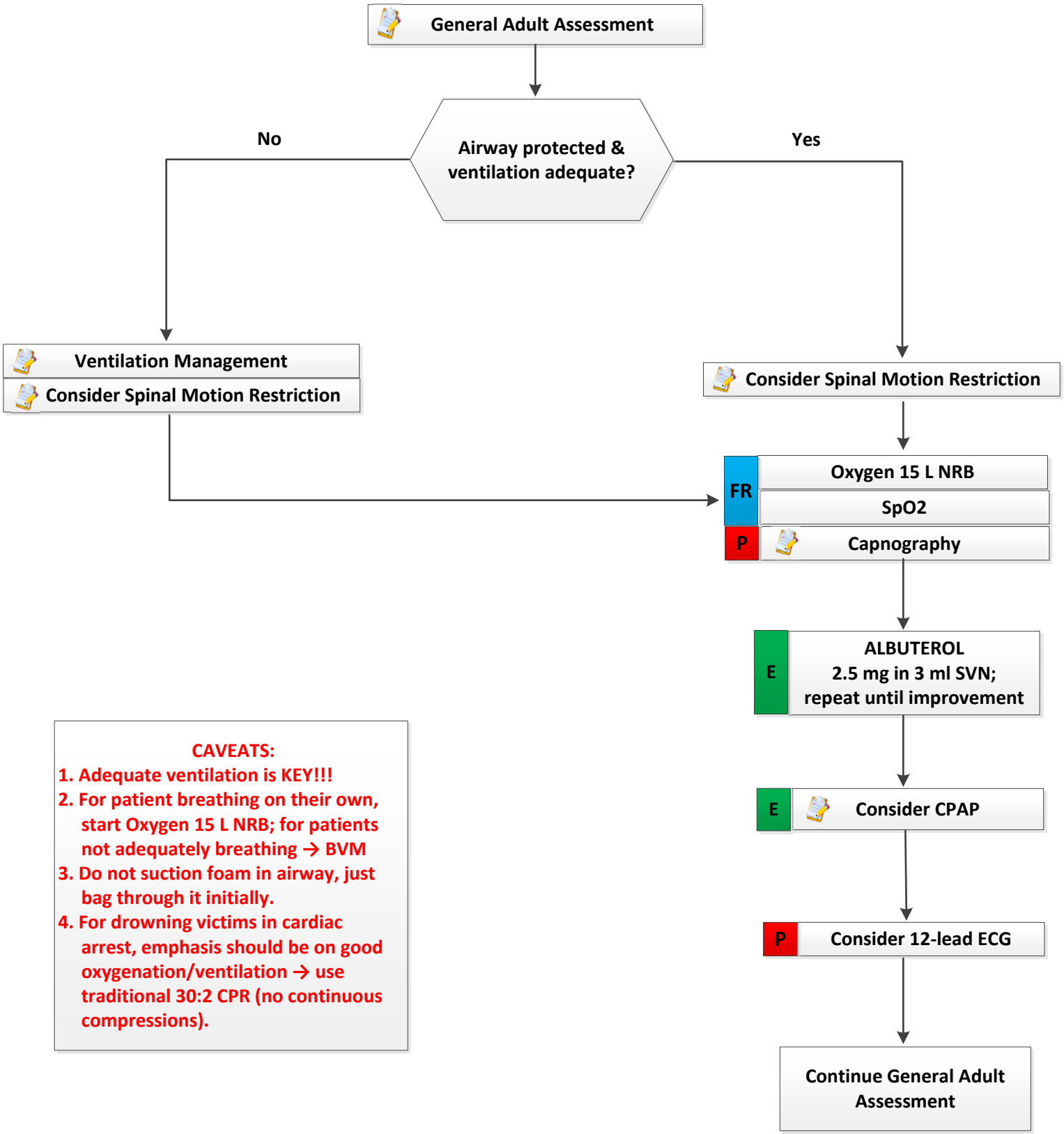
Pearls
- Recommended exam: Mental Status, Heart, Lung, Abdomen, Extremities, Neuro.
- Pulse checks for patients suffering hypothermia should be performed for up to 60 seconds.
- Handle the patient gently to prevent triggering a ventricular arrest.
- Extremes of age are more prone to cold emergencies.
- Obtain and document patient temperature.
- If temperature is unknown, treat the patient based on suspected temperature.
- Active warming includes hot packs that can be used on the armpit and groin (care should be taken not to place the packs directly on the skin) and/or Ready Heat II thermal blanket or equivalent.
- Warm saline or lactated ringers IV may be used.

Hypothermia Categories
- Mild 90°- 95° F (33°- 35° C)
- Moderate 82°- 90° F (28°- 32° C)
- Severe 75°- 82° F (24°- 28° C)
- Profound <75 degrees F (<24° C)

Hypothermia Mechanisms
- Radiation
- Convection
- Conduction
- Evaporation

Cardiac Arrest Resuscitation Guidelines for the Hypothermic Patient
- Contraindications for initiation of resuscitation in the hypothermic patient:
  - Obvious fatal injuries (such as decapitation)
  - The patient exhibits signs of being frozen (such as ice formation in the airway)
  - Chest wall rigidity such that compressions are impossible
  - Danger to rescuers or rescuer exhaustion
  - Avalanche victims buried for 35 minutes or longer with airway obstruction by ice or snow
- Fixed and dilated pupils, apparent rigor mortis, and dependent lividity may not be contraindication for resuscitation in the severely hypothermic patient.
- The mainstay of therapy in severe hypothermia and cardiac arrest should be effective chest compressions and attempts at rewarming.
- Defibrillation may be attempted once. Do not make further attempts at defibrillation until the core temperature has increased to greater than 30°C (86°F).
- Medications should be withheld until the patient's core temperature is greater than 30°C (86°F). Intervals between medication provision should be doubled until the patient reaches 35°C (95°F), at which time, normal medication intervals may be adopted.
- If a hypothermic patient clearly suffered cardiac arrest and subsequently became hypothermic afterward with prolonged down time between arrest and rescue, there is no rationale for initiating resuscitation and warming the patient.

Drowning



CAVEATS:

1. Adequate ventilation is KEY!!!
2. For patient breathing on their own, start Oxygen 15 L NRB; for patients not adequately breathing → BVM
3. Do not suction foam in airway, just bag through it initially.
4. For drowning victims in cardiac arrest, emphasis should be on good oxygenation/ventilation → use traditional 30:2 CPR (no continuous compressions).

History

- Submersion in liquid, regardless of depth
- Possible history of trauma (dive)
- Duration of immersion
- Temperature of water or possibility of hypothermia
- Degree of water contamination

Signs and Symptoms

- Unresponsive
- Mental status changes
- Decreased or absent vital signs
- Vomiting
- Coughing, wheezing, rales, stridor, rhonchi
- Apnea
- Frothy/foamy sputum

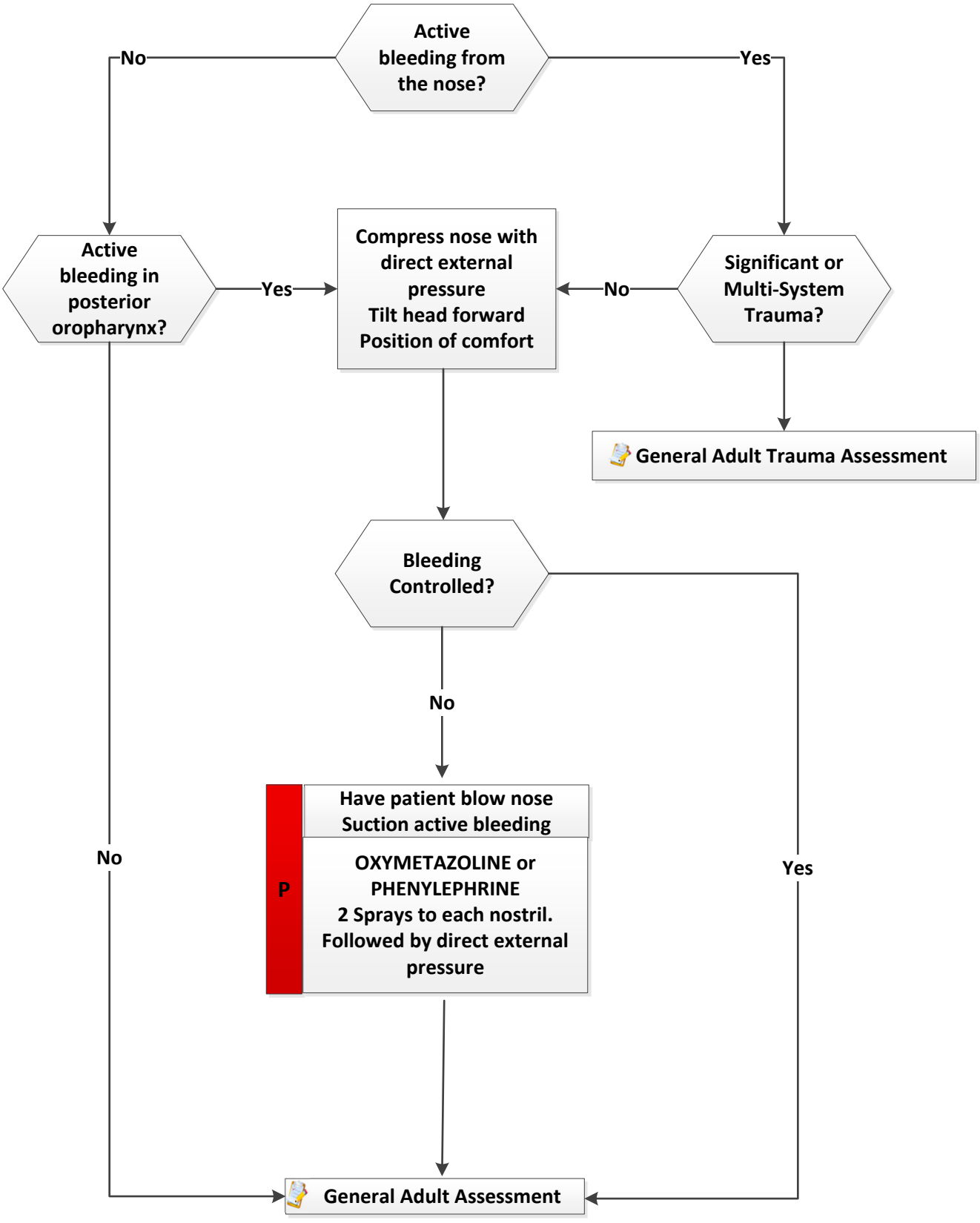
Differential

- Trauma
- Pre-existing medical condition
- Barotrauma
- Decompression illness
- Post-immersion syndrome

Pearls

- Recommended exam: Trauma survey, Head, Neck, Chest, Abdomen, Back, Extremities, Skin, Neuro.
- Ensure scene safety.
- Resuscitation efforts should follow an **ABCs** (**A**irway, **B**reathing, **C**irculation) strategy for drowning victims in cardiac arrest. Initiate 5 rescue breaths followed by a ratio of 30 chest compressions to 2 breaths.
- Hypothermia is often associated with submersion incidents.
- All patients should be transported for evaluation because of potential for worsening over the next several hours.
- Decompression illness may have a variety of presentations depending on system affected (e.g., skin, joint(s), pulmonary, neurologic), and can occur even when a diver does not exceed dive table limits.
- Resuscitation recommendations based on water temperature and submersion time:
  - If water temperature is less than 43°F (6°C) and the patient is submerged with evidence of cardiac arrest: Survival is possible for submersion time less than 90 minutes and resuscitative efforts should be initiated.
  - If water temperature is greater than 43°F (6°C) and the patient is submerged with evidence of cardiac arrest: Survival is possible for submersion time less than 30 minutes and resuscitative efforts should be initiated.

Epistaxis


Active bleeding from the nose?
No
Yes
Active bleeding in posterior oropharynx?
Yes
Compress nose with direct external pressure
Tilt head forward
Position of comfort
No
Significant or Multi-System Trauma?
General Adult Trauma Assessment
Bleeding Controlled?
No
Yes
No
P
Have patient blow nose
Suction active bleeding
OXYMETAZOLINE or PHENYLEPHRINE
2 Sprays to each nostril.
Followed by direct external pressure
General Adult Assessment

History

- Age
- Past Medical History (HTN)
- Medications (anticoagulants, antiplatelets, aspirin, NSAIDS)
- Previous episodes of epistaxis
- Trauma
- Duration of bleeding
- Quantity of bleeding

Signs and Symptoms

- Bleeding from nasal passages
- Dizziness/Lightheadedness
- Chest pain
- SOB
- Pain
- Nausea
- Vomiting

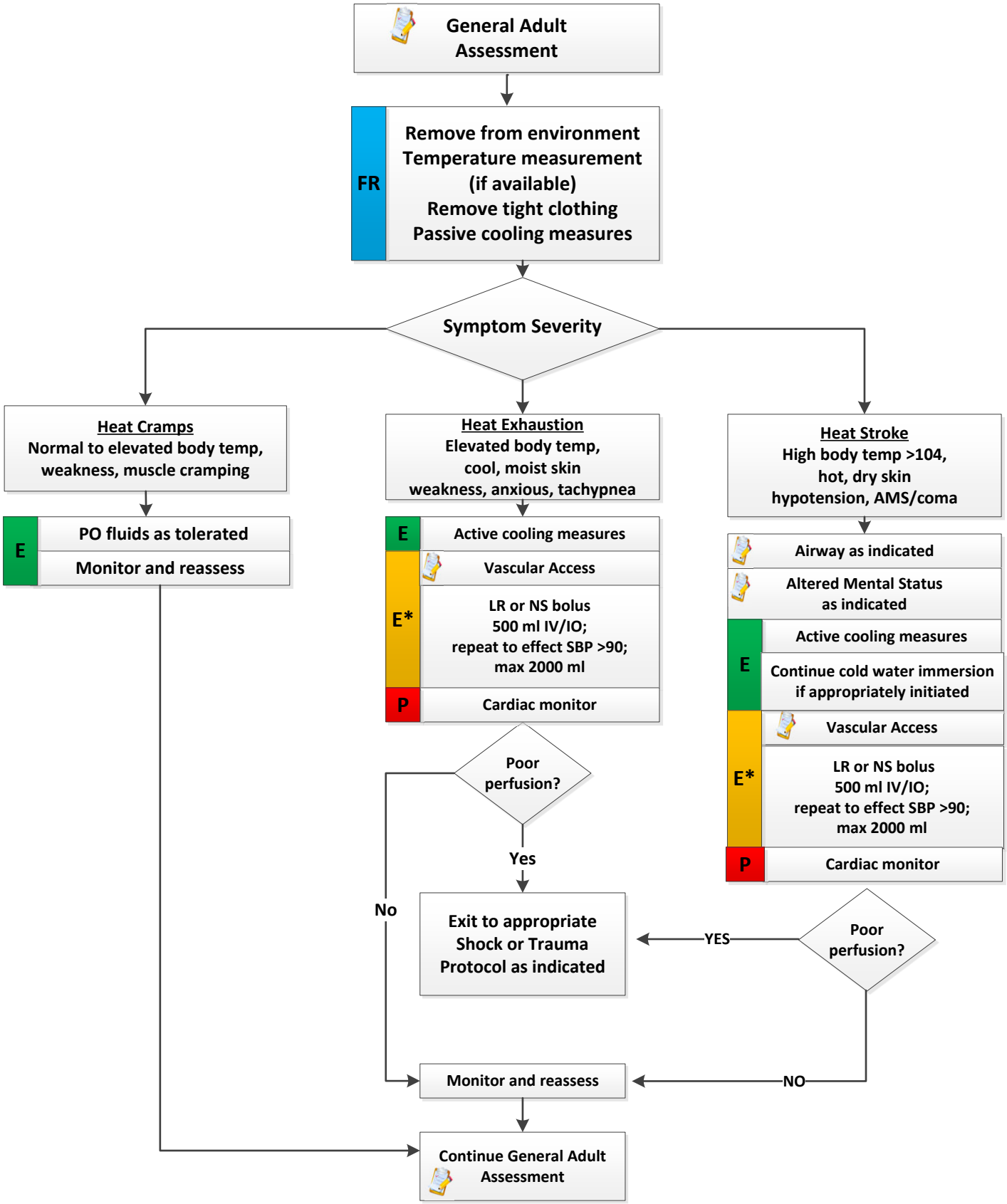
Differential

- Trauma
- Infection (viral URI or Sinusitis)
- Allergic rhinitis
- Lesions (polyps, ulcers)
- Hypertension

Pearls

- Recommended exam: Mental Status, HEENT, Lungs, Neuro.
- It is very difficult to quantify the amount of blood loss with epistaxis.
- Bleeding may be also occurring posteriorly. Evaluate for posterior blood loss by examining the posterior pharynx.
- Anticoagulants include warfarin (Coumadin), heparin, enoxaparin (Lovenox), dabigatran (Pradaxa), rivaroxaban (Xarelto), apixaban (Eliquis) and many other over the counter headache relief medications.
- Anti-platelet agents like aspirin, clopidogrel (Plavix), aspirin/diplyridamole (Aggrenox), and ticlopidine (Ticlid) can contribute to bleeding.

Heat-Related Illness



History
- Age, very old and young
- Exposure to increased temperatures and/or humidity
- Past medical history/medications
- Time and duration of exposure
- Poor PO intake, extreme exertion
- Fatigue and/or muscle cramping

Signs and Symptoms
- AMS/coma
- Hot, dry, or sweaty skin
- Hypotension or shock
- Seizures
- Nausea

Differential
- Fever, Sepsis
- Dehydration
- Medications
- Hyperthyroidism
- DTs
- Heat cramps, heat exhaustion, heat stroke
- CNS lesions or tumors

Pearls
- Recommended exam: Mental Status, Skin, Heart, Lung, Abdomen, Extremities, Neuro.
- Extremes of age are more prone to heat emergencies.
- Cocaine, amphetamines, and salicylates may elevate body temperatures.
- Sweating generally disappears as body temperatures rise over 104° F (40° C).
- Intense shivering may occur as patient is cooled. Paramedics can consider administering a low dose benzodiazepine.
- Active cooling includes application of cold packs or ice (not directly on skin), fanning, or air conditioning.
- Cold saline is not to be administered for the treatment of hyperthermia unless directed by online medical control.
- There is no evidence supporting EMS obtaining orthostatic vital signs as a clinical indicator.
- Cold water immersion is the preferred method of active cooling. Some providers such as certified athletic trainers and event medical personnel are prepared to initiate cold water immersion prior to EMS arrival. If cold water immersion was initiated due to documented hyperthermia, these patients should not be removed from cold water immersion prior to their rectal temperature reaching 102.2F (39C) or mental status returning to baseline unless it is required to manage other emergent issues such as airway.

Heat Cramps
- Consist of benign muscle cramping caused by dehydration and is not associated with an elevated temperature.

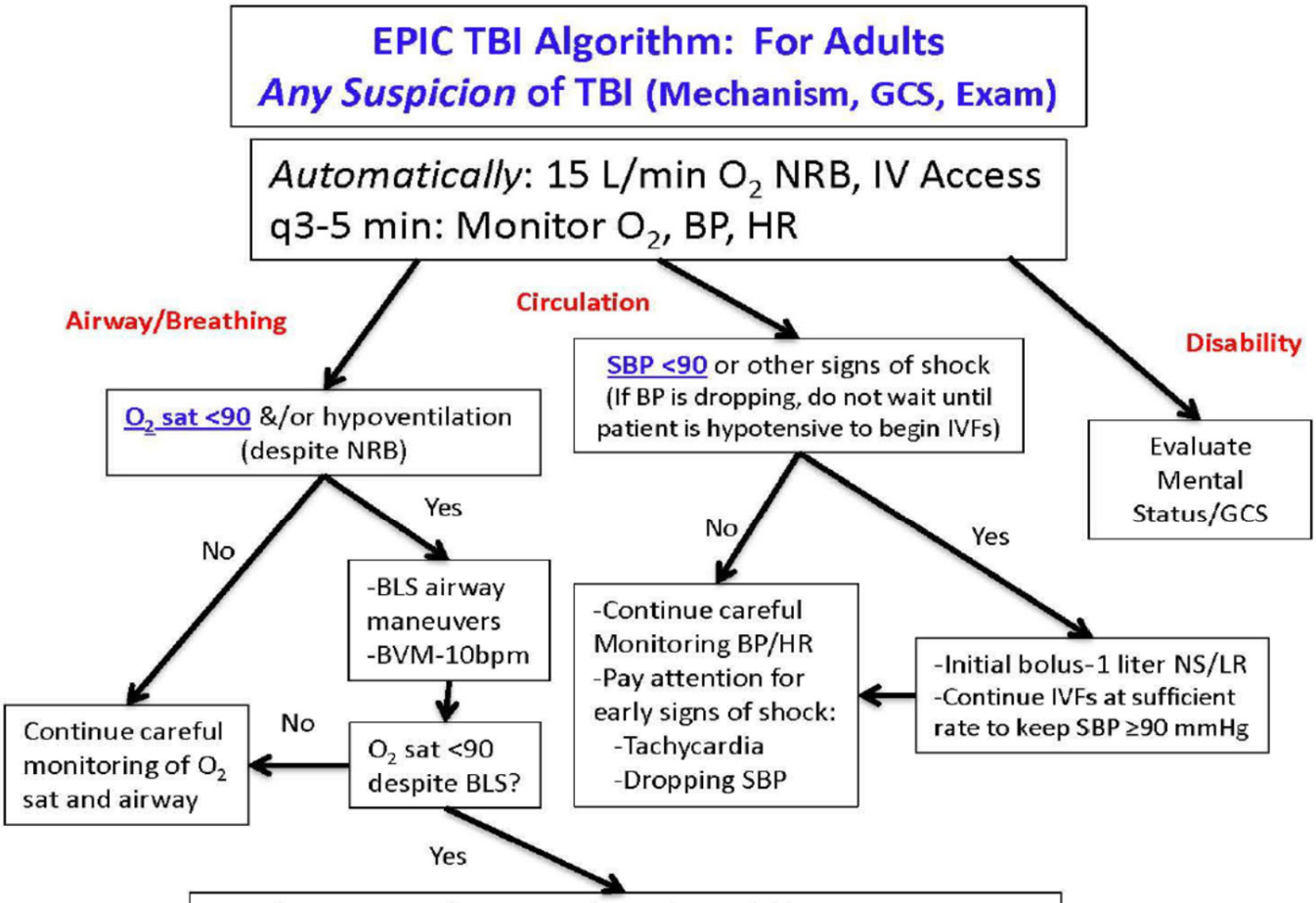
Heat Exhaustion
- Consists of dehydration, salt depletion, dizziness, fever, AMS, headache, cramping, N/V. Vital signs usually consist of tachycardia, hypotension and elevated temperature.

Heat Stroke
- Consists of dehydration, tachycardia, hypotension, temperature >104° F (40° C), and AMS. Potential for seizures or coma.

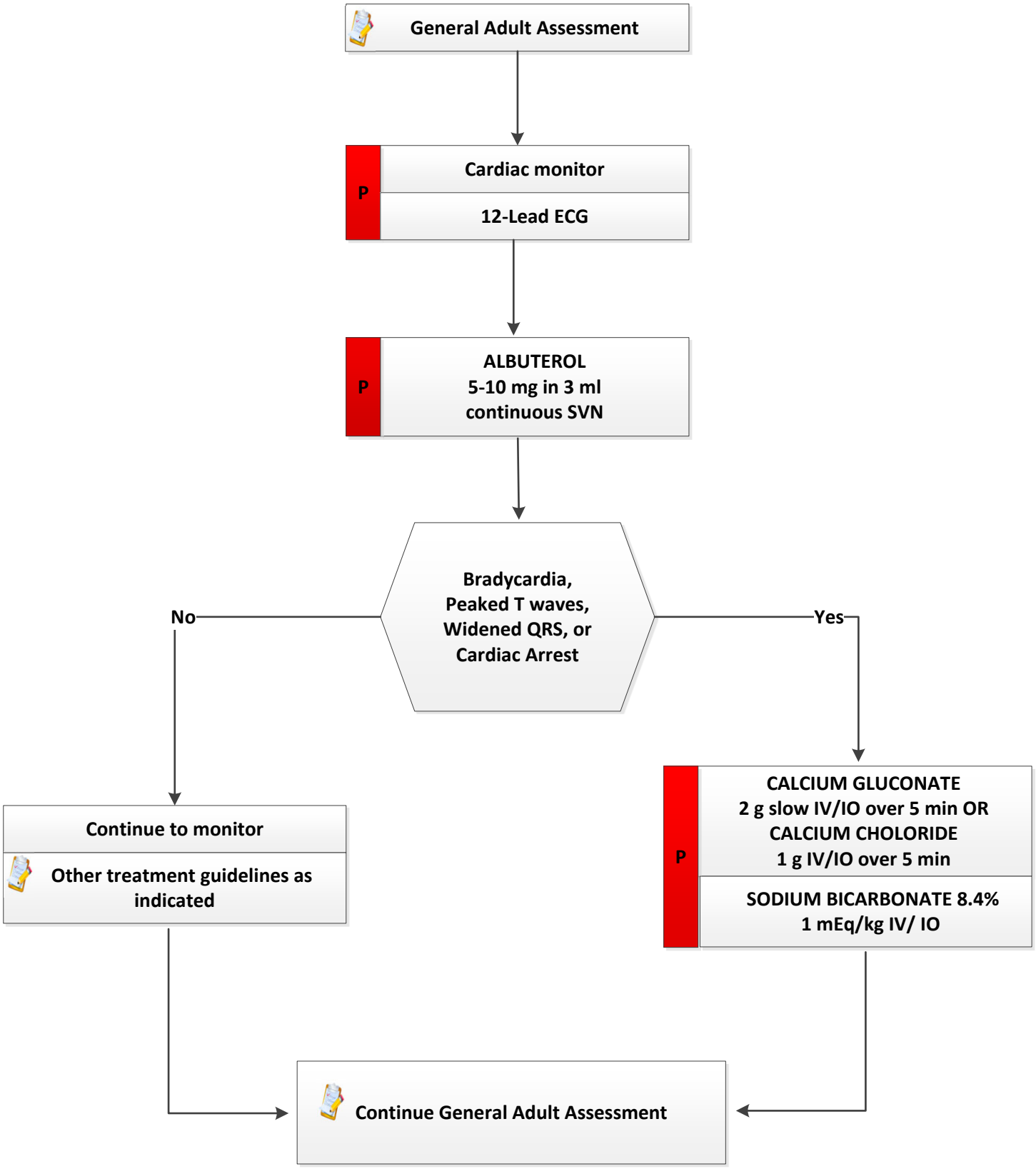
Heat Syncope
- Transient loss of consciousness attributed to heat exposure.

Head Injury

EPIC ALGORITHM FOR ADULTS



Hyperkalemia (Suspected)



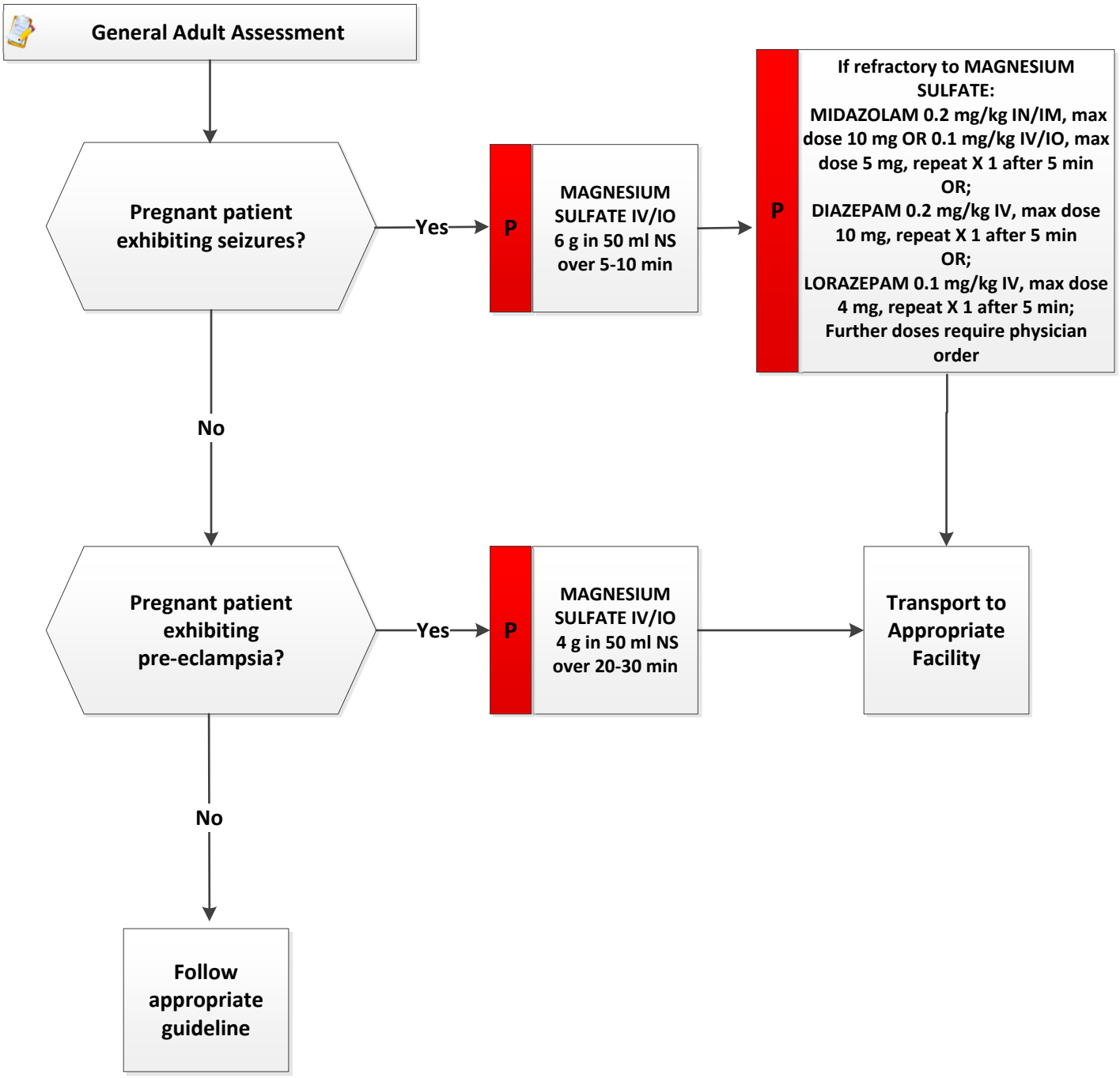
History
- History of renal failure
- History of dialysis
- Trauma, crush injury

Signs and Symptoms
- Cardiac conduction disturbances
- Irritability
- Abdominal distension
- Nausea
- Diarrhea
- Oliguria
- Weakness

Differential
- Cardiac disease
- Renal failure
- Dialysis
- Trauma, crush injury

Pearls
- Patients must have suspected hyperkalemia *OR* electrocardiographic findings consistent with hyperkalemia (bradycardia with widening QRS complexes) BEFORE initiating treatment.
- Hyperkalemia is defined as a potassium level higher than 5.5 mmol/L.
  - Potassium of 5.5 - 6.5 mmol/L - Tall peaked T waves.
  - Potassium of 6.5 - 7.5 mmol/L - Loss of P waves.
  - Potassium of 7.5 - 8.5 mmol/L - Widening QRS.
  - Potassium of >8.5 mmol/L - QRS continues to widen, approaching sine wave.

Obstetrical Emergency



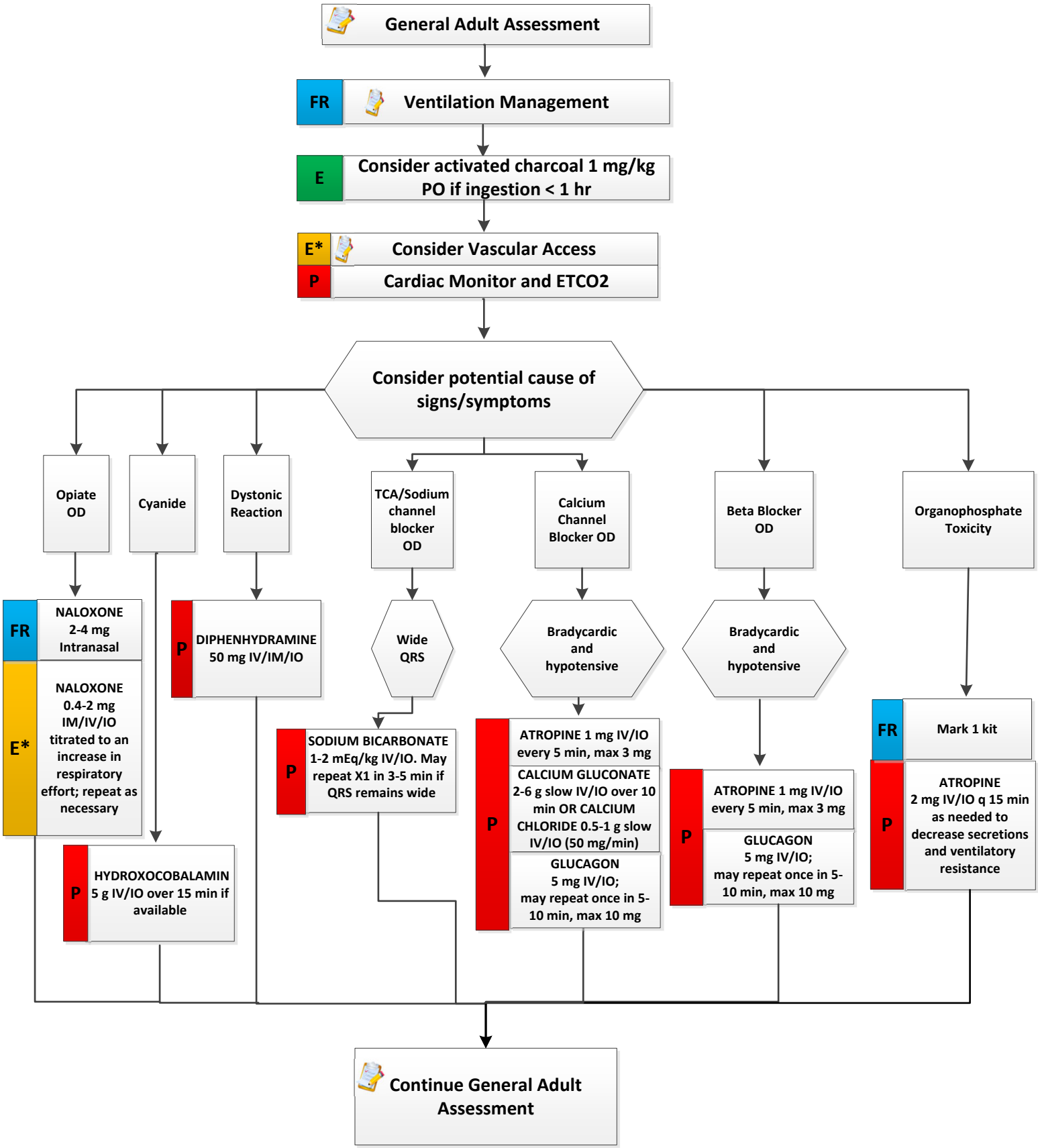
History
- Medical history
- Hypertension medication
- Prenatal care
- Prior pregnancies/births
- Previous pregnancy complications

Signs and Symptoms
- Vaginal bleeding
- Abdominal pain (epigastric or RUQ)
- Seizures
- Hypertension
- Severe headache
- Visual changes
- Edema of the hands or face
- Shortness of breath/Pulmonary edema
- Confusion/AMS
- Ecchymosis (bruising, petechiae)

Differential
- Pre-eclampsia/eclampsia
- Placenta previa
- Placenta abruptio
- Spontaneous abortion
- Ectopic pregnancy
- Chronic hypertension (PMHx)
- Pregnancy induced hypertension

Pearls
- Recommended exam: Mental Status, Heart, Lung, Abdomen, Neuro.
- Severe headache, vision changes or RUQ pain may indicate pre-eclampsia.
- In the setting of pregnancy: hypertension is defined as >140 systolic or >90 diastolic or a relative increase of 30 systolic or 20 diastolic from the patient's normal pre-pregnancy BP.
- Maintain left lateral position.
- Ask patient to quantify bleeding - number of pads used per hour.
- Any pregnant patient involved in a MVC should be seen by a physician for evaluation.
- Postpartum eclampsia/pre-eclampsia commonly presents up to 48 hours after childbirth. Often the presenting symptom is headache or SOB. If symptomatic, treat as eclampsia/pre-eclampsia.
- May present up to 6 weeks after childbirth, assess for history or pre-eclampsia/ eclampsia during pregnancy or delivery.
- Magnesium toxicity presents as (progression): Hypotension followed by, Loss of deep tendon reflexes followed by, Somnolence, slurred speech followed by, Respiratory paralysis followed by, Cardiac arrest. Treatment includes stopping the MAGNESIUM drip and giving CALCIUM GLUCONATE 3 g IV or CALCIUM CHLORIDE 1 g IV in cases of pending respiratory arrest.

Overdose / Poisoning



History
- Ingestion or suspected ingestion of a potentially toxic agent
- Substance ingested, route, quantity
- Time of ingestion
- Reason (suicidal, accidental, criminal)
- Available medications in home
- Past medical history, medications

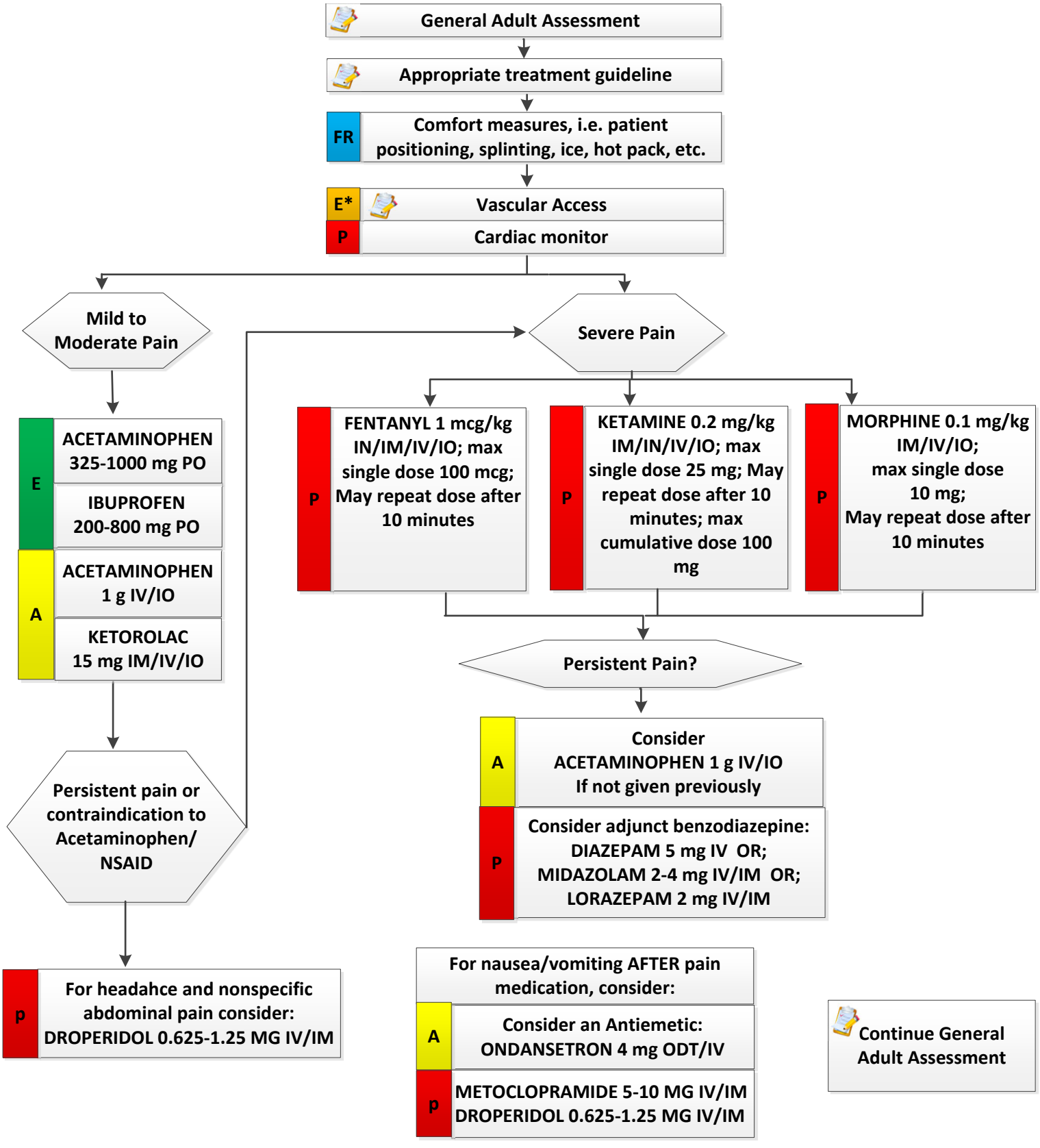
Signs and Symptoms
- Mental status changes
- Hypotension/hypertension
- Decreased respiratory rate
- Tachycardia, dysrhythmias
- Seizures
- SLUDGE+BBB
- Malaise, weakness
- GI symptoms
- Dizziness
- Syncope
- Chest pain

Differential
- TCA overdose
- Acetaminophen
- Aspirin
- Depressants
- Stimulants
- Anticholinergic
- Cardiac medications
- Solvents, alcohols, cleaning agents, insecticides

Pearls
- Recommended exam: Mental Status, Skin, HEENT, Heart, Lung, Abdomen, Extremities, Neuro.
- NALOXONE should be administered in small increment doses IV to address respiratory depression and ensure adequate ventilation. Monitor patient to watch for any signs of respiratory depression reoccurring. IV/IM are preferred routes for predictability.
- Overdose or toxin patients with significant ingestion/exposure should be closely monitored and aggressively treated. Do not hesitate to contact medical control if needed.
- In the case of cyanide poisoning, altered mental status may be profound. Profound altered mental status can be defined as a deficit that includes disorientation, bewilderment and difficulty following commands.
- If patient is suspected to have narcotic overdose/hypoglycemia, administer NARCAN/ GLUCOSE prior to supraglottic device/intubation.
- Poison Control: 1-800-222-1222

Agents
- Acetaminophen: Initially normal or N/V. Tachypnea and AMS may occur later. Renal dysfunction, liver failure and/or cerebral edema may manifest.
- Depressants: Decreased HR, BP, temp and RR.
- Anticholinergic: Increased HR, increased temperature, dilated pupils and AMS changes.
- Insecticides: May include S/S of organophosphate poisoning.
- Solvents: N/V, cough, AMS.
- Stimulants: Increased HR, BP, temperature, dilated pupils, seizures, and possible violence.
- TCA: Decreased mental status, dysrhythmias, seizures, hypotension, coma, death.

