Universal Patient Assessment

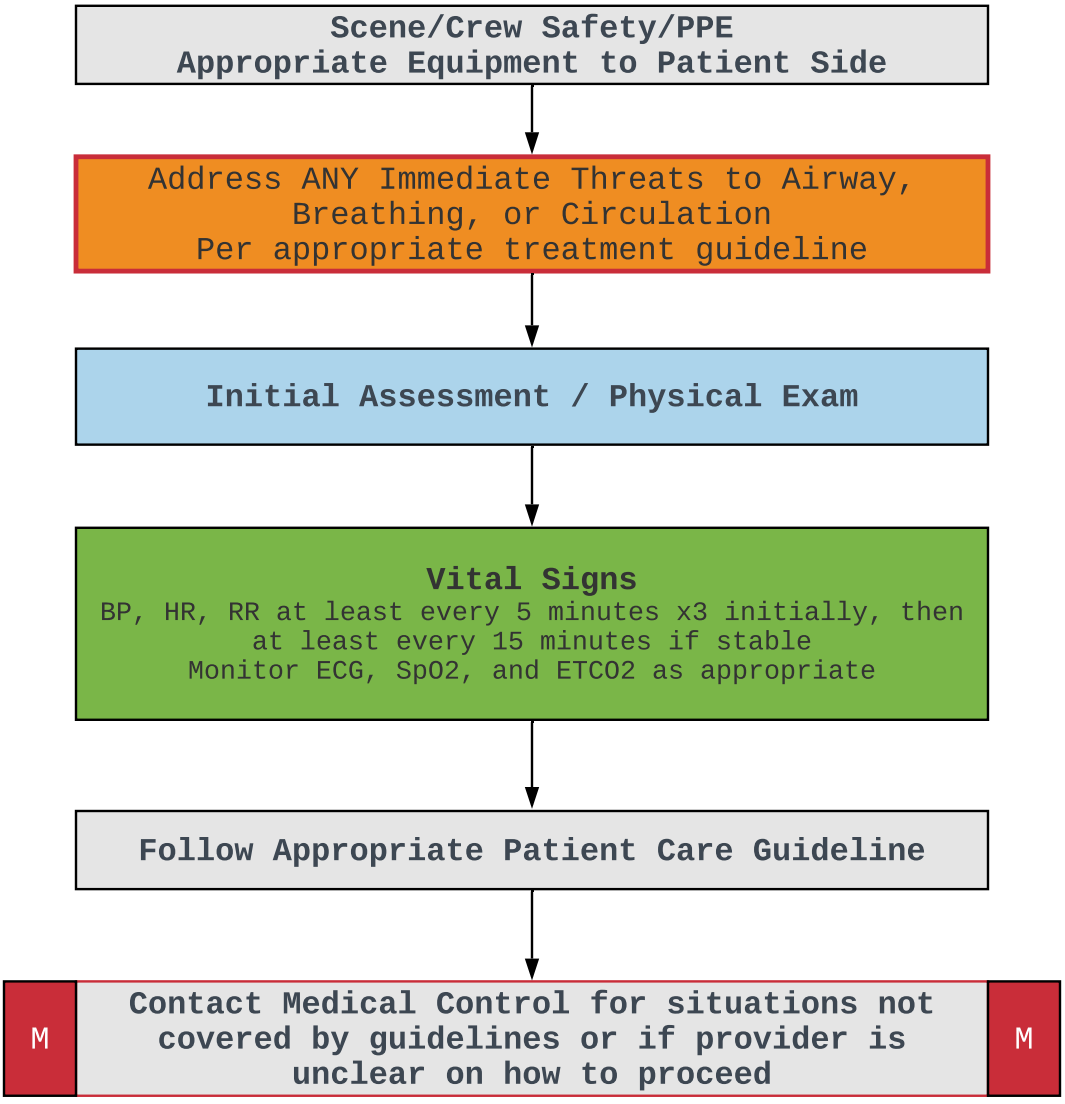
History
- A problem or event that precipitated a call for service or assistance
- Some complaint that causes a person to require or request medical assistance, either perceived by the person or by EMS Providers
- SAMPLE
- OPQRST

Exam

Primary Assessment
- Airway
- Breathing
- Circulation
- Disability
- Expose

Secondary Assessment
- HEENT
- Chest
- Abdominal / Gastrointestinal
- Pelvis
- Back
- Extremities
- Neurological

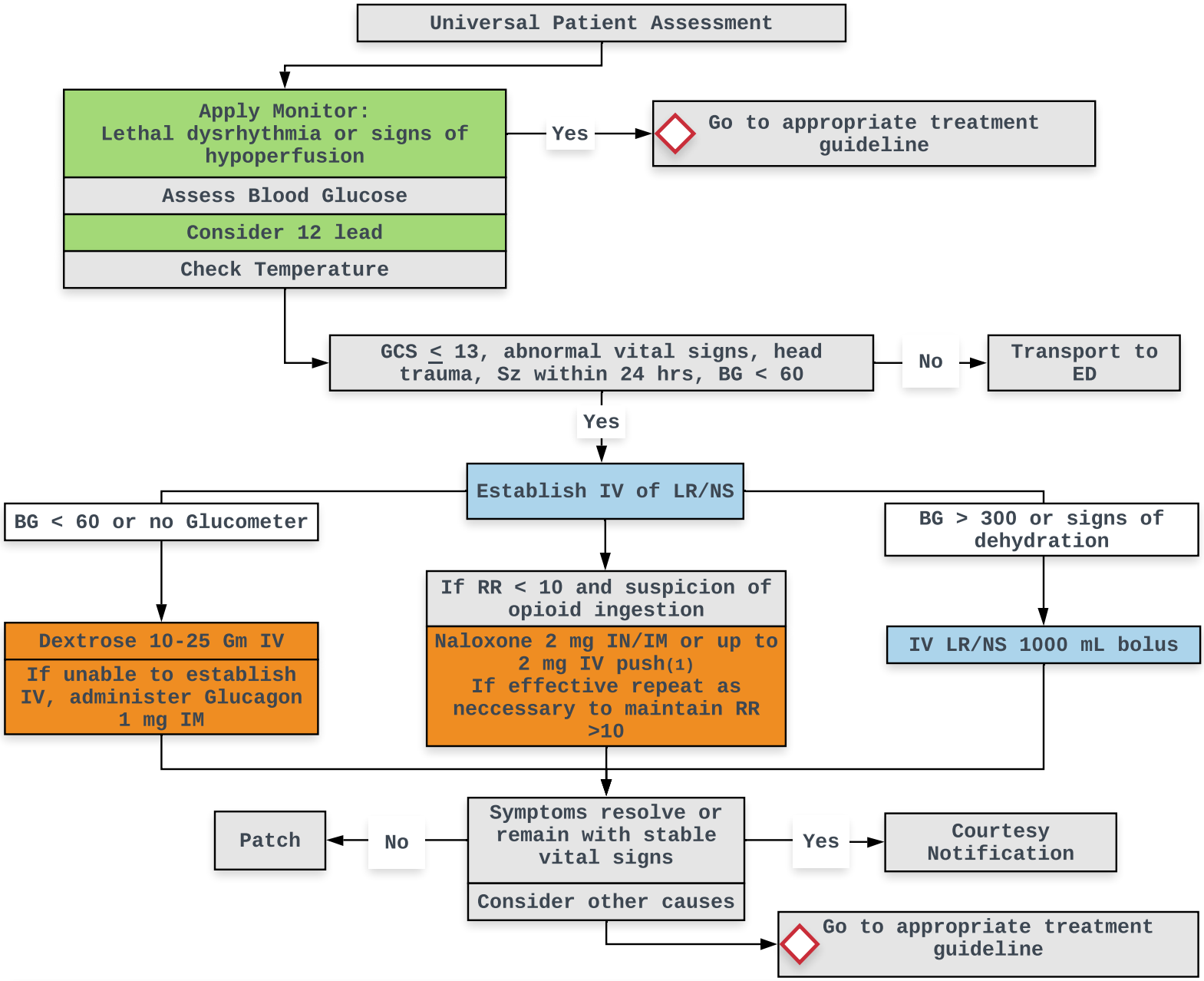
Differential
- Depends on the initial complaint or problem
- Consider all likely causes



Pearls:
- Minimum exam for every patients is: V/S, mental status with GCS, location of injury or complaint and pain scale.
- Pediatric patients are defined as anyone ≤ age 14, or anyone without signs of puberty

Adult **Altered Level of Conciousness**

History	Signs/Symptoms	Differential
• Diabetes • Drug/ ETOH use • Medication changes/ potential OD • Trauma • Syncope • Seizures • Sepsis	• Decreased or change in baseline mental status • Hypoglycemia (cool, diaphoretic skin) • Hyperglycemia (warm/ dry skin, fruity breath) • Changes in or irregular breathing patterns	• Alcohol, Acidotic/ Alkalotic • Endocrine, Environment • Insulin • Overdose, Opiates • Uremia • Trauma • Infection, Increased ICP • Psych, Poisoning • Seizure, Stroke, Syncope



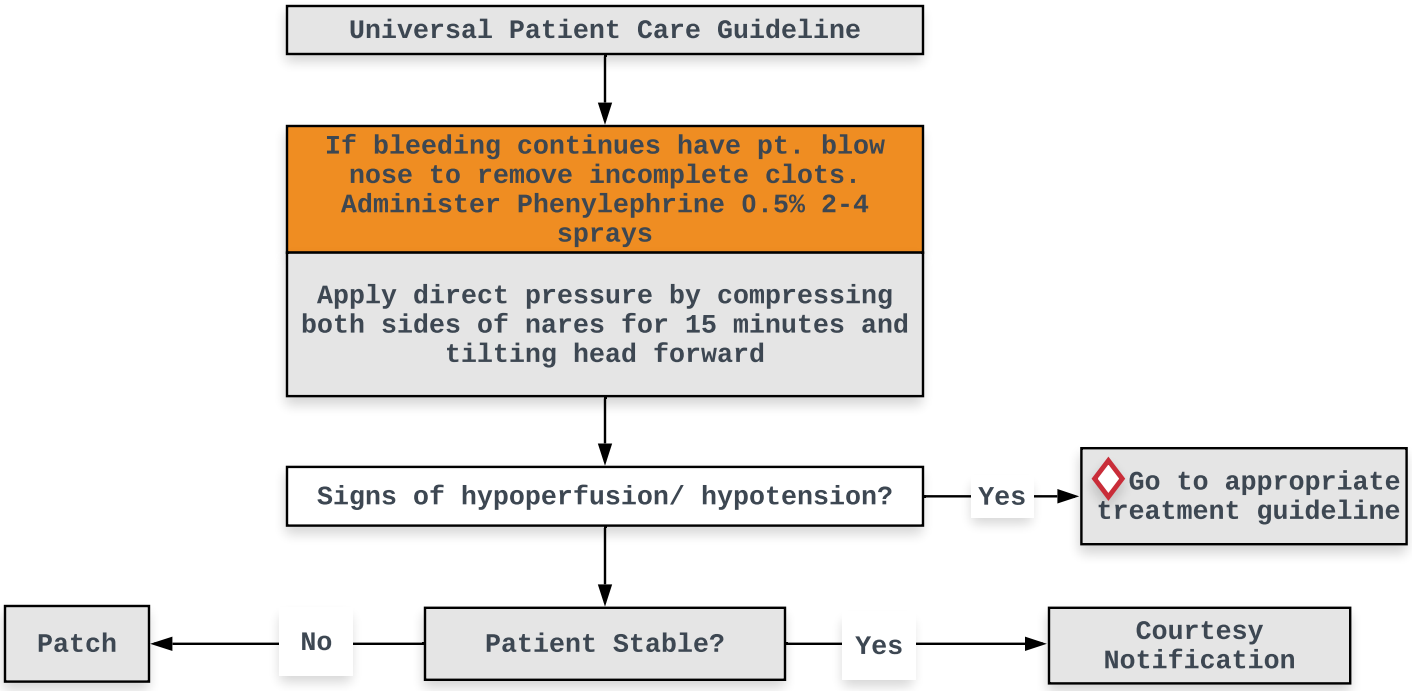
(1) **Administer small 0.5 mg doses of IV Naloxone every 2 min up to max to maintain adequate spontaneous RR**

Pearls:

- ALOC can be presenting sign of environmental toxin or Haz-Mat exposure
- Reassess BG after glucose or glucagon administration
- Patients on oral hypoglycemics are at risk for repeat episodes of hypoglycemia, monitor closely and encourage transport

Adult **Epistaxis**

History	Signs/Symptoms	Differential
• Hypertension • Trauma • Anticoagulant use • Headache • Vision Changes	• Nose bleeding • Blood in the posterior pharynx	• Tumor • Trauma • Coagulopathy (Medical) • Thrombocytopenia • HTN



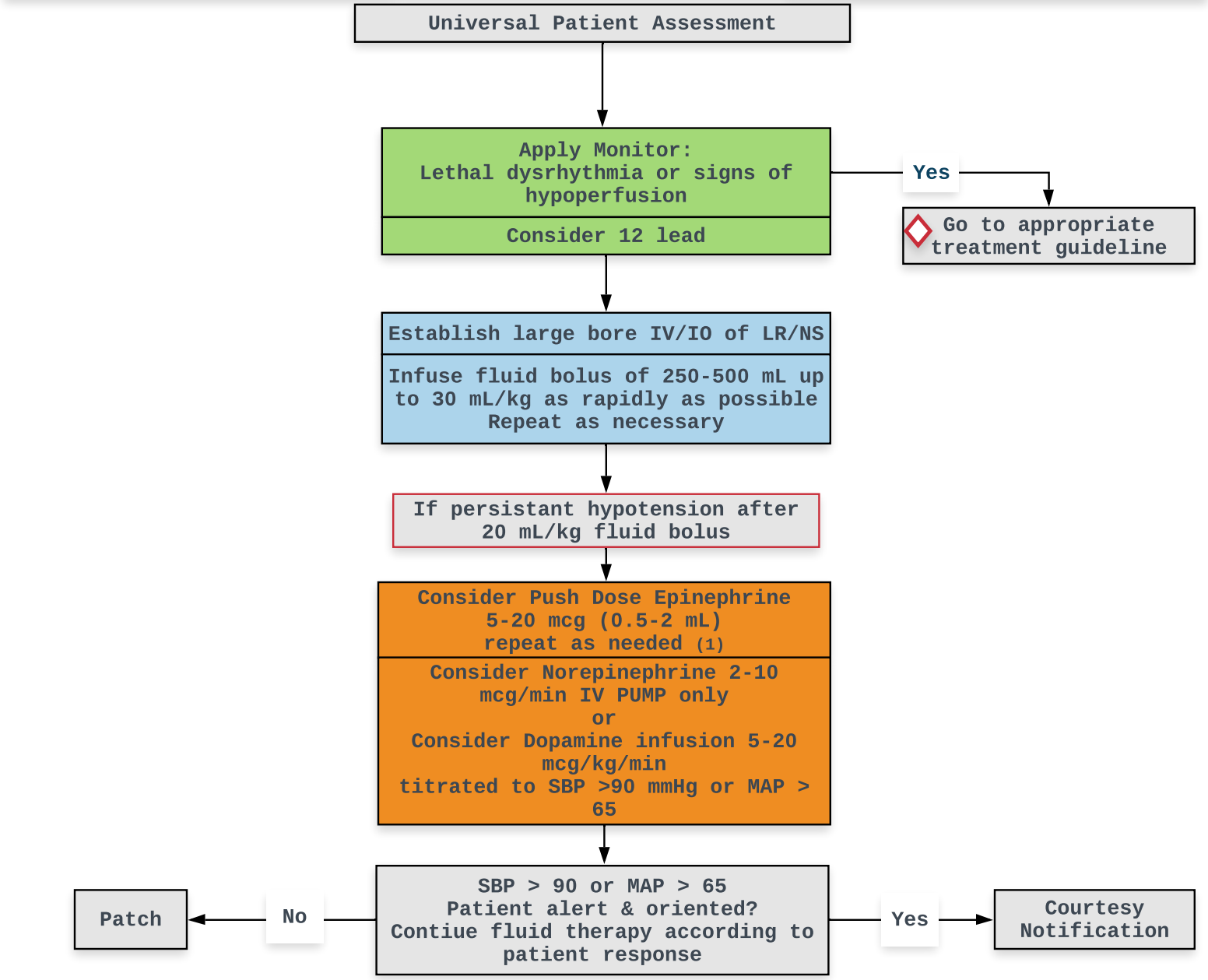
Adult **Hypotension, Non-Traumatic**

History
- Blood loss
- Fluid loss
- Infection
- Cardiac ischemia (MI, CHF)
- Medications
- Pregnant or Recently Pregnant
- Allergic reaction

Signs/Symptoms

SBP < 90 or MAP < 65
- Restlessness, confusion
- Weakness, dizziness
- Weak, rapid pulse
- Pale, cool, clammy skin
- Delayed cap refill
- Hematemesis, Melena

Differential
- Shock
- Sepsis
- DKA
- Pregnancy-Related Issue
- Dysrhythmias
- PE
- Tension pneumothorax
- AAA, Aortic Dissection

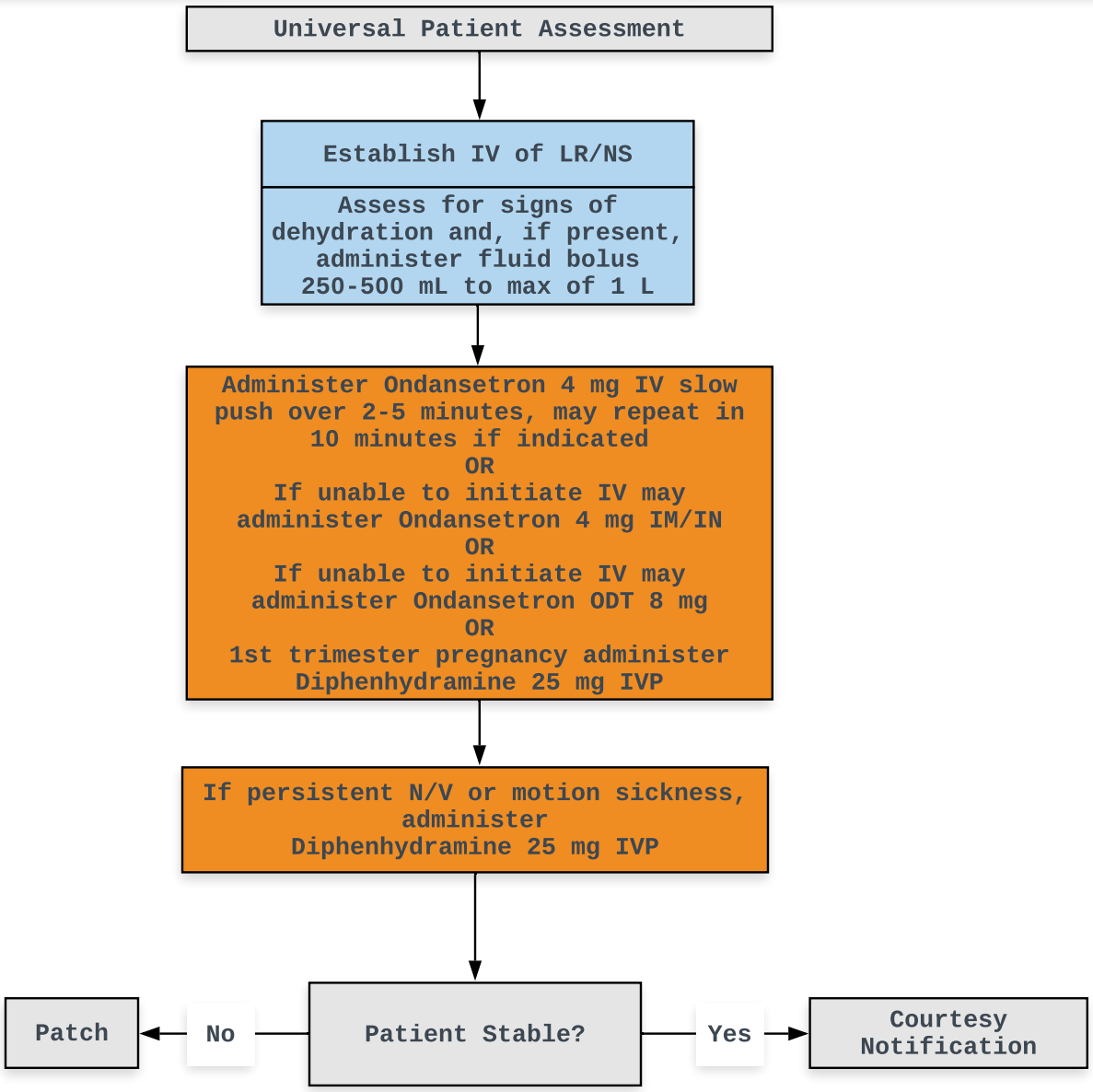


(1) **Mix 1 mL Epinephrine 0.1 mg/mL in 9 mL NS = 10 mcg/mL**

Pearls:
- Consider all possible causes of shock and treat per appropriate guideline.
- Patients should **always** have adequate intravascular fluid load **prior** to using vasopressors
- Consider establishing 2 large bore IVs based on patient's presentation
- Bolus fluids in < 10 minutes
- Repeat vital signs and lung auscultation before/after fluid administration
- If pulsatile mass present, or suspected AAA/TAA, Patch
- **Patch to titrate norepinephrine higher than 10mcg/min**

Adult **Nausea/ Vomiting**

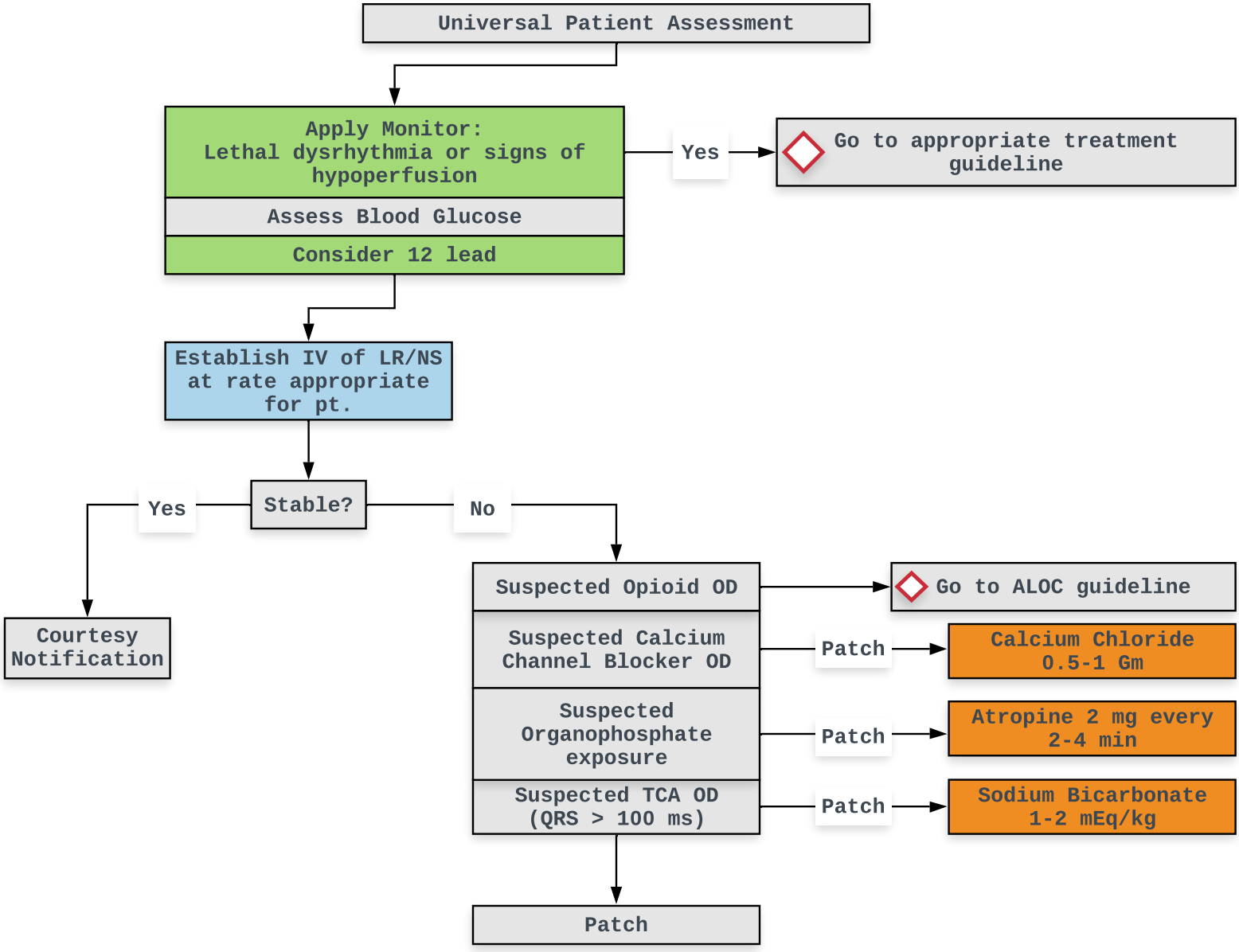
History	Signs/Symptoms	Differential
• Duration of problem • Time of last meal • Ability to hold down food or fluids • Past medical/ surgical Hx • Medications • Menstrual history/ Pregnancy • Bloody emesis or diarrhea • Congenital long QT syndrome	• Fever • Pain • Abdominal rigidity • Rebound pain • Guarding • Abdominal distension • Diarrhea • Hematemesis	• CNS (increased pressure, HA, CVA) • Drugs (NSAIDs, Abx,chemotherapy) • GI or renal disorders • DKA • Infection • Medication/ substance abuse • Pregnancy



Pearls:
- Use Diphenhydramine as first line antiemetic in 1st trimester pregnancy
- DKA may present as vomiting and/ or abdominal pain
- Use Ondansetron with caution in patients with history of long QT syndrome.

