

University Emergency Medical Services Administrative Guidelines

2025 Guidelines



Administrative Guidelines and Associated References

**Department of Emergency Medicine
1501 N. Campbell Ave
Tucson, Arizona**

Introduction and Guidelines

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Introduction and Foundations of Practice

This document provides evidence-based guidelines and historically proven practices for common pre-hospital scenarios. They require that individual EMS providers use their education, experience, and clinical judgement to perform an independent evaluation of every patient and apply each component of the guideline as needed to optimized patient care. While it is impossible to address every possible variation of disease or traumatic injury, these off-line policies, procedures, and protocols offer a foundation for treating most patients we encounter. Certainly, our education, experience, and clinical judgment will assist us as we strive to provide the highest quality pre-hospital patient care

These Administrative Guidelines have been developed and approved by the University Emergency Medical Services physicians and approved by the Office of the Medical Director for TFD, NWFD and GRFD. They are based on the National Association of State EMS Officials Model EMS Clinical Guidelines and modified to include other EMS best practices and statutory requirements specific to the state of Arizona

Guidelines for the Use of Administrative Guidelines

Individual protocols are organized into three sections, each describing an important element of patient care. The top section includes 'History,' 'Signs and Symptoms,' and 'Differential,' and guides us to obtain patient information and consider potential causes for each clinical scenario.

The middle section describes the essentials of patient care, presented in flow chart style. These guidelines represent proven practices that provide the foundation of our pre-hospital care. Nearly every patient should receive the care suggested in this section, usually in the order described. Certainly, exceptions will exist, but the rationale for any deviation from the recommended course should be clearly explained in the narrative of the patient care report. Such exceptions should be rare.

The last section is titled 'Education and Pearls' and is found on the second page or bottom of each guideline. This section provides further guidance and adjuncts for patient care based on experience and common medical knowledge. While it is impossible to condense emergency medicine to a single-page flow chart, these pearls allow for expanded medication advice, dosages, and description of special situations. The section should be studied along with the rest of the guidelines and followed if applicable.

Lastly, pediatric patients often require age-tailored care. The pediatric-specific protocol should be utilized (Age < 14) if one exists for the patient's complaint. If a pediatric-specific protocol is unavailable, utilize the adult protocol for care guidance, but always use pediatric weight-based dosing for medications. Never exceed adult doses of medication for a pediatric patient.

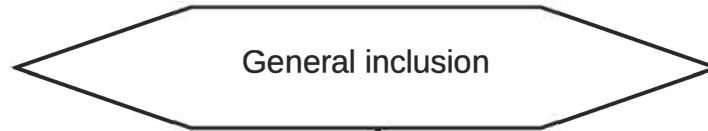
Definition of a Patient

A patient is any individual who is sick, injured or wounded, and who is deemed by the officer or senior medic on scene to require medical evaluation, medical monitoring, medical treatment, or transport. (R9-25-101-33 as authorized by A.R.S 36-2201, 36-2202, 36-2204, 36-2205). A patient should meet one or more of the following criteria:

- Has an acute medical complaint or the potential for acute illness or injury (including lift assist, found down, MVA with injury, or otherwise involved in an event with a mechanism of injury that a similarly trained EMS professional would believe to have caused injury).
- Appears disoriented or to have impaired decision-making capacity.
- Exhibits psychiatric illness with likely danger to self or others, including psychosis, suicidal ideation or homicidal intent.
- A witness or person with personal knowledge of the individual requesting assessment or treatment on their behalf.

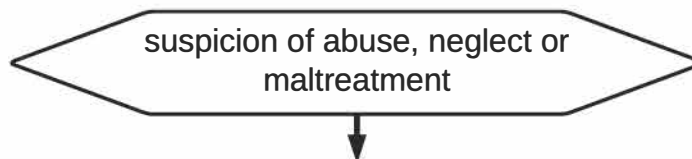


History <ul style="list-style-type: none"> • Items that may be relevant in the patient's history • Not an exhaustive list 	Signs and Symptoms <ul style="list-style-type: none"> • Signs and symptoms that would be consistent with the diagnosis • Not an exhaustive list 	Differential <ul style="list-style-type: none"> • Other considerations or other diagnoses that may present similarly • Not an exhaustive list
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B	B sections are for treatment and procedures authorized to be performed by EMT level providers.
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P	P sections are for treatment and procedures aithorized to be performed by Paramedic level providers.
	Blue boxes highlight drug dosing instructions.



EMS role is to:

- Document concerns
- Assess and stabilize potentially serious injuries
- Disclose concerns to the appropriate authorities (hospital and law enforcement or appropriate state authorities)

EMS personnel are mandatory reporters of any suspicion for abuse, maltreatment, neglect, or suspected human trafficking or sex trafficking of a minor per A.R.S. §13-3620.A and A.R.S. §13-3212

B Primary survey:

- Identify potentially life-threatening issues.
- Refer to [Trauma AG](#) as needed.

B Secondary survey:

- Assess physical issues, document any statements made spontaneously by patient
- Avoid extensive investigation of the specifics of abuse.

B Notify the following applicable entities:

1. Law enforcement and one of the following:
 - a. Arizona Department of Child Safety [1-888-SOS-CHILD (1-888-767-2445)]
 - b. Adult Protective Services Central Intake Unit [1-877-SOS-ADULT (1-877-767-2385)]
<https://www.azdes.gov/landingforms.aspx?form=13004>
2. A tribal law enforcement or social services agency for any Native American minor who resides on an Indian reservation

NOTE: Reporting to hospital personnel does not qualify as having fulfilled the mandatory reporting requirement. Leave the investigation to law enforcement.

B Transport to appropriate receiving facility.

Refer to [BLS Transport Threshold AG](#) as indicated

Scenarios that call for a high index of suspicion for abuse in children include:

- Brief Resolved Unexplained Event (BRUE)
- Any bruising on a patient <4 months
- Any bruising on the torso, ears, neck on a patient <4 years



Education/Pearls

TEN-4-FACESp is a useful acronym to help screen children under 4 years of age with bruising to identify when a bruise is more likely to be caused by abuse than accidental injury. TEN-4-FACESp stands for bruising to the **T**orso, **E**ars, **N**eck, **F**renulum, **A**ngle of the jaw, **C**heeks, **E**yelids or **S**ubconjunctivae, “**4**” represents infants 4 months and younger with any bruise, anywhere, and “**p**” represents the presence of patterned bruising (“TEN-4-FACESp”).

Attention to bruising is an actionable step that we can take to help identify children at risk of physical abuse and potentially improve the outcomes of these young children

TEN-4-FACESp

Bruising Clinical Decision Rule for Children < 4 Years of Age

When is bruising concerning for abuse in children < 4 years of age?
If bruising in any of the three components (Regions, Infants, Patterns) is present without a reasonable explanation, strongly consider evaluating for child abuse and/or consulting with an expert in child abuse.

<p>TEN</p> <p>Torso Ears Neck</p> <p>FACES</p> <p>Frenulum Angle of Jaw Cheeks (<i>fleshy part</i>) Eyelids Subconjunctivae</p> <p>REGIONS</p>	<p>4 months and younger</p> <p>Any bruise, anywhere</p> <p>INFANTS</p>	<p>Patterned bruising</p> <p>Bruises in specific patterns like slap, grab or loop marks</p> <p>PATTERNS</p>
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See the signs

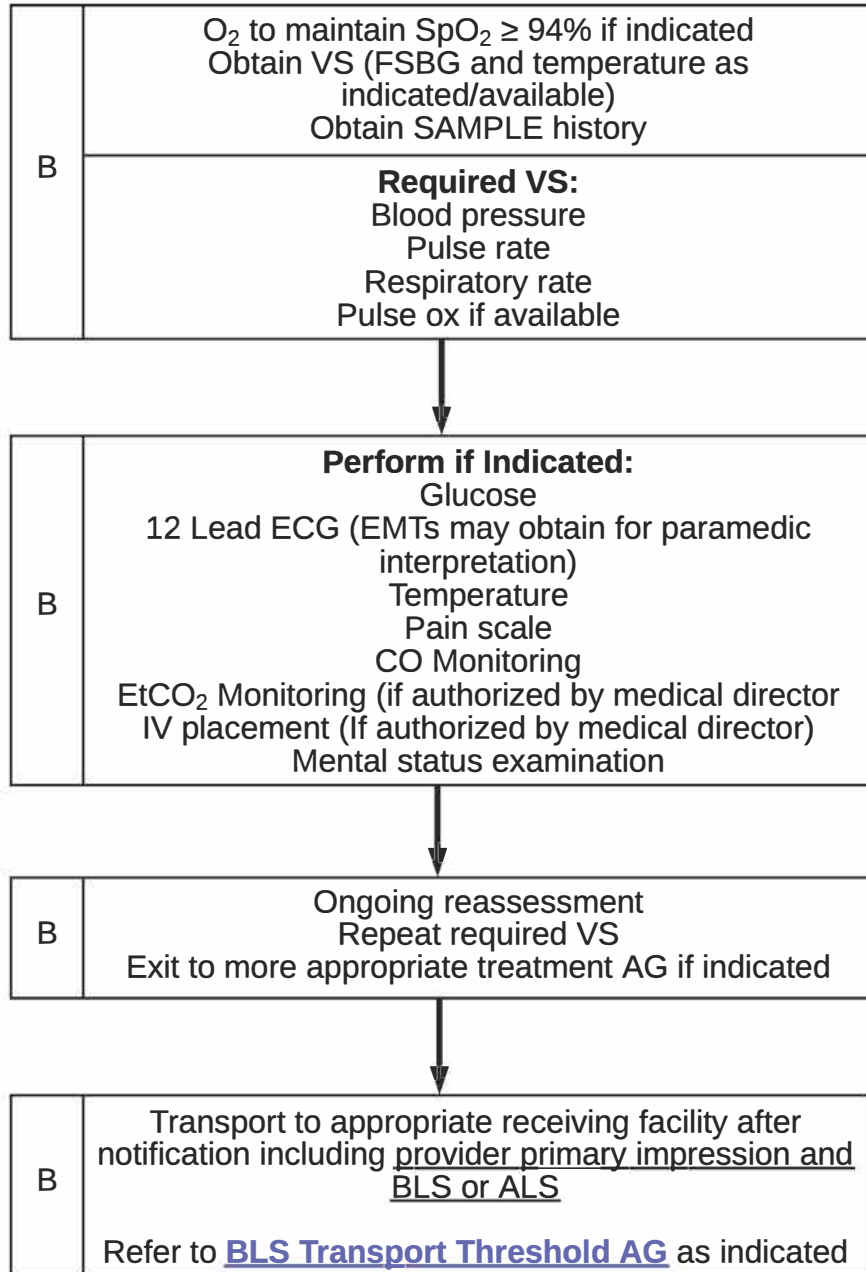
Unexplained bruises in these areas most often result from physical assault. TEN-4-FACESp is not to diagnose abuse but to function as a screening tool to improve the recognition of potentially abused children with bruising who require further evaluation.

TEN-4-FACESp was developed and validated by Dr. Mary Clyde Pierce and colleagues. It is published and available for FREE download at luriechildrens.org/ten-4-facesp.

Ann & Robert H. Lurie Children's Hospital of Chicago

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Education/Pearls

All patient care must be appropriate to your level of training and documented in the PCR. The PCR / EMR narrative should be considered a story of circumstances and include events and care of the patient. A comprehensive narrative should allow a reader to understand the complaint, the assessment, the treatment, why procedures were performed, why indicated procedures were not performed, as well as ongoing assessments and response to treatment and interventions.

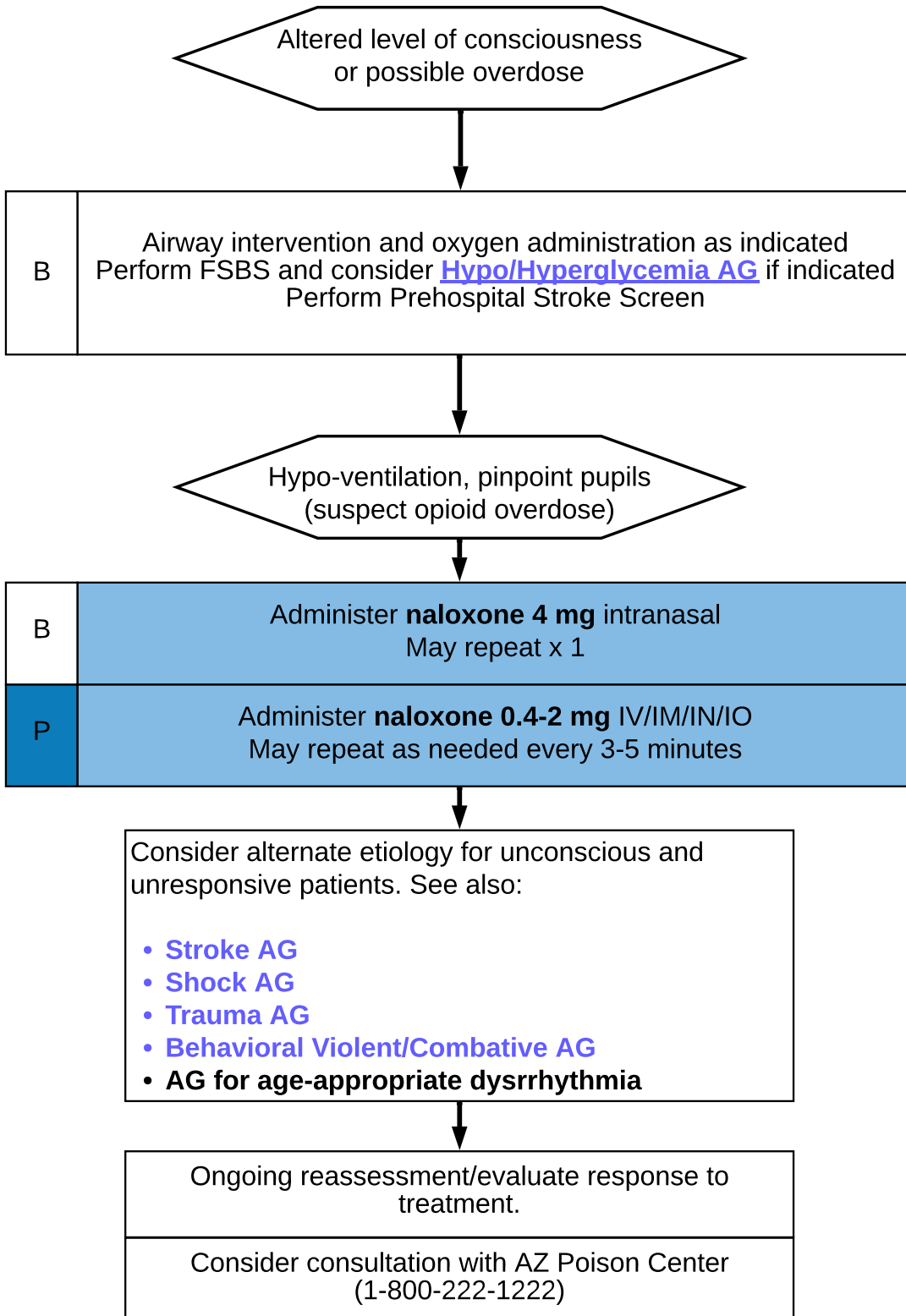
For minor patients, it is preferable to have a parent or legal guardian provide consent for treatment; however EMS may provide emergency treatment when parent or guardian is not available.

- **Adult Patient:** Vital signs are a good indicator of underlying illness. An adult with new hypotension (a Systolic Blood Pressure less than 90 mmHg) may have a critical problem with the heart, blood volume, infection, or other problem. Vital signs may be masked by medications; beta blockers and other cardiac drugs may prevent a reflex tachycardia in shock so patients may have low to normal pulse rates. General weakness can be a symptom of an underlying process. Diabetic patients and women may have atypical presentations of cardiac-related problems, such as MI.
- **Geriatric Patient:** Minor or moderate injury in the typical adult may be very serious in the elderly; hip fractures and dislocations carry a high mortality. Altered mental status is not always dementia, and may represent a stroke, metabolic problem, or infection. Always check Blood Sugar and assess for signs of a stroke, trauma, etc. with any change in a patient's baseline mental status.
- **Pediatric Patient:** Special needs children may require continued use of pediatric-based guidelines regardless of age and weight. Initial assessment should utilize the Pediatric Assessment Triangle which encompasses Appearance, Work of Breathing and Circulation to skin. The order of assessment may require alteration dependent on the developmental state of the pediatric patient. Generally the child or infant should not be separated from the caregiver unless absolutely necessary during assessment and treatment.
- Refer to **BLS Thresholds AG** for criteria to transport via BLS.
- All medications should be pushed slowly (unless otherwise indicated) and followed with a **20 mL NS flush**.
- When administering a fluid bolus to a patient, reassess VS and lung sounds after every 500 mL infused.
- If a patient has a status changes or changes in complaint where another AG would be best to treat the patient, transition to that AG or contact medical direction.

Primary Survey (Airway, Breathing, Circulation, Disability, Exposure) <ul style="list-style-type: none"> • Open airway as indicated <ul style="list-style-type: none"> ◦ Position ◦ Suction ◦ Consider use of airway adjuncts as indicated ◦ Administer oxygen as appropriate • Assess circulatory status <ul style="list-style-type: none"> ◦ Control any major external bleeding ◦ Initiate chest compressions as indicated • Evaluate patient responsiveness: AVPU/GCS • Evaluate gross motor and sensory function in all extremities • Expose patient as appropriate to the chief complaint 	Secondary Survey <ul style="list-style-type: none"> • Obtain baseline vital signs • Assess blood glucose as indicated • OPQRST history • SAMPLE history • Check temperature as indicated, treat environmental hyperthermia/hypothermia
	Ongoing Reassessment <ul style="list-style-type: none"> • Proceed to the appropriate guideline as indicated • Determine need for transport, resources available, and location of most appropriate destination • Reassess chief complaint, assessment findings, and response to treatment • Assess vital signs at least every 5 minutes for unstable patients; every 15 minutes for stable patients



History <ul style="list-style-type: none"> • Diabetes • Medical Alert Tag/Bracelet • Report of toxic ingestion or overdose • History of trauma • Past medical history <ul style="list-style-type: none"> ◦ ETOH/Drug usage ◦ Seizure 	Signs and Symptoms <ul style="list-style-type: none"> • Decreased level of consciousness • Change in behavior reported • Signs of hypoglycemia (cool/clammy) • Hyperglycemia/DKA (dehydration, Kussmaul respirations) • Irritability 	Differential <ul style="list-style-type: none"> • Shock or sepsis • Cardiac arrhythmia • Hyperglycemia/hypoglycemia/other metabolic abnormality • Ingestion/intoxication • Seizures or postictal state
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Education/Pearls

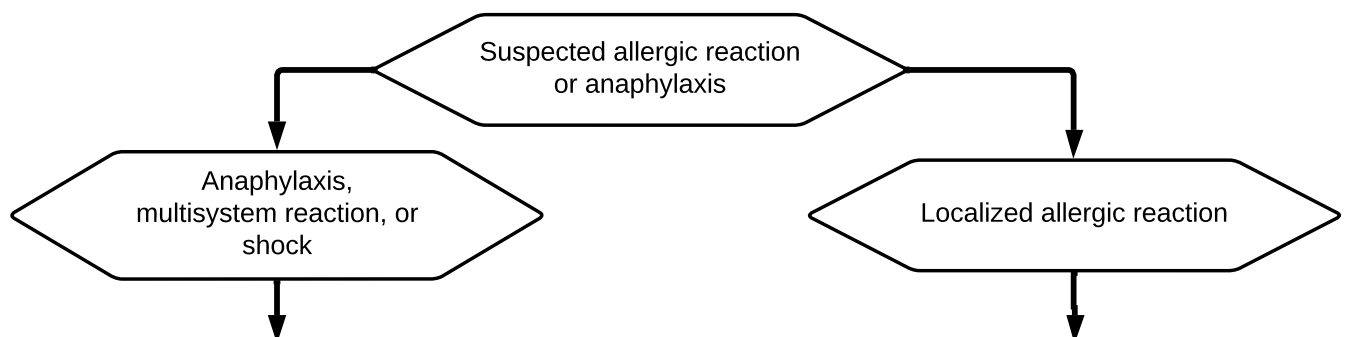
Altered mental status can arise from a variety of diseases and traumatic injuries. A careful history is an important adjunct to a physical exam in determining the cause of altered mental status; these patients require a careful assessment of the patient, scene, and circumstances.

- Pay careful attention not to miss subtle signs of trauma, especially head injury. Signs of head trauma in patients with altered mental status or altered level of consciousness warrant consideration of cervical spine immobilization and/or other methods of spinal motion restriction.
 - Consider **Trauma AG** if indicated
- Patients with a history of substance abuse and/or mental health issues quite often have co-morbid medical conditions that may lead to alterations in mental status. They may also be the victims of violence.
 - Do not assume that substance use or underlying mental health conditions are the only reason for the patient's altered mental status or change in behavior (e.g. patients with a history of alcohol abuse are at risk for hypoglycemia).
- Patients with severe or dangerous behavioral presentations may need sedation or restraint per **Behavioral Violent/Combative AG**.
- Patients who receive naloxone should be evaluated and observed in the emergency department.
- Max 1 mL per nostril for MAD administration of naloxone per dose.
- Consider contacting Poison Control for suspected overdose or toxic ingestion 1-800-222-1222. Poison Control may be able to provide additional treatment and transport recommendations.

Anaphylaxis/Allergic Reaction Administrative Guideline



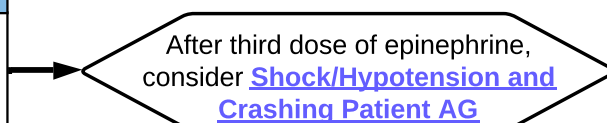
History	Signs and Symptoms	Differential
<ul style="list-style-type: none"> Onset and location Insect sting or bite Food or med allergy/exposure Past history of reactions 	<ul style="list-style-type: none"> Dyspnea/hypoxia Wheezing Stridor Difficulty swallowing Oropharyngeal/tongue swelling Shock/decreased perfusion Urticaria Abdominal pain/vomiting 	<ul style="list-style-type: none"> Urticaria (rash only) Anaphylaxis (systemic) Infection/sepsis Angioedema Airway obstruction Asthma/COPD CHF



B	<p>Administer epinephrine by autoinjector or by prepared kit (if available)</p> <p>For children <30kg (8 years or younger) administer 0.15 mg (1 mg/mL concentration) IM or EpiPen Jr.</p> <p>For adults and children >30kg (9 years or older) administer 0.3 mg (1 mg/mL concentration) IM or EpiPen</p> <p>Administration should be upper lateral thigh May repeat epinephrine dose every 5-15 minutes</p>
P	<p>Administer epinephrine 0.01 mg/kg (1 mg/mL concentration) IM (max dose 0.3 mg)</p> <p>Administration should be upper lateral thigh May repeat epinephrine dose every 5-15 minutes</p>

P	Administer diphenhydramine 1 mg/kg IV/IM/PO (max dose 50 mg)
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B	<p>Administer albuterol 2.5 mg SVN for wheezing May repeat albuterol to max of 3 doses</p> <p>Consider administration of ipratropium (Atrovent) 0.5 mg nebulized with albuterol x 1</p> <p>Administer 20 mL/kg NS/LR bolus for hypotension</p>
P	<p>IV/IO access Cardiac Monitor, EtCO₂ if available Consider appropriate airway management adjuncts Assess for signs of shock (poor perfusion, decreased mental status)</p> <p>Administer 20 mL/kg NS/LR bolus for hypotension</p> <p>Administer diphenhydramine 1 mg/kg IV/IM (max dose 50 mg)</p> <p>Administer methylprednisolone 2 mg/kg IV/IM (max dose 125 mg)</p>





Education/Pearls

An allergic reaction is a systemic response to an allergen, which may be food, drugs, or other substance. The response varies from mild (one organ system, such as skin) to severe, when the condition may become life-threatening. The presence of shock or airway compromise always indicates a severe response and can lead to cardiac arrest and airway compromise.

Anaphylaxis is defined as:

- Severe, acute onset AND one of the following:
 - Respiratory compromise (dyspnea, wheeze, stridor, hypoxemia)
 - Decreased BP (SBP<90)

OR

- A combination of 2 of the following:
 - Urticaria
 - Swollen tongue or lips
 - Nausea/Vomiting
 - Abdominal pain
 - Syncope
 - Incontinence

A non-anaphylactic allergic reaction is defined as ONE of the following:

- Localized symptoms
- Localized angioedema without airway or GI symptoms
- Urticaria alone

Medication administration:

- Epinephrine:
 - Increases heart rate and blood pressure and decreases airway edema/swelling and histamine release
 - Should be the first drug administered in acute anaphylaxis in moderate and severe symptoms, and its administration intramuscularly should not be delayed for IV or IO access.
 - Is most effective as an **intramuscular** injection in the thigh, which results in the fastest rise of blood concentration. Intramuscular or subcutaneous injections in the upper arm (deltoid) result in a much slower absorption and should not be used as a first choice
 - Is **less effective** when given as push-dose epinephrine dosing. Push-dose epinephrine is **not recommended** for the treatment of anaphylaxis.
 - Can be repeated every 5-15 minutes for persisting signs of anaphylaxis.
- Fluids and pressors may be started to treat shock additionally.
- Diphenhydramine and steroids have no proven utility in moderate or severe anaphylaxis and may be given only after epinephrine. Diphenhydramine and steroids should NOT delay repeated epinephrine administration if needed.
- In moderate and severe anaphylaxis, diphenhydramine may decrease mental status. Caution with rate of administration.
- If a patient exhibits respiratory distress with wheezing, administer nebulized albuterol and consider administration of ipratropium (Atrovent).

Any patient with concern for anaphylaxis or who has received epinephrine IM should be transported to the ED, even if symptoms have resolved.

Behavioral Violent/Threatening Administrative Guideline



History <ul style="list-style-type: none"> • Past medical history • Pertinent medication history • Compliance with medications • Recent exacerbating factor(s) • Petitioned or court ordered • Collateral information • Substance abuse history 	Signs and Symptoms <ul style="list-style-type: none"> • Statements of suicidal/homicidal thoughts/ actions • Agitated/violent behavior • Exhibiting behaviors that can be deemed dangerous to self or others • Acute psychological complaint 	Differential <ul style="list-style-type: none"> • Altered mental status related to drug usage • Trauma • Hypoglycemia/Hyperglycemia • Infection/Fever
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B	Attempt verbal reassurance and calm patient Engage friends or family if they are able to help calm patient
	Follow agency SOP for physical restraint

P	Administer midazolam , per dosing regimen below.
	<i>Use caution when patient at risk for hypotension or respiratory depression, as midazolam administration will depress blood pressure and respiratory rate.</i> For patients ≤ 8 yrs , contact Medical Direction for orders. For patients >65 and <14 yrs , halve the initial and max doses.

Violent or threatening behavior
that is dangerous to self or others.
Not for trauma patients

Agitation that interferes with ability to
provide necessary patient care

P	IM
	Administer midazolam 0.1 mg/kg Max initial dose 10 mg May repeat x 1 at half initial dose after 10 minutes to a max total dose of 15 mg
	IV/IO Administer midazolam 0.05 mg/kg Max initial dose 5 mg May repeat x1 at half initial dose after 10 minutes to a max total dose of 7.5 mg

P	IM/IV/IO
	Administer midazolam 0.05 mg/kg Max initial dose 2.5 mg May repeat x1 at full initial dose after 10 minutes to a max total dose of 5 mg

Use great caution with the use of midazolam in patients with trauma and potential head injury. Use only the **Agitation** dose if absolutely necessary.

B	Obtain full set of vital signs once able (including initial temperature when available) O ₂ to maintain sat ≥ 94%
P	IV/IO access once able to safely obtain Apply cardiac monitor and EtCO ₂ as soon as possible if sedation is administered. Consider 12-lead ECG

B	Reassess and document mental status and vital signs every 5 minutes and neurovascular status of all extremities every 15 minutes (if physically restrained).
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Education/Pearls

Behavioral patients provide a unique challenge and possible danger to the healthcare provider. These patients often lose their ability to make medical decisions. Patients with mental health disorders often have co-existing medical conditions.

Combative patients with traumatic injury/TBI present a uniquely challenging scenario. The provider must consider the risks of causing hypotension by providing chemical sedation only when absolutely necessary.

- Security is essential:
 - Always be sure to protect yourself and others.
 - Patients who verbalize a danger to self or others may NOT refuse care.
 - Attempt to protect patient from injury, but do not place yourself in danger to do so.
 - Summon law enforcement as necessary.
- Restraints should only be used if necessary.
 - Physical Restraint:
 - Handcuffs are to be placed by law enforcement only. If law enforcement places handcuffs, the key must be within proximity of patient care at all times (but not within patient's reach).
 - Place stretcher in the sitting position.
 - Do not apply restraints that restrict the patient's chest wall movement.
 - Do not place the patient prone.
 - Pearls for extremity restraint:
 - Restrain all four extremities to stationary frame of stretcher
 - All restraints must allow quick release
 - Reassess and document neurovascular status of all extremities every 15 minutes
 - Chemical Restraint:
 - Utilize with caution, as all restraint medications can cause respiratory compromise
 - Should be a later consideration for pediatric patients
 - EtCO₂ should be used for all patients who receive chemical sedation.
 - A request by law enforcement for sedation does not justify initiating chemical sedation.
- Patients with severe agitation have a propensity to develop severe acidemia with progression to sudden cardiac arrest, which is why safe positioning, prompt sedation, and thorough medical evaluation are necessary for prehospital treatment.
- Apply cardiac monitor and obtain vital signs as soon as possible, particularly when chemical restraints have been administered. Reassess VS every 5 minutes and document patient status, response, and monitor airway.