Pain Management



History
- Age
- Location, duration
- Severity (1-10)
- Past medical history
- Pregnancy status
- Drug allergies and medications

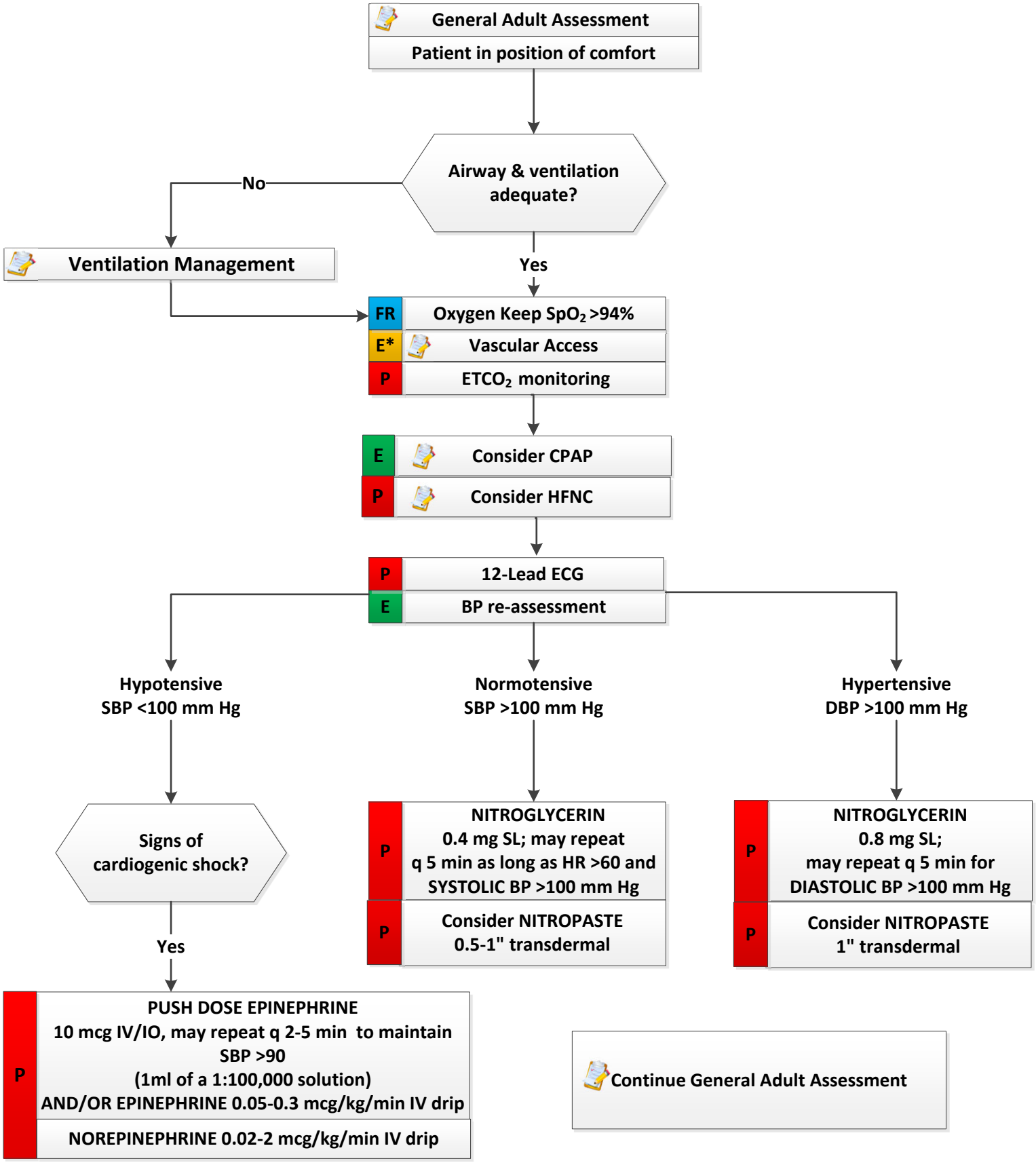
Signs and Symptoms
- Severity (pain scale)
- Quality
- Radiation
- Relation to movement, respiration
- Increased with palpation of area

Differential
- Musculoskeletal
- Visceral (abdominal)
- Cardiac
- Pleural, respiratory
- Neurogenic
- Renal (colic)

Pearls
- Recommended exam: Respiratory Status, Mental Status, Area of pain, Neuro.
- Pain severity (1-10) is to be recorded before and after medication administration and upon arrival at hospital.
- Monitor BP and respirations closely as sedative and pain control agents may cause hypotension and/or respiratory depression.
- Consider patient's age, weight, clinical condition, use of drugs/alcohol, exposure to opiates when determining initial opiate dosing. Weight based dosing may provide a standard means of dosing calculation, but it does not predict response. Consider starting at a lower initial dose and titrating to effect is recommended.
- Administer opioids with caution to patients with Glasgow Coma Score (GCS) less than 15, hypotension, identified medication allergy, hypoxia (SPO2 less than 90%) after maximal supplemental oxygen therapy, or signs of hypoventilation.
- Exercise care when administering opiates and benzodiazepines; this combination results in deeper anesthesia with significant risk of respiratory compromise. Utilize ETCO2 when giving combination.
- Burn patients may require more aggressive dosing.
- ACETAMINOPHEN and KETOROLAC are not to be used as the primary pain management medication for Chest Pain/ Suspected ACS or STEMI patients.
- ACETAMINOPHEN and/or KETOROLAC should be considered the primary treatment for severe pain for patients that do not wish to receive narcotic analgesia.
- Avoid non-steroidal anti-inflammatory medications such as IBUPROFEN and KETOROLAC in patients with NSAID allergy, aspirin-sensitive asthma, renal insufficiency, pregnancy, or known peptic ulcer disease. KETOROLAC should not be used in patients with hypotension (due to renal toxicity).
- Consider FENTANYL as the preferred opioid agent for traumatic pain.
- ACETAMINOPHEN may be given if it has been ≥ 4 hours since last dose of ≤ 650 mg or ≥ 6 hours since last dose of 1 gm. IBUPROFEN/KETOROLAC may be given if it has been ≥ 6 hours since last dose of ≤ 600 mg NSAID, ≥ 8 hours since last dose of 800 mg NSAID, ≥ 12 hours since last dose of Naproxen/Naprosyn, or ≥ 24 hours since last dose of Meloxicam.

- **QI Metrics**
- Vital signs with O_2 sats recorded.
- Pain scale documented before and after intervention.
- Vital signs repeated after intervention.
- If considering repeat administration of pain medications, nasal cannula capnography should be utilized. ETCO2 when giving combination opiates and benzodiazepines.

Pulmonary Edema / CHF



History
- Congestive heart failure
- Past medical history
- Medications
- Cardiac history
- Home oxygen

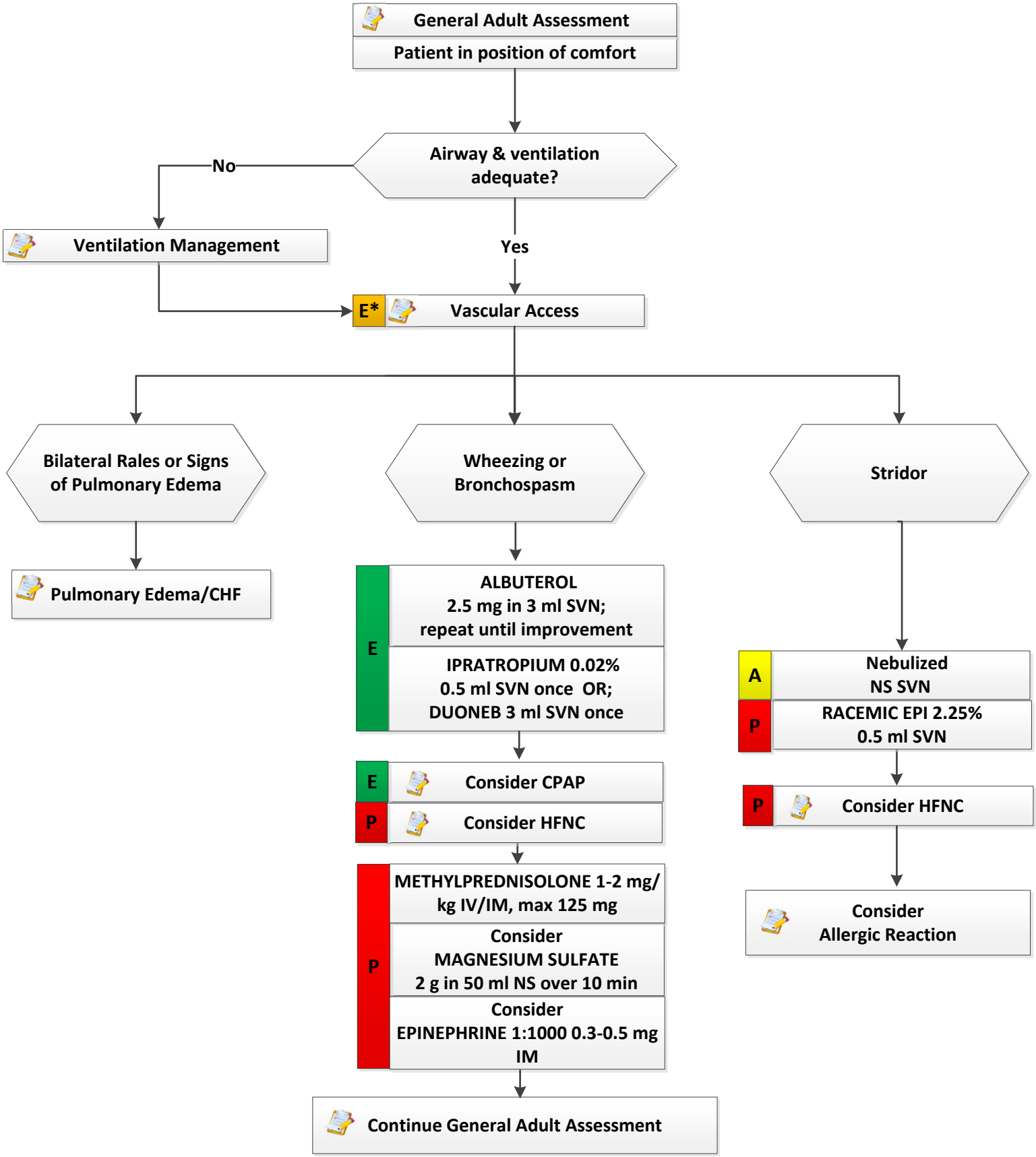
Signs and Symptoms
- Respiratory distress, bilateral rales
- Apprehension, orthopnea
- JVD
- Pink, frothy sputum
- Peripheral edema
- Diaphoresis
- Hypotension, shock
- Chest pain

Differential
- MI
- Congestive heart failure
- Asthma
- Anaphylaxis
- Aspiration
- COPD
- Pleural effusion
- Pneumonia
- Pericardial tamponade
- Toxic exposure
- High altitude pulmonary edema (HAPE)
- Opioid overdose
- Kidney failure or dialysis noncompliance

Pearls
- Recommended exam: Mental Status, HEENT, Skin, Neck, Heart, Lungs, Abdomen, Extremities, Neuro.
- Allow patient to maintain position of comfort.
- The administration of NITROGLYCERIN is contraindicated for any patient who has used erectile dysfunction medications within the last 48-72 hours.
- Pulse oximetry and EtCO2 should be routinely used as adjuncts to other forms of monitoring in patients with respiratory complaints.
- 12-lead ECG may be indicated to assess for dysrhythmia or ischemia, particularly in patients with risk factors for coronary artery disease and/or presentation consistent with CHF.
- Pulmonary edema is more commonly a problem of volume distribution than total body fluid overload, so administration of diuretics provide no immediate benefit for most patients and can cause significant harm.
- Nitrates provide both subjective and objective improvement, and might decrease intubation rates, incidence of MIs, and mortality. High-dose nitrates can reduce both preload and afterload and potentially increase cardiac output and blood pressure.

QI Metrics
- Blood pressure reassessed after each NITROGLYCERIN dose.
- $ETCO_2$ monitored.

Respiratory Distress



History

- PMHx: asthma, COPD, CHF, chronic bronchitis, emphysema
- Home treatment (oxygen, nebulizers)
- Medication
- Toxic exposure

Signs and Symptoms

- Shortness of breath
- Pursed lip breathing
- Decreased ability to speak
- Increased respiratory rate and effort
- Wheezing, rhonchi
- Use of accessory muscles
- Fever, cough
- Tachycardia

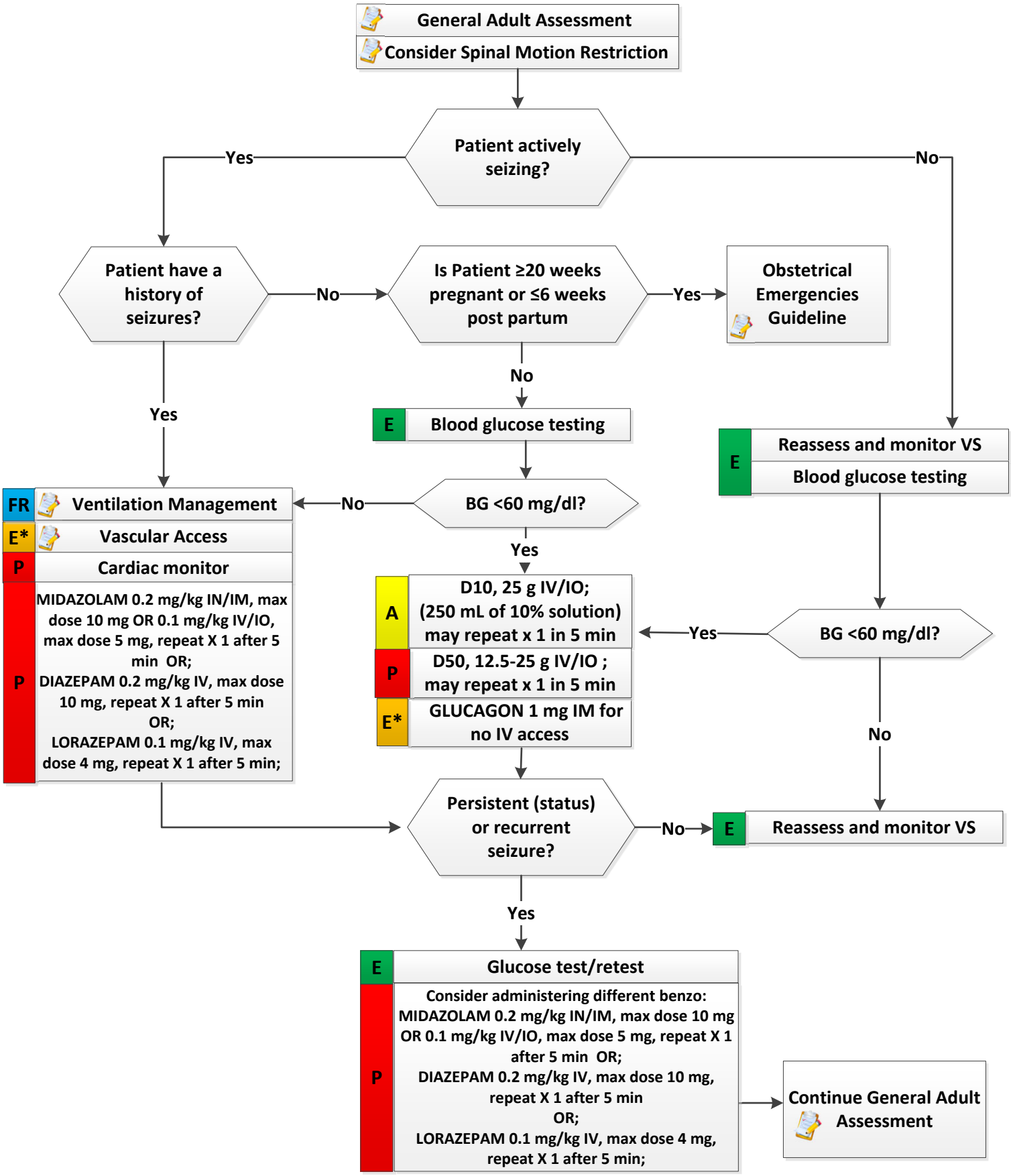
Differential

- Asthma
- Anaphylaxis
- Aspiration
- COPD
- Pleural effusion
- Pneumonia
- Pulmonary embolus
- Pneumothorax
- Cardiac (MI or CHF)
- Pericardial tamponade
- Hyperventilation
- Inhaled toxin

Pearls

- Recommended exam: Mental Status, HEENT, Skin, Neck, Heart, Lungs, Abdomen, Extremities, Neuro.
- Pulse oximetry and end tidal continuous waveform capnography should be monitored.
- Consider MI.
- Allow the patient to assume a position of comfort.
- In the setting of severe bronchoconstriction, wheezing may not be heard. Patients with known asthma with severe dyspnea should be empirically treated, even if wheezing is absent.
- A “shark fin” on waveform capnography suggests significant bronchospasm and obstructive physiology.
- Invasive airways do not improve bronchospasm. The airway should be managed in the least invasive way possible. Supraglottic devices and endotracheal intubation should be considered only if BVM ventilation fails.
- Positive pressure ventilation in the setting of bronchoconstriction, either via a supraglottic airway or intubation, increases the risk of air trapping which can lead to pneumothorax and cardiovascular collapse. These interventions should be reserved for situations of respiratory failure.

Seizure


General Adult Assessment
Consider Spinal Motion Restriction
Patient actively seizing?
Yes
No
Patient have a history of seizures?
No
Is Patient ≥20 weeks pregnant or ≤6 weeks post partum
Yes
Obstetrical Emergencies Guideline
No
Yes
E
Blood glucose testing
E
Reassess and monitor VS
Blood glucose testing
FR
Ventilation Management
E*
Vascular Access
P
Cardiac monitor
P
MIDAZOLAM 0.2 mg/kg IN/IM, max dose 10 mg OR 0.1 mg/kg IV/IO, max dose 5 mg, repeat X 1 after 5 min OR;
DIAZEPAM 0.2 mg/kg IV, max dose 10 mg, repeat X 1 after 5 min OR;
LORAZEPAM 0.1 mg/kg IV, max dose 4 mg, repeat X 1 after 5 min;
No
BG <60 mg/dl?
Yes
A
D10, 25 g IV/IO; (250 mL of 10% solution) may repeat x 1 in 5 min
P
D50, 12.5-25 g IV/IO ; may repeat x 1 in 5 min
E*
GLUCAGON 1 mg IM for no IV access
Yes
BG <60 mg/dl?
No
Persistent (status) or recurrent seizure?
No
E
Reassess and monitor VS
Yes
E
Glucose test/retest
P
Consider administering different benzo:
MIDAZOLAM 0.2 mg/kg IN/IM, max dose 10 mg OR 0.1 mg/kg IV/IO, max dose 5 mg, repeat X 1 after 5 min OR;
DIAZEPAM 0.2 mg/kg IV, max dose 10 mg, repeat X 1 after 5 min OR;
LORAZEPAM 0.1 mg/kg IV, max dose 4 mg, repeat X 1 after 5 min;
Continue General Adult Assessment

History

- Reported or witnessed seizure activity
- Previous seizure history
- Seizure medications
- History of trauma
- History of diabetes
- History of pregnancy
- Time of seizure onset
- Number of seizures
- Alcohol use, abuse, or abrupt cessation
- Fever

Signs and Symptoms

- Decreased mental status
- Sleepiness
- Tongue trauma
- Incontinence
- Observed seizure activity
- Evidence of trauma
- Unconsciousness

Differential

- CNS trauma
- Tumor
- Metabolic, hepatic or renal failure
- Hypoxia
- Electrolyte abnormality (Na, Ca, Mg)
- Drugs, medication non-compliance
- Infection, fever
- Alcohol withdrawal
- Eclampsia
- Stroke
- Hyperthermia
- Hypothermia

Pearls

- Recommended exam: Mental Status, HEENT, Heart, Lungs, Extremities, Neuro.
- Benzodiazepines are effective in terminating seizures; do not delay IM/IN administration while initiating an IV.
- Recent evidence supports the use of MIDAZOLAM IM as an intervention that is at least as safe and effective as intravenous LORAZEPAM for prehospital seizure cessation.
- Status epilepticus is defined as two or more seizures successively without an intervening lucid period, or a seizure lasting over five minutes.
- Grand mal seizures (generalized) are associated with loss of consciousness, incontinence and oral trauma.
- Focal seizures affect only part of the body and are not usually associated with a loss of consciousness.
- Be prepared to address airway issues and support ventilations as needed. Many airway/breathing issues in seizing patients can be managed without intubation or placement of an advanced airway. Reserve these measures for patients that fail less invasive maneuvers as noted above.
- Consider ETCO2 monitoring.
- For new onset seizures or seizures that are refractory to treatment, consider other potential causes including, but not limited to, trauma, stroke, electrolyte abnormality, toxic ingestion, pregnancy with eclampsia, hyperthermia.

Sepsis (Suspected)

General Adult Assessment

FR	Oxygen Keep SpO2 >94%
E*	Vascular Access
P	Cardiac Monitoring/Capnography

Does the patient have a known or suspected source of infection AND TWO of the following criteria?

SBP <90 mm Hg

HR >90/min

Respiratory rate >20/min

Altered mental status

Temperature > or = 100.4 F or < or = 96.8 F

Persistent ETCO2 <25 on waveform capnography

YES

CODE SEPSIS notification immediately upon recognition of patient meeting Sepsis criteria

E*	LR or NS bolus 500 ml IV/IO, reassess criteria and re-examine. May repeat x3 for SBP <90, with no rales on lung exam. Max dose 2000 ml.
P	If SBP <90 after 2000 ml IV fluids: NOREPINEPHRINE 0.05-0.5 mcg/kg/min IV drip titrate to maintain SBP >90 or MAP >65 OR;
P	PUSH DOSE EPINEPHRINE 1:100,000 10 mcg IV/IO, may repeat q 2-5 min to maintain SBP >90 (1 ml of a 1:100,000 solution) AND/OR EPINEPHRINE 0.05-0.3 mcg/kg/min IV drip

NO

Alternate appropriate treatment guidelines as indicated

Continue General Adult Assessment

History

- Age (Common in elderly and very young)
- Presence and duration of fever
- Previously documented infection or illness (UTI, Pneumonia, meningitis, encephalitis, cellulitis, abscesses, etc)
- Recent surgery or invasive procedure
- Any recent hospitalization
- Immunocompromised (transplant, HIV, diabetes, cancer)
- Bedridden or immobile patients
- Prosthetic or indwelling devices
- Immunization status
- Open wounds, even minor ones

Signs and Symptoms

- Hyper or hypothermia
- Rash and/or excessive bruising
- Fever, Chills
- Myalgia
- Markedly decreased urine output
- Altered mentation
- Delayed capillary refill
- Elevated blood glucose (unless diabetic)

Differential

- Cardiogenic Shock
- Hypovolemic Shock
- Dehydration
- Hyperthyroidism
- Medication/drug interaction
- Non-septic infection
- Allergic reaction/anaphylaxis
- Toxicological emergency
- Withdrawal syndromes

Pearls

- Early recognition of sepsis allows for attentive care and early administration of antibiotics.
- Aggressive IV fluid therapy is the most important prehospital treatment for sepsis. Suspected septic patients should receive repeated fluid boluses (to a max total of 2 liters) while being checked frequently for signs of pulmonary edema, especially those patients with known history of CHF or ESRD on dialysis. STOP fluid resuscitation in the setting of pulmonary edema.
- Time IV fluid bolus was initiated and total amount given is to be recorded and reported to hospital staff at patient hand off.
- Septic patients are especially susceptible to traumatic lung injury and ARDS. If artificial ventilation is necessary, avoid ventilating with excessive tidal volumes. If CPAP is utilized, airway pressure should be limited to 5 cm H_2O.
- Attempt to identify source of infection (skin, respiratory, etc.) and relay previous treatments and related history to the ED physician and nursing staff.
- Elevated serum lactate levels are a useful marker of hypoperfusion in sepsis and often become elevated prior to the onset of hypotension. $ETCO_2$ levels are inversely proportional to serum lactate levels.
- Disseminated intravascular coagulation (DIC) is an ominous, late stage manifestation of sepsis characterized by frank, extensive bruising, bleeding from multiple sites, and finally tissue death.
- Conditions such as Crohn's, psoriasis, rheumatoid arthritis and other autoimmune disorders are now being treated with medications that impair the immune system. These patients need to be considered as immunocompromised.
- Hypovolemia or distributive shock should be addressed with a fluid bolus prior to the administration of vasopressors.
- NOREPINEPHRINE is the preferred vasopressor drip for septic shock.

QI Metrics

- Vital signs to include blood pressure, heart rate, respiratory rate, SpO_2, and $EtCO_2$ documented throughout transport.
- Vital signs before, during, and after fluid administration.
- Documentation of the time IV fluid was started and total amount given.

Shock

For patients with known adrenal insufficiency, administer patient's own SOLU-CORTEF (HYDROCORTISONE) as prescribed OR; METHYLPREDNISOLONE 2 mg/kg IV, max 125 mg

General Adult Assessment

FR Oxygen Keep SpO_2 >94%

E* Vascular Access

P Cardiac monitor/capnography

Alternative appropriate treatment protocols as indicated

Trauma - related

General Trauma

Non-trauma, Non-cardiogenic

E* LR or NS bolus 1000 ml IV/IO; may repeat x 1 with no rales on lung exam

P NOREPINEPHRINE 0.05-0.5 mcg/kg/min IV drip titrate to maintain SBP >90 or MAP >65

P PUSH DOSE EPINEPHRINE 1:100,000 10 mcg IV/IO, may repeat q 3-5 min to maintain SBP >90 or MAP >65 (1 ml of a 1:100,000 solution) AND/OR EPINEPHRINE 0.05-0.3 mcg/kg/min IV drip

P Obtain waveform capnography

Cardiogenic

Appropriate arrhythmia protocol as indicated

P 12-Lead ECG

P Obtain waveform capnography

E* LR or NS bolus 500 ml IV/IO; if no rales on lung exam, may repeat x 1

P NOREPINEPHRINE 0.05-0.5 mcg/kg/min IV drip titrate to maintain SBP >90 or MAP >65

P PUSH DOSE EPINEPHRINE 1:100,000 10 mcg IV/IO, may repeat q 3-5 min to maintain SBP >90 or MAP >65 (1 ml of a 1:100,000 solution) AND/OR EPINEPHRINE 0.05-0.3 mcg/kg/min IV drip

Continue General Adult Assessment

History
- Blood loss - vaginal bleeding, ectopic, GI bleeding or AAA
- Fluid loss - vomiting, diarrhea, fever
- Infection
- Cardiac problems
- Medications
- Allergic reaction
- Pregnancy
- History of poor oral intake
- Adrenal insufficiency

Signs and Symptoms
- Restlessness, confusion
- Weakness, dizziness
- Weak rapid pulse
- Pale, cool, clammy skin
- Delayed capillary refill
- Hypotension
- Coffee-ground emesis
- Tarry stools

Differential
- Hypovolemic shock
- Cardiogenic shock
- Septic shock
- Neurogenic shock
- Anaphylactic shock
- Ectopic pregnancy
- Dysrhythmias
- Pulmonary embolism
- Tension pneumothorax
- Medication effect or overdose
- Vasovagal
- Physiologic (pregnancy)

Pearls
- Recommended exam: Mental Status, Skin, Heart, Lungs, Abdomen, Back, Extremities, Neuro.
- Shock often is present with normal vital signs and may develop insidiously. Tachycardia may be the only manifestation.
- Hypotension can be defined as a systolic BP of <90. This is not always reliable and should be interpreted in context and patient's typical BP, if known. Shock may present with a normal BP initially.
- Normal Shock Index (SI) is less than 0.7. A Shock Index (SI) greater than 1.0 is indicative of shock and need for aggressive resuscitation. [SI = HR / SBP]
- An ETCO2 measurement of <25 mm/hg is indicative of shock.
- Hypovolemia or distributive shock should be addressed with a fluid bolus prior to the administration of vasopressors.
- If the patient's condition deteriorates after fluid administration, rales or hepatomegaly develop, then consider cardiogenic shock and withholding further fluid administration.
- While there are no absolute contraindications to epinephrine, it should be used with caution in elderly patients, patients with known cardiovascular disease, or significant tachycardia or hypertension, and should be administered only when the patient's signs and symptoms are severe.
- Consider all possible causes of shock and treat per appropriate protocol.

Hypovolemic shock
- Hemorrhage, trauma, GI bleeding, ruptured aortic aneurysm, or pregnancy related bleeding

Cardiogenic shock
- Heart failure, MI, cardiomyopathy, myocardial contusion, toxins, dysrhythmia, valvular disease

Distributive shock
- Sepsis, anaphylaxis, neurogenic, toxins, overdose, endocrine

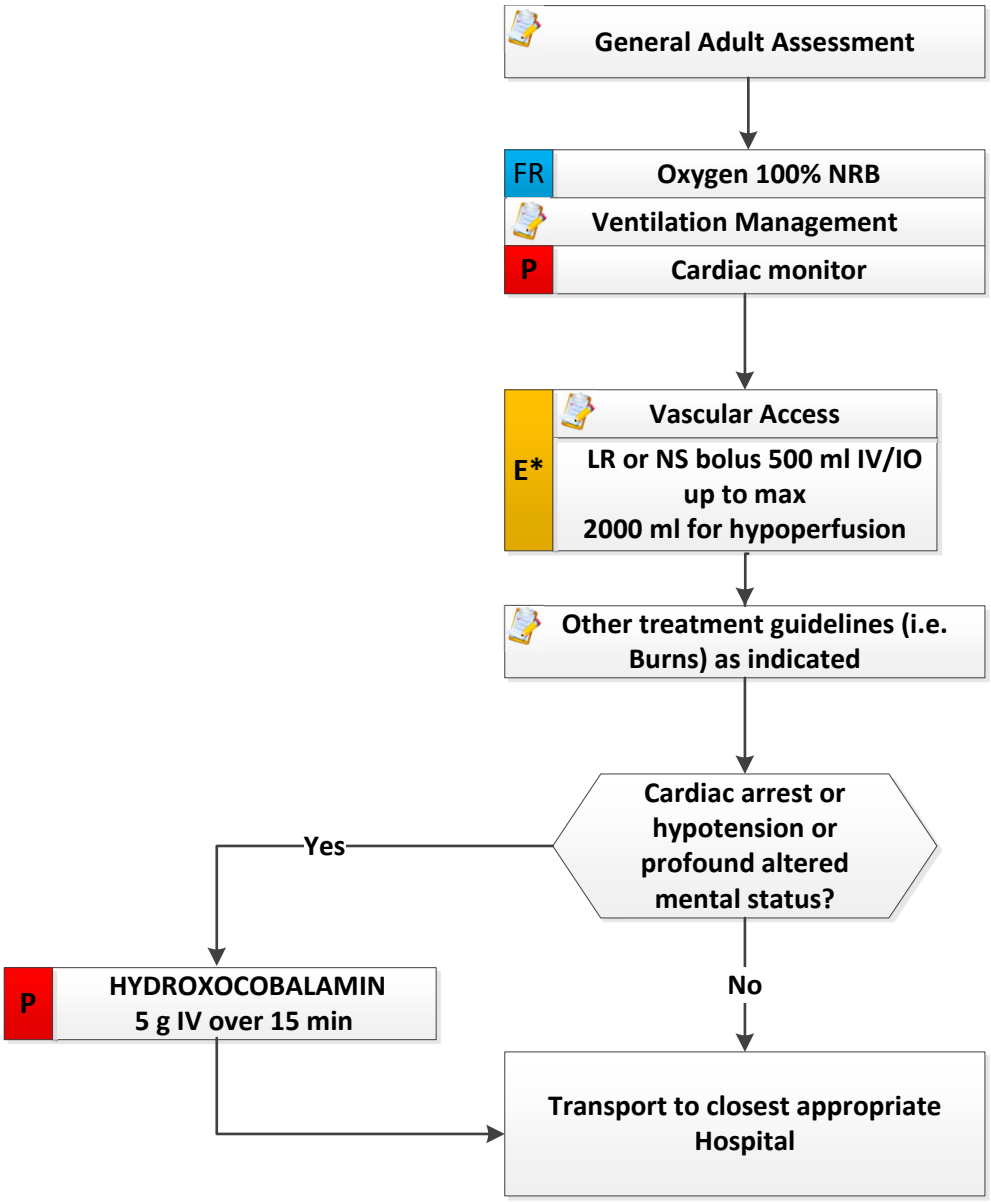
Obstructive shock
- Pericardial tamponade, pulmonary embolus, tension pneumothorax

For patients with known adrenal insufficiency, administer patient's own SOLU-CORTEF (HYDROCORTISONE) as prescribed OR;

METHYLPREDNISOLONE 2 mg/kg IV, max 125 mg

Causes of Adrenal Insufficiency:
Addison's Disease
Congenital Adrenal Hyperplasia
Long term administration of steroids
Others

Smoke Inhalation



History
- Exposed to smoke in a structure fire
- Exposed to smoke in a vehicle fire
- Exposed to smoke from other sources, industrial, confined space, wilderness fire, etc.

Signs and Symptoms
- Facial burns
- Singed nasal hairs or facial hair
- Shortness of breath
- Facial edema
- Stridor
- Grunting respirations

Differential
- COPD
- CHF
- Toxic inhalation injury
- Caustic inhalation injury
- Pneumonitis

Pearls
- Recommended exam: Mental Status, HEENT, Heart, Lungs, Abdomen, Back, Extremities, Neuro.
- Protect yourself and your crew.
- Have a high index of suspicion when treating patients at the scene of a fire.
- If the medication is not available on scene do not delay transport waiting for it.
- Carefully monitor respiratory effort and correct life threats immediately.
- Decide early on if you want to intubate as burned airways swell, making intubation difficult.
- Profound altered mental status can be defined as a deficit that includes disorientation, bewilderment and difficulty following commands.

Preparation and Administration of HYDROXOCOBALAMIN

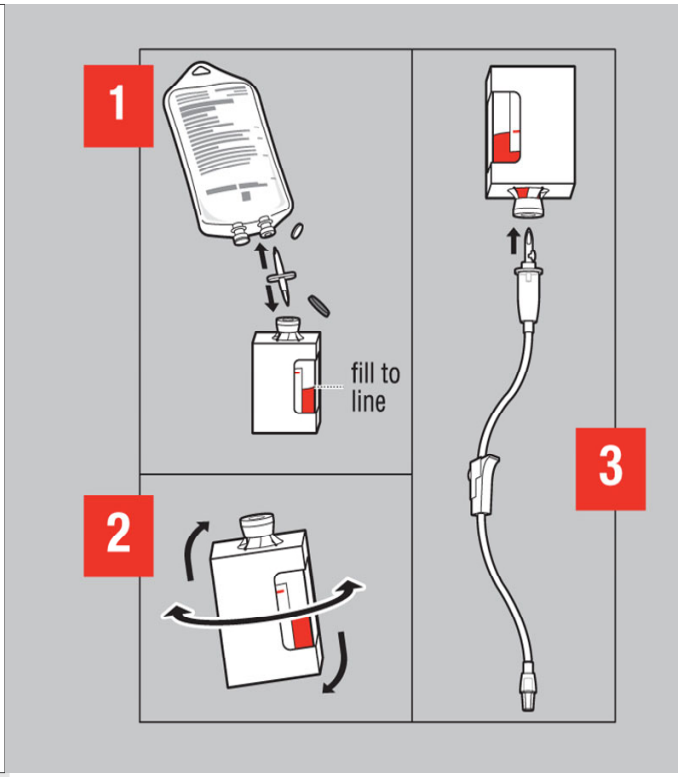
Complete Starting Dose: 5 g

1. Reconstitute: Place the vial in an upright position.
Add **200 mL** of 0.9% Sodium Chloride Injection* to the vial using the transfer spike. **Fill to the line.**

* 0.9% Sodium Chloride Injection is the recommended diluent (diluent not included in the kit). Lactated Ringer's Solution and 5% Dextrose Injection have also been found to be compatible with HYDROXOCOBALAMIN.

2. Mix: The vial should be repeatedly inverted or rocked, ***NOT*** shaken, for at least **60 seconds** prior to infusion.

3. Infuse Vial: Use vented intravenous tubing, hang and infuse over **15 minutes**.



STEMI (Suspected)

General Adult Assessment

E — 12-Lead ECG within 10 minutes of patient contact

STEMI

Facility STEMI Alert notification immediately upon recognition of STEMI

E* — Vascular Access

FR — Oxygen
Keep SpO2 >94%

E — ASPIRIN
324 mg PO

NITROGLYCERIN

E — Assist pt with own medication as prescribed; may repeat q 5min X2

E* — 0.4 mg SL;
may repeat q 5min X2

P — Consider NITROPASTE
0.5-1" transdermal

P — Pain Management for continued pain

P — <u>BSFD, YMCRFD, & HBRFD *only*</u>
For physician confirmed STEMI:
BRILINTA 180 mg PO
HEPARIN 60 units/kg IV bolus (max 4000 units)

A — Consider antiemetic for nausea/ vomiting: ONDANSETRON
4 mg ODT/IV/IO

p — METOCLOPRAMIDE 5-10 MG IV/IM
DROPERIDOL 0.625-1.25 MG IV/IM

NITROGLYCERIN is contraindicated in any patient with hypotension, bradycardia, tachycardia (HR>100bpm) in the absence of heart failure, evidence of a right ventricular infarction, and use of erectile dysfunction medications within the last 48-72 hours. Caution is advised in patients with Inferior Wall STEMI and a right-sided ECG should be performed to evaluate RV infarction or withhold NITRO.

Refer to Arrhythmia and Shock Guidelines as needed

Transport and re-notify receiving facility

History

- Age
- Medication: Viagra, Levitra, Cialis, Revatio, Staxyn, etc.
- Past Medical History: MI, angina, diabetes, HTN, HLD
- Allergies
- Recent physical exertion
- Time of onset, duration

Signs and Symptoms

- CP, pressure, ache, vice-like pain, tight, heavy
- Location: substernal, epigastric, arm, jaw, neck, shoulder
- Radiation of pain
- Pale, diaphoresis
- Shortness of breath
- Nausea, vomiting
- Dizziness, lightheadedness

Differential

- Trauma versus medical
- Angina versus MI
- Pericarditis
- Pulmonary embolism
- Asthma, COPD
- Pneumothorax
- Aortic dissection or aneurysm
- GE reflux or hiatal hernia
- Esophageal spasm
- Chest injury or pain
- Pleural pain
- Drug overdose (cocaine, methamphetamines)

Pearls

- Recommended exam: Mental Status, Skin, HEENT, Heart, Lungs, Abdomen, Back, Extremities, Neuro.
- Diabetics, geriatrics, and female patients often have atypical pain. Have a high index of suspicion.
- Perform a 12-Lead ECG on all patients 35 years old and older experiencing vague jaw/ chest/ abdominal discomfort.
- Perform a 12-Lead ECG within 10 minutes of patient contact.
- The administration of NITROGLYCERIN is contraindicated for any patient who has used erectile dysfunction medications within the last 48-72 hours.