Adult **Poisoning/ Overdose**

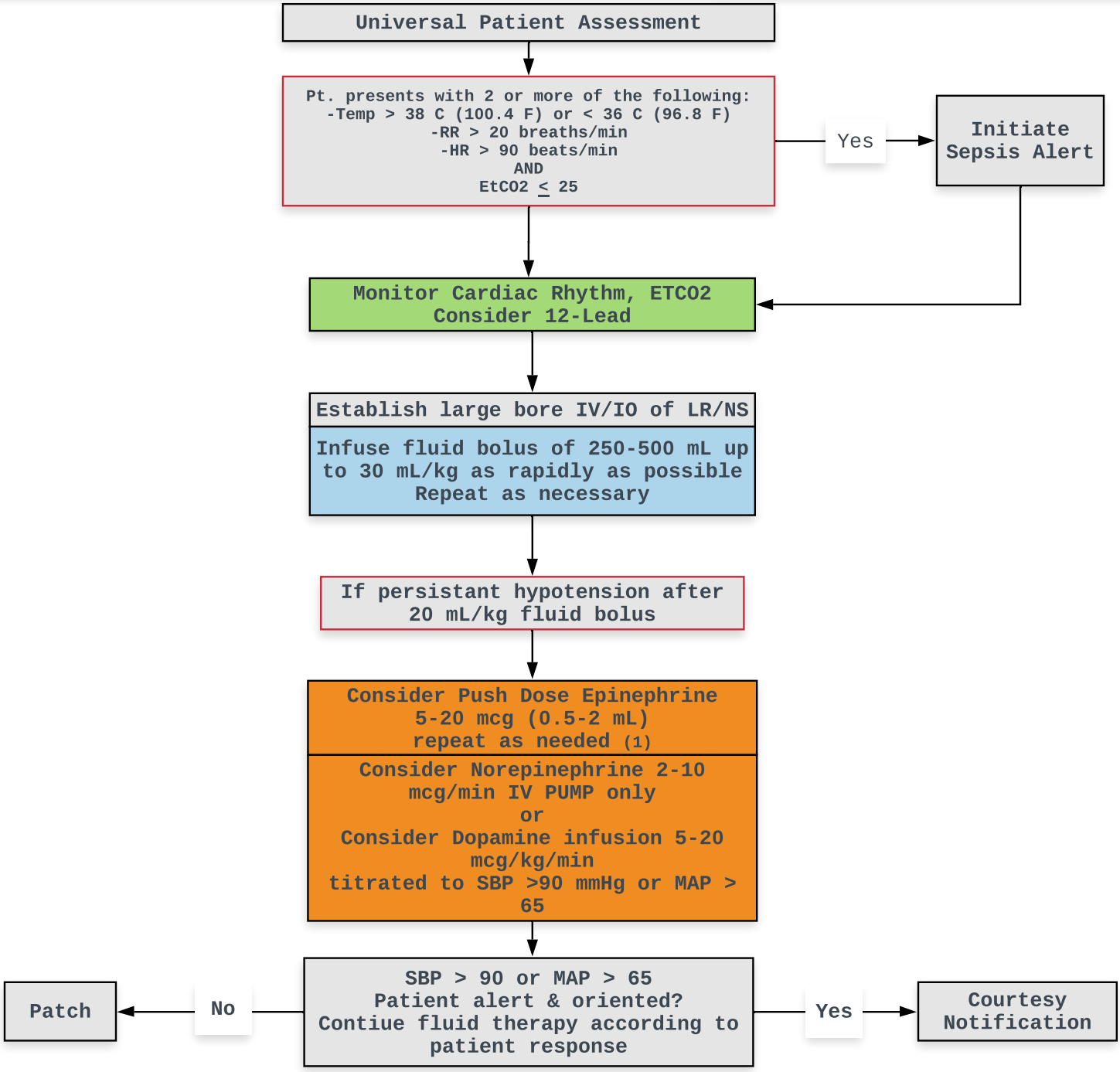
History	Signs/Symptoms	Differential
• Exposure or suspected exposure to a possibly toxic substance • Reason (accidental, suicidal) • Substance ingested, route, quantity	• Mental status changes • Hypotension / hypertension • Irregular respiratory rate / pattern • Seizures • Irregular heart rate / rhythms	• TCA • Acetaminophen • Depressants • Stimulants • Anticholinergics • Cardiac medications • Organophosphates



Pearls:
- Patients suspected or known to have ingested substances with a suicidal intent may not refuse transport
- Bring bottles/ containers if possible. Inspect scene.
- **TCA**: Sz, dysrhythmias, hypotension, ALOC/coma, rapid progress from alert to death
- **Depressants**: decreased HR, decreased BP, decreased RR, decreased temp, non-specific pupils
- **Stimulants**: increased HR,increased BP, increased temp, dilated pupils, Sz
- **Anticholinergic**: increased HR, increased temp, dilated pupils, mental status changes
- **Insecticides**: increased or decreased HR, increased secretions, N/V/D, pinpoint pupils
- DECON patients appropriately and ensure providers have appropriate PPE

Adult **Sepsis**

History	Signs/Symptoms	Differential
• Age (common in elderly/ young) • Known or suspected infection • Fever • Recent surgery or invasive procedure • Indwelling devices	• Altered level of consciousness • Hypotension • Tachycardia • Changes in Breathing Rate and Pattern • Potential Site of Infection	• Hyperventilation, Anxiety • Pneumonia • Upper Respiratory Infection • Urinary Tract Infection • Cellulitis • Necrotizing Fasciitis



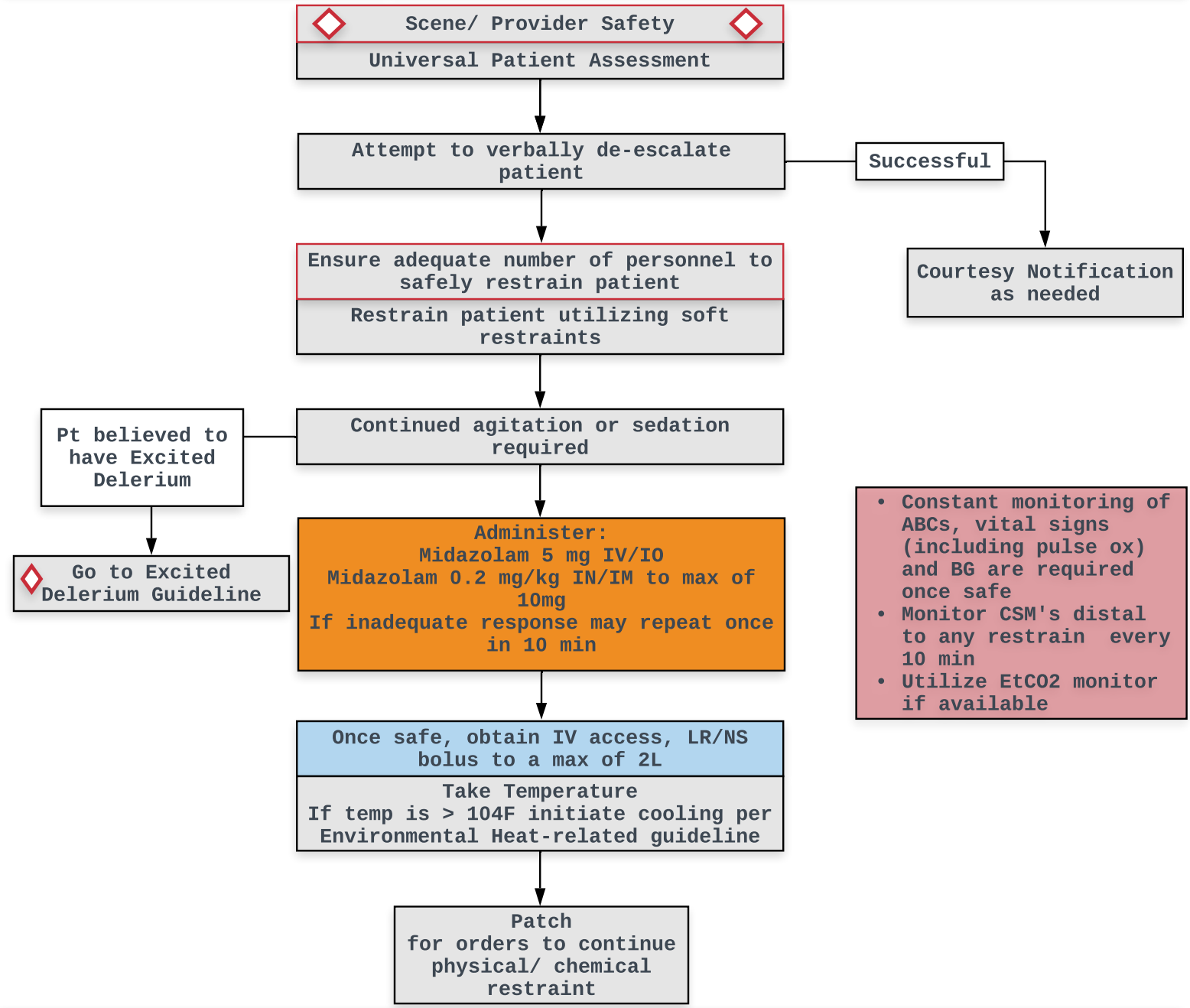
(1) **Mix 1 mL Epinephrine 0.1 mg/mL in 9 mL NS = 10 mcg/mL**

Pearls:

- Hypotension is defined as a SBP < 90 or MAP < 65
- Consider DKA along with Sepsis, as 30% of patients with DKA also have Sepsis
- Patch early if the patient has signs of fluid overload in addition to hypotension
- **Patch to titrate norepinephrine higher than 10mcg/min**

Adult **Violent/ Agitated**

History	Signs/Symptoms	Differential
• Situational crisis • Psychiatric illness • Injury to self or others • Medical tag alert • Substance abuse/ OD • Diabetes • Seizures	• Anxiety, agitation, confusion • Affect change, hallucinations • Delusional thoughts, bizarre behavior • Combative/ violent • Expression of SI or HI	• See ALOC differential • Hypoxia • ETOH intoxication • Toxin/ substance abuse • Medication effect/ OD • Withdrawl syndromes • Depression • Mental health disorder

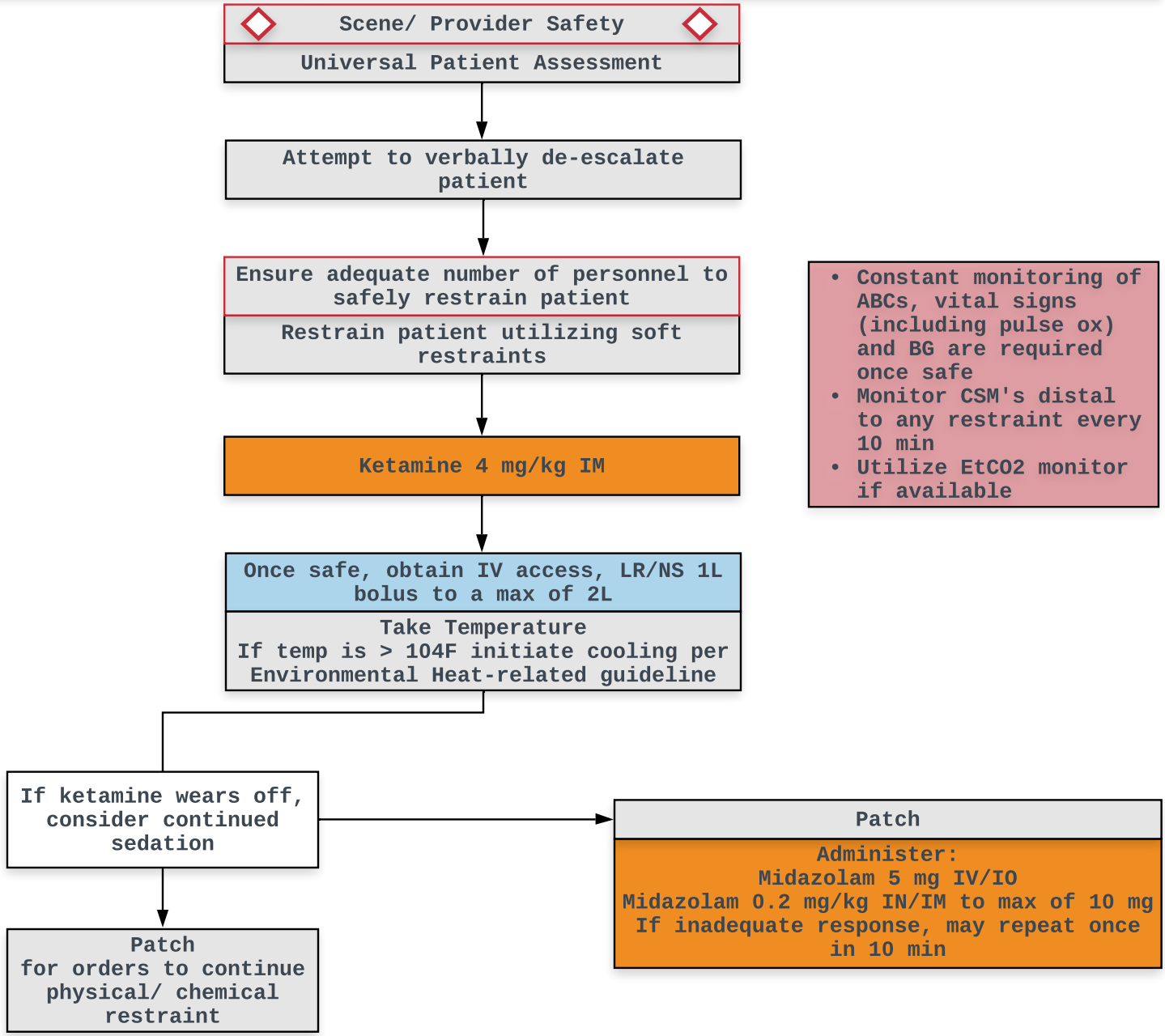


Pearls:

- If patient is in police custody and handcuffs have been applied, it is preferable that a police officer also accompany the patient. EMS providers must, at a minimum, have the handcuff key in their possession during transport
- Patients shall be positioned in a manner that does not compromise airway or breathing. No patient will be restrained prone or "hog-tied". No patient shall be placed between backboards or gurneys.

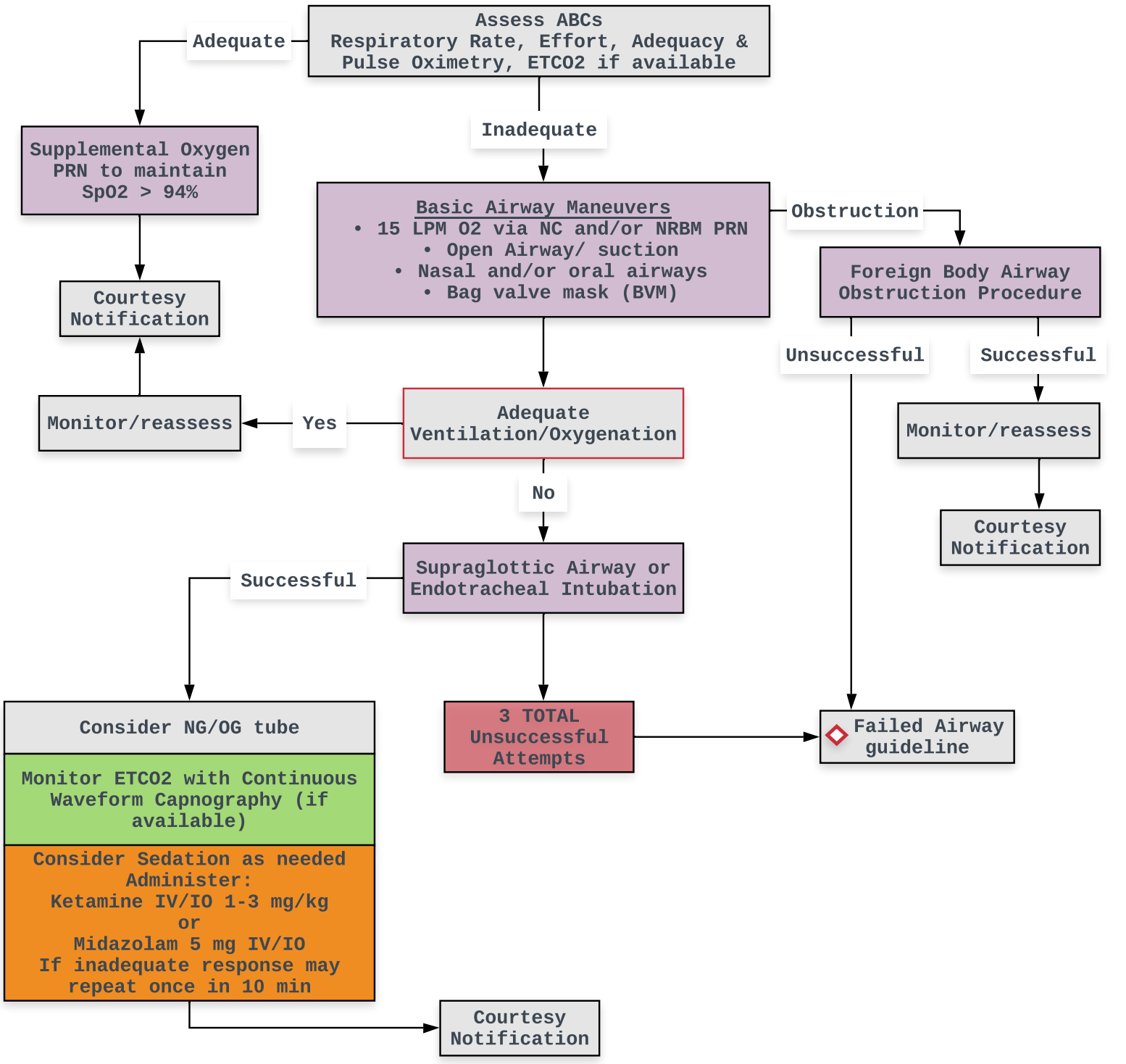
Adult **Excited Delirium**

History	Signs/Symptoms	Differential
• Situational crisis • Psychiatric illness • Injury to self or others • Medical tag alert • Substance abuse/ OD • Diabetes	• Anxiety, agitation, confusion • Affect change, hallucinations • Delusional thoughts, bizarre behavior • Combative/ violent • Expression of SI or HI	• See ALOC differential • Hypoxia • ETOH intoxication • Toxin/ substance abuse • Medication effect/ OD • Withdrawl syndromes • Depression • Mental health disorder



Pearls:
- If patient is in police custody and handcuffs have been applied it is preferable that a police officer also accompany the patient. EMS providers must, at a minimum, have the handcuff key in their possession during transport
- Patients shall be positioned in a manner that does not compromise airway or breathing. No patient will be restrained prone or "hog-tied." No patient shall be placed between backboards or gurneys.
- Duration of action of Ketamine is approximately 20 min. Consider continuing sedation in preparation for return of agitation.