History

- Past medical & psychiatric history
- Pertinent medication hx
- Compliance with meds
- Court ordered treatment or current petition
- Hx of substance abuse
- Hx of alcohol withdrawal seizures
- Any current medical complaints

Signs and symptoms

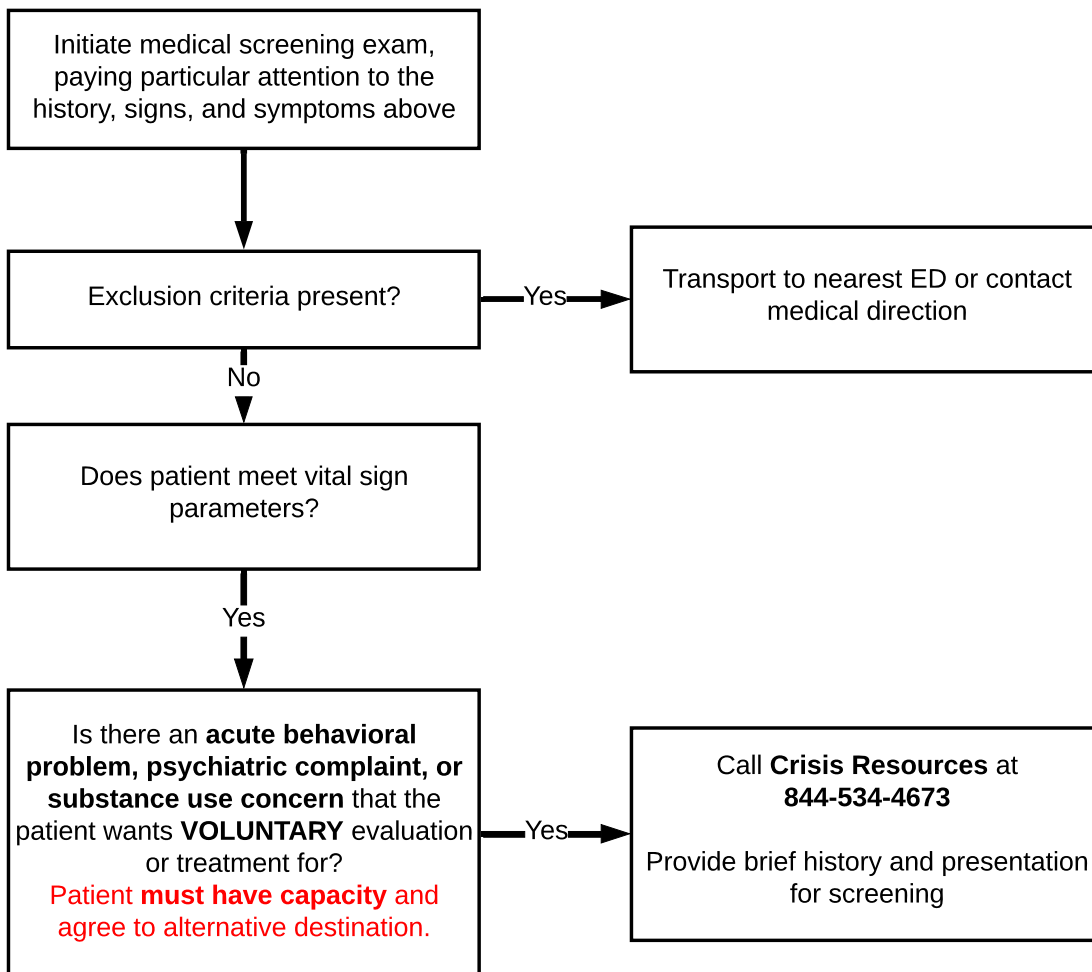
- Statements of suicidal thoughts/actions
- Exhibiting behaviors that could be dangerous to self or others
- Acute psychiatric complaints
- Substance abuse and/or withdrawal

Differential

- Altered mental status
- Drug use
- Trauma
- Stroke
- Hypoglycemia Infection

Exclusion Criteria

- Any new medical condition, injury, or complaint requiring medical evaluation
- Any vital sign outside of range
- Suicide attempt (i.e. any ingestion, self-harm)
- Concerns for current alcohol withdrawal
- Trauma or suspected trauma
- Combative or violent behavior (i.e., behavior that poses a danger to self or others that cannot be verbally de-escalated, requiring physical restraints and/or chemical sedation)
- Need for IV or medication administration by EMS
- Unable to perform activities of daily living due to medical or physical limitations



Required vital Signs

Temp < 100.4
RR 10-20
SBP > 100
HR 60-120
SpO2 ≥ 92%
Gluc 60-250

***** IMPORTANT: *****

All patients have the right to request evaluation and transportation to an emergency department.



Education/Pearls

The “Treat and Refer - Behavioral” outcome is intended to be used with this Behavioral Health Treat and Refer AG. This is for patients who want help with substance withdrawal, suicidal thoughts without active attempt or plan, or other behavioral health concerns. This protocol enables a provider to initiate municipal resources for behavioral health, including evaluation and treatment by healthcare professionals outside of the emergency department.

Capacity:

- Determining if a patient is A&O x 4 does not automatically mean a person has the ability to make an informed decision.
- Patients must demonstrate:
 - an understanding of what is going on, including risks, burdens, and benefits
 - an understanding of what you are offering
 - the ability to make their own decision to refuse care
 - the ability to make that decision without impairment

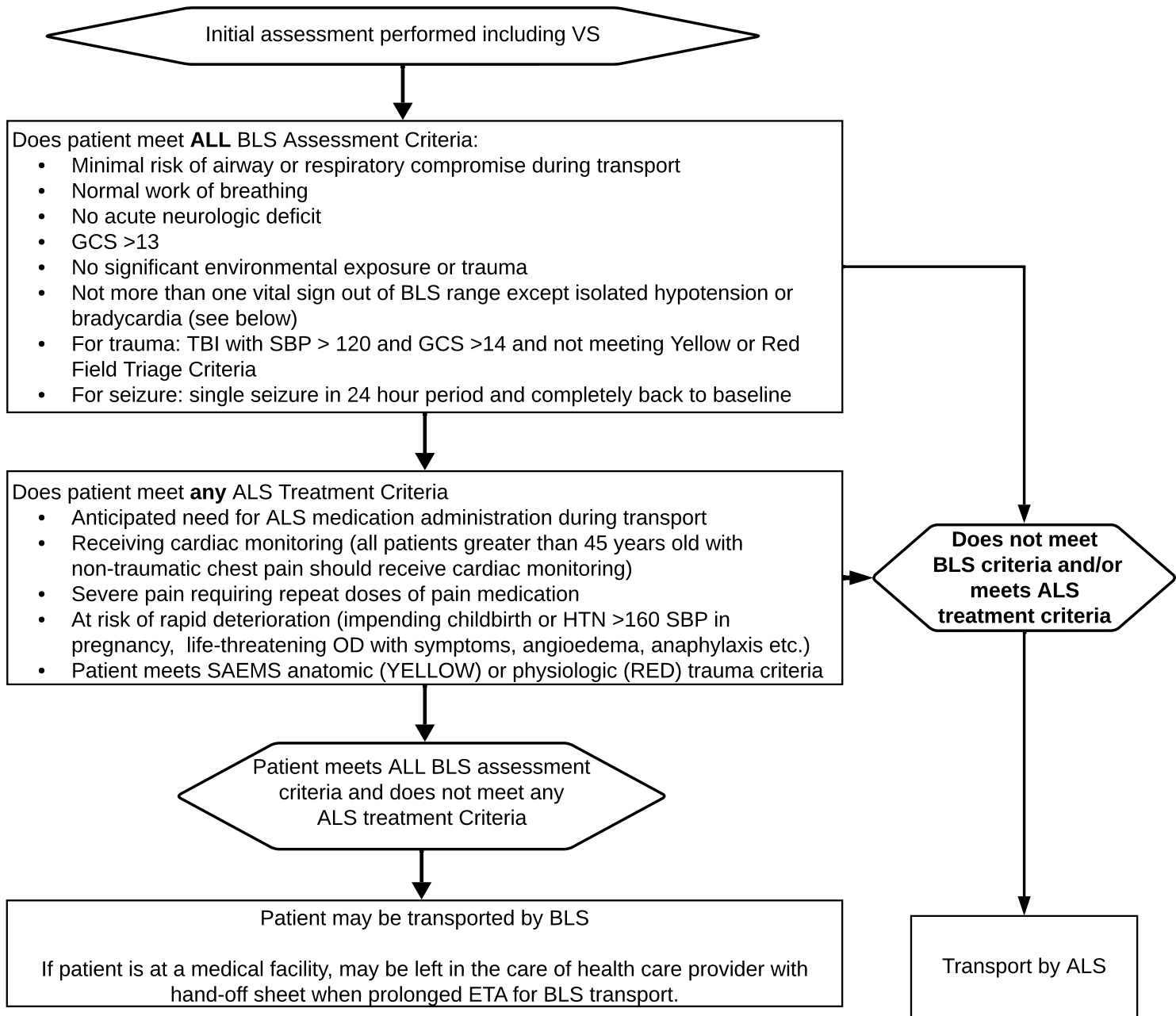
Suicidal Patients:

- If the patient has **actively attempted suicide** (ex: overdose, self-harm), the **patient must go to the ED**.
- If a reliable third party reports suspicion of an attempt of suicide (ex: overdose, self-harm), the **patient must go to the ED**.
- If the patient only reports suicidal ideation with no active attempt, the patient may be evaluated over the phone by the AZ crisis intervention services (844-534-4673).
 - The patient must be accompanied by a responsible adult (age 18 years or older)
 - Under no circumstances should a suicidal patient be left alone
 - If patient is alone and requires transportation by Crisis Team, wait with patient for transportation.
 - When in doubt, transport patient to the Emergency Department

Warm Hand-Off and Transportation Considerations:

- AZ Complete Health is contracted through the state to provide crisis resources for patients undergoing substance related problems, thoughts of self-harm, and other behavioral health issues. They are **available 24/7 at 844-534-4673** to assist in the evaluation of patients telephonically and help to determine safe disposition. Please identify yourself as a 9-1-1 EMS provider at the start the phone-call to expedite services.
- Warm handoff
 - Provide patient name, age, and other useful demographics
 - Provide history of present illness
 - Confirm that an evaluation of capacity has been made
- Possible Dispositions
 - Patient is provided all resources by Crisis Team over the phone and no longer requests transport. EMS may clear the scene.
 - Patient requires further evaluation and management at a substance abuse or behavioral health center, but is determined to be safe to wait for transportation arranged by Crisis Team. EMS may clear the scene.
 - Patient requires further evaluation and management at a substance abuse or behavioral health center, but is not safe to be left on scene alone. If there is a responsible adult (18 years or older) on scene, patient may be left in their care. If not, wait for transportation arranged by Crisis Team.
- **Important: When transferring care to another agency, we are making an assessment that this patient is medically safe for an alternative destination and does not require immediate evaluation in the emergency department.**

BLS Transport Thresholds Administrative Guideline



	Age > 14 yr	Age 6-13 yr	Age 1 w-5 yr	Age < 1 w
Respiratory Rate	12-20	20-25	25-30	30-50
Heart Rate*	60-130	60-150	60-160	100-180
SBP*	> 90	> 80	> 70 + (Age x2)	> 70
Glucose	> 60 with no symptoms			> 40
Oxygen Saturation	>92% with maximum of 6L supplemental O ₂ by nasal cannula			>92%
*Isolated hypotension or bradycardia with HR <40 require ALS transport				



Education/Pearls

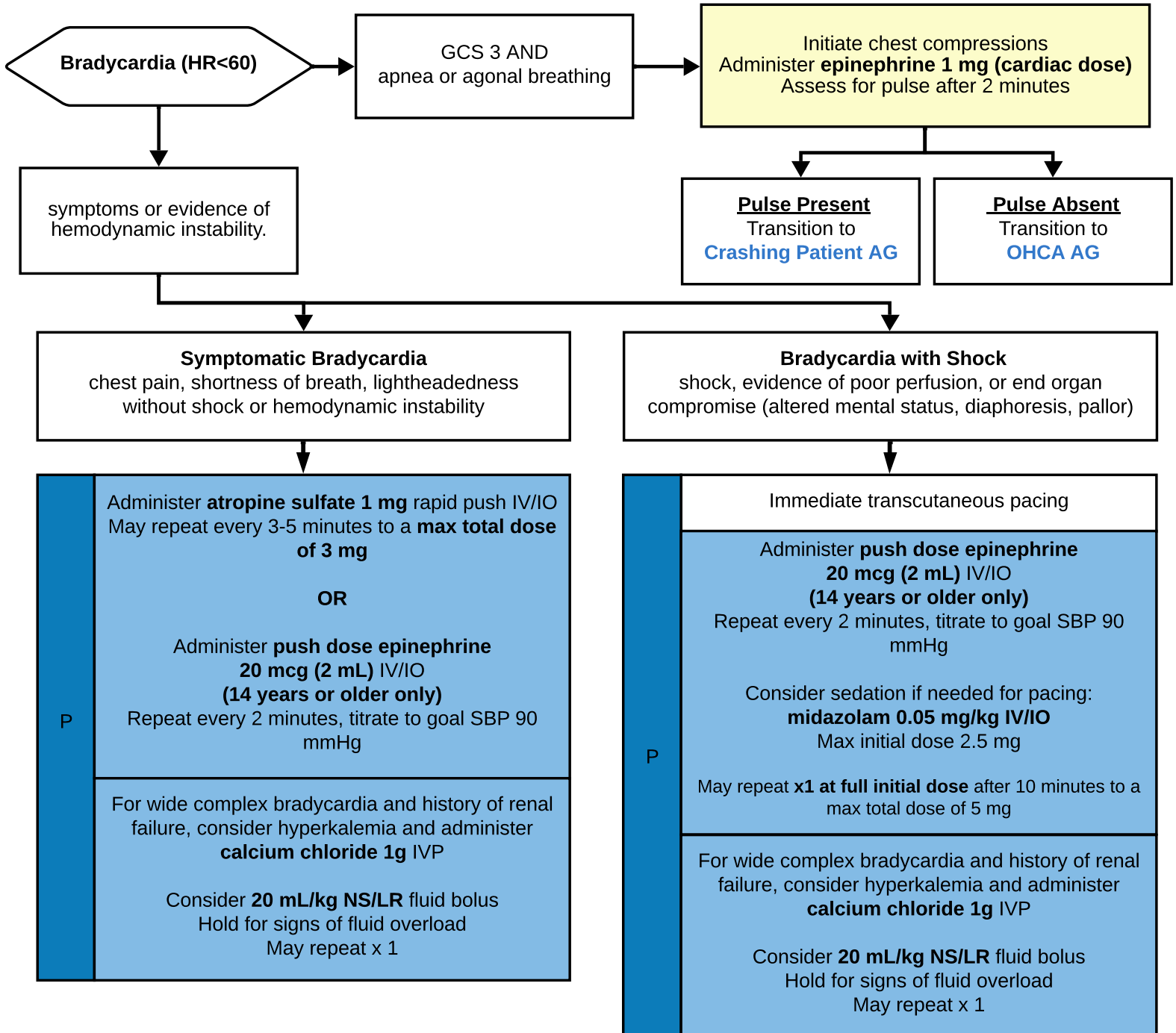
Err on the side of caution; if you think a patient is sick or has the potential to decompensate then choose ALS transport.

- **Adult Patient:** Vital signs are an essential indicator of underlying illness. **An adult with new hypotension (SBP <90 mmHg), may have a critical problem with the heart, a severe infection, or other problem.** Tachycardia (HR > 110), bradycardia (HR <60), tachypnea (RR > 20), bradypnea (RR <12), or hypoxia (SpO2 <94%) may also indicate underlying illness. Vital signs may be masked or accentuated by medications; a beta blocker, for example, may prevent a patient from developing reflex tachycardia in shock, so that patient may have lower than expected pulse rates and blood pressure. General weakness can be a symptom of an underlying process. Diabetic patients and women may have atypical presentations of cardiac-related problems, such as MI.
- **Geriatric Patient:** Minor or moderate injury in the typical adult may be very serious in the elderly; hip fractures and dislocations carry a high mortality. Always check Blood Sugar and assess for signs of a stroke, trauma, etc. with any change in a patient's baseline mental status. Altered mental status is not always dementia, and may represent a stroke, metabolic problem, or infection, per **Altered/OD AG**.
- **Pediatric Patient:** For minor patients, it is preferable to have a parent or legal guardian provide consent for treatment; however EMS may provide emergency treatment when parent or guardian is not available. Special needs children may require continued use of pediatric-based guidelines regardless of age and weight. Initial assessment should utilize the Pediatric Assessment Triangle which encompasses Appearance, Work of Breathing and Circulation to skin. The order of assessment may require alteration dependent on the developmental state of the pediatric patient. Generally the child or infant should not be separated from the caregiver unless absolutely necessary during assessment and treatment.
- **Intoxicated Patient:** In practice for intoxicated individuals, consider the patient's mental status. If the person is "talking but not walking," BLS transport could be appropriate for suspected mild intoxication. If the person is "not talking and not walking," then ALS transport is indicated for suspected moderate to severe intoxication. Any evidence of respiratory compromise should prompt ALS transport.

Adult Bradycardia Administrative Guideline (Age ≥ 14)



History <ul style="list-style-type: none"> Past medical history Medications <ul style="list-style-type: none"> Beta-Blockers Calcium channel blockers Clonidine Digoxin Pacemaker 	Signs and Symptoms <ul style="list-style-type: none"> Chest pain Respiratory distress Hypotension or Shock Altered mental status Syncope Lightheadedness/Dizziness 	Differential <ul style="list-style-type: none"> Acute myocardial infarction Hypoxia / Hypothermia Pacemaker failure Sinus bradycardia Head injury (elevated ICP) or Stroke Spinal cord lesion Sick sinus syndrome AV blocks (1°, 2°, or 3°) Overdose
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DRUG PREPARATION:

Preparation of push dose epinephrine (14 years or older only):
Mix 1 mL of 1 mg/10 mL (CARDIAC) epinephrine with 9 mL NS. This results in a 10 mcg/mL concentration



Education/Pearls

A bradycardic rhythm should be interpreted in clinical context, with pharmacological treatment reserved for significant symptoms or when signs of shock are present. Otherwise, closely monitor the patient and reassess regularly. Bradycardia typically causes symptoms when present at a rate of <50 beats/minute. Bradycardia may present with altered mental status, chest pain, congestive heart failure, seizure, syncope, shock, pallor, diaphoresis, cardiac arrest, or other evidence of hemodynamic instability.

Patients with profound bradycardia are at high risk of cardiac arrest, but many patients proceed through bradycardia prior to arresting. If you suspect cardiac arrest, do not use this AG and instead assume the presence of PEA and proceed directly to the **OHCA (Medical) AG**. Proceed to managing cardiac arrest in any patient with:

- Agonal or absent breathing
- GCS 3

Consider treatable causes for bradycardia, which include electrolyte abnormalities (e.g. hyperkalemia), myocardial ischemia, medication overdose (see below for more details), infections, hypoxemia, and hypothyroidism.

- Consider hyperkalemia in patients with ECG evidence of wide complex bradycardic rhythms and consider treatment with calcium chloride.
- Hypoxemia is a common cause of bradycardia. Ensure oxygenation and support respiratory efforts.
- Consider opioid overdose, as well as medication overdoses, such as beta blockers, calcium channel blockers, and alpha-2 agonists (clonidine)

Medications: The two primary drugs utilized for chronotropy (increase in heart rate) are atropine and epinephrine. While both medications generally increase the heart rate, only epinephrine provides additional support as a peripheral vasopressor, increasing blood pressure through a second mechanism.

- Use caution in the administration of atropine or epinephrine in acute MI, as elevated heart rate can worsen ischemia. Pressors are often required in acute MI, despite this caution.
- **Epinephrine:** the preferred agent for bradycardia in the setting of unstable bradycardia, epinephrine provides vasoconstriction in addition to chronotropy.
- **Atropine:** an additional agent for bradycardia, atropine only increases a patient's heart rate and has no direct effect on peripheral blood pressure. Use caution when administering atropine in the setting of:
 - Overdoses, as administration may cause worsening bradycardia in certain scenarios (such as alpha agonist overdose, like with Clonidine).
 - Cardiac transplant patients, as it may cause paradoxical bradycardia.

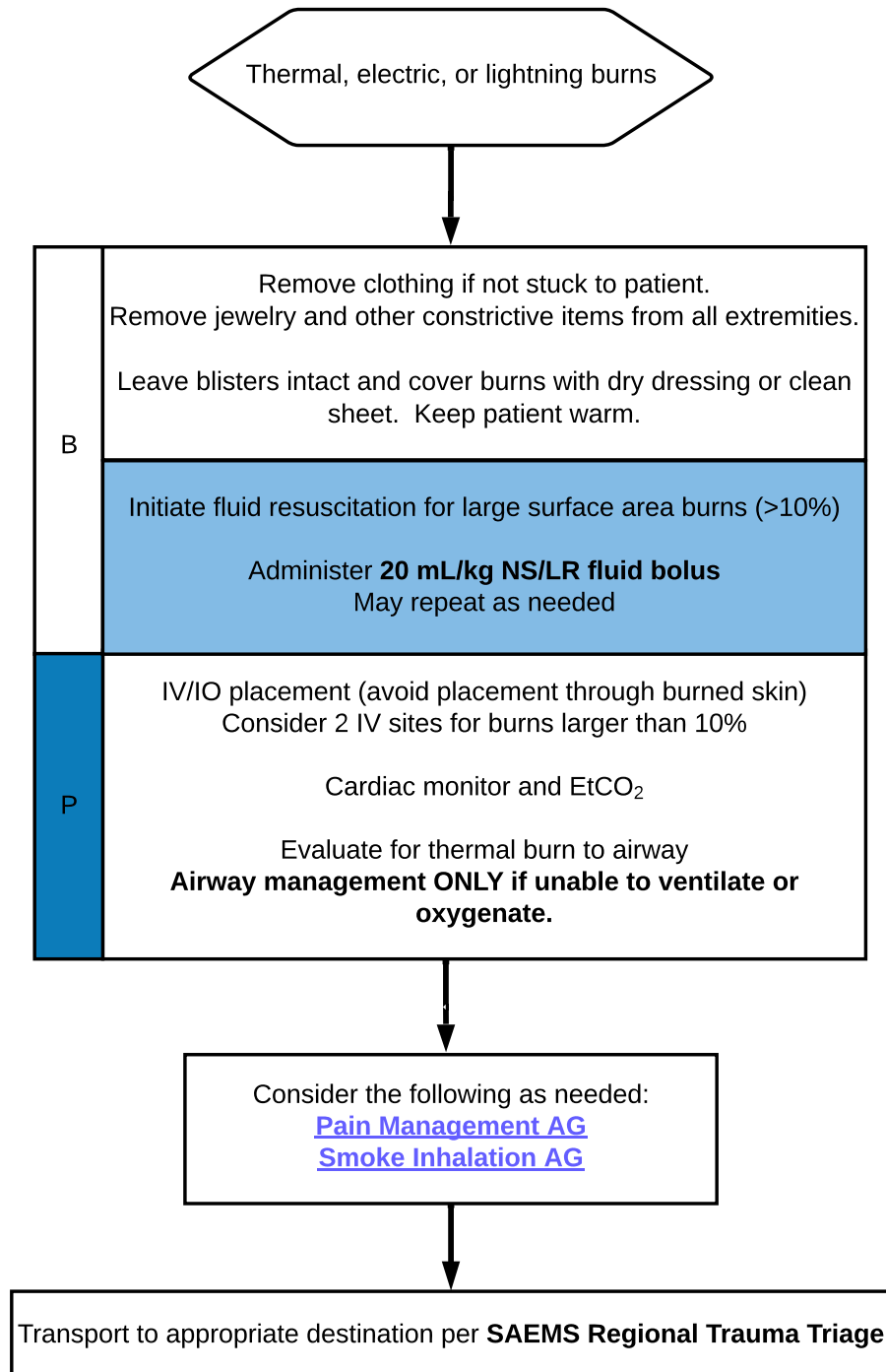
Transcutaneous Pacing (TCP)

- Immediately use TCP in patients with evidence of poor perfusion or with high-degree AV block (2nd or 3rd degree) without IV/IO access.
- If time allows, transport to a cardiac receiving center because transcutaneous pacing is a temporizing measure and patients may need to go to the cath lab for pacemaker placement.
- Consider sedation or pain control for TCP, utilizing EtCO₂ for all patients receiving sedation
- Verify mechanical capture every 2-4 minutes when pacing a patient
- Patients in cardiac arrest or who are post-ROSC should not be paced; instead, use chest compressions and push-dose pressors, respectively.

Once at the hospital, consider having one crew member monitor the pacing equipment and monitor until hospital pads are successfully placed on the patient.



History <ul style="list-style-type: none"> • Type of exposure • Time of injury • Other trauma • Airway/inhalation injury 	Signs and Symptoms <ul style="list-style-type: none"> • Burns • Pain and swelling • Hypotension/shock • Airway compromise/distress could be indicated by hoarseness/wheezing 	Differential <ul style="list-style-type: none"> • Superficial (1stDegree) red, painful (Don't include in TBSA) • Partial Thickness (2nd Degree) blistering • Full Thickness (3rd Degree) painless/charred or leathery skin • Thermal injury, including chemical or electrical • Radiation injury • Blast injury
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Education/Pearls:

Critical or serious burns require often complex management and should be transported directly to a burn center, when available. These burns are defined as:

- Partial thickness burns $\geq 10\%$ total body surface area (TBSA)
- Full thickness burn $\geq 5\%$ TBSA
- Significant burns that involve the face, hands, feet, genitalia, perineum, or major joints
- Electrical burns, including lightning injury
- Inhalational burn injury
- Significant burn injury in patients with pre-existing medical disorders that could complicate management, prolong recovery, or affect mortality, such as: diabetes, cardiac disease, pulmonary disorders, pregnancy, cirrhosis, morbid obesity, immunosuppression, bleeding disorders

Burn patients are often trauma patients; evaluate for multisystem trauma and consider whether a patient meets trauma criteria. These patients are prone to **hypothermia** due to losing protective skin layers - never apply ice or cool the burn, which may further damage tissue and contribute to hypothermia. Instead, maintain normal body temperature. In evaluating burn patients,

- Circumferential burns to extremities are dangerous due to potential vascular compromise secondary to soft tissue swelling.
- Evaluate the possibility of abuse with burn injuries in the elderly or pediatric patients.
- Do not administer IM pain injections through burned skin.

Electrical Burns:

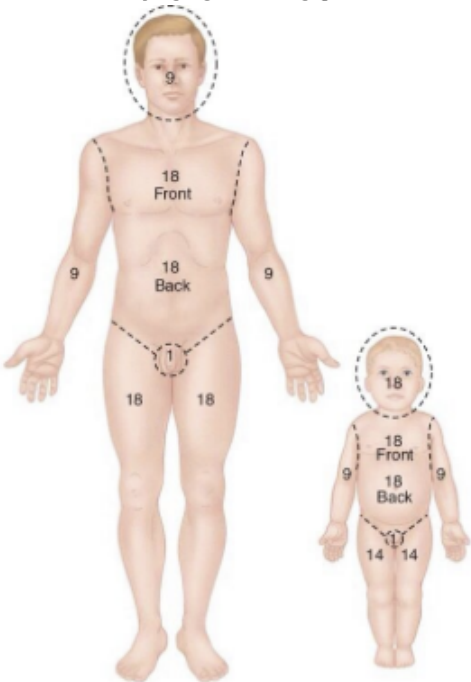
- DO NOT contact patient until the source of the electrical shock is disconnected..
- Cardiac Monitor: anticipate cardiac arrhythmias including VT, VF, atrial fibrillation and/or heart blocks.

Lightning Strikes: Lightning strikes generate unique injuries that require appropriate interventions. They can cause hearing difficulty, cardiac arrhythmias, and deep burns that may not be visible externally. They may coincide with additional physical trauma (e.g. falls or being thrown by event). Utilize **reverse triage** for multiple victims:

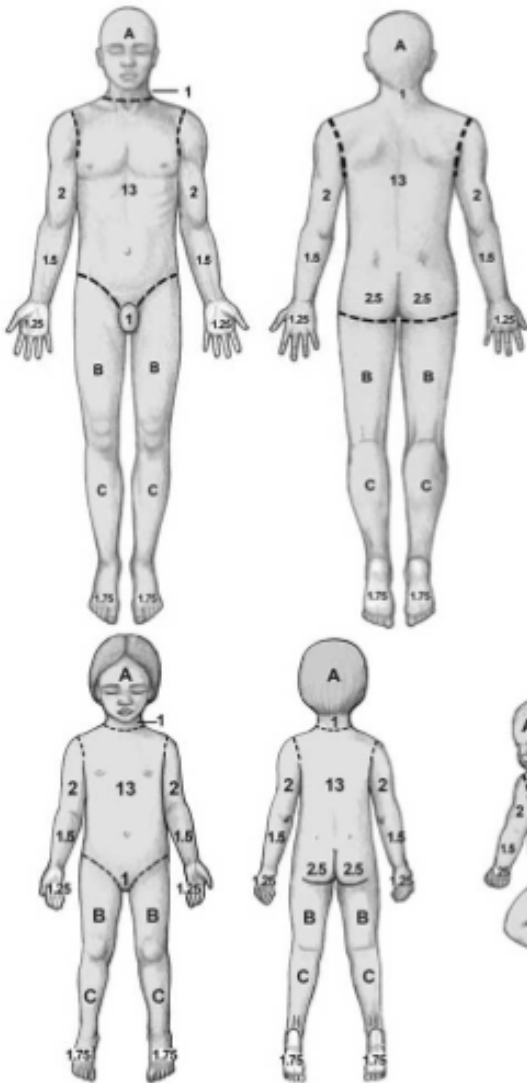
- Initiate treatment on apneic or pulseless patients first, then proceed to address the less-injured.
- Patients may experience cardiac arrest and/or be in extremis from both a medical (dysrhythmia) and traumatic cause. Prioritize correction of any life-threatening dysrhythmia (e.g. defibrillate VF and initiate CPR) and also initiate transport to a trauma center with ongoing high-quality resuscitation.