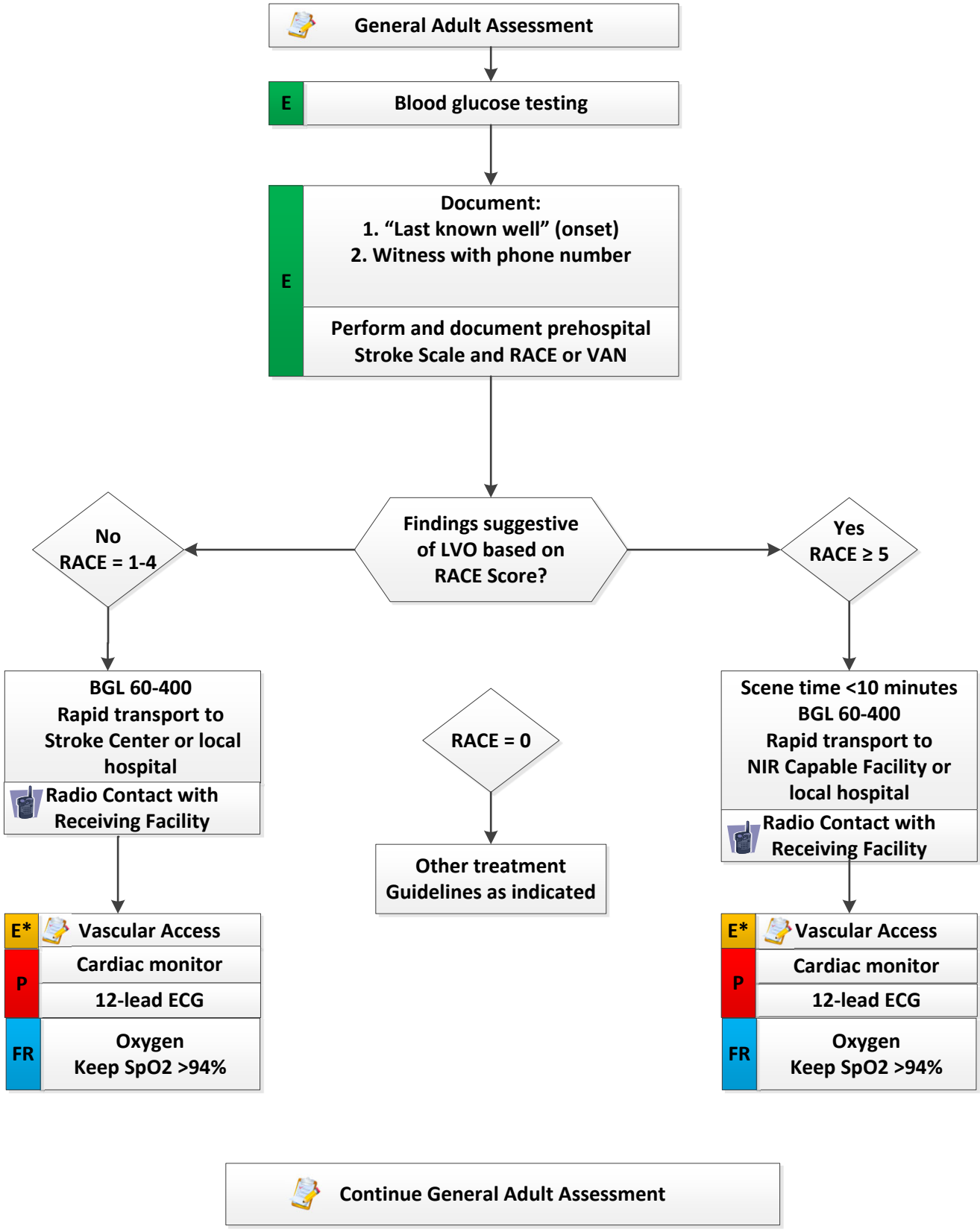
STEMI BYPASS PROCEDURE

- Applicable to BSFD, YMCRFD, and HBRFD *only* when bypassing BSMC and transporting (ground or flight) directly to hospital with cardiac catherization capability (i.e. BHDRMC, EIRMC).
- Perform a 12-Lead ECG within 10 minutes of patient contact and transmit to base hospital or receiving facility.
- Once physician confirms STEMI on 12-Lead ECG, administer:
  - BRILINTA 180 mg PO
  - HEPARIN 60 units/kg IV bolus (max 4000 units)

QI Metrics

- 12-Lead ECG within 10 minutes of patient contact.
- Pain reassessed with every intervention.
- Pain control documented.

Stroke (CVA)


General Adult Assessment
E
Blood glucose testing
E
Document:
1. "Last known well" (onset)
2. Witness with phone number
Perform and document prehospital Stroke Scale and RACE or VAN
Findings suggestive of LVO based on RACE Score?
No
RACE = 1-4
Yes
RACE ≥ 5
RACE = 0
BGL 60-400
Rapid transport to Stroke Center or local hospital
Radio Contact with Receiving Facility
Other treatment Guidelines as indicated
Scene time <10 minutes
BGL 60-400
Rapid transport to NIR Capable Facility or local hospital
Radio Contact with Receiving Facility
E*
Vascular Access
P
Cardiac monitor
12-lead ECG
FR
Oxygen
Keep SpO2 >94%
E*
Vascular Access
P
Cardiac monitor
12-lead ECG
FR
Oxygen
Keep SpO2 >94%
Continue General Adult Assessment

History
- Previous CVA, TIAs
- Previous cardiac/vascular surgery
- Associated diseases: diabetes, HTN, CAD
- Atrial Fibrillation
- Medications: anticoagulant, antiplatelet
- History of recent trauma
- History of recent surgery
- History of recent hemorrhage

Signs and Symptoms
- Facial droop
- Weakness, paralysis
- Blindness or other vision change
- Aphasia, dysarthria
- Vertigo, dizziness
- Vomiting
- Headache
- Neck pain/stiffness
- Seizures
- Hypertension, hypotension

Differential
- AMS
- TIA
- Seizure
- Hypoglycemia
- Sepsis
- Migraine
- Intoxication
- Tumor
- Trauma
- Dialysis/ Renal Failure

Pearls
- Recommended exam: Mental Status, HEENT, Heart, Lungs, Abdomen, Extremities, Neuro.
- Determine time of "last known well" (onset) or last time patient was seen normal.
- Three most predictive findings for diagnosis of stroke: facial droop, arm drift or weakness, abnormal speech.
- Activate CODE STROKE for "last known well" under 4.5 hours or signs of LVO stroke under 24 hours. Note – a 'wake up stroke' is an indication for CODE STROKE as still may be a thrombolytics candidate based on MRI showing DWI-positive and FLAIR-negative mismatch.
- Transport to an appropriate Stroke Center or Endovascular Treatment Center if possible.
- Prevent aspiration by elevating head of stretcher 15–30 degrees if SBP greater than 100 mmHg.
- Avoid multiple IV attempts.

QI Metrics
- Complete the prehospital stroke scale and RACE or VAN assessment in less than five minutes.
- Time of "last known well" (onset) documented.
- Blood glucose documented.
- 12-Lead EKG completed.
- Scene time <10 minutes.
- Telemetry to receiving facility.

Cincinnati Pre-hospital Stroke Scale

1. FACIAL DROOP: *Have patient show teeth or smile.*

Normal: both sides of the face move equally

Abnormal: one side of face does not move as well as the other side

2. ARM DRIFT: *Patient closes eyes & holds both arms out for 10 sec.*

Normal: both arms move the same or both arms do not move at all

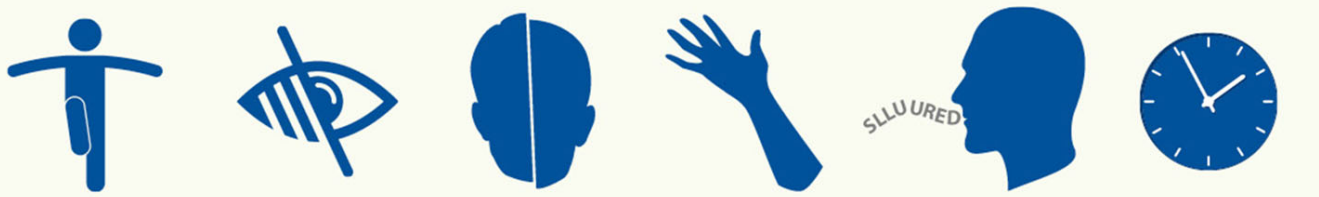
Abnormal: one arm does not move or drifts down compared to the other

3. ABNORMAL SPEECH: *Have the patient say "you can't teach an old dog new tricks."*

Normal: patient uses correct words with no slurring **Abnormal:** patient slurs words, uses the wrong words, or is unable to speak

INTERPRETATION: If any 1 of these 3 signs is abnormal, the probability of a stroke is 72%.

If you suspect a stroke, BE FAST:



Balance
Does the person have a loss of balance?

Eyes
Has the person lost vision in one or both eyes?

Face
Does the person's face look uneven?

Arms
Can the person raise both arms for 10 seconds?

Speech
Is the person's speech slurred?

Time
Time is brain. Call 911 if you suspect a stroke.

Weakness PLUS...

V Vision

A Aphasia

N Neglect

Rapid Arterial oCclusion Evaluation (RACE) Scale

An EMS Assessment Tool for Acute Ischemic Stroke

(Sensitivity 85%, Specificity 68%)

Test Item	Score = 0	Score = 1	Score = 2	Patient Score
Facial Palsy	Absent	Mild	Moderate/Severe	
Arm Motor	Normal/Mild	Moderate	Severe	
Leg Motor	Normal/Mild	Moderate	Severe	
Head/Gaze Deviation	Absent	Present	N/A	
Aphasia* (if right hemiparesis)	Performs Both Tasks	Performs 1 Task	Performs Neither Tasks	
Agnosia+ (if left hemiparesis)	Patient Recognizes Arm and Impairment	Unable to Recognize Arm or Impairment	Unable to Recognize BOTH Arm and Impairment	
			TOTAL SCORE = (0-9)	

*Aphasia: Ask the patient to: 1. "Close your Eyes" AND 2. "Make a Fist"

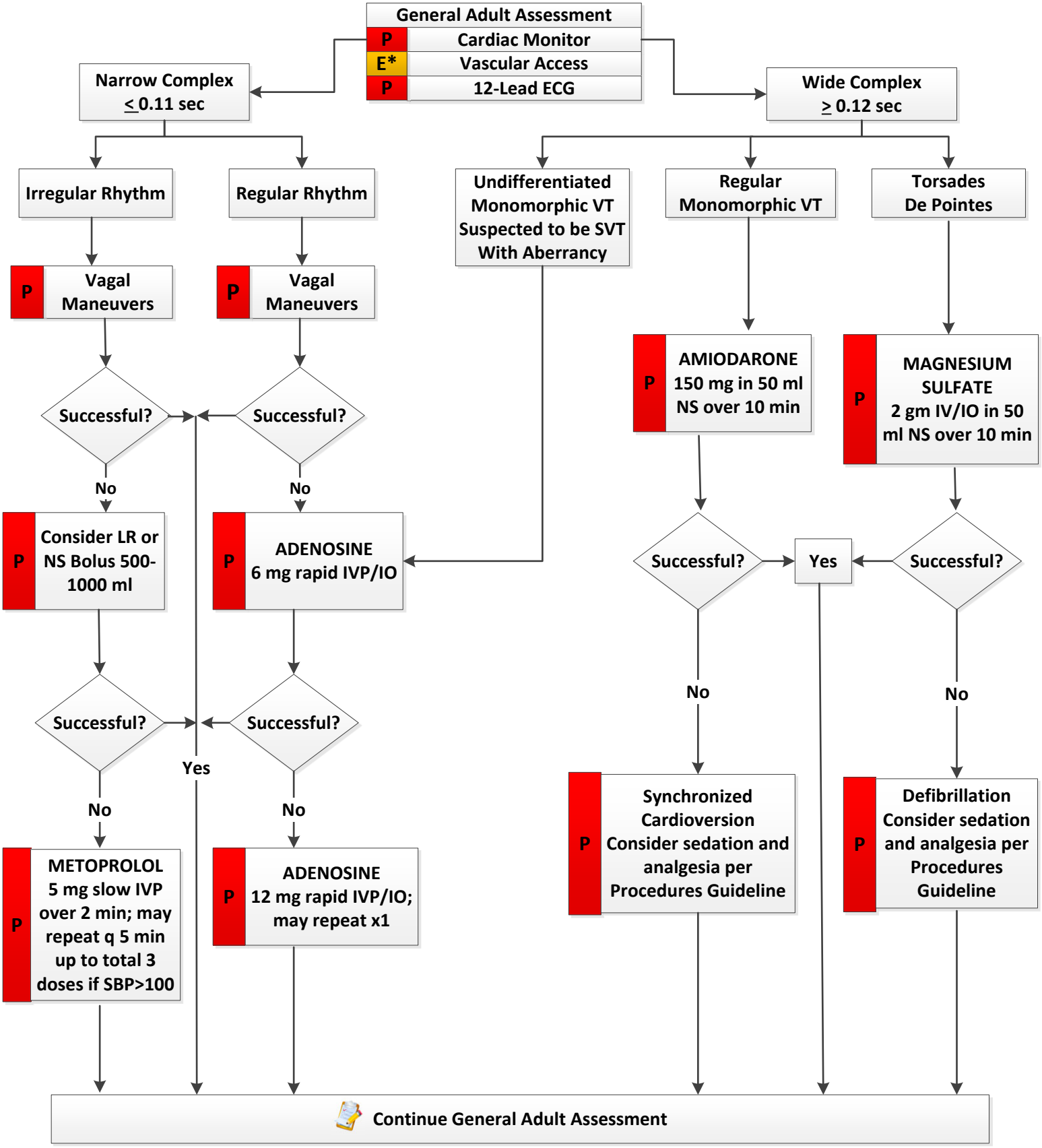
+Agnosia: Ask the patient and evaluate recognition of deficit:

1. While showing paretic arm: "Whose arm is this?"
2. Ask patient: "Can you lift both arms and clap?"

If RACE Score = 5 or greater, patient may have an ischemic stroke with a large vessel occlusion

Reference:
Natalia Pérez de la Ossa, et al. (2014). Design and Validation of a Prehospital Stroke Scale to Predict Large Arterial Occlusion: The Rapid Arterial Occlusion Evaluation Scale. *Stroke*, 45, 87-91. Retrieved from http://stroke.ahajournals.org/content/45/1/87.full

Tachycardia / Stable
(Normal Mental Status, Palpable Radial Pulse)



History

- Medications (aminophylline, diet pills, thyroid supplements, decongestants, digoxin)
- Diet (caffeine)
- Drugs (cocaine, methamphetamines)
- Past medical history: CHF, dysrhythmia

Signs and Symptoms

- Heart rate >150
- Dizziness, lightheadedness
- CP
- SOB, dyspnea
- Diaphoresis
- Palpitations
- Syncope/near syncope
- AMS
- Hemodynamic compromise

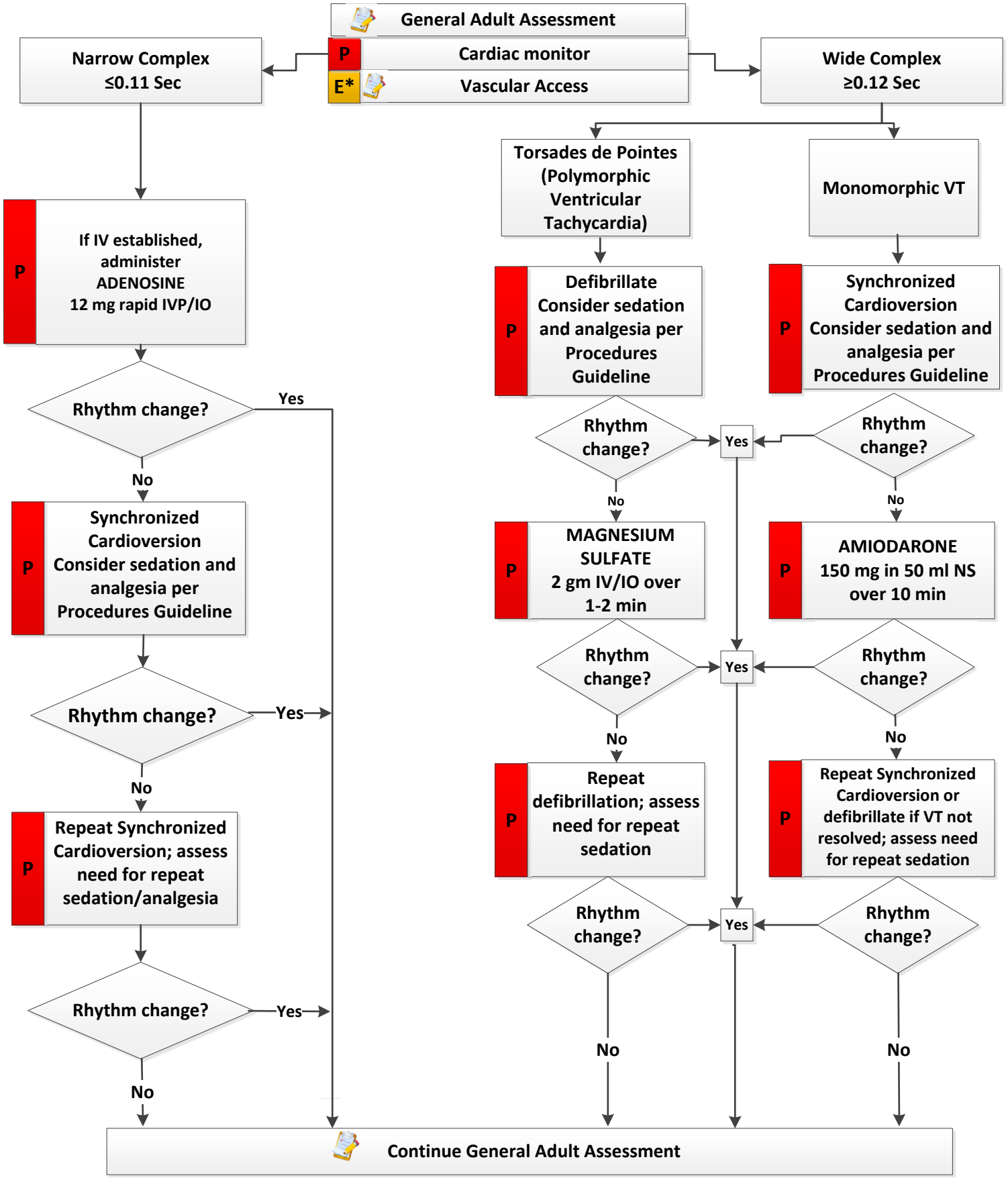
Differential

- Heart disease (WPW, valvular)
- Sick sinus syndrome
- MI
- Electrolyte imbalance (acidosis, hypokalemia, hyperkalemia)
- Exertion, fever, pain, emotional stress
- Hypoxia
- Hypovolemia
- Drug effect, overdose
- Hyperthyroidism
- Hypoglycemia
- Hypothermia
- Tension pneumothorax
- Cardiac tamponade
- Thrombus
- Trauma

Pearls

- Recommended exam: Mental Status, Skin, Heart, Lungs, Abdomen, Back, Extremities, Neuro.
- Carefully monitor patients as you treat them; stable tachycardia may convert to unstable rhythms/conditions quickly.
- A-fib rarely requires cardioversion in the field. As it is difficult to ascertain the onset of this rhythm, the risk of stroke needs to be considered prior to cardioversion.
- A wide-complex irregular rhythm should be considered pre-excited A-fib (e.g., Wolff-Parkinson-White Syndrome, Lown-Ganong-Levine Syndrome). Extreme care must be taken in these patients. Avoid AV nodal blocking agents such as ADENOSINE, calcium channel blockers, digoxin, and beta-blockers in patients with pre-excitation A-fib because these drugs may cause a paradoxical increase in the ventricular response and potential ventricular fibrillation. Treatment in order of preference is: PROCAINAMIDE, synchronized cardioversion, and potentially AMIODARONE.
- Use of METOPROLOL can worsening CHF, chronic obstructive pulmonary disease (COPD), asthma, as well as hypotension and bradycardia.
- Patients who receive beta-blockers (e.g., METOPROLOL) with calcium channel blockers (e.g., DILTIAZEM) are at increased risk for hypotension and bradycardia.
- Sedate patients prior to cardioversion, if time allows. Preference for anterior-posterior pad placement. Dose escalating strategy preferrable with biphasic monitor versus single high energy/highest success rate for single shock.

Tachycardia / Unstable
(Mental Status Changes, No Palpable Radial Pulse)



History

- Medications (aminophylline, diet pills, thyroid supplements, decongestants, digoxin)
- Diet (caffeine)
- Drugs (cocaine, methamphetamines)
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Signs and Symptoms

- Heart rate >150
- Dizziness, lightheadedness
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- Diaphoresis
- Palpitations
- Syncope/near syncope
- AMS
- Hemodynamic compromise

Differential

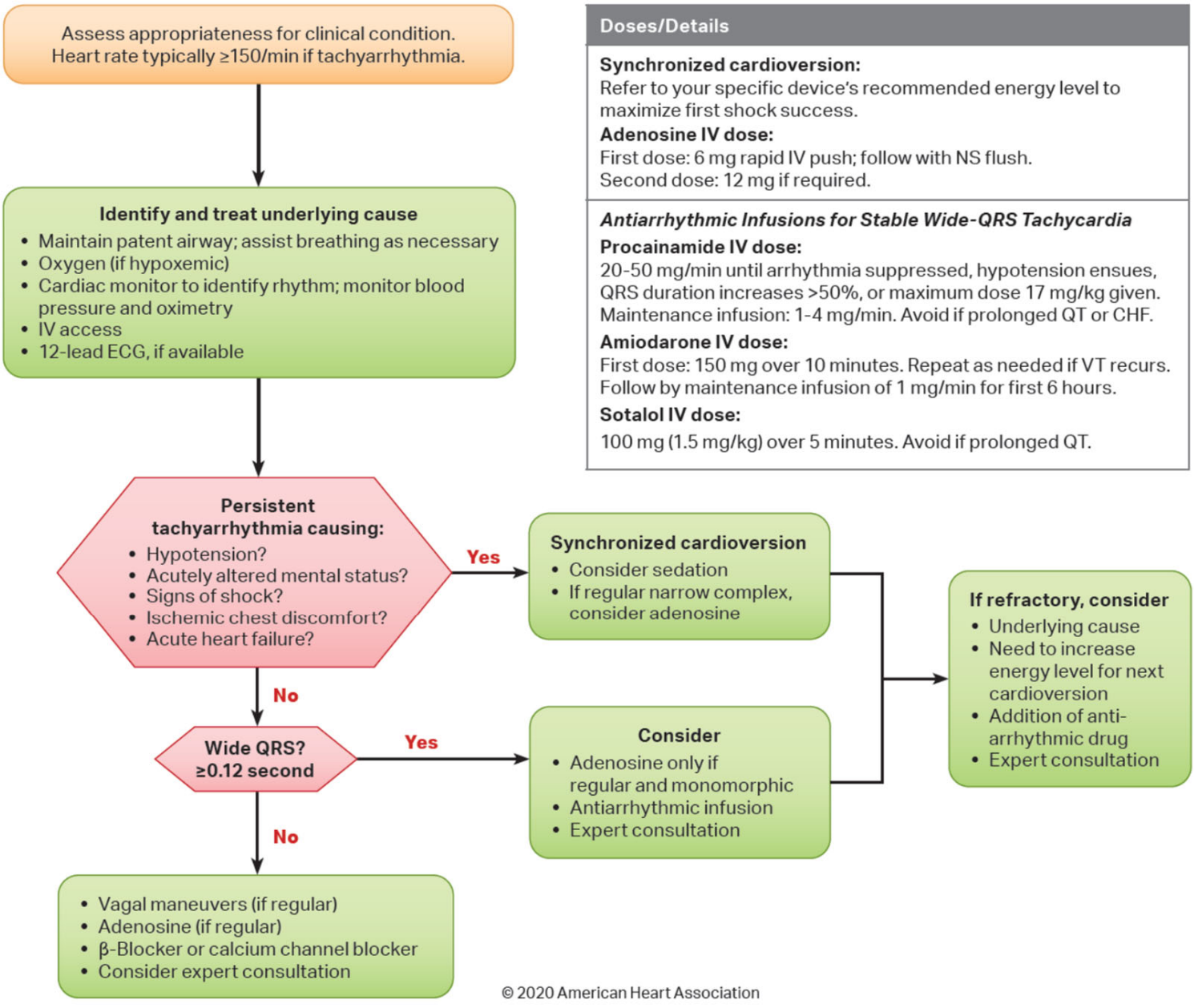
- Heart disease (WPW, valvular)
- Sick sinus syndrome
- MI
- Electrolyte imbalance (acidosis, hypokalemia, hyperkalemia)
- Exertion, fever, pain, emotional stress
- Hypoxia
- Hypovolemia
- Drug effect, overdose
- Hyperthyroidism
- Hypoglycemia
- Hypothermia
- Tension pneumothorax
- Cardiac tamponade
- Thrombus
- Trauma

Pearls

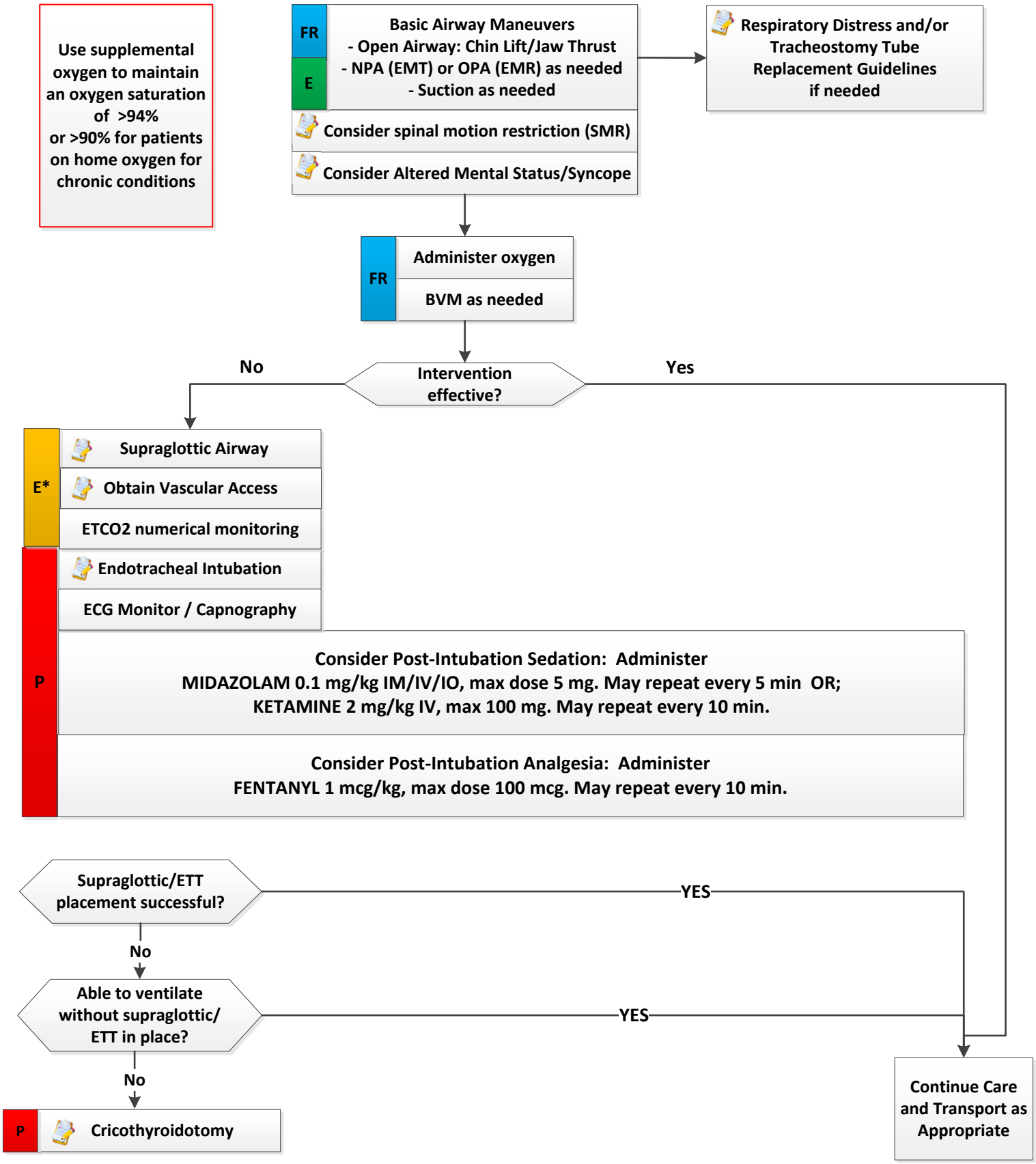
- Recommended exam: Mental Status, Skin, Heart, Lungs, Abdomen, Back, Extremities, Neuro.
- If patient is in arrest, efforts should focus on quality chest compressions and rhythm correction.
- Administer ADENOSINE at a proximal large bore IV site, rapidly followed by a saline flush.
- Sedate patients prior to cardioversion/defibrillation, if time allows. Preference for anterior-posterior pad placement. Dose escalating strategy preferrable with biphasic monitor versus single high energy/highest success rate for single shock.

Adult Tachycardia with a Pulse Algorithm

Adult Tachycardia With a Pulse Algorithm



Ventilation Management



Always weigh the risks and benefits of endotracheal intubation in the field against transport. All prehospital endotracheal intubations are considered high risk. If ventilation/oxygenation is adequate, transport may be the best option. The most important airway device and the most difficult to use correctly and effectively is the Bag Valve Mask (not the laryngoscope). Few prehospital airway emergencies cannot be temporized or managed with proper BVM techniques.

DIFFICULT AIRWAY ASSESSMENT:

Difficult BVM Ventilation – MOANS: Difficult **M**ask seal due to facial hair, anatomy, blood or secretions/trauma; **O**bese or late pregnancy; **A**ge >55; **N**o teeth (roll gauze and place between gums and cheeks to improve seal); **S**tiff or increased airway pressures (asthma, COPD, obese, pregnant).

Difficult Laryngoscopy – LEMON: **L**ook externally for anatomical distortions (small mandible, short neck, large tongue); **E**valuate 3-3-2 Rule (Mouth open should accommodate 3 patient fingers, mandible to neck junction should accommodate 3 patient fingers, chin-neck junction to thyroid prominence should accommodate 2 patient fingers); **M**allampati (difficult to assess in the field); **O**bstruction / Obese or late pregnancy; **N**eck mobility.

Difficult Supraglottic Device Placement – RODS: **R**estricted mouth opening; **O**bstruction / Obese or late pregnancy; **D**istorted or disrupted airway; **S**tiff or increased airway pressures (asthma, COPD, obese, pregnant).

Nasotracheal intubation: *Orotracheal intubation is the preferred choice.* Procedure requires patient to have spontaneous breathing. Contraindicated in anatomically disrupted or distorted airways, increased intracranial pressure, severe facial trauma, basal skull fracture, head injury.

Pearls

- **The Montana Board of Medical Examiners DOES NOT allow drug assisted intubation (DAI) or rapid sequence intubation (RSI) for standard ground ALS paramedics.**
- Consider preoxygenation/lung denitrogenating with a non-rebreather, a nasal cannula at 15 LPM, CPAP, or BVM prior to intubation (as patient condition allows).
- Severe hypotension (SBP<90) should be addressed with IV fluids and/or pressors (as appropriate) prior to intubation in order to reduce the likelihood of post-intubation cardiovascular decline.
- Capnometry (color) or capnography (waveform) is mandatory with all methods of intubation. Document results.
- Continuous capnography (ETCO2) is mandatory for the monitoring of all patients with an advanced airway.
- If an effective airway is being maintained by BVM and/or basic airway adjuncts (e.g. nasopharyngeal airway) with continuous pulse oximetry values of ≥90% or values expected based on pathophysiologic condition with otherwise reassuring vital signs (e.g. pulse oximetry of 85% with otherwise normal vitals in a post-drowning patient), it is acceptable to continue with basic airway measures instead of using a supraglottic airway device or intubation. Consider CPAP or HFNC as indicated by guidelines and patient condition.
- For the purposes of this guideline, a secure airway is achieved when the patient is receiving appropriate oxygenation and ventilation.
- An intubation attempt is defined as passing the laryngoscope blade or endotracheal tube past the teeth or inserted into the nasal passage.
- An appropriate ventilatory rate is one that maintains an ETCO2 of 35 - 45. Avoid hyperventilation.
- Paramedics should use a supraglottic airway device if oral-tracheal intubation is unsuccessful.
- Maintain C-spine stabilization for patients with suspected spinal injury.
- Gastric tube placement should be considered in all intubated patients if time allows.

QI Metrics

- Mandatory notification of Medical Director within 24 hours of any failed intubation attempt. For simplicity, may use this online form: https://forms.gle/G3RPJQ8fEugRafMTA
- Mandatory notification of Medical Director within 24 hours of any attempted, successful, and/or failed cricothyroidotomy in the field. For simplicity, may use this online form: https://forms.gle/G3RPJQ8fEugRafMTA

PEDIATRIC TREATMENT GUIDELINES

For patients who weigh up to 40 kg or < 15 years of age.

Pediatric treatment guidelines are to be used on children who have not yet experienced puberty. Signs of puberty include chest or underarm hair on males, and any breast development in females.

General Pediatric Assessment

Scene Safety / Scene Size-Up
Nature of Illness / Mechanism of Injury
PPE / BSI
Bring all equipment to patient's side, including Broselow Tape or equivalent

MCI → S.T.A.R.T. Triage

Level of Consciousness
- Unresponsive → Check Pulse
  - None or <60 → Cardiac Arrest

Airway
- Signs of compromise or not protecting → Ventilation Management

Breathing
- Inadequate or respiratory distress → Respiratory Distress

Circulation
- Bleeding → Hemorrhage Control

Disability
- Altered or confused → Altered Mental Status/ Syncope

History – HPI & SAMPLE
Vital Signs & Physical Exam
E — Blood glucose testing as indicated
Specific treatment guideline as indicated
Spinal motion restriction as indicated
Comfort measures (splint, position of comfort)
P — Cardiac monitor as indicated
E* — Vascular Access as indicated
FR — Oxygen therapy to keep SpO_2 ≥94%
P — Pain Management as indicated

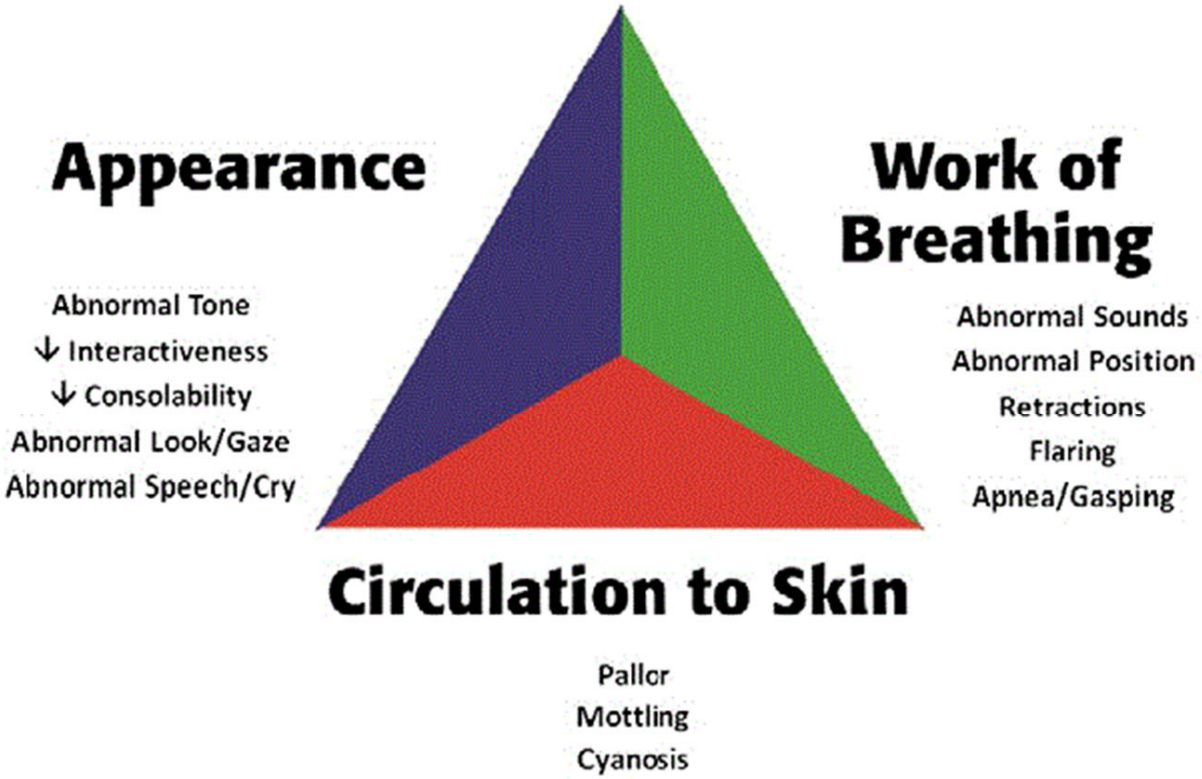
History
- **OPQRST**
  - Onset
  - Provocation
  - Quality
  - Radiation
  - Severity
  - Time
- **SAMPLE**
  - Symptoms
  - Allergies
  - Medications
  - Past medical history
  - Last oral intake
  - Events leading to call

Transport to closest facility for:
- Airway emergencies (inability to adequately ventilate)

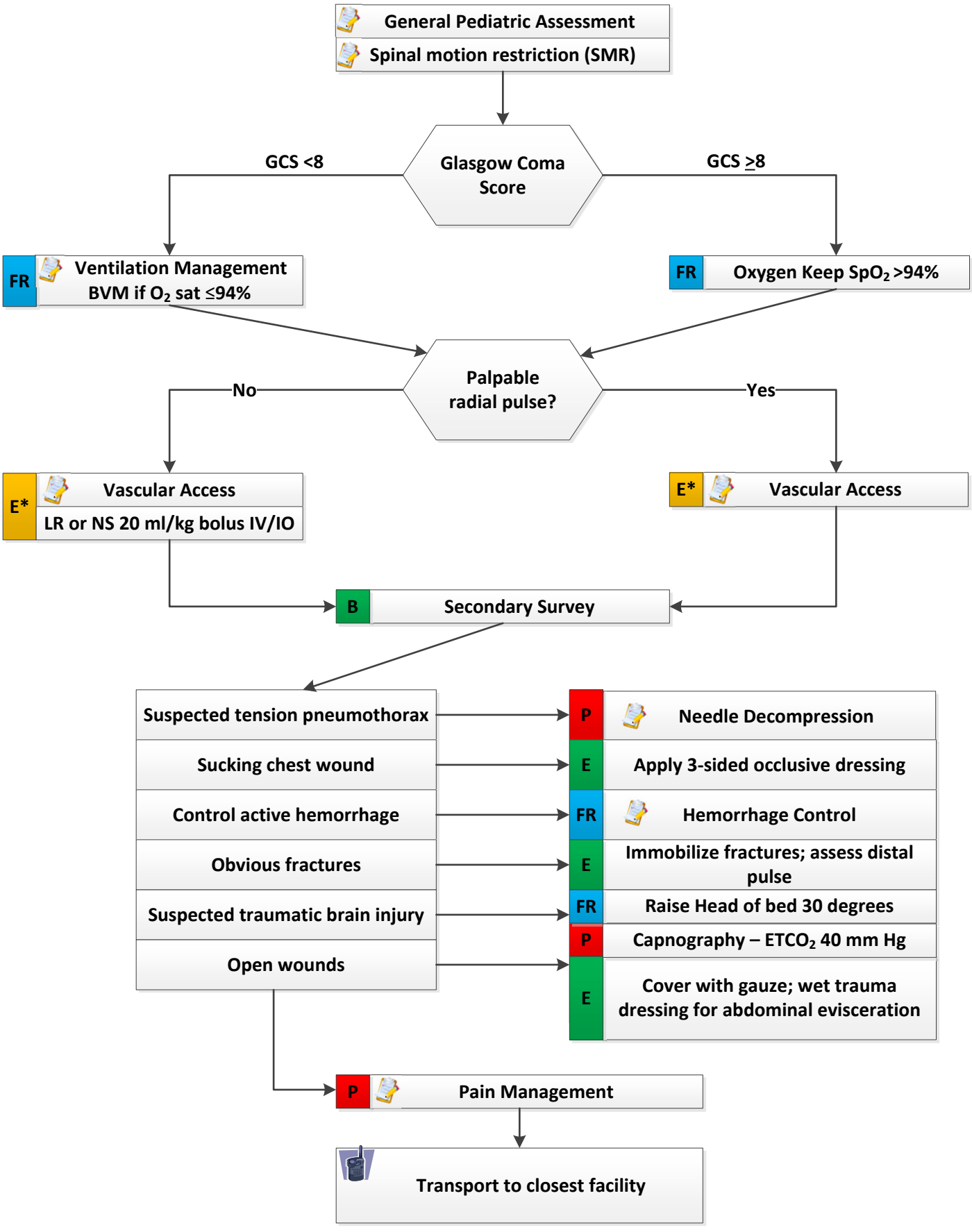
Pearls

- For all scenes where patient needs exceed available EMS resources, initial assessment and treatment shall be in accordance with an approved triage methodology.
- Correct life-threatening problems as identified.
- If the ability to adequately ventilate a patient cannot be established, the patient must be transported to the nearest emergency department.
- Never withhold oxygen from a patient in respiratory distress.