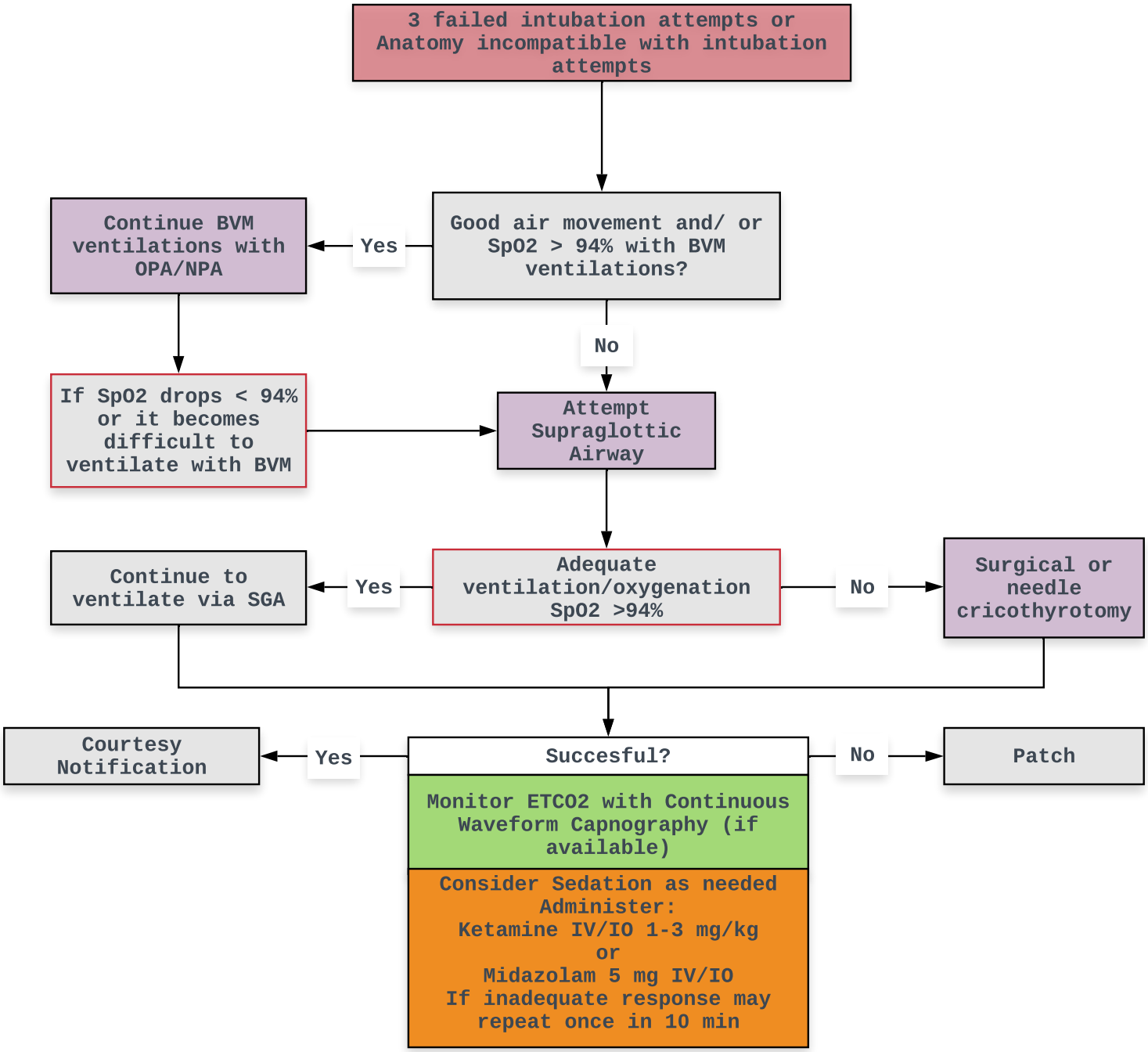
Adult **Airway Management**



Pearls:

- **ETCO2 and SpO2 should be used on all patients with advanced airways**
- If an airway is being maintained by BVM with SpO2 >94%, advanced airway might not be required
- Ventilatory rate should target ETCO2 of 35-45 (when appropriate)
- If difficult intubation is predicted, consider early use of supraglottic airway
- Verify tube placement by visualizing tube passing through the cords, chest wall rise, bilateral breaths sounds, absence of gastric sounds, oximetry (if avaiable), colormetric device for initial confirmation, ETCO2 waveform (gold standard)
- Consider NG/OG tube for any patient receiving BVM ventilations for > 2 minutes or any intubated patient

Adult **Failed Airway**

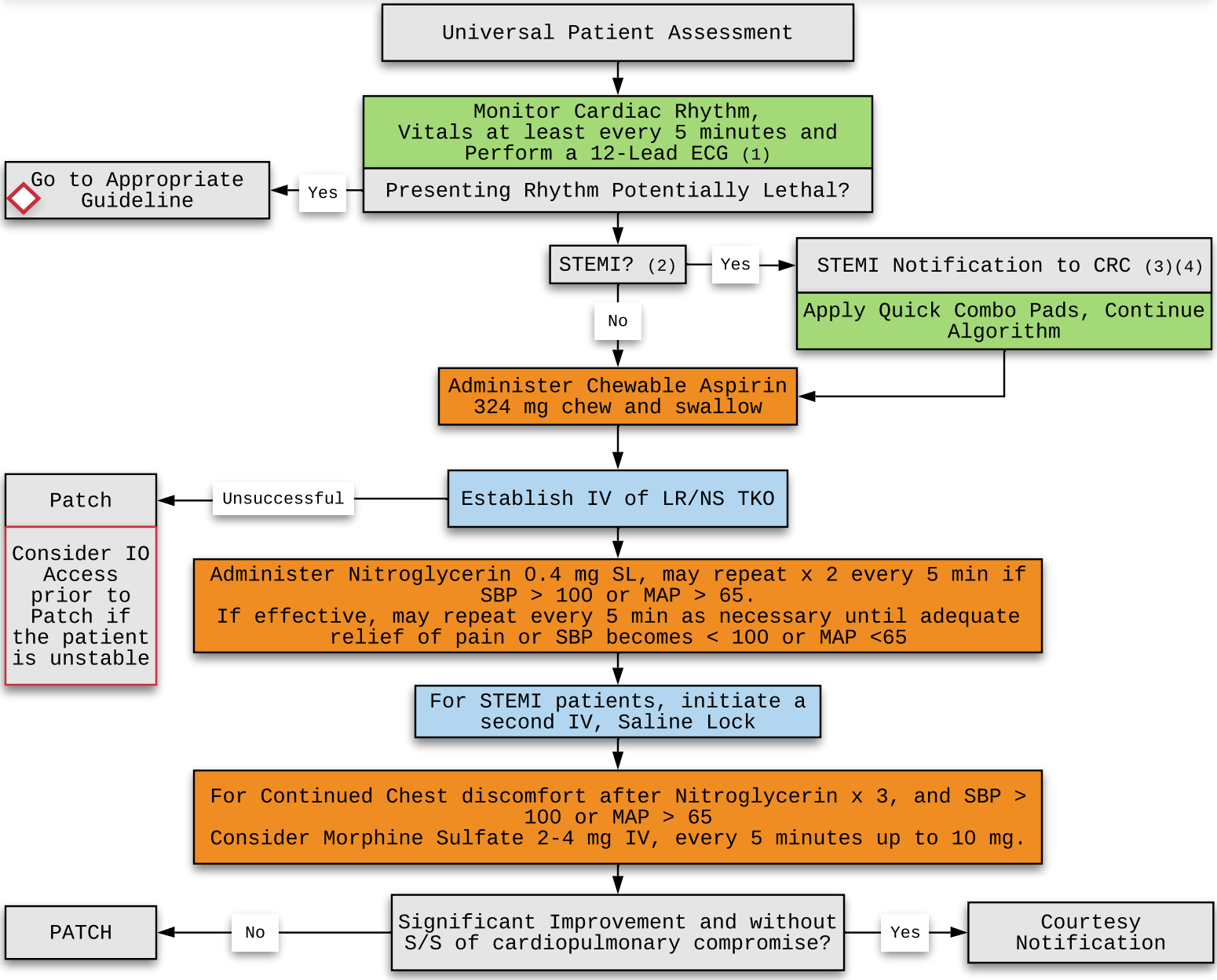


Pearls:

- **ETCO2 and SpO2 should be used on all patients with advanced airways**
- **If an airway is being maintained by BVM with SpO2 >94% , it is acceptable to maintain BLS airway measures instead of attempting SGA or ETI.**
- **If a supraglottic airway is providing good ventilatory exchange and is functioning appropriately: DO NOT REMOVE or EXCHANGE**
- Ventilatory rate should target ETCO2 of 35-45 (when appropriate)
- Verify tube placement by visualizing tube passing through the cords, chest wall rise, bilateral breaths sounds, absence of gastric sounds, oximetry (if avaiable), colormetric device for initial confirmation, ETCO2 waveform (gold standard)
- Consider NG/OG tube for any prolonged BVM ventilations

Adult **Chest Discomfort (Cardiac)**

History	Signs/Symptoms	Differential
• Hypertension • Diabetes • Heart Problems (CABG, Prior MI, etc) • Family History of Heart Disease • Obesity • Smoking • Recent Increase in Stress	**Age > 30 with associated risk factors** • Chest Pain, Pressure or discomfort • Indigestion • Shoulder and/or Jaw Pain • Nausea/Vomiting • Pale, Cool, Clammy Skin, Diaphoresis • Weakness, Feeling Tired • Abdominal Pain	• Gastritis • Angina • Acute MI • Thoracic Aneurysm • Musculoskeletal Pain • Pulmonary Emboli



(1) 12 Lead must be **clear, straight baseline and without artifact**. Transmit ASAP if available
(2) Cardiac Monitor interpretation must read ***STEMI*** or *ACUTE MI SUSPECTED* or device equivalent
(3) Patient must have signs/symptoms of cardiac origin
(4) Bypass of non-Cardiac Recieving Center requries on-line medical direction if the patient can be transported in less than 90 minutes from time of first medical contact to the Cardiac Recieving Center, otherwise transport patient to closest facility

Pearls

- 12-lead ECG's should be performed as a part of initial assessment; consider serial 12-lead acquisitions
- Once a STEMI is identified, expeditious transport is indicated
- Allergy is the only absolute contraindication to Aspirin administration. Administration of Aspirin should be as soon as possible.
- Nitroglycerin should be avoided if the patient is hypotensive, or has taken Sildenafil, Cialis, Levitra, or similar medication (PDE5 inhibitors) in the last 48-72 hours. If inferior wall MI is present consider consultation with medical control before Nitroglycerine administration.
- If the patient does not improve with Nitroglycerin, consider other causes and other routes of pain management

Adult **Pulseless Arrest - CCR Alternative**

History
- Difficulty Breathing
- Chest Pain
- Headache
- Dizziness, Syncope

Signs/Symptoms
- Pulseless
- Apneic

without
- Rigor Mortis
- Dependent Lividity
- Decapitation
- Transection of Thorax or Abdomen
- Incineration
- Decomposition

Differential
- Hypoxemia
- Hypovolemia
- Hydrogen Ions
- Hyper/Hypokalemia
- Hypothermia
- Hypoglycemia
- Toxins
- Tamponade
- Tension Pneumothorax
- Thrombosis
- Thromboembolism
- Trauma

Universal Patient Assessment

Is the cause of the arrest presumed Cardiac in Origin? Patient Age > 8 years?
- No → Go to Appropriate Guideline

Provider Witnessed Arrest or Adequate Bystander CPR?
- No → 2 Minutes of Chest Compressions Compressions, then continue Algorithm

Place Defib. Pads Immediately and Assess Rhythm
Monitor Cardiac Rhythm, ETCO2, SpO2

Place an OPA and Non-Rebreather Mask with high-flow Oxygen

ROSC?
- Yes → Go to Appropriate Guideline

Shockable Rhythm?
- Yes → Defibrillate Machine's Max Joule Setting

2 Minutes of Chest Compressions

Obtain IO or IV Access with NS or LR

Administer **Epinephrine (0.1 mg/mL) 1 mg IV/IO OR 0.01 mg/kg** for patients < 14 AND < 50 kg without signs of puberty as soon as venous access is established. Repeat as necessary every 3-5 minutes during Chest Compressions.

ROSC?
- Yes → Go to Appropriate Guideline

Shockable Rhythm?
- Yes → Defibrillate at Machine's Max Joule Setting

2 Minutes of Chest Compressions

ROSC?
- Yes → Go to Appropriate Guideline

Shockable Rhythm?
- Yes → Defibrillate at Machine's Max Joule Setting

2 Minutes of Chest Compressions

ROSC?
- Yes → Go to Appropriate Guideline

Shockable Rhythm?
- Yes → Defibrillate at Machine's Max Joule Setting

Establish Definitive Airway

Go to Appropriate Guideline based on patient condition or Transition to NAH Adult Pulseless Arrest Guideline

- Only interrupt chest compressions for very brief rhythm/pulse checks and defibrillations; continue compressions while charging the cardiac monitor
- Do not attempt to place definitive airway until transitioning from CCR to ACLS
- Epinephrine administration should occur immediately following pulse checks and defibrillations; administration of medication immediately prio to these procedures should be avoided

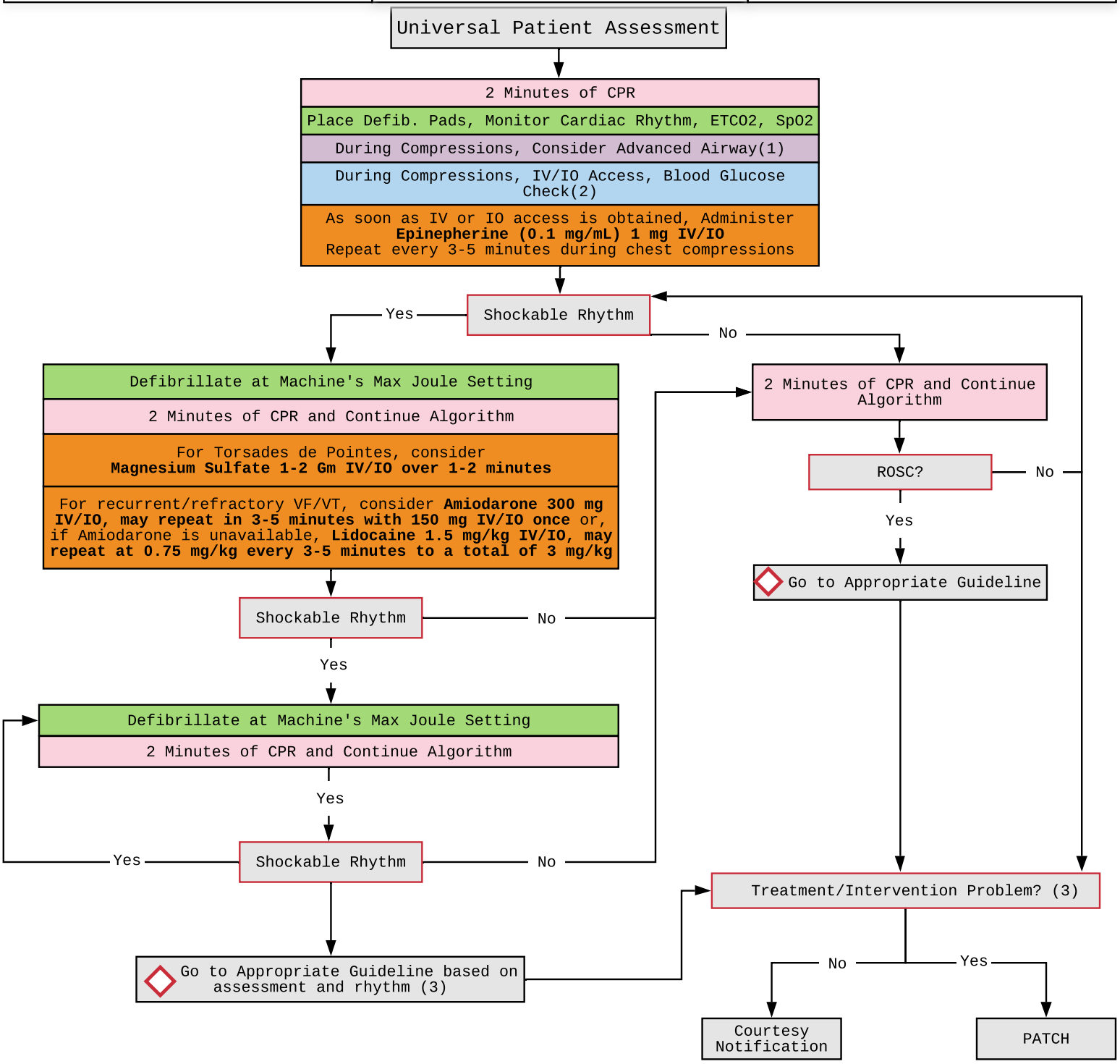
Adult **Pulseless Arrest - Medical**

History
- Difficulty Breathing
- Chest Pain
- Headache
- Dizziness, Syncope
- Drug Use

Signs/Symptoms
- Pulseless
- Apneic

without
- Rigor Mortis
- Dependent Lividity
- Decapitation
- Transection of Thorax or Abdomen
- Incineration
- Decomposition

Differential
- Hypoxemia
- Hypovolemia
- Hydrogen Ions
- Hyper/Hypokalemia
- Hypothermia
- Hypoglycemia
- Toxins
- Tamponade
- Tension Pneumothorax
- Thrombosis
- Thromboembolism
- Trauma



(1)Once an advanced airway is placed, compressions and breaths should be asynchronous, monitor ETCO2 continuously.
(2)Consider and treat reversible causes early, administer Dextrose per appropriate Guideline as applicable, PATCH for Sodium Bicarbonate and/or Calcium Chloride for suspected Hyperkalemia or suspected Overdose.
(3)If patient remains asystolic or other agonal rhythm after definitive airway management, initial medications, no reversible causes are identified or reversible causes are treated, and transport has not been initiated, consider termination of resuscitative efforts by order of a physician. Consider interval since arrest.

- Medications should be administered after Rhythm Checks, during CPR
- Limit interruptions in Chest Compressions to brief rhythm checks and defibrillations (less than 10-15 seconds)
- Continue chest compressions while the defibrillator charges
- When possible, no single provider should do more than 2 minutes of consecutive chest compressions

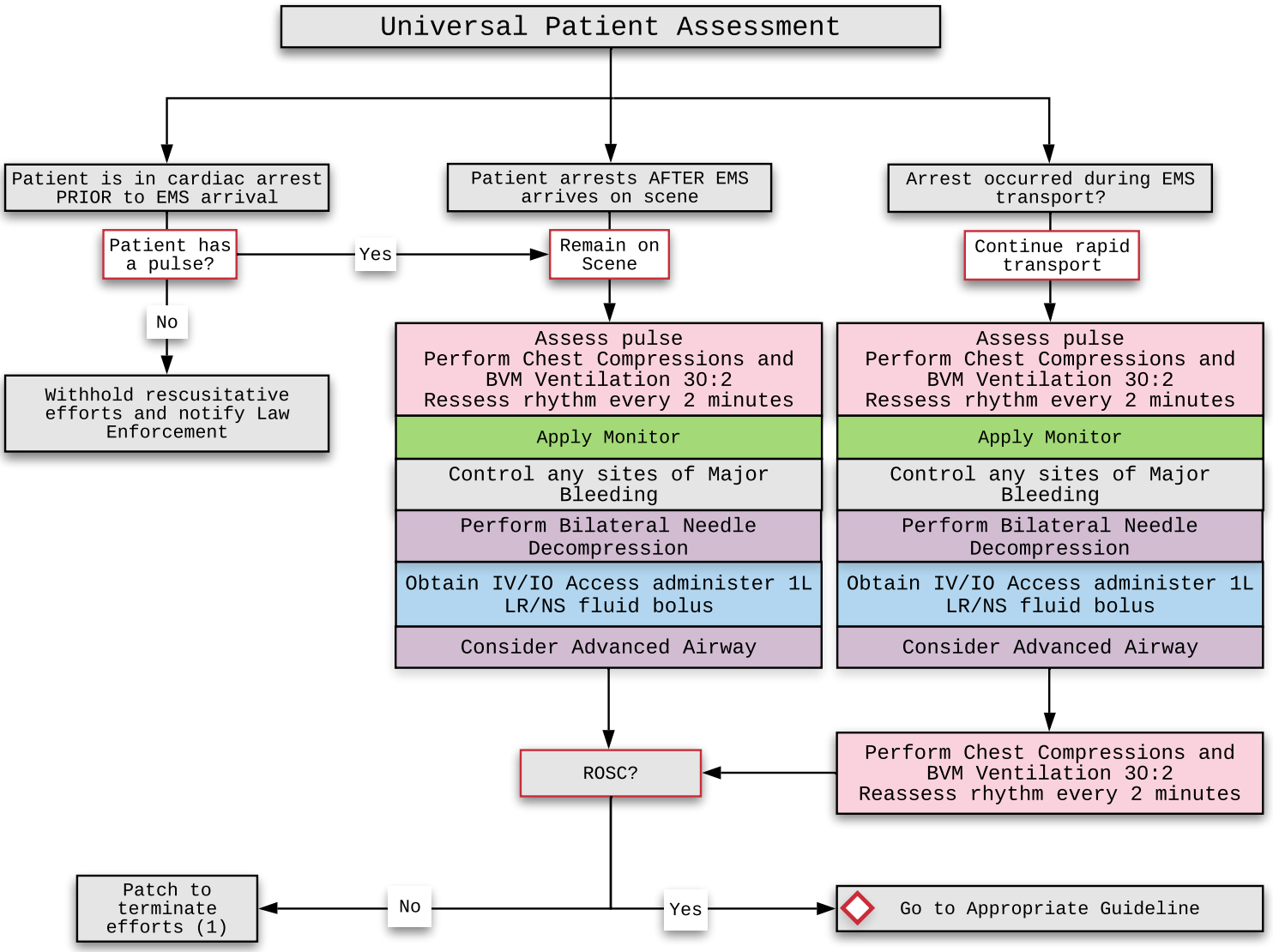
Adult **Pulseless Arrest - Trauma**

History
- Acute Traumatic blunt or penetrating injury

Signs/Symptoms
- Pulseless
- Apneic

without
- Rigor Mortis
- Dependent Lividity
- Decapitation
- Transection of Thorax or Abdomen
- Incineration
- Decomposition

Differential
- Hypoxemia
- Hypovolemia
- Hydrogen Ions
- Hyper/Hypokalemia
- Hypothermia
- Hypoglycemia
- Toxins
- Tamponade
- Tension Pneumothorax
- Thrombosis
- Thromboembolism
- Trauma



(1) If ordered to terminate efforts, notify Law Enforcement. If during transport, pull over at closest safe location and await Law Enforcement's arrival.

Pearls:
If EMS witnessed arrest AND penetrating trauma is the suspected cause of cardiac arrest AND time from arrest to hospital is within 10 minutes, consider rapid transport.
Once an advanced airway is placed, compressions and breaths should be asynchronous, monitor ETCO2 continuously.
V-Fib and V-Tach arrest due to trauma are rare (Commotio Cordis), but the treatment remains the same (defibrillation). Consider Medical Causes of arrest in the trauma patient.
If patient remains asystolic or other agonal rhythm after successful intubation, initial medications, no reversible causes are identified or reversible causes are treated, and transport has not been initiated, consider termination of resuscitative efforts by order of a physician. Consider interval since arrest.