Rule of Nines



Lund and Browder Charts for area of body burnt

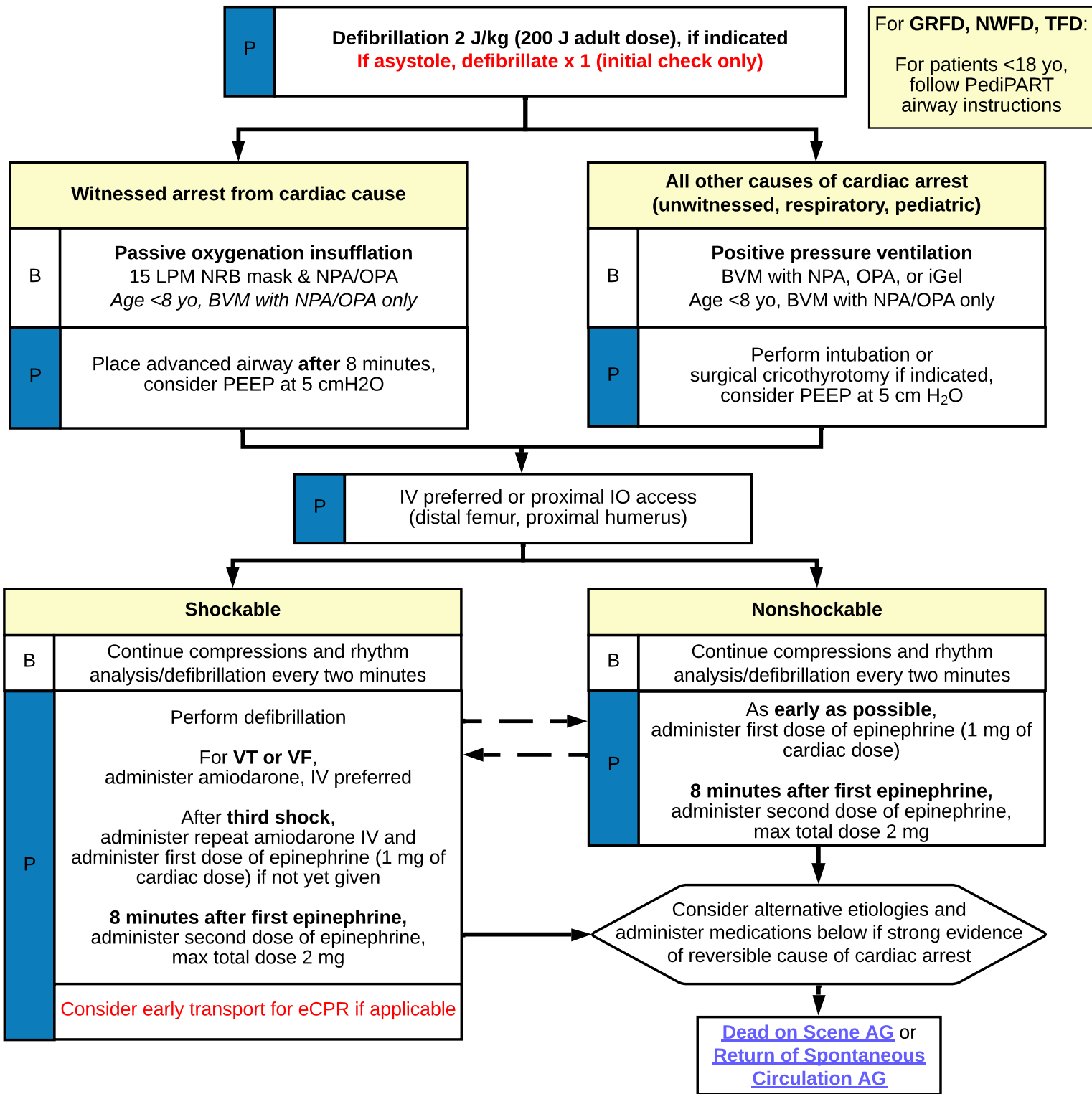


Burnt area	%
Head	
Neck	
Trunk (front)	
Trunk (back)	
Arm (right)	
Arm (left)	
Hand (right)	
Hand (left)	
Buttock (right)	
Buttock (left)	
Genitals	
Leg (right)	
Leg (left)	
Feet (right)	
Feet (left)	
Total burn area	

Age (years)	Under 1	2-4	5-9	10-14	15	Adult
A — 1/3 of head	9 1/2	8 1/2	6 1/2	5 1/2	4 1/2	3 1/2
B — 1/3 of one thigh	2 1/2	3 1/2	4	4 1/2	4 1/2	4 1/2
C — 1/3 of one leg	2 1/2	2 1/2	2 1/2	3	3 1/2	3

Remote Primary Health Clinic Manuals. Burns. 2014. Available from: <https://rphcm.allette.com.au/publication/cpm/Burns.htm>

Adult and Pediatric Medical Cardiac Arrest Administrative Guideline



DRUG DOSAGES:

Neonate <10 days old
Perform heel stick glucose
Administer **Dextrose 10% (D10) 1 mL/kg IV/IO**, max dose 250 mL

Ventricular tachycardia or ventricular fibrillation
Administer **amiodarone 5 mg/kg IV/IO**, max initial 300 mg, IV preferred.
May repeat once 6-8 min later at 2.5 mg/kg IV, max repeat dose 150 mg. Follow amiodarone doses with 20 mL flush.

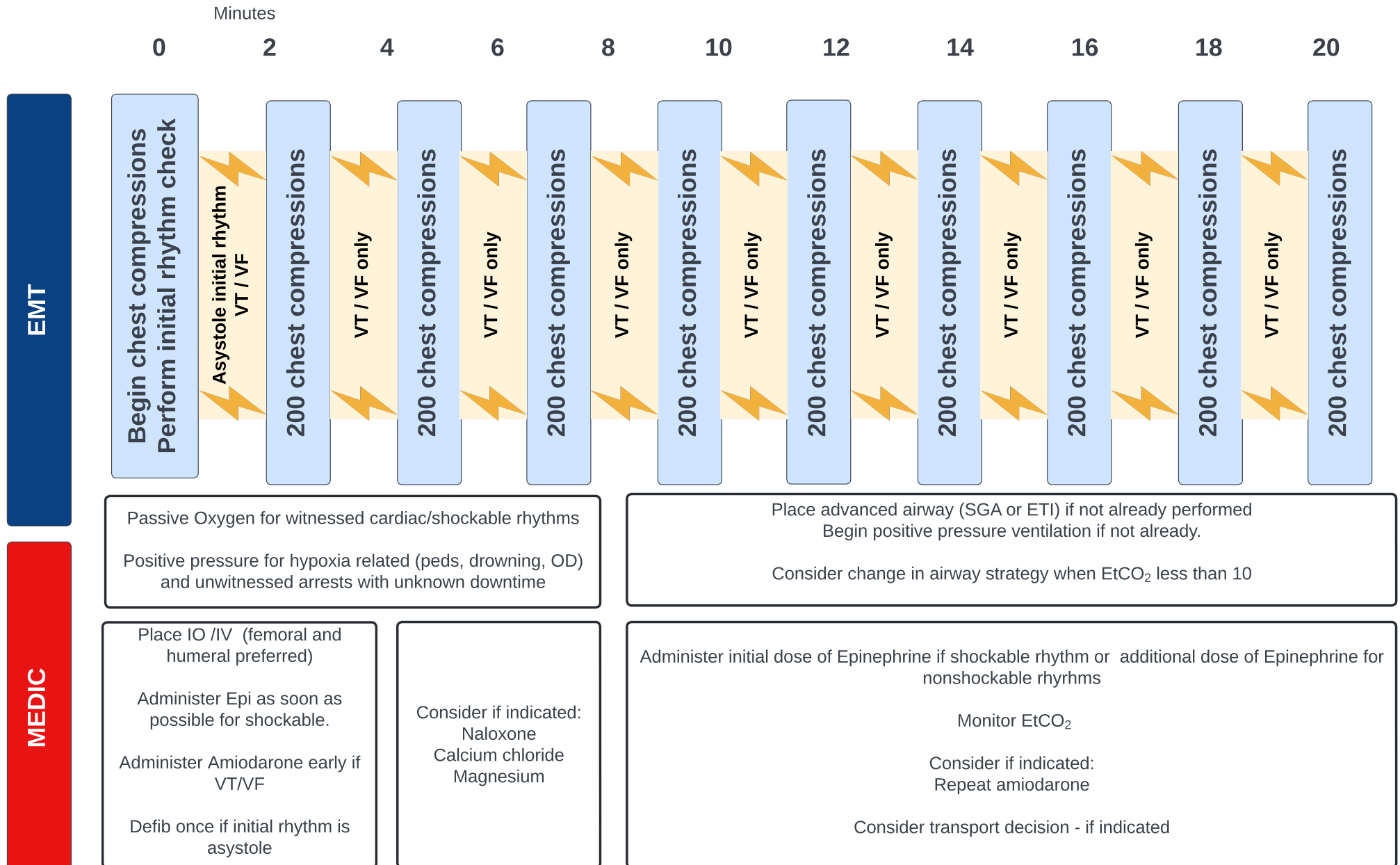
Defibrillation: 2 J/kg → 4 J/kg → 6 J/kg → 10 J/kg (Max 200J)

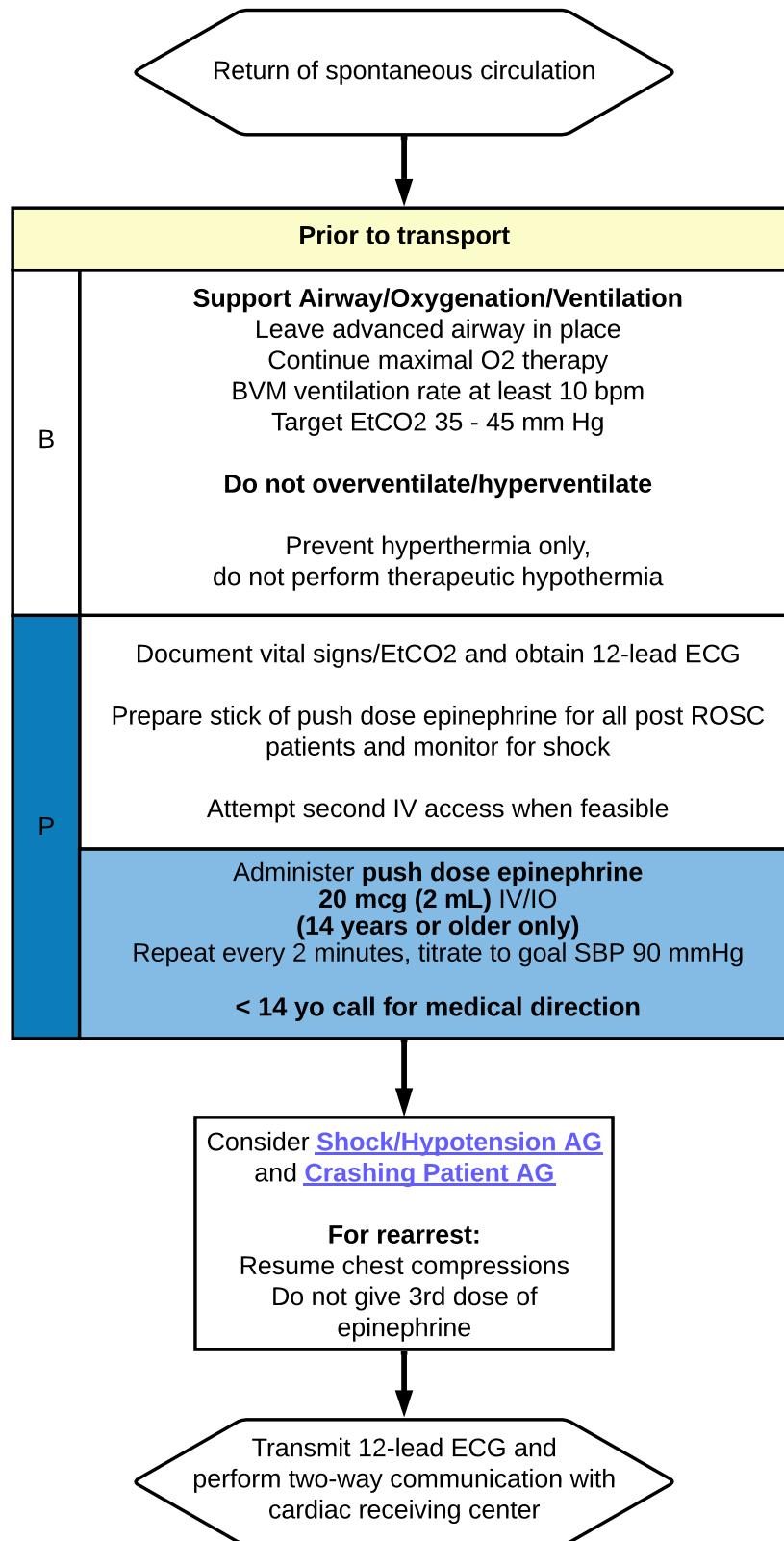
Opioid overdose
Administer **naloxone 2 mg IV/IO or 4 mg IN**
May repeat x 1 **naloxone 2 mg IV/IO**, max total 6 mg

Hyperkalemia
Administer **calcium chloride 20 mg/kg IV/IO**, max dose 1 g

Polymorphic ventricular tachycardia (Torsades)
Administer **magnesium 25 mg/kg IV/IO** over 2 min, max 2g

Prehospital CPR Timeline





DRUG PREPARATION:

Preparation of push dose epinephrine (14 years or older only):
 Mix 1 mL of 1 mg/10 mL (CARDIAC) epinephrine with 9 mL NS. This results in a 10 mcg/mL concentration



Return of Spontaneous Circulation (ROSC): The post-arrest period is dynamic, and re-arrest and dysrhythmias frequently occur. Prioritize vasopressor administration and target oxygen to optimize vital sign parameters. Dysrhythmias in this period are common and usually self-limiting; some warrant no further treatment, especially atrial dysrhythmias. Others, such as worsening bradycardia and wide-complex tachycardia, should be managed emergently. Due to the complex nature of post-arrest care, it is highly recommended to stay on scene to administer the interventions described in the AG.

After arrest,

- Monitor EtCO₂; EtCO₂ should remain above 20. Lower readings may indicate re-arrest or airway displacement.
- Monitor SpO₂ to maintain saturation between 94-99%
- Obtain a 12-lead; if STEMI, transmit ECG and expedite preparation for transport
- Prepare for transport and assure adequate personnel; once loaded, reassess airway and pulse
- Prepare your pressor; titrate fluid resuscitation and vasopressor administration to maintain SBP of 90-100 mmHg or Mean Arterial Pressure (MAP) of 65-80 mmHg.

Post-arrest Bradycardia: A common post-ROSC rhythm, the first-line treatment is push-dose epinephrine. Titrate the pressor as needed to target a perfusing heart rate (i.e. a SBP >90).

- **Pacing:** only attempt in severe bradycardia when mechanical capture can absolutely be verified (i.e. finger on the pulse with good blood pressure) and the patient is under constant monitoring. After ROSC, heart muscle is often stunned and pacing will be ineffective. **You must have a patient with a pulse for pacing to be an option.** If a patient is pulseless or you cannot verify a pulse with bradycardia, administer CPR.

Wide-complex tachycardia: See [Wide Complex Tachycardia AG](#)



Education/Pearls

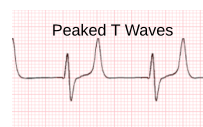
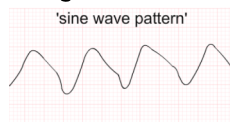
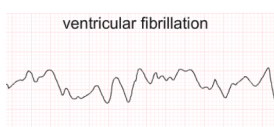
Prioritize effective CPR in the first 8 minutes of cardiac arrest management, addressing promptly any cardiac arrhythmias. First-look asystole is defibrillated once to cover for otherwise undetected or occult VF. Anytime a shockable rhythm is assessed in cardiac arrest, defibrillation should be performed. Good quality CPR, effective post-ROSC care, and early epinephrine in non-shockable rhythms are tied to improved patient outcomes.

Refractory VF/VT: For patients exhibiting 3+ episodes of shockable rhythm, pre-hospital management is often only temporizing due to profound cardiac ischemia. These patients often require emergent hospital resources, such as ECMO or the cath lab. For patients with refractory shockable rhythms, consider early transport (e.g. at the third shock) to a cardiac receiving facility, administration of a second dose of amiodarone, and a vector change. In patients with isolated electrical disturbances, we delay epinephrine to the third shock. The second, final dose of epinephrine should follow approximately eight minutes after the first dose.

Asystole and PEA: Early administration of epinephrine is prioritized in these patients, as trials have shown benefit in survival. Asystole (not PEA) should be shocked once when first detected. The second, final dose of epinephrine should again follow approximately eight minutes after the first dose.

Airway management: For patients with witnessed cardiac arrests in the setting of suspected cardiac cause (i.e. suspected MI, sudden syncope), airway management should consist of passive oxygen insufflation with a NRB +/- NC. For all other cardiac arrests (unwitnessed, pediatric, respiratory), hypoxia is a suspected major contributor of the cardiac arrest. Pursue positive pressure ventilation immediately in these patients and place an earlier advanced airway.

Hyperkalemia: In the setting of renal failure, tissue destruction (e.g. rhabdomyolysis, large burns), certain medication use, or prior hyperkalemia, treat hyperkalemia in wide complex rhythms or VF. When suspected, give Calcium Chloride. The following ECG changes may be present in hyperkalemia:



<https://acadoodle.com/articles/5-ecg-changes-of-hyperkalemia-you-need-to-know>

Pediatrics: In patients under the age of 14, strongly consider respiratory illness as the cause of cardiac arrest.

- Early ventilation is indicated in these patients
- Defibrillation should follow an escalating doses: 2J/kg, 4J/kg, 6J/kg, then 10J/kg with a max of 200J.
- **Do not intubate patients <8 years**

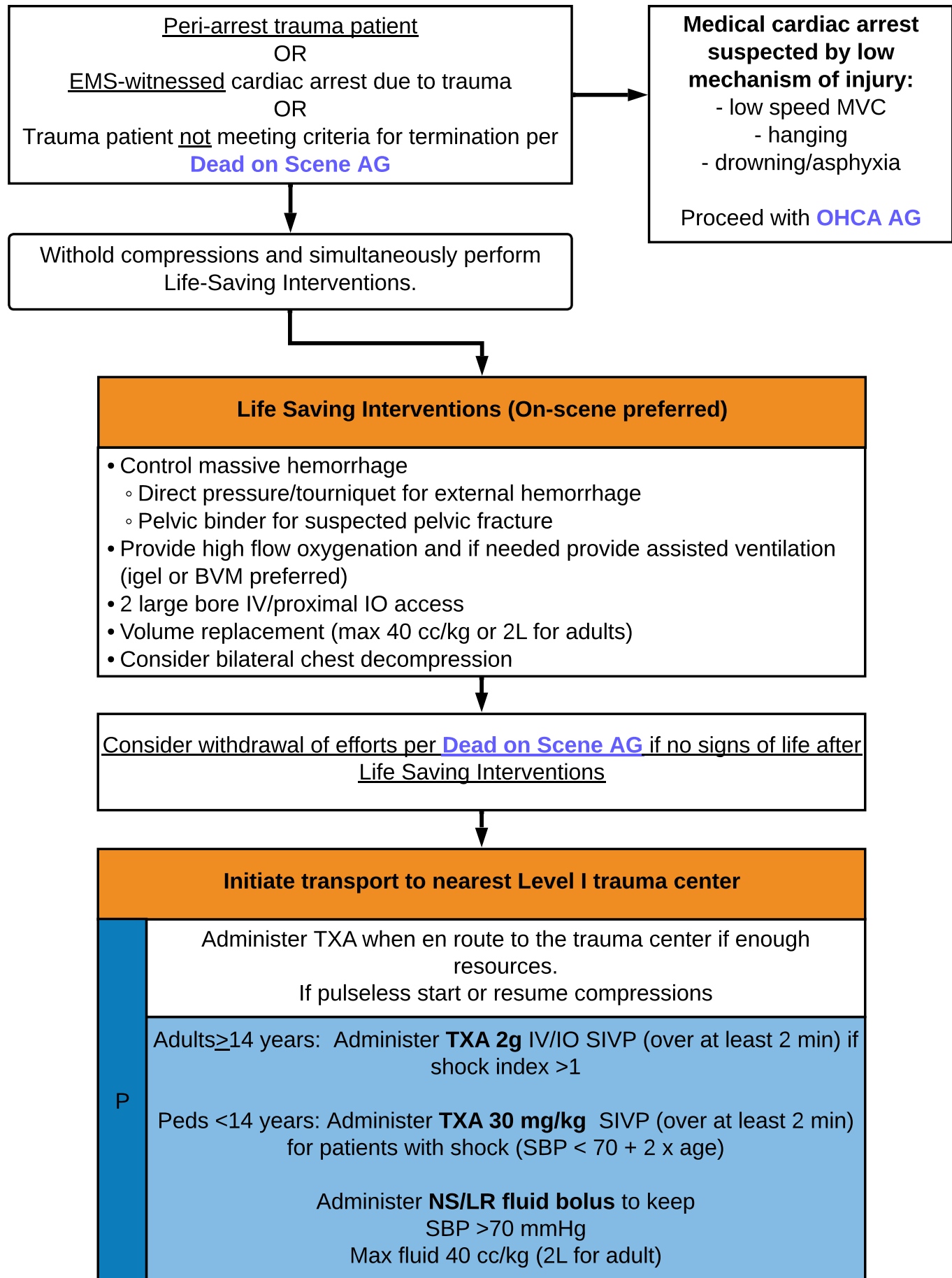
Polymorphic VT (Torsades de Pointes):

- Administer magnesium (max 2 g)
- Defibrillate pulseless torsades.

IV/IO Access: Recent studies have shown improved outcomes in patients with amiodarone when administered IV (when compared to IO) access in cardiac arrest, as well as increased flow rates for proximal IO access. For this reason, IV/IO access is a renewed focus in OHCA management.

- When IV access is not feasible, obtain proximal IO access. Femoral or humeral are preferred over tibial.
- When possible, administer amiodarone via IV.

Traumatic Cardiac Arrest and Peri-Arrest Administrative Guideline





Education and Pearls

The initial cardiac rhythm for most patients in survivable traumatic cardiac arrest is pulseless electrical activity (PEA). This rhythm in traumatic cardiac arrest usually represents a very low output state caused by an obstruction (e.g. pneumothorax, pericardial tamponade) or hypovolemia (blood loss anemia), rather than a true "cardiac" arrest.

In cardiac arrest caused by hypovolemia, cardiac tamponade, or tension pneumothorax, *chest compressions are unlikely to be effective*. Subsequently, chest compressions take a lower priority than the immediate treatment of reversible causes (e.g. needle decompression, airway management, controlling hemorrhage, etc.). Performing chest compressions cannot only impair and hinder the performance of life saving interventions in trauma patients, they can - in some patients - cause significant harm; in a patient with extensive chest or rib injuries, for example, chest compressions may cause direct injury to underlying organs.

In cardiac arrest due to trauma, hemorrhage control, the restoration of circulating blood volume, opening the airway, and relieving suspected tension pneumothorax should take priority over conventional cardiopulmonary resuscitation (CPR) (i.e. external chest compressions, defibrillation, and adrenaline) unless a medical cause for cardiac arrest is reasonably suspected to have preceded the traumatic event.

This guideline is for trauma patients that are about to lose pulses or have lost pulses in front of EMS. It does not apply to those patients who would meet the criteria for termination based on the Dead on Scene AG.

Chest Pain/STEMI Administrative Guideline



History

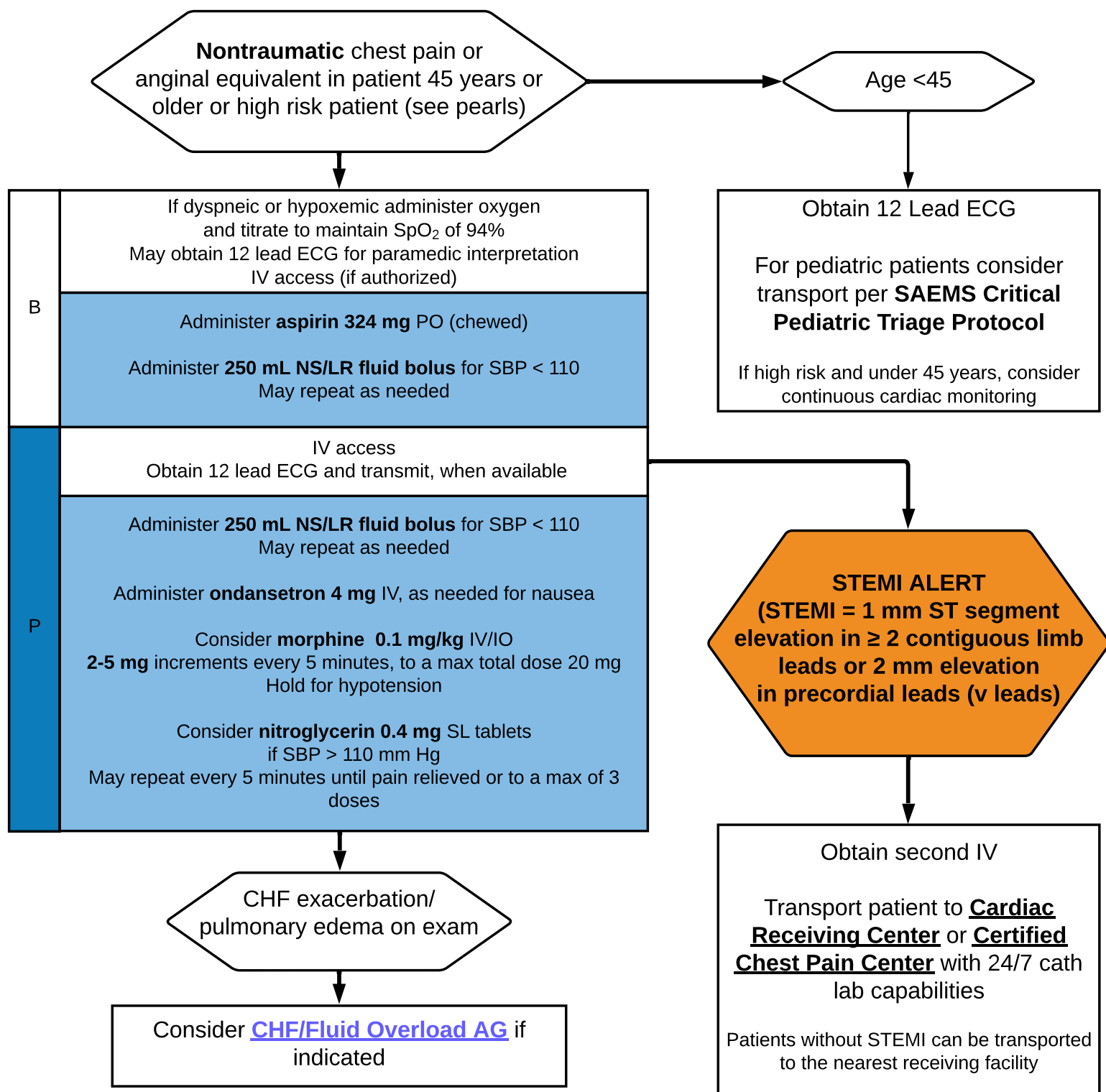
- Age
- Medications (Viagra / sildenafil, Levitra / vardenafil, Cialis / tadalafil)
- Past medical history (MI, Angina, Diabetes, post menopausal)
- Recent physical exertion

Signs and Symptoms

- CP (pain, pressure, aching, vice-like tightness)
- Location (substernal, epigastric, arm, jaw, neck, shoulder)
- Radiation of pain
- Pale, diaphoresis
- Shortness of breath
- Nausea, vomiting, dizziness
- Time of onset

Differential

- Angina vs. Myocardial infarction
- Pericarditis
- Pulmonary embolism
- Asthma / COPD
- Pneumothorax
- Aortic dissection or aneurysm
- GE reflux
- Chest wall injury or pain
- Pleural pain





Education /Pearls

Acute Coronary Syndrome (ACS) is a common cause of chest pain and occurs when the blood supply of the heart cannot meet the demand, leading to ischemia or even infarct (permanent damage). Myocardial ischemia can present in a number of ways, including:

- **Chest pain or discomfort:** The most common symptom is chest pain or pressure, usually on the left side of the body, but can be the right side.
- **Pain in other areas:** Pain can radiate to the neck, jaw, shoulder, arm, back, or stomach.
- **Shortness of breath:** This can occur when you're physically active or at rest.
- **Other symptoms:** Other symptoms include nausea, vomiting, sweating, fatigue, feeling lightheaded or dizzy, and a fast or irregular heartbea

Risk factors for ACS include diabetes, smoking, hypertension, hyperlipidemia, family history of cardiac disease, and atherosclerotic disease (prior stroke, heart attack, or peripheral vascular disease).

- Consider ACS as the cause of chest pain in patients >45 y with multiple risk factors or in younger patients with recent cocaine/methamphetamine use.
- If presentation is severe or delayed, patients may present with acute heart failure, syncope and/or shock; consider fluid or pressors, as appropriate.
- Performance of serial ECGs is recommended if the first is not diagnostic and your suspicion for a cardiac event is high, or if you note a change in the patient's condition

ST Elevation Myocardial Infarction (STEMI):

- Diagnostic criteria: Anginal symptoms plus one of the following:
 - 1 mm ST elevation in 2 or more contiguous limb leads (I, II, III, aVF, aVR, aVL)
 - 2 mm ST elevation in 2 or more select precordial leads (V1-V6)
- Reciprocal changes on the ECG make myocardial infarction more likely, but is not required for diagnosis of MI.
- Treatment timing goals:
 - Obtain and transmit ECG within 5 minutes
 - Provide STEMI alert within 10 minutes
 - Time at scene less than 15 minutes

Aspirin: Apart from timely transport and recognition of ACS, aspirin is the only primary pre-hospital intervention in ACS that **improves survival**.

- Do not withhold aspirin while obtaining IV access.

Morphine: Morphine provides analgesia but offers no survival benefit.

- Monitor for hypotension after administration.
- Opioids may be repeated per dosing guidelines.

Nitroglycerin: Nitroglycerin dilates vasculature and may ease pain caused by myocardial ischemia.

- The use of **nitroglycerine is contraindicated** within 24-48 hours of the use of erectile dysfunction medication (e.g. sildenafil, tadalafil).
- Remember when providing nitroglycerin to patients with inferior STEMI patterns (II, III, aVF), that this may represent a right-sided MI, that could lead the patient to be more dependent on preload. These adverse events can be managed, as long as you are prepared to administer fluids if hypotension occurs. Monitor closely for hypotension after administration..
- The use of nitroglycerin offers no survival benefit in chest pain.
- Nitroglycerin may be repeated per guidelines



History

- Congestive heart failure
- Medications (digoxin, Lasix, Viagra/sildenafil, Levitra/vardenafil, Cialis/tadalafil)
- Cardiac history/past myocardial infarction

Signs and Symptom

- Respiratory distress
- Crackles on lung exam
- Jugular vein distention
- Frothy/pink sputum
- Peripheral edema, diaphoresis
- Hypotension, shock
- Chest pain

Differential

- CHF exacerbation
- MI
- Asthma/COPD/Pneumonia/PE
- Pericardial effusion/tamponade
- Aspiration
- Noncardiogenic pulmonary edema

Respiratory distress with signs of fluid overload and pulmonary edema

B	Administer oxygen and titrate to SpO ₂ of ≥ 94% May obtain 12 lead ECG for paramedic interpretation
P	Cardiac monitoring Perform 12-lead ECG and transmit when available Administer nitroglycerin 0.4 mg SL tab if SBP > 110 mm Hg Repeat every 5 min to total of 3 doses, as BP allows Administer aspirin 324 mg PO chewed

STEMI ALERT
(STEMI = 1 mm ST segment elevation in ≥ 2 contiguous limb leads or 2 mm elevation in precordial leads (v leads))

No clinical improvement;
continued hypoxia or respiratory distress

B	CPAP: Continuous positive airway pressure ventilation as blood pressure allows Begin with 5 cmH₂O , increase by 2.5cm cmH ₂ O increments up to a max of 10 cmH₂O
P	<i>For patients with agitation that interferes with necessary patient care</i> Administer midazolam 0.05 mg/kg IM/IV/IO (max dose 2.5 mg) May repeat x 1 after 10 minutes to a max total dose of 5 mg IV/IO ≤14 or > 65 years max initial and total doses are half ≤ 8 yrs: <i>Contact Medical Direction for orders</i> <i>Use caution when patient at risk for hypotension, as midazolam administration will lower blood pressure.</i>

Obtain second IV

Transport patient to **Cardiac Receiving Center** or **Certified Chest Pain Center** with 24/7 cath lab capabilities

Patients without STEMI can be transported to the nearest receiving facility



Education/Pearls

Heart failure describes a clinical syndrome in which the heart's ability to pump is impaired. When a patient experiences an increase in their fluid status (ingestion of excess fluid or salt) or a decrease in their heart's ability to pump (such as a myocardial infarction or valve failure), a heart failure exacerbation may occur. Pulmonary edema is a dangerous consequence and can impair breathing and gas exchange. Commonly, patients with heart failure may not tolerate lying supine and may complain of chest pain, shortness of breath, or sudden night-time awakening. Prehospital treatment goals include reducing the work of the heart with preload/afterload reduction (nitroglycerine and CPAP) and providing as needed ventilatory support with CPAP.