PEDIATRIC ASSESSMENT TRIANGLE



General Pediatric Trauma Assessment



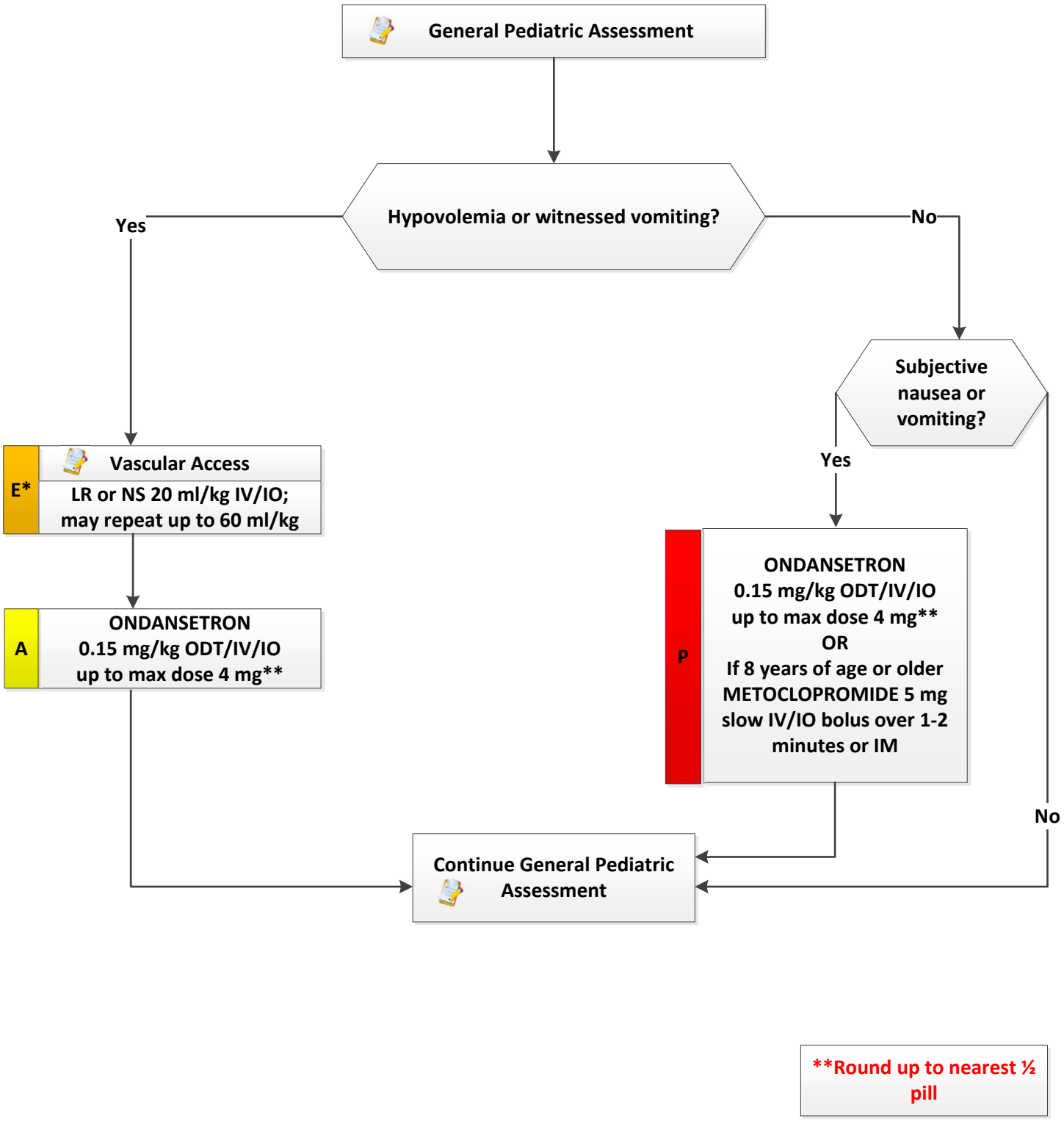
History
- Time and mechanism of injury
- Damage to structure or vehicle
- Location in structure or vehicle
- Others injured or dead
- Speed and details of MVC
- Restraints/protective equipment
- Past medical history
- Medications

Signs and Symptoms
- DCAP-BTLS
- AMS or unconscious
- Hypotension or shock
- Arrest

Differential (Life threatening)
- Tension pneumothorax
- Flail chest
- Pericardial tamponade
- Open chest would
- Hemothorax
- Intra-abdominal bleeding
- Pelvis/femur fracture
- Spine fracture/cord injury
- Head injury
- Extremity fracture
- HEENT (airway obstruction)
- Hypothermia

Pearls
- Recommended exam: Mental Status, Skin, HEENT, Heart Lung, Abdomen, Extremities, Back, Neuro.
- Transport destination is based on the Trauma Field Triage Criteria Guideline.
- Transport should not be delayed for procedures; ideally procedures should be performed enroute when possible. Target scene time less than 10 minutes for unstable patients or those likely to need surgical intervention.
- BVM is an acceptable method of ventilating and managing an airway if pulse oximetry can be maintained ≥90%.
- Pediatric patients should be evaluated with a high index of suspicion; occult injuries may be present and pediatric patients can decompensate quickly.

Pediatric Abdominal Pain, Nausea & Vomiting



**Round up to nearest ½ pill

History

- Age
- Medical/surgical history
- Onset
- Quality
- Severity
- Fever
- Travel history
- Other sick contacts

Signs and Symptoms

- Pain location
- Tenderness
- Nausea
- Vomiting
- Diarrhea
- Dysuria
- Constipation
- Lack of appetite
- AMS

Differential

- Liver (Hepatitis)
- Gastritis
- Pancreatitis
- Kidney stone
- Appendicitis, mesenteric adenitis
- Bladder infection
- Bowel obstruction
- Intussusception
- Gastroenteritis
- Diabetic ketoacidosis (DKA)
- CNS (Increased pressure, headache, stroke, CNS lesions, trauma or hemorrhage)

Pearls

- Recommended Exam: Mental Status, Skin, HEENT, Heart, Lung, Abdomen, Back, Extremities, Neuro.
- Document mental status and vital signs prior to administration of antiemetics & pain management.
- Repeat vital signs after each fluid bolus.
- Consider retroperitoneal palpation for kidney pain.
- Pediatric fluid bolus is 20 ml/kg; may repeat to a maximum of 60 ml/kg.
- New onset DKA in pediatric patients commonly presents with nausea, vomiting, abdominal pain, and/or urinary frequency. Overly aggressive administration of fluid in hyperglycemic patients may cause cerebral edema or dangerous hyponatremia. Cerebral edema is a leading cause of death in children with DKA.
- If there is suspicion that the patient is in DKA, do not exceed 10 ml/kg NS bolus x1.
- MORPHINE is not recommended in children for abdominal pain.
- Consider cardiac and ETCO2 monitoring.
- Abdominal pain in children less than 2 years old may be a harbinger for severe illness.

Pediatric Allergic Reaction

General Pediatric Assessment

Evidence of anaphylaxis?

NO (Mild)

E* Vascular Access

E* DIPHENHYDRAMINE 1 mg/kg PO; max 50 mg

A

P DIPHENHYDRAMINE 1 mg/kg IM/IV/IO; max 50 mg

Reassess patient q 5 min

YES (Moderate/Severe)

EPINEPHRINE

FR Assist patient with EpiPen Jr

E EPINEPHRINE 1:1000, 0.01 mg/kg IM; max single dose 0.3 mg; may repeat q 15 min

ALBUTEROL

E Assist patient with MDI

E ALBUTEROL <10 kg 1.25 mg in 3 ml SVN >10 kg 2.5 mg in 3 ml SVN; repeat until improvement

P Ventilation Management

Cardiac monitor

E* Vascular access 20 ml/kg IV/IO LR or NS bolus; may repeat up to 60 ml/kg

P DIPHENHYDRAMINE 1 mg/kg IM/IV/IO; max 50 mg

Pt in persistent shock? If Yes, then

P PUSH DOSE EPINEPHRINE 0.1 mcg/kg IV/IO, max dose 5 mcg Titrate to SBP>70 mm Hg + 2 X age AND/OR EPINEPHRINE 0.5 mcg/kg/min IV drip

Continue General Pediatric Assessment

Allergic Reaction – mild immune response to an allergen with symptoms such as hives or local swelling/itching

Anaphylaxis – moderate/severe reaction meeting either of these criteria:

- Exposure to known or likely allergen with hypotension OR respiratory compromise
- Two or more of the following after exposure to likely allergen: skin/mucosal changes (hives, flushing, edema); respiratory compromise (SOB, wheezing, stridor, hypoxia); hypotension or signs of shock; persistent GI symptoms (abdominal pain, vomiting)

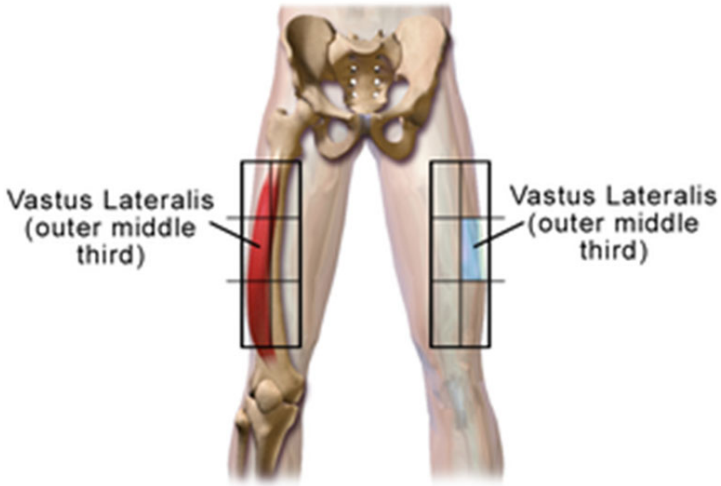
History
- Onset and location
- Insect sting or bite
- Food allergy/exposure
- Medication allergy/exposure
- New clothing, soap, detergent
- Past history of reactions
- Past medical history
- Medication history

Signs and Symptoms
- Itching or hives
- Coughing/wheezing or respiratory distress
- Throat or chest constriction
- Difficulty swallowing
- Hypotension/shock
- Edema
- Nausea/vomiting

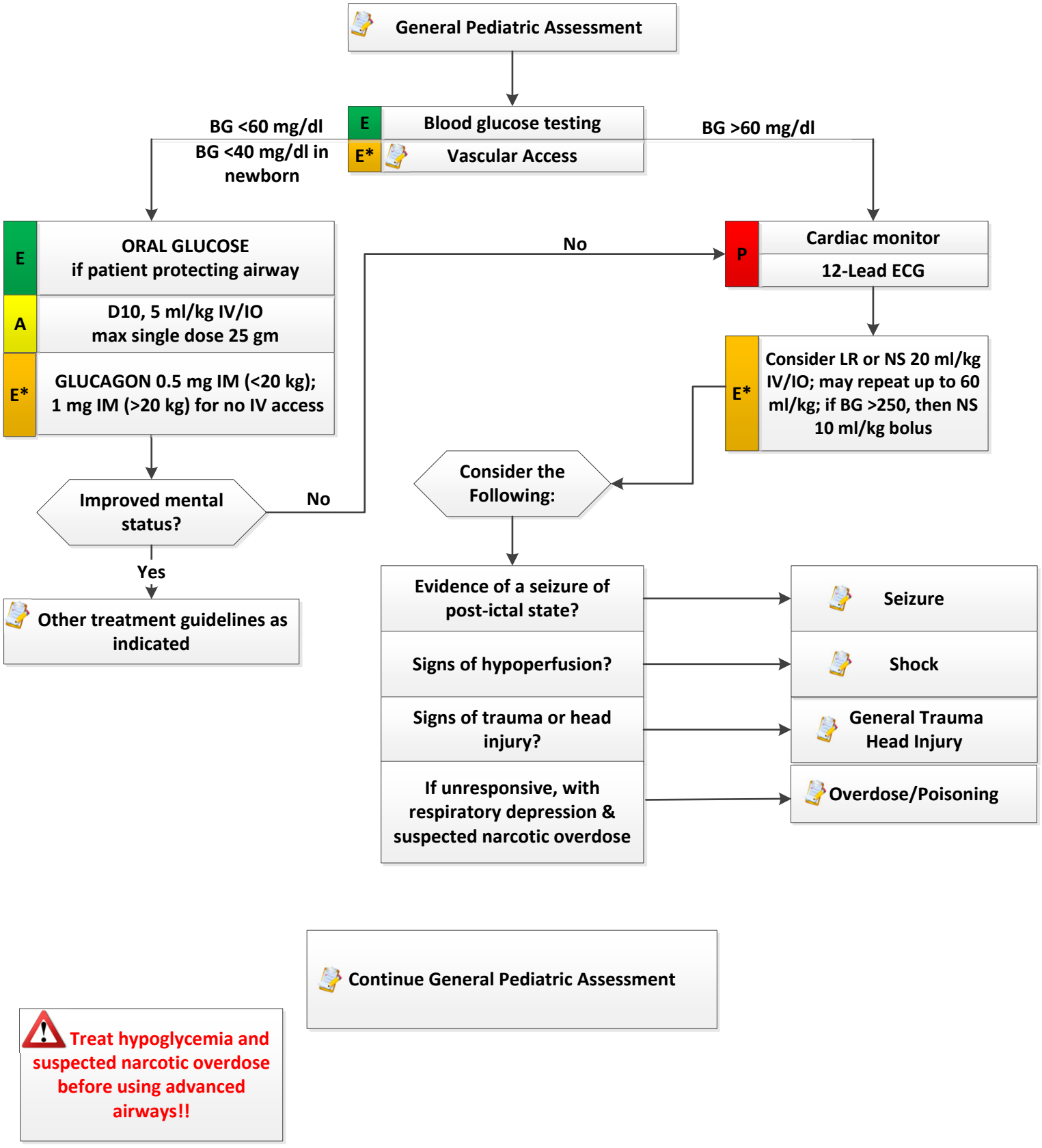
Differential
- Urticarial (rash only)
- Anaphylaxis (systemic effect)
- Shock (vascular effect)
- Angioedema (drug induced)
- Aspiration/airway obstruction
- Asthma/RAD
- CHF
- Scorpion Envenomation

Pearls
- Recommended exam: Mental status, skin, heart, lung
- Anaphylaxis is an acute and potentially lethal multisystem allergic reaction.
- EPINEPHRINE is a first-line drug that should be administered immediately in acute anaphylaxis. IM EPINEPHRINE (1:1000) should be administered before or during attempts at IV or IO access.
- Remove trigger if still present (stinger, food, etc).
- Never give EPINEPHRINE 1:1000 (IM concentration) through IV/IO route.
- IM EPINEPHRINE should be administered in the anterolateral thigh (vastus lateralis) as produces the most rapid rise in serum level.
- Contact Medical Control for refractory anaphylaxis.
- Consider monitoring ETCO2.
- Hypovolemia or distributive shock should be addressed with a fluid bolus prior to the administration of push-dose pressors.
- Contrary to common belief that all cases of anaphylaxis present with cutaneous manifestations, such as urticaria or mucocutaneous swelling, a significant portion of anaphylactic episodes may not involve these signs and symptoms on initial presentation.
- There is no proven benefit to using steroids in the management of allergic reactions and/or anaphylaxis.

QI Metrics
- EPINEPHRINE given appropriately.
- Airway assessment documented.



Pediatric Altered Mental Status



History

- Past medical history
- Medications
- Recent illness
- Irritability
- Lethargy
- Changes in feeding/sleeping
- Diabetes
- Potential ingestion
- Trauma
- Last wet diaper/urine output

Signs and Symptoms

- Decrease in mentation
- Change in baseline mentation
- Bizarre behavior
- Hypoglycemia (cool, diaphoretic skin)
- Hyperglycemia (warm, dry, skin; fruity breath; Kussmaul respirations; dehydration)

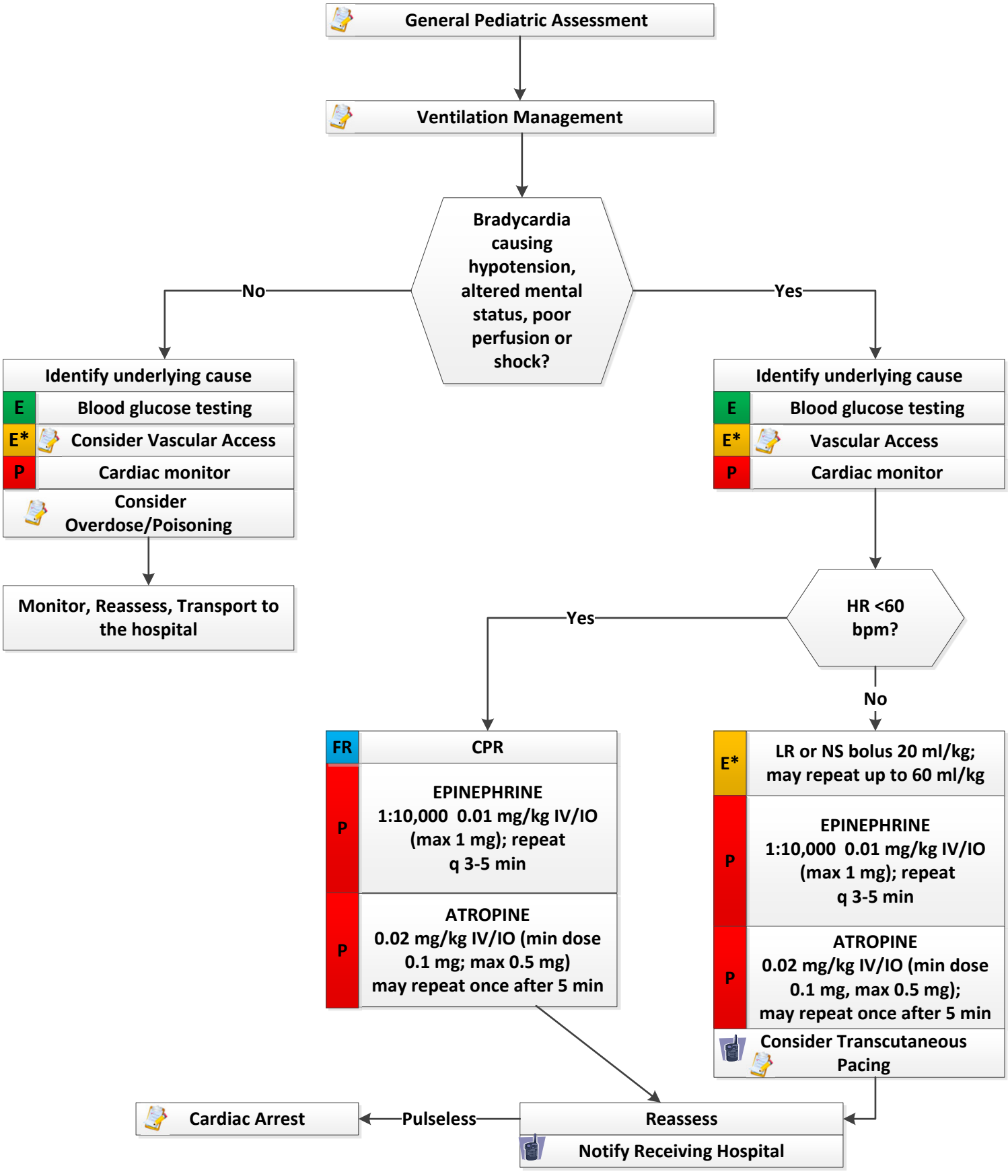
Differential

- Hypoxia
- CNS (trauma, stroke, seizure, infection)
- Thyroid (hyper/hypo)
- Shock (septic-infection, metabolic, traumatic)
- Diabetes (hyper/hypoglycemia)
- Toxicologic
- Acidosis/Alkalosis
- Environmental exposure
- Electrolyte abnormalities
- Psychiatric disorder

Pearls

- Recommended Exam: Mental Status, HEENT, Skin, Heart, Lung, Abdomen, Back, Extremities and Neuro.
- Pay careful attention to the head exam for signs of injury.
- With depressed mental status, initial focus is on airway protection, oxygenation, ventilation, and perfusion.
- Be aware of AMS as presenting sign of an environmental toxin or Haz-Mat exposure and protect personal safety and that of other responders.
- Consider alcohol, prescription drugs, illicit drugs and over the counter preparations as possible etiology.
- If narcotic overdose or hypoglycemia is suspected, administer NARCAN 0.1 mg/kg or GLUCOSE prior to advanced airway procedures.
- New onset DKA in pediatric patients commonly presents with nausea, vomiting, abdominal pain, and/or urinary frequency. Overly aggressive administration of fluid in hyperglycemic patients may cause cerebral edema or dangerous hyponatremia. Cerebral edema is a leading cause of death in children with DKA. Limit IV fluid bolus to single 10 ml/kg bolus.
- Dextrose 10% can be safely used in all ages of patient. Dextrose 10% works as effectively and quickly as other concentrations.

Pediatric Bradycardia



History
- Respiratory insufficiency
- Past medical history
- Medications
- Pacemaker

Signs and Symptoms
- HR <60/min with hypotension, acute altered mental status, chest pain, acute CHF, seizures, syncope, or shock secondary to bradycardia
- Respiratory distress

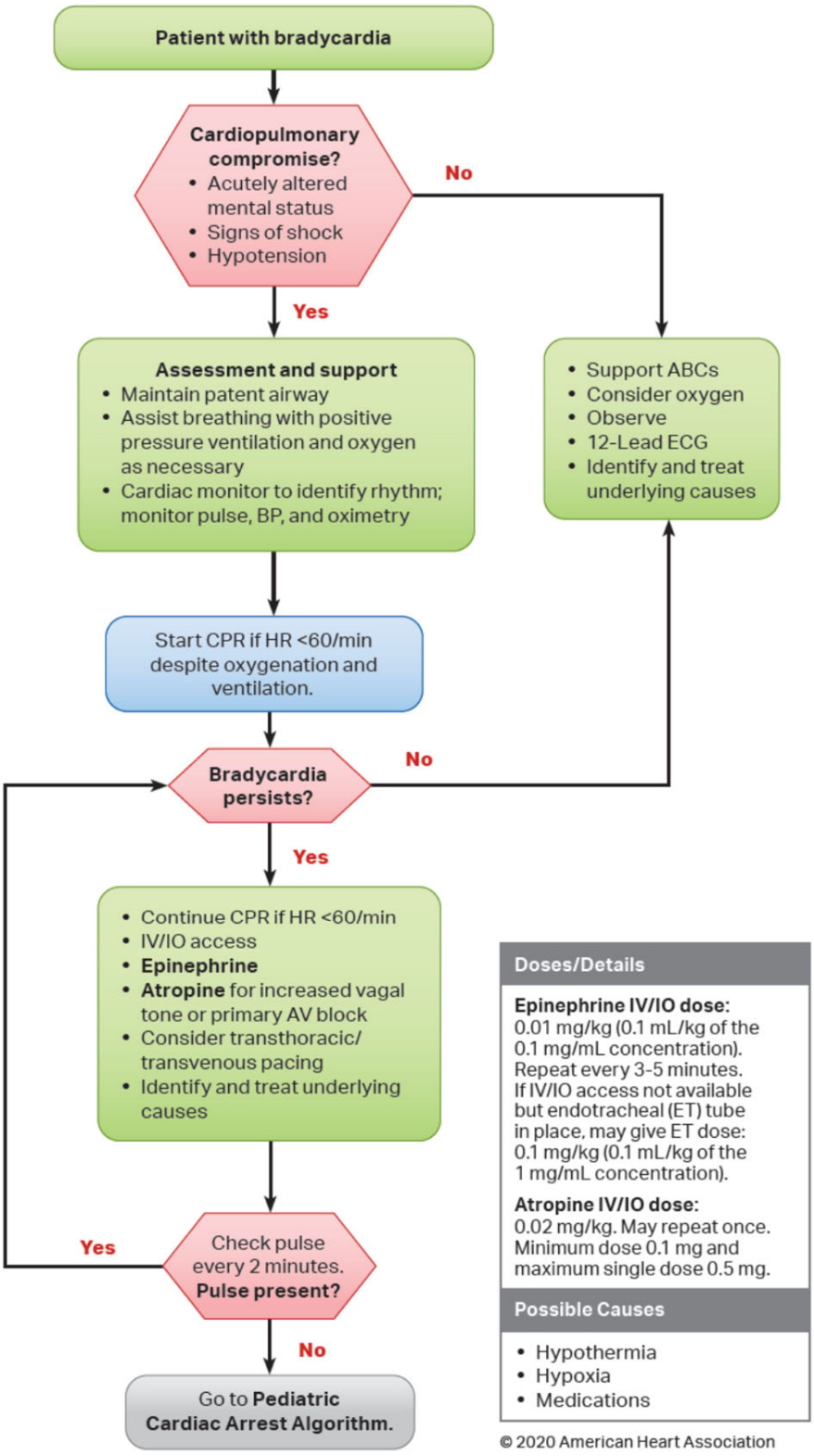
Differential
- Hypoxia
- Hypothermia
- Sinus bradycardia
- Athletic
- Head injury (elevated ICP)
- Spinal cord lesion
- Overdose

Pearls
- Pediatric pacing is by Medical Control order only.
- Recommended Exam: Mental Status, HEENT, Heart, Lung, Neuro.
- Bradycardia causing symptoms is typically <50/minute. Rhythm should be interpreted in the context of symptoms and pharmacological treatment given only when symptomatic; otherwise, monitor and reassess.
- Identifying signs and symptoms of poor perfusion caused by bradycardia are paramount.
- Hypoxemia is a common cause of bradycardia; be sure to oxygenate the patient and provide ventilatory support as needed.

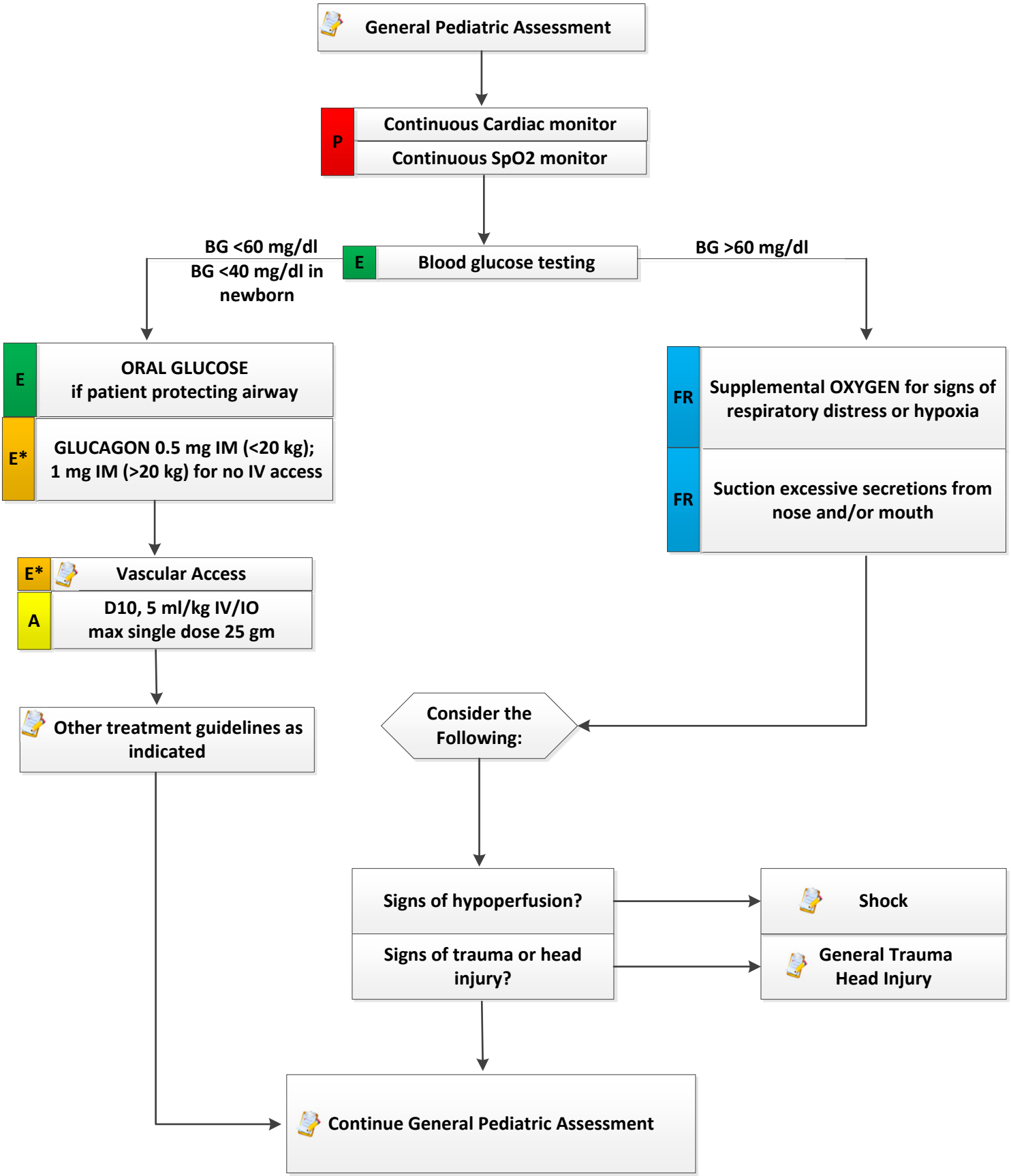
ACLS Pediatric Bradycardia Algorithm

Pediatric Bradycardia With a Pulse Algorithm

Pediatric Bradycardia With a Pulse Algorithm



Brief Resolved Unexplained Event (BRUE)



History

- History of circumstances and symptoms before, during, and after the event
- Concurrent symptoms (e.g., infectious symptoms, fussy, less active, poor sleep, poor feeding)
- Prior history of BRUE
- Past medical history (e.g., prematurity, prenatal/birth complications, gastric reflux, congenital heart disease, developmental delay, airway abnormalities)
- Family history of sudden unexplained death or cardiac arrhythmia
- Social history

Signs and Symptoms

- Signs of respiratory distress (e.g., tachypnea, grunting or other abnormal breath sounds, nasal flaring, retracting, or head bobbing)
- Skin color (pallor, cyanosis, redness)
- Altered mental status (tired, lethargic, unresponsive, or irritable)
- Trauma or neglect

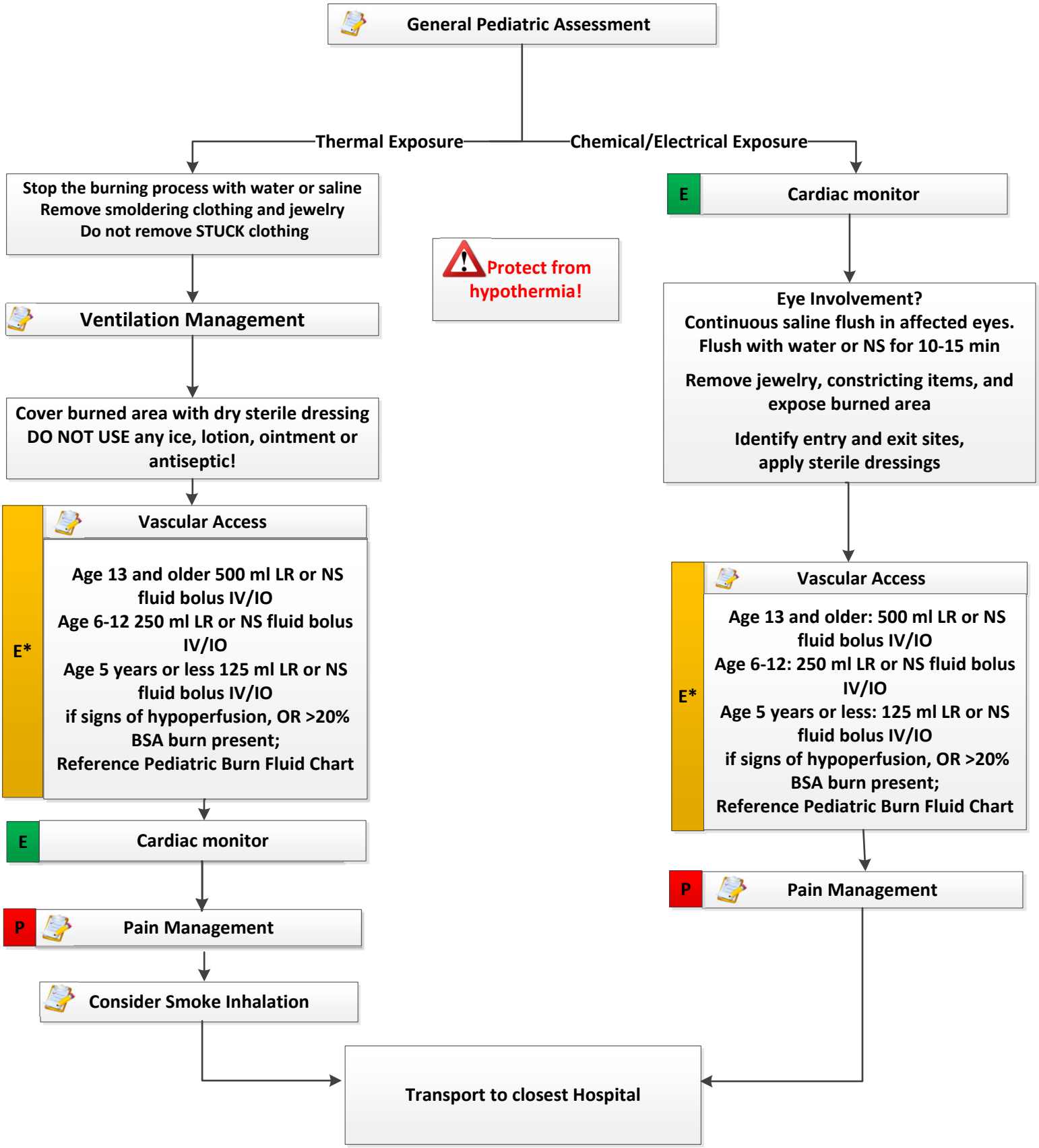
Differential

- Gastric reflux
- Swallowing dysfunction
- Nasal congestion or excessive secretions
- Periodic breathing of the newborn
- Breath-holding spell
- Seizure
- Hypoglycemia
- Abuse or neglect

Pearls

- Recommended Exam: Mental Status, HEENT, Skin, Heart, Lung, Abdomen, Back, Extremities and Neuro.
- Definition of BRUE: an event in an infant less than 1 year old reported by a bystander as sudden, brief (less than 1 minute), unexplained, and completely resolved upon EMS arrival that includes one or more of the following:
  - Breathing change (absent, decreased, or irregular)
  - Color change (central cyanosis or pallor)
  - Marked change in muscle tone (hyper- or hypotonia)
  - Altered level of responsiveness (increased, irritability, or decreased)
- Historically called an ALTE (apparent life-threatening event).
- BRUE is a group of symptoms, not a disease process.
- If the infant is not completely well upon EMS arrival, this excludes possible BRUE event.
- Routine IVs should not be placed on all suspected BRUE patients.
- Regardless of the patient's well appearance, all infants with a history of signs or symptoms suggestive of BRUE should be transported for further evaluation. Transport to a facility with at least baseline pediatric readiness. Consider transport to facility with pediatric critical care capability for any high-risk criteria:
  - Less than 2 months of age
  - History of prematurity (less than or equal to 32 weeks gestation)
  - More than one BRUE, now or in the past
  - Event duration greater than 1 minute
  - CPR or resuscitation by caregivers or trained rescuers
- EMS clinicians play a unique and important role in obtaining an accurate history soon after the event and in observing, documenting, and reporting environmental, scene and social indicators that may point to an alternate diagnosis.

Pediatric Burns

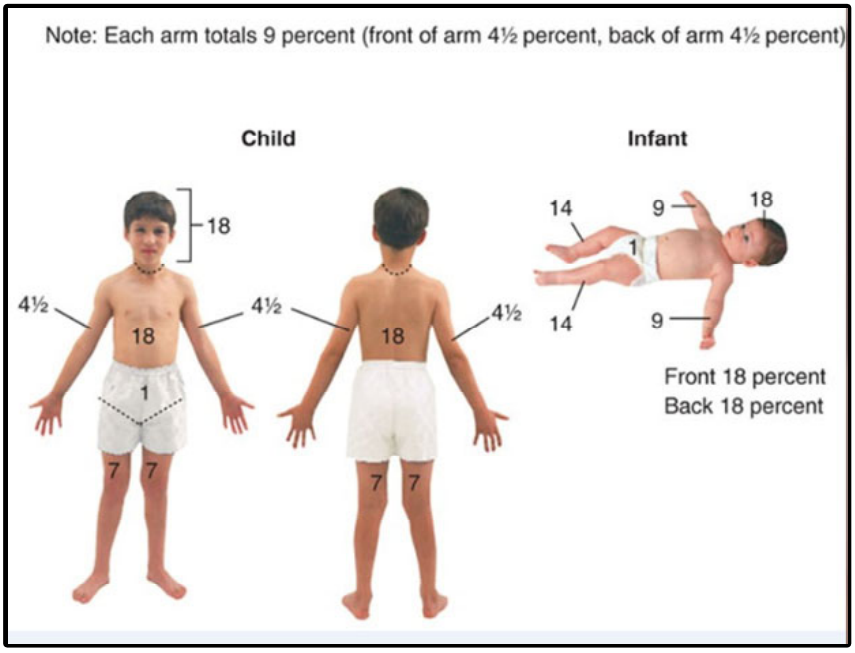


History
- Type of exposure (heat, gas, chemical)
- Inhalational injury
- Time of injury
- Past medical history & medications
- Other trauma
- Loss of consciousness
- Tetanus/immunization status

Signs and Symptoms
- Burns, pain, swelling
- Dizziness
- Loss of consciousness
- Hypotension/shock
- Airway compromise/distress
- Wheezing
- Singed facial or nasal hair
- Hoarseness or voice changes

Differential
- Superficial (1st degree) – red and painful
- Partial Thickness (2nd degree) – blistering
- Full Thickness (3rd degree) – painless/charred or leathery skin
- Thermal
- Chemical
- Electrical
- Radiation
- Lightning

Pearls
- Burn patients are trauma patients; evaluate for multisystem trauma.
- Assure whatever has caused the burn, is no longer contacting the injury. (Stop the burning process!)
- Recommended Exam: Mental Status, HEENT, Neck, Heart, Lungs, Abdomen, Extremities, Back, Neuro.
- Consider early intubation with patients experiencing significant inhalation injuries. Consider air ambulance for airway management needs beyond the scope of the responding ground medic.
- Potential CO exposure should be treated with 100% oxygen. Pulse oximetry may not be accurate. (For patients in which the primary event is CO inhalation, transport to a hospital equipped with a hyperbaric chamber is indicated [when reasonably accessible].)
- Circumferential burns to extremities are dangerous due to potential vascular compromise secondary to soft tissue swelling. Elevate extremity.
- Burn patients are prone to hypothermia - never apply ice or cool burns; must maintain normal body temperature.
- Consider ETCO2 monitoring.
- Evaluate the possibility of child abuse with children and burn injuries



Early Intubation Indications
- Signs of Airway Obstruction
- Hoarseness, Stridor, Dysphagia
- Extensive Deep Facial Burns
- Significant Risk of Edema
- Burns in Mouth
- Total BSA ≥ 40%
- Signs of Respiratory Compromise
  - Accessory Muscle Use
  - Inability to Clear Secretions
  - Poor Oxygenation
- Altered Mentation

Patients meeting the following Criteria shall be transported to the closest appropriate Burn Care Center:

1. Second degree burns >10% body surface area (BSA).
2. Any Third degree burns.
3. Burns that involve the face, hands, feet, genitalia, perineum, or major joints.
4. Electrical burns including lightning injury.
5. Chemical burns.
6. Circumferential burns.
7. Inhalation burns.
8. Burn injury with concomitant trauma

Pearls (Electrical)
- Do not contact the patient until you are certain the source of the electric shock has been disconnected.
- Attempt to locate contact points, (entry wound where the AC source contacted the patient; an exit at the ground point); both sites will generally be full thickness.
- Cardiac monitor; anticipate ventricular or atrial irregularity to include V-Tach, V-Fib, heart blocks, etc.
- Attempt to identify the nature of the electrical source (AC vs DC), the amount of voltage and the amperage the patient may have been exposed to during the electrical shock.

Pearls (Chemical)
- Certainly 0.9% NaCl Sol'n or Sterile Water is preferred; however if it is not readily available, do not delay; use tap water for flushing the affected area or other immediate water sources. Flush the area as soon as possible with the cleanest, readily available water or saline solution using copious amounts of fluids.