- Medications should be administered after Rhythm Checks, during CPR. THE CURRENT RECOMMENDATION IS NOT TO USE VASOPRESSORS IN KNOWN TRAUMATIC CARDIAC ARREST, AS THERE IS NO PROVEN BENEFIT.
- Limit interruptions in Chest Compressions to brief rhythm checks and defibrillations (less than 10-15 seconds)
- Continue chest compressions while the defibrillator charges
- When possible, no single provider should do more than 2 minutes of consecutive chest compressions

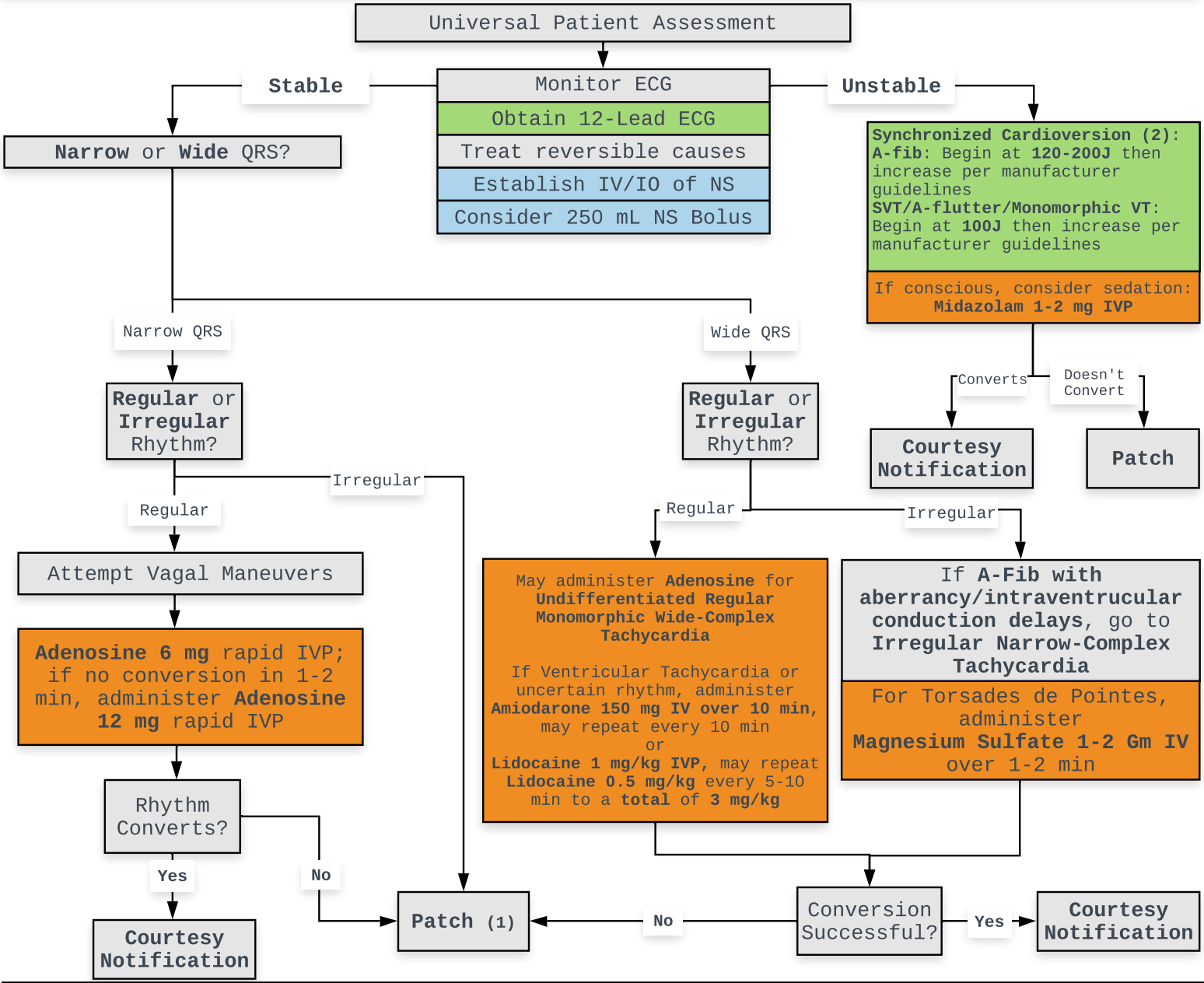
Adult **Tachycaria with Pulses**

History
- Medications: diet pills, thyroid supplements, decongestants
- Diet: caffeine
- Drugs: stimulants
- Hx of SVT, A-Fib, or WPW
- Feeling of palpitations/ heart racing

Signs/Symptoms

HR > 150/min with:
- Dizziness, CP, SOB
- Syncope/ Near Syncope
- ALOC
- Hypotension

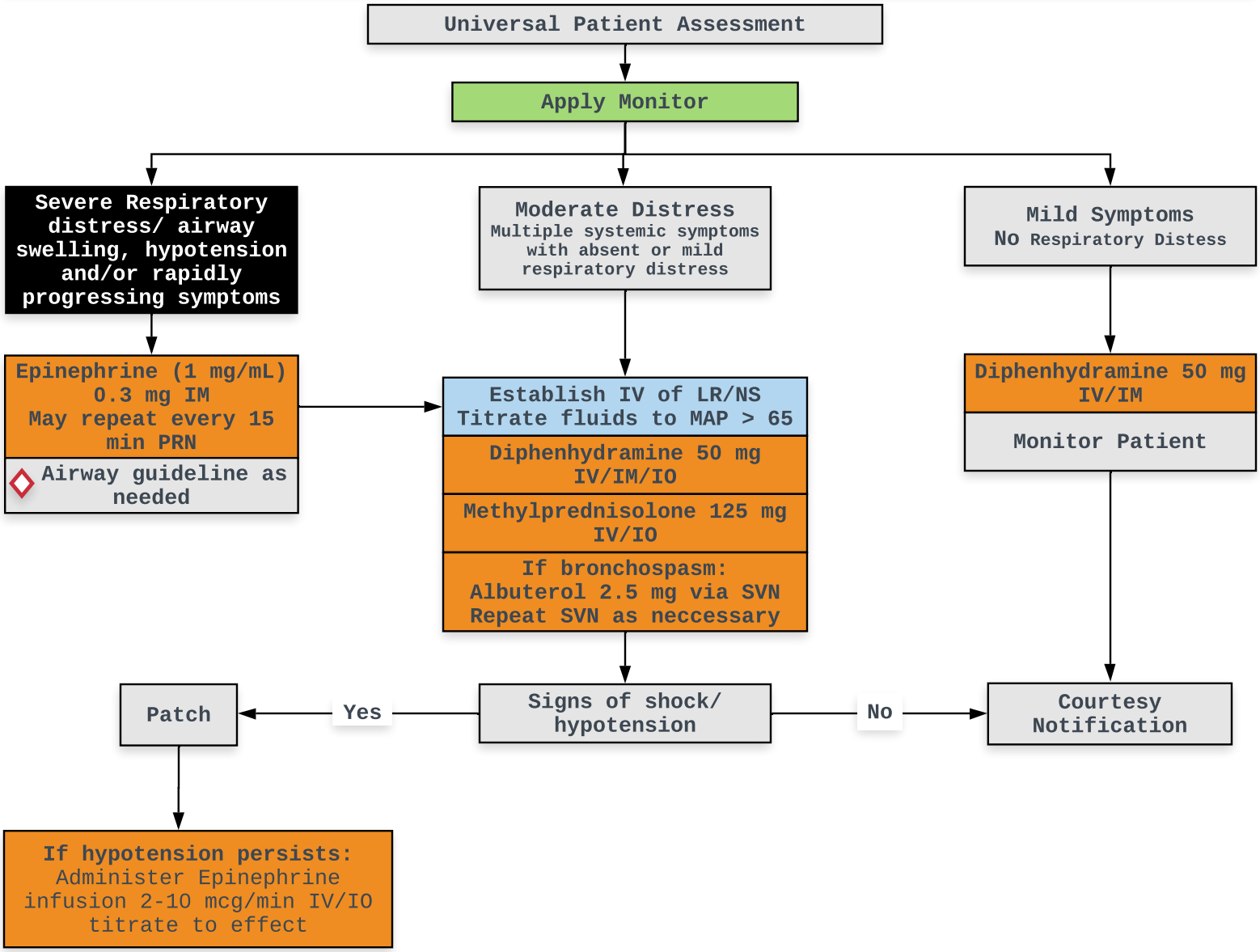
Differential
- Heart disease: WPW
- Sick Sinus Syndrome
- MI
- Electrolyte Imbalance
- Fever
- Hypoxia
- PE
- Thyroid Storm



Pearls:
- **If at any time patient becomes unstable, proceed to "Unstable" side**
- (1) Contact Medical Control to administer Diltiazem 0.25 mg/kg, if no reponse may repeat in 15 minutes 0.35 mg/kg. Maintenance infusion after conversion is 5-15 mg/hr or Amiodarone 150 mg administered over 10 min, if no response may repeat every 10 min. Maintenance infusion after conversion is 1mg/min
- (2) Do not delay synchronized cardioversion for IV access for an unstable patient
- For successful conversions of venticular arrhythmias with HR > 60 and no 2nd or 3rd degree blocks: administer Amiodarone 150 mg IV over 10 min then begin drip at 1 mg/min for first 6 hrs or Lidocaine 1 mg/kg and start infusion at 2-4 mg/min, reduce maintenance infusion of Lidocaine in half for patients with renal or hepatic disease or > 70 y/o. If patient recieved bolus doses prior to conversion administer maintenance infusion only.
- If delays in synchronization occur, or rhythm is polymorphic VT go immediately to Defibrillation at 120-200J biphasic per manufacturer recomendations.

Adult **Allergic Reaction/ Anaphylaxis**

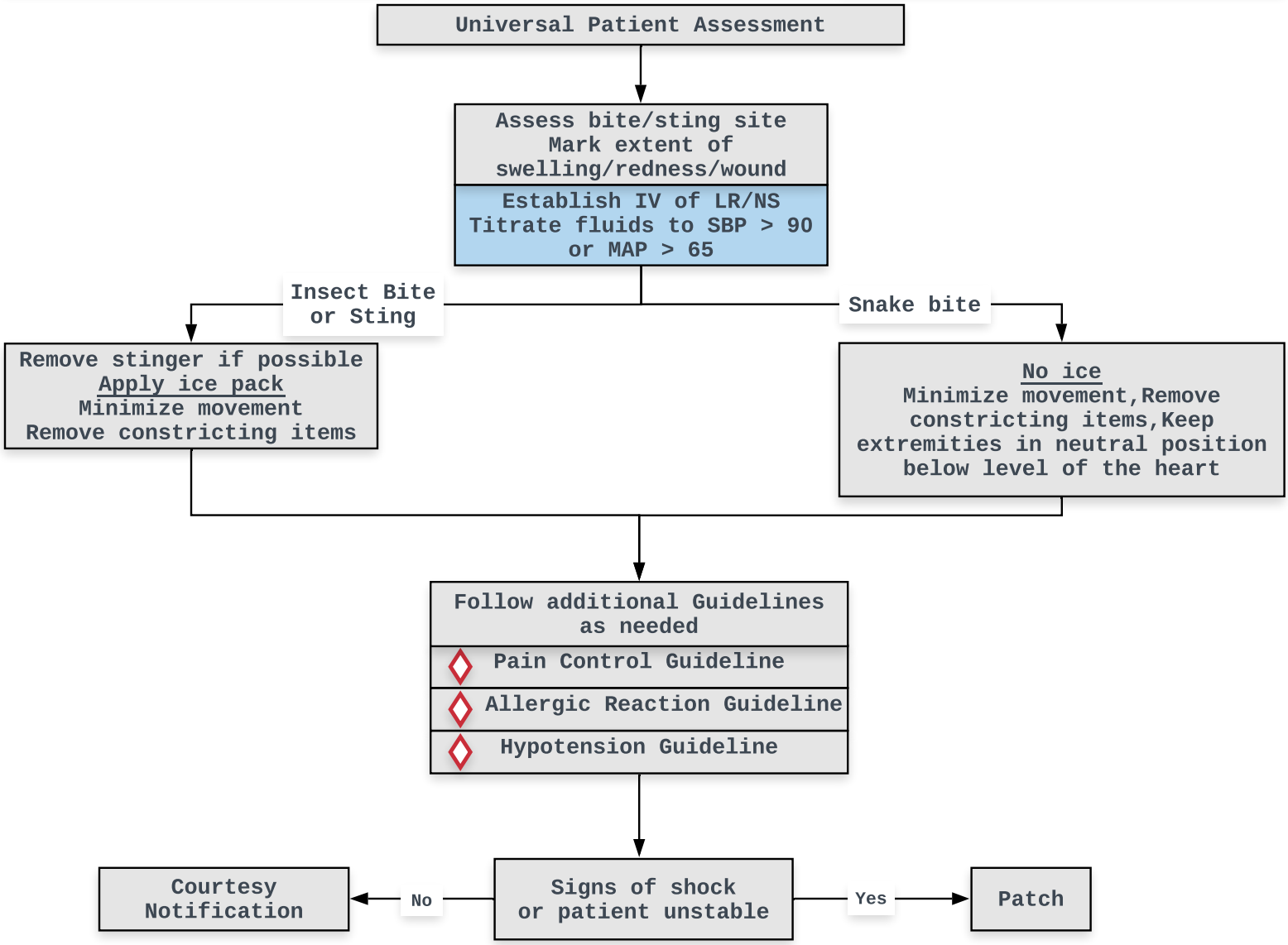
History	Signs/Symptoms	Differential
• Medication history • Onset and location • Past history of reactions • Medication allergy/ exposure • Food allergy/ exposure • Insect sting or bite	• Hypotension/ Shock • Chest/ throat constriction • SOB/ respiratory distress • Laryngeal edema/ voice changes • Coughing/ wheezing • Difficulty swallowing • Itching, hives or redness • Nausea, vomiting, diarrhea	• Uticaria (rash only) • Anaphylaxis (systemic effect) • Shock (vascular effect) • Angioedema • Aspiration/ airway obstruction • CHF • Asthma or COPD



Pearls:
- The faster the onset from exposure to symptoms, the more severe the reaction
- Use caution with Epinephrine in patients >45 y/o or with known coronary artery disease
- Administer diphenhydramine as soon as possible after IM epinephrine
- Establishment of an IV should not delay the adminstration of IM epinephrine for patients in extremis

Adult **Bites & Envenomation**

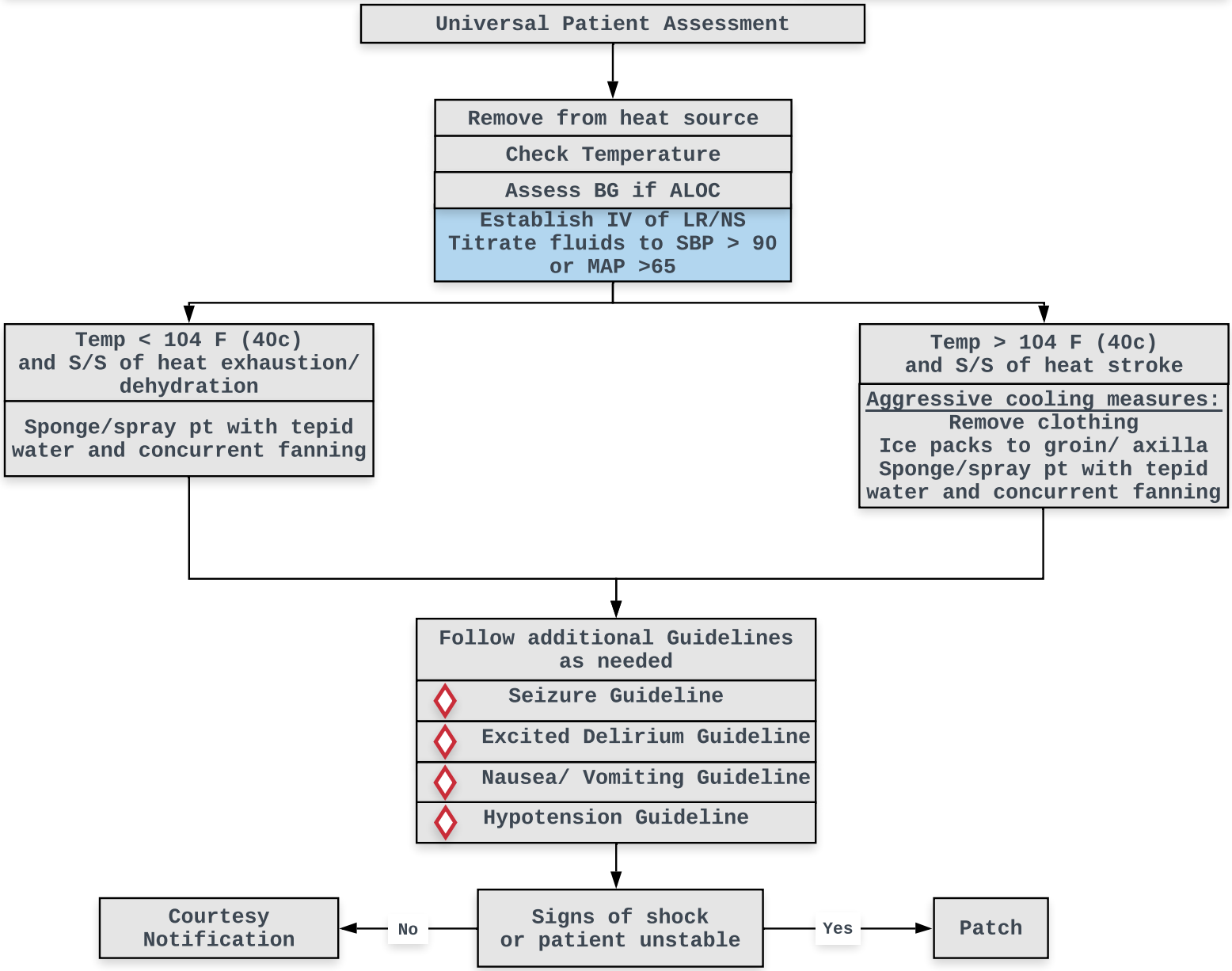
History	Signs/Symptoms	Differential
• Type of bite/sting • Description of animal involved • Time, location, size of bite/sting • Domestic vs. wild • Previous reaction to bite/sting • Immunocompromised patient	• Pain, soft tissue swelling, redness, rash • Blood oozing from the bite wound • Evidence of infection • SOB, wheezing • Allergic reaction, hives, itching • Hypotension or shock	• Animal/human bite • Snake/spider bite • Insect sting/bite • Infection risk • Rabies risk • Tetanus risk



Pearls:
- **DO NOT attempt to kill or capture animal**
- Venomous snakes in this area are generally of the pit viper family: rattlesnake, copperhead
- Black widow spider bites have minimal pain initially but may develop muscular pain and severe abdominal pain
- Evidence of infection: swelling, redness, drainage, fever, red streaks proximal to wound
- Mark area of advancing edema every 15 minutes with time noted

Adult **Environmental - Heat Related**

History	Signs/Symptoms	Differential
• Age • Past medical history • Medications • Exposure to environment • Exposure to extreme heat • Extreme exertion • Drug use • Muscle cramping/ fatigue	• ALOC • Hot, dry or sweaty skin • Mental status changes • Seizures • Hypotension or shock	• Fever • Dehydration • Medications • Hyperthyroidism (storm) • Excited delirium • Heat cramps • Heat exhaustion • Heat stroke

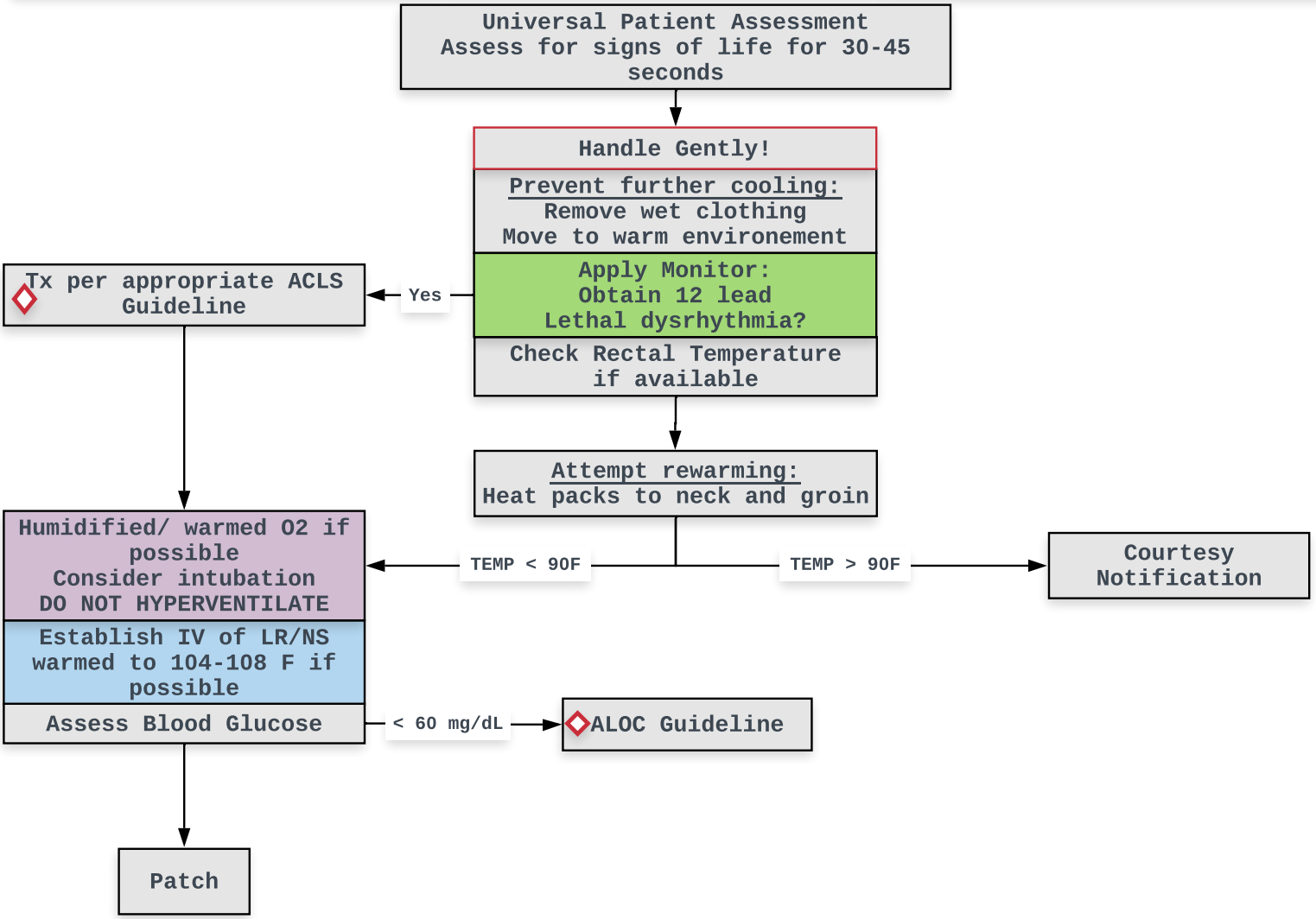


Pearls:

- Do not cool below 102 F
- Do not over cool and cause shivering and reoccuring heat buildup. If patient is shivering contact Medical Control to administer Midazolam
- Extremes of age are more prone to heat emergencies
- Drugs may contribute to hyperthermia: TCA, anticholinergics, ETOH, cocaine, amphetamines
- **Heat Cramps:** benign muscle cramping secondary to dehydration and not associated with elevated temperature
- **Heat Exhaustion:** dehydration, salt depletion, dizziness, fever, HA, cramping, N/V. VS: tachycardia, hypotension, and elevated temperature
- **Heat Stroke:** hyperthermia and ALOC or SZ with temperature > 104 F

Adult **Environmental - Hypothermia**

History	Signs/Symptoms	Differential
• Past medical history • Medications • Exposure to environment • Exposure to extreme cold • Extremes of age • Drug use: ETOH, barbiturates • Length of exposure	• Cold, clammy skin • Shivering • Mental status changes • Extremity pain or sensory abnormality • Bradycardia • Hypotension or shock	• Metabolic disorder • Toxins • Environmental exposure • Hypoglycemia • Shock

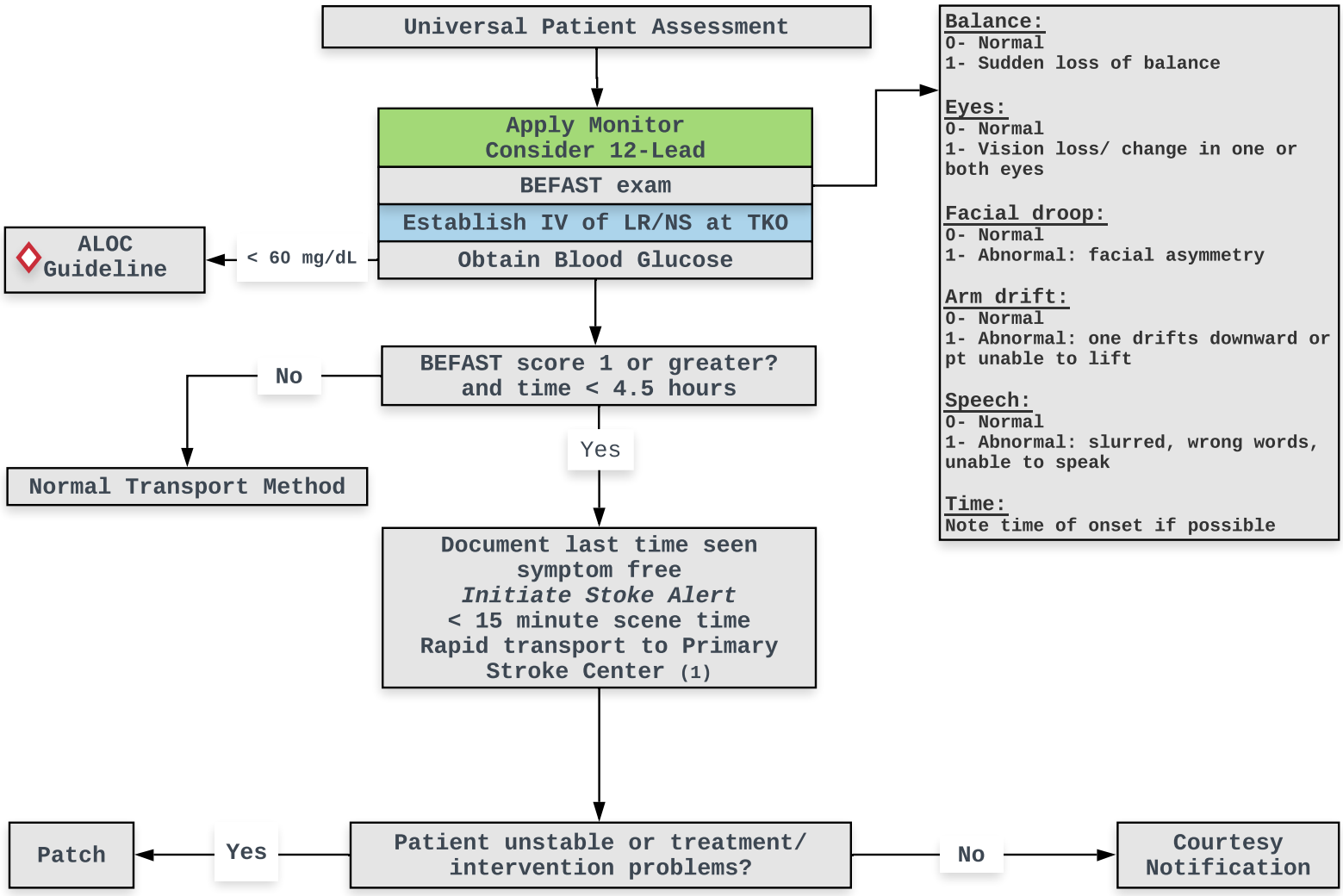


Pearls:

- Extremes of age are more prone to cold emergencies
- Temperatures < 93 F (34 C), shivering may diminish; at < 89 F (31 C) shivering may stop
- If temperature is unable to be measured, treat patient based on suspected temperature
- Hypothermia may produce profound bradycardia. Do not treat HR unless profound hypotension unresponsive to fluids
- Assess rectal temperature with hypothermia thermometer if available

Adult **Cerebral Vascular Accident - Stroke**

History	Signs/Symptoms	Differential
• Previous CVA, TIA • Previous cardiac/ vascular surgery • Associated diseases: DM, HTN, CAD • Atrial Fibrillation • Medications: blood thinners • History of trauma	• ALOC • Weakness/ paralysis • Blindness or other sensory loss • Aphasia/ dysarthria • Syncope • Vertigo/ dizziness • Vomiting • HA, SZ, HTN, hypotension • Respiratory pattern change	• Altered mental status • TIA • Seizure • Hypoglycemia • Hypoxia/ hypercarbia • Tumor • Trauma

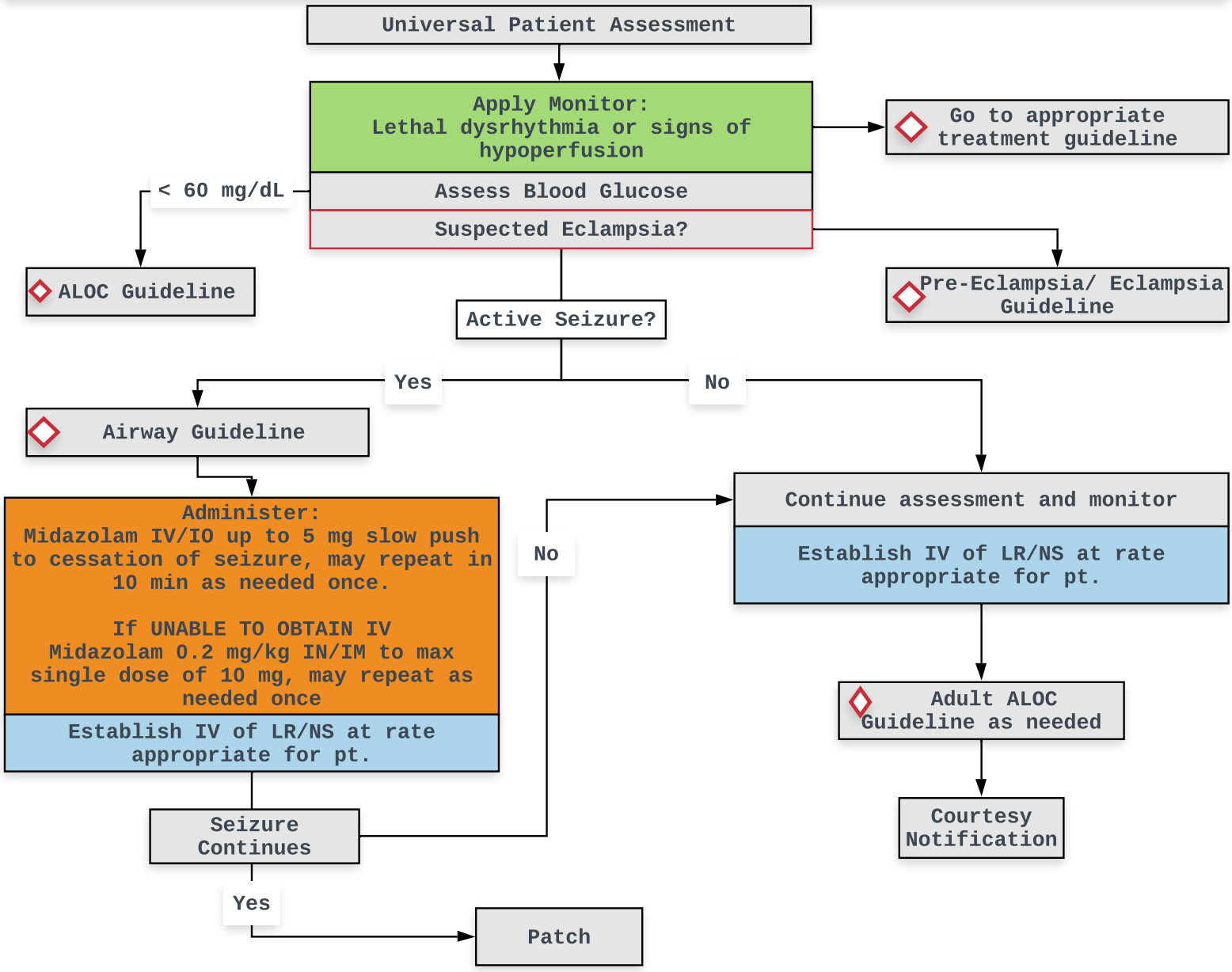


Pearls:

- (1) Determination of destination and transport method are dependent upon time of symptom onset, and total transport time
- If patient awoke from sleep with S/S attempt to determine how long patient was sleeping.
- Patients with ischemic stroke less than 4.5 hours old may be candidates for TPA therapy
- May initiate normal transport if BEFAST is positive and onset is greater than 4.5 hours
- Hypoglycemia can present as a localized neurological deficit, especially in the elderly

Adult **Seizure**

History	Signs/Symptoms	Differential
• Reported/ witnessed Seizure activity • Medical alert tag info • Head Injury • Trauma • Pregnancy • Seizures / Epilepsy • Diabetes	• Decreased mental status • Sleepiness • Incontinence • Observed seizure activity • Evidence of trauma • Unconcious	• Head trauma • Metabolic, hepatic, renal failure • Hypoxia • Electrolyte abnormality • Infection/ fever • Alcohol withdrawl • Eclampsia • Stroke • Hypoglycemia

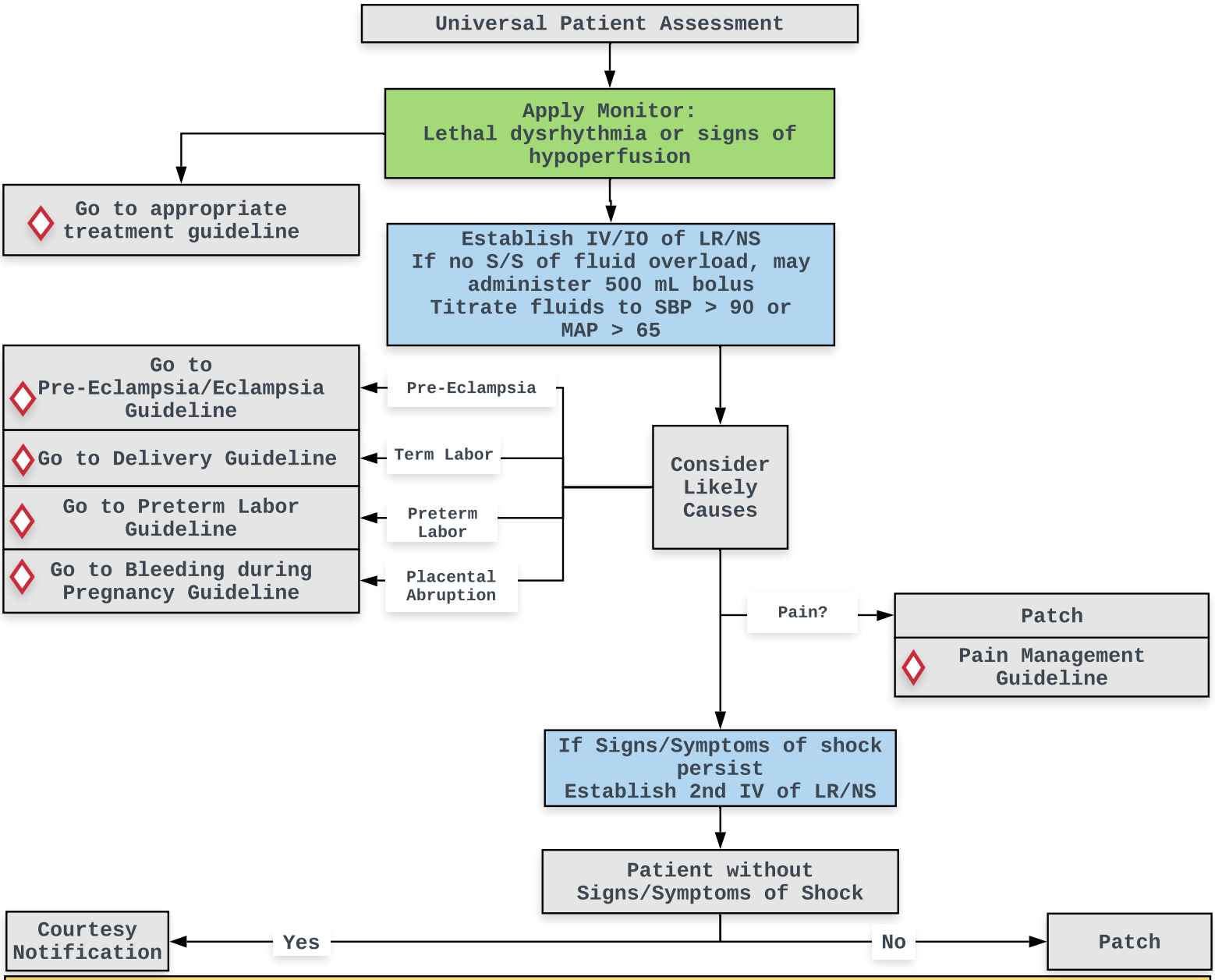


Pearls:

- Status epilepticus is defined as two or more consecutive seizures without a period of consciousness or recovery in between, or any seizure lasting longer than 5 minutes.
- Gereralized seizures are associated with loss of consciousness, incontinence, and tongue trauma
- Focal seizures effect only a part of the body and are not usually associated with loss of consciousness
- Jacksonian seizures are seizures which start as focal and become generalized
- Be prepared to assist ventilations especially if Midazolam is used

Obstetric Emergencies - **Abdominal Pain during Pregnancy**

History	Signs/Symptoms	Differential
• Abdominal Trauma • Spontaneous, Acute-Onset Pain • Possibility of Pregnancy • Smoking • Advanced Maternal Age • Endomitriosis • Cesarean Section Delivery	• Bleeding or Spotting • Pain with or without contractions • Abdominal Distention • Irregular Gravid Abdomen • Shock • Referred Pain	• Ectopic Pregnancy • Ruptured Ovarian Cyst • Uterine Rupture • Placental Abruption • Gastritis • Miscarriage • Pre-eclampsia • UTI



Pearls:

- Pre-eclampsia can be accompanied by RUQ pain, and can transition quickly to eclampsia
- Ruptured ectopic pregnancy may or may not present with bleeding or spotting
- Uterine rupture is often associated with prior C-Section delivery and can be precipitated by trauma or subsequent onset of labor with attempted vaginal delivery
- Braxton-Hicks contractions are frequently associated with dehydration, and are not as strong as contractions that occur with labor
- Consider transporting left lateral recumbent if patient is > 20 weeks gestation to take weight/ pressure off inferior vena cava

Obstetric Emergencies - **Bleeding During Pregnancy**

History	Signs/Symptoms	Differential
• Smoking, drugs • Obesity • Diabetes • Trauma • Spontaneous bleeding • Known Placenta Previa	• Bleeding • Abdominal Pain • Lack of Abdominal Pain • Weakness/Dizziness • Tachycardia • Hypotension	• Placenta Previa • Placental Abruption • Other Placenta Pathologies • Idiopathic Bleeding or Spotting

Universal Patient Assessment

Apply Monitor

Ensure adequate oxygenation

Avoid Supine Position (1)

Establish IV/IO LR/NS

Airway Guideline as needed

Transport any obtainable tissue or clots in a sterile container to the hospital; estimate blood loss

For Signs of poor perfusion, Infuse fluid bolus of 500 mL up to 30 mL/kg as rapidly as possible Repeat as necessary

Third Trimester or BP Unresponsive to Initial Fluid Bolus: Establish 2nd Large Bore IV

SBP > 90 or MAP > 65 Patient alert, oriented & improving? Contiue fluid therapy according to patient response

No

Patch

Consider Norepinephrine 2-10 mcg/min IV PUMP only or Consider Dopamine infusion 5-20 mcg/kg/min titrated to SBP >90 mmHg or MAP > 65

Yes

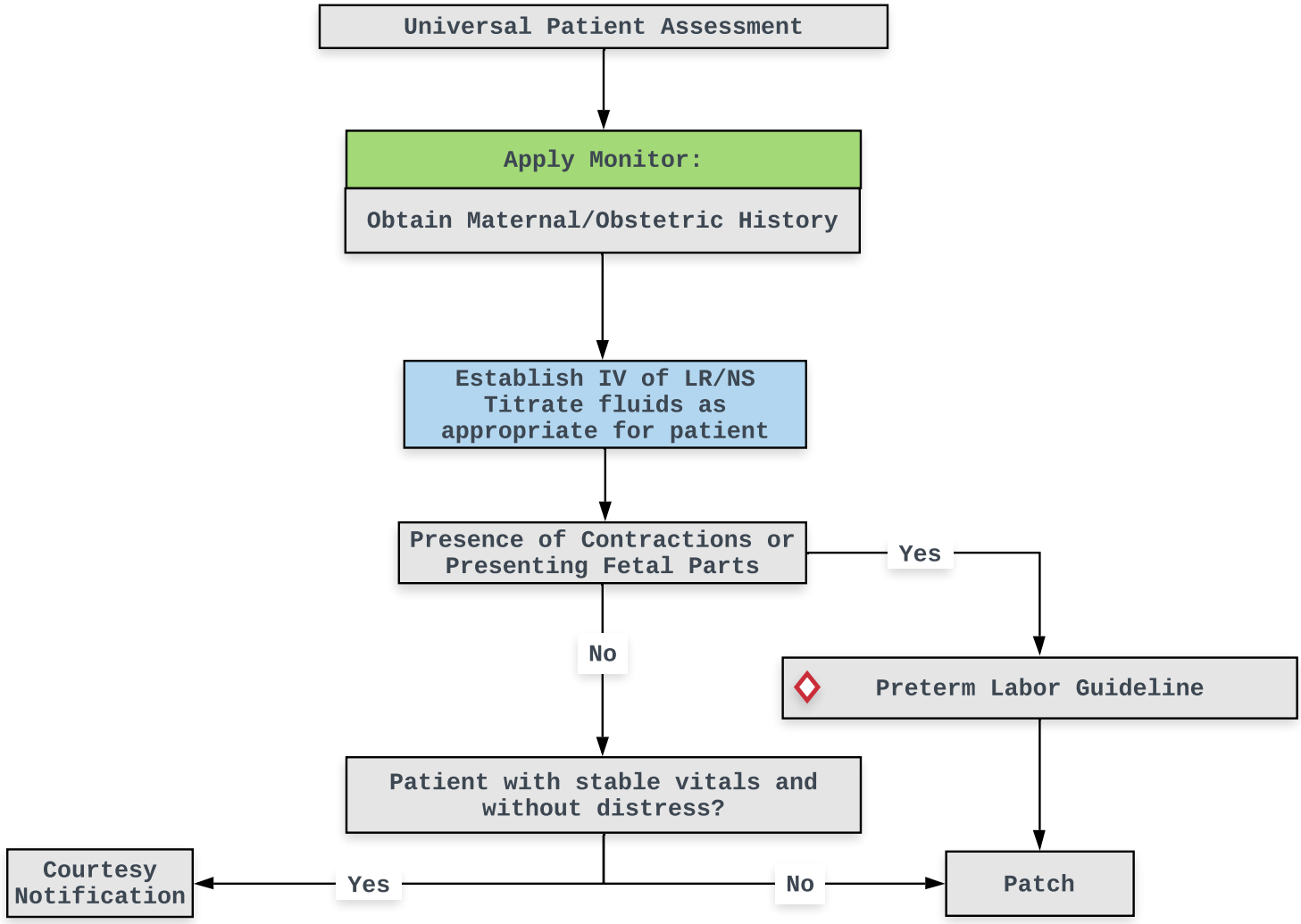
Courtesy Notification

Pearls:
(1) Consider transporting left lateral recumbent if patient is > 20 weeks gestation to take weight/ pressure off inferior vena cava

- Maternal blood volume increases by 30% by the time she reaches the middle of the third trimester; hemodynamic changes due to maternal blood loss may present later than expected and are late signs of hypoperfusion for the fetus
- Other hemodynamic changes include increased cardiac output, reduced systemic vascular resistance, and (usually) reduced blood pressure
- Signs of fetal distress include fetal tachycardia, fetal bradycardia, lack of fetal movement
- If possible, avoid using antecubital veins for IV access in late-term pregnancy

Obstetric Emergencies - **Preterm Rupture of Membranes**

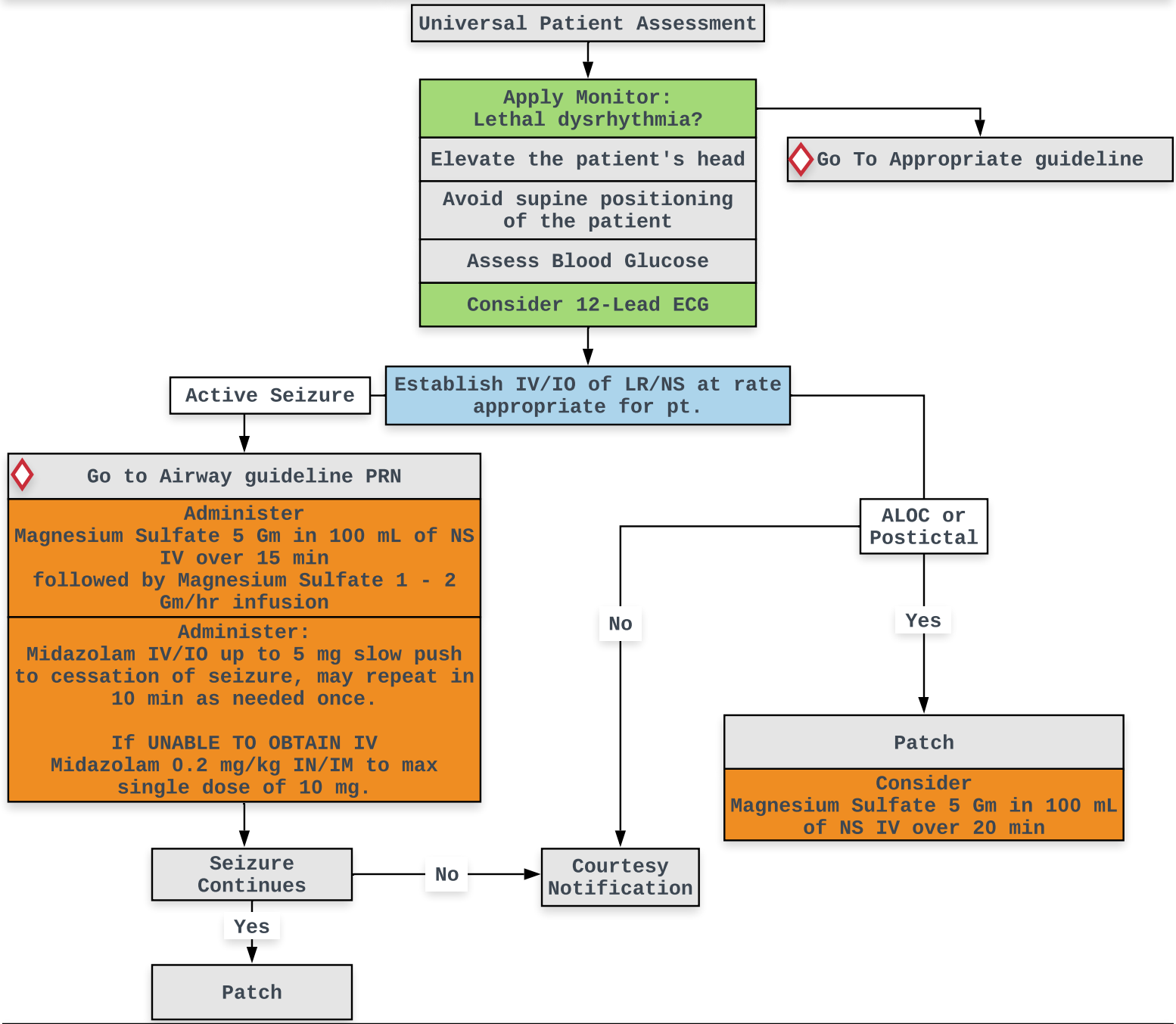
History	Signs/Symptoms	Differential
• Gravida (total pregnancies) • Para (# of births) • Abortions (spontaneous/ elective) • Smoking, drug/ ETOH use • Prior pre-term deliveries • Uterine Distention • Infection • Prenatal care • Last Menstrual Period	• Leaking of fluid from the vagina, esp. when laughing or coughing • Report of a sudden rush of fluid, followed by continued leaking	• Preterm Labor • Premature Rupture of Membranes (without labor) • Other Fluid Leaking?