- ECG should be obtained on all patients, as STEMI may also be present
- Use care in administration of fluid in hypotension, as this may worsen respiratory status.

Nitroglycerin:

Nitroglycerin is beneficial in acute congestive heart failure (CHF) exacerbations due to its ability to reduce the workload on the heart and improve symptoms of pulmonary congestion. It acts primarily as a vasodilator, and its effects include:

- 1.Reduction in Preload:** Nitroglycerin dilates the veins, which decreases the volume of blood returning to the heart (preload). This reduction in preload lessens the volume that the heart must pump, decreasing the pressure in the left ventricle. In patients with CHF, high preload often contributes to fluid backup in the lungs (pulmonary congestion), so reducing preload can relieve symptoms like shortness of breath.
- 2.Reduction in Afterload (at higher doses):** Nitroglycerin also causes some arterial dilation at higher doses, reducing the pressure the heart has to pump against (afterload). By lowering afterload, it makes it easier for the left ventricle to eject blood, thus improving cardiac output and reducing strain on the heart muscle.
- 3.Relief of Pulmonary Congestion:** By reducing both preload and afterload, nitroglycerin can rapidly relieve pulmonary congestion and reduce symptoms of dyspnea. This helps prevent further deterioration into severe respiratory distress or respiratory failure.
- 4.Decrease in Myocardial Oxygen Demand:** With reduced workload on the heart, myocardial oxygen demand decreases, which is particularly beneficial if underlying ischemia is exacerbating heart failure symptoms.

Cautions:

- The use of **nitroglycerine is contraindicated** within 24-48 hours of the use of erectile dysfunction medication (sildenafil, tadalafil).
- Remember when providing nitroglycerin to patients with inferior STEMI patterns (II, III, aVF), that this may represent a right-sided MI, that could lead the patient to be more dependent on preload. These adverse events can be managed, as long as you are prepared to administer fluids if hypotension occurs. Monitor closely for hypotension after administration.
- Nitroglycerin may be repeated per dosing guidelines

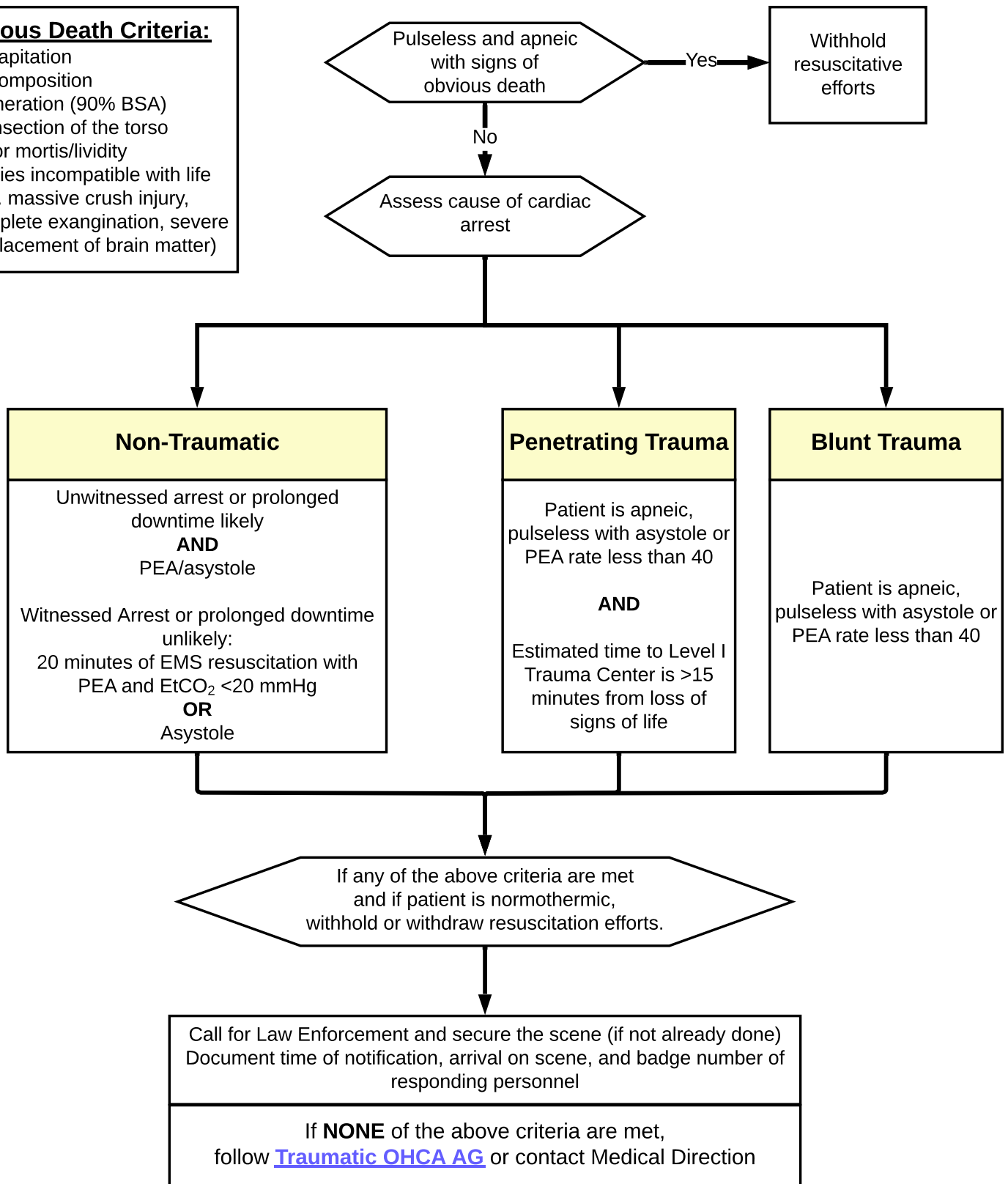
Continuous Positive Airway Pressure (CPAP): CPAP, supports respiratory status in patients with evidence of pulmonary edema and assists in providing afterload reduction on the heart.

- Closely monitor vitals and mental status, and discontinue CPAP for shock, vomiting, or altered LOC.
- Patients with a decreased GCS and an inability to protect their airway are at risk for aspiration and should not receive CPAP.
- Consider Midazolam to assist with CPAP compliance. Benzodiazepines may precipitate respiratory depression or may worsen compliance with CPAP in patients who are already tired, already have altered LOC, or who have recent history of alcohol or drug ingestion. Benzodiazepines may also cause hypotension. All efforts at verbal coaching should be utilized prior to giving benzodiazepines for patients in respiratory distress.



Obvious Death Criteria:

- Decapitation
- Decomposition
- Incineration (90% BSA)
- Transection of the torso
- Rigor mortis/lividity
- injuries incompatible with life (e.g. massive crush injury, complete exangination, severe displacement of brain matter)





Education/Pearls

Patients must be pulseless and apneic to apply this AG. PEA/Asystole should be confirmed in two leads for at least ten seconds. An EMS provider or other healthcare provider must remain with the patient until released to an Law Enforcement Officer. After termination, do not alter body condition in any way or remove equipment (lines, tubes, etc.). Doing so may compromise potential Medical Examiner investigation

- If the patient is hypothermic due to submersion or environmental exposure, follow **OHCA AG** and transport per guideline.
- For patients <18 years of age, consultation with online medical direction is recommended.

Unwitnessed Arrest

- Determination of suspected downtime assists with termination of resuscitation (TOR) in these patients. For patients with suspected prolonged downtime, 20 minutes of resuscitation are not required if the patient remains in PEA or asystole, and TOR may proceed irrespective of EtCO₂. For patients with uncertain downtime (e.g. reports of recent fall or bystander description of recently being alive), utilize the witnessed arrest TOR criteria and provide 20 minutes of resuscitation.
- Examples of appropriate termination:
 - A patient was found down after being last seen alive 12 hours ago. He has no obvious rigor, but undergoes 10 minutes of resuscitation by EMS, and resuscitation is terminated at minute 10 in asystole.
 - A patient was found down after being last seen alive 20 minutes ago; he has no obvious rigor, but undergoes 20 minutes of resuscitation by EMS. Resuscitation is terminated at minute 20 in PEA with EtCO₂ of 17.

Advanced Directives (ADs): ADs describe the patient's wishes for treatment in life-threatening situations, and may include limitations of compressions, airway management, feeding, fluids, and preference for organ donation. In the absence of formal written directions (MOLST, POLST, DNR, generic advanced directives), a person with power of attorney for healthcare or healthcare proxy may prescribe limits of treatment.

- Prehospital Medical Care Directive (PMCD, a.k.a. Orange Form or DNR)
 - Emergency medical personnel are not required to accept or interpret medical care directives other than the PMCD (Orange Form), which is letter- or wallet-sized and includes mandated wording by ARS 36-3251.
 - These patients may also wear an orange, identifying bracelet on the wrist or ankle stating in bold type:
DO NOT RESUSCITATE, PATIENT'S NAME, PATIENT'S PHYSICIAN
 - Contact medical direction if the patient's guardian or agent wishes to reverse a DNR order. Resuscitative efforts should be initiated until clarification of the PMCD is made by a medical direction authority.

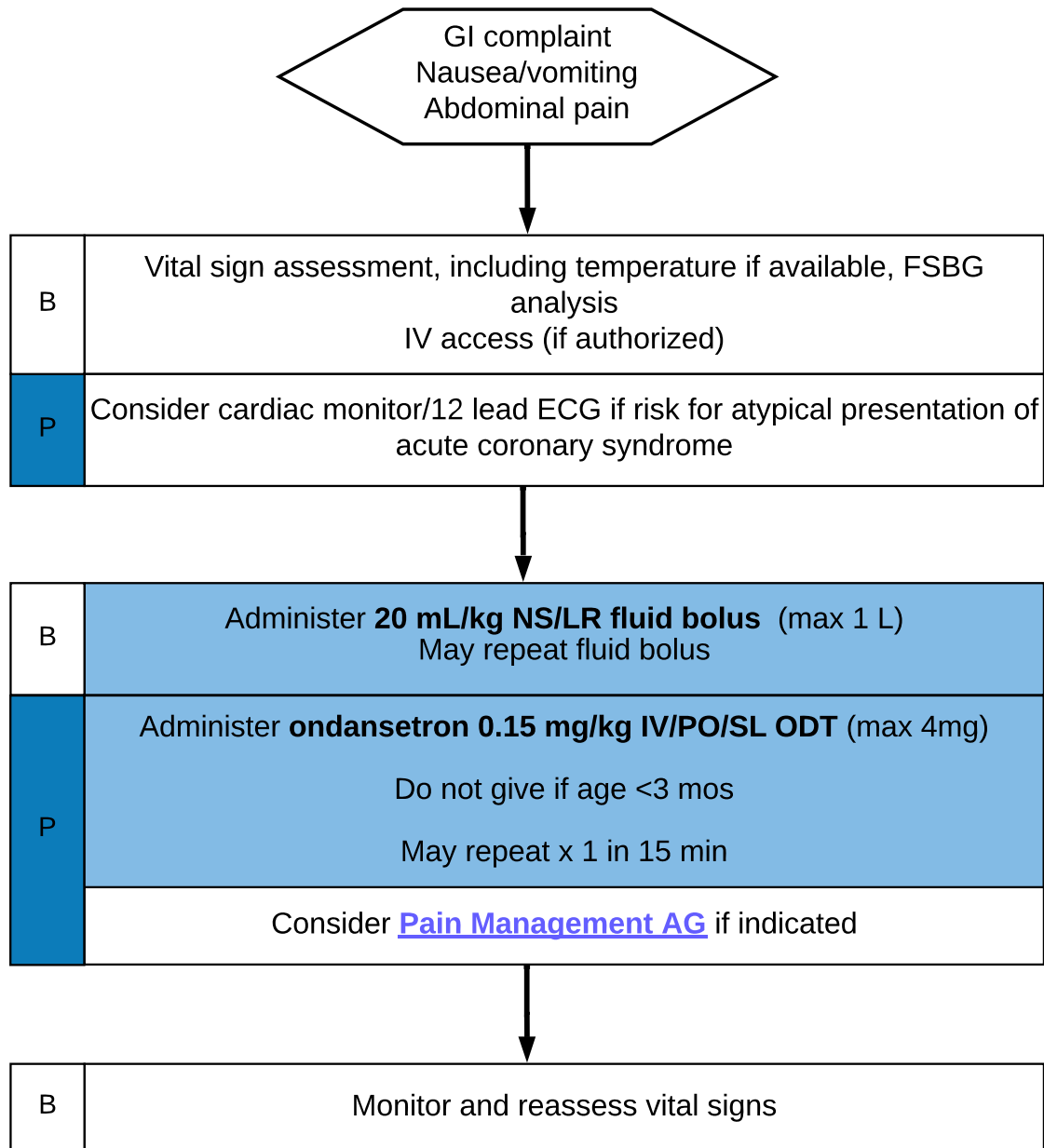
In cases where the patient's code status is unclear, appropriateness of withholding resuscitation efforts is questioned, or if there is question on the validity of the provided forms, EMS personnel should initiate CPR immediately and then contact online medical direction.

Traumatic Arrest:

- Resuscitation efforts may be terminated in any blunt trauma patient who is apneic, and pulseless with a PEA rate < 40.
- Victims of penetrating trauma found apneic and pulseless should be rapidly assessed for the presence of other signs of life, such as pupillary reflexes, spontaneous movement, response to pain. Penetrating trauma patient may be terminated of apneic, and pulseless with a PEA rate < 40.
- If resuscitation is not terminated, transport is indicated. Cardiopulmonary arrest patients in whom mechanism of injury does not correlate with clinical condition, suggesting a non-traumatic cause of arrest, should have standard ALS resuscitation initiated.



History <ul style="list-style-type: none"> • Age • Time of last meal • Last bowel movement/emesis • Improvement or worsening with food or activity • Duration of problem • Other sick contacts • Past medical history • Past surgical history/medications • Menstrual history (pregnancy) • Travel history • Bloody emesis / diarrhea 	Signs and symptoms <ul style="list-style-type: none"> • Pain • Character of pain (constant, intermittent, sharp, dull, etc.) • Distention, constipation • Diarrhea • Anorexia • Radiation • Associated symptoms: Fever, headache, blurred vision, weakness, malaise, myalgias, cough, headache, dysuria, mental status changes, rash 	Differential <ul style="list-style-type: none"> • CNS (stroke, CNS lesions, trauma or hemorrhage, vertigo, migraine) • Myocardial Infarction • Drugs (NSAID's, chemo, antibiotics) • Chronic GI or renal disorders • Diabetic ketoacidosis • OB-Gyn disease (ovarian cyst, PID, Pregnancy) • Infections (pneumonia, influenza) • Food or toxin induced
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Education/Pearls:

Vomiting and diarrhea are common symptoms, but can be the symptoms of uncommon and serious pathology such as stroke, carbon monoxide poisoning, acute MI, new onset diabetes, diabetic ketoacidosis (DKA), or poisonings. Maintain a high index of suspicion and utilize other protocols as indicated. Epigastric discomfort can be a mimic of cardiac disease - especially in elderly women and diabetic patients - and warrants an EKG in those populations. Analgesia may be administered via the **Pain Management AG**.

Vital signs are an important guideline in gastrointestinal illness:

- Repeat vital signs after each fluid bolus.
- Heart Rate: Increased heart rate is one of the first clinical signs of dehydration or infection, and may represent a reduction in volume status. Tachycardia usually increases as dehydration becomes more severe. Patients with normal heart rate are very unlikely to be significantly dehydrated.

Ondansetron can be given as an orally disintegrating tablet (ODT) or IV preparation. The IV preparation may be administered by mouth but tastes bad; it is easier to give in a small amount of flavored drink.

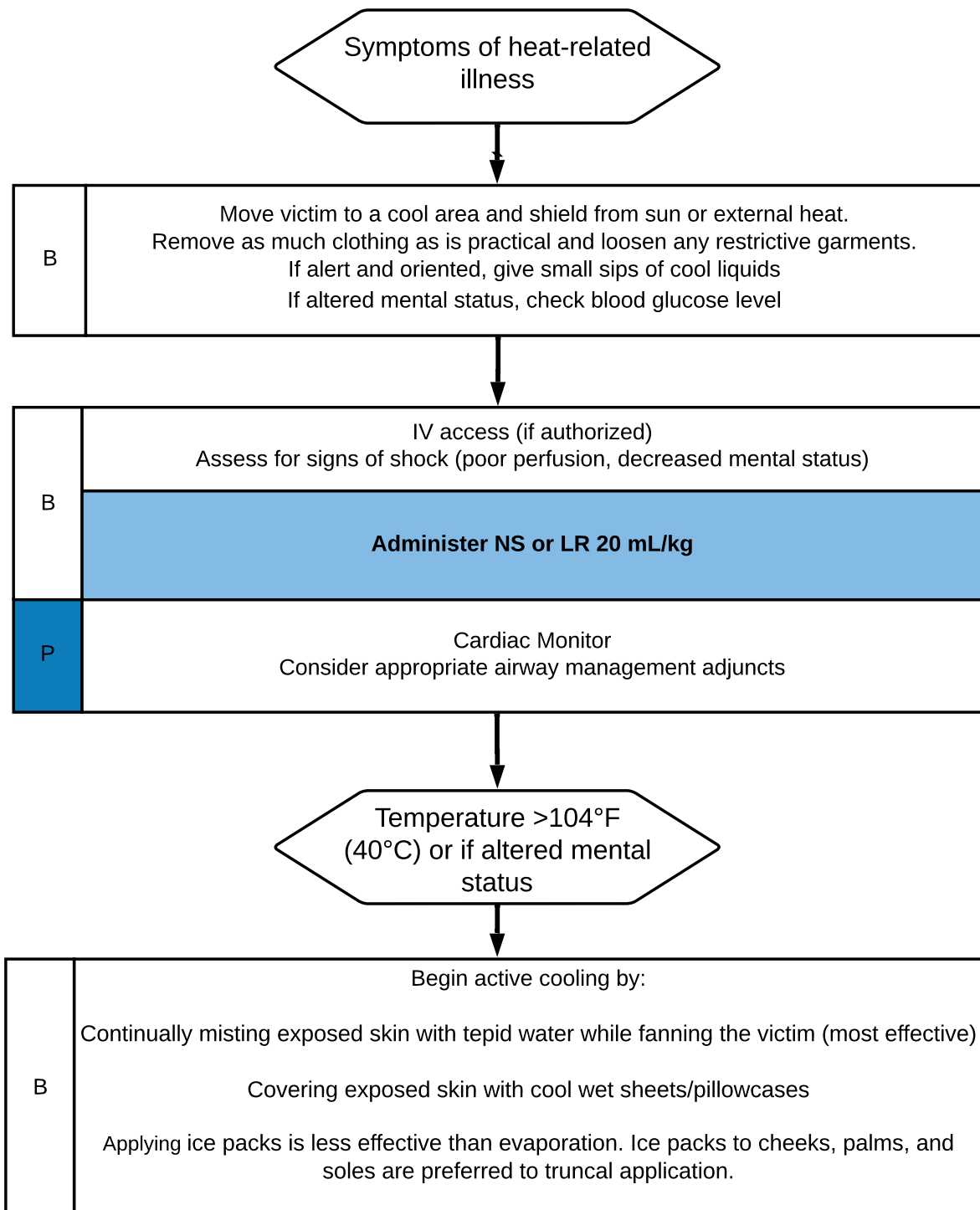
Pediatrics:

- Beware of isolated vomiting in children. Isolated vomiting may represent pyloric stenosis, bowel obstruction, and CNS processes (bleeding, tumors, or increased CSF pressures), as well as a response to fever or infection.

Hyperthermia Administrative Guideline



History <ul style="list-style-type: none"> • Ambient temperature • Medications/drugs • Exertion level • Time of exposure to heat • Attire • Fluid intake 	Signs and Symptoms <ul style="list-style-type: none"> • Flushed • Dry or sweaty • Muscle cramps • Nausea/vomiting • Tachycardia/hypotension/poor perfusion • Elevated temperature • Altered mental status 	Differential <ul style="list-style-type: none"> • Heat cramps • Heat edema • Heat exhaustion • Heat syncope • Heat stroke • Stimulant drug use • Fever/sepsis • Dehydration • Medication adverse reaction
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Education/Pearls

Heat-related illness is a spectrum of disease that occurs when the body's thermoregulatory system does not work properly. Heat-related illness most often affects athletes (exertional hyperthermia), but can also occur during the warm weather months, in periods of prolonged exposure, or in locations with extreme temperatures. Patients with impaired thermoregulation (those at extremes of age, the obese or mentally ill) are at higher risk. The definitive treatment for heat-related illness is total body cooling.

Heat (Muscle) Cramps

- Heat cramps are minor muscle cramps usually in the legs and abdominal wall.
- Temperature is normal.

Heat Exhaustion

- Heat exhaustion has both salt and water depletion, usually with a gradual onset.
- As heat exhaustion progresses, tachycardia, hypotension, elevated temperature, and very painful cramps occur.
- Patient has symptoms of headache, nausea, and vomiting.
- Heat exhaustion can progress to heat stroke.

Heat Stroke

- Heat stroke occurs when the cooling mechanism of the body fails due to temperature overload and/or electrolyte imbalances and is determined by the presence of altered mental status.
- Temperature is usually > 104 F.
- When no thermometer is available, it is distinguished from heat exhaustion by altered level of consciousness.

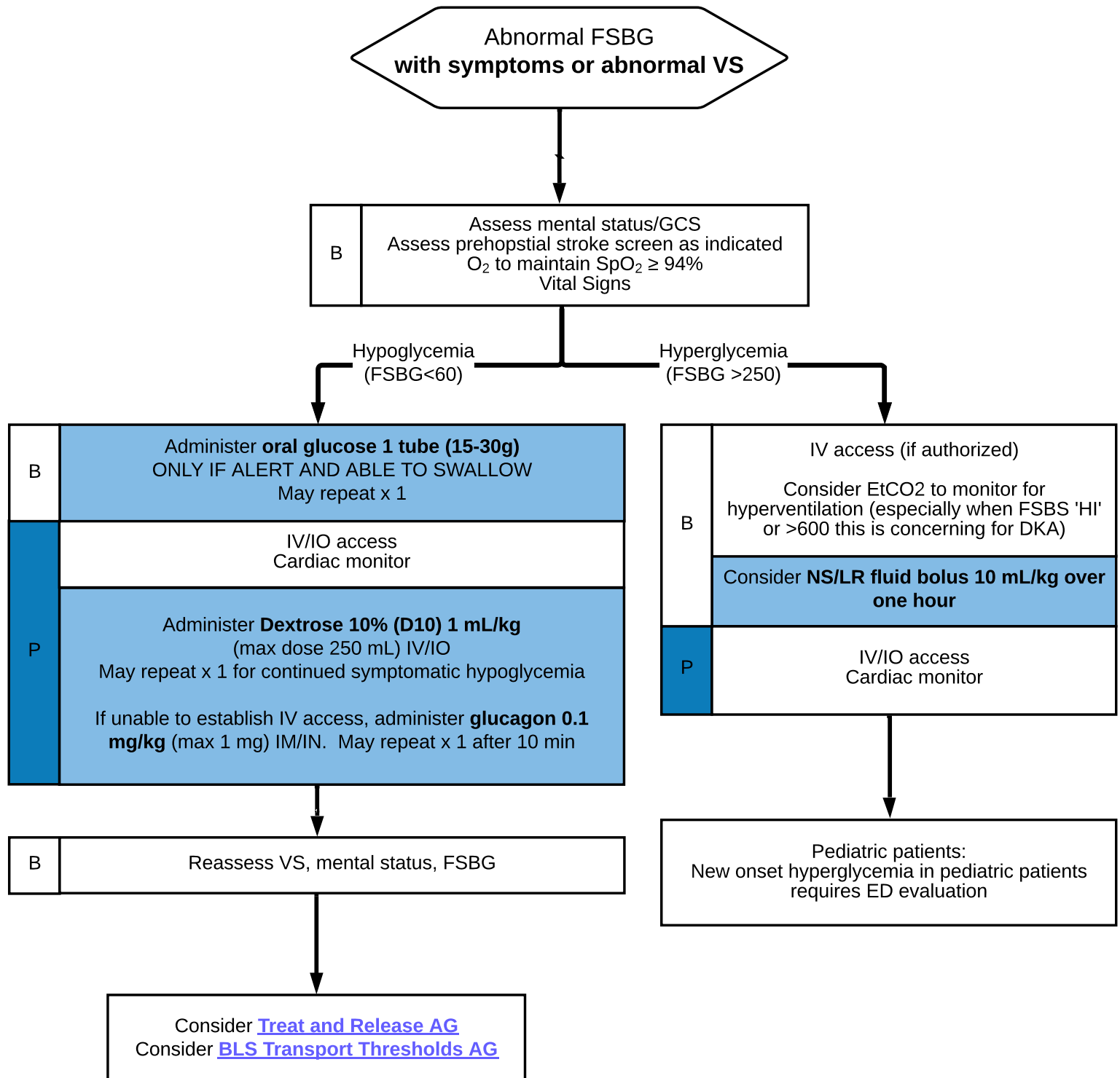
Treatment for heat related illness:

- In mild cases of hyperthermia, treatment is supportive. Removing the patient from a heated environment is the first intervention, followed by passive cooling measures such as removing clothing and fanning air across the skin.
- Besides ice water immersion, evaporation (mist and fan) is the most rapid way to cool a patient.
- Ice packs to the groin, axilla, neck, and areas near other great vessels have been shown to be less effective than evaporation.
- Monitor the skin if applying ice packs for prolonged periods. The skin is susceptible to damage with prolonged exposure to ice. Covering ice packs with a sheet and adjusting the site can mitigate injury.
- Hydration orally or intravenously can help restore water balance quickly.
- For patients who have signs and symptoms of hypovolemic shock, volume replacement is indicated.

Hypo/Hyperglycemia Administrative Guideline



History <ul style="list-style-type: none"> Recent illness or infection Past medical history <ul style="list-style-type: none"> Insulin pump? Pertinent medication history <ul style="list-style-type: none"> PO or Sub Q interventions Recent treatments Treatment compliance 	Signs and Symptoms <ul style="list-style-type: none"> Altered mental status Kussmaul breathing Polyuria Tachycardia Weakness 	Differential <ul style="list-style-type: none"> Stroke Head injury/Trauma Drug usage ETOH usage
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Education/Pearls

Symptoms vary broadly in patients with hypoglycemia and hyperglycemia. **Hypoglycemia** may cause some patients to feel anxious or exhibit diaphoresis, tachycardia, or hypotension; others are asymptomatic. Many patients with **hyperglycemia** are also asymptomatic and do not need prehospital treatment of their hyperglycemia, especially if chronic. Other patients may feel thirst, urinate frequently, or experience malaise; even others progress to developing acidosis or altered mental status from complications of hyperglycemia in such emergent diseases as diabetic ketoacidosis and hyperosmolar hyperglycemic state.

Evaluate patients for causes of their glucose level abnormalities, as it may represent an underlying process, like infection, trauma, or other illness. Patients who have developed diabetic ketoacidosis (DKA) related to elevated blood sugar may benefit from fluid administration; these patients often appear ill, and exhibit a constellation of symptoms (e.g. polyuria, polydipsia, weakness, dizziness, abdominal pain, tachypnea).