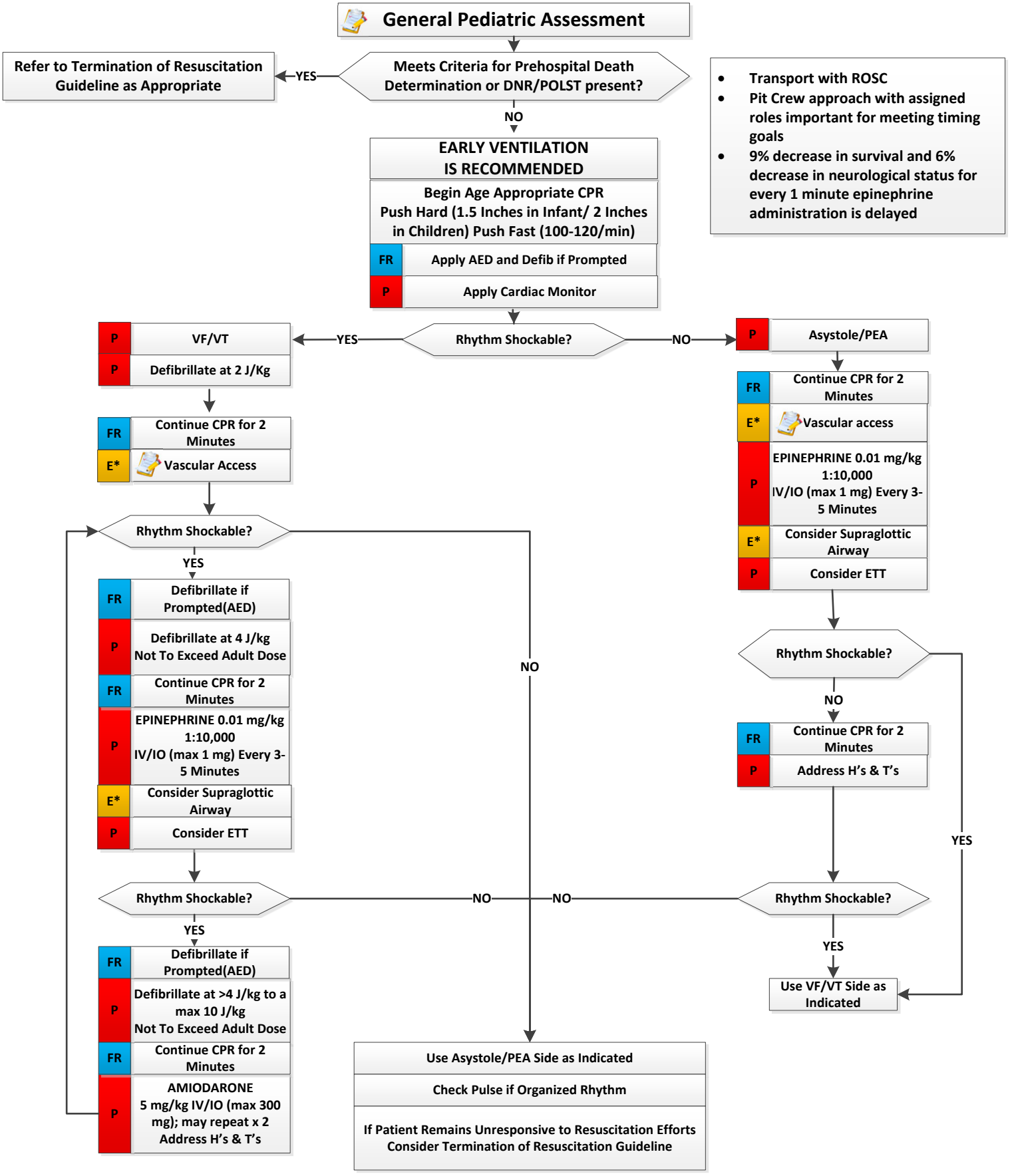
Burn Injury IV Fluid Rates
Infusion Rate < 30 KG
Parkland Formula

*Fluid of choice LR/NS, DO NOT use dextrose containing fluids

Wt (lbs)	Wt (kg)	% TBSA	/Hr for 1st 8 Hrs of care	60 gtt set, gtt/min	20 gtt set, gtt/min	15 gtt set, gtt/min	10 gtt set, gtt/min
11	5	10	12.5	12.5	4.2	3.2	2.1
11	5	20	25	25	8.3	6.3	4.2
11	5	30	37.5	37.5	12.5	9.5	6.3
11	5	40	50	50	16.7	12.5	8.3
11	5	50	62.5	62.5	20.8	15.7	10.5
11	5	60	75	75	25	18.7	12.5
22	10	10	25	25	8.4	6.4	4.1
22	10	20	50	50	16.6	12.5	8.4
22	10	30	75	75	25	18.9	12.5
22	10	40	100	100	33.3	25	16.6
22	10	50	125	125	41.6	31.4	20.9
22	10	60	150	150	50	37.4	25
27.5	12.5	10	31.3	31.3	10.5	7.5	5.2
27.5	12.5	20	62.5	62.5	20.8	15.7	10.5
27.5	12.5	30	93.8	93.8	31.3	23.6	15.7
27.5	12.5	40	125	125	41.7	31.7	21
27.5	12.5	50	156.2	156.2	52.1	39.8	26.3
27.5	12.5	60	187.4	187.4	62.5	47.9	31.6
33	15	10	37.5	37.5	12.6	8.5	6.2
33	15	20	75	75	25	18.8	12.6
33	15	30	112.5	112.5	37.5	28.3	18.8
33	15	40	150	150	50	37.5	25
33	15	50	187.5	187.5	62.5	46.7	31.2
33	15	60	225	225	75	55.9	37.4
38.5	17.5	10	43.8	43.8	14.7	10.6	7.3
38.5	17.5	20	87.5	87.5	29.2	21.9	14.7
38.5	17.5	30	131.3	131.3	43.8	33	21.9
38.5	17.5	40	175	175	58.3	44.2	29.2
38.5	17.5	50	218.7	218.7	72.8	55.4	36.5
38.5	17.5	60	262.4	262.4	87.3	66.6	43.8
44	20	10	50	50	16.7	12.6	8.3
44	20	20	100	100	33.3	25	16.7
44	20	30	150	150	50	37.6	25
44	20	40	200	200	66.7	50	33.3
44	20	50	250	250	83.3	62.6	41.7
44	20	60	300	300	100	75	50
49.6	22.5	10	56.3	56.3	18.8	14.2	9.4
49.6	22.5	20	112.5	112.5	37.5	28.1	18.8
49.6	22.5	30	168.8	168.8	56.3	42.3	28.2
49.6	22.5	40	225	225	75	56.4	37.6
49.6	22.5	50	281.2	281.2	93.7	70.5	47
49.6	22.5	60	337.4	337.4	112.5	84.6	56.4
55.1	25	10	62.5	62.5	20.9	15.7	10.4
55.1	25	20	125	125	41.7	31.2	20.9
55.1	25	30	187.5	187.5	62.5	47	31.3
55.1	25	40	250	250	83.4	62.5	41.8
55.1	25	50	312.5	312.5	104.2	78	52.3
55.1	25	60	375	375	125	93.5	62.8
60.6	27.5	10	68.8	68.8	23	17.3	11.5
60.6	27.5	20	137.5	137.5	45.9	34.4	23
60.6	27.5	30	206.2	206.2	68.8	51.7	34.4
60.6	27.5	40	274.9	274.9	91.7	79.7	53.3
60.6	27.5	50	343.6	343.6	114.6	96.9	64.8
60.6	27.5	60	412.4	412.4	137.5	114.1	76.3
66	30	10	75	75	25.0	18.8	12.5
66	30	20	150	150	50.0	37.5	25.0
66	30	30	225	225	75.0	56.3	37.5
66	30	40	300	300	100.0	75.0	50.0
66	30	50	375	375	125.0	93.8	62.5
66	30	60	450	450	150.0	112.6	75.0

Pediatric Burn Fluid Chart

Pediatric Cardiac Arrest (Non-Traumatic)



History
- Events leading to arrest
- Estimated down time
- Past medical history
- Medications
- Existence of terminal illness

Signs and Symptoms
- Unresponsive
- Apneic
- Pulseless

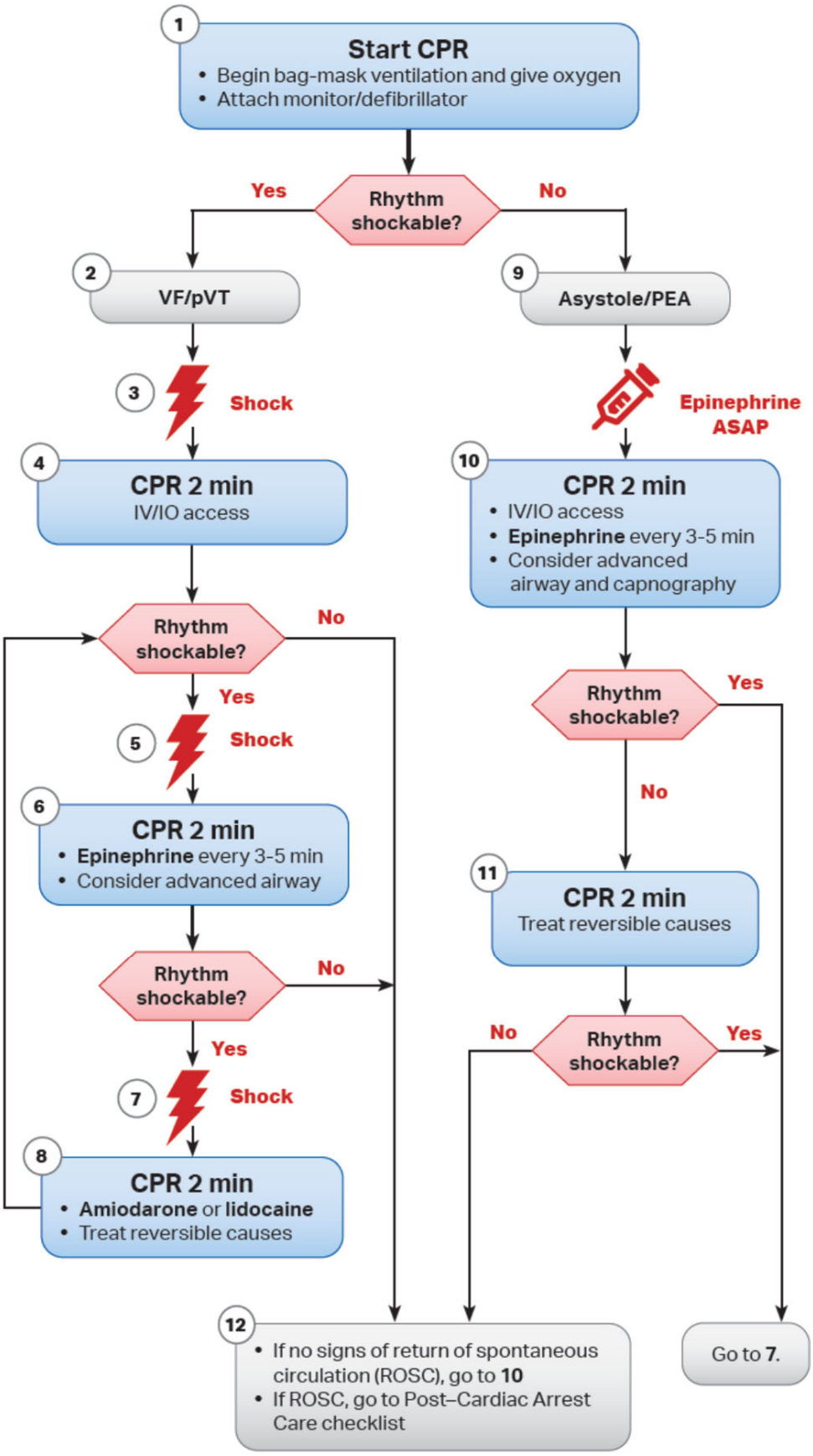
Differential
- Medical vs. Trauma
- VF/Pulseless VT
- Asystole
- PEA
- Primary cardiac event vs. respiratory or drug overdose

Pearls
- Respiratory failure resulting in cardiac arrest should be addressed as it is identified.
- Efforts should be directed at high quality chest compressions with limited interruptions and early defibrillation when indicated.
- Consider early IO placement if IV is difficult.
- DO NOT HYPERVENTILATE.
- Once an advanced airway is in place, compressions should be continuous with ventilations every three seconds.
- Reassess and document ETT placement using auscultation and ETCO2 capnography.
- Switch compressors every two minutes.
- Try to maintain patient modesty.
- Mechanical chest compression devices should be used if available and appropriate for patient age/size in order to provide for consistent uninterrupted chest compressions and crew safety.
- Adult paddles/pads may be used on children weighing greater than 10 kg.
- Pre-assignment of pit crew roles is recommended. When this is not possible, tasks may be assigned by order of arrival: 1st: Airway; 2nd: Compressions; 3rd: IV/IO access, medication administration; 4th: Measure, Monitor/AED placement; 5th: family liaison/history gathering.
- Pre-plan drug dosing based on weight estimations while en route and verify with a height based tape once reaching the patient.
- Proper BVM selection: <5 kg = infant BVM. 5-30 kg = pediatric BVM. >30 kg = adult BVM.

H's & T's (reversible causes)
- Hypovolemia – Volume infusion
- Hypoxia – Oxygenation & ventilation, CPR
- Hydrogen ion (acidosis) – Ventilation, CPR
- Hyperkalemia – Calcium, Glucose, Sodium Bicarbonate, Albuterol
- Hypokalemia
- Hypothermia – Warming
- Hypoglycemia – Glucose
- Tension pneumothorax – Needle decompression
- Tamponade, cardiac – Volume infusion
- Toxins – Agent specific antidote
- Thrombosis, pulmonary – Volume infusion
- Thrombosis, coronary – Emergent PCI

ENVIRONMENTAL EXPOSURE EXCEPTION:
All victims of electrocution and lightning strikes should have resuscitative efforts begun. Any decision to determine death in the field in these cases should be made **ONLY** after consultation with online medical control.

Pediatric Cardiac Arrest Algorithm



CPR Quality

- Push hard (≥⅓ of anteroposterior diameter of chest) and fast (100-120/min) and allow complete chest recoil
- Minimize interruptions in compressions
- Change compressor every 2 minutes, or sooner if fatigued
- If no advanced airway, 15:2 compression-ventilation ratio
- If advanced airway, provide continuous compressions and give a breath every 2-3 seconds

Shock Energy for Defibrillation

- First shock 2 J/kg
- Second shock 4 J/kg
- Subsequent shocks ≥4 J/kg, maximum 10 J/kg or adult dose

Drug Therapy

- **Epinephrine IV/IO dose:** 0.01 mg/kg (0.1 mL/kg of the 0.1 mg/mL concentration). Max dose 1 mg. Repeat every 3-5 minutes. If no IV/IO access, may give endotracheal dose: 0.1 mg/kg (0.1 mL/kg of the 1 mg/mL concentration).
- **Amiodarone IV/IO dose:** 5 mg/kg bolus during cardiac arrest. May repeat up to 3 total doses for refractory VF/pulseless VT
  or
  Lidocaine IV/IO dose: Initial: 1 mg/kg loading dose

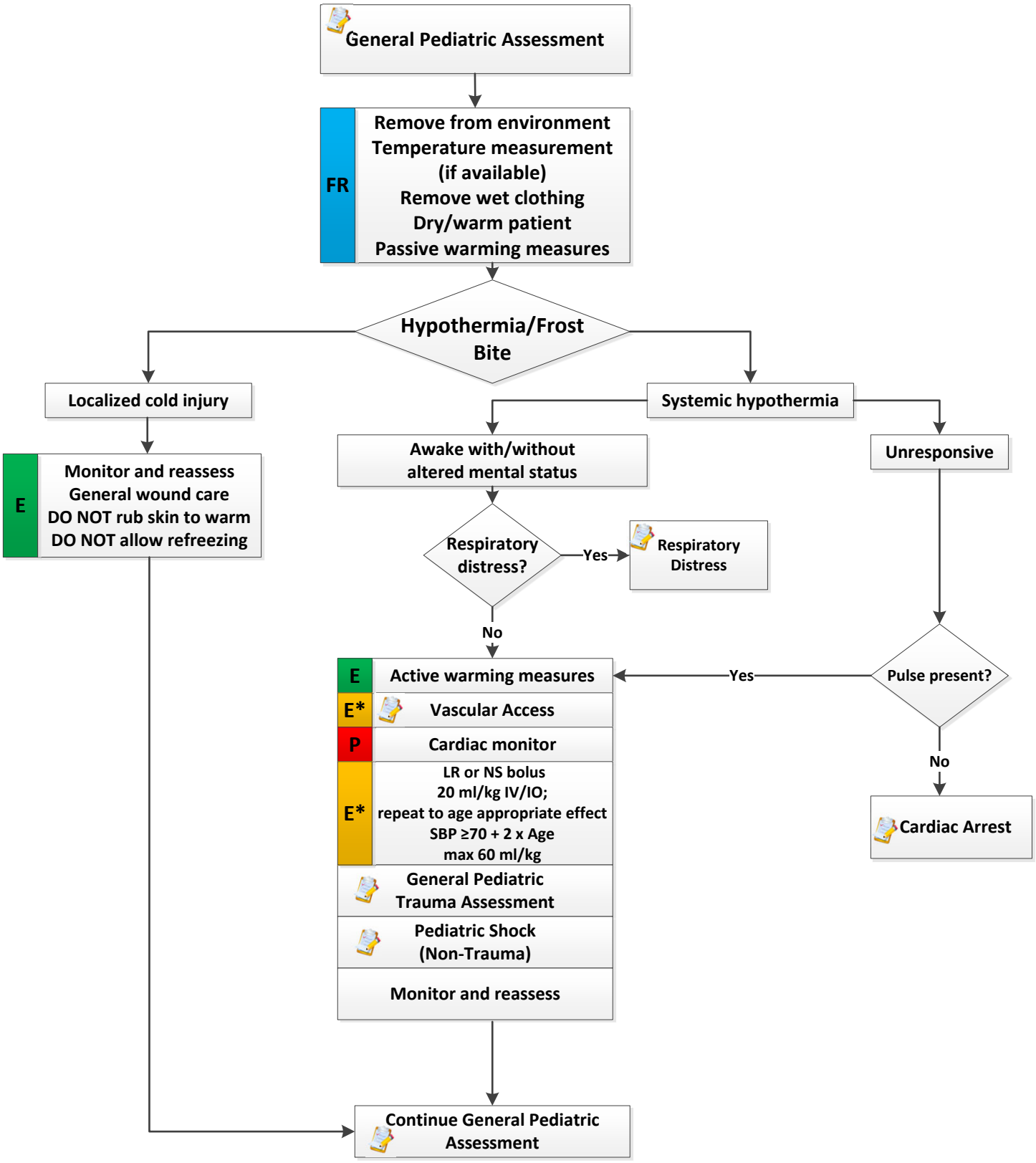
Advanced Airway

- Endotracheal intubation or supraglottic advanced airway
- Waveform capnography or capnometry to confirm and monitor ET tube placement

Reversible Causes

- **H**ypovolemia
- **H**ypoxia
- **H**ydrogen ion (acidosis)
- **H**ypoglycemia
- **H**ypo-/hyperkalemia
- **H**ypothermia
- **T**ension pneumothorax
- **T**amponade, cardiac
- **T**oxins
- **T**hrombosis, pulmonary
- **T**hrombosis, coronary

Pediatric Cold-Related Illness



History
- Age, very young and old
- Exposure to decreased temperatures, but may occur in normal temperatures
- Past medical history/medications
- Drug or alcohol use
- Infections/sepsis
- Time of exposure/wetness/wind chill

Signs and Symptoms
- AMS/coma
- Cold, clammy
- Shivering
- Extremity pain
- Bradycardia
- Hypotension or shock
- Decreased respirations

Differential
- Sepsis
- Environmental exposure
- Hypoglycemia
- Stroke
- Head injury
- Spinal cord injury
- Trauma

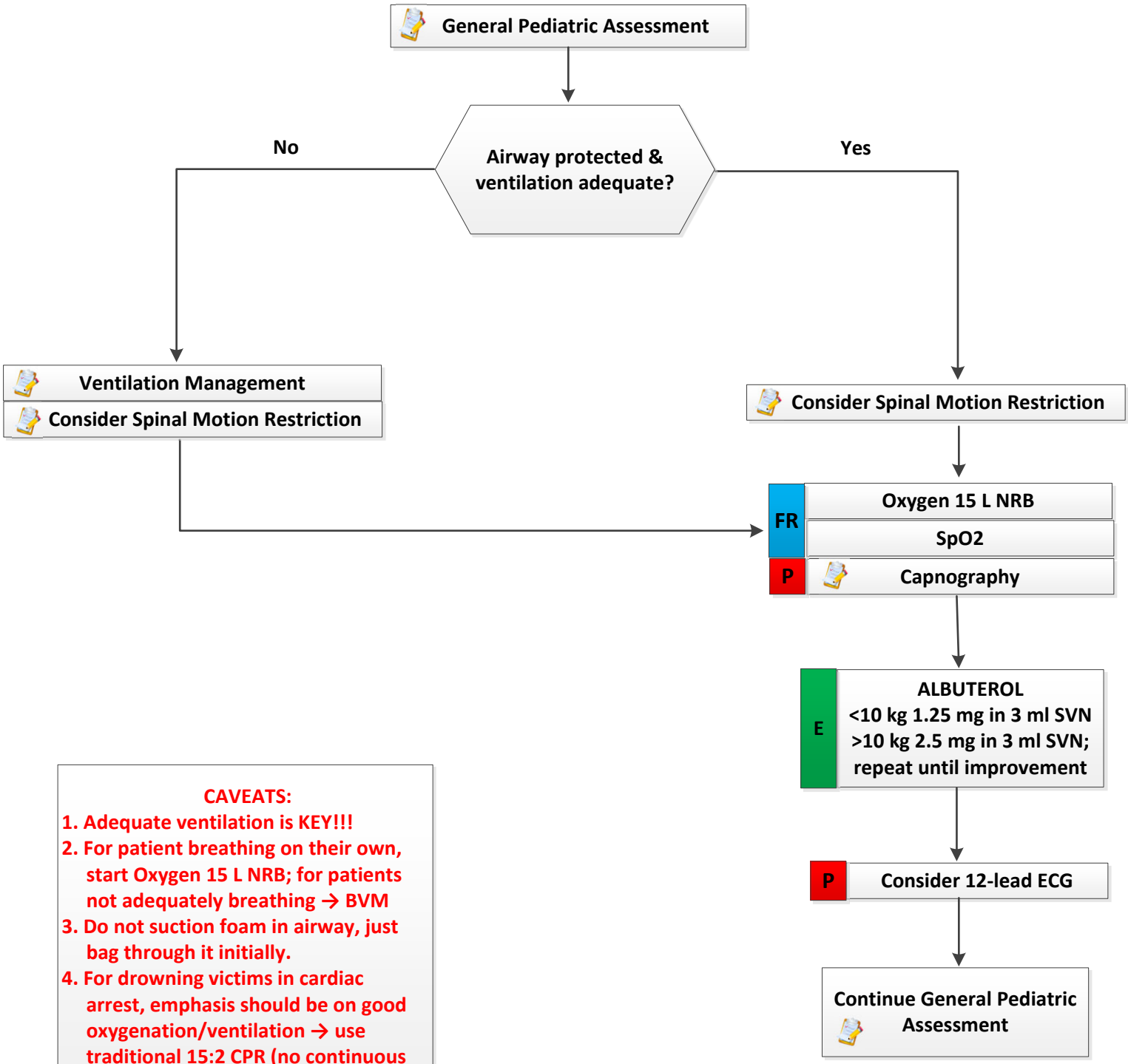
- **Pearls**
- Recommended exam: Mental Status, Heart, Lung, Abdomen, Extremities, Neuro.
- Pulse checks for patients suffering hypothermia should be performed for up to 60 seconds.
- Handle the patient gently to prevent triggering a ventricular arrest.
- Extremes of age are more prone to cold emergencies.
- Obtain and document patient temperature.
- If temperature is unknown, treat the patient based on suspected temperature.
- Active warming includes hot packs that can be used on the armpit and groin (care should be taken not to place the packs directly on the skin) and/or Ready Heat II thermal blanket or equivalent.
- Warm saline or lactated ringers IV may be used.

Hypothermia Categories
- Mild 90°- 95° F (33°- 35° C)
- Moderate 82°- 90° F (28°- 32° C)
- Severe 75°- 82° F (24°- 28° C)
- Profound <75 degrees F (<24° C)

Hypothermia Mechanisms
- Radiation
- Convection
- Conduction
- Evaporation

Cardiac Arrest Resuscitation Guidelines for the Hypothermic Patient
- Contraindications for initiation of resuscitation in the hypothermic patient:
  - Obvious fatal injuries (such as decapitation)
  - The patient exhibits signs of being frozen (such as ice formation in the airway)
  - Chest wall rigidity such that compressions are impossible
  - Danger to rescuers or rescuer exhaustion
  - Avalanche victims buried for 35 minutes or longer with airway obstruction by ice or snow
- Fixed and dilated pupils, apparent rigor mortis, and dependent lividity may not be contraindication for resuscitation in the severely hypothermic patient.
- The mainstay of therapy in severe hypothermia and cardiac arrest should be effective chest compressions and attempts at rewarming.
- Defibrillation may be attempted once. Do not make further attempts at defibrillation until the core temperature has increased to greater than 30°C (86°F).
- Medications should be withheld until the patient's core temperature is greater than 30°C (86°F). Intervals between medication provision should be doubled until the patient reaches 35°C (95°F), at which time, normal medication intervals may be adopted.
- If a hypothermic patient clearly suffered cardiac arrest and subsequently became hypothermic afterward with prolonged down time between arrest and rescue, there is no rationale for initiating resuscitation and warming the patient.

Pediatric Drowning



CAVEATS:

1. Adequate ventilation is KEY!!!
2. For patient breathing on their own, start Oxygen 15 L NRB; for patients not adequately breathing → BVM
3. Do not suction foam in airway, just bag through it initially.
4. For drowning victims in cardiac arrest, emphasis should be on good oxygenation/ventilation → use traditional 15:2 CPR (no continuous compressions).

History

- Submersion in liquid, regardless of depth
- Possible history of trauma (dive)
- Duration of immersion
- Temperature of water or possibility of hypothermia
- Degree of water contamination

Signs and Symptoms

- Unresponsive
- Mental status changes
- Decreased or absent vital signs
- Vomiting
- Coughing, wheezing, rales, stridor, rhonchi
- Apnea
- Frothy/foamy sputum

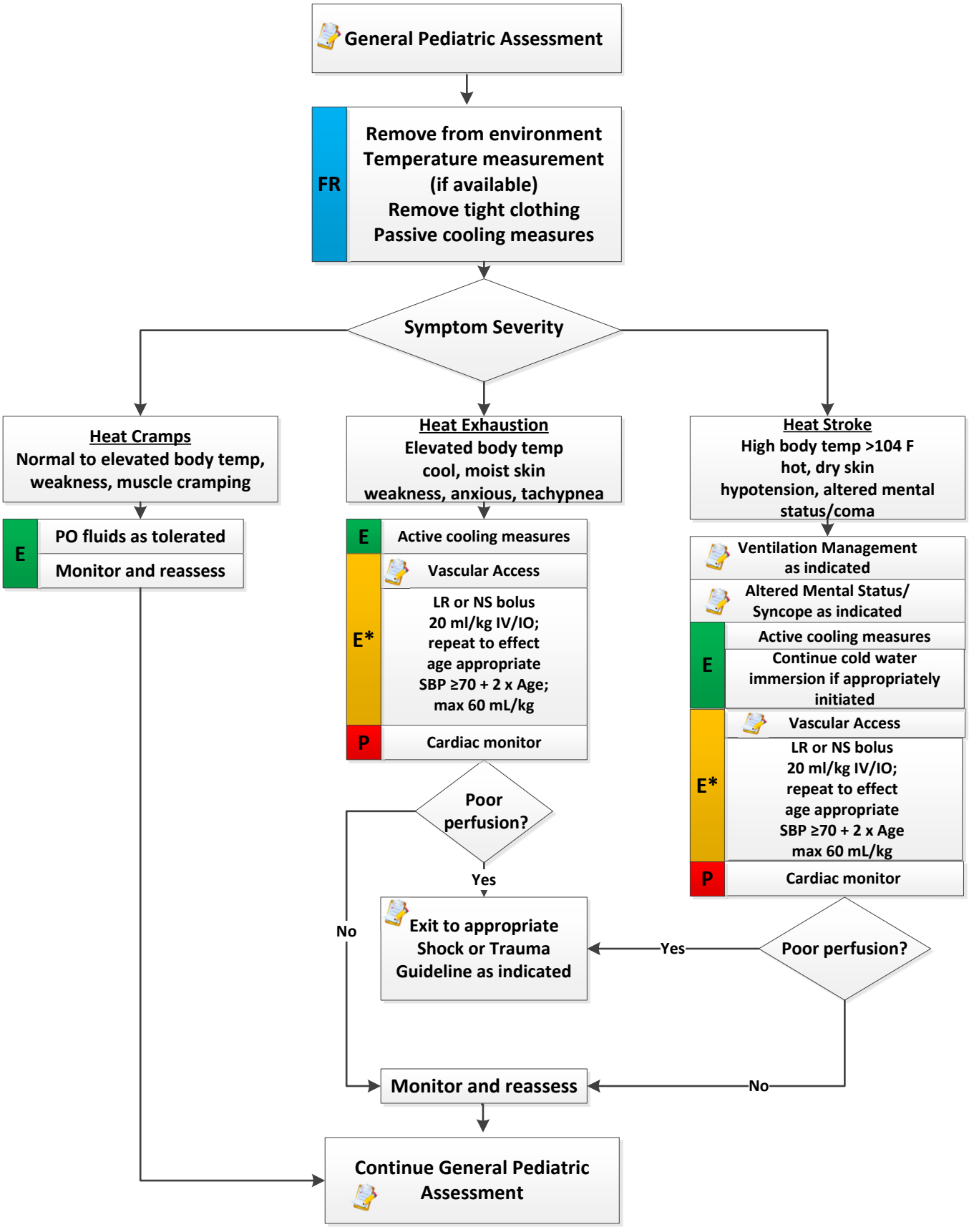
Differential

- Trauma
- Pre-existing medical condition
- Barotrauma
- Decompression illness
- Post-immersion syndrome

Pearls

- Recommended exam: Trauma survey, Head, Neck, Chest, Abdomen, Back, Extremities, Skin, Neuro.
- Ensure scene safety.
- Resuscitation efforts should follow an **ABCs** (**A**irway, **B**reathing, **C**irculation) strategy for drowning victims in cardiac arrest. Initiate 5 rescue breaths followed by a ratio of 15 chest compressions to 2 breaths.
- Drowning is a common cause of death in children. Risk factors for drowning include male gender, age less than 14 years old, alcohol use, lack of supervision, and risky behavior.
- Hypothermia is often associated with submersion incidents.
- All patients should be transported for evaluation because of potential for worsening over the next several hours.
- Resuscitation recommendations based on water temperature and submersion time:
  - If water temperature is less than 43°F (6°C) and the patient is submerged with evidence of cardiac arrest: Survival is possible for submersion time less than 90 minutes and resuscitative efforts should be initiated.
  - If water temperature is greater than 43°F (6°C) and the patient is submerged with evidence of cardiac arrest: Survival is possible for submersion time less than 30 minutes and resuscitative efforts should be initiated.

Pediatric Heat-Related Illness



History
- Age, very old and young
- Exposures to increased temperatures and/or humidity
- Past medical history/medications
- Time and duration of exposure
- Poor PO intake, extreme exertion
- Fatigue and/or muscle cramping

Signs and Symptoms
- AMS/coma
- Hot, dry, or sweaty skin
- Hypotension or shock
- Seizures
- Nausea

Differential
- Fever
- Dehydration
- Medications
- Hyperthyroidism
- Heat cramps, heat exhaustion, heat stroke
- CNS lesions or tumors

Pearls
- Recommended exam: Mental Status, Skin, Heart, Lung, Abdomen, Extremities, Neuro.
- Extremes of age are more prone to heat emergencies.
- Salicylates may elevate body temperatures.
- Sweating generally disappears as body temperatures rise over 104° F (40° C).
- Intense shivering may occur as patient is cooled. Paramedics can consider administering a low dose benzodiazepine.
- Active cooling includes application of cold packs or ice (not directly on skin), fanning, or air conditioning.
- Cold saline is not to be administered for the treatment of hyperthermia unless directed by online medical control.
- There is no evidence supporting EMS obtaining orthostatic vital signs as a clinical indicator.
- Cold water immersion is the preferred method of active cooling. Some providers such as certified athletic trainers and event medical personnel are prepared to initiate cold water immersion prior to EMS arrival. If cold water immersion was initiated due to documented hyperthermia, these patients should not be removed from cold water immersion prior to their rectal temperature reaching 102.2F (39C) or mental status returning to baseline unless it is required to manage other emergent issues such as airway.

Heat Cramps
- Consist of benign muscle cramping caused by dehydration and is not associated with an elevated temperature.

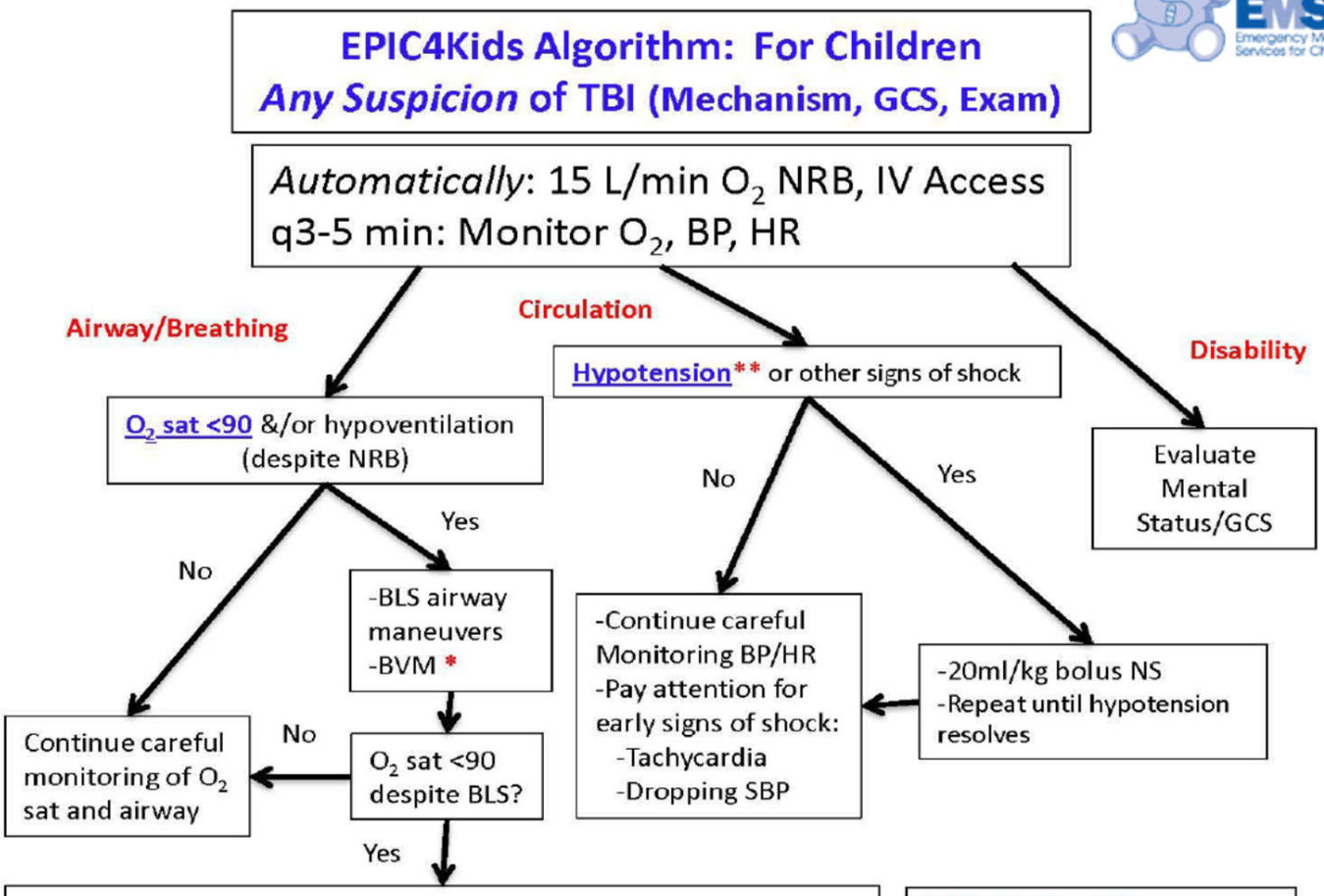
Heat Exhaustion
- Consists of dehydration, salt depletion, dizziness, fever, AMS, headache, cramping, N/V. Vital signs usually consist of tachycardia, hypotension and elevated temperature.

Heat Stroke
- Consists of dehydration, tachycardia, hypotension, temperature >104° F (40° C), and AMS. Potential for seizures or coma.

Heat Syncope
- Transient loss of consciousness attributed to heat exposure.

Pediatric Head Injury

EPIC4KIDS ALGORITHM



Consider ALS airway if experienced provider available:

-Place advanced airway:

- Pre-oxygenate: BVM with 100% O_2 @ age-appropriate rate *
- Check placement using $ETCO_2$ monitor/detector

-*AVOID* even *MILD* hyperventilation with *Ventilation Rate Timer* and *Pressure-controlled Bag*:

- Carefully keep rate @ age-appropriate rate *
- ETCO2 available: Target $ETCO_2$ 40 mmHg (range: 35-45)
- Control Ventilatory volume:
  - Ventilator available: utilize *as soon as possible*
    - Tidal volume = 7 cc/kg
  - Ventilator *not* available: Continue Pressure-controlled BVM

-Monitor: O_2 sat and airway *every 3-5 minutes*:

- If O_2 sat <90% despite above interventions, consider:
  - Tension pneumothorax & needle thoracostomy

NOTE: NO ONE (not even Respiratory Therapists) can manually ventilate at the proper rate without ventilatory adjuncts (EVERYONE inadvertently hyperventilates unless meticulously preventing it):

- Ventilation Rate timers
- Pressure-controlled bags
- $ETCO_2$ monitoring with someone watching the level continuously
- Mechanical ventilator with careful $ETCO_2$ monitoring

* ***Ventilation Rates***:

-Infants: (0-24 mo.):
-25 breaths/min (bpm)

-Children: (2-14 yrs):
-20 bpm

-Adolescents: (15-17 yrs):
-10 bpm (same as adults)

** ***Identifying Hypotension in children***

0-9 yrs:	70 + (age x 2)
≥10 yrs:	<90mmHg

-*Rules of thumb*:

Newborn:	<70mmHg
5 year old:	<80mmHg
10 and older:	<90mmHg →

(Same as adults)

Neonatal Resuscitation

FR Assist mother with delivery as needed
Obstetrical Emergency

Term gestation? Breathing or crying? Good tone?

Yes → FR Provide warmth, Clear airway if necessary, Dry baby
General Pediatric Assessment

No → FR Warm, Dry, Clear airway if necessary, and Stimulate baby

HR <100, gasping, or apnea?

No → Labored breathing or persistent cyanosis?

Labored breathing or persistent cyanosis? → No → (Provide warmth, Clear airway if necessary, Dry baby)

Yes → FR BVM ventilation 40-60 bpm with room air
SpO_2 monitoring; goal 85-95%
P Cardiac monitor

Labored breathing or persistent cyanosis? → Yes → (BVM ventilation 40-60 bpm with room air)

Caveats:
- Deep airway suctioning is no longer recommended
- Traditional CPR 3:1 ratio is standard for newborns
- Most newborns requiring resuscitation will respond to BVM, compressions and Epi; for those that don't, consider hypovolemia, pneumothorax, and/or hypoglycemia (BG <40)

Targeted Preductal Spo_2 After Birth

1 min	60%-65%
2 min	65%-70%
3 min	70%-75%
4 min	75%-80%
5 min	80%-85%
10 min	85%-95%

HR <100?

No → FR Oxygen, keep SpO_2 per table
Maintain warmth
Monitor and reassess

Yes → BVM ventilation 40-60 bpm with oxygen

HR <60?

No → (HR <100?)

Yes → CPR 3:1 ratio
E* Vascular Access
E* Consider supraglottic airway
P Consider ETT intubation

HR <60?