Pearls:
- Preterm Rupture of Membranes does not always mean that delivery is imminent, inquire about the presence of contractions
- Inspection for presentation of fetal parts, umbilical cord or crowning may be appropriate
- The patient may require emergent delivery of the baby or treatment at the hospital to prevent birth for as long as possible, depending on condition of the baby, gestational age, and risk of continuing the pregnancy

Obstetric Emergencies - **Pre-Eclampsia/Eclampsia**

History	Signs/Symptoms	Differential
• Pregnant or delivered within the past 6 weeks • Swelling of the face, hands, ankles • Diabetes • Kidney Disease • Pre-existing Hypertension • Obesity • Previously diagnosed pre-eclampsia	• Nausea/Vomiting • RUQ Pain • Visual Disturbances • Seizures • ALOC • Edema - peripheral and/or pulmonary • Hypertensive (140/90 or greater)	• Epileptic Seizures • Eclamptic Seizures • Pre-Eclampsia • Increased ICP (other causes) • Stroke

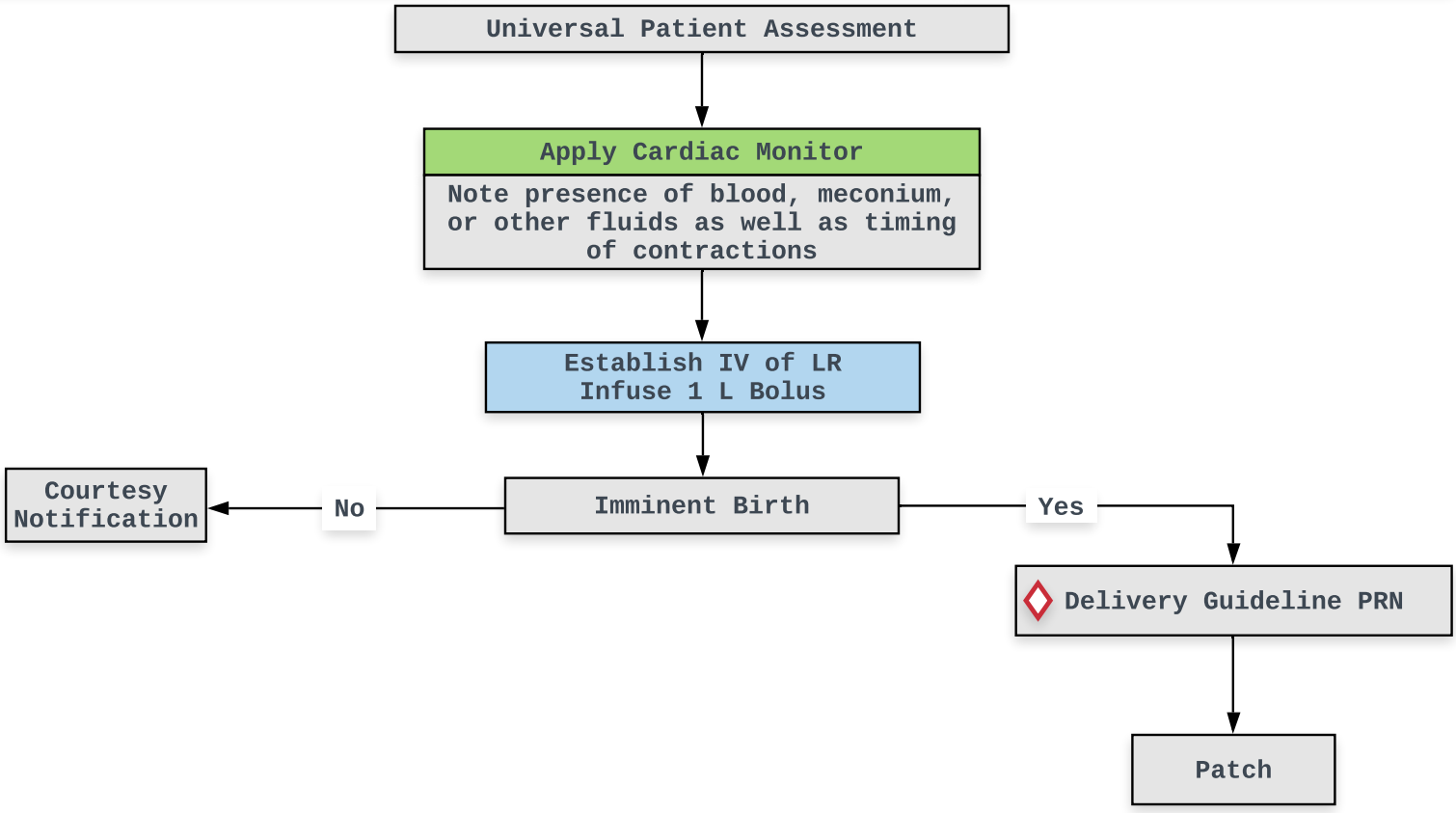


Pearls:

- Women with pre-eclampsia can develop eclampsia quickly
- Pre-eclamptic and eclamptic patients are at increased risk for heart attack and stroke
- Eclampsia increases the risk of placental abruption
- Blood pressures of ≥ 160/110 require emergency treatment
- If magnesium is administered, monitor carefully for apnea, loss of deep tendon reflexes, somnolence and hypotension
- GTPAL: Gravida, Term (37+ weeks), Preterm (20-37 weeks), Abortions (prior to 20 wks), Living Children

Obstetric Emergencies - **Preterm Labor**

History	Signs/Symptoms	Differential
• Pregnancy < 37 weeks Gestation • Uterine Bleeding • Infection • Previous Preterm Deliveries • Smoking, Alcohol/Drug Use • Pre-eclampsia	• Contractions • Rupture of Membranes	• Braxton-Hicks Contractions • Preterm Labor



Pearls:

Very small Preterm Neonates may be kept warm by wrapping the body in plastic after drying. DO NOT use standard hot packs, as these WILL CAUSE BURNS

- Avoid childbirth in a moving vehicle, if possible
- Not all preterm neonates will require resuscitation, however they are at increased risk of requiring some assistance and must be monitored very closely; consider risk vs. benefit of transporting baby and mother separately
- If delivery occurs, observe the mother for complications such as post-partum hemorrhage
- Venous access in a premature neonate can be very challenging; consider using a flashlight to visualize veins through the skin, using care not to cause burns

Obstetric Emergencies - **Field Delivery**

History	Signs/Symptoms	Differential
• Para (# of births) • Gravida (total pregnancies) • Abortions (Spontaneous and Otherwise) • Number of living children • Last menstrual period • Expected due date • Prenatal Care • Known complications • Drug/Alcohol Use • Presence, strength, duration of contractions	• Contractions (typically under 2 min apart) • Rupture of membranes (usually) • Urge to push • Bulging or crowning at the perineum • Vaginal discharge or bleeding	• Term Labor • Preterm Labor • Prolapsed cord • Placenta previa • Abruptio placenta

Appearance
Pulse
Grimace
Activity
Respirations

Universal Patient Assessment

If Time Permits

Apply Cardiac Monitor

Abnormal Presentations Guideline

Establish IV of LR/NS

Prepare a work area that allows for as much comfort and privacy as possible

Ensure that there are adequate sheets and towels, and prepare OB Kit

Head is the Presenting Part

No

Yes

As the head crowns and delivers, apply gentle pressure to the perineum to prevent excessive tearing while supporting the baby's head

Gently guide the baby's body as it delivers, keeping the baby at or below the level of the mother's abdomen until the umbilical cord is cut. Note the Time of Birth.

Nuchal Cord

If the umbilical cord is around the baby's neck, attempt to slip it over the head. If this is not possible, double clamp and cut the cord while continuing delivery

Dry, Warm, and Stimulate the baby, suction secretions if needed

Clamp the umbilical cord about 6 inches from the baby's body, and again about 8 inches from the baby's body, then cut the cord when pulsations between clamps are no longer felt

Assess and Record APGAR at 1 min and again at 5 min after birth

Shoulder Dystocia

In cases where the baby's head is stuck and appears to "turtle," flex the pt's legs into a high knee-chest position; if this is unsuccessful, apply manual suprapubic pressure and attempt to push the baby's anterior shoulder under the pubic bone to allow delivery; if these are not successful, transport immediately

Assess Baby's Blood Glucose

Baby in Distress

Neonatal Resuscitation Guideline

BGL < 50

Pediatric ALOC Guideline

After the baby is dry, give baby to the mother and encourage attempts to breast feed

Allow the Placenta to deliver and transport it with the patients in a basin or bag

Excessive Maternal Bleeding

Post-Partum Hemorrhage Guideline

Normal Transition

Courtesy Notification

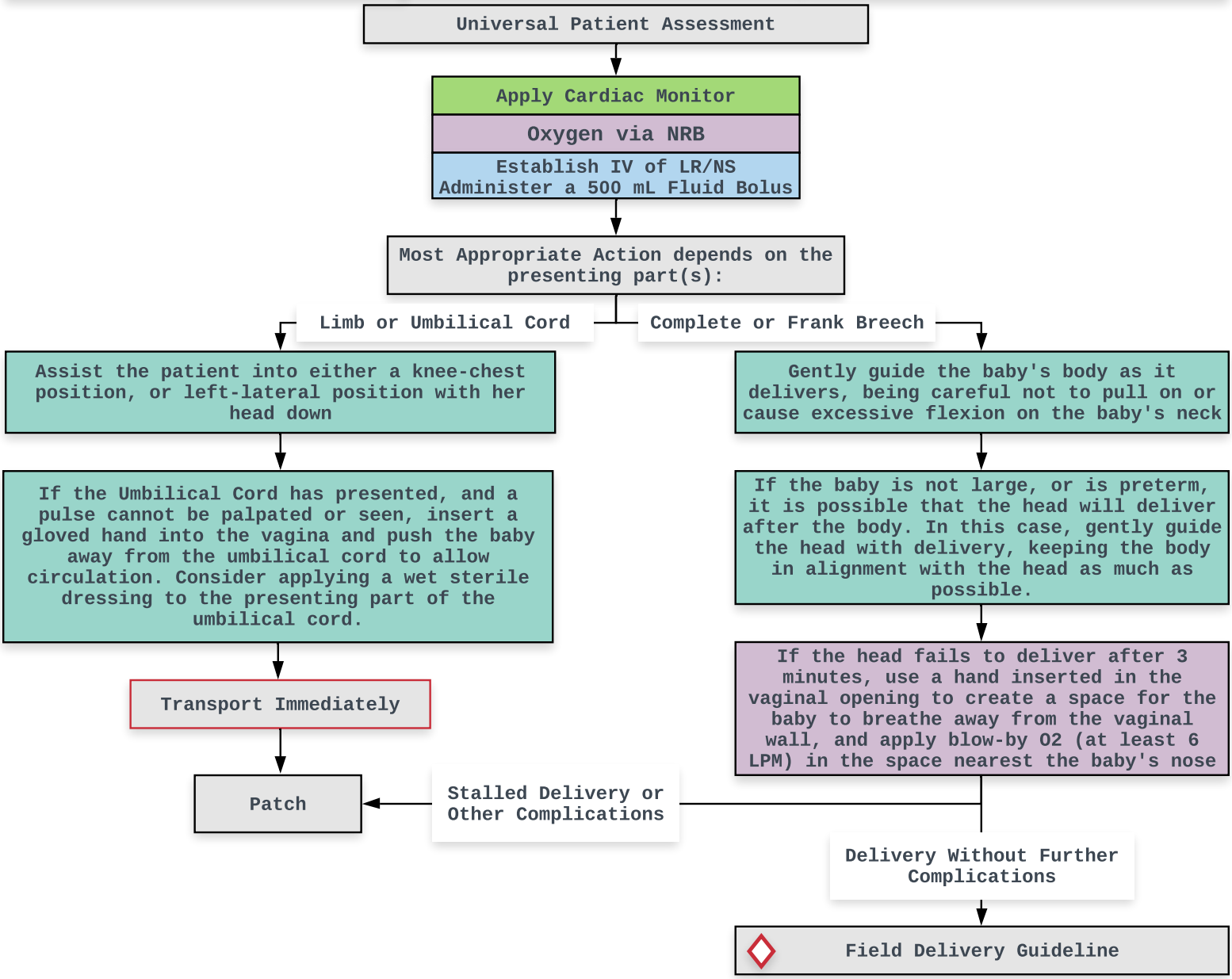
Complications

Patch

Pearls:
- When the baby is born, consider: Is baby term? Is baby vigorous? Breathing or crying? Heart Rate > 100? This will assist with both an APGAR score and in deciding whether the baby requires assistance.
- Birth can occur without rupture of membranes. Always check for crowning prior to moving the patient.
- Post-Partum Hemorrhage is blood loss in excess of 500 mL after delivery
- The placenta usually delivers within 20 minutes of the baby. Retained parts can contribute to post-partum hemorrhage
- Fundal massage may be required in cases of uterine atony
- Avoid fundal pressure if suspected shoulder dystocia

Obstetric Emergencies - **Complicated Presentation Deliveries**

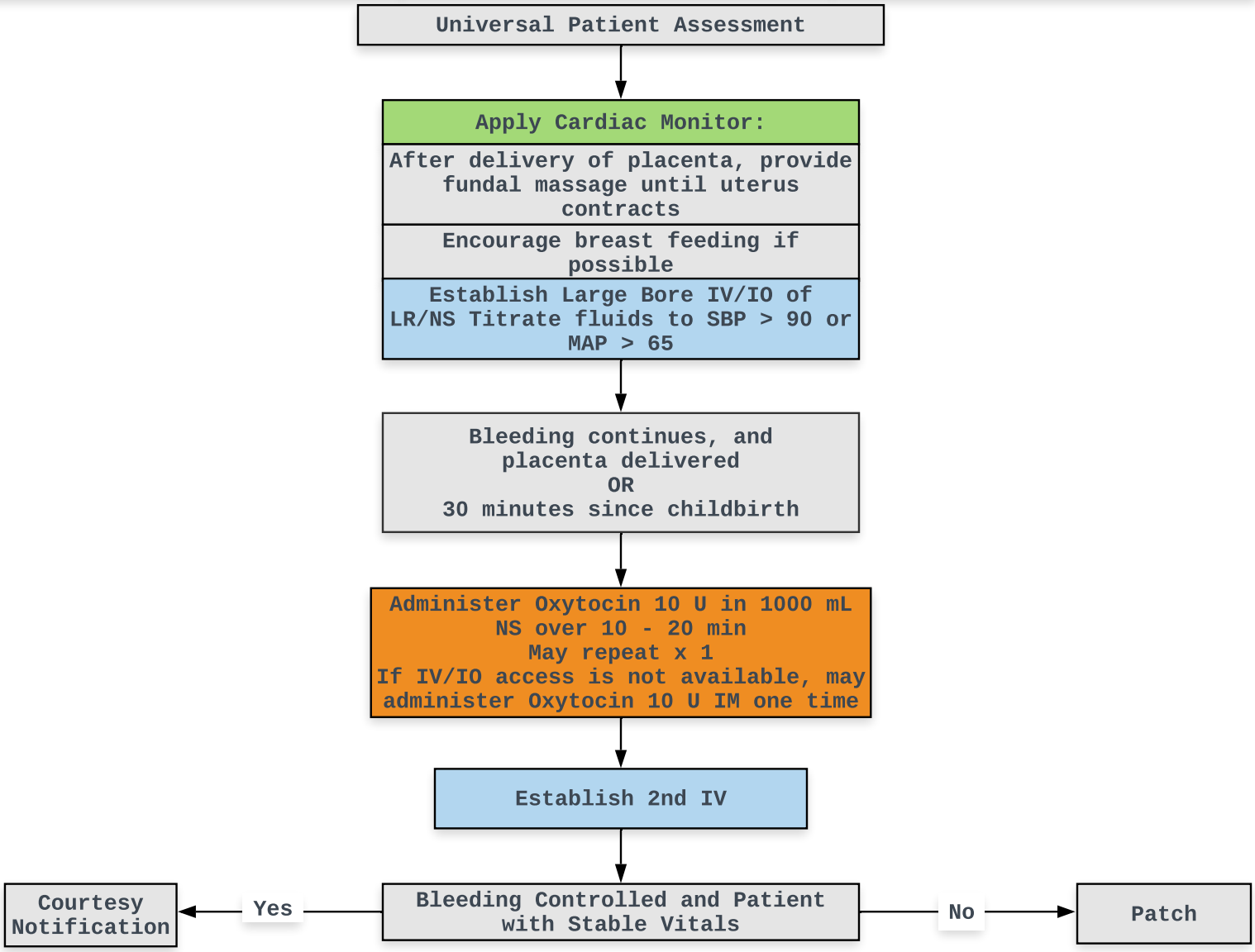
History	Signs/Symptoms	Differential
• Para (# of live births) • Gravida (total # of pregnancies) • Abortions (Spontaneous and Otherwise) • Number of Living Children • Last Menstrual Period • Expected Due Date • Prenatal Care • Known Complications • Drug/Alcohol Use • Presence, Strength, Duration of Contractions	• Labor/Contractions • Ruptured Membranes (usually) • Presenting part other than a head • Fetal Distress	• Breech Presentation • Limb Presentation • Umbilical Cord Presentation



Pearls:
- Greater risk for these situations includes preterm labor, multiparity, polyhydramnios, fetal malformations, placenta previa, and others
- Be prepared to resuscitate the baby if delivery occurs
- Prolapsed cord and breech or limb presentation may occur simultaneously

Obstetric Emergencies - **Post-Partum Hemorrhage**

History	Signs/Symptoms	Differential
• Recent Delivery (within 24 hours) • Prolonged delivery • Multiple deliveries • History of Post-Partum Hemorrhage	• Bleeding after delivery in excess of 500 mL • Tachycardia • Hypotension (late) • Uterine Atony (Boggy Uterus)	• Post-Partum Hemorrhage • DIC or other Coagulopathy • Uterine Inversion • Uterine Rupture • Retained Placenta • Uterine Atony



Pearls:
- Post-Partum Hemorrhage is defined as blood loss > 500 mL after delivery; it is the most common cause of maternal morbidity
- The most common cause of post partum hemorrhage is uterine atony due to prolonged labor or mulitple gestations
- Monitor vital signs carefully after childbirth

Adult **Pain Management**

(does not apply to cardiac chest pain or pregnancy)

History	Signs/Symptoms	Differential
• OPQRST • Severity • Past Medical History • Medications • Drug allergies • Medications taken prior to arrival • Previous narcotic use/ tolerance?	• Severity (pain scale) • Quality • Radiation • Relation to movement, respiration • Increased with palpation of area	• Musculoskeletal • Visceral (abdominal) • Pleural/ Respiratory • Neurogenic • Cardiac • Renal (Colic)

Universal Patient Assessment

↓

Provide basic supportive measures:
positioning, reassurance, psychological support, splinting, cold packs, padding, etc. as appropriate

↓

Establish IV of LR/NS

↓

If patient is not hypotensive

Consider Fentanyl 50 mcg IV/IO/IN/IM may repeat every 5 min PRN to a total of 200 mcg

or

Consider Morphine Sulfate 2-6 mg IV every 5 min PRN to a total of 20 mg

If no IV access, may administer Morphine 5 mg IM, may repeat in 10 min PRN

If patient is hypotensive or Fentanyl / Morphine are believed to be inadequate

Consider Ketamine 15 mg IV, may repeat x 1 in 10 min if needed

If no IV access, may administer Ketamine 30 mg IN/IM, may repeat x 1 in 10 min if needed

↓

If inadequate pain relief and patient is not hypotensive

Consider Midazolam 2.5 mg IV for large muscle spasms

↓

Patient Stable & adequate pain relief?

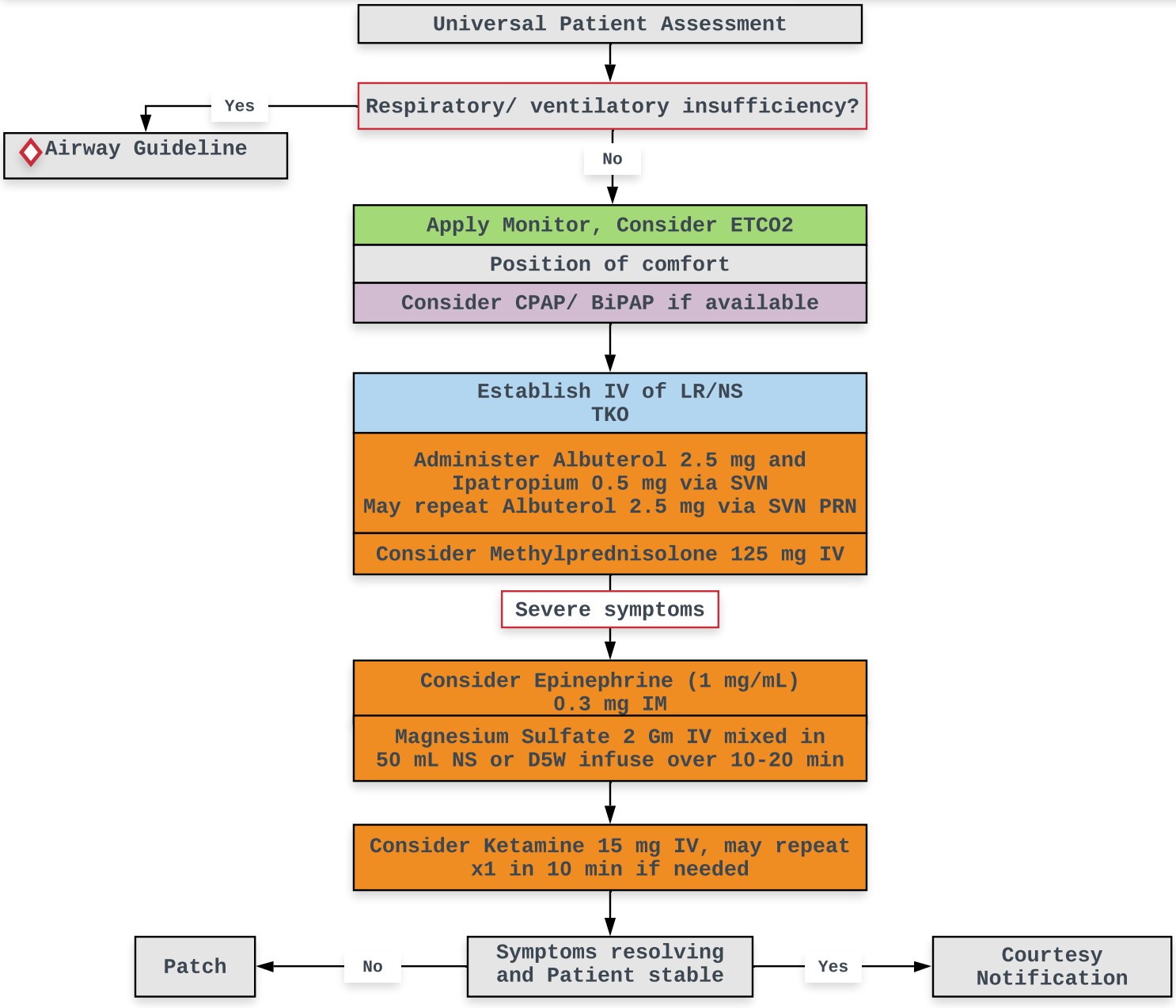
- **No** → **Patch**
- **Yes** → **Courtesy Notification**

Pearls:

- For geriatric or patients with small stature, consider starting with 25 mcg of Fentanyl
- For IN administration, draw up Ketamine dose then NS to achieve a volume of 0.5 mL and administer IN dose via MAD device per manufacturer's recommendations
- Pain severity should be documented pre- and post-medication delivery and at disposition
- Monitor closely for oversedation
- Consider EtCO2 monitoring, if possible, on patients receiving pain management

Adult **Respiratory Arrest or Insufficiency - Bronchospasm**

History	Signs/Symptoms	Differential
• Asthma; COPD - chronic bronchitis, emphysema, CHF • Home treatment (oxygen, steroids, inhalers) • Medications: steroids, inhalers) • Toxic exposure, smoke inhalation	• Shortness of breath • Pursed lip breathing, Decreased ability to speak • Increased respiratory rate/ effort • Wheezing, rhonchi, rales, stridor • Use of accessory muscles • Fever, cough • Tachycardia	• Asthma/ COPD • Anaphylaxsis • Aspiration • Pneumonia • Pulmonary embolus • Cardiac (MI or CHF) • Hyperventilation • Inhaled toxin • Pericardial tamponade