Hypoglycemia: Patients may be considered for release without transport or further EMS treatment per the **Treat and Release AG**. If patients do not meet the following criteria, they are at increased risk of decompensation. Consider consultation with medical direction for patients that do not meet all of the following criteria:

- Not actively vomiting/is tolerating oral intake
- Patient had adequate response to single dose of dextrose - with VS in BLS range, normal mentation, and FSBG within normal limits.
- Patient has no acute conditions other than hypoglycemia (chest pain, shortness of breath, intoxication, liver disease, kidney disease, or febrile illness).
- Patient only on short acting insulin or premixed analog (e.g. NovoLog® 70/30 or Humalog® 70/30)
- Patient is not taking oral agents (other than metformin) for blood glucose control.
- Patient released to competent adult
- Patient or legal guardian refuses transport or patient and providers agree transport is not indicated

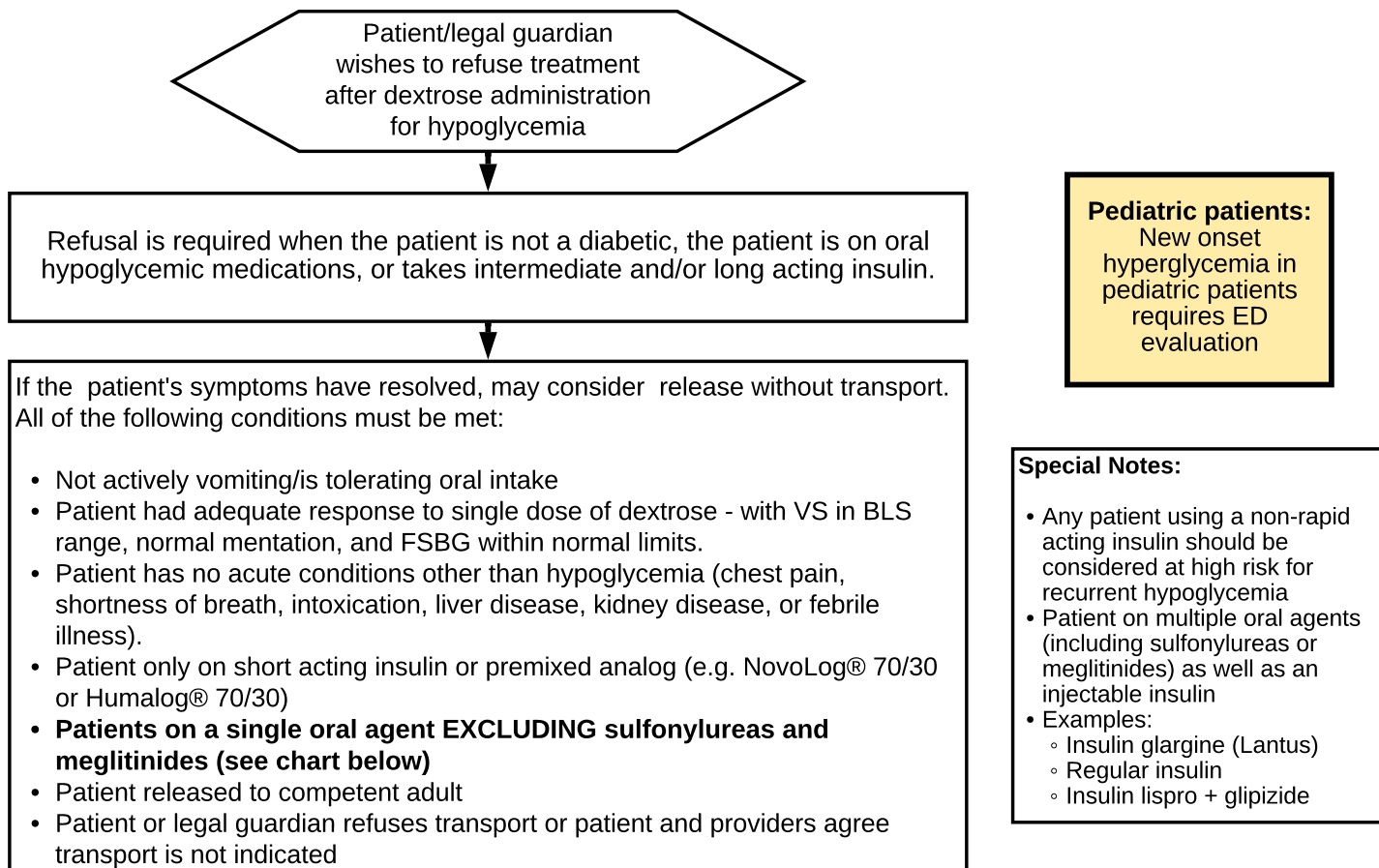
Hypoglycemia in patients with insulin pump:

- ALOC/AMS – stop insulin pump or disconnect at insertion site.
- GCS 15 & able to take oral glucose – leave connected with pump running.

Hyperglycemia: Defined as blood glucose greater than 200 mg/dL. Elevated glucose alone does not represent a medical emergency. Markedly elevated glucose in the setting of DKA is an urgent medical condition.

Patients may benefit from fluid administration; a 10 mL/kg bolus is indicated, especially in the setting of dehydration.

- Multiple boluses of fluid may be harmful to patients in DKA; however, if the patient is exhibiting signs of shock or decreased perfusion, treat per **Shock AG**.
- Avoid administration of narcotics or anxiolytics in the setting of DKA, as tachypnea is important to maintaining the patient's precarious acid-base status.
- In young patients with diabetes or suspected new-onset diabetes, **administer fluid slowly** to minimize the chance of developing cerebral edema.

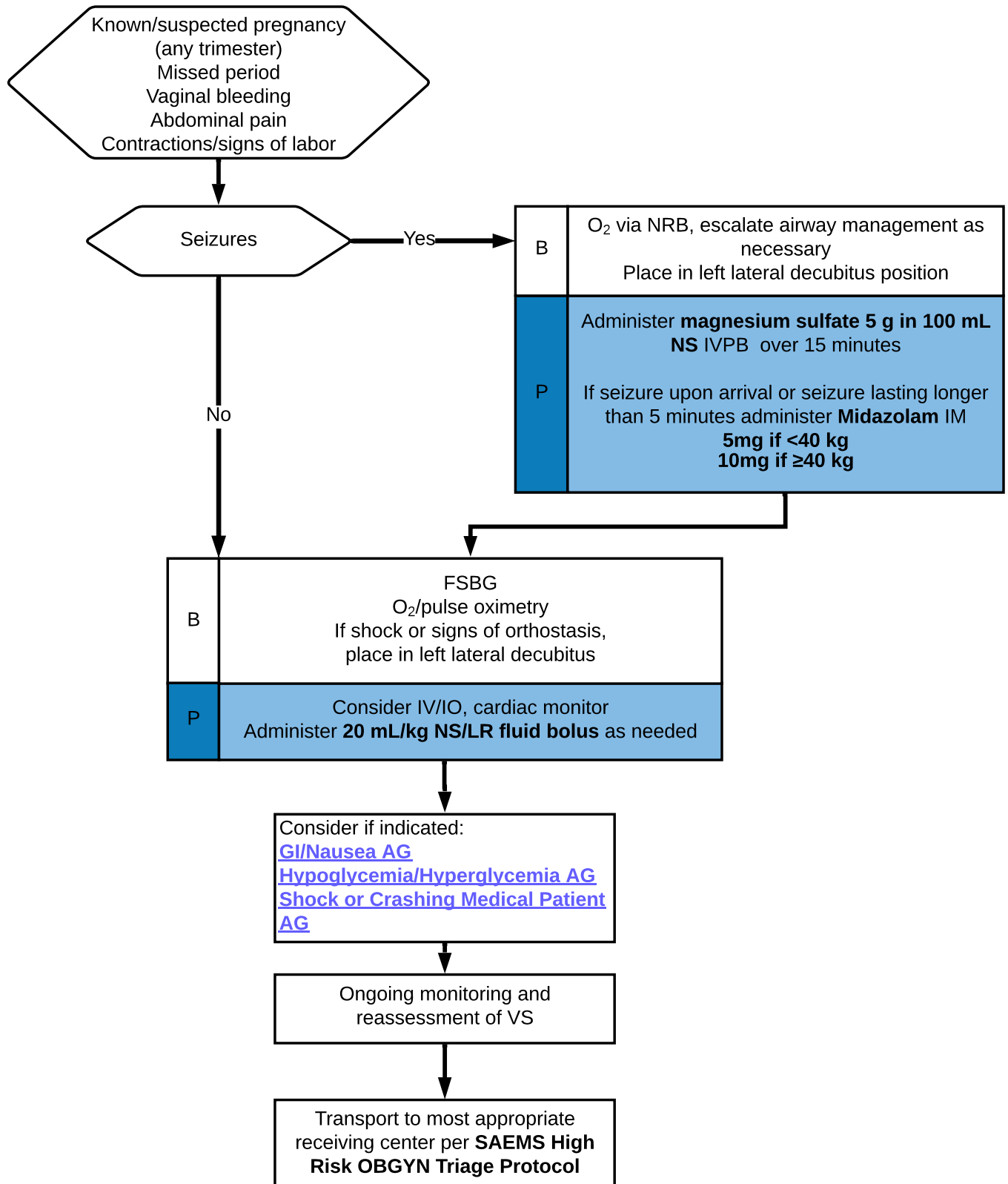


Drug Name	Drug Class	Route	Risk of Hypoglycemia
Metformin	Biguanide	PO	Very low
Glyburide Glipizide Glimepiride	Sulfonylureas	PO	High
Repaglinide Nateglinide	Meglitinides (same MOA as sulfonylureas)	PO	High
Rosiglitazone Pioglitazone	Thiazolidinediones	PO	Low
Acarbose Miglitol	Alpha-glucosidase inhibitors	PO	Low
Bromocriptine	Dopamine-2 agonist	PO	Low
Sitagliptin Saxagliptin Linagliptin Vildagliptin	DPP-IV inhibitors	PO	Low
Canagliflozin Dapagliflozin Empagliflozin Ertugliflozin	SGLT-2 inhibitors	PO	Very Low
Exenatide Liraglutide Dulaglutide Semaglutide	GLP-1 agonists	SubQ	Low





History <ul style="list-style-type: none"> • Past medical history • History of hypertension • Prenatal care • Prior pregnancies/complications 	Signs and symptoms <ul style="list-style-type: none"> • Vaginal bleeding • Abdominal pain • Seizures • Hypertension • Severe headache • Visual changes • Edema of hands and face 	Differential <ul style="list-style-type: none"> • Preeclampsia/eclampsia • Placenta previa • Placental abruption • Spontaneous abortion • Ectopic pregnancy
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Education/Pearls

- **Ectopic Pregnancy:** the implantation of the fertilized egg outside of the uterus, which may cause rupture of organs, bleeding, and death. This often presents with abdominal pain and may mimic other abdominal pathology, like appendicitis.
 - Patients may or may not be aware they are pregnant (usually occurs within 5-10 weeks of implantation).
 - Maintain a high suspicion in women of childbearing age with severe abdominal pain, syncope, or shock.
 - May or may not present with vaginal bleeding.
- **Pre-eclampsia:** a disorder thought to be related to the placenta, pre-eclampsia may cause hypertension, swelling of hands and legs, abdominal pain, and in severe cases cerebral edema with vision changes.
 - Occurs in approximately 6% of pregnancies, up to 6 weeks postpartum
 - Some symptoms include: headache, RUQ pain, visual disturbances, leg/arm swelling, frothy urine
 - Management of hypertension associated with preeclampsia is typically not performed in the prehospital environment.
- **Eclampsia:** seizures or altered LOC in the context of pre-eclampsia.
 - Can occur up to 6 weeks post-partum
 - Treatment consists of magnesium sulfate administration and delivery of the fetus.
 - Magnesium IV is the mainstay of treatment until delivery can occur. Due to the serious consequences of seizures in the eclamptic patient, if the patient is actively seizing on your arrival or has a seizure lasting > 5 minutes, administer midazolam.
- **Placental Abruptio:** a pathological detachment of the placenta, abruptio presents as vaginal bleeding with or without abdominal pain.
 - Can occur after abdominal trauma
 - Treatment consists of delivery of the fetus.
 - May present with shock due to rapid internal blood loss.
- **Uterine Rupture:** rupture of the uterus, typically after abdominal trauma (such as an MVC).
 - May present with abdominal pain, palpable fetal parts on exam of the abdomen
 - May present with shock due to rapid internal blood loss.
- **Precipitous Delivery:** delivery of the fetus outside of an obstetric setting.
 - May occur more commonly in patients without prenatal care or who are multiparous (multiple prior deliveries).
 - Patient may express "needing to push"; examine externally for presenting fetal parts.
 - Utilize the OB kit; ensure support of the neonate's head during delivery, reduce any nuchal cord (cord wrapped around neonate's neck) present.
 - Follow the **Neonatal Resuscitation AG** for care of the neonate. Resuscitate the patient using the **Shock AG** if indicated.

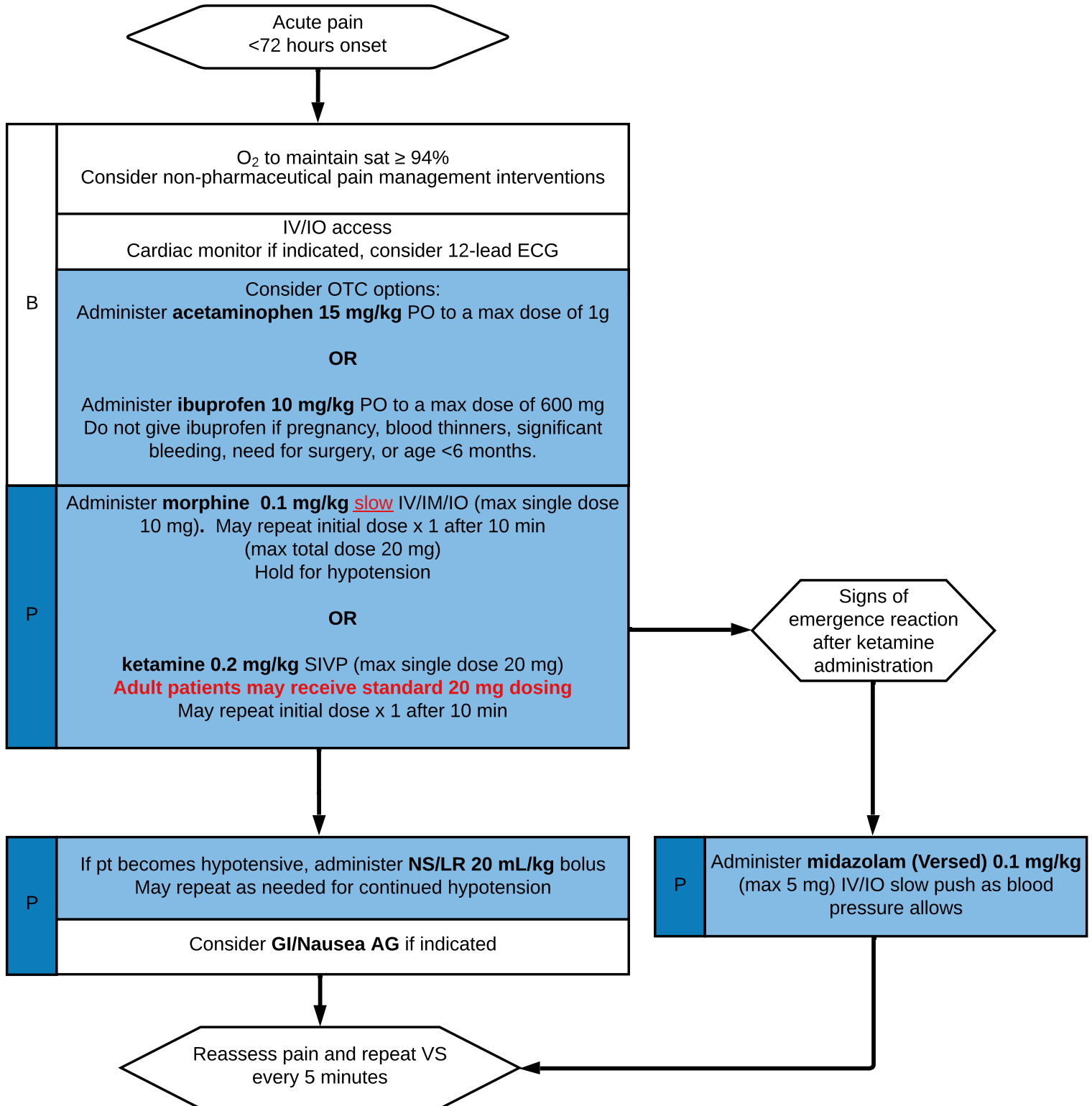
Destination: Transport to facility based on gestational age - Per **SAEMS High Risk OB Triage**

- ≥20 weeks and <28 weeks - BUMC-T or TMC (NICU capable)
- ≥28 weeks - BUMC-T, TMC, SJH or NMC

Pain Management Administrative Guideline



History <ul style="list-style-type: none"> Past medical history Pertinent medication history <ul style="list-style-type: none"> Home pain medications Pain source Mechanism of injury (if known) 	Signs and Symptoms <ul style="list-style-type: none"> Pain level - utilize the age appropriate pain scale Pain exacerbation factors (e.g. movement, palpation, position, etc.) 	Differential <ul style="list-style-type: none"> Chronic pain Trauma
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Education/Pearls

Pain is a consequence of a multitude of medical conditions from trauma to infections to neurological syndromes, and should be assessed as part of general patient care in all ages. Pain should be assessed prior to and after all pain-relieving interventions. In the setting of analgesic administration, patients require monitoring of continuous pulse oximetry and vital signs.

- Use an age appropriate pain scale to assess pain
 - Numerical scale: 0 to 10, zero as no pain and 10 as the worst pain possible
 - Age <4 years: consider using an observational scale (i.e. FLACC - face, legs, activity, cry consolability)
 - Age 4-12 years: Consider using a self-report scale (i.e. Faces Pain Scale or Wong-Baker Faces)
 - Age > 12 years: Consider using a self-report numerical scale
- Non-pharmaceutical pain management techniques:
 - Place patient in position of comfort for patient while still adhering to safe transport recommendations
 - Supporting affected extremity as indicated
 - Applying ice packs and/or splints
 - Verbal reassurance/distraction

Morphine Cautions:

Caution with administration of morphine and/or midazolam in trauma patients who have concern for TBI, due to risk of hypotension.

Ketamine Cautions

- Ketamine should not be used as treatment for chest pain, as vasoconstriction may be harmful
- Push this medication via slow IV push - rapid administration can cause apneic episodes
- If the patient becomes excessively agitated and impedes safe transport, consider administration of midazolam and/or contact medical direction for further orders.

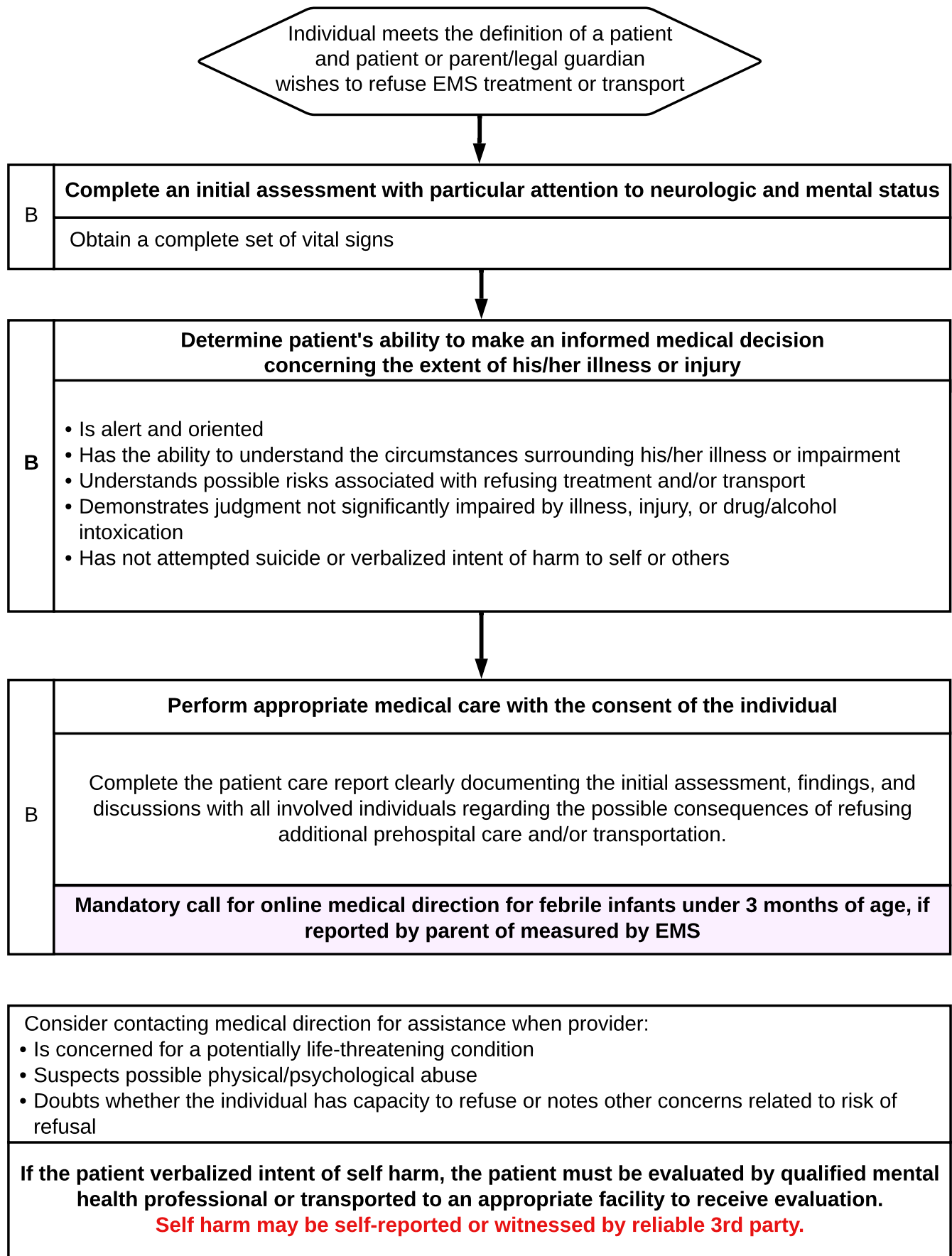
Emergence reactions:

- Although not common, emergence reactions are psychological symptoms that can occur as a patient "emerges" from the dissociative effects of ketamine anesthesia. These reactions are generally temporary but can be distressing for the patient. Key signs of an emergence reaction after ketamine administration include hallucinations, agitation, confusion, increased muscle tone.
- Management of emergence reactions includes;
 - Reassurance: Providing a calm, reassuring environment can often reduce the intensity and duration of symptoms.
 - Medication: In some cases, a benzodiazepine, such as midazolam, can be administered to alleviate symptoms of agitation or anxiety.

Wong-Baker FACES® Pain Rating Scale



FLACC Behavioral Pain Assessment 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





Education/Pearls

Patients play a central role in their own healthcare and have the right to accept or refuse any part of their medical assessment, treatment, or transport, provided that they (or their surrogate) demonstrate decision-making capacity. During this assessment, EMS providers should take all reasonable precautions to avoid personal risk.

Decision-Making Capacity: An individual who is alert, oriented, and has the ability to understand the circumstances surrounding his/her illness or impairment, as well as the possible risks associated with refusing treatment and/or transport, typically is considered to have decision-making capacity. Decision-making capacity should be demonstrated and documented as defined by the presence of the following criteria. The patient must:

- Receive and comprehend information needed to make a decision,
- Process and deliberate a decision and its potential consequences,
- Make and articulate a decision that is consistent over time,
- Justify that decision with logic that fits the individual's own value system, AND
- Demonstrate no impairment of judgment due to illness, injury, or clinically apparent drug/alcohol intoxication.

If a patient refuses any part of medical care, that individual must be advised of the risks and consequences resulting from that refusal. During a refusal:

- Assess the patient's understanding of the medical emergency, including possible medical problems, proposed medical care, the benefits of medical care and risks of refusal.
- Contact online medical direction if there is a question as to the legality of the refusal or the patient's ability to make an informed medical decision.
- Thoroughly document the patient encounter.

Pediatrics: It is preferable for a minor to have a parent or legal guardian present who can provide consent for treatment on their behalf. However, EMS providers may provide emergency treatment when a parent is not available to provide consent.

- **Minors cannot refuse care on their own behalf unless they have documentation of emancipation.**
- **If the minor is unemancipated, a parent or legal guardian must be contacted to refuse care.**
- The provider should take additional means necessary to facilitate transport if abuse or neglect is suspected. Notify law enforcement as necessary to facilitate transport to the hospital.
- A Department of Child Safety (DCS) report should be made as required for suspected abuse or neglect.

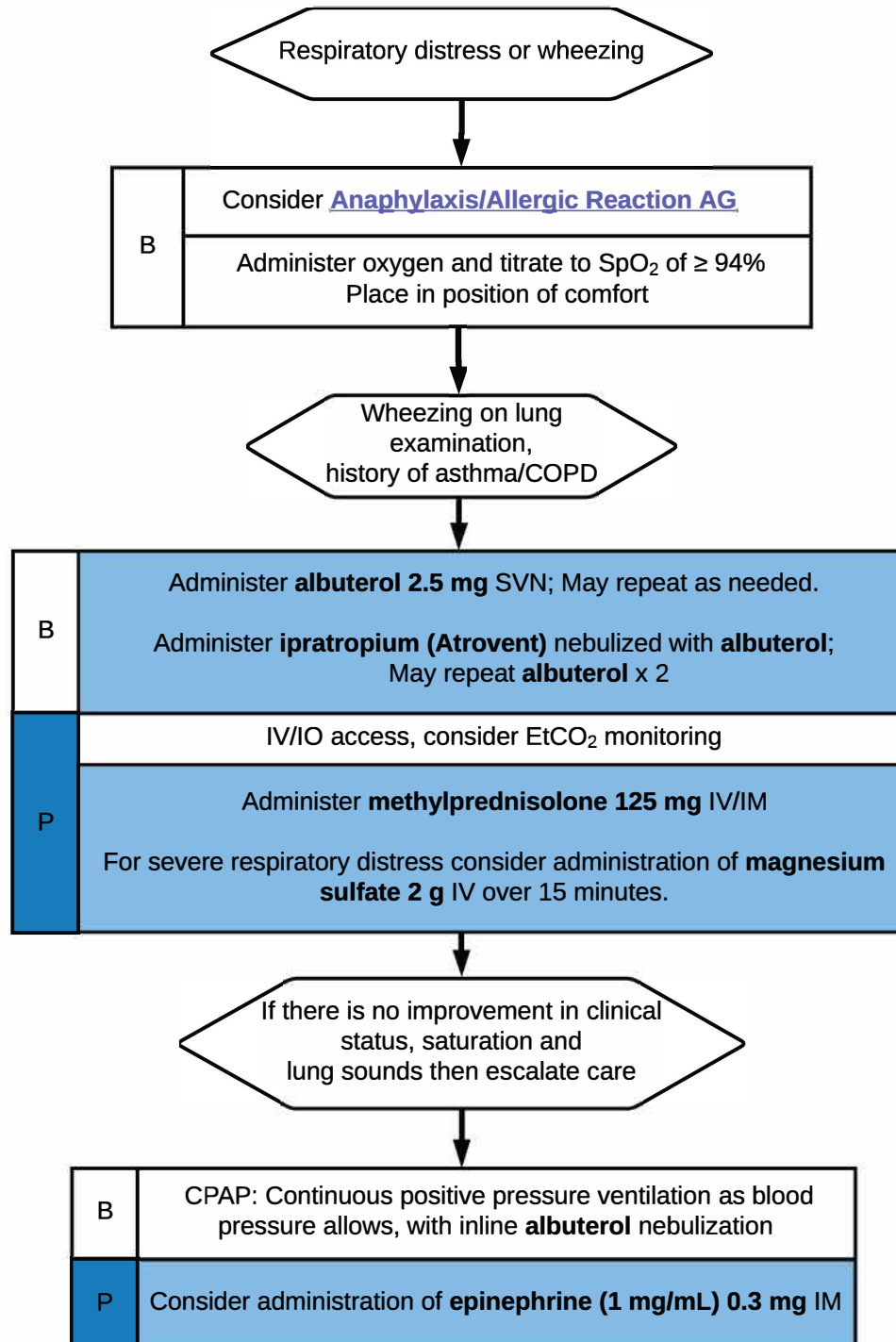
Petition:

- Patients may generally refuse EMS **medical** care even with petition for mandatory psychiatric evaluation, but cannot refuse transport.
- The only exception to this is patients with a revoked court order.

Suicidal Ideation: A patient who is exhibiting suicidal behavior, including a reported attempt, must be evaluated by a healthcare provider. If a reliable individual reports a suicide attempt in a patient, that statement is adequate to prompt transport to a behavioral health facility. See the [Treat and Refer: Behavioral AG](#) for destination guidance.



History <ul style="list-style-type: none"> • Asthma/COPD/chronic bronchitis/emphysema • Congestive heart failure • Home treatment (oxygen, nebulizer) • Medications (theophylline, steroids, inhalers) • Toxic exposure, smoke inhalation 	Signs and Symptom <ul style="list-style-type: none"> • Shortness of breath • Decreased ability to speak • Increased work of breathing/accessory muscle use • Wheezing, rhonchi • Fever, cough • Tachycardia 	Differential <ul style="list-style-type: none"> • Asthma • Anaphylaxis • Aspiration • COPD (Emphysema, Bronchitis) • Pneumonia • Pulmonary embolus • Pneumothorax • Cardiac (MI or CHF) • Pericardial tamponade • Hyperventilation • Inhaled toxin (Carbon monoxide, etc.)
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Education/Pearls

Asthma and chronic obstructive pulmonary disease (COPD) are common reactive airway diseases in which inflammation of the airways impedes airflow. The mainstay of treatment includes reducing inflammation, providing oxygenation, and assisting in ventilation. For patients reporting or demonstrating respiratory distress:

- Treatment is tailored to the severity of the patient's symptoms.
- Pulse oximetry and waveform capnography should be monitored continuously.
- The patient should be placed in a position of respiratory comfort: generally Fowler's Position or even in a tripod position.

Mild to moderate symptoms: Patients with asthma or COPD may describe breathing difficulty, tightness, or wheezing. Patients with mild symptoms generally have near-normal vital signs, breathe unlabored, and may have detectable wheezing on exam. Patients with moderate disease experience vital sign changes - usually with tachypnea - and examination findings that demonstrate respiratory distress, diffuse wheezes and difficulty exhaling, also known as prolonged expiratory phase. Treatment involves:

- Administration of oxygen
- Administration of aerosols, which dilate the airways
- Administration of a steroid, which reduces airway inflammation

Severe symptoms: Patients with a severe asthma or COPD exacerbation demonstrate critical symptoms, including cyanosis, tripod position, prolonged expiration, and extensive wheezing or - even more concerning - a near-silent chest without audible breath sounds. In addition receiving the treatment for mild to moderate symptoms, these patients require **supportive treatment, ideally before initiating movement of the patient**, including:

- Administration of magnesium, which reduces airway inflammation and relaxes airway musculature
- Fluid resuscitation, as many respiratory patients become dehydrated from work of breathing
- Application of non-invasive positive-pressure ventilation (CPAP)
 - Should be administered for severe respiratory distress if not improving with less invasive support
 - Discontinue CPAP for shock, altered LOC, or vomiting
- Administration of epinephrine if impending respiratory failure is suspected
 - Administer with caution in patients with history of CAD/MI/stents, as epinephrine may precipitate myocardial ischemia in these patient

Consider [Anaphylaxis/Allergic Reaction AG](#) in patients with asthma-like disease without prior history.