Yes → P EPINEPHRINE 1:10,000; 0.01 mg/kg IV/IO q 3-5 min as needed for HR <60

No → Radio Contact to receiving facility

History
- Due date
- Time contractions started/ duration/frequency
- Rupture of membranes (meconium)
- Time and amount of any vaginal bleeding
- Sensation of fetal movement
- Prenatal care
- Past medical and delivery history
- Medications
- Gravida/Para Status
- High risk pregnancy

Signs and Symptoms
- Respiratory rate and effort
- Signs of respiratory distress
- Heart rate
- Muscle tone
- Color, appearance
- APGAR score

Differential
- Abnormal presentation (breech, limb)
- Prolapsed cord
- Placenta previa
- Abruptio placenta

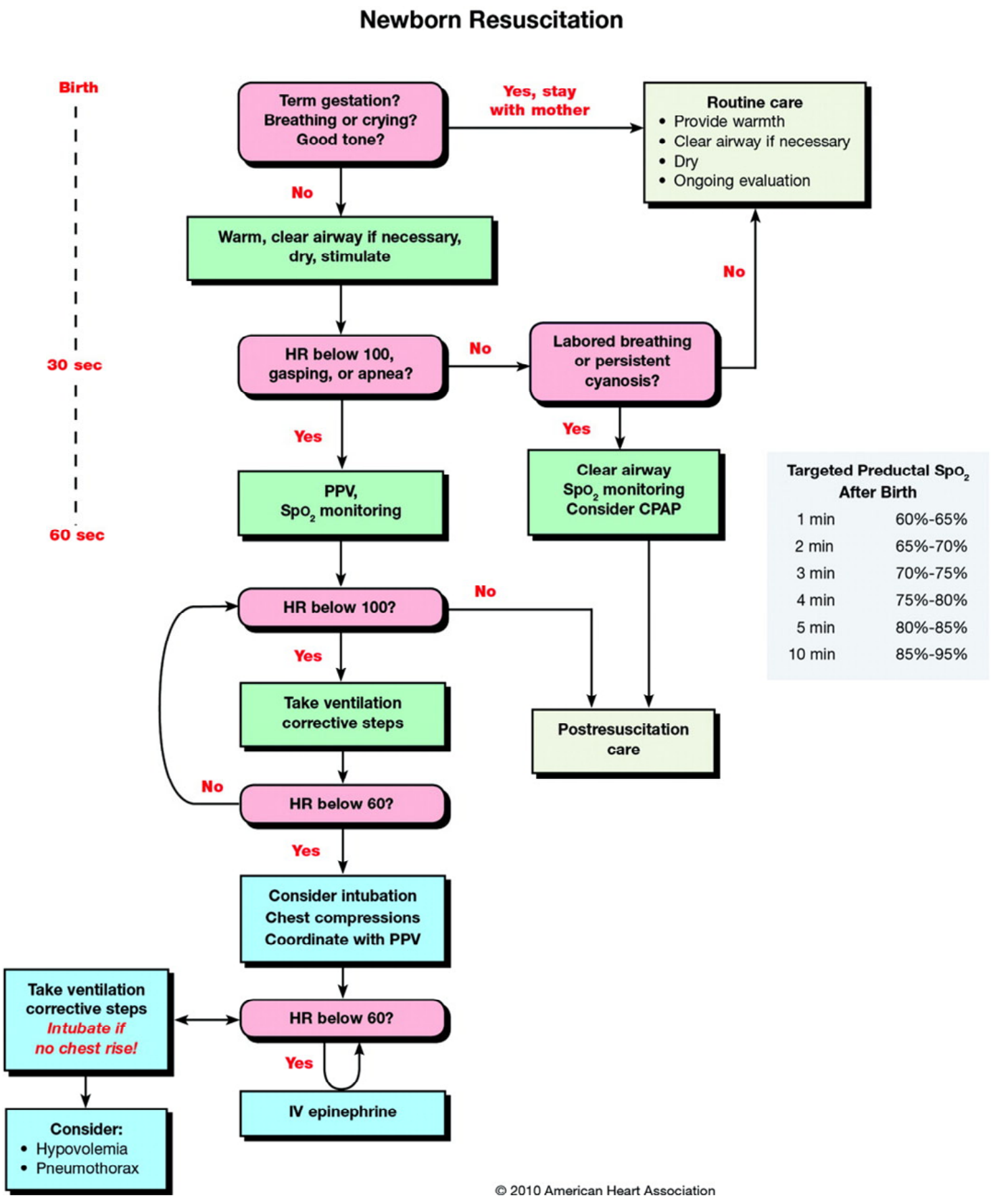
Pearls
- Recommended Exam: Mental Status, Skin, HEENT, Neck, Chest, Heart, Lungs, Abdomen, Neuro.
- Document all times (delivery, contraction, duration, frequency).
- Some bleeding is normal; copious amounts of blood or free bleeding is abnormal.
- Record APGAR at one and five minutes after birth.
- APGAR of 7-10 is normal, while 4-7 require resuscitative measures.
- Pulse oximetry should be considered if resuscitative efforts are initiated or if supplemental oxygen is administered. Place pulse oximeter probe on right hand (preductal).
- If immediate resuscitation is required and the newborn is still attached to the mother, clamp the cord in two places and cut between the clamps. If no resuscitation is required, warm/dry/stimulate the newborn, and then cut/clamp the cord after 60 seconds or the cord stops pulsating.
- Most newborns require only drying, warming, and stimulating to help them transition from fetal respiration to newborn respiration. The resuscitation sequence can be remembered as **Dry, Warm, and Stimulate – Ventilate – Evaluate – and Resuscitate.**
- Transport mother and infant together whenever possible.

		INTERVENTION INDICATED		
		Blow-by Oxygen	Bag-Mask-Ventilation (BVM)	BVM and Chest compressions
ASSESSMENT	Heart Rate (BPM)	> 100	60–100	< 60
	Respiratory Distress/Apnea	No	Yes	
	Central Cyanosis Present	Yes	Yes/No	

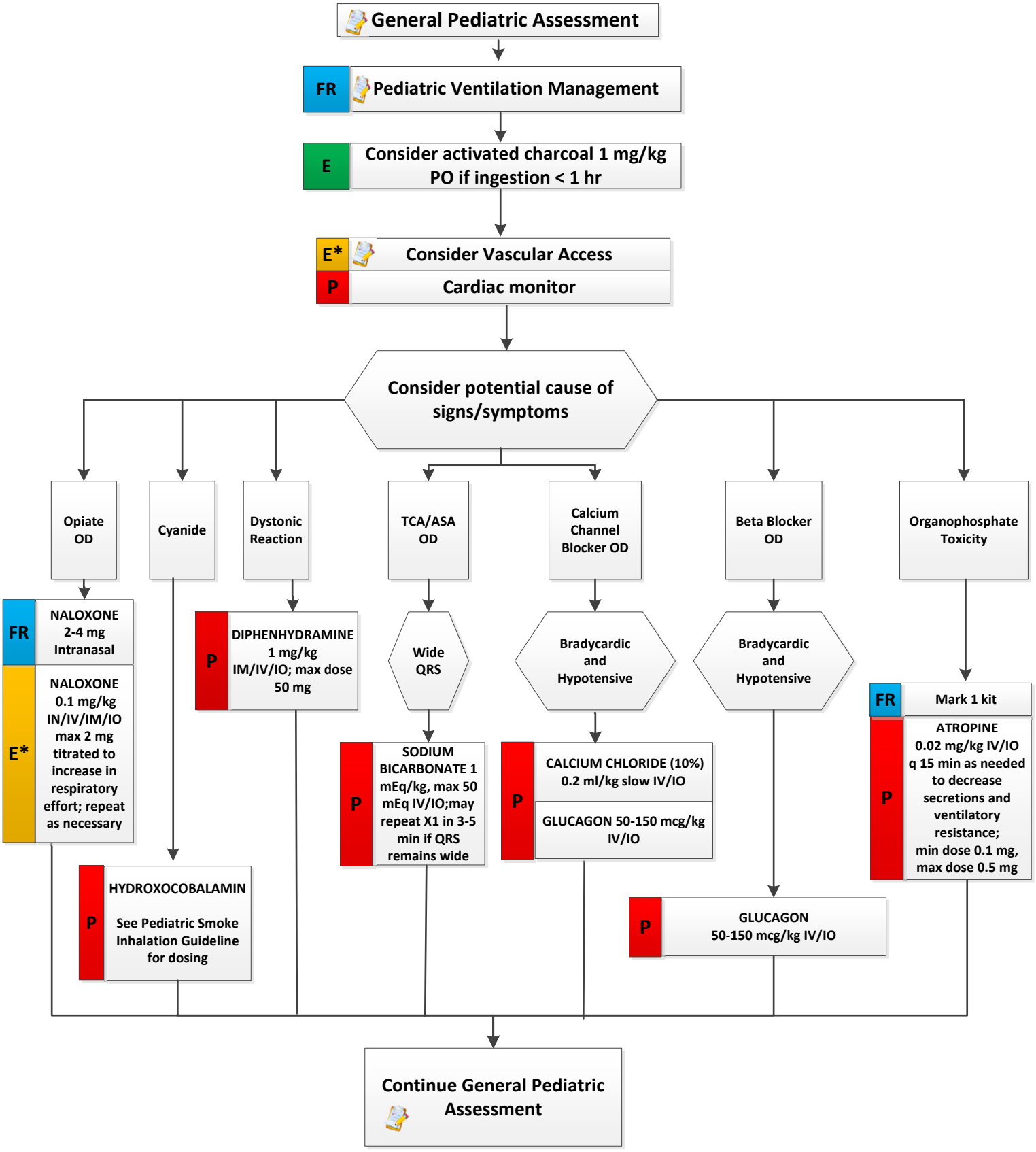
APGAR	Score=0	Score=1	Score=2
• Activity/Muscle Tone	Absent	Arms/legs flexed	Active Movement
• Pulse	Absent	Below 100	Above 100
• Grimace/Reflex Irritability	No response	Grimace	Sneeze, cough, pulls away
• Appearance/Skin Color	Blue-Grey, pale all over	Normal, except extremities	Normal over entire body
• Respiration	Absent	Slow, irregular	Good, crying

Caveats:
- Deep airway suctioning no longer recommended.
- Traditional CPR 3:1 ratio is standard for newborns.
- Most newborns requiring resuscitation will respond to BVM, compressions and Epinephrine; for those that don't, consider hypovolemia, pneumothorax, and/or hypoglycemia (BG <40).

NR Algorithm



Pediatric Overdose / Poisoning



History

- Ingestion or suspected ingestion of a potentially toxic agent
- Substance ingested, route, quantity
- Time of ingestion
- Reason (suicidal, accidental, criminal)
- Available medications in home
- Past medical history, medications

Signs and Symptoms

- Mental status changes
- Hypotension/hypertension
- Decreased respiratory rate
- Tachycardia, dysrhythmias
- Seizures
- SLUDGE+BBB
- Malaise, weakness
- GI symptoms
- Dizziness
- Syncope
- Chest pain

Differential

- TCA overdose
- Acetaminophen
- Aspirin
- Depressants
- Stimulants
- Anticholinergic
- Cardiac medications
- Solvents, alcohols, cleaning agents, insecticides

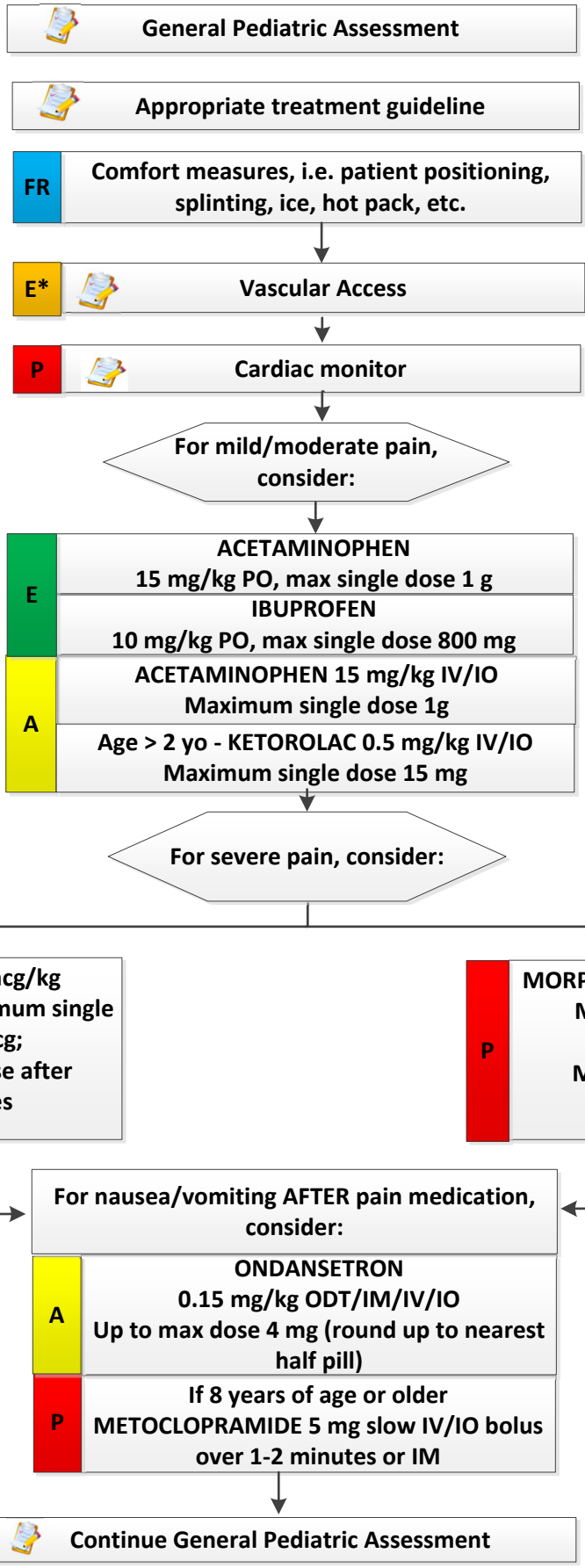
Pearls

- Recommended exam: Mental Status, Skin, HEENT, Heart, Lung, Abdomen, Extremities, Neuro.
- Pediatric patients should be evaluated by a physician if an overdose/poisoning is suspected regardless of agent, amount or time.
- 4.2% SODIUM BICARBONATE should be used for all neonatal patients.
- NARCAN should be administered in small increment doses IV to address respiratory depression and ensure adequate ventilation. Monitor patient to watch for any signs of respiratory depression reoccurring. IV/IM are preferred routes for predictability.
- Overdose or toxin patients with significant ingestion/exposure should be closely monitored and aggressively treated. Do not hesitate to contact medical control if needed.
- In the case of cyanide poisoning, altered mental status may be profound. Profound altered mental status can be defined as a deficit that includes disorientation, bewilderment and difficulty following commands.
- Poison Control: 1-800-222-1222

Agents

- Acetaminophen: Initially normal or N/V. Tachypnea and AMS may occur later. Renal dysfunction, liver failure and/or cerebral edema may manifest.
- Depressants: Decreased HR, BP, temp and RR.
- Anticholinergic: Increased HR, increased temp, dilated pupils and mental status changes.
- Insecticides: May include S/S of organophosphate poisoning.
- Solvents: N/V, cough, AMS.
- Stimulants: Increased HR, BP, temp, dilated pupils, seizures and possible violence.
- TCA: Decreased mental status, dysrhythmias, seizures, hypotension, coma, death.

Pediatric Pain Management



History
- Age
- Location, duration
- Severity (1-10)
- Past medical history
- Pregnancy status
- Drug allergies and medications

Signs and Symptoms
- Severity (pain scale)
- Quality
- Radiation
- Relation to movement, respiration
- Increased with palpation of area

Differential
- Musculoskeletal
- Visceral (abdominal)
- Cardiac
- Pleural, respiratory
- Neurogenic
- Renal (colic)

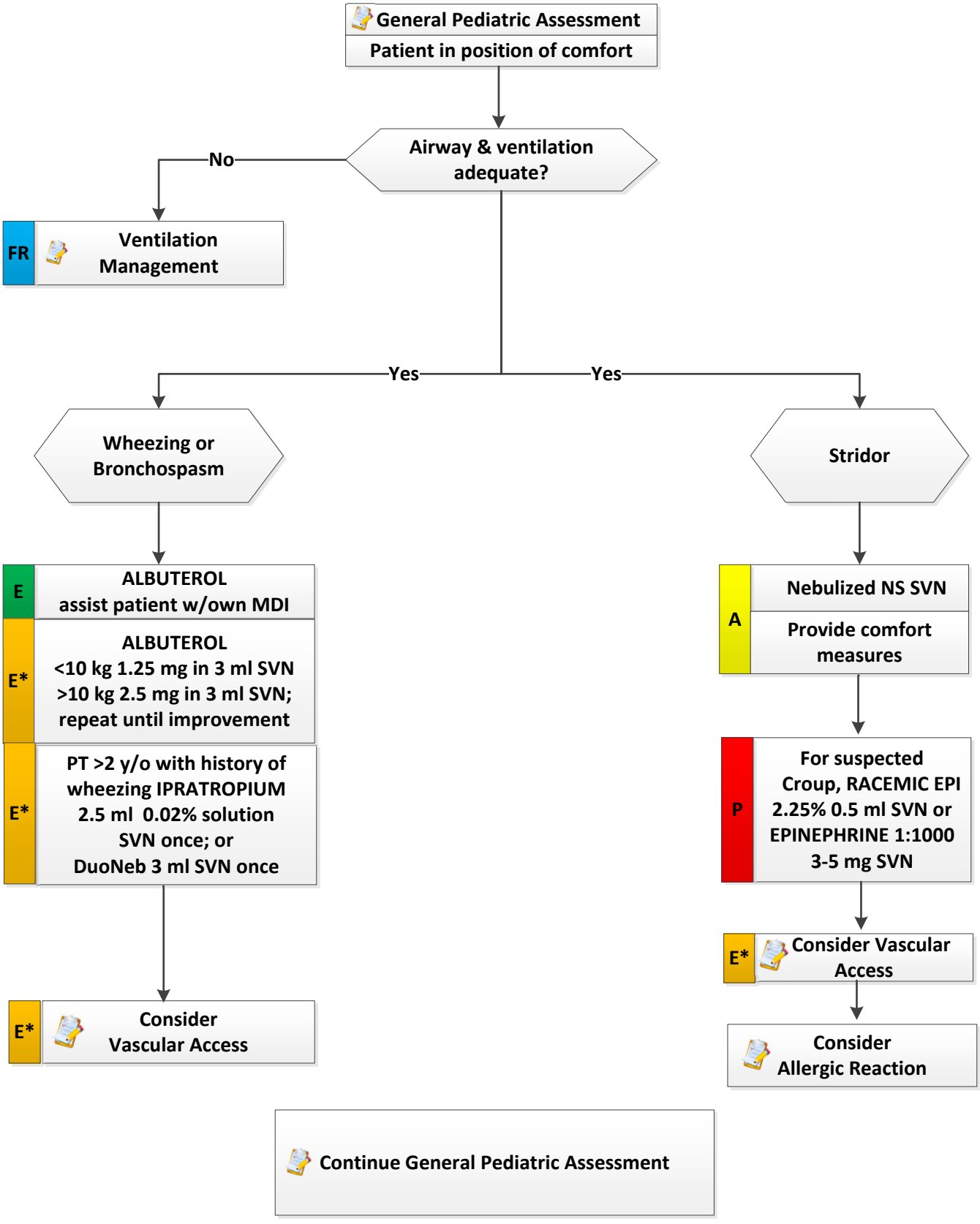
Pearls
- Recommended exam: Respiratory Status, Mental Status, Area of pain, Neuro.
- Pain severity (1-10) is to be recorded before and after medication administration and upon arrival at the hospital. Use FLACC for < 4 yo. Use Wong-Baker FACES for 4-12 yo.
- Monitor BP and respirations closely as sedative and pain control agents may cause hypotension and or respiratory depression.
- Consider patient's age, weight, clinical condition, use of drugs/alcohol, exposure to opiates when determining initial opiate dosing. Weight based dosing may provide a standard means of dosing calculation but it does not predict response. Consider starting at a lower initial dose and titrating to effect is recommended.
- Intranasal routes of opioid analgesia are preferred as the initial dosing route in pediatrics where IV access may be problematic.
- Exercise caution when administering opiates and benzodiazepines; this combination results in deeper anesthesia with significant risk of respiratory compromise.
- Burn patients may require more aggressive dosing.
- Consider FENTANYL as the primary opioid medication for pediatric traumatic pain.
- ACETAMINOPHEN may be given if it has been ≥ 4 hours since last dose. IBUPROFEN may be given if it has been ≥ 6 hours since last dose and age > 6 months. KETOROLAC may be given if it has been ≥ 6 hours since last NSAID dose and age > 2 years old.

QI Metrics
- Vital signs with O_2 sats documented.
- Pain scale documented before and after each intervention.
- Repeat vital signs after each intervention.
- If considering repeat administration of pain medications, nasal cannula capnography must be utilized.

FLACC Behavioral Scale

Categories	Scoring		
	0	1	2
Face	No particular expression or smile	Occasional grimace or frown, withdrawn, disinterested	Frequent to constant frown, clenched jaw, quivering chin
Legs	Normal position or relaxed	Uneasy, restless, tense	Kicking, or legs drawn up
Activity	Lying quietly, normal position, moves easily	Squirming, shifting back and forth, tense	Arched, rigid, or jerking
Cry	No cry (awake or asleep)	Moans or whimpers, occasional complaint	Crying steadily, screams or sobs, frequent complaints
Consolability	Content, relaxed	Reassured by occasional touching, hugging, or being talked to, distractable	Difficult to console or comfort
Each of the five categories (F) Face; (L) Legs; (A) Activity; (C) Cry; (C) Consolability is scored from 0-2, which results in a total score between zero and ten.			

Pediatric Respiratory Distress



History
- Asthma, RAD
- Home treatment (oxygen, nebulizers)
- Medication
- Prematurity
- Family history of asthma, eczema, or allergies
- Change in feeding patterns and/ or number of wet diapers
- Sick contacts
- Toxic exposure

Signs and Symptoms
- Change in mental status
- Decreased ability to speak, weak cry
- Increased respiratory rate and effort
- Wheezing, rhonchi
- Use of accessory muscles, retractions, grunting, nasal flaring
- Fever, nasal congestion, cough
- Tachycardia

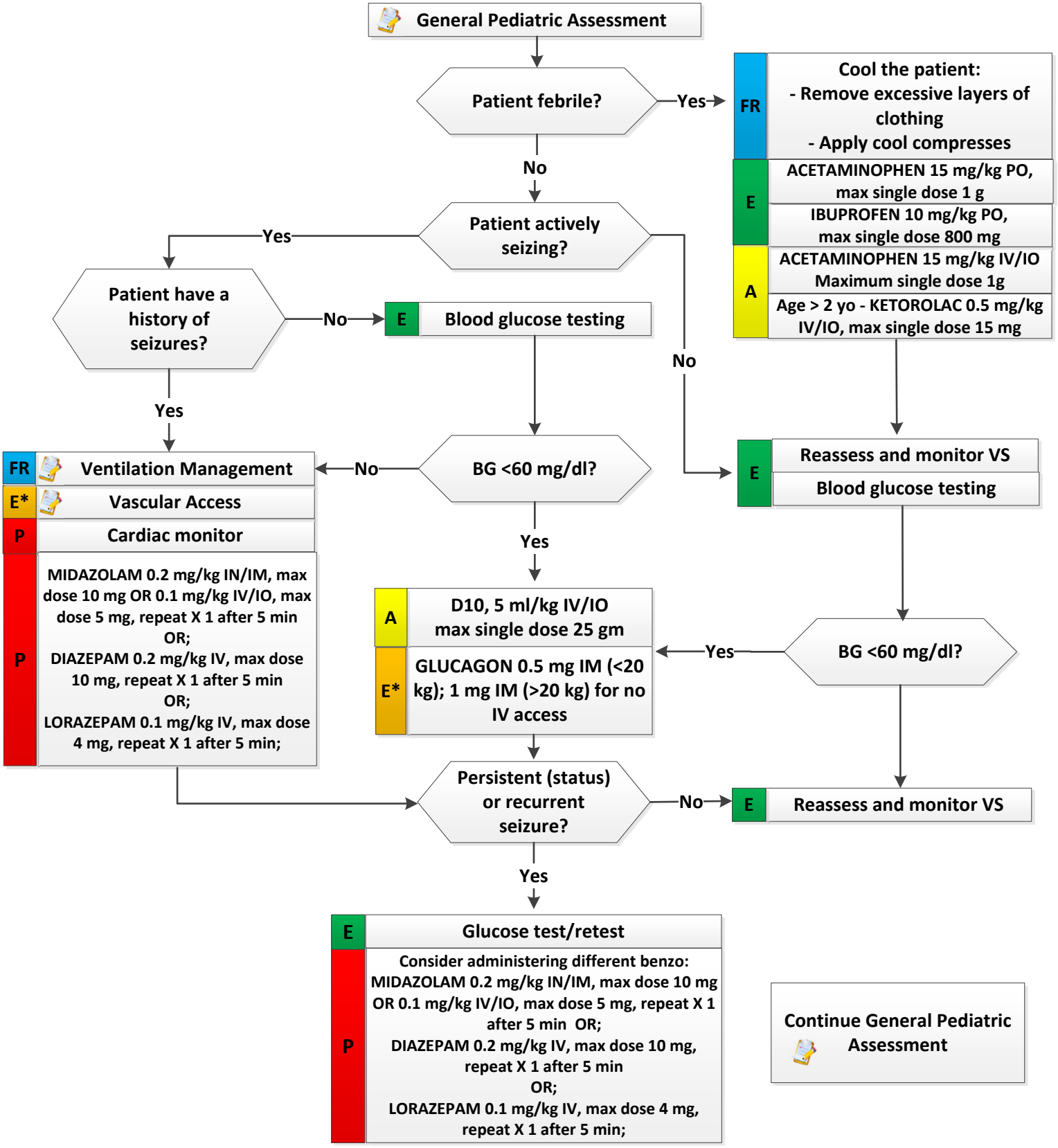
Differential
- Bronchiolitis
- Croup
- Asthma, RAD
- Epiglottitis
- Anaphylaxis
- Aspiration, foreign body
- Pneumonia
- Pneumothorax
- Hyperventilation
- Inhaled toxin

Pearls
- Recommended exam: Mental Status, HEENT, Skin, Neck, Heart, Lungs, Abdomen, Extremities, Neuro.
- Be prepared to assist ventilations as needed.
- Pulse oximetry and end tidal continuous waveform capnography should be monitored.
- Allow the patient to assume a position of comfort.

Bronchiolitis
- Typically presents with diffuse rhonchi and/or wheezing with a viral or other undifferentiated illness characterized by fever, rhinorrhea, nasal congestion, cough, tachypnea, and/or respiratory distress.
- Suctioning can be a very effective intervention to alleviate distress since infants are obligate nose breathers.
- Insufficient data exist to recommend the use of inhaled steam or nebulized saline
- Although albuterol and steroids have previously been a consideration, the most recent evidence does not demonstrate a benefit in routine use of albuterol or steroids for bronchiolitis.
- Ipratropium and other anticholinergic agents should not be given to children with bronchiolitis.
- Although nebulized hypertonic saline has been shown to decrease hospital length of stay when used for bronchiolitis, it does not provide immediate relief of distress and should not be administered to children in respiratory distress in the prehospital setting.

Croup
- Typically presents with barky cough and/or stridor with a viral or other undifferentiated illness characterized by fever, rhinorrhea, nasal congestion, tachypnea, and/or respiratory distress.
- Symptoms often improve with being upright and breathing cold night air.
- Foreign bodies can mimic croup, it is important to ask about a possible choking event.

Pediatric Seizure



History
- Reported or witnessed seizure activity
- Previous seizure history
- Seizure medications
- History of trauma
- History of diabetes
- Time of seizure onset
- Number of seizures
- Alcohol ingestion
- Fever

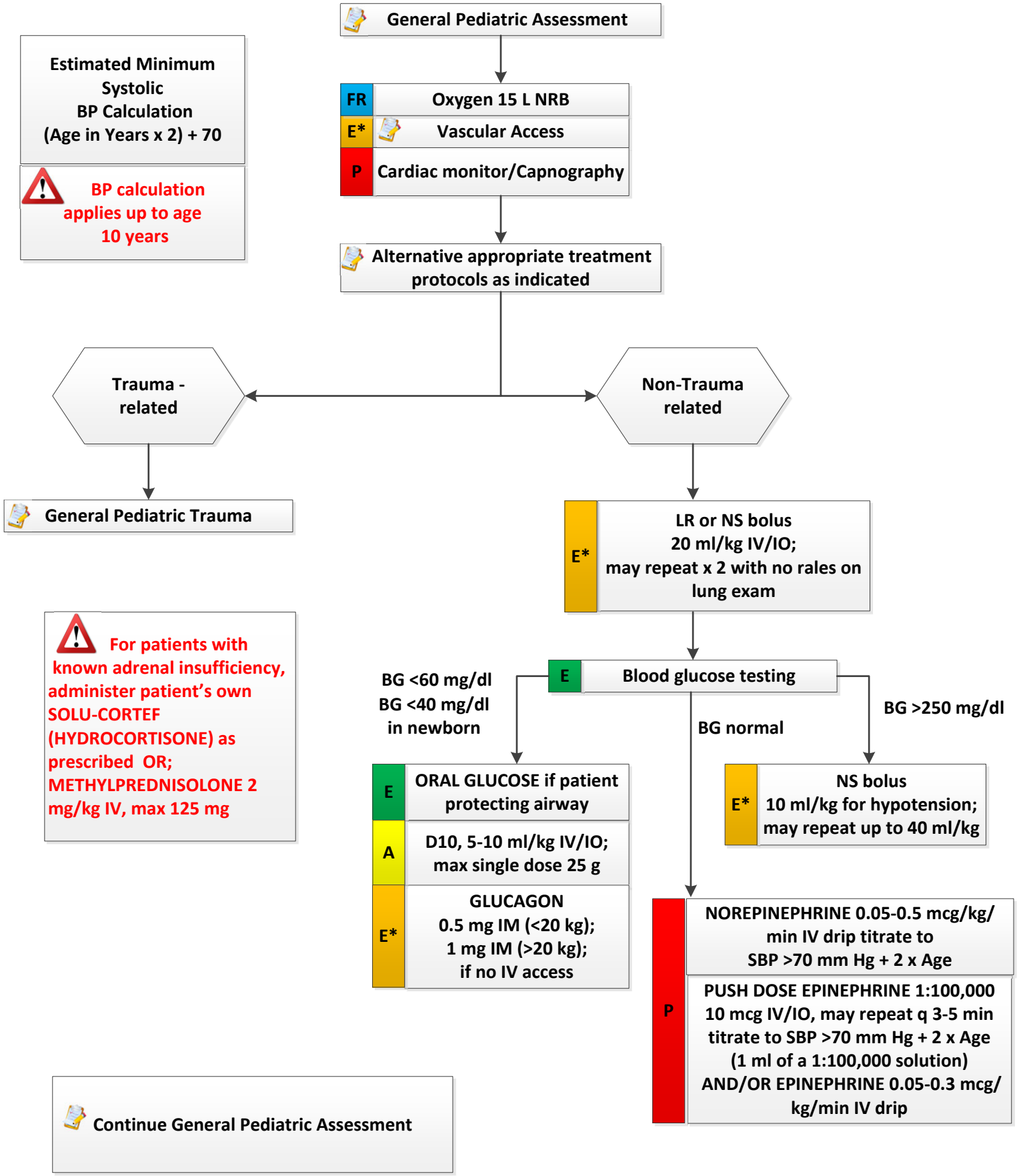
Signs and Symptoms
- Decreased mental status
- Sleepiness
- Oral trauma
- Incontinence
- Observed seizure activity
- Evidence of trauma
- Unconsciousness

Differential
- CNS trauma
- Tumor
- Metabolic, hepatic or renal failure
- Hypoxia
- Electrolyte abnormality (Na, Ca, Mg)
- Drugs, medications non-compliance
- Infection
- Febrile seizure
- Hyperthermia
- Hypothermia
- Nonaccidental trauma (abuse)

Pearls
- Recommended exam: Mental Status, HEENT, Heart, Lungs, Extremities, Neuro.
- Benzodiazepines are effective in terminating seizures; do not delay IM/IN administration while initiating an IV.
- Status epilepticus is defined as two or more seizures successively without an intervening lucid period, or a seizure lasting over five minutes.
- Grand mal seizures (generalized) are associated with loss of consciousness, incontinence and oral trauma.
- Focal seizures affect only part of the body and are not usually associated with a loss of consciousness.
- Be prepared to address airway issues and support ventilations as needed.
- Consider cardiac and ETCO2 monitoring.

Febrile Seizures
- Seizure activity in the setting of a febrile illness occurring between the age of 6 months and under 6 years old.
- The following interventions provide symptomatic relief for fevers, but do not stop the seizure:
  - ACETAMINOPHEN and/or
  - IBUPROFEN/KETOROLAC and/or
  - Removing excessive layers of clothing and/or
  - Applying cool compresses to the body
- ACETAMINOPHEN may be given if it has been ≥ 4 hours since last dose. IBUPROFEN may be given if it has been ≥ 6 hours since last dose and age > 6 months. KETOROLAC may be given if it has been ≥ 6 hours since last NSAID dose and age > 2 years old.

Pediatric Shock



History
- Blood loss
- Fluid loss - vomiting, diarrhea, fever
- Infection
- Medications
- Allergic reaction
- History of poor oral intake

Signs and Symptoms
- Restlessness, confusion
- Weakness, dizziness
- Weak rapid pulse
- Pale, cool, clammy skin
- Poor skin turgor
- Delayed capillary refill
- Dry mucous membranes
- Hypotension
- Coffee-ground emesis
- Tarry stools

Differential
- Hypovolemic shock
- Cardiogenic shock
- Septic shock
- Neurogenic shock
- Anaphylactic shock
- Dysrhythmias
- Pulmonary embolism
- Tension pneumothorax
- Medication effect or overdose
- Vasovagal

For patients with known adrenal insufficiency, administer patient's own SOLU-CORTEF (HYDROCORTISONE) as prescribed OR;
METHYLPREDNISOLONE 2 mg/kg IV, max 125 mg

Causes of Adrenal Insufficiency:
Addison's Disease
Congenital Adrenal Hyperplasia
Long term administration of steroids
Others

- **Pearls**
- Recommended exam: Mental Status, Skin, Heart, Lungs, Abdomen, Back, Extremities, Neuro.
- Hypotension can be defined as a systolic < Estimated Minimum Systolic. This is not always reliable and should be interpreted in context and patient's typical BP, if known. Shock may present with a normal BP initially.
- Hypotension for age (lowest acceptable systolic blood pressure in mmHg):
  - Less than 1 years of age: 60
  - 1–10 years old: (age in years) (2) + 70
  - Greater than 10 years old: 90
  - Shock often is present with normal vital signs and may develop insidiously. Tachycardia can be a late sign of shock in children and a tachycardic child may be close to cardiovascular collapse.
  - Consider all possible causes of shock and treat per appropriate protocol.
  - Physiologic targets of resuscitation: Systolic blood pressure at least fifth percentile for age, strong distal pulses, warm skin perfusion, capillary refill less than 2 seconds and improving mental status.

New onset DKA in pediatric patients commonly presents with nausea, vomiting, abdominal pain, and/or urinary frequency. Overly aggressive administration of fluid in hyperglycemic patients may cause cerebral edema or dangerous hyponatremia. Cerebral edema is a leading cause of death in children with DKA.

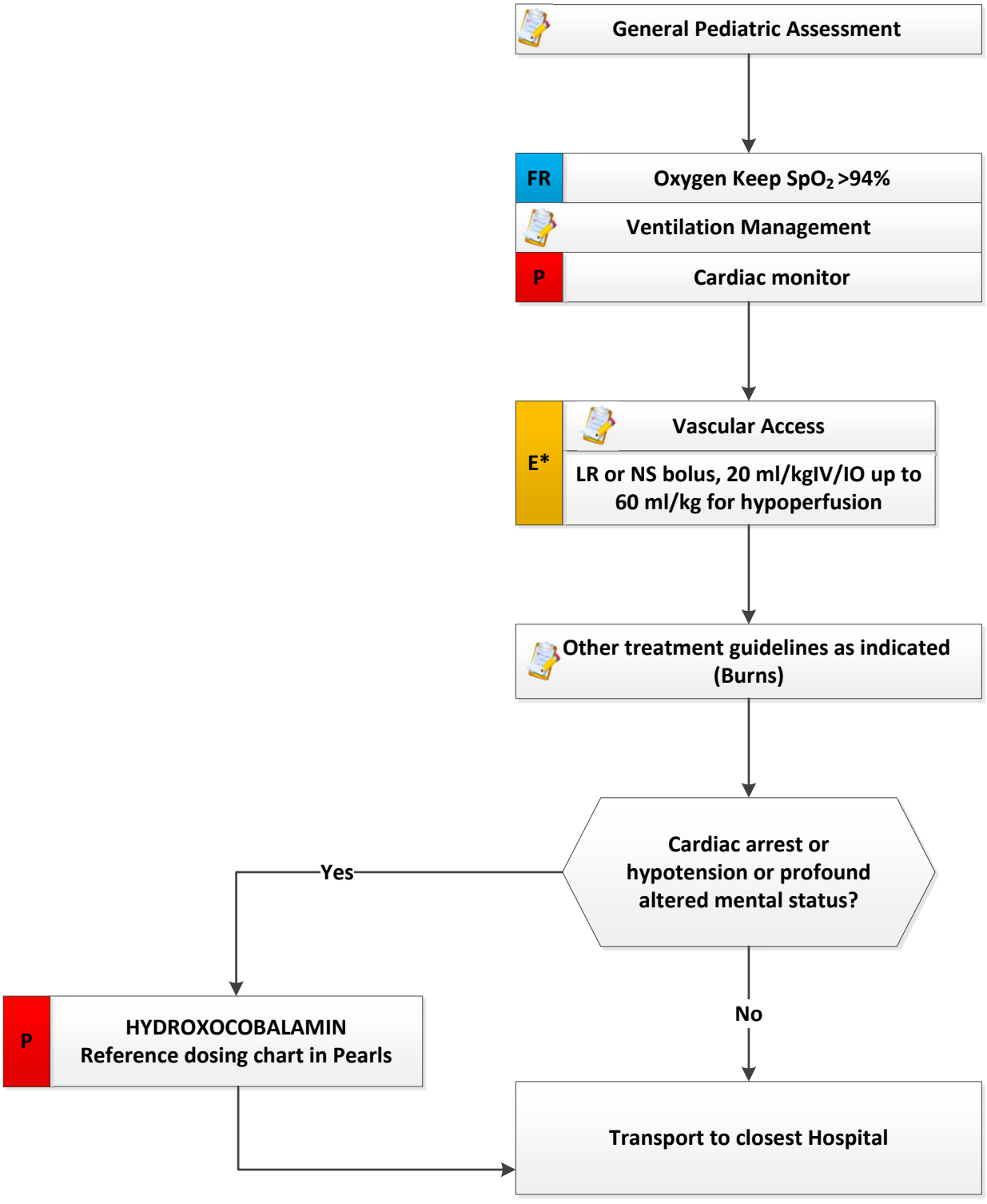
Hypovolemic shock
- Hemorrhage, trauma, GI bleeding, ruptured aortic aneurysm, or pregnancy related bleeding

Cardiogenic shock
- Heart failure, MI, cardiomyopathy, myocardial contusion, toxins, dysrhythmia, valvular disease

Distributive shock
- Sepsis, anaphylaxis, neurogenic, toxins, overdose, endocrine

Obstructive shock
- Pericardial tamponade, pulmonary embolus, tension pneumothorax

Pediatric Smoke Inhalation



History
- Exposed to smoke in a structure fire
- Exposed to smoke in a vehicle fire
- Exposed to smoke from other sources, industrial, confined space, wilderness fire etc.

Signs and Symptoms
- Facial burns
- Singed nasal hairs or facial hair
- Shortness of breath
- Facial edema
- Stridor
- Grunting respirations

Differential
- COPD
- CHF
- Toxic inhalation injury
- Caustic inhalation injury
- Pneumonitis

Pearls
- Protect yourself and your crew.
- Have a high index of suspicion when treating patients at the scene of a fire.
- If the medication is not available on scene do not delay transport waiting for it.
- Carefully monitor respiratory effort and correct life threats immediately.
- Decide early on if you want to intubate as burned airways swell making intubation difficult.
- Profound altered mental status can be defined as a deficit that includes disorientation, bewilderment and difficulty following commands.

Pediatric Cyanokit Instructions and Dosing

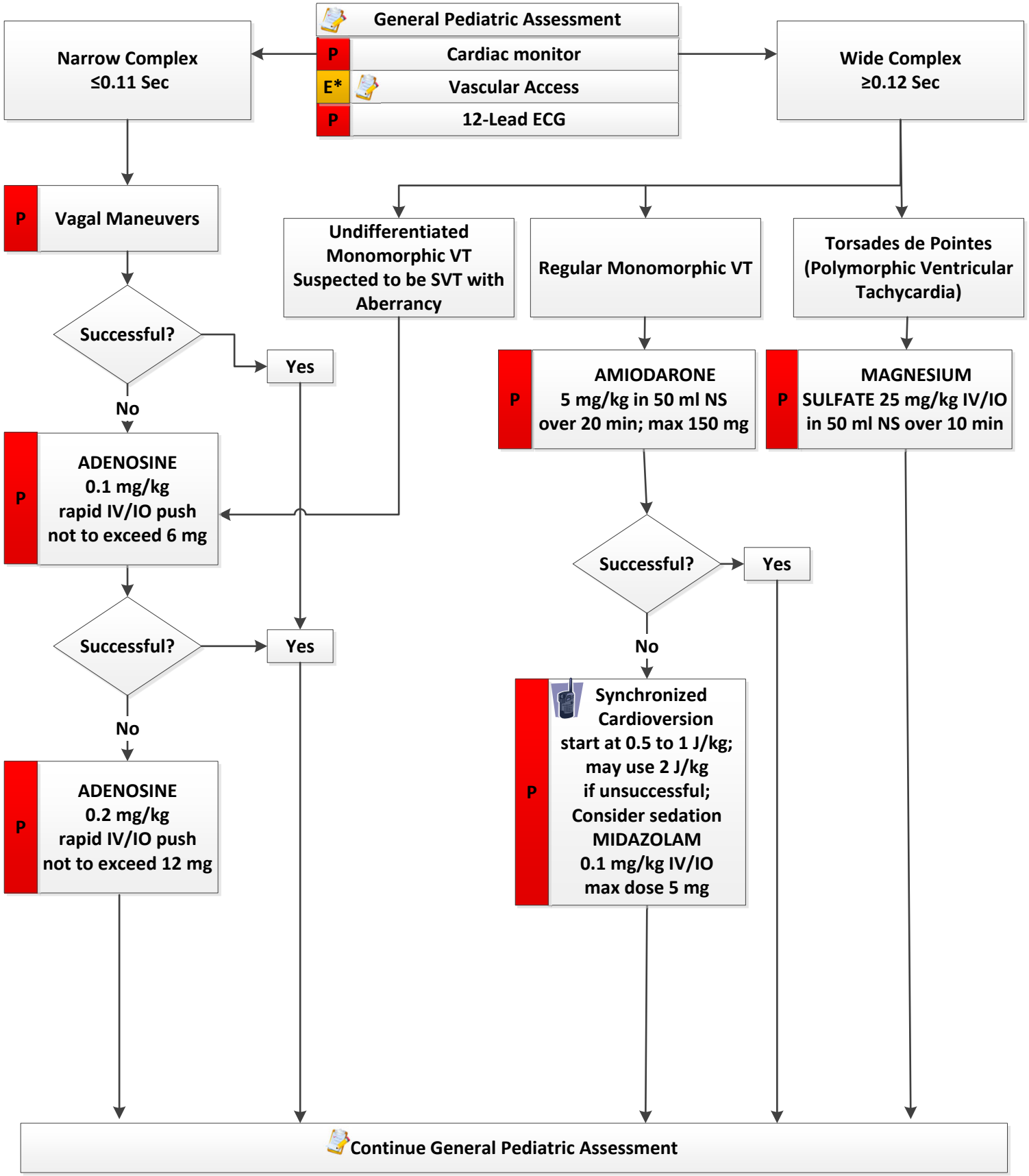
1. Reconstitute Cyanokit vial per the Instructions. **The new vial concentration will be 25mg/ml.**
2. See chart below to find the appropriate reconstituted dose.