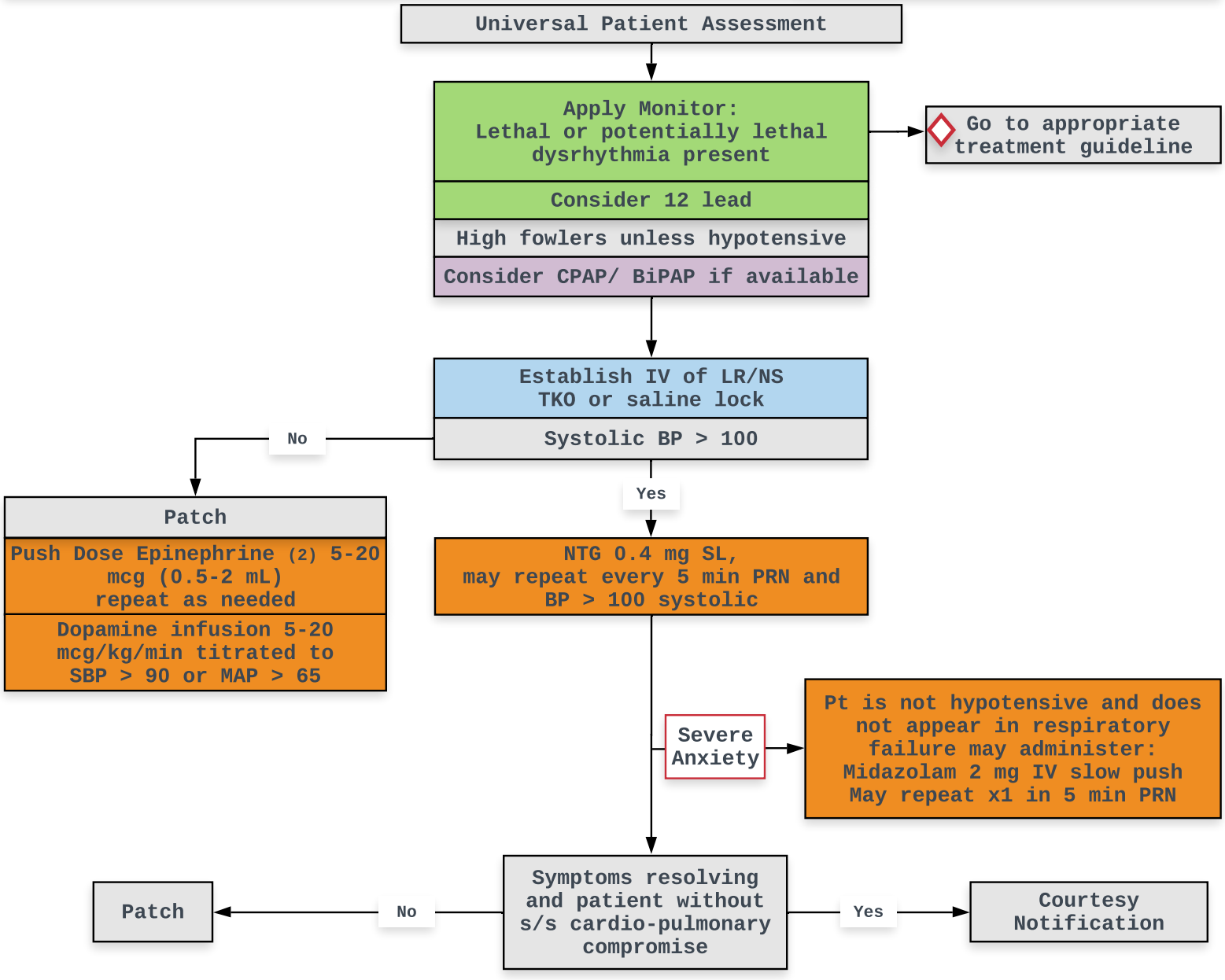


Pearls:

- Consider the use of SVN therapy via inline BVM in patients who are tiring or who appear to have decreased tidal volumes
- Use caution with Epinephrine in patients >45 y/o or with known coronary artery disease
- CPAP/ BiPAP and medications can be administered prior to IV attempts
- Respiratory distress with subsequent hypoxia/ hypercarbia is often associated with restlessness, confusion, and anxiety warranting more aggressive therapies
- Absent breath sounds in respiratory distress is a pre-respiratory arrest sign

Adult **Respiratory Arrest or Insufficiency - Pulmonary Edema**

History	Signs/Symptoms	Differential
• Congestive heart failure • Past medical history • Medications (digoxin, lasix) • **Viagra, Levitra, Cialis use (1)** • Cardiac history (MI)	• Respiratory distress, bilateral rales • Jugular vein distension • Pink frothy sputum • Peripheral edema, diaphoresis • Hypotension, shock • Chest pain • Hypoxia	• Myocardial infarction • Congestive heart failure • Asthma • Anaphylaxis • Aspiration • COPD • Pleural effusion • Pulmonary embolus • Pneumonia • Toxic exposure



(2) **Mix 1 mL Epinephrine 0.1mg/mL in 9 mL NS = 10 mcg/mL**

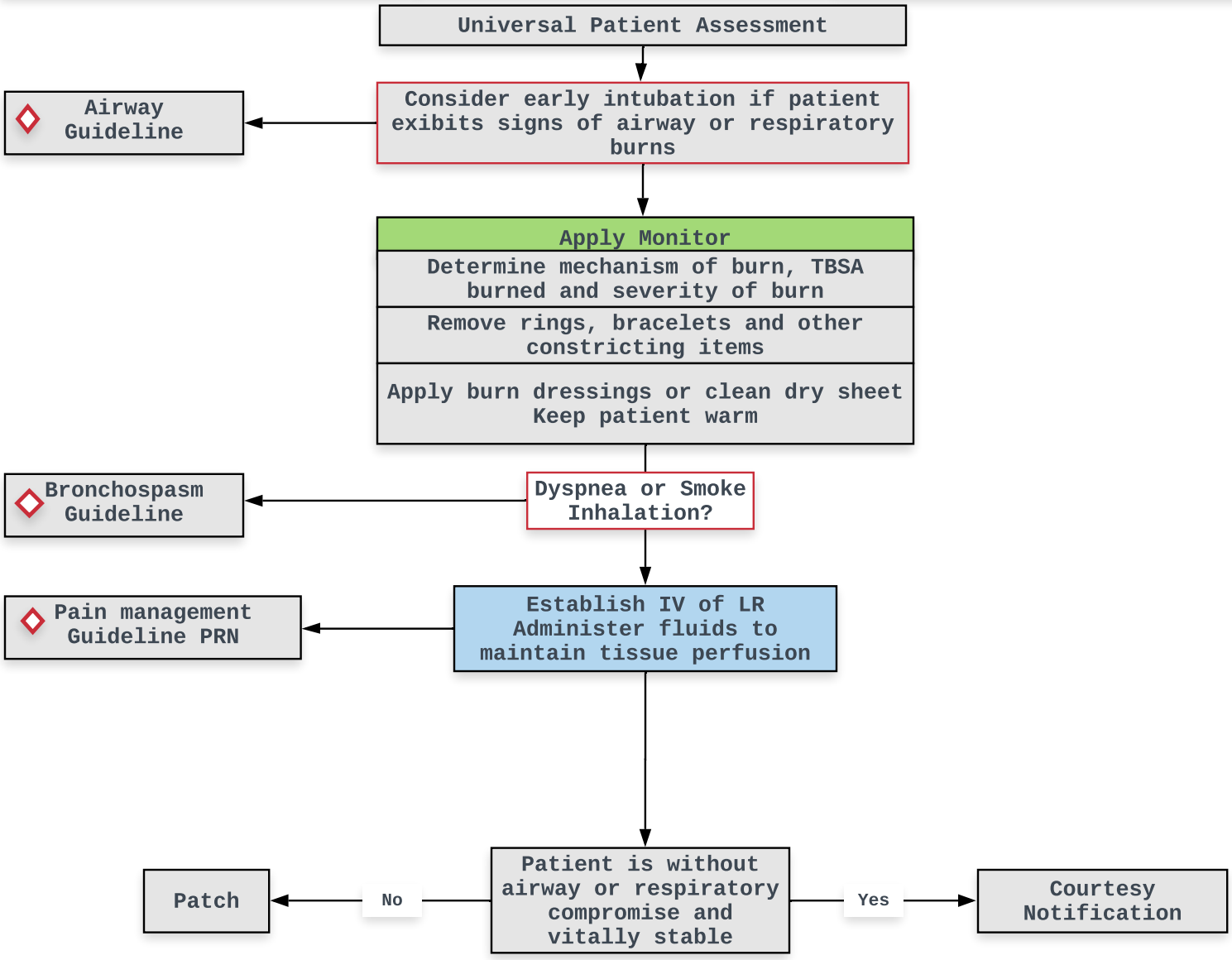
Pearls:

(1) Avoid NTG in any patient who has used Viagra or Levitra in the past 24 hrs or Cialis in the past 48 hrs unless directed by Medical Control

- Patients who appear to be tiring or have decreased tidal volume may require respiratory assist
- High flow O2 should be used in any patient who appears distressed
- Repeat assessment of LOC, BP, respiratory status, and lung sounds before and after NTG administration
- Do not delay definitive therapy to initiate CPAP/ BiPAP

Adult **Trauma - Burns**

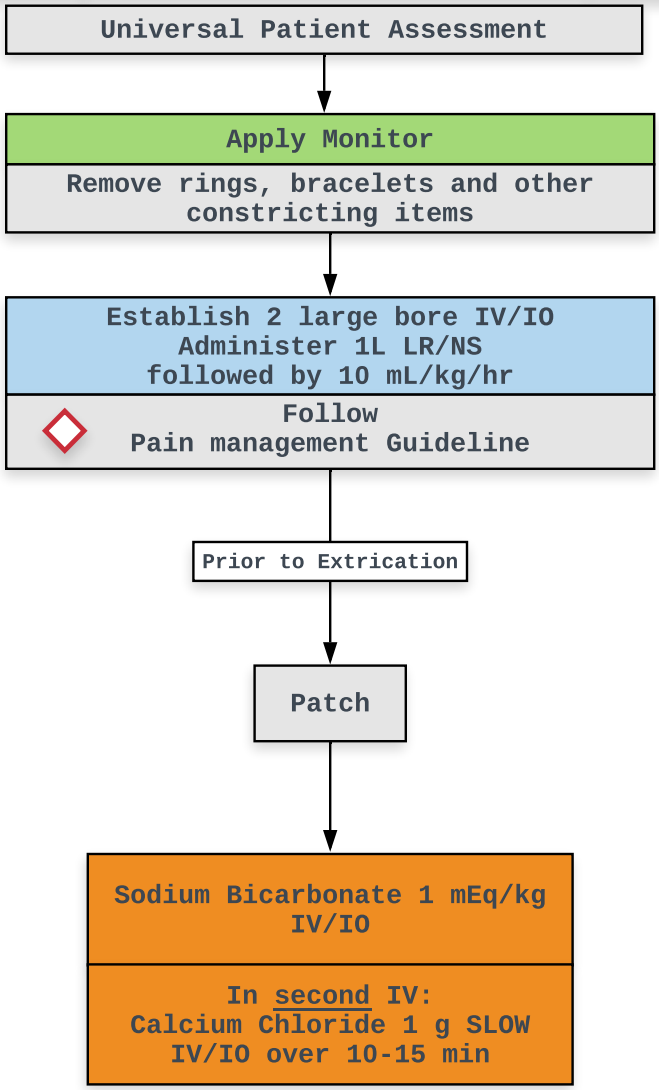
History	Signs/Symptoms	Differential
• Type of exposure (heat, gas, chemical) • Inhalation • Time of injury • Past medical history and medications • Trauma • LOC	• Burns, pain, swelling • Dizziness • LOC • Hypotension/ shock • Airway compromise/ distress, singed facial or nasal hair, hoarseness/ wheezing	• Superficial: red and painful • Partial thickness: blistering • Full thickness: painless and charred or leathery skin • Chemical, thermal, electrical, radiation



Pearls:
- Stop the burning. Appropriately decontaminate any patient exposed to chemicals or radiation.
- Burn patients are prone to hypothermia
- If patient or clothing is still burning, cool hot areas immediately. Flush chemical burns for at least 20 min
- Observe urine output during longer transports

Adult **Trauma - Crush Injury**

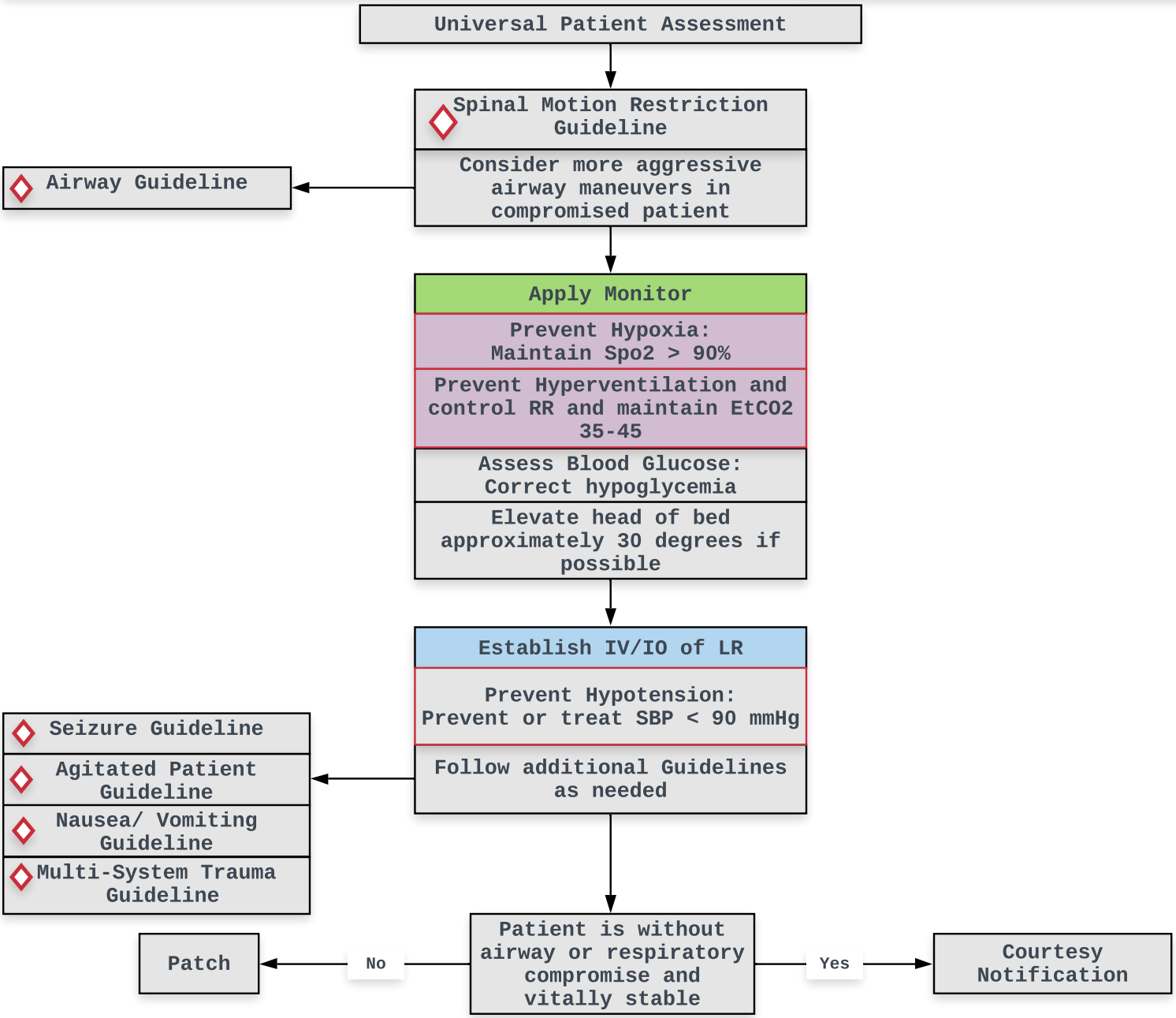
History	Signs/Symptoms	Differential
• Prolonged immobility • Compressed body part(s) • Time/ duration of compression • Renal/ cardiac history • Additional trauma • Loss of conciousness	Trapped extremity or torso with compression of vascular supply lasting > 60 minutes S/Sx of Compartment syndrome - Pain on passive stretch - Paresthesia - Paralysis - Pallor - Pulselessness • Hypotension/ Shock • Altered mental status	• Skin irritant exposure • Toxic inhalation • Hypo/ hyperthermia • Hyperkalemia • Dehydration • EKG abnormalaties • Additional trauma



Pearls:
- Hydration should begin prior to extrication whenever possible. Large volume resuscitation prior to removal of the crushed object is critical to preventing secondary renal failure and death.
- Crush injury is usually seen with compression of 4-6 hours but can occur in as little as 20 minutes
- Monitor patient for signs of compartment syndrome.
- The larger the mass crushed (e.g. more limbs) the greater the likelihood of severe rhabdomyolysis and renal failure.
- Crush injury may cause profound electrolyte disturbances resulting in dysrhythmias.
- Do not overlook treatment of additional injuries, airway compromise, hypo/ hyperthermia.

Adult **Trauma - Head Injury with ALOC**

History	Signs/Symptoms	Differential
• Mechanism: Blunt/penetrating • Loss of conciousness • Bleeding • SAMPLE • Evidence of trauma • Helmet use or damage to helmet	• Pain, swelling, bleeding • Altered mental status • Respiratory distress/ failure • Vomiting • Pupillary abnormalities • CSF leaking from ears or nose	• Skull fracture • Alcohol intoxication • Spinal injury • Brain injury/ bleed

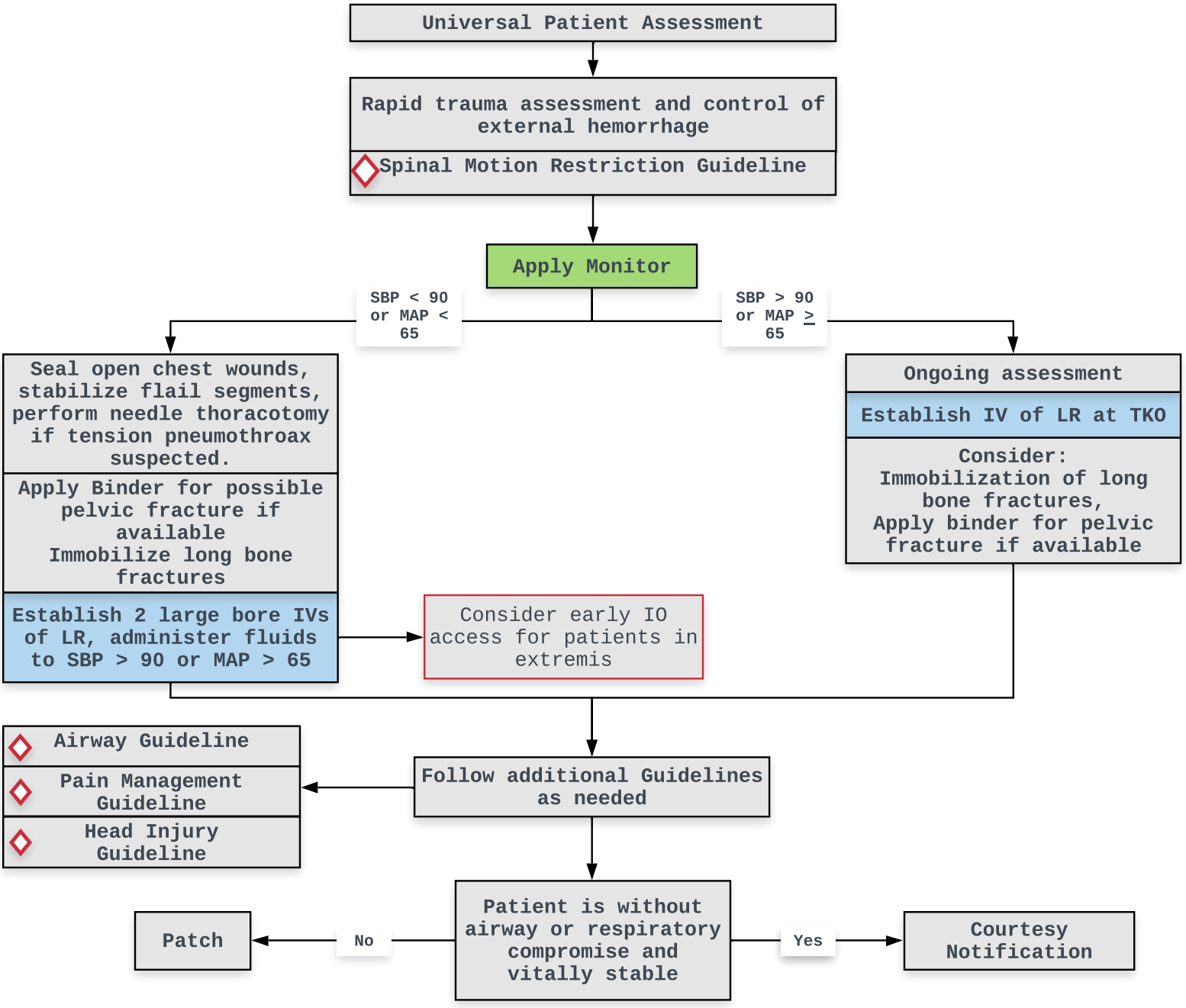


Pearls:
Prevent "H Bombs" -Hypoxia, Hyperventilation, Hypotension, Hypoglycemia

- If hypotensive, consider spinal shock or additional occult injury as source
- Consider IO early if no IV and patient is in extremis
- Nasal intubation should be last resort as it can increase ICP
- Suction as nessessary but note prolonged suctioning can increase ICP
- ICP increases with many maneuvers; supine or trendelenberg position (avoid), prolonged intubation attempts, positive pressure ventilation, unnecessary noise, pain, and many others. Attempt to mitigate or avoid these issues as time/situation permits.

Adult **Trauma - Multi-System**

History	Signs/Symptoms	Differential (life threatening)
• Mechanism of injury • Damage to structure or vehicle • Others injured or dead • Speed and details of MVC • Restraints / protective equipment	• Cardiac Arrest • Altered mental status • Respiratory distress/ failure • Pain, swelling, bleeding	• Chest: Tension pneumothorax, Flail chest, pericardial tamponade, open chest wound, hemothorax • Intra-abdominal bleeding • Pelvis/ femur fracture • Spine fractures/ cord injury • HEENT (airway obstruction)

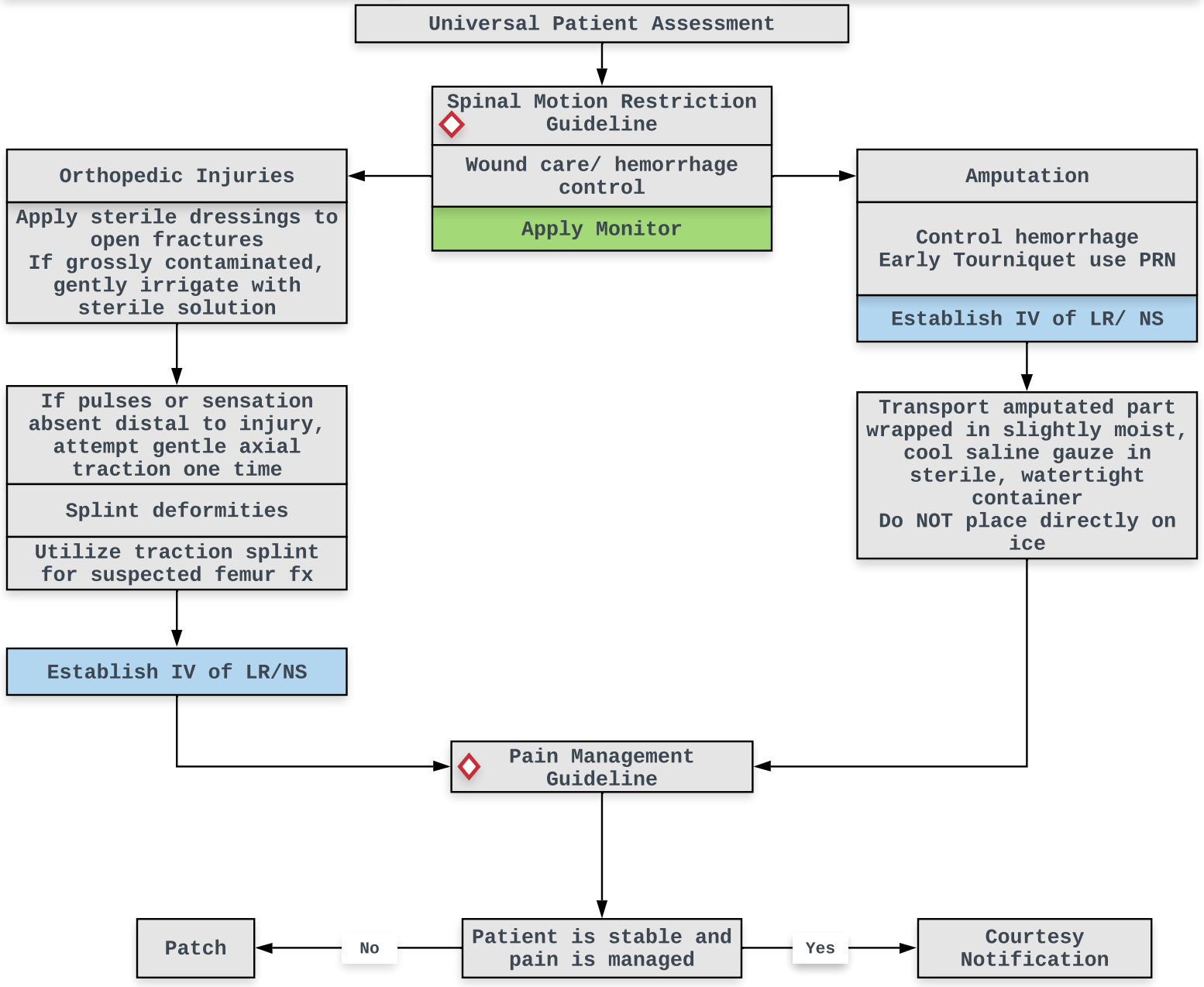


Pearls:

- Consider chest decompression with signs of shock and diminished/ absent breath sounds. If patient arrests, perform bilateral needle decompression
- Minimize scene time and perform interventions enroute when possible
- For severe bleeding from extremity not rapidly controlled with direct pressure, consider early tourniquet use
- Keep patient warm
- Caution should be used in the administration of fluids greater than 1 Liter.

Adult **Trauma - Musculoskeletal Injury**

History	Signs/Symptoms	Differential
• Type of injury • Mechanism: crush/ penetration/ amputation • Open vs closed wound/ fracture • Wound contamination	• Pain, swelling, bleeding • Deformity • Altered sensation/ motor function • Diminished pulse/ capillary refill • Decreased extremity temperature	• Deformity • Contusion • Abrasion • Puncture/ Penetration • Burn • Tenderness • Laceration • Swelling



Pearls:
- Assess neurovascular status before and after splinting
- Don't apply traction splint if suspicion of hip joint or knee injury on affected side
- Splint the joint above and below bone injuries and the bones above and below joint injuries
- Urgently transport any injury with vascular compromise

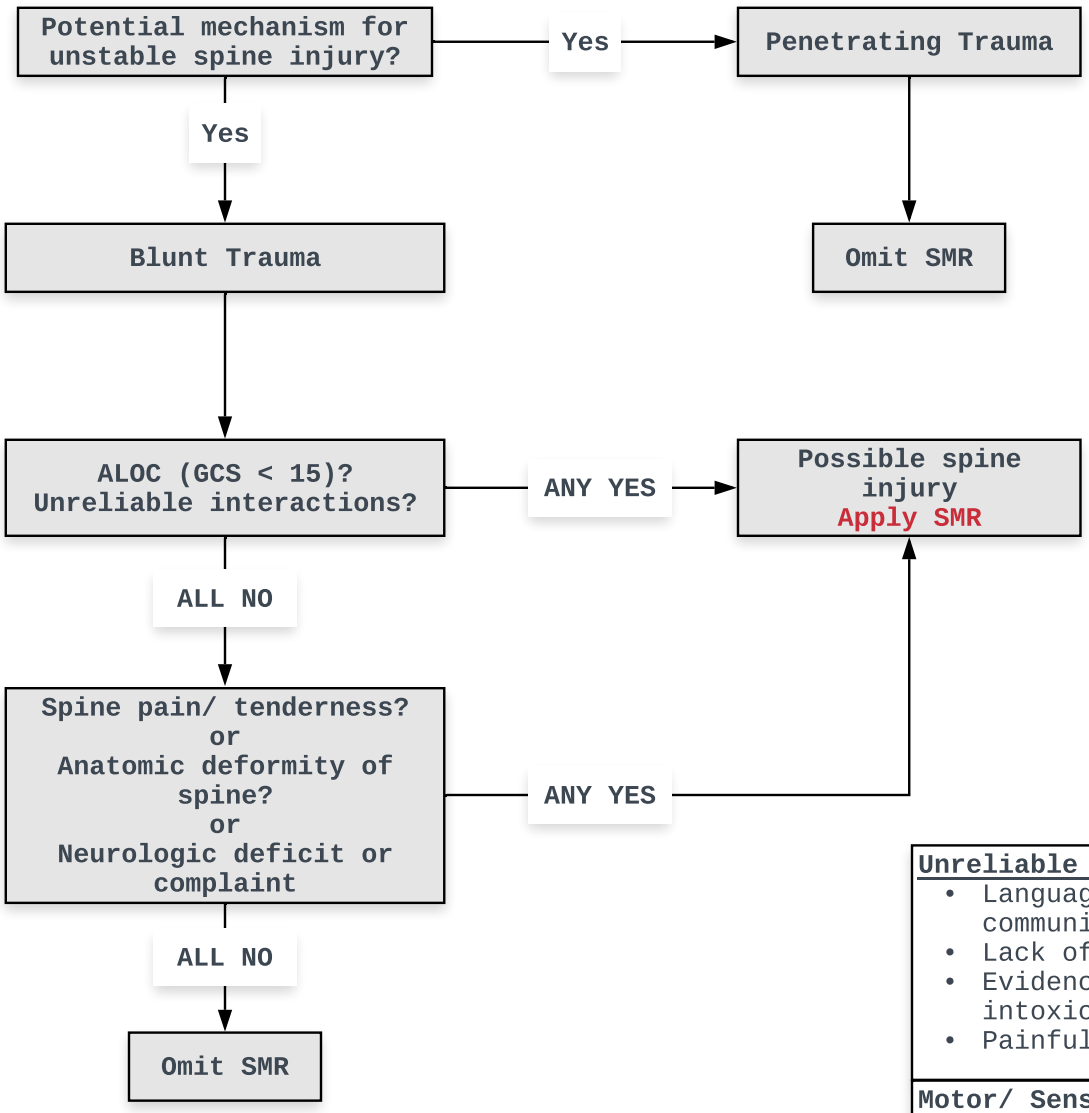
Adult **Spinal Motion Restriction Age ≥ 15**

Low-Risk
- Simple rear-end collision
- Ambulatory on scene
- No neck pain on scene
- No midline cervical tenderness

Consider omission of SMR in patient with GCS=15

High-Risk
- Age > 65
- Trauma triage criteria based on mechanism
- Axial loads/ diving injuries
- Sudden acceleration/ deceleration, lateral bending forces to neck, torso, pelvis
- Numbness, tingling, parasthesias

IF ANY OF THE ABOVE, STRONGLY CONSIDER SMR



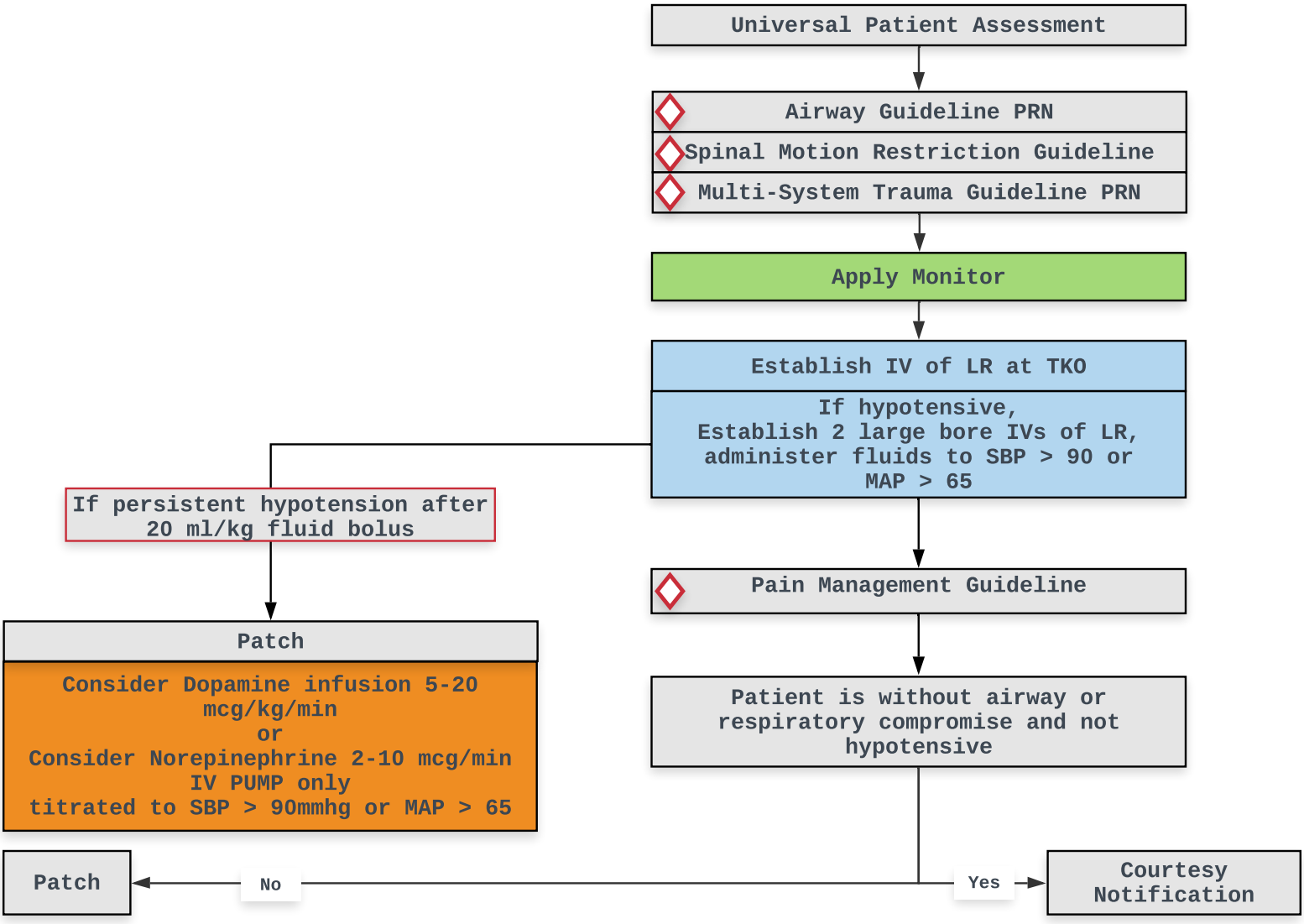
Unreliable Patient Interactions
- Language Barriers, inability to communicate
- Lack of cooperation during exam
- Evidence of drug/alcohol intoxication
- Painful **distracting** injuries

Motor/ Sensory Exam
- Wrist/hand extension bilaterally
- Foot plantar flexion bilaterally
- foot dorsiflexion bilaterally
- gross sensation in all extremities
- Assess for parethesias

Pearls:
- The decision NOT to implement spinal immobilization is the responsibility of all providers
- In the very old or young a normal exam may not be sufficient to rule out spinal injury
- Consider the use of a soft collar and vacuum mattress for SMR if avilable

Adult **Trauma - Spinal Injury**

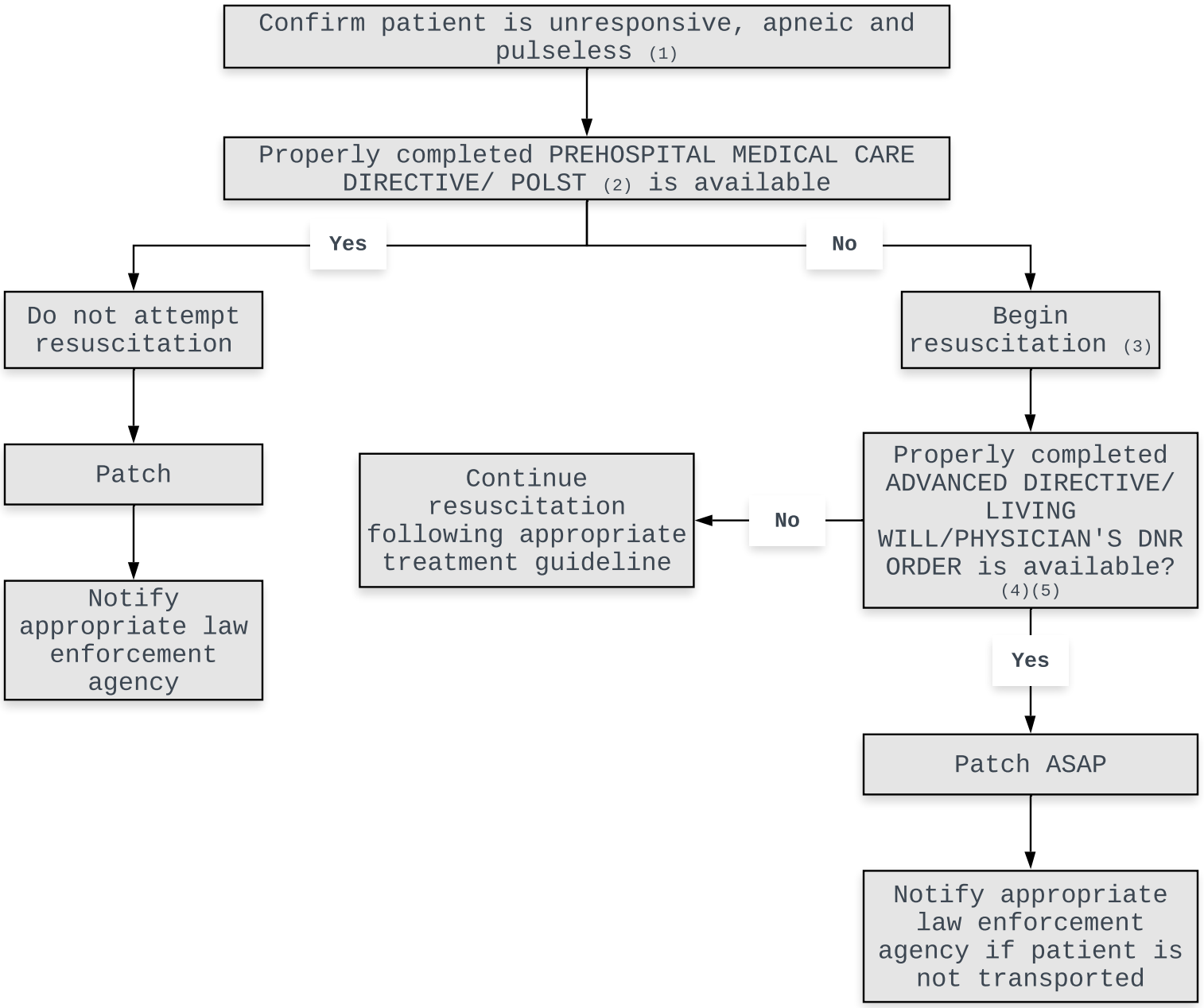
History	Signs/Symptoms	Differential
• Motor vehicle accident • Fall • Diving Injury • Assault • Sports Injury • Penetrating Trauma (GSW) • Tumor/Cancer	• Flushed skin below line of demarcation • Diminished or absent sensation to extremities or below a Specific Level of the Spine • Unable to protect airway • Slow-Normal Heart Rate • Loss of Fine Motor Control • Hypotension • Incontinence or Urinary/Bowel Retention • Priapism (in males)	• Aortic Dissection • Spinal Cord Infection • Vertebral fracture • Spinal Abscess • Anterior Cord Symdrome • Central Cord Syndrome • Brown-Sequard Syndrome • Tumor



Pearls:

- Thorough assessment of the spine is important. Ensure each vertebra is palpated and note any stepoffs, deformities, crepitus or increases in pain or decrease in sensation
- Patients with neurogenic shock often become hypotensive, even after large amounts of fluid, monitor closely and anticipate the need for Dopamine or Norepinephrine

Health Care Directives/ Do Not Attempt Resuscitation Orders



Pearls:

(1) It is not the intent of advanced directives to deny treatment of other medical conditions not related to the terminal illness, pain medication or other supportive care

(2) Box A of form is marked Do Not Attempt Resuscitation. If any person who qualifies as a surrogate objects to the DNAR and a Prehospital Medical Care Directive is available the PMCD may be followed. If any other form of health care directive is presented that is dated earlier than the POLST and conflicts with the POLST and a PMCD is present with a date later than the health care directive then the PMCD may be followed

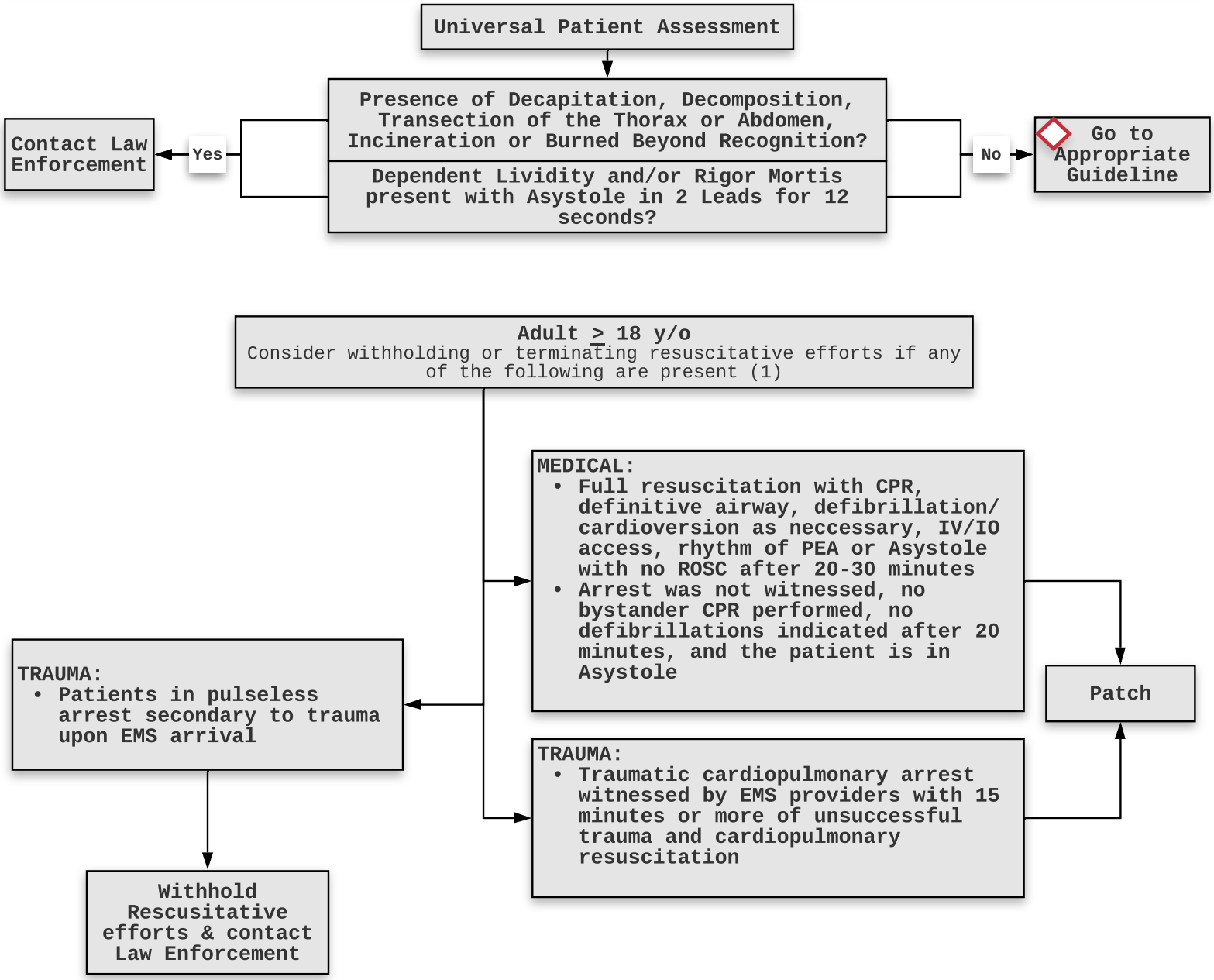
(3) Provide careful discussion with any family members present who may not want resuscitation attempts of need to communicate with on-line medical direction about patient's written healthcare directives prior to terminating resuscitation

(4) If there are no written healthcare directives available and there are family members available, discuss with medical direction the family's desires for resuscitation or terminating efforts

(5) If patient is in a healthcare facility or is being transported interfacility with a physician's DNR in place it is not necessary to being CPR

Termination of Efforts or Withholding Resuscitation

History	Signs/Symptoms	Differential
• Recent Illness • Recent Severe Blunt Trauma • Recent Severe Penetrating Trauma	• Pulseless • Apneic	• Overdose • Severe Hypothermia • Tension Pneumothorax • Pericardial Tamponade • Other treatable cause of arrest



Pearls:
(1) For indications where no treatment is required the provider may withold resuscitative efforts and patch for medical direction.
- Consider Potentially Reversible Causes: Cold Water Drowning, Severe Hypothermia, Witnessed Traumatic Arrest (Tension Pneumothorax), Overdose, Hypoxemia
- The survival rate for any out of hospital cardiac arrest is low, however consideration should be given to arrest interval (down time of 10 minutes or less), especially in trauma
- Younger, healthier patients tend to have better outcomes even with prolonged resuscitations
- Deceased individuals must be left in the care of the appropriate law enforcement agency

Trauma Triage/ Transport

Universal Patient Assessment

Physiologic Criteria:
- GCS ≤ 13
- Systolic BP < 90 or MAP < 65
- Respiratory rate < 10 or >29 or need for ventilatory support (<20 infant aged < 1 year)

Yes → Transport to **Level 1 Trauma Center** if possible

No

Assess Anatomy of Injury:
- Penetrating injury to the head, neck, torso, and extremities proximal to the elbow or knee
- Chest wall instability or deformity (e.g. flail chest)
- Two or more proximal long bone fractures
- Crushed, degloved, mangled, or pulseless extremity
- Amputation proximal to wrist or ankle
- Pelvic fractures
- Open or depressed skull fractures
- Paralysis

Yes → Transport to **Level 1 Trauma Center** if possible

No

Assess Mechanism of Injury & Evidence of High Impact Injury:

Falls
- Adult > 20 feet
- Child > 10 feet or two to three times the patient's height

High-Risk Auto Crash
- Intrusion, including roof: > 12 inches, occupant site; > 18 inches any site
- Ejection (partial or complete) from automobile
- Death in same passenger compartment

Auto vs. pedestrian/ bicycle thrown, run over or with significant (>20 mph) impact

Motorcycle crash > 20 mph

Yes → Transport to **Level 1 Trauma Center** if possible

No

Assess Special Patient or System Considerations:

Older Adults
- Risk of injury or death increases after age 55
- SPB < 110 may represent shock after age 65
- Low impact mechanisms (e.g. ground level fall) may result in severe injury

Anticoagulation & Bleeding Disorders
- Patients with head injury are at high risk for rapid deterioration

Burns
- Without other trauma mechanisms: to burn facility
- With trauma: to trauma center

Pregnancy > 20 weeks