Seizure Administrative Guideline



History

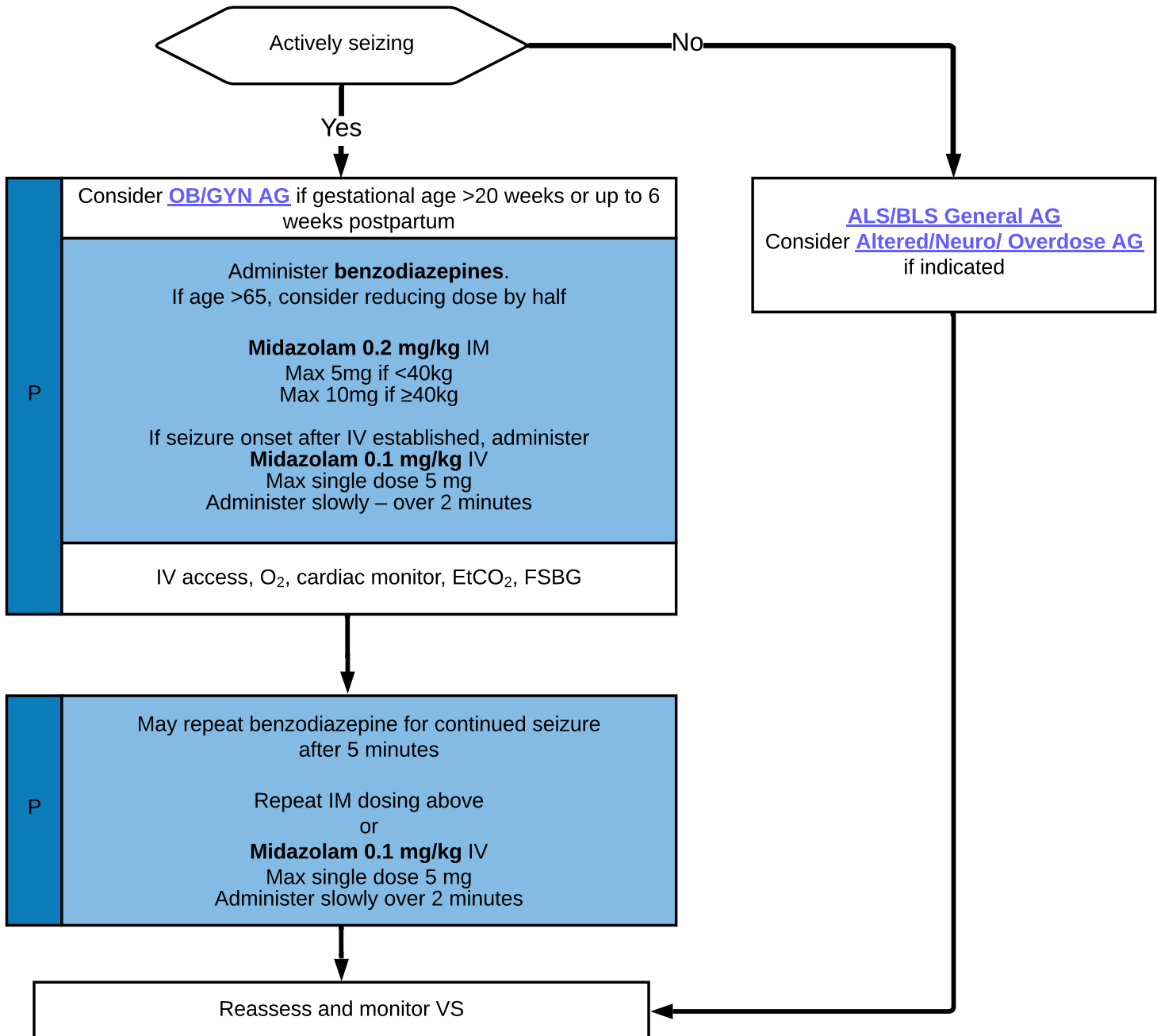
- Hx of seizure disorder
- Seizure medications
- Alcohol withdrawal
- Hx Trauma
- Hx Diabetes
- Hx Pregnancy
- Overdose
- History of Isoniazid use

Signs and Symptoms

- Decreased mental status compared to baseline
- Signs of trauma
- Witnessed seizure activity
- Urinary incontinence

Differential

- Trauma
- Alcohol withdrawal
- Metabolic/electrolyte abnormality (i.e. renal failure)
- Stroke
- Hypoglycemia
- Infection/Fever





Education/Pearls

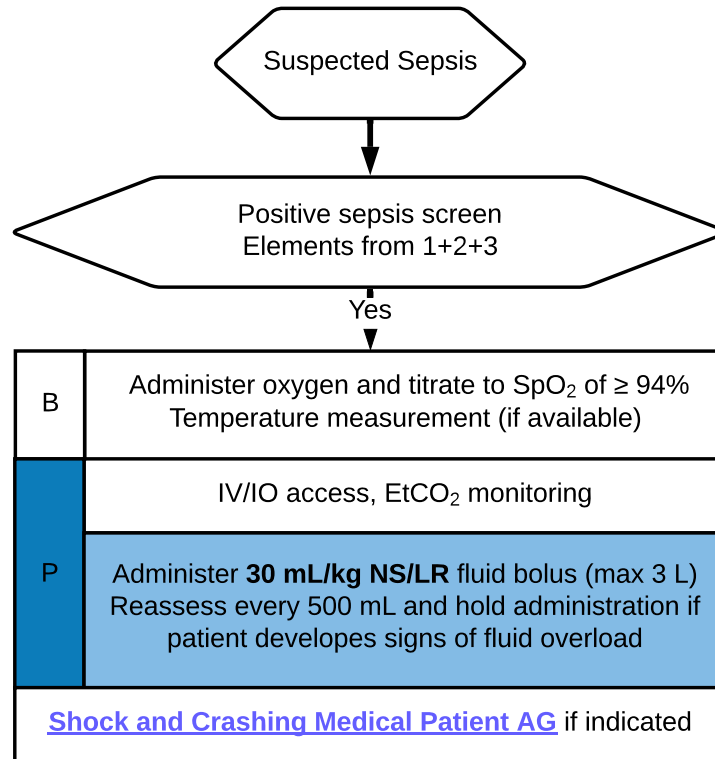
Seizures occur due to abnormal electrical activity in the brain. Standard of treatment consists of prevention of seizures with anti-epileptics, stabilizing patients when seizures do occur, and treatment of the consequences of seizures. Glucose should be rapidly checked, as hypoglycemia may cause seizures and is treated with glucose administration.

- Types of seizures:
 - **Status epilepticus:** Status epilepticus occurs when a seizure lasts longer than 5 minutes or when seizures occur close together without a patient regaining normal mental status between seizures.
 - **Generalized:** This seizure affects the whole brain at once. They often begin with stiffening of the limbs (the tonic phase), followed by rhythmic jerking of the limbs and face (the clonic phase). A generalized seizure is the type most likely to be encountered by EMS responders. A generalized tonic-clonic seizure can also be caused by head trauma, poisoning, brain tumors, metabolic disorders or other acute conditions affecting the brain.
 - **Focal:** Seizure activity is limited to a part of one brain hemisphere. There is a site, or a focus, in the brain where the seizure begins. Patients may or may not be aware of their surroundings depending on the type of focal seizure. Symptoms may be confined to one extremity or portion of a patient's body.
 - **Febrile:** Febrile seizures occur in children from 6 months to 5 years of age. A febrile seizure must be a generalized seizure in the setting of fever, lasting less than 5 minutes, and with return to normal neurologic baseline. Treat the seizure if lasting > 5 minutes.
 - **Eclamptic:** Eclampsia is an obstetric emergency. It is considered a complication of severe preeclampsia, and is commonly defined as new onset of generalized seizure activity during pregnancy or the immediate postpartum period in a woman with signs or symptoms of preeclampsia. Eclampsia typically occurs during or after the 20th week of gestation or in the postpartum period.
- Treatment of seizures:
 - IM midazolam is the preferred treatment in patients without IV access. Do not delay administration of Midazolam for placement of IV/IO.
 - Hypoglycemia is a common cause of seizures. Obtain fingerstick glucose rapidly, and treat any hypoglycemia encountered.
 - Midazolam and Lorazepam are well absorbed when administered IM.
- Many overdoses may cause seizures and warrant hospital evaluation; medications that cause seizures include anti-depressants (e.g. escitalopram, citalopram, bupropion), anti-cholinergics (e.g. diphenhydramine), illicit drugs (e.g. cocaine), and antibiotics (e.g. Isoniazid).
- Prolonged postictal periods - Within 20 minutes, most patients have regained full alertness and orientation. If after 20 minutes the person remains confused, the person should be transported to an appropriate medical facility for evaluation.
- Be prepared for airway problems and continued seizures. Be prepared to assist ventilations, especially if midazolam is used.
- Assess the possibility of occult trauma.
- In an infant, a seizure may be the only evidence of a closed head injury or hypoglycemia.
- For any seizure in a pregnant patient, follow the [OB Emergencies AG](#).
- Refusals: Patients with first time or new-onset seizures, history of trauma, history of alcohol abuse, or other medical comorbidities should be strongly encouraged to accept transport to the ED since there are multiple life-threatening conditions that may be present. If refusing transport, these patients should be made aware of the potential for underlying medical conditions.
 - Refer to [Refusal AG](#)

Sepsis Administrative Guideline



History <ul style="list-style-type: none"> • Duration and severity of fever • Past medical history • Medications/recent antibiotics • Immunocompromised (transplant, HIV, diabetes, cancer) • Last acetaminophen or ibuprofen 	Signs and symptoms <ul style="list-style-type: none"> • Fever/chills • Altered mental status • Delayed capillary refill • Chest pain, cough, headache, abdominal pain, dysuria • Nausea, vomiting, diarrhea 	Differential <ul style="list-style-type: none"> • Infection - pneumonia, UTI, cellulitis, abscess, gastrointestinal • Malignancy • Heat related illness • Hyperthyroid • Meningitis • Hyperglycemia/hypoglycemia • Overdose (sympathomimetic, anticholinergic)
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Sepsis Screen																							
1	<u>Suspected Infection or immunosuppression</u> <u>High Risk Pediatric Patients</u>																						
2	<u>Two or more markers of Systemic Inflammatory Response Syndrome (SIRS):</u> Temp ≥ 100 or ≤ 97 HR ≥ 90 RR ≥ 20 Glucose > 140 in non-diabetic Altered mental status <table><tr><td><u>Pediatric</u></td></tr><tr><td><table><tr><td></td><td>0-2 yr</td><td>2-10 y r</td><td>10-14 yr</td></tr><tr><td>HR</td><td>>190</td><td>>140</td><td>>100</td></tr><tr><td>RR</td><td>>50</td><td>>34</td><td>>30</td></tr><tr><td colspan="4">Capillary refill delayed > 2 sec</td></tr><tr><td colspan="4">Mental status: decreased arousability, irritable</td></tr></table></td></tr></table>	<u>Pediatric</u>	<table><tr><td></td><td>0-2 yr</td><td>2-10 y r</td><td>10-14 yr</td></tr><tr><td>HR</td><td>>190</td><td>>140</td><td>>100</td></tr><tr><td>RR</td><td>>50</td><td>>34</td><td>>30</td></tr><tr><td colspan="4">Capillary refill delayed > 2 sec</td></tr><tr><td colspan="4">Mental status: decreased arousability, irritable</td></tr></table>		0-2 yr	2-10 y r	10-14 yr	HR	>190	>140	>100	RR	>50	>34	>30	Capillary refill delayed > 2 sec				Mental status: decreased arousability, irritable			
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3	<u>Findings of Shock:</u> SBP <90 or MAP < 65 or SBP drop of 40 mmHg from prior baseline EtCO ₂ ≤ 25 O ₂ sat $\leq 92\%$ on RA Mottled or cold extremities Central cap refill ≥ 3 seconds Purpuric rash No radial pulse <table><tr><td><u>Pediatric</u></td></tr><tr><td>SBP $<70 + (\text{age in yr} \times 2)$</td></tr><tr><td>3 or more exam criteria</td></tr><tr><td>2 or more exam criteria in high risk patient</td></tr></table>	<u>Pediatric</u>	SBP $<70 + (\text{age in yr} \times 2)$	3 or more exam criteria	2 or more exam criteria in high risk patient																		
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3 or more exam criteria																							
2 or more exam criteria in high risk patient																							



Education/Pearls

Sepsis is a life-threatening condition in which the body's immune response to infection injures its own tissues and organs. When this occurs, the body generates an inflammatory reaction, which is called Systemic Inflammatory Response Syndrome (SIRS), defined by vital sign abnormalities. Tachypnea or tachycardia may precede shock and AMS. Suspect sepsis in the elderly with AMS or hypothermia, post-operative patients with worsening pain or malaise, or unwell-appearing patients with fever. Fever may be absent in immunocompromised patients. See the table below for other high-risk scenarios that should increase your suspicion for sepsis.

Sepsis is categorized the following ways:

- Sepsis - a suspected infection with 2 or more SIRS criteria (tachypnea, tachycardia, abnormal temperature, and a white blood cell abnormality on lab draw)
- Severe sepsis - sepsis with the presence of organ dysfunction, such as AMS or hypotension. Lactate, a consequence of tissue metabolism, rises when organ dysfunction is present. Severe sepsis is responsive to fluid resuscitation.
- Septic shock - severe sepsis and poor perfusion, unimproved after fluid bolus.

Sepsis can be monitored and treated:

- Quantitative waveform capnography - can be used as a surrogate for lactate monitoring in detecting metabolic acidosis. $\text{EtCO}_2 < 25$ mm Hg are associated with serum lactate levels > 4 mmol/L, indicating severe sepsis/septic shock.
- IV access - 2 large bore (18 gauge) IVs are preferred for patients with shock. Do not delay transport if unsuccessful in obtaining IV access.
- IV fluid - suspected septic patients should receive repeated fluid boluses while being checked frequently for signs of pulmonary edema (particularly in dialysis and CHF patients). Stop fluid infusion in the setting of pulmonary edema; re-evaluate lung exams every 500 mL of fluid.
- Supplemental oxygen - titrate to oxygenation saturation $\geq 94\%$. Septic patients are especially susceptible to traumatic lung injury and ARDS.
- Airway management - If artificial ventilation is necessary, avoid ventilating with excessive tidal volumes. If CPAP is utilized, airway pressure (PEEP) should be limited to 5 cmH₂O

Risk factors for developing sepsis

Open wounds, sores, or cellulitis
 Active infections (UTI, pneumonia, meningitis)
 Indwelling medical devices (ports, stents, hardware)
 Recent surgery or procedure
 Chemotherapy in the past 6 weeks
 Immunosuppression (chronic steroid use, diabetes, untreated HIV)
 IV drug use

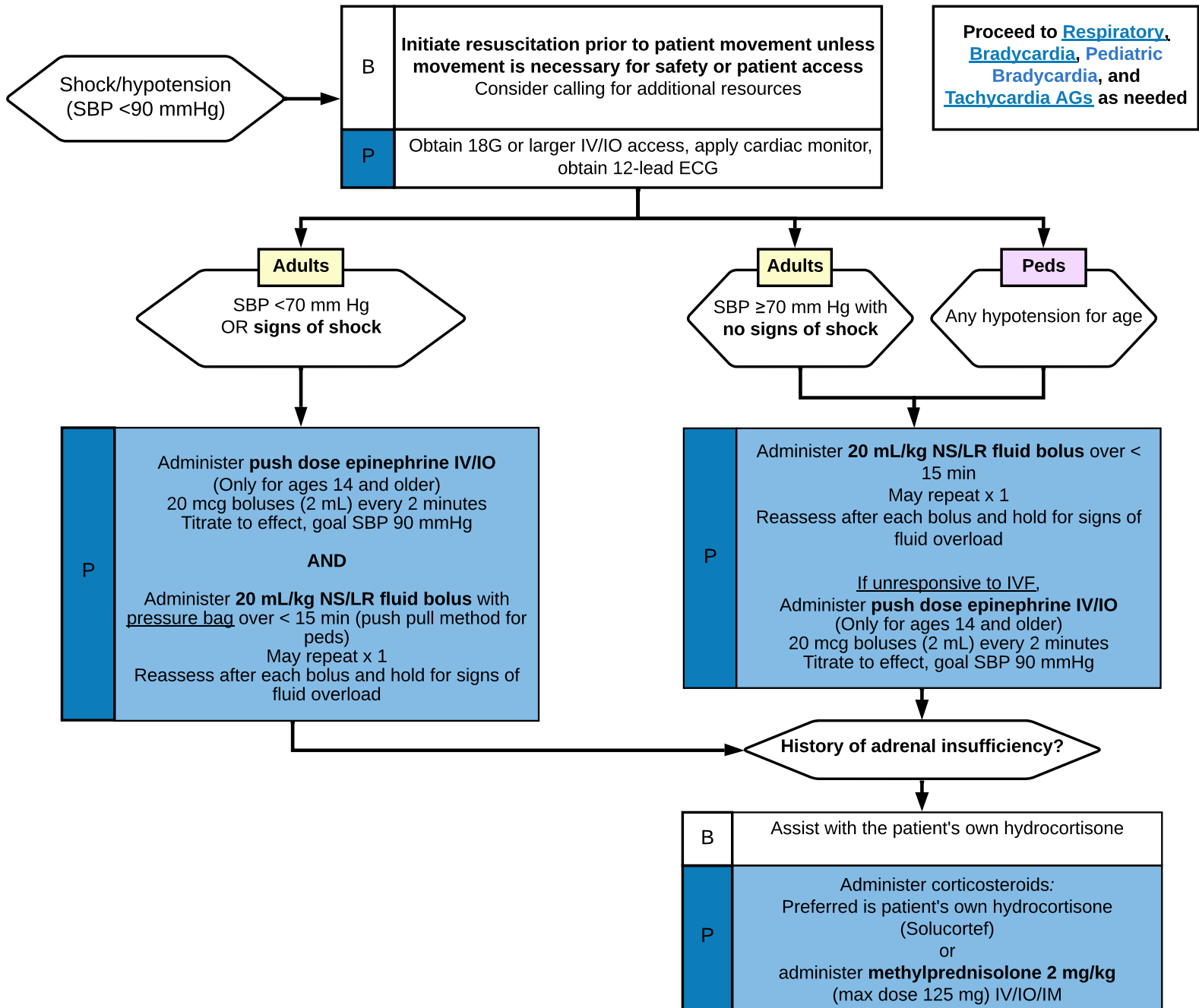
Pediatric risk factors:

Malignancy
 Asplenia/sickle cell disease
 Bone marrow transplant
 Indwelling medical device
 Solid organ transplant
 Severe intellectual disability
 Immunocompromise

Shock or Crashing Medical Patient Administrative Guideline



History <ul style="list-style-type: none"> • Blood loss - vaginal or gastrointestinal bleeding, AAA, ectopic • Fluid loss - vomiting, diarrhea, fever • Infection • Cardiac ischemia (MI, CHF) • Medications • Allergic reaction • Pregnancy • History of poor oral intake 	Signs and Symptoms <ul style="list-style-type: none"> • Tachycardia out of proportion to temp • AMS • Delayed capillary refill >2 sec • Tachypnea • Hypotension for age • Cool/mottled or flushed/ruddy skin. • Tarry stool/GI bleed 	Differential <ul style="list-style-type: none"> • Ectopic pregnancy • Dysrhythmias • Pulmonary embolus • Tension pneumothorax • Medication effect / overdose • Vasovagal • Physiologic (pregnancy) • Sepsis
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DRUG PREPARATION:

Preparation of push dose epinephrine (14 years or older only):
Mix 1 mL of 1 mg/10 mL (CARDIAC) epinephrine with 9 mL NS. This results in a 10 mcg/mL concentration

Preferred Access

- 1st line: 18G or larger IV
- 2nd line: Proximal IO
Adults: distal femur or proximal humerus
Pediatrics: distal femur
- 3rd line: Tibial IO



Education/Pearls

Both EMT and paramedic training have traditionally emphasized the "load and go" approach for critically ill patients, often resulting in delayed resuscitation until arrival at the hospital. Historically, this was due to the lack of tools such as IOs and vasopressors in the prehospital setting, which necessitated rapid transport. However, new tools are now available, prompting a transition to a "stay and play" model for medical patients. Our goal is to reduce the incidence of EMS-witnessed cardiac arrests by prioritizing early IV/IO access, administering push-dose epinephrine, and utilizing pressure bags for intravenous fluids, which allows for patient stabilization on scene. This strategy aligns with current best practices in cardiac arrest management, as on-scene resuscitation typically yields better patient outcomes than interventions conducted in the back of a moving ambulance. It is crucial to note this approach does not extend to hypotensive trauma patients, for whom we continue to emphasize rapid transport to ensure timely, definitive care by trauma surgery.

Shock describes a state of tissue underperfusion. There are multiple etiologies of shock, including hypovolemic (e.g. dehydration, blood loss), obstructive (e.g. tension pneumothorax, cardiac tamponade), distributive (e.g. sepsis, severe burns), and cardiogenic (e.g. heart failure, acute papillary muscle rupture). Rapid vasopressors and fluid resuscitation are the mainstay of treatment, as the duration of shock coincides with the extent of tissue damage. Signs of shock are present in the diagram to the right.

Treatment priorities for hypotensive medical patients:

- 2 large bore (18 gauge) IVs are preferred.
- If unsuccessful in obtaining IV access, early IO placement is crucial. Distal femur and proximal humerus are both preferred over tibial IOs due to better flow rates.
- Push dose epinephrine should be given early in patients with SBP <70 or signs of shock present.
- Fluid resuscitation: Although often essential in shock, fluid may worsen the clinical picture in certain conditions, including cardiogenic shock. Monitor patients for signs of fluid overload when administering rapid fluid boluses.
 - Discontinue fluids if patient is developing signs of pulmonary edema or respiratory insufficiency/failure.
 - Utilize pressors early in suspected cardiogenic shock and signs of pulmonary edema.

Signs of Shock

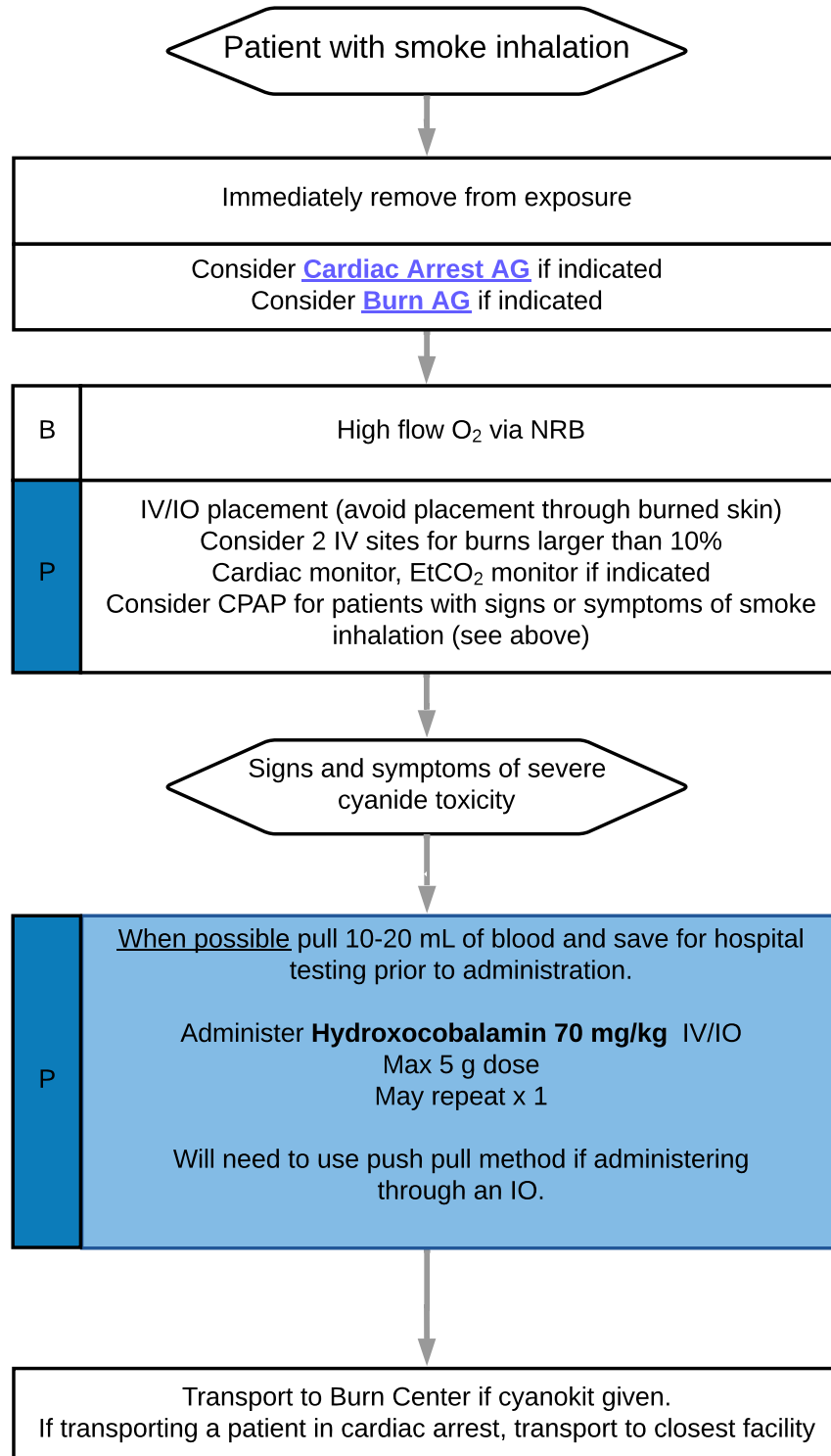
- Altered mental status
- Respiratory distress
- Pallor
- Clammy/diaphoretic skin

Other considerations:

- Adrenal insufficiency: Patients may have a history of adrenal insufficiency related to congenital adrenal hyperplasia or from long-term daily steroid use. These patients may require stress dose steroids to maintain blood pressure in the setting of shock.
 - For adults the typical dose of hydrocortisone is 100 mg IM
 - For children:
 - 0-3 years 25 mg IM
 - 3-12 years: 50 mg IM
 - 12+ years: 100 mg IM
 - Methylprednisolone is the alternative treatment.
- Pregnancy: Pregnant patients can be assisted by shifting their gravid uterus left-ward, off of their inferior vena cava.



History <ul style="list-style-type: none"> Smoke inhalation Time of injury Other trauma Airway/inhalation 	Signs and Symptoms <ul style="list-style-type: none"> Altered mental status Dyspnea Syncope Chest Pain Cardiac Arrest 	Differential <ul style="list-style-type: none"> MI Trauma/head injury Other chemical exposure
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Severe Cyanide Toxicity:

Dyspnea, respiratory failure, hypotension, dysrhythmias, chest pain, altered mental status



Education/Pearls:

Smoke inhalation can cause exposure to a variety of dangerous substances, including cyanide (CN), carbon monoxide (CO), and other chemicals.

Cyanide Toxicity:

- HCN is developed from an incomplete combustion of any material containing nitrogen such as plastic, vinyl, wool, or silk.
- HCN can be produced when there are only burning embers.
- CN is a small lipid soluble molecule and penetration into cells is rapid.

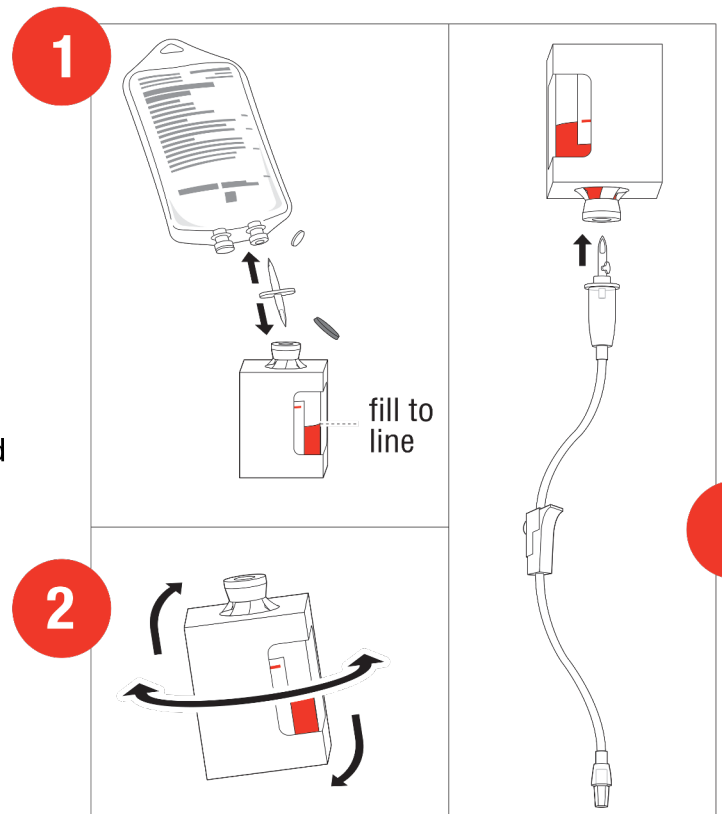
Hydroxocobalamin treatment is indicated for patients with evidence of severe cyanide toxicity. This medication allows for harmless excretion of CN.

- Side effects are red coloring of skin and urine, urticaria (hives), rarely anaphylaxis. It may also cause tachycardia and hypertension.
- Administration of hydroxocobalamin must not delay any other basic life support such as securing of the airways, cardiovascular support, or oxygen administration.