APPROXIMATE AGE	NB–1 m	2 m	4–6 m	8–10 m	1–1.5 y	2–2.5 y	3–3.5 y	4–5 y	5.5–7 y	7.5–8 y	8.5–10 y
WEIGHT IN LBS	7–9 lb	11 lb	13–15 lb	18–20 lb	22–24 lb	26–31 lb	33–40 lb	42–48 lb	53–62 lb	66–70 lb	71–80 lb
WEIGHT IN KGS	3–4 kg	5 kg	6–7 kg	8–9 kg	10–11 kg	12–14 kg	15–18 kg	19–22 kg	24–28 kg	30–32kg	34–36 kg
RECONSTITUTED SYRINGE AMOUNT	10 ml	15 ml	20 ml	25 ml	30 ml	40 ml	50 ml	60 ml	75 ml	85 ml	100 ml
TOTAL DOSAGE OF MEDICATION	250mg	375mg	500mg	625mg	750mg	1000mg	1250mg	1500mg	1875mg	2125mg	2500mg
gtts / sec	**1**	**1**	**1**	**5**	**5**	**5**	**5**	**5**	**5**	**6**	**6**

GIVE DOSE IN **50ml NS BAG** | GIVE DOSE IN **250ml NS BAG**

3. Withdraw and waste the equivalent volume of Normal Saline from the bag size indicated.
4. Draw the appropriate dose from the vial referencing the chart, using the appropriate syringe size.
5. Inject the reconstituted medication into the appropriate sized bag of Normal Saline, below the Chart.
6. Spike the bag with 15 gtts/ml IV tubing.
7. Piggyback line into an IV/IO line and **Infuse over ~15 minutes** using the gtts/second noted above.

Pediatric Tachycardia / Stable
(Normal Mental Status, Palpable Radial Pulse)



History

- Medications
- Diet (caffeine)
- Drugs (cocaine, methamphetamines)
- Past medical history
- Syncope/near syncope
- History of palpitations/racing heart

Signs and Symptoms

- Heart rate ≥ 180 in children
- Heart rate ≥ 220 in infants
- Dizziness, CP, SOB
- Diaphoresis

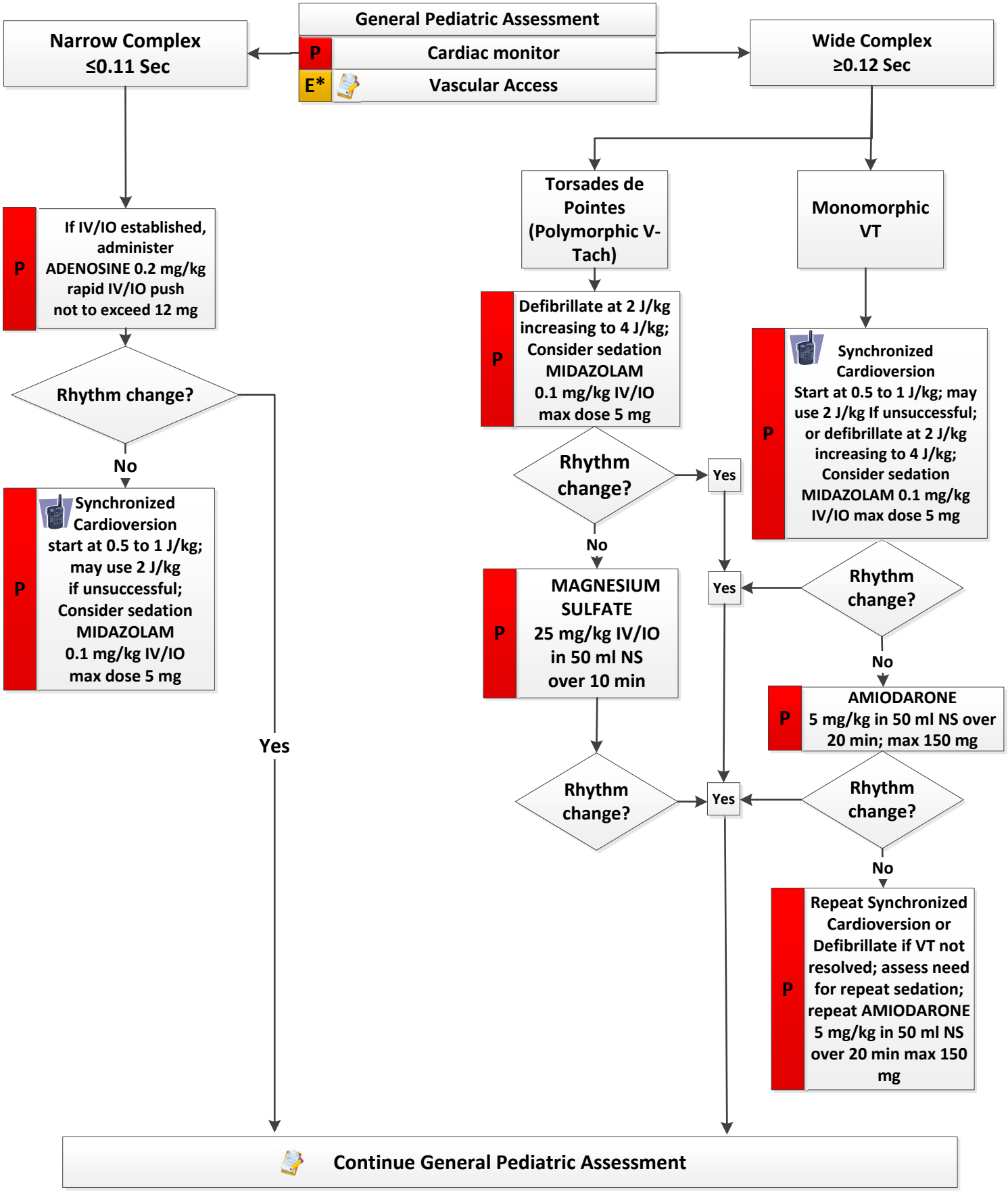
Differential

- Heart disease (WPW, valvular)
- Sick sinus syndrome
- Electrolyte imbalance
- Exertion, fever, pain, emotional stress
- Hypoxia
- Hypovolemia
- Drug effect, overdose
- Hyperthyroidism

Pearls

- Pediatric synchronized cardioversion is by Medical Control order only.
- Recommended exam: Mental Status, Skin, Heart, Lungs, Abdomen, Back, Extremities, Neuro.
- Carefully monitor patients as you treat them; stable tachycardias may convert to unstable rhythms/conditions quickly.
- Sedate patients prior to cardioversion, if time allows.
- Administer ADENOSINE at a proximal IV site, rapidly followed by a saline flush.
- The most common tachyarrythmia in children is sinus.

Pediatric Tachycardia / Unstable
(Mental Status Changes, No Palpable Radial Pulse)



History
- Medications
- Diet (caffeine)
- Drugs (cocaine, methamphetamines)
- Past medical history
- Syncope/near syncope
- History of palpitations/racing heart

Signs and Symptoms
- Cardiac Arrest
- Heart rate ≥ 180 in children
- Heart rate ≥ 220 in infants
- Dizziness, CP, SOB
- Diaphoresis

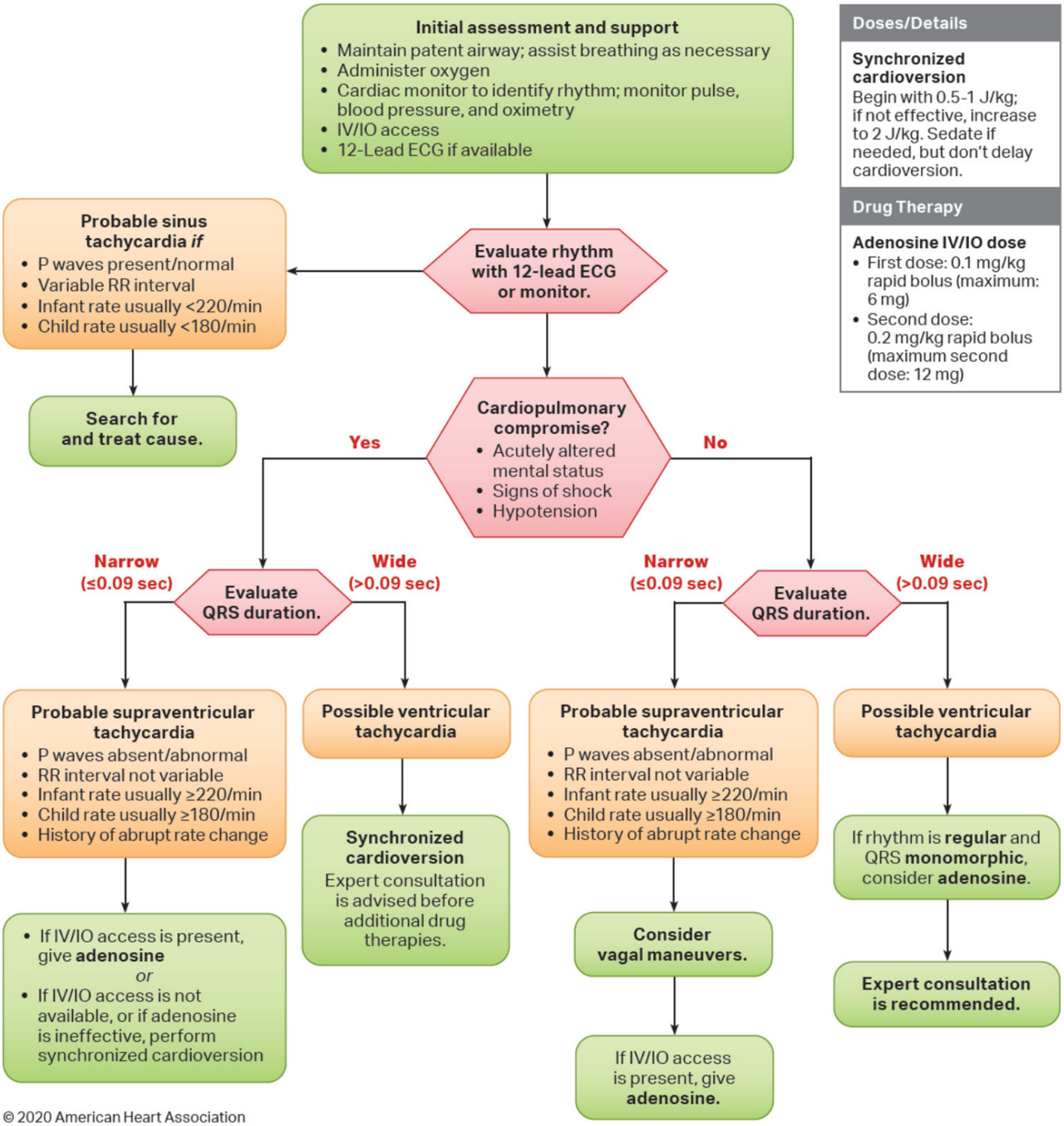
Differential
- Heart disease (WPW, valvular)
- Sick sinus syndrome
- Electrolyte imbalance
- Exertion, fever, pain, emotional stress
- Hypoxia
- Hypovolemia
- Drug effect, overdose
- Hyperthyroidism

Pearls

- Pediatric synchronized cardioversion is by Medical Control order only.
- Recommended exam: Mental Status, Skin, Heart, Lungs, Abdomen, Back, Extremities, Neuro.
- If patient is in arrest, efforts should focus on quality chest compressions and rhythm correction.
- Administer ADENOSINE at a proximal IV site, rapidly followed by a saline flush.

Pediatric Tachycardia With a Pulse Algorithm

Pediatric Tachycardia With a Pulse Algorithm



Pediatric Ventilation Management

Use supplemental oxygen to maintain an oxygen saturation of >94%; >90% for patients on home oxygen for chronic conditions

FR
Basic Airway Maneuvers
- Open airway, Chin lift/Jaw thrust
- NPA (EMT) or OPA (EMR) as needed
- Suction as needed

Consider spinal motion restriction

Consider Altered Mental Status/Syncope

→ Respiratory Distress and/or Tracheostomy Tube Replacement Guideline if needed

FR
Administer oxygen
BVM as needed

Intervention effective?

No

E* Supraglottic Airway

P Endotracheal Intubation

ECG Monitor

E* Vascular Access

P
Consider Post-Intubation Sedation: Administer
MIDAZOLAM 0.1 mg/kg IM/IV/IO, max dose 5 mg. May repeat after 5 min OR;
KETAMINE 2 mg/kg IV, max 100 mg. May repeat after 10 min.

Consider Post-Intubation Analgesia: Administer
FENTANYL 1 mcg/kg; max dose 50 mcg. May repeat after 10 min.

Yes

Supraglottic/ETT placement successful?

YES

NO

Able to ventilate without supraglottic/ ETT in place?

YES

NO

P Needle Cricothyroidotomy

Continue General Pediatric Assessment

Always weigh the risks and benefits of endotracheal intubation in the field against transport. All prehospital endotracheal intubations are considered high risk. If ventilation/oxygenation is adequate, transport may be the best option. The most important airway device and the most difficult to use correctly and effectively is the Bag Valve Mask (not the laryngoscope). Few prehospital airway emergencies cannot be temporized or managed with proper BVM techniques.

Pearls

- **The Montana Board of Medical Examiners DOES NOT allow drug assisted intubation (DAI) or rapid sequence intubation (RSI) for standard ground ALS paramedics.**
- Consider preoxygenation/lung denitrogenation with a non-rebreather or a nasal cannula at 15 LPM prior to intubation (as patient condition allows).
- Severe hypotension (SBP < 70+(2 X age)) should be addressed with IV fluids and/or pressors (as appropriate) prior to intubation in order to reduce likelihood of post-intubation cardiovascular decline.
- Capnometry (color) or capnography (waveform) is mandatory with all methods of intubation. Document results.
- Continuous capnography (ETCO2) is mandatory for the monitoring of all patients with an advanced airway.
- If an effective airway is being maintained by BVM and/or basic airway adjuncts (e.g. nasopharyngeal airway) with continuous pulse oximetry values of ≥90%, or values expected based on pathophysiologic condition with otherwise reassuring vital signs (e.g. pulse oximetry of 85% with otherwise normal vitals in a post drowning patient), it is acceptable to continue with basic airway measures instead of using a supraglottic airway device or intubation.
- For the purposes of this protocol, a secure airway is achieved when the patient is receiving appropriate oxygenation and ventilation.
- An Intubation Attempt is defined as passing the laryngoscope blade or endotracheal tube past the teeth or inserted into the nasal passage.
- An appropriate ventilatory rate is one that maintains an ETCO2 of 35 - 45. Avoid hyperventilation.
- Paramedics should use a supraglottic airway device if oral-tracheal intubation is unsuccessful.
- Maintain C-spine stabilization for patients with suspected spinal injury.
- Gastric tube placement should be considered in all intubated patients if time allows.
- It is important to secure the endotracheal tube well.

QI Metrics

- Mandatory notification of Medical Director within 24 hours of any failed intubation attempt. For simplicity, may use this online form: https://forms.gle/G3RPJQ8fEugRafMTA
- Mandatory notification of Medical Director within 24 hours of any attempted, successful, and/or failed cricothyroidotomy in the field. For simplicity, may use this online form: https://forms.gle/G3RPJQ8fEugRafMTA

OPERATIONS GUIDELINES

Air Medical Activation

INDICATIONS:

- The decision for mode of transport from both field and inter-facility transfer patients is based on the premise that the time to definitive care and quality of care are critical to achieving optimal outcomes.
- Factors of distance, injury severity, road conditions, weather, and traffic patterns must be considered when choosing between air or ground transport. The skill level of the transport team must also be considered.
- The potential benefit to the patient should outweigh the risks associated with air transport.

In general, use of air ambulances should be considered in the following situations:

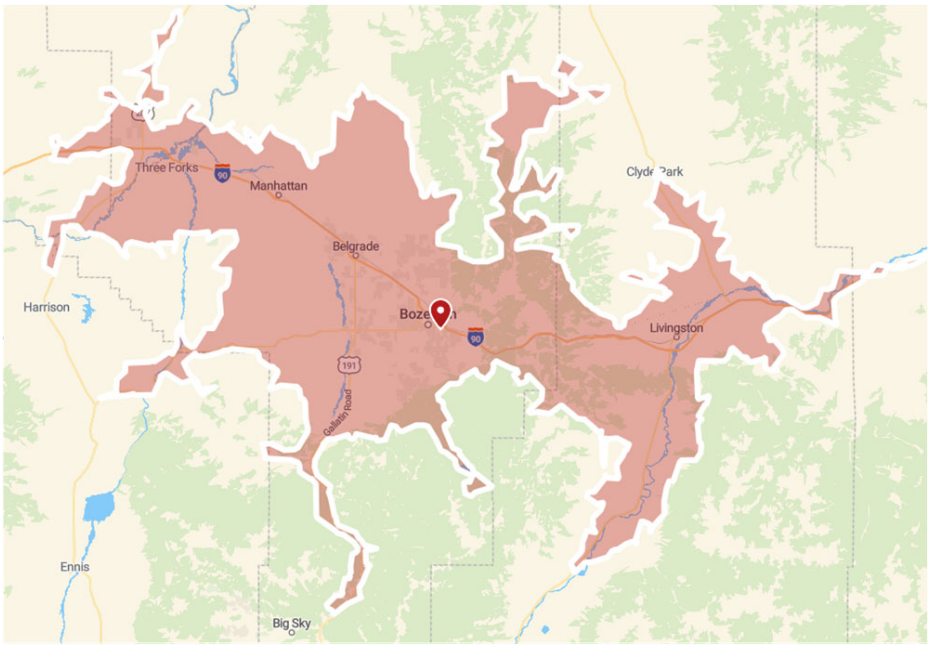
Skill-based reasons: The skill set or medical equipment of the critical care air medical team is required for the patient's condition. Example: Expected need for rapid sequence intubation in a patient with airway difficulties.

Aircraft-based reasons: The specific qualities of aircraft transport, such as speed of transport over large distances, are expected to benefit the patient. The National Associated of State EMS Officials' National Model of EMS Guidelines (2019 Version 2.2, pg. 11) recommends considering "air medical transport, if available, for patients with time-critical conditions where ground transport time exceeds 45 minutes." See map below for Gallatin Valley highlighting 45 minute drive time to BHDRMC.

Provider discretion: Local providers are often aware of resource limitations and/or challenges specific to certain incidents or locations. Use of air ambulance resources may be considered per incident command discretion based on these circumstances.

CANCELING AIR MEDICAL TRANSPORT

- When air medical transport (AMT) has been requested, consideration for canceling it should only be made by trained EMS providers who are on scene and able to evaluate the situation and patient care needs.
- Resources are often dispatched before the full details of a situation are known. If AMT arrives on scene, it is appropriate to make a decision to transport the patient by ground EMS if it is felt by all providers that the patient does not require the higher level services of the AMT team.



BHDRMC Trauma Activation

Bozeman Health
Trauma Services

Trauma Activation Criteria

LEVEL 1

High likelihood of needing immediate procedures/MTP/OR
(Need services in <30mins)

- Traumatic Cardiac Arrest with or without ROSC
- Intubated/compromised airway
- Assisted Ventilations
- Respiratory
  - RR <10 or >30
  - 0-12mo. RR <20
  - Concern for new hypoxia
    - SpO_2 <90% on room air in the setting of trauma
- Chest Injury
  - Flail chest/ chest deformity
  - Signs of tension pneumothorax
- Shock/Hypotension/Hemodynamic instability
  - >64 y.o. w/ SBP <110,
  - 10-64 y.o. w/ SBP <90
  - 0-9 y.o. w/ SBP < 70+(2 x age in years)
    - capallary refill time > 3 sec., mottling, weak pulses
- Shock index >1 (HR/SBP)
- GCS less than or equal to 8 with traumatic mechanism
- Active bleeding requiring tourniquet proximal to wrist/ankle
- Amputation proximal to wrist/ankle
- Pulseless/mangled extremity
- Suspected spinal cord injury with paralysis/motor function loss
- GSW/ penetrating trauma to head, neck, chest, abdomen, extremities proximal to elbow/knee
- Receipt of transfer patients from another hospital who require ongoing blood transfusion and/or ongoing respiratory compromise
- Physician Discretion

LEVEL 2

High likelihood of serious injury but less likely to need time sensitive intervention
(Needs services in < 60 mins)

- Suspected fractures of two or more long bones
- Burns >25% TBSA or signs of inhalation injury
- Pelvic instability or significant pain with pelvic compression
- Blunt abdominal trauma with concerning exam
- Chest injury with any of the following:
  - Asymmetric or absent lung sounds
- GCS 9–12 with concerning mechanism
- Open or depressed skull fracture(s)

LEVEL 3

Concerning mechanism but patient **does not meet** criteria for level 1 or level 2

- **MVC with High Risk of Severe Injury**
  - Rollover
  - Partial or complete ejection
  - Vehicle intrusion: >12 in at occupant site, >18 in at any other site
  - Death in the same vehicle
  - Unrestrained child in MVC
  - Vehicle telemetry data consistent with significant injury (ex. OnStar alert)
  - Need for extrication
  - High speed with significant impact
- **Other High-Risk Mechanisms / Criteria**
  - Pedestrian or bicyclist vs. auto
  - Fall >10 feet
  - Rider separation from motorcycle, ATV, horse, bike, etc.
  - Blast or explosion
  - Hanging or drowning
  - Head trauma with GCS 13–14
  - Suspected hip fracture
  - EMS provider judgment

Geriatric Trauma Activation Considerations (>64 years)

Anatomic: Proximal long bone fracture from MVC, multiple body regions injured

Mechanism: Fall from any height with head/brain injury, pedestrian struck by vehicle

Risk Factors: Anticoagulation use, significant comorbidities (cardiac disease, COPD, dialysis, immunosuppression)

Note: Comorbidities/anticoagulation alone are not automatic triggers but should prompt escalation when combined with mechanism or physiologic/anatomic findings

Big Sky Area Trauma Field Triage

Trauma Field Triage Job Aid

Priority 1	Priority 2	Priority 3
STEP 1: Traumatic mechanism with unstable vital signs / altered mental status/ noted injuries	**STEP 2: Traumatic mechanism with isolated injury and stable vital signs**	**STEP 3: Traumatic mechanism with stable vital signs and no noted injury / single orthopedic injury**
Activate helicopter and transport to the closest Level 3 or higher facility	Bypass Big Sky Medical Center —can be ground	Transport to Big Sky Medical Center

Airway: unable to maintain airway or need for vent
Breathing: RR<10 or >29, SpO2<88% despite supp. O2
Circulation: confirmed reading at any time
• Age 0-9 <70mmHg + (2 x age in years)
• Age 10-64 ≤90mmHg
• Age 65+ <110mmHg
Disability: GCS <9
 	
Post-arrest with ROSC
Injury Patterns
 	
-Skull deformity, suspected skull fracture
-Suspected spinal injury with motor or sensory loss
-Significant penetrating injuries to head, neck, chest, abdomen, back, groin, buttocks or extremities proximal to elbow or knee
-Chest wall instability, deformity or suspected flail chest
-Unstable pelvic fracture (unable to ambulate)
-Suspected fracture of two or more proximal long bones
-Crushed, degloved, mangled or pulseless extremity
-Amputation proximal to wrist or ankle
-Active bleeding requiring a tourniquet or wound packing with continuous pressure
-Burns >20% TBSA COMBINED with other injury and trauma
-Chest wall injury with suspected pneumothorax
-Blunt abdominal trauma with significant firmness, distention or tenderness
-High voltage electrical injury with or without significant injury
 	
Transport to nearest Level 2 facility
-Isolated neurological injury
-Isolated burns >20% TBSA with no associated trauma
	-Pregnancy >20 weeks with stable vital signs and without priority 1 injuries
	-Geriatric (>65) with SBP >110 with multiple body regions injured
	
	Injury Patterns
	
	-Suspected hip fracture
	-Orthopedic injury needing OR: Obvious femur fracture, obvious tib/fib fracture , open fractures, etc.
	
	Provider Judgement
		Mechanism of Injury
		
		-High-risk auto crash
		• Partial or complete ejection
		• Death in passenger compartment
		• Significant intrusion (including roof)
		  • >12 inches occupant site OR
		  • >18 inches any site
		• Child (age 0-9) unrestrained or in unsecured child safety seat
		-Pedestrian/bicycle rider thrown, run over or with significant impact
		-Fall from height >10ft (all ages)
		-Rider separated from transport vehicle with significant impact (motorcycle, ATV, horse, snowmobile etc.)
		-High energy dissipation/rapid deceleration incidences striking fixed object with momentum (Skier, mountain biker, etc.)
		Injury Patterns
		
		-Orthopedic injury with neurovascular compromise for relocation
		-Stable, isolated orthopedic injury; upper extremity fractures, ankle fractures, etc.
		-GCS 10-13 (suspected concussion)
		-Penetrating injury to hand or foot

Bozeman Health Trauma Services

BSMC Trauma Activation Criteria

LEVEL 1

High likelihood of needing immediate procedures/RTP/Transport
(Need services in < 30mins)

Anatomic/Physiologic

Neuro/Head:
- GCS ≤ 13
- Suspected spinal cord injury with paralysis/motor function loss
- Open/depressed skull fractures

Cardiac/Chest:
- Traumatic Cardiac Arrest with or without ROSC including hanging/drowning
- Flail chest/signs of tension pneumothorax

Respiratory:
- Intubated/compromised airway
- Assisted ventilations
- Respiratory Rate <10 or >30

Shock/Hypotension/Hemodynamic instability
- >64 y.o. w/ SBP <110
- 10-64 y.o. w/ SBP <90
- 0-9 y.o. w/ SBP < 70+(2 x age in years)
- capillary refill time > 3 sec., mottling, weak pulses
- Shock index >1 (HR/SBP)

Abdomen:
- Blunt abdominal trauma with tenderness/distension
- GSW/ penetrating trauma to head, neck, chest, abdomen, extremities proximal to elbow/knee

Pelvis:
- Suspected pelvis fracture

Extremities:
- Active bleeding requiring tourniquet proximal to wrist/ankle
- Amputation proximal to wrist/ankle
- Pulseless/mangled extremity
- Suspected fracture of two or more proximal long bone fractures

Burns:
- Burns ≥ 25% TBSA or high-energy electrical injury

Mass casualty 2 or more major trauma

Physician/RN Discretion

LEVEL 2

High likelihood of serious injury but less likely to need time sensitive intervention
(Needs services in < 60 mins)

Mechanism
+ Any complaint or s/s of injury to head, neck, spine, chest, abdomen, pelvis

MVC:
- Partial/complete ejection
- Death in same vehicle
- Child 0-9 years old unrestrained or in unsecured child safety seat
- Need for extrication for entrapped patient
- Auto vs pedestrian or bicycle

Head/Neuro:
Head trauma with GCS 14 and on anticoagulants

Ejection:
- Motorcycle, ATV, Snowmobile, Horse/Bull

Falls:
- >10 feet
- >64 y.o. fall from any height (including standing) with evidence of traumatic head injury

Hip:
Suspected hip fracture

Blast/ explosion

Physician/RN Discretion

Defining a Patient

FIRST & SECOND PARTY CALLS:
All first party calls (the patient calls to summon assistance for themselves) and second party calls (someone who knows the patient or who is involved in the situation summons EMS) should generate a refusal of care (including lift assists). If the patient refuses vitals/assessment/etc., that should be documented.

EXAMPLES OF SECOND PARTY CALLS:
A family member calls for a choking relative who is better by arrival.
A motorist calls for someone they have hit in an MVC.
Law enforcement calls for someone involved in an MVC.

THIRD PARTY CALLS:
Third party calls are calls where the reporting party does NOT know the person(s) involved or the situation.

EXAMPLES OF THIRD PARTY CALLS:
Someone passes an accident on the road and calls 911 without knowledge of the individuals involved.
Someone driving down the road calls for someone unknown to them who was lying in the grass.

If it is a third party call and the parties refuse EMS and state there is no medical problem (as in the person sleeping in the park, or multiple parties involved in an MVC), and they do not appear obviously injured, ill, or impaired, then the incident may be documented as “no patient found”. Providers are encouraged to document that they made a visual assessment of the scene and the person(s) involved in the paperwork to demonstrate due diligence.

Destination Hospital Choice

GUIDELINE:

Patients should be transported to the closest appropriate receiving hospital unless:

- In consultation with medical control it is determined that a more distant hospital is more appropriate to meet the needs of the patient;

-OR-

- The patient meets criteria or published EMS guidelines for transport to a specialty care center (i.e. Trauma, STEMI);

-OR-

- The patient requests a specific hospital,
- **AND** The patient's condition is considered stable to tolerate additional transport time without the need for more urgent stabilization before more lengthy transport;
- **AND** The EMS transport service has determined that such a transport would not unreasonably remove the unit from its primary area of response causing a decrease of 911 coverage to the local area;
- **AND** The patient has been informed that the transport to a more distant location will be more expensive and may not be covered by insurance if the added transport is not felt to be medically necessary by the insurance company.

Interfacility Transfers

ECPs may transfer patients between medical facilities if they possess the knowledge and skills necessary to manage the needs of the patient. Consultation with the transferring physician is required to assure the potential needs of the patient are met while conducting the transfer. The ECPs scope of practice may not be expanded to meet the needs of the patient. Appropriate personnel must be obtained to assure continuity of patient care. Questions regarding whether the patient qualifies for IFT via ground ambulance at a certain level of care should be directed to a supervisor/battalion chief/assistant chief depending on the structure of your agency or the EMS Medical Director.

EMT (Emergency Medical Technician): GENERAL GUIDANCE: If the patient has active medications running in an IV drip, has recently been administered sedating medications, has active airway or circulation issues, or has undergone advanced procedures (beyond simple IV starts, for example), this suggests that the patient falls outside the scope of the EMT for transfer and a higher-level provider or other means of transport should be considered. Status and care required for each patient must be evaluated individually to assess if the EMT is the correct provider for interfacility transport.

AEMT (Advanced Emergency Medical Technician): GENERAL GUIDANCE: If the patient is being ventilated, requires continuous ECG monitoring, has cardiac rhythm disturbances or active ischemia, has active medications running in an IV drip, has recently been administered sedating medications, has active airway or circulation issues, or has undergone advanced procedures, this suggests that the patient falls outside the scope of the AEMT for transfer and a higher level provider or other means of transport should be considered. Status and care required for each patient must be evaluated individually to assess if the AEMT is the correct provider for interfacility transport.

PARAMEDIC: GENERAL GUIDANCE: If the patient is being transferred from an ICU or inpatient unit, has multiple IV medications or infusions, or has labile condition or vital signs, this suggests that the patient falls outside the scope of the Paramedic for transfer and Paramedic(s) with the Critical Care Endorsement or other means of transport should be considered. Status and care required for each patient must be evaluated individually to assess if the Paramedic is the correct provider for interfacility transport. The Paramedic may continue administration of medications initiated in the emergency department such as antibiotics, steroids, ACLS drugs, vitamins, magnesium (including OB mag), nitroglycerin, fractionated heparin, etc. via subcutaneous, intramuscular, intraosseous, and/or intravenous routes. The Paramedic may utilize central venous lines if previously trained and authorized by the EMS Medical Director. For the transport medication the Paramedic should be familiar with pharmacology & indications as well as signs, symptoms and treatment of any major adverse drug reactions. Infusion may be discontinued if significant adverse reaction is noted and should be reported as soon as possible.

Paramedics may initiate or continue the infusion of blood products.

Paramedics may maintain and monitor patients with a chest tube in place.

PARAMEDIC, CRITICAL CARE ENDORSEMENT: GENERAL GUIDANCE: Transport of intubated patients maintained on a mechanical ventilator and requiring the administration of sedation/paralytic medications are limited to critical care endorsed paramedics only.

Medication List

The following is a list of approved medications for use in Gallatin County. While other medications are listed in the NASEMSO National Model EMS Clinical Guidelines version 3.0, only the following are approved for administration in Gallatin County.

Acetaminophen
Activated charcoal
Adenosine
Albuterol
Amiodarone
Aspirin
Atropine
Brilinta (BSFD, HBRFD, and YMCRFD only)
Calcium chloride
Calcium gluconate
Dextrose
Diazepam
Diphenhydramine
Droperidol
Epinephrine
Fentanyl
Glucagon
Haloperidol
Heparin
Ibuprofen
Ipratropium
Ketamine
Ketorolac
Lidocaine
Lorazepam
Magnesium sulfate
Methylprednisolone
Metoclopramide
Metoprolol
Midazolam
Morphine
Naloxone
Nitroglycerin
Norepinephrine
Ondansetron
Oral glucose
Oxygen
Oxymetazoline
Phenylephrine
Pitocin
Sodium bicarbonate
Tranexamic acid

Prehospital Death Determination

For all emergency scenes where patient needs exceed available EMS resources, initial assessment and treatment shall be in accordance with the START triage methodology.

1. Patients who appear to have expired will not be resuscitated or transported by EMS personnel if any of the following obvious signs of death are present:

   A. Body decomposition
   B. Decapitation
   C. Transection of thorax (hemicorpectomy)
   D. Incineration
   E. Other obvious fatal injuries

Contact medical control if in doubt traumatic injuries are suspected to be incompatible with life.

OR if ***ALL* five (5)** presumptive signs of death **AND AT LEAST one (1)** conclusive sign of death are identified.

The (5) presumptive signs of death that **MUST** be present are:

1) Unresponsiveness
2) Apnea
3) Pulselessness
4) Fixed, dilated pupils
5) For Non-Traumatic Arrests, Asystole in at least 2 (two) leads or a "No Shock Advised" prompt from an AED

Conclusive signs of death include:

1) Dependent lividity
2) Rigor mortis

If any of the findings are different than those described above, clinical death is not confirmed, and resuscitative measures should be immediately initiated or continued.

2. Once it has been determined that the patient has expired and resuscitation will not be attempted:
   A) Immediately notify the appropriate authority;
   B) **DO NOT** leave a body unattended. You may be excused once a responsible person (i.e. coroner, law enforcement, fire, etc.) is present;
   C) **DO NOT** remove any property from the body or the scene for any purpose;
   D) **NEVER** transport/move a body without permission from the coroner except for assessment or its protection.

If the body is in the public view and cannot be isolated, screened, or blocked from view, and is creating an unsafe situation with citizens/family, the body can be covered with a clean sheet or STERILE BURN SHEET obtained from the EMS vehicle.

Prehospital Report

PURPOSE:
The purpose of the prehospital report is to give the receiving hospital notification of an inbound ambulance. The report should be brief and concise. It allows the receiving hospital to properly assign a room and assemble appropriate staff and resources depending on the acuity level. A full detailed report can be given at bedside to the receiving staff.

GUIDELINE:
In the case of an MCI, early notification is key so the hospital has time to assemble extra staff and resources. As soon as triage is complete, the triage officer or incident command should contact the hospital with a patient count and corresponding triage categories (e.g. 2 red, 2 yellow, and 3 green).

METHOD:
The preferred method of contacting BHDRMC is via Pulsara. It is also acceptable to call on the designated EMS landline. As a backup or as primary during an MCI, communication to BHDRMC will be via the GC MED COM radio channel.

The preferred method of contacting BSMC is via Pulsara. It is also acceptable to call the general ED phone number. As a backup or as primary during an MCI, communication to BSMC will be via the GC MED COM radio channel.

PREHOSPITAL REPORT FORMAT:
The expected prehospital report format is MIVT for trauma and SSVT for medical. A full set of vitals signs should be reported including blood pressure, heart rate, respiratory rate, oxygen saturation, and GCS if a trauma patient. Terms such as “within normal limits” or “stable” are not acceptable.

- Name and DOB
- Activation? (Trauma, STEMI, Stroke, Sepsis)
- ETA

Trauma (MIVT)
- Mechanism
- Injuries
- Vital Signs
- Treatment

Medical (SSVT)
- Signs
- Symptoms
- Vital Signs
- Treatment

POLST / Palliative Care

POLST forms have replaced the previous program of Comfort One in Montana. However, Comfort One forms are still valid and still present in the community. They should be honored if one is presented to EMS in the course of patient care.

POLST:

Out-of Hospital Guideline when presented with POLST Documentation

- POLST documentation, if presented to the prehospital provider, **MUST** be followed.
- POLST documentation **MUST** accompany the patient and be presented to other health care providers who subsequently attend the patient.
- The prehospital patient care report (PCR) must include the POLST documentation and care provided based on the POLST documentation.
- Never delay patient care to determine if the patient has POLST documentation.
- Comfort One bracelet identifies a patient who has a POLST document and a DNR (section A).
- A POLST document can be disregarded if the **PATIENT** requests or if the terminal condition no longer exists.
- A verbal DNR order from a physician **MUST** be followed.
- If there is a question regarding POLST, contact online medical control.

End-of-Life Care/Palliative Care:

PATIENT CARE GOALS: When providing care for a patient near end-of-life:

- Provide relief from pain and other distressing symptoms.
- Affirm dying as a normal process.
- Integrate psychological and spiritual aspects of patient care.
- Offer a support system to help the family cope during the patient's illness and in their own bereavement.

Inclusion Criteria

- Patient enrolled in hospice or palliative care, or who have advanced care directives or POLST, experiencing complaints related to the illness for which the patient is receiving those services.

Exclusion Criteria

- Complaints unrelated to the illness for which they are receiving those services.

POLST / Palliative Care

End-of-Life Care/Palliative Care (conti):

PATIENT MANAGEMENT:

Patients with decision making capacity:

If the patient is able to communicate and has the capacity to make decisions regarding treatment and transport, consult directly with the patient before treatment or transport.

Patients without decision making capacity:

If the patient lacks the capacity to make decisions regarding treatment or transport, identify any advanced care planning in place for information and consent for treatment, including:

- POLST or similar form
- Advanced care directives
- Guardian, healthcare power of attorney, or other accepted healthcare proxy
- In collaboration with hospice or palliative care provider, coordinate with guardian, healthcare power of attorney, or other accepted healthcare proxy if refusal of transport is considered.

TREATMENT CONSIDERATIONS:

If the patient has **EXCESSIVE SECRETIONS**: provide suction
If the patient requires **PAIN RELIEF**: see Pain Management guideline
If the patient has **NAUSEA**: see Abdominal/Flank pain, Nausea & Vomiting guideline

PATIENT SAFETY CONSIDERATIONS:

Careful and thorough assessments should be performed to identify complaints not related to the illness for which the patient is receiving hospice or palliative care. Care should be delivered with the utmost patience and compassion.

KEY CONSIDERATIONS:

- Social interactions with family may affect end-of-life care.
- Scene safety should be considered when deciding on management.

PERTINENT ASSESSMENT FINDINGS:

- Vital signs
- Pain score
- Neurological exam
- Lung sounds

KEY DOCUMENTATION ELEMENTS:

- Interaction with hospice or palliative care provider.
- Confirmation of advanced directive or POLST
- Pain score, if applicable

Refusal

PURPOSE:
To define the requirements a patient must meet in order to refuse treatment and/or transport to the hospital.