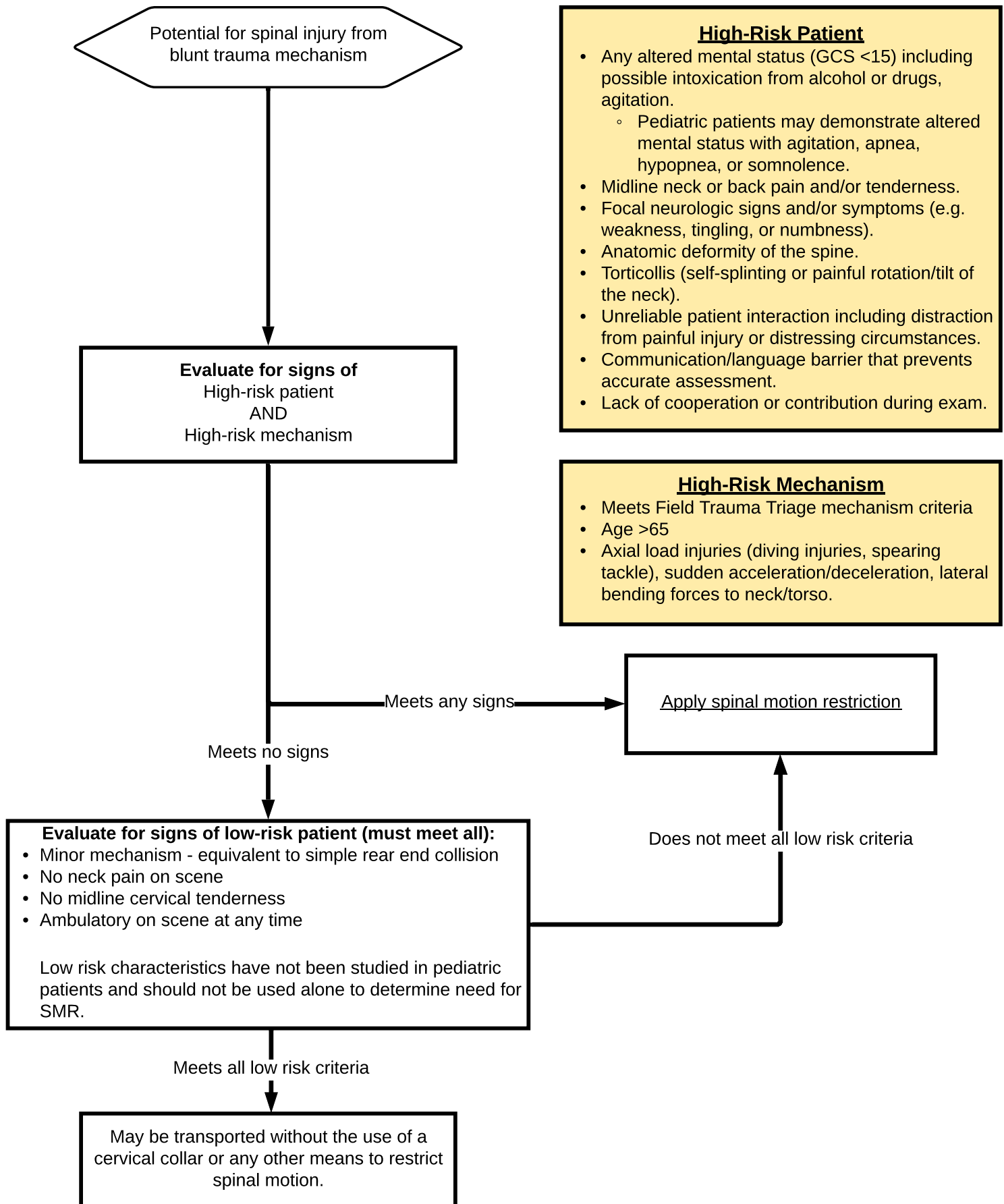
Severe Cyanide Toxicity:

Dyspnea, respiratory failure, hypotension, dysrhythmias, chest pain, altered mental status

- Administration instructions:
 - 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.** (LR and dextrose are also compatible)
 - Mix: The vial should be repeatedly inverted or rocked, not shaken, for at least **60 seconds** prior to infusion.
 - Infuse Vial: Use vented intravenous tubing, hang and infuse over **15 minutes**. Will need to use push pull method if administering through an IO.
- **Pediatrics (70 mg/kg) is the starting dose. May round up to the nearest 1/4 of a bottle.**



CPAP can be utilized in patients with evidence of inhalational injury to enhance oxygen delivery; however, the patient must be breathing spontaneously to tolerate CPAP.





Education/Pearls

Spinal Motion Restriction (SMR) aims to reduce movement in a patient's spine, thereby preventing injury to a potentially unstable spine or injury to the spinal cord. SMR is defined as placement of a cervical collar and its accompanying stabilizing maneuvers. These include securing the patient FLAT to stretcher unless anatomy prevents, minimizing movement and transfers, and maintainin in-line spine stabilization during any necessary movement and transfers.

- SMR cannot be safely performed with a patient in a sitting position.
- Patients who meet any high-risk criteria require SMR but do NOT require the use of a long spine board. Long spine boards do not immobilize the spine and may actually cause increased spinal movement due to patient discomfort. They should not be used to immobilize the spine, but may be used to extricate or move a patient.
 - SMR may be achieved by use of a scoop stretcher, vacuum splint, or ambulance stretcher with the patient safely secured.
 - LSB should be reserved for extrication. Effort should be made to remove the patient from this form of rigid device as soon as possible.
 - These patients should not be transported in the sitting position.
- If elevation of the head is required, maintain alignment of the neck and torso while elevating the head.

Pediatrics:

- Low risk characteristics have not been studied in pediatric patients and should not be used alone to determine need for SMR.
- Children may require additional padding under the shoulders to avoid excessive cervical spine flexion with SMR.

Stroke Administrative Guideline



History

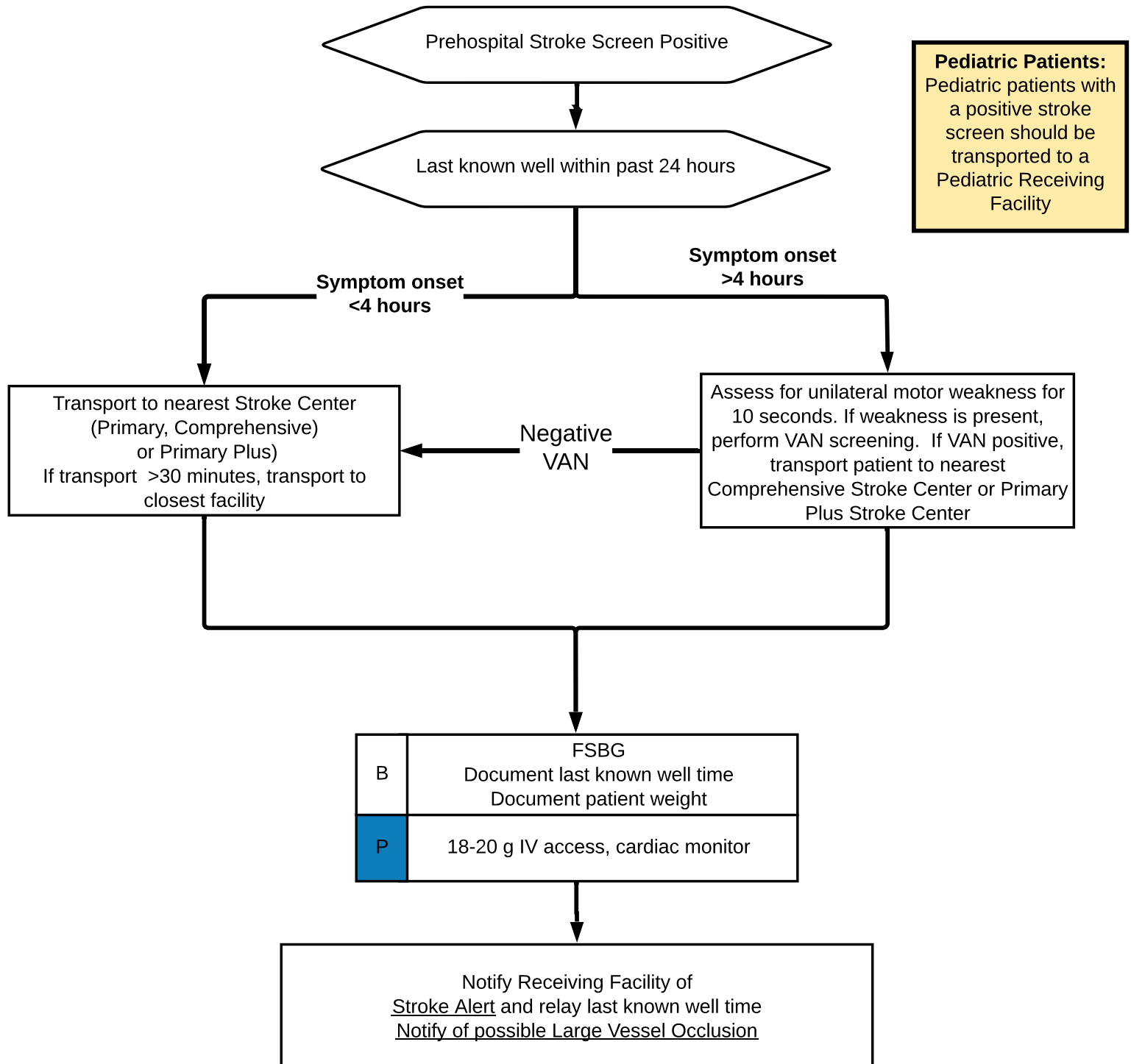
- Pertinent Medical history
 - Hypertension
 - Stroke
 - Diabetes
- Medication history
 - Blood thinners (and time last taken)
 - Blood pressure meds
- Last known well time

Signs and Symptoms

- Weakness
 - Facial
 - extremity
- Difficulty with speech
 - Slurred
 - Inappropriate verbiage
- Altered mental status

Differential

- ETOH/Drug usage
- Hypoglycemia
- Head injury







Education/Pearls

Strokes cause a variety of clinical findings, from hemiparesis to obtundation. The severity of symptoms often relates to the size of infarction of brain tissue. Consider other causes of altered mental status in patients with vague symptoms or globally decreased mental status. Treatment is time-sensitive and includes thrombolytics or supportive care.

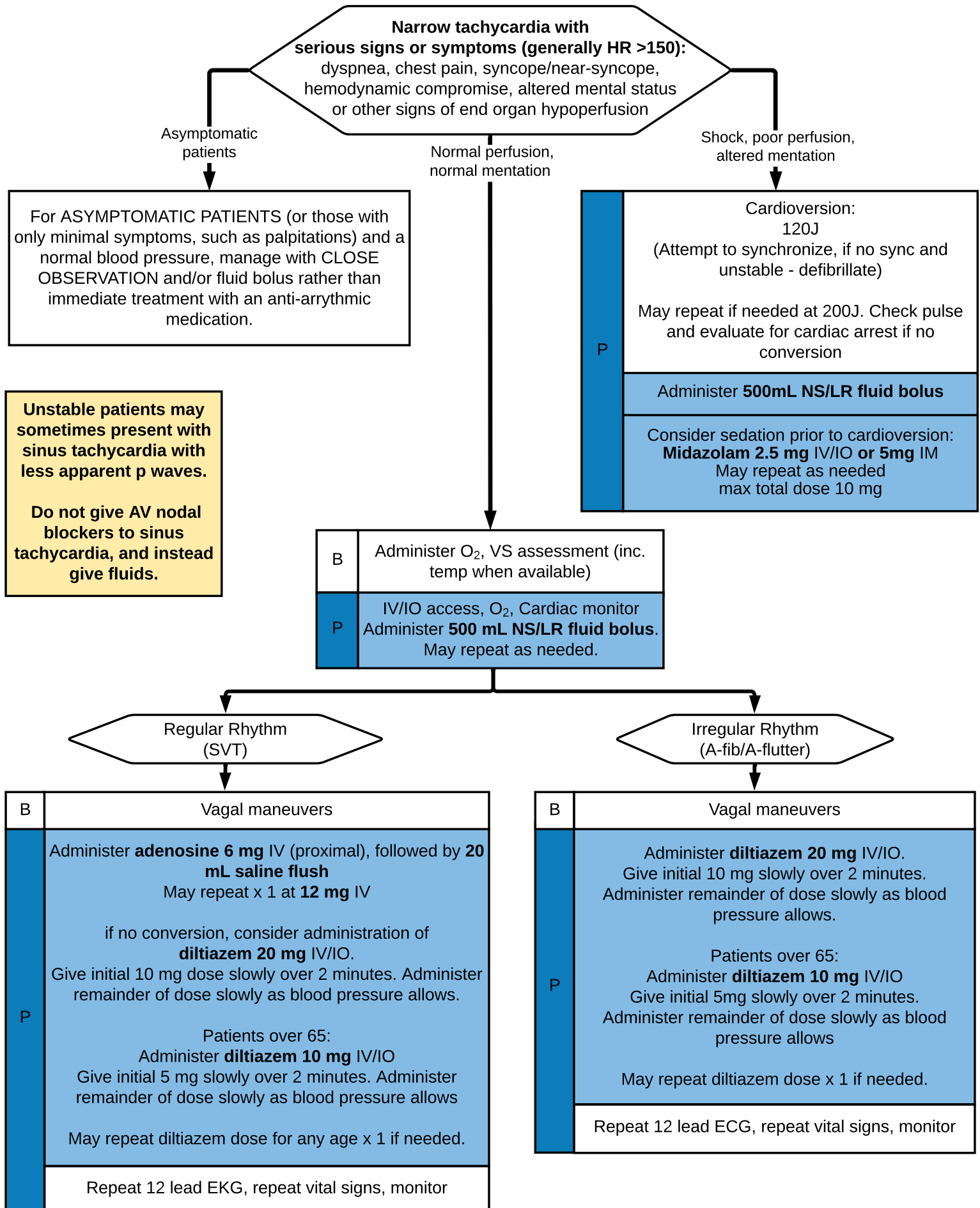
- Obtaining the last-known well time is extremely important and helps hospital providers administer time-sensitive thrombolytics. EMS often has the advantage of direct communication with family or other witnesses. Please attempt to obtain last-known well time and a list of important medications without causing significantly delays in transport.
- If able, obtain a phone number of a family member / friend for the stroke team to contact.
- Patients with acute stroke or altered mental status are at risk of aspiration due to their neurologic deficit. Avoid administering oral medications or other food/liquid by mouth in acute stroke patients.
- Pediatric patients with concern for stroke should be taken to the nearest pediatric capable center. While strokes in children are extremely rare, they do occur and require prompt intervention.

Interpretation: if any of these 3 signs is abnormal, the probability of a stroke is 72%

 <p>Arm Drift The patient closes eyes and extends both arms straight out, with palms up for 10 seconds</p> <ul style="list-style-type: none"> • Normal – both arms move the same or both arms do not move at all (other findings, such as pronator drift, may be helpful) • Abnormal – one arm does not move or one arm drifts downward 	<p>Facial Droop The patient shows teeth or smile</p> <ul style="list-style-type: none"> • Normal – both sides of the face move equally • Abnormal – one side of the face does not move as well as the other side 
<p>Abnormal Speech The patient repeats "you can't teach an old dog new tricks"</p> <ul style="list-style-type: none"> • Normal – patient uses correct words with no slurring • Abnormal – patient slurs words, uses the wrong words, or is unable to speak 	

<p>Vision Provider holds 2 fingers to the right and one to the left while the patient stares at the providers nose/mouth (left and right visual fields) Can patient correctly identify the number of fingers on both sides? <input type="checkbox"/> Yes <input type="checkbox"/> No</p>	
<p>Ask the patient to look left and right one or more times. (Double vision, equal eye movements) Do both eyes move at the same speed and direction? <input type="checkbox"/> Yes <input type="checkbox"/> No</p>	
<p>Aphasia Show the patient 2 common objects (pen, shirt) and ask patient to verbally identify. Can patient verbally correctly identify both objects? <input type="checkbox"/> Yes <input type="checkbox"/> No</p>	
<p>Neglect Ask the patient to follow your finger with only their eyes from left to right. (forced gaze, inability to track) Can patient track your finger? <input type="checkbox"/> Yes <input type="checkbox"/> No</p>	
<p>Ask the patient to close their eyes with arms by their side. Begin brushing patient's forearms simultaneously and ask "which arm am I touching?" (equal arm sensation) Can patient feel both arms at the same time? <input type="checkbox"/> Yes <input type="checkbox"/> No</p>	
<p>Observe if the gaze turns to one side or does not react to stimuli on one side. Can patient look, move, and react to stimuli on both sides? <input type="checkbox"/> Yes <input type="checkbox"/> No</p>	
<p>If No to any of the above: Notify receiving facility of "stroke alert" with positive VAN</p>	

Adult Tachycardia - Narrow Complex Admin Guideline (Age ≥ 14)

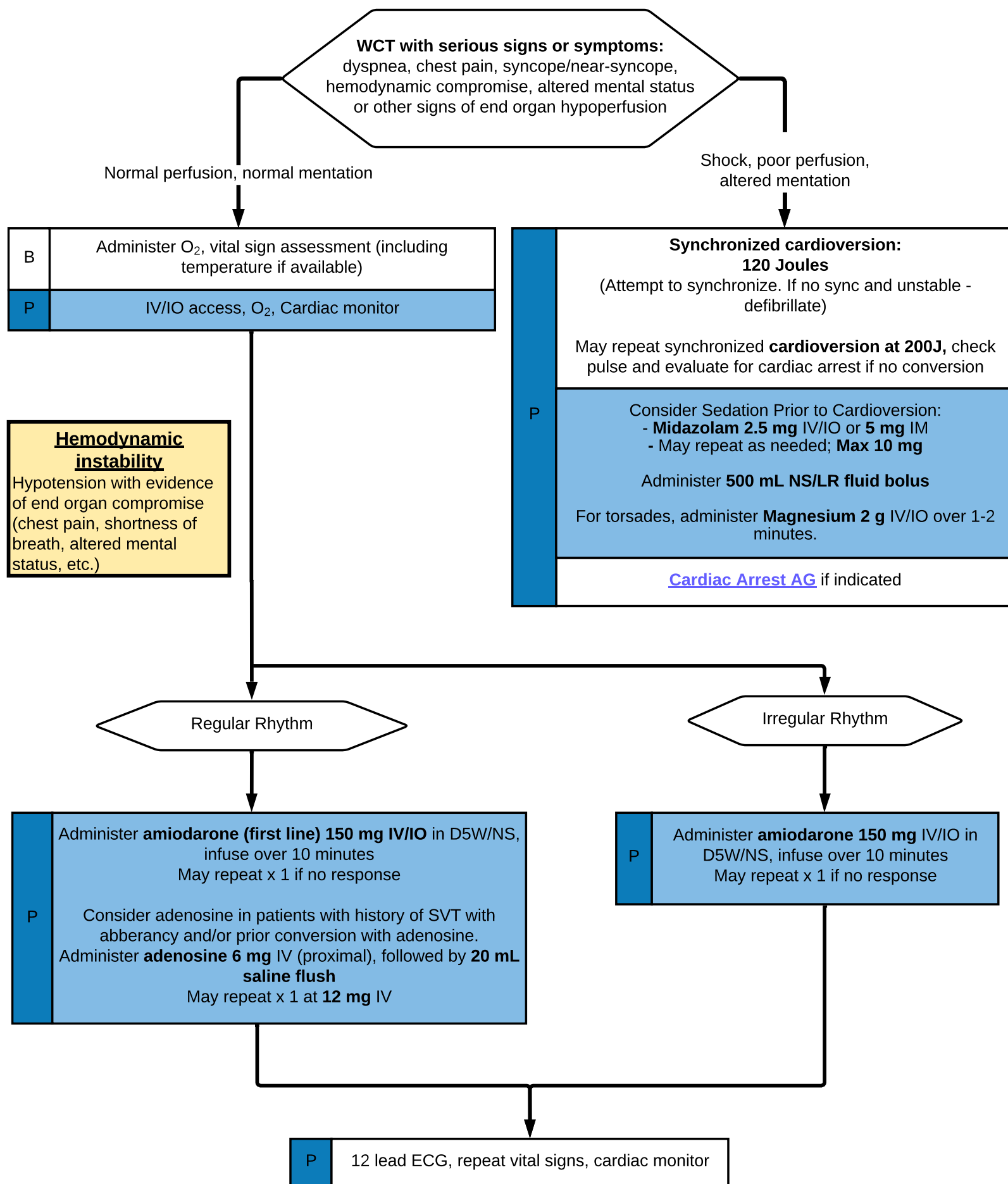


Education/Pearls:

Tachycardia is common, and may reflect an underlying process (such as a reaction to infection, pain, or injury) or represent a primary cardiac disease, such as an accessory electric cardiac pathway or cardiac ischemia. Treatment of tachycardia depends on symptoms of the patient and vital sign stability. In the stable patient with minimal symptoms, non-electric interventions may be attempted first. Evidence of shock (altered mental status, hypotension, mottled extremities, cyanosis), chest pain with evidence of ischemia (STEMI, ST changes, T-wave inversions or depressions) or acute heart failure should prompt rapid intervention. Continuous pulse oximetry is required for all narrow complex patients.

For ASYMPTOMATIC PATIENTS (or those with only minimal symptoms, such as palpitations) and any tachycardia with rate approximately 100-120 and a normal blood pressure, consider CLOSE OBSERVATION and/or fluid bolus rather than immediate treatment with an anti-arrhythmic medication. A patient's "usual" atrial fibrillation, for example, may not require emergent treatment.

- **Sinus tachycardia:** Typically ranges from 100 to (220 - patient's age) beats per minute. It may be caused by dehydration, fever, substance use, etc.
 - Symptomatic tachycardia usually occurs at rates of 120 -150 and typically ≥ 150 beats per minute.
 - Patients symptomatic with heart rates < 150 often have impaired cardiac function, such as CHF
 - Search for underlying cause of tachycardia such as fever, sepsis, dyspnea, etc.
- **Wolff-Parkinson-White (WPW):**
 - A rare syndrome, WPW is diagnosed by a short PR interval and upsloping QRS complex (delta wave). The rhythm can degenerate to appear similar to atrial fibrillation with rapid ventricular response. A 12-lead ECG or the patient's history may reveal WPW. A chaotic wide complex tachycardia greater than 220 beats per minute can represent WPW. This usually will require electrical cardioversion.
 - DO NOT administer any Ca Channel Blocker (e.g. Diltiazem), Beta Blockers, or Adenosine
 - Unstable patients with WPW require electrical cardioversion.
- **Regular Narrow-Complex Tachycardia (SVT):**
 - Vagal maneuvers and adenosine may be administered. Vagal maneuvers may convert up to 25 % of SVT.
 - Adenosine should be pushed rapidly via proximal IV site followed by 20 mL Normal Saline rapid flush.
 - Diltiazem may be considered alternatively or if rhythm does not convert with adenosine.
- **Irregular Tachycardia:** Includes atrial fibrillation and atrial flutter.
 - First line agents for rate control are calcium channel blockers.
 - Adenosine may be considered to assist with diagnosis or if patient has history of Adenosine conversion, but Adenosine is NOT mandated.
 - Adenosine may not be effective in atrial fibrillation / flutter, yet is not harmful and may help identify rhythm.
- Synchronized cardioversion is recommended to treat UNSTABLE Atrial Fibrillation, Atrial Flutter and Regular Narrow-Complex Tachycardia (SVT.)
- Amiodarone may also be used to treat narrow complex tachycardia, either regular or irregular, as a second line agent if there is an allergy or contraindication to adenosine or diltiazem or other primary agent.
 - Refer to dosing in the **Tachycardia - Wide Complex AG**.
- Monitor for hypotension after administration of Calcium Channel Blockers.
- Monitor for respiratory depression and hypotension associated with Midazolam if utilized to facilitate cardioversion.
- Document all rhythm changes with monitor strips and obtain monitor strips with therapeutic interventions.





Education/Pearls

If the patient is stable with no symptoms they should be observed and expeditiously transported and monitored with precautionary IV transport. Any unstable patient will need prompt therapy including electrical therapy.

The evaluation of wide complex tachycardia is based principally on the stability of the patient and evidence of altered mental status or shock. If the patient is unstable, utilize electricity if able; otherwise, medications or vagal maneuvers may be employed.

- Do not administer calcium channel blockers (diltiazem) in wide-complex tachycardias.
- Symptomatic tachycardia usually occurs at heart rates >150 BPM. If symptomatic at lower rates (100-120), consider underlying heart disease, like congestive heart failure.
- Obtaining rhythm strips can be helpful in further diagnosis of the patient's arrhythmia at the Emergency Department. Obtain rhythm strips and/or EKG after therapeutic intervention.
- Monomorphic (Regular) Wide-Complex Tachycardia:
 - Unstable - synchronized cardioversion if possible, otherwise defibrillate.
 - Stable - consider VT or SVT with aberrancy (presence of a bundle branch block). Amiodarone is the first line treatment. Adenosine can be considered if you suspect SVT with aberrancy; the strip must be regular and monomorphic.
 - Defibrillator pads should be in place on the patient when administering adenosine.
 - If there is suspicion of WPW, do not administer adenosine or other nodal blockers (e.g. CCB) and if there is a chaotic wide complex tachycardia greater than 220 bpm they probably will need cardioversion.
 - Administering nodal blocking agents in WPW can cause a paradoxical increase in the ventricular rate.
- Polymorphic Wide-Complex Tachycardia:
 - May be Torsades de Pointes, especially in patients with history of prolonged QTc.
 - Administer magnesium 2 g IV in addition to above treatments and defibrillation.

Local Cardiac Receiving Centers:

- | | |
|----------|--------|
| • BUMC-T | • TMC |
| • NWMC | • SJMC |
| • SMH | |

Trauma Administrative Guideline



History <ul style="list-style-type: none"> • Time/mechanism/speed • Damage/intrusion • Restraints or protective equipment 	Signs and Symptoms <ul style="list-style-type: none"> • Pain • Deformity • Bleeding • ALOC • Shock 	Differential <ul style="list-style-type: none"> • Chest injuries • Intraabdominal injuries • Pelvic fractures/bleeding • Head injury • Extremity trauma
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Dead on Scene AG or Traumatic Cardiac Arrest AG if indicated

B	Hemorrhage control Airway maintenance Breathing and ventilation Circulation Time critical procedures as part of primary survey ***Minimize scene times***
P	18 g IV/IO placement Cardiac monitor

Shock Index =
HR/SBP

For peds, use
age-appropriate BP
goals

Blunt trauma at risk for hemorrhage	
B	Apply Spinal Motion Restriction
P	<p>≥14 years: Administer TXA 2 g slow IV/IO push (over at least 2 minutes) if shock index >1 or SBP <90 mmHg</p> <p>Peds <14 years: Administer TXA 30 mg/kg (max 2 g) slow IV/IO push (over at least 2 minutes) for patients with shock (per age-based cutoff)</p> <p>Administer NS/LR fluid bolus to keep SBP >110 mmHg</p>

Penetrating or isolated extremity trauma at risk of hemorrhage	
B	If isolated penetrating trauma to head, follow EPIC TBI for fluid resuscitation BP goals
P	<p>≥14 years: Administer TXA 2 g slow IV/IO push (over at least 2 minutes) if shock index >1 or SBP <90 mmHg</p> <p>Peds <14 years: Administer TXA 30 mg/kg (max 2 g) slow IV/IO push (over at least 2 minutes) for patients with shock (per age-based cutoff)</p> <p>Administer NS/LR fluid bolus to keep SBP >70 mmHg</p>

EPIC TBI GCS <15 or loss of consciousness

B	<p>O₂ to target saturation of 100%</p> <p>20 mL/kg NS/LR fluid bolus to keep SBP >110 mmHg [70+(age x 2) for peds]</p> <p>EtCO₂ target for all mechanically or manually ventilated patients 40 (range 35-45)</p>
P	Advanced airway management <u>only</u> if unable to oxygenate/ventilate with BLS airway interventions

Trauma Procedures

Control massive hemorrhage
 Needle decompression for tension pneumothorax
 Pelvic binder
 Splint obvious fractures



Education/Pearls

The treatment of traumatic injury focuses on ABCs and prevention of further or secondary injury. Interventions are aimed at preventing overt hypoxemia, hypotension, and hyperventilation.

- Transport patients based on **SAEMS Regional Trauma Triage Guidelines**.
- **Airway/Breathing:** Prepare for a difficult airway, as traumatic airways are made difficult by trauma conditions, including spinal motion restriction, patient mentation, and bloodied airways.
 - For advanced airway, anticipate the need for suction and video laryngoscopy, if available.
 - Use care during intubation to maintain in-line stabilization, as cervical spine fractures may be present.
- **Circulation:** The most common cause of shock following trauma is hemorrhage. Scalp wounds, abdominal organ injury, and long-bone fractures can cause rapid blood loss.
 - Shock: For any evidence of shock, obtain two points of access (IV/IM/IO).
 - Bleeding - apply anticoagulant gauze wound packing until resistance is met and/or apply tourniquet until bleeding is stopped.
 - Pulseless - refer to **Traumatic Cardiac Arrest AG**; may terminate as per **Dead on Scene AG** if blunt trauma mechanism or for penetrating trauma if transport will take > 15 min to Level 1 Trauma Center.
- **Immobilization:**
 - Long spine board use in trauma patients should be restricted to extrication procedures only and should be avoided in patients with penetrating trauma.
 - Spinal motion restriction procedure should be followed for all trauma patients with neck or back pain, neurologic deficit, or other risk factor for spine trauma. The elderly are at high risk for spinal injury with lower mechanism injury.
 - Patients with isolated blunt injuries may not warrant SMR or pelvic binder placement.
- **Temperature:** Prevent hypothermia, as this contributes to a harmful acid/base status and bleeding abnormalities.
 - Expose the patient for rapid trauma assessment/treatment only.
 - Cover patient and rewarm as soon as possible.

Moderate or severe TBI: defined as anyone with physical trauma and a mechanism consistent with the potential to have induced a brain injury, and:

- i. Any injured patient with loss of consciousness, especially those with GCS <15 or confusion
OR
- ii. Multisystem trauma requiring intubation whether the primary need for intubation was from TBI or from other potential injuries OR
- iii. Post-traumatic seizures, whether ongoing or not
- iv. (*Pediatric*) Infants (where GCS may be difficult to obtain or interpret): any evidence of decreased level of consciousness, decreased responsiveness, or deterioration of mental status

See next page (**EPIC TBI**) for TBI management guidelines.

Emergency Surgical Airway

- In the event oxygenation and ventilation of the patient cannot be achieved either by BLS maneuvers, placement of a SGA or Endotracheal Intubation, perform surgical cricothyrotomy.
 - Surgical Cricothyrotomy: 12 years of age and above
 - Needle Cricothyrotomy: Under 12 years of age



Prevent hypoxia, hypotension, and hyperventilation

B	<p>All patients</p> <ul style="list-style-type: none"> - Supplemental oxygen therapy to maintain O₂ saturation 100% - Monitor HR, BP and O₂ every 3-5 minutes
P	IV access with 18g IV (document exceptions, e.g. pediatric patient)

B	Monitor vital signs closely and initiate treatment before the patient becomes hypoxic or hypotensive.
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Prevent hypoxia

B	<p>Treat all TBI patients with a goal saturation of 100%</p> <p>Provide positive pressure ventilation with BVM with 100% O₂ at <u>age appropriate ventilation rate</u></p> <p>Avoid hyperventilation Maintain <u>age appropriate ventilation rate</u> Target EtCO₂ 40 mmHg (range 35-45)</p>
P	<p>If patient is failing BVM and remains hypoxic, consider endotracheal intubation or supraglottic airway placement (if age >8 years old)</p> <p>If O₂ saturation <90% despite intubation or other advanced airway management, consider tension pneumothorax</p> <p>Avoid hyperventilation Maintain <u>age appropriate ventilation rate</u> Target EtCO₂ 40 mmHg (range 35-45)</p>

Age Appropriate Ventilation Rates:

- Infants (0-24 mos) **25 bpm**
- Children (2-14 yrs) **20 bpm**
- >14 yrs **10 bpm (same as adults)**

Patients with TBI are often hemodynamically unstable

Recheck vital signs every 3-5 minutes and address any changes

Prevent hypotension (SBP <110 or downtrending)

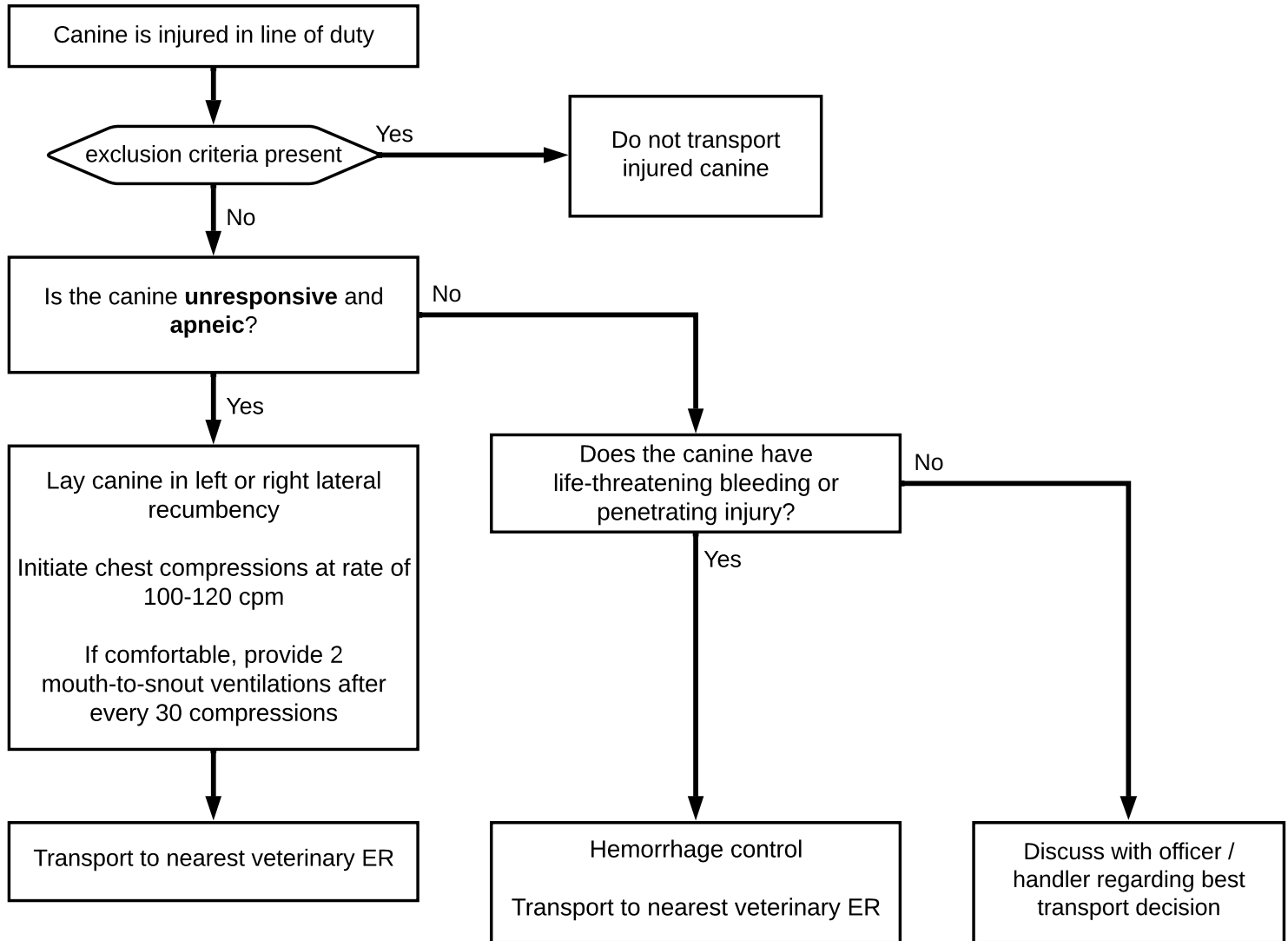
P	<p>Administer NS fluid bolus 20 ml/kg to patient with <u>any</u> SBP reading <110 mmHg (or below age specific SBP)</p> <p>Repeat until hypotension resolves</p> <p>Consider <u>Shock AG</u></p>
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	Age > 14 yr	Age 6-13 yr	Age 1 w-5 yr	Age < 1 w
Heart Rate	60-130	60-150	60-160	100-180
SBP	> 90	> 80	> 70 + (Age x2)	> 70



Exclusion Criteria

- Another patient requires emergency medical treatment or transport by ground ambulance or other EMS vehicle at that time
- Estimated time to veterinary clinic or veterinary hospital is >30 minutes
- There is no other additional ground ambulance in service and available to respond to emergency calls
- Law enforcement officer deems it safer or more expeditious to transport via their own emergency vehicle



24/7 Veterinary ER

VCA Valley Animal Hospital and Emergency Center (4984 E 22nd St, Tucson, AZ 85711)
[520-748-0331]

Southern Arizona Veterinary Specialty and Emergency Center (7474 E Broadway Blvd, Tucson, AZ 85710)
[520-888-3177]

Civano Animal Hospital and Emergency Center (10425 E Drexel Rd, Tucson, AZ 85747)
[520-600-7100]

Veterinary Specialty Center of Tucson (4909 N La Cañada Dr, Tucson, AZ 85704)
[520-795-9955]

Veterinary Emergency Group (7080 N Oracle Rd, Tucson, AZ 85704)
[520-476-3410]



Education/Pearls

- **Cardiac Arrest**

- While cardiopulmonary resuscitation in dogs has some similarities to care in humans, there are some differences. Dogs will typically experience respiratory difficulties prior to onset of cardiac arrest. Symptoms include the following:
 - Dyspnea
 - Dilated pupils
 - Loss of consciousness
 - Unresponsiveness to external stimuli
- In any unresponsive and apneic canine, initiate CPR immediately and transport to nearest veterinary ER.
- In order to find the optimal position to perform CPR on the canine, pull the canine's upper extremity back towards it's chest/abdomen. The canine's heart is located where the elbow meets the chest.
- CPR metrics are similar in dogs:
 - Compression-to-ventilation ratio = 30:2
 - Chest compressions per minute = 100 - 120 bpm
 - Compression depth = 1/3 - 1/2 chest width
 - Allow for full recoil
- These dogs should be driven immediately to the nearest Veterinary ER facility so they can be intubated to provide better ventilation in CPR and receive ACLS care by an emergency veterinarian. On-scene time should be minimized.

- **Hemorrhage Control**

- Bleeding control in dogs is similar to humans. Stop the bleed through application of direct pressure.
- Steps:
 - Apply direct pressure with hands
 - Apply compressive/hemostatic dressing and continue direct pressure
 - If injury is noted on the extremities and bleeding continues, consider using a rubber tourniquet from the IV starting kit to achieve hemostasis
 - Transport to the nearest veterinary ER

- **Transportation Decision and Laws**

- Injured law enforcement canines should be brought to the nearest emergency veterinarian for care, unless exclusionary criteria are met. They can be transported by:
 - Ambulance
 - Another EMS Vehicle
 - Law Enforcement Vehicle (if an officer chooses)
- The transportation of injured law enforcement canines is outlined by Arizona Senate Bill 1068 (AZ SB1068), effective 1/1/2024
 - On June 20, 2023, the Arizona State Legislature passed AZ SB1068, which requires the EMS system to transport law enforcement canines who are injured in the line of duty, and - **only if personnel are trained in canine resuscitation** - to provide the canines with "basic level first aid, cardiopulmonary resuscitation and life-saving interventions." **Personnel without training in canine first aid are not required to initiate medical interventions.**
- In accordance with AZ SB1068, the following must apply prior to care and transport of an injured law enforcement canine:
 - A person is not requiring emergency medical treatment or transport by the ground ambulance or other EMS vehicle at that time
 - The transport is not expected to take more than 30 minutes from point of pickup to the veterinary clinic or veterinary hospital
 - The ambulance service has at least one additional ground ambulance in service and available to respond to emergency calls
 - The transport by a law enforcement officer's emergency vehicle is not deemed to be more safe and more expeditious than transport by a ground ambulance

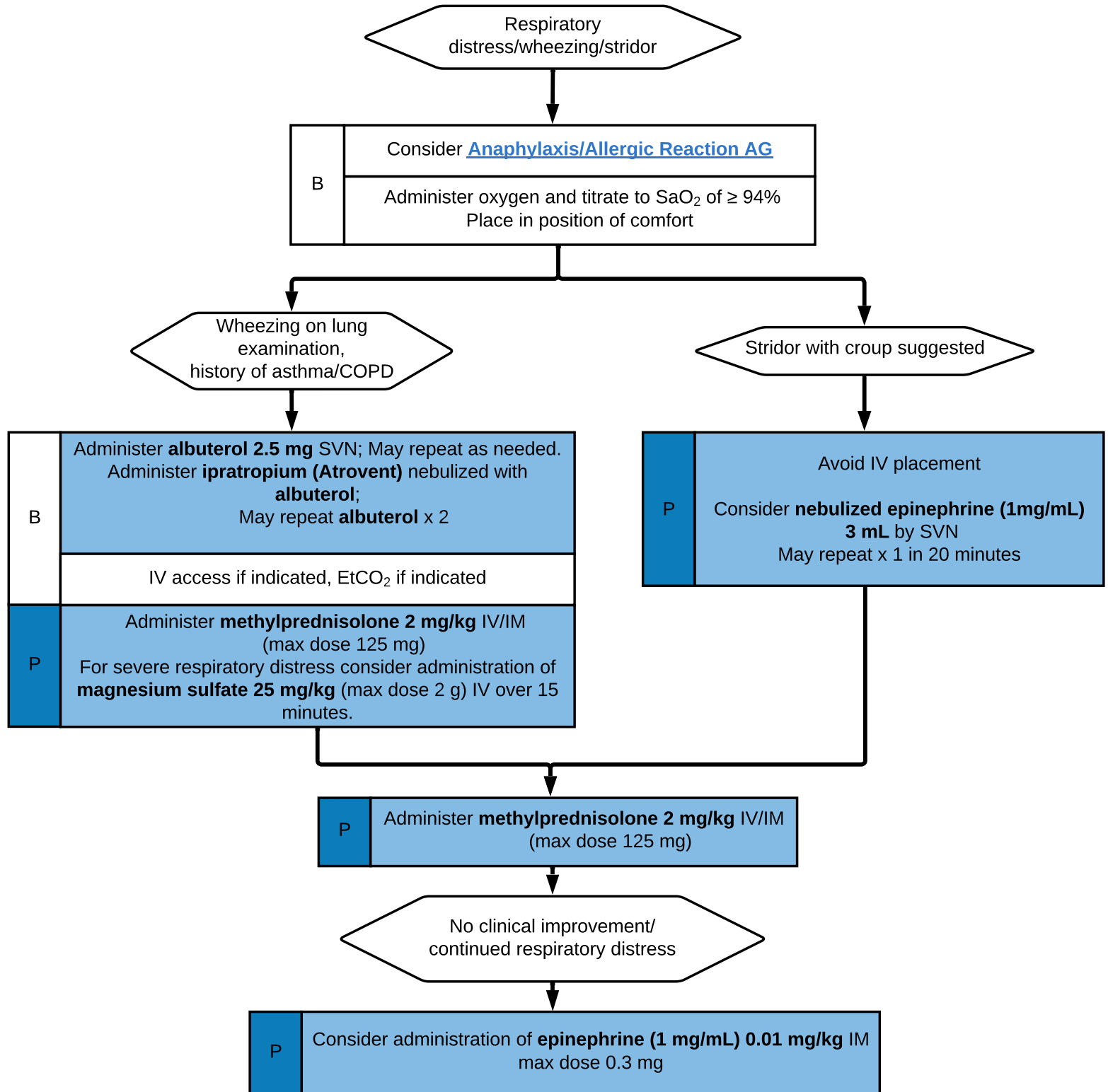


University Emergency Medical Services Pediatric Administrative Guidelines





History <ul style="list-style-type: none"> • Asthma; COPD -- chronic bronchitis, emphysema, • Congestive heart failure • Home treatment (oxygen, nebulizer) • Medications (theophylline, steroids, inhalers) • Toxic exposure, smoke inhalation 	Signs and Symptom <ul style="list-style-type: none"> • Shortness of breath • Decreased ability to speak • Increased work of breathing/accessory muscle use • Wheezing, rhonchi • Fever, cough • Tachycardia 	Differential <ul style="list-style-type: none"> • Asthma • Anaphylaxis • Aspiration/inhaled foreign body • Croup • Pneumonia • Pulmonary embolus • Hyperventilation • Inhaled toxin (i.e. carbon monoxide)
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Education/Pearls

Reactive airway disease is a common cause of respiratory distress in pediatric patients. Pediatric airways are smaller, and partial obstruction - depending on the location of it - causes wheezing and stridor. **Wheezing** is a whistling sound that results from air flowing through the lower airways, and can be caused by asthma, allergies, or other lung diseases. **Stridor** is a harsh, crowing, or vibratory sound of variable pitch that results from turbulent air flow caused by partial obstruction of the upper respiratory passages.

- Pulse oximetry and waveform capnography should be monitored continuously for any patient with respiratory distress.
- Epinephrine may be administered IM for suspected allergic reaction/anaphylaxis or impending respiratory failure related to asthma.

Croup is most common in children ages 6 and younger, and is the most common cause of inspiratory stridor in children. It affects about 60 of every 1,000 children between ages 1 and 2; occurrence drops significantly after age 6.

- When assessing a patient with croup, you may note hoarseness, coryza (acute rhinitis), pharyngeal erythema, and a slightly increased respiratory rate. When croup progresses to upper airway obstruction, the patient may have an increased respiratory rate, nasal flaring, and suprasternal, infrasternal, and intercostal retractions along with continuous stridor.

To aid assessment and diagnosis of croup, clinicians may use the number grades below:

- Grade 1 (*mild*): exertion causes dyspnea or stridor.
- Grade 2 (*moderate*): stridor is present at rest, and worsens with exertion.
- Grade 3 (*severe*): stridor and retractions of the sternal chest wall are present at rest.
- Grade 4 (*impending respiratory failure*): respiratory distress, irritability, pallor or cyanosis, tachycardia, and exhaustion are present at rest.

Audible without a stethoscope, stridor always warrants immediate attention because it may be the first sign of a serious or life-threatening process. Grade 3 and 4 croup is an emergency that necessitates immediate treatment. Your ability to promptly recognize croup and stridor can save a child's life.

In pediatric patients with sudden symptoms of wheezing or stridor, consider foreign body aspiration as a cause. Obtain history to clarify history of recent illness vs sudden onset of symptoms.

Epinephrine (using parenteral 1 mg/mL solution) Nebulization: Nebulize 3 mL of 1 mg/mL solution, totaling 3 mg of epinephrine. May repeat x 1 in 20 minutes.

Pediatric Bradycardia (age <14) Administrative Guideline



History

- Past medical history
- Foreign body aspiration
- Respiratory distress
- Apnea
- Possible toxic exposure or ingestion
- Congenital diseases
- Medication (maternal or infant)

Signs and Symptoms

- Decreased heart rate
- Delayed capillary refill or cyanosis
- Mottled, cool skin
- Hypotension or arrest
- Altered level of consciousness

Differential

- Respiratory failure
- Foreign body/secretions
- Infection (croup, epiglottitis)
- Hypovolemia (dehydration)
- Congenital heart disease
- Trauma
- Hypothermia
- Toxin, medication
- Hypoglycemia

Bradycardia (HR<60)
causing ALOC, hypotension,
poor perfusion, or shock (usually <50 BPM)

B	Open airway Provide supplemental oxygenation and ventilation as indicated FSBG analysis Search for reversible causes (see differential above)
P	IV/IO access, pulse ox, cardiac monitor 12 lead ECG (do not delay initiating treatment)

Bradycardia (HR<60)
causing ALOC, hypotension,
poor perfusion, or shock despite adequate
oxygenation and ventilation

Apneic or pulseless at
any time, follow
[Cardiac Arrest AG](#)

Age > 1 yr

Age <28 days begin
chest compressions and
refer to [Neonatal
Resuscitation AG](#)

<1 yr begin chest
compressions and refer to
[Cardiac Arrest AG](#)

P	<p><u>First line: administer epinephrine 0.01 mg/kg (1 mg/10 mL) IV/IO</u> Max single dose 1 mg May repeat every 3-5 minutes OR If vagally mediated: administer atropine sulfate: 0.02 mg/kg IV/IO rapid push (min dose 0.1 mg) max initial dose 1 mg May repeat every 3-5 minutes Max total dose 3 mg</p> <p>Administer NS/LR 20 mL/kg IV/IO fluid bolus, assess for signs of fluid overload</p>
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Continued bradycardia
causing ALOC, hypotension,
poor perfusion, or shock (usually <50 BPM)

B	Begin chest compressions
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Transport according to **SAEMS Critical Pediatric Triage Protocol**
Notify receiving facility or contact Medical Direction



Education/Pearls

The majority of pediatric bradycardia is caused by respiratory failure and hypoxia. Evaluate for signs of respiratory distress in all pediatric patients. Medication overdose is also a common cause of pediatric bradycardia, often due to unintentional ingestion of parental medications; in the setting of a breastfeeding child, consider overdose or intoxication via maternal breast milk.

- Hypoglycemia, severe dehydration, and opioids may produce bradycardia. Many other agents a child ingests can cause bradycardia, often in a single dose.
- Age appropriate minimal SBP = $70 + (2 \times \text{Age in Years})$

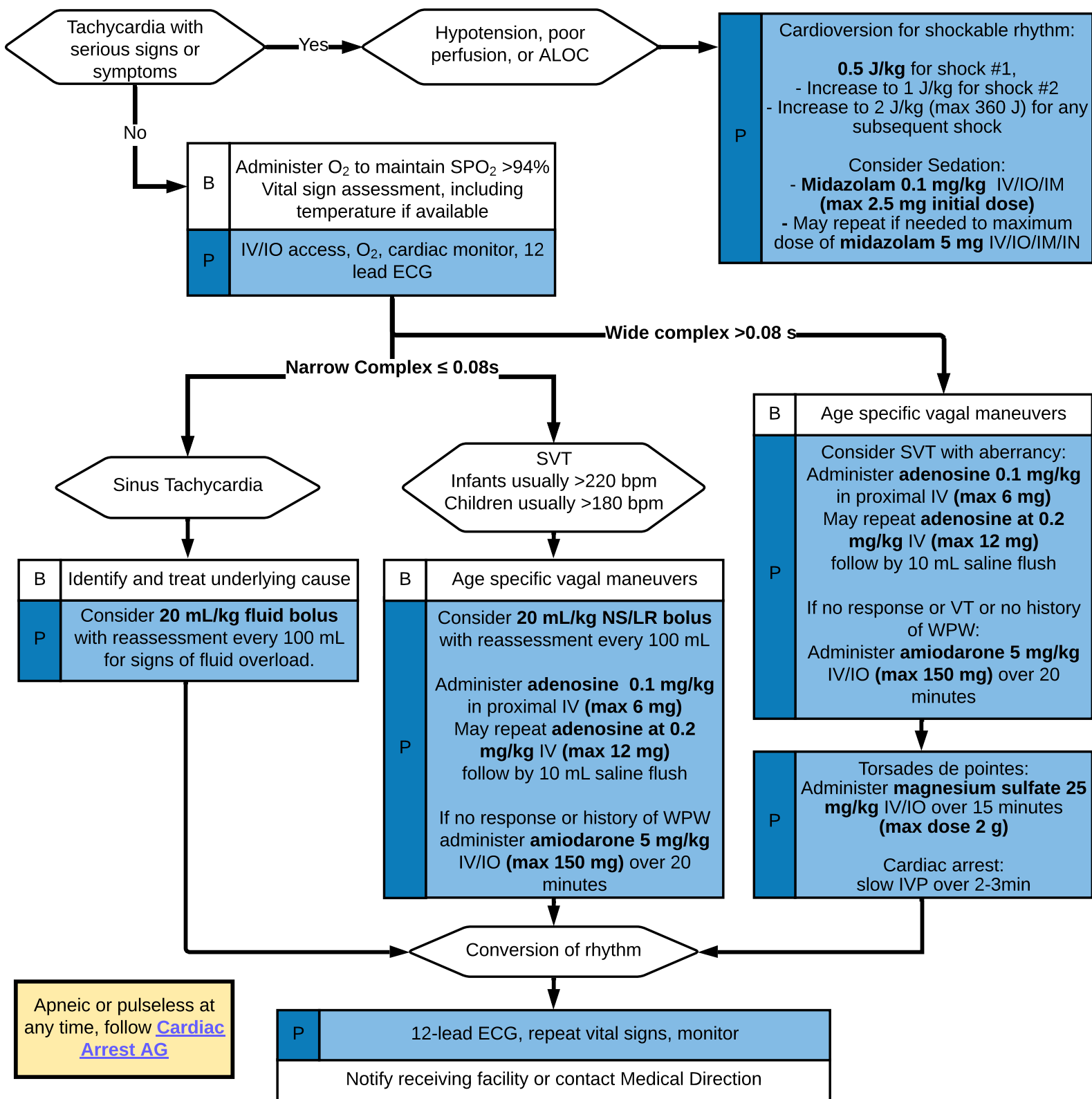
Medications:

- Epinephrine is the drug choice for persistent, symptomatic bradycardia in pediatric patients.
- Atropine:
 - Although atropine is effective in a broader range of patients and provides a greater amount of hemodynamic support, it can cause or worsen bradycardia.
 - It is **second choice in pediatric patients** unless there is evidence of increased vagal tone or a primary AV conduction block. It is safer to use epinephrine in pediatric patients.
 - Increased vagal tone can be caused by nasal or esophageal stimulation, coughing, sleep apnea, esophageal reflux, increased intracranial pressure.
 - The paradoxical effects are the reason for the minimum dose and recommendation for rapid administration.
- Transcutaneous pacing:
 - **Indicated if bradycardia is due to complete heart block or other AV blocks which are not responsive to oxygenation, ventilation, chest compressions, or medications.**
 - **Indicated with known congenital or acquired heart disease.**
 - Not indicated for asystole or bradycardia due to postarrest hypoxic / ischemic myocardial insult or respiratory failure.

Pediatric Tachycardia Administrative Guideline (Age < 14)



History <ul style="list-style-type: none"> Past medical history Medications or Toxic Ingestion Drugs (nicotine, cocaine) Congenital Heart Disease Respiratory Distress Syncope or Near Syncope 	Signs and symptoms <ul style="list-style-type: none"> Heart rate: (child >180/bpm, Infant > 220/bpm) Pale/cyanotic/diaphoretic Hypotension/ALOC Pulmonary congestion/tachypnea Syncope 	Differential <ul style="list-style-type: none"> Heart disease (Congenital) Hypo/hyperthermia Hypovolemia or anemia Anxiety/pain/emotional stress Fever/infection/sepsis Hypoxia, hypoglycemia Medication / Toxin / Drugs (see HX) Trauma
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Education/Pearls

Children may present atypically when exhibiting elevated heart rates. Serious signs and symptoms include respiratory distress or failure, signs of shock or poor perfusion (mottled skin, perioral cyanosis), AMS, or sudden collapse with rapid, weak pulse. Generally, the maximum sinus tachycardia rate is (220 - the patient's age in years) beats/minute (bpm). If available, continuous pulse oximetry is indicated for all unstable tachycardias.

Narrow Complex Tachycardia ($QRS \leq 0.08$ seconds)

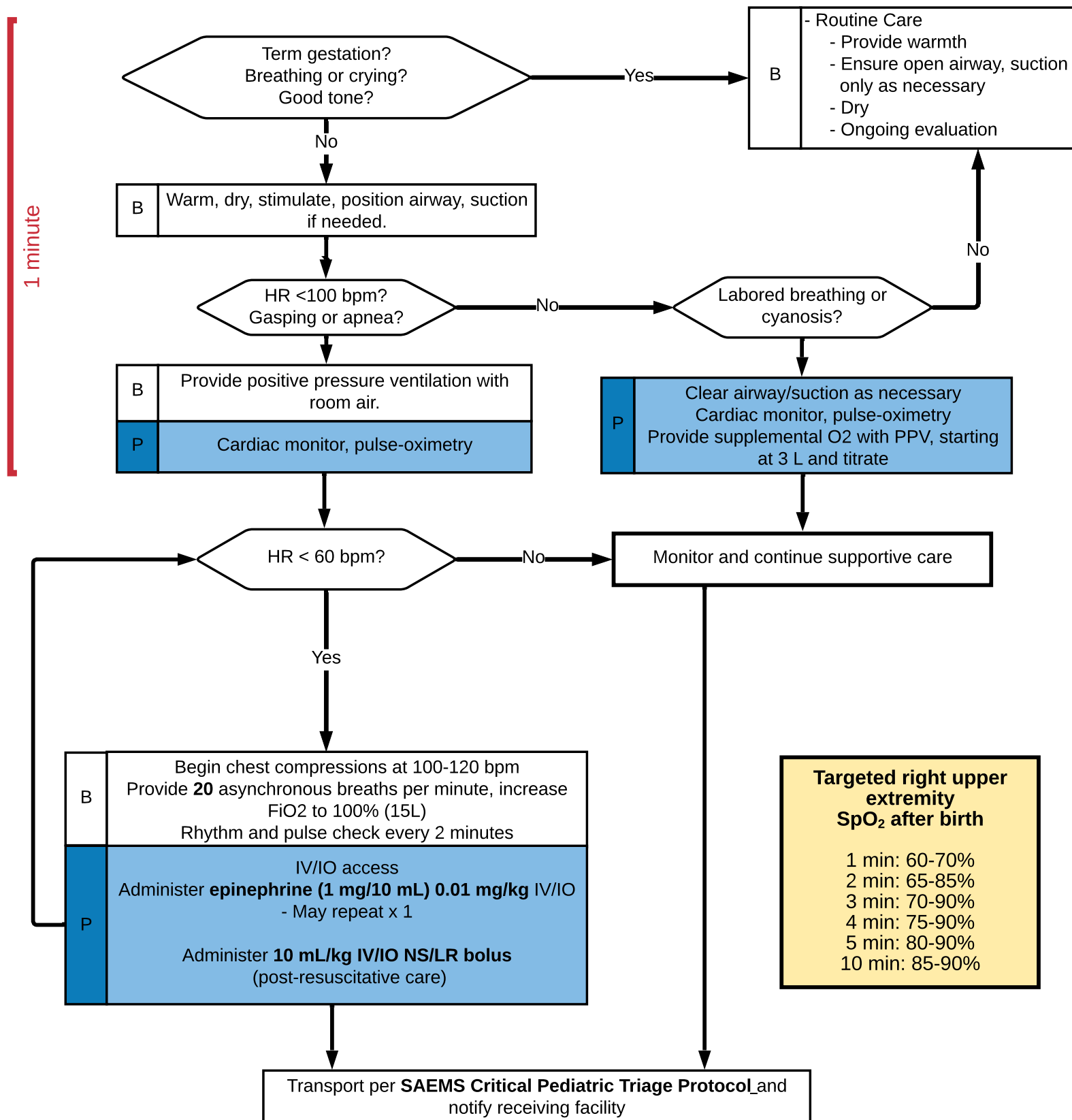
- Sinus tachycardia: P waves present. Variable R-R waves. Infants usually < 220 bpm. Children usually <180 bpm.
- SVT: > 90 % of children with SVT will have a narrow QRS (≤ 0.08 seconds.) P waves absent or abnormal. R-R waves not variable. Usually abrupt onset. Infants usually > 220 bpm. Children usually >180 bpm.
- Atrial Flutter: Will have saw-tooth atrial waves. Rate can vary depending on conduction. May be irregular if variable block/conduction is present.
- Atrial Fibrillation: In children, may represent Wolff-Parkinson-White. Adenosine is **contraindicated**.

Wide Complex Tachycardia ($QRS \geq 0.08$ seconds):

- SVT with aberrancy - Monomorphic and regular wide complex tachycardia. **May be seen in children with Wolf-Parkinson White (WPW) syndrome. If observed in WPW, the use of adenosine is contraindicated.**
- VT is uncommon in children. Rates may vary from near normal to > 200 bpm. Most children with VT have underlying heart disease, cardiac surgery, long QT syndrome, or cardiomyopathy.
 - **Amiodarone 5 mg/kg over 20-60 minutes** is the recommended agent.
 - The presence of capture or fusion beats is diagnostic.
- Torsades de Pointes (Polymorphic Ventricular Tachycardia):
 - Rate is typically 150 to 250 bpm.
 - Associated with long QT syndrome, hypomagnesaemia, hypokalemia, and many cardiac drugs. May quickly deteriorate to VT.
 - Administer Magnesium Sulfate 25 mg/kg IV or IO over 15 minutes. In cardiac arrest give over 2 minutes.
- Vagal Maneuvers:
 - Breath holding.
 - Blowing a glove into a balloon.
 - Have child blow out "birthday candles" or through an obstructed straw.
 - Infants: May put a bag of ice water over the upper half of the face, using care not to occlude the airway.

Pediatric Notes:

- Separating the child from the caregiver may worsen the child's clinical condition.
- Pediatric paddles should be used in children < 10 kg or Broselow-Luten color Purple if available.
- Monitor for respiratory depression and hypotension associated if Midazolam is used to facilitate cardioversion.
- Document all rhythm changes with monitor strips and obtain monitor strips with each therapeutic intervention.





Education/Pearls

- Wait at least 30-60 seconds post delivery before clamping and cutting the umbilical cord.
- Warm, dry, and stimulate baby for 30 seconds.
- Wrap infant in a dry towel and keep as warm as possible during the resuscitation. Keep the head covered if possible. If gestational age < 32 weeks, additional warming measures are recommended (plastic wrap or bag).
- If strong cry, regular respiratory effort and good tone are present and the infant is term gestation, place infant skin to skin with mother.
- If weak cry, signs of respiratory distress, or poor tone are present, or the infant is preterm gestation, then position airway (sniffing position) and clear airway as needed. If thick meconium, signs of respiratory distress, or secretions are present then suction mouth and nose.
- Consider checking blood glucose for ongoing resuscitation, maternal history of diabetes, if the infant is ill-appearing, or if the infant is unable to feed. Refer to **Hypoglycemia/Hyperglycemia AG** as needed.

First 30-60 seconds:

If heart rate > 100 beats per minute:

- Monitor for signs of respiratory distress. If apneic or in significant respiratory distress, initiate BVM with room air at 10 breaths per minute.

If heart rate < 100 beats per minute:

- Initiate BVM ventilations with room air at 10 breaths per minute while monitoring heart rate closely.
- **If no improvement after 90 seconds, begin augmenting O₂ delivery at 3L, increasing every 30 seconds until HR > 100 bpm.**

If heart rate < 60 beats per minute:

- Ensure effective ventilations with supplementary oxygenation.
- If no improvement after 30 seconds, initiate chest compressions.
- **Initiate BVM ventilations at 20 breaths per minute.**

Epinephrine is indicated if the newborn's heart rate remains less than 60 beats per minute after at least 30 seconds of positive pressure ventilation, and another 60 seconds of chest compressions with positive pressure ventilation administered with 100% FiO₂.

Neonatal transportation destinations:

- BUMC-T
- TMC