GUIDELINE:
Any patient refusing treatment must be informed of the risk of potential worsening of their condition, and the possibility it could lead to death or permanent disability.
A patient may refuse care:

- **IF** the patient has **CAPACITY** (see below);
- **AND** has no signs of being under the influence of an intoxicating substance;
- **AND** is alert and oriented to person, place, and time;
- **AND** is not a minor;
- **AND** is not showing signs of suicidal ideation or homicidal intent;
- **AND** still refuses;

THEN the patient must sign a refusal form indicating they understand and are accepting the risk of refusal and cannot hold anyone responsible for any negative outcome as a result of their refusal. If there are any questions or concerns about a patient's state of mind (capacity, intoxication, or altered mental status) who is refusing care or transport, EMS providers should involve online medical direction, enlist the help of family members or friends, and/or notify law enforcement for potential protective custody as appropriate.

For the purpose of EMS, a patient with CAPACITY is defined as:

- At least 18 years old (unless emancipated minor);
- **AND** is alert, responsive, oriented to person, place, time, and situation;
- **AND** has no signs of injury or illness which may impair the ability to make an informed decision;
- **AND** displays no signs of the patient's judgment being impaired by an intoxicating/mind altering substance (including carbon monoxide);
- **AND** is not suicidal or homicidal and does not want to hurt themselves;
- **AND** the patient demonstrates an understanding of:

1. Diagnosis, possible diagnosis, or current medical problem: Does the patient understand the condition/medical problem for which the specific treatment/transport is being offered?

2. Nature and purpose of treatment: Is the patient able to explain the nature of the treatment and understand relevant information?

3. Risk and benefits of proposed treatment/transport:

- Is the patient aware of the possible outcomes of treatment, alternatives, or lack of treatment, and is able to verbalize the potential danger/risk to their health and well-being by refusing transport/care?
- Is the patient able to make a decision and communicate a choice, and/or the expectations realistic? Are they able to manipulate the information rationally?

Refusal

DOCUMENTATION:

- Documentation of the refusal requires a patient care report (PCR) with as much information regarding the patient's evaluation as possible, including, but not limited to:
  - Any history obtained and any physical exam or objective observations. This may include visual descriptions if the patient declined any physical exam.
  - Documentation describing the discussions about the risks of refusal and options presented to the patient.

A BLS Provider may obtain a refusal:

- If there is no ALS Provider on scene, including before ALS has arrived to the scene, if en route.
- If the ALS Provider is occupied with care of a more seriously ill or injured patient(s) on scene.
- If there are multiple patient refusals within the same call.

NOTE: Multiple services do not need to obtain refusals from the same patient, and the responsibility to obtain a refusal should fall to the agency having jurisdiction (AHJ) for the call, the agency holding incident command, or the transporting EMS agency. Refusals should be obtained by ALS Level Providers when available on scene.

Termination of Resuscitation

1. Licensed EMS personnel are not obligated to continue resuscitation efforts that have been started by other persons at the scene if the patient meets the criteria listed in the Prehospital Death Determination guideline. This includes telephone CPR initiated by Emergency Medical Dispatchers.

2. Resuscitation should be terminated/not initiated if a valid DNR/POLST or physician written order is provided.

3. Resuscitation started in the field may be discontinued when the following conditions have been met:
   A. For **medical arrest**:
      The patient remains in persistent asystole or agonal rhythm after twenty (20) minutes of appropriate resuscitation, to include:
      1) CPR
      2) Effective ventilation with 100% oxygenation
      3) Administration of appropriate ACLS medications, if available
      4) Confirm asystole, no organized rhythm, PEA < 40, or a "No Shock Advised" on AED
   B. For **traumatic arrest**:
      1) Hemorrhage control
      2) Airway management with least-invasive approach needed to maintain patency and effective ventilations with 100% oxygenation for two (2) minutes
      3) Perform bilateral needle decompression only if signs of chest trauma or if tension pneumothorax suspected
      4) Provide CPR *ONLY* after above life saving interventions have been performed
      5) Confirm asystole, no organized rhythm, PEA < 40, or a "No Shock Advised" on AED
   C. The patient develops, or is found to have one of the following conclusive signs of death at any point during the resuscitative effort:
      1) Lividity
      2) Rigor mortis

Contact Medical Control for cases not meeting above criteria for Termination of Resuscitation.

4. When resuscitation has been terminated in the field, all medical interventions shall be left in place.

5. If possible, do not leave a body unattended. Once a responsible person (i.e. coroner, law enforcement, fire, etc.) is present at the scene, you may be excused.

6. ***NEVER*** transport/move a body without permission from the coroner, except for assessment or its protection.

If the body is in the public view and cannot be isolated, screened, or blocked from view, and is creating an unsafe situation with citizens/family, the body can be covered with a clean sheet or *STERILE BURN SHEET* obtained from the EMS vehicle.

PROCEDURES GUIDELINES

Continuous Positive Airway Pressure (CPAP)

LEVEL: EMT/AEMT/Paramedic

Indications:

This process may be performed on any patient 18 years old or older in severe respiratory distress, CHF, pulmonary edema, HAPE, or pneumonia, who has *TWO* of the following:

A. Retractions, accessory muscle use, and/or increased work of breathing
B. Respiratory rate >20 per minute
C. SpO2 ≤ 94%

Contraindications:

A. Apnea
B. Vomiting or active GI bleed
C. Major trauma/pneumothorax
D. Altered Mental Status

Use device per manufacturer instructions

Key procedural considerations:

A. Assess patient and document VS, SpO2 and ETCO2 if available prior to applying oxygen. Paramedics should document ETCO2.
B. Select the appropriate size face mask for the patient.
C. Inform the patient about procedure process.
D. If using CPAP, gradually increase the flow rate, slowly reaching the desired CPAP pressure. Secure face mask onto patient's face using the head harness.
E. Check the mask and tubing for leaks.
F. Reassess patient and document every five minutes.
G. If the patient develops any of the contraindications or requires definitive airway control, discontinue CPAP and provide necessary airway control.

Electrical Therapy/Defibrillation

LEVEL: Paramedic

Indications:

This procedure may be performed on any patient experiencing:

A. Ventricular fibrillation
B. Pulseless ventricular tachycardia
C. Torsades de Pointes

Contraindications: None

Use device per manufacturer instructions

Key procedural considerations:

A. The initial and subsequent attempts shall be at the energy level(s) suggested by the device manufacturer and/or the agency's medical director.
B. Defibrillation should be immediately provided in an arrest ***WITNESSED*** by EMS personnel. In an arrest that is ***UNWITNESSED*** by EMS personnel, two minutes of CPR should be provided prior to defibrillation.
C. Patients with automatic implantable cardioverter-defibrillators (AICD) will need external defibrillation if the AICD is ineffective.
D. If defibrillation is needed on a patient with a permanent implanted pacemaker, the defibrillator paddles or self adhesive electrodes should be placed at least one inch from the pulse generator of the pacemaker.

Initial attempt at pediatric defibrillation shall be at 2 J/kg. If unsuccessful, defibrillation should be attempted at 4 J/kg. Repeated defibrillations should be at >4 J/kg up to 10 J/kg until conversion occurs. Adult paddles/pads may be used in children weighing more than 10 kg.

Electrical Therapy/Synchronized Cardioversion

LEVEL: Paramedic

The patient ***MUST*** be on a cardiac monitor
and ***SHOULD*** have Vascular Access

Indications:

This procedure may be performed on any patient experiencing:

A. Ventricular tachycardia with inadequate perfusion
B. Supraventricular tachycardia with inadequate perfusion
C. Ventricular tachycardia with adequate perfusion, but refractory to drug therapy

Contraindications: None

Adjunctive therapy:

In the conscious patient with a systolic blood pressure of >90mmHg consider:

Sedation: Midazolam 0.1 mg/kg IN/IM/IV/IO, max dose 5 mg OR;

Lorazepam 0.1 mg/kg IM/IV/IO, max dose 2 mg OR;

Diazepam 5 mg IV/IO.

Analgesia: Morphine Sulfate up to 0.1 mg/kg slow IV/IO to a maximum single dose of 10 mg OR;

Fentanyl up to 1 mcg/kg IN/IM/IV/IO to a maximum single dose of 100 mcg OR;

Ketamine 0.2 mg/kg IN/IM/IV/IO to a maximum single dose of 25 mg

Key procedural considerations:

A. Biphasic device: The initial and subsequent attempts shall be at the energy level(s) suggested by the device manufacturer and/or the agency's medical director.
B. Monophasic device:
   1. Ventricular dysrhythmias: 100 J escalating to 200, 300, and 360
   2. Supraventricular dysrhythmias: 50 J with subsequent attempts at 100 J

Pediatric synchronized cardioversion is by Medical Control order only.

Initial attempt at pediatric cardioversion shall be at 0.5 J/kg.
If unsuccessful, cardioversion should be attempted at 2 J/kg.
Adult paddle/pads may be used in children weighing more than 10 kg.

Electrical Therapy/Transcutaneous Pacing

LEVEL: Paramedic

Indications:

This procedure may be performed on any patient experiencing:

A. Hemodynamically unstable bradycardia
B. Unstable clinical condition that is likely because of bradycardia
C. For pacing readiness (i.e. standby mode) in the setting of MI with bradycardia, second degree type II AV block, third degree AV block, new left or right alternating BBB or bifascicular block
D. Overdrive pacing of tachycardias refractory to drug therapy or electrical cardioversion

Contraindications: None

Adjunctive therapy:

In the conscious patient with a systolic blood pressure of >90mmHg consider:

Sedation: Midazolam 0.1 mg/kg IN/IM/IV/IO, max dose 5 mg OR;

Lorazepam 0.2 mg IM/IV/IO, max dose 2 mg OR;

Diazepam 5 mg IV/IO.

Analgesia: Morphine Sulfate up to 0.1 mg/kg slow IV/IO to a maximum single dose of 10 mg OR;

Fentanyl up to 1 mcg/kg IN/IM/IV/IO to a maximum single dose of 100 mcg OR;

Ketamine 0.2 mg/kg IN/IM/IV/IO to a maximum single dose of 25 mg

Key procedural considerations:

A. Apply pacing pads, begin pacing at a rate of 60 beats per minute at the lowest available current.
B. Increase current by 20 milliamp increments until electrical capture.
C. In the event of electrical capture and no pulses, continue pacing and CPR.

Pediatric pacing is by Medical Control order only.

Endotracheal Intubation

LEVEL: Paramedic

1. All intubations ***MUST*** have initial, en route, and at transfer of care End-Tidal CO2 detection/capnography performed and recorded on the PCR.
2. All intubation attempts ***MUST*** be documented on the PCR.

Indications:

This procedure may be performed on any patient in whom attempts at basic airway and ventilatory support are unsuccessful ***AND*** who has at least one of the following:

A. Hypoxia
B. Respiratory arrest/failure
C. Inability to maintain airway patency

Contraindications:

Absolute contraindications: None

Relative contraindications:

A. Presence of gag reflex
B. Suspected narcotic overdose/hypoglycemia prior to administration of NALOXONE/GLUCOSE

Check and prepare the endotracheal airway device prior to insertion

Key procedural considerations:

A. Position head properly.
B. Insert blade while displacing tongue and elevate mandible with laryngoscope.
C. Introduce ET tube and advance to proper depth.
D. Inflate cuff to proper pressure and disconnect syringe.
E. Ventilate patient and confirm proper placement.
F. Verify proper tube placement by secondary confirmation such as capnography or colorimetric device.
G. Secure device or confirm that the device remains properly secured.

Mandatory notification of Medical Director within 24 hours of any failed intubation attempt. For simplicity, may use this online form: https://forms.gle/G3RPJQ8fEugRafMTA

Hemorrhage Control

LEVEL: EMR/EMT/AEMT/Paramedic *Note: Use of TRANEXAMIC ACID (TXA) is Paramedic only*

Hemorrhage:

This procedure may be performed on any patient that has bleeding from an extremity, junctional hemorrhage, or torso hemorrhage.

Extremity Hemorrhage – Tourniquet Application:

A. Apply tourniquet proximal to the bleeding site.
B. Absolute contraindication: Bleeding has stopped or controlled with less invasive measure.
C. If bleeding is not controlled, consider additional tightening or applying a second tourniquet proximal side by side to the first.
D. Wound packing does not preclude you from placing a tourniquet.

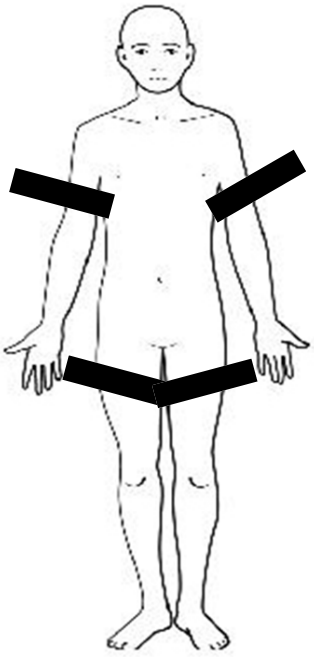
Junctional Hemorrhage – Wound Packing:

A. Junctional Hemorrhage Defined: hemorrhage occurring at the junction of an extremity with the torso, and/or the base of the neck.
B. Use direct pressure and an appropriate pressure dressing with deep wound packing (plain gauze or, if available, hemostatic gauze).
C. Absolute Contraindication: Hemostatic gauze use on hemorrhaging abdominal wounds.

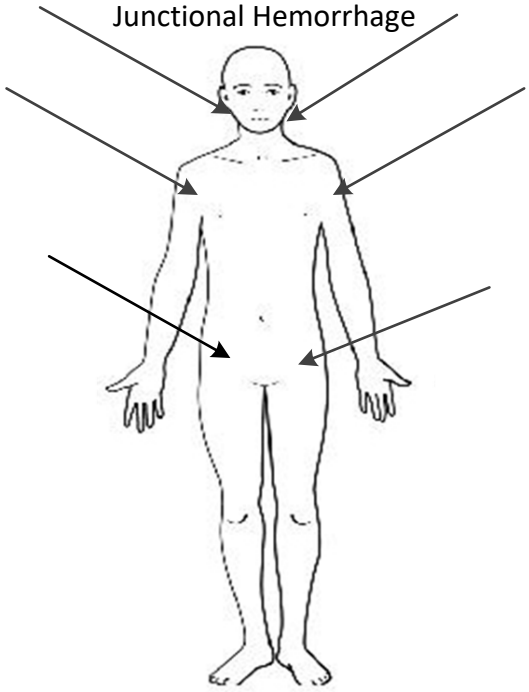
Torso Hemorrhage – Consider TRANEXAMIC ACID (TXA) for blunt or penetrating chest or abdominal trauma with suspected blood loss. Paramedic Administration Only.

1. Dose: Adults: 2 g IV/IO over 10 min for patients with SBP<90 and/or HR>110.
2. TRANEXAMIC ACID is ideally given within the first 90 minutes of injury.
3. TRANEXAMIC ACID administration is contraindicated if the traumatic injury occurred more than 3 hours prior to proposed administration.

Tourniquet Placement



Junctional Hemorrhage



High Flow Nasal Cannula (HFNC)

LEVEL: Paramedic

Indications:

Acute hypoxic respiratory failure (examples include asthma, pneumonia, COVID-19 infection, pulmonary embolism, pulmonary hypertension, interstitial lung disease, or other respiratory process)

Contraindications:

A. Abnormalities or surgery of the face, nose, or airway that preclude appropriate-fitting nasal cannula
B. Basilar skull fracture or severe facial trauma
C. Upper airway surgery to avoid theoretical risk that high pressure may precipitate a venous thromboembolism
D. Circumstances in which CPAP, endotracheal intubation, or surgical airway is indicated
E. Inability to provide continuous, heated humidification using an approved delivery device
F. Inability to provide therapy through an appropriate sized nasal prongs
G. Insufficient supply of oxygen to complete the transport

Use device per manufacturer instructions

Key procedural considerations:

A. Ensure that an adequate supply of oxygen is available.
1. Calculate the amount of oxygen needed for interfacility transport based on current therapy:

$$\text{Minutes of available oxygen} = \frac{(\text{Tank PSI} \times \text{Tank Factor})}{(\text{Flow rate} \times FiO_2)}$$

Tank PSI: pounds
Tank Factor: D size = 0.16; E size = 0.28; G size = 2.41; H and K size = 3.14; M size = 1.56
Flow rate: liters per minute
FiO_2: expressed as a fraction (eg 40% = 0.40)

2. Estimate total duration of interfacility transport and ensure there is at least twice the amount of necessary oxygen available.

B. Perform appropriate patient assessment, including obtaining vital signs, pulse oximeter, and cardiac rhythm.
C. Set FiO_2 to maintain SpO_2 at or above 90% (range 21-100%).

High Flow Nasal Cannula (HFNC)

Key procedural considerations (conti):

D. Set flow rate in liters per minute (L/min) to decrease work of breathing:
   1. Utilize facility settings as starting point, if available.
   2. Pediatric flow calculation: 2 L/kg/min up to adult flow rate.
   3. Adult flow calculation: initial 50 L/min (range 5-60 L/min.

E. In general, maximize the flow rate first and attempt to keep the $FiO_2 \leq 60\%$.

F. Reassess vital signs, work of breathing, mental status, and breath sounds.

G. Consider the need for escalation of respiratory support if patient remains in respiratory failure on more than 2 L/kg/min of flow or maximum settings for the delivery device.

Complications:

A. Abdominal distension
B. Aspiration
C. Rarely barotrauma (eg pneumothorax)

FOR CIRCUMSTANCES IN WHICH THE PATIENT DOES NOT IMPROVE OR CONTINUES TO DETERIORATE ON HFNC, TERMINATE HFNC ADMINISTRATION AND ESCALATE RESPIRATORY SUPPORT TO PROVIDE POSITIVE PRESSURE VENTILATION VIA CPAP, BVM, SUPRAGLOTTIC AIRWAY, OR ENDOTRACHEAL INTUBATION, IF NECESSARY.

Legal Blood Draw

LEVEL: EMT w/ IV/IO Initiation Endorsement/AEMT/Paramedic

GUIDELINE:
Steps for Legal Blood Draws:
1. Obtain patient ID
2. Ask their full name and DOB
3. Use the kit law enforcement provides
4. Prepare the site with a non-alcohol prep
5. Draw gray topped tube from the kit, label it, and hand the tube to law enforcement
6. Fill out the paperwork from the kit and hand the paperwork to law enforcement
7. Document a patient care record (PCR)

Example: “On May 7th at 1800 I drew blood from Tom Smith, DOB 1/2/99, into a gray topped vacutainer, which I subsequently labeled with the name Tom Smith and my initials (BB). Tube and associated paperwork handed to officer John Doe of the Bozeman Police Department, Badge #123.”

LUCAS Device

LEVEL: EMT/AEMT/Paramedic

Rationale:
The LUCAS is a non-invasive mechanical CPR device. It has a role in providing uninterrupted chest compressions at an appropriate rate and depth, but it has **NOT** been shown to be superior to well-performed manual chest compressions. Manual compressions are still considered the standard of care by the AHA. Consider the device a tool to use in non-traumatic cardiac arrest, but it should not distract from beginning manual chest compressions as soon as possible, or cause unneeded interruptions in compressions at any point. Use of a LUCAS device can make chest compressions during transport more effective and safer for the transporting crew. However, availability of a LUCAS should not prompt transport when it would not have otherwise been considered. Cardiac arrests are still best managed in place unless there are extenuating circumstances mandating transport such as v-fib resistant to multiple shocks.

Indications:
Non-traumatic cardiac arrest requiring CPR

Contraindications:
- Traumatic arrest
- Patient too small for the pressure pad in the suction cup to make contact with the chest OR patient too large for the legs to lock
- Patient is a child under 12 years old
- Pregnancy

Key procedural considerations:
- The LUCAS shall be used in accordance with the manufacturer's recommendations.
- LUCAS should not be used until after two full cycles of manual compressions. A defibrillator should be applied before the LUCAS. Starting manual chest compressions and initial defibrillation should take precedence over placement of the LUCAS. Use a two-step application and minimize pauses in chest compressions.
- The machine is a tool, but not a priority. Placement of the device should be done to take opportunity of inevitable pauses and to minimize no-flow states.
- The LUCAS should **NOT** be paused for intubations.
- Do **NOT** attempt to lift the patient or the device by the arm straps.
- A member of the agency that placed the device and has been trained on the LUCAS must remain with the patient at all times until the LUCAS is removed. That person shall be responsible for the safe operation of the device.
- One agency's hood may be exchanged for another, but keep the initial back plate in place and minimize any interruptions.

Device malfunction:
If there is a device malfunction, immediately remove the device and resume high performance CPR. The device may be reapplied **ONLY** after the problem has been addressed.

Medication Administration

LEVEL: EMT/EMT w/ Medication Endorsement/AEMT/Paramedic (based on medication)

Indications:

This procedure may be performed on any patient that requires the administration of a medication.

Key procedural considerations (GENERAL):

A. Inquire about allergies and previous medication reactions
B. Check and recheck medication
C. Solution clarity and expiration date
D. Right drug
   Right patient
   Right dose
   Right time
   Right route
   Right documentation
E. Dispose of syringe and other material in proper container

Intravenous and Intraosseous Bolus Medications

Key procedural considerations:

A. Identify and cleanse injection site closest to the patient
B. Administer correct dose at proper push rate
C. Turn IV on and adjust drip rate to TKO/KVO

Intramuscular and Subcutaneous Drug Administration

Key procedural considerations:

A. Needle should be 20 gauge or smaller
B. Locate administration site
   Deltoid muscle
   Vastus lateralis (lateral thigh) muscle
   Ventrogluteal or dorsogluteal muscles (buttocks)

IM	SQ
Pull skin tight	Pinch to lift skin slightly
Insert needle at a 90° angle to the skin	Insert needle at a 45° angle to the skin
Advance into muscle layer	Advance into subcutaneous layer

Mucosal Atomizer Device (MAD) Administration

Medications: FENTANYL, KETAMINE, MIDAZOLAM, NALOXONE

Key procedural considerations:

A. Using the free hand, hold the crown of the head stable.
B. Place the tip of the MAD snugly against the nostril, aiming slightly up and outward (toward the top of the ear).
C. Briskly compress the syringe to deliver half the medication into the nostril.
D. Move the device over to the opposite nostril and administer the remaining medication.

Needle Cricothyroidotomy

LEVEL: Paramedic

Indications:

This procedure may be performed on any patient with:

A. Total airway obstruction by any BLS or ALS procedures, *OR*
B. Inability to adequately ventilate AND oxygenate with any provider level emergency care procedures prior to the attempt.

Contraindications:

A. Inability to identify landmarks (cricothyroid membrane)
B. Underlying anatomical abnormality (tumor)
C. Tracheal transection
D. Acute laryngeal disease due to infection or trauma

You ***MUST*** use a 14 gauge over-the-needle catheter attached to a 10 cc syringe or commercial cricothyroidotomy device.

Key procedural considerations:

Please follow Manufacturer's Instructions

A. Position patient supine (if possible), hyperextending the head.
B. Locate cricothyroid membrane and clean site thoroughly.
C. Stabilize cricoid and thyroid cartilages with one hand.
D. Puncture needle/catheter at a 90° angle and then change insertion angle to 45°up to the stopper; gently aspirate with attached syringe.
E. When syringe is able to aspirate air, stop advancing needle.
F. Remove the stopper from the cannula and advance the cannula only until the phlange is flush with the patient's neck. Remove the metal needle from the cannula. Remove the syringe.
G. Secure the cannula with the neck strap.
H. Apply connecting tube and attach to BVM and ventilate patient.

Mandatory notification of Medical Director within 24 hours of any attempted, successful, and/or failed cricothyroidotomy in the field. For simplicity, may use this online form: https://forms.gle/G3RPJQ8fEugRafMTA

Needle Decompression

LEVEL: Paramedic

Indications:

This procedure may be performed on any patient who has evidence of a tension pneumothorax, demonstrated by the following criteria:

1. Severe/progressive respiratory distress and/or increased resistance to bagging, AND unilateral diminished/absent breath sounds, AND:
   - A. Hypotension with signs of shock, or
   - B. Persistent hypoxia despite supplemental oxygen, or
   - C. Jugular venous distention, or
   - D. Tracheal deviation (late sign)
2. Any traumatic cardiac arrest with chest or abdominal trauma and undergoing resuscitation should have bilateral needle thoracostomy performed as soon as possible.

Contraindications: None

Needle Decompression is permitted in pediatric patients.

Key procedural considerations:

A. Select and identify insertion site:

1. Primary site is the 4th intercostal space in the mid-axillary line of the affected side.
   - a. Needle should be placed within the "triangle of safety". Insertion site must be above the nipple line as the nipple lies flat against the chest wall with the arm abducted.
   - b. In females, the breast can displace the nipple inferiorly. If displaced, the clinician should identify where the nipple would lie if flat against the chest wall. This will be superior to the inframammary fold/crease. When in doubt, a more superior site is preferred.
2. Alternate site is the 2nd intercostal space in the mid-clavicular line of the affected side.

C. Use appropriate size needle and length.

D. Prep site with appropriate disinfectant (e.g. iodine, chlorhexidine, alcohol).

E. Place tip of needle on top of appropriate rib and insert over top of rib into intercostal space.

F. Advance needle into pleural space and remove needle. Leave catheter in place.

G. Consider attaching a one-way valve, if available.

Push Dose Epinephrine

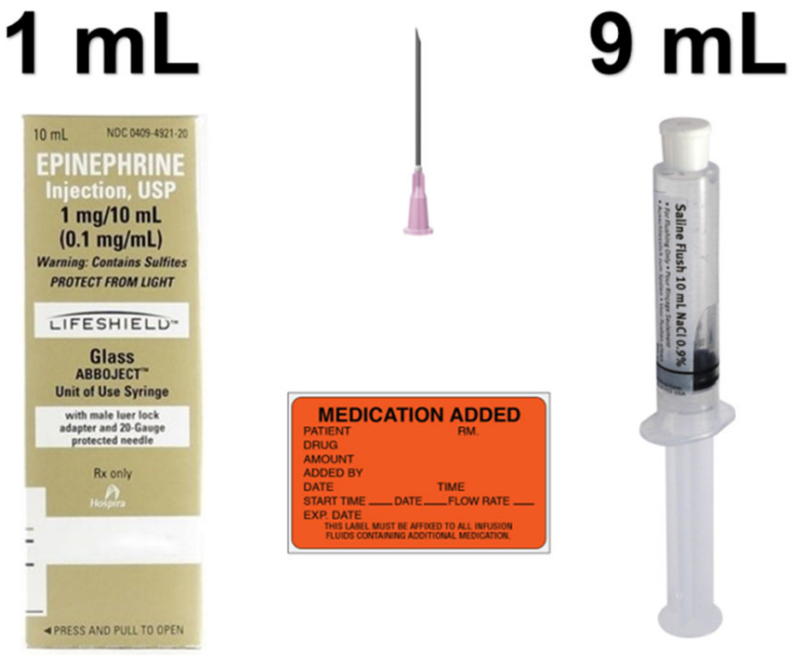
LEVEL: Paramedic

History:
When norepinephrine was added and dopamine removed from the stock of medications carried in the prehospital setting, concern was raised about the ACLS algorithm for unstable bradycardia as norepinephrine does not primarily increase heart rate and is not indicated for bradycardia.

Indications:
- Unstable or symptomatic bradycardia with a pulse
- Shock unresponsive to fluid resuscitation
- Post-ROSC with persistent hypotension
- Anaphylaxis/allergic reaction not responding to IM epinephrine 1:1000
- Sepsis while initiating norepinephrine drip

Preparation:
- Mix 1 ml of epinephrine 1:10,000 (cardiac epi) with 9 ml of normal saline (NS) in a 10 ml syringe
- Results in a 10 mcg/ml concentration

Dosage:
10 mcg (1 ml) every 2-5 minutes titrated to SBP > 90 or MAP > 65



Spinal Motion Restriction

LEVEL: EMT/AEMT/Paramedic

Spinal motion restriction is indicated in any patient who meets the indications (A-E) below:

Indications:

This procedure may be performed on any patient with potential for spinal injury based upon the following (NEXUS) criteria:

A. Midline cervical spinal tenderness
B. Focal neurologic deficit
C. Altered mental status
D. Evidence of drug and/or alcohol intoxication
E. Any painful, distracting injury

Contraindications:

Spinal motion restriction is ***NOT*** performed in the following conditions:

A. Penetrating trauma to the head and/or neck and no evidence of spinal injury
B. Injuries where placement of the cervical collar might compromise patient assessment, airway management, ventilation and/or hemorrhage control
C. Patients in cardiac arrest

Key procedural considerations:

A. If (A-E) above are ***ALL NEGATIVE***, spinal motion restriction is not required.
B. If required, spinal motion restriction is the placement of an approved, properly-sized cervical collar before the patient is moved.
C. Tape, head straps, wedges, and head and/or neck support devices are generally not recommended.
D. Patients found in motor vehicles should be asked if they are able to exit the motor vehicle on their own. If so, they should be assisted to a soft stretcher and secured for transport. Patients unable to exit the vehicle on their own accord should be removed by the appropriate extrication method.
E. Once on the stretcher, the patient may be moved to a semi-Fowler's or high-Fowler's position for comfort.
F. If a backboard is used for extrication or movement, the patient should be immediately moved to a soft mattress, if possible.
G. In special situations, alternate stabilization devices (e.g. vacuum mattress, KED, etc.) may be used as indicated.
H. Pediatric patients may be stabilized in an approved car seat or with a commercial pediatric stabilization device.

Supraglottic Airway Device

LEVEL: EMT w/ Airway Endorsement/AEMT/Paramedic

Indications:

This procedure may be performed on any patient in which attempts at basic airway and ventilatory support are unsuccessful *AND* who has at least one of the following:

A. Hypoxia
B. Respiratory arrest/failure
C. Obtundation
D. Failed endotracheal intubation

Contraindications:

A. Gag reflex
B. History of esophageal trauma, or known esophageal disease
C. Recent ingestion of a caustic substance
D. Tracheostomy or laryngectomy
E. Suspected foreign body obstruction

Check and prepare the supraglottic airway device prior to insertion

Key procedural considerations:

A. Pre-oxygenate the patient.
B. Position the patient's head in a neutral or slightly flexed position if no suspected spinal injury (if a spine injury is suspected, maintain a neutral, in-line head position).
C. Perform a tongue-jaw lift.
D. Insert device to proper depth. *NEVER* force. If device does not advance, readjust the insertion.
E. Secure device in the patient.
F. Ventilate patient and confirm proper ventilation (correct lumen and proper insertion depth) by auscultation bilaterally over lungs and over epigastrium.
G. Adjust ventilation as necessary (slightly withdraw tube until ventilation is optimized).
H. Verify proper tube placement by secondary confirmation such as capnography or colorimetric device.
I. Secure device or confirm that the device remains properly secured.

Surgical Cricothyroidotomy

LEVEL: Paramedic

Indications:

This procedure may be performed on any patient with:

A. Total airway obstruction by any BLS or ALS procedures, *OR*
B. Inability to adequately ventilate AND oxygenate with any provider level emergency care procedures prior to the attempt.

Contraindications:

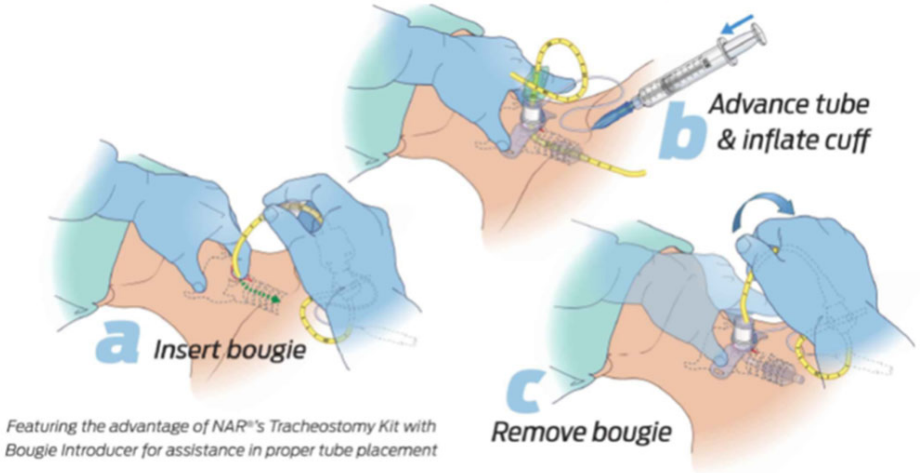
A. Inability to identify landmarks (cricothyroid membrane)
B. Underlying anatomical abnormality (tumor)
C. Tracheal transection
D. Acute laryngeal disease due to infection or trauma

Key procedural considerations:

****Must use North American Rescue Bougie-Aided Cricothyroidotomy Pack (BAC-Pack)****

A. Position patient supine (if possible), hyperextending the head.
B. Locate cricothyroid membrane and clean site thoroughly.
C. Stabilize cricoid and thyroid cartilages with one hand.
D. Insert scalpel through skin, subcutaneous tissue, and cricothyroid membrane.
E. Extend incision laterally in both directions.
F. Prior to removing scalpel, insert tracheal hook.
G. Insert the bougie down the trachea. Advance tube and inflate cuff. Remove bougie.
H. Attach to BVM and ventilate patient.

Mandatory notification of Medical Director within 24 hours of any attempted, successful, and/or failed cricothyroidotomy in the field. For simplicity, may use this online form: https://forms.gle/G3RPJQ8fEugRafMTA



Featuring the advantage of NAR®'s Tracheostomy Kit with Bougie Introducer for assistance in proper tube placement

Tracheostomy Tube Replacement

LEVEL: Paramedic

Indications:

This procedure may be performed on any patient that has A *TRACHEOSTOMY TUBE* and *WHO HAS*:

A. Hypoxia
B. Respiratory arrest/failure
C. Obtundation
D. Secretions unable to be cleared by suctioning

Contraindications: None

Key procedural considerations:

A. If the patient or family has a replacement tube available, it may be used. If a replacement tube is not available, an endotracheal tube of a similar outer diameter may be used.
B. Premoisten the tube with water soluble lubricant.
C. Extend the neck and, if necessary, place a roll between the patient's shoulder blades to aid in visualizing the stoma.
D. If the tube cannot be placed easily, withdraw the tube; administer oxygen and positive pressure ventilation. *NEVER* force the tube.
E. Secure the device to the patient.
F. If the tube cannot be easily placed, a suction catheter may be used as a guide.

Traction Splint

LEVEL: EMT/AEMT/Paramedic

Indications:

This procedure may be performed on any patient with an isolated midshaft femur fracture.

Contraindications:

A. Pelvic fracture or instability
B. Knee, lower leg, or ankle instability

Key procedural considerations:

A. Assess motor, sensory, and circulatory function in the involved extremity.
B. Apply traction splint per the manufacturer's guidelines.
C. Initiate mechanical traction to match manual traction.
D. Reassess motor, sensory, and circulatory function in the involved extremity.
E. Exercise care when applying traction not to reintroduce bone ends into the body.

Pearls

- Femur fractures can be difficult to identify and difficult to exclude comorbid injuries.
- No benefit of traction in preventing shock or reducing need for blood transfusion.
- Traction only minimally better for pain (based on a single study with weak evidence).
- Static (non-traction) splinting is acceptable alternative.

Ultrasound

LEVEL: Paramedic

Procedure:

Ultrasound will be available for the following modalities outlined below:

A. EFAST
B. Vascular Access
C. Cardiac Arrest

EFAST

Indications:

May perform on patients suspected of having intra-abdominal free fluid, pericardial effusion, thoracic free fluid, or pneumothorax, which may guide appropriate therapy and resuscitation.

Contraindications:

Higher priority critical actions needed, i.e., stabilization of ABCs.

Technique:

Obtain the following views:

a) Abdominal RUQ (right upper quadrant)
b) Abdominal LUQ (left upper quadrant)
c) Cardiac Subcostal OR Parasternal Long
d) Pelvis
e) Right lateral chest
f) Left lateral chest
g) Right anterior chest
h) Left anterior chest

Complications:

False positive exams:

a) Intra-abdominal free fluid may not always be acute hemoperitoneum (e.g. patients with liver cirrhosis may have ascites).
b) Pericardial effusion may not always be acute hemopericardium (e.g. patients with chronic pericardial effusions due to CHF, uremia, malignancy, inflammatory processes like lupus).
c) Thoracic fluid may not always be acute hemothorax (e.g. patients with volume overload from heart/liver/kidney failure, parapneumonic effusions).
d) Lack of lung sliding may not always be due to a pneumothorax (e.g. patient with subcutaneous air, prior pleurodesis, hyper-inflation from severe COPD/asthma, main-stem intubation, apnea).

Ultrasound

Vascular

Indications:

a) Multiple failed attempts at peripheral access.
b) Need for large bore access.
c) Need for central access for vasopressors.

Contraindications:

a) Should not be used to replace IO (intraosseous) lines in trauma patients that need fast vascular access.
b) Same contraindications as non-ultrasound-guided vascular access (ie overlying cellulitis, suspected ipsilateral extremity fracture, ipsilateral lymph node dissection).

Technique:

a) Evaluate possible vascular access locations and identify compressible vein.
b) Prep the skin with Chlorhexidine swab.
c) Cleanse the ultrasound probe with Chlorhexidine swab.
d) Place sterile ultrasound gel on the clean skin.
e) Under ultrasound guidance, place angiocath into the vein and thread the catheter.
f) Attach angiocath cap.
g) Flush the catheter.
h) Apply tegaderm and tape to secure the IV.

Complications:

a) Local hematoma
b) Arterial stick
c) Pain
d) Infection

Cardiac Arrest

Indications:

The performance of ultrasound during cardiac arrest is controversial due to evidence that it is associated with prolonged pulse checks. However ultrasound during arrest has also been shown to identify reversible causes and also may be prognostic and aid in the decision to continue resuscitative efforts. For the performance of ultrasound during cardiac arrest a regimented approach should be followed to ensure that rhythm checks are not prolonged by it's usage, and that specific questions are answered which may directly impact the resuscitation.

Relative Contraindications:

(1) Higher priority critical actions needed, i.e., administration of epinephrine or defibrillation.
(2) Lack of available provider to perform exam. Code leader should avoid becoming task fixated on performing scan.

Technique:

Operational Approach to Image Acquisition

(1) Do it early so there is time to act on data
(2) Find subcostal or apical window during compressions
(a) If no subcostal or apical window then be ready to look parasternal at pause

Interpretation and Action Based on Findings

(1) Pericardial Effusion
(2) Absence of organized cardiac activity
(a) Absence of cardiac activity is a poor prognostic indicator, however, it should not be used in isolation to cease resuscitative efforts as there are documented survivors in this group and additionally there is variability in provider interpretation of cardiac standstill.

Complications:

a) Prolonger interruption in chest compressions.
b) False positives:
(1) Falsely identifying a pericardial effusion.
(2) Falsely calling cardiac standstill in patient with severe bradycardia or profoundly reduced contractility.

Vagal Maneuvers

LEVEL: Paramedic

The patient ***MUST*** be attached to a cardiac monitor
and ***MUST*** have vascular access prior to performing the procedure

Indications:

This procedure may be performed on any patient who is experiencing Supraventricular Tachycardia with adequate perfusion.

Contraindications: None

Key procedural considerations:

A. Approved methods include:
   1. Valsalva maneuver
   2. Head-down tilt with deep inspiration
   3. Activation of the "diving reflex" by facial immersion in ice water (unless ischemic heart disease is present)
   4. Carotid massage (only on patients under 40 years of age)

B. In infants and young children, the most effective vagal maneuver is the application of ice to the face. IV access is not mandatory prior to vagal maneuvers in children.

Vascular Access

LEVEL: EMT w/ IV/IO Initiation Endorsement/AEMT/Paramedic

Vascular access attempts should not unnecessarily delay transport, attempts should be completed enroute.
All attempts are to be documented on the PCR.

Indications for Peripheral Vascular Access:

This procedure may be performed on any patient whenever there is a potential need for:

A. Intravenous drug administration.
B. Need to administer IV fluids for volume expansion.

Contraindications: None

Key procedural considerations:

A. Saline locks may be used when appropriate and flushed with a 3 cc bolus of NS as needed.
B. Extension tubing should be used on all IV lines.

Indications for Intraosseous Access:

Critically ill or injured patient who requires IV drugs/fluids and in whom a peripheral line cannot be immediately established.

Contraindications:

A. Placement in, or distal to, a fractured bone.
B. Previous significant orthopedic procedure at the site; prosthetic limb or joint.
C. IO catheter use in past 48 hours of the target bone.
D. Infection at the area of insertion.
E. Absence of adequate anatomical landmarks.

Paramedic may administer LIDOCAINE 1% preservative-free for anesthetic if IO is to be used for a conscious patient.

1) Administer 0.5 mg/kg of LIDOCAINE 0.1 mg/mL with slow push through IO needle to a maximum of 40 mg to mitigate pain from IO medication administration.
2) Allow LIDOCAINE to dwell in IO space for 60 seconds.
3) Flush IO with 5-10 ml normal saline.
4) Consider systemic pain medication for patients not responding to IO LIDOCAINE.

Key procedural considerations: Only 1 (one) attempt is permitted per extremity

Indications for use of Previously Established Central Line Access:

This procedure may be performed on any critically ill or injured patient who requires IV drugs or IV fluids AND in whom a peripheral line cannot be established.

Contraindications: Inability to freely aspirate blood out of the catheter

Key procedural considerations: Central line access (Implantable Ports, Port-A-Caths, Mediports)

A. May only be used if the device has already been accessed and IV fluid set-up has been established and running.
B. These devices require special needles (non-coring type) for access. The device may be damaged if standard jumper (conventional) needles are used to access the ports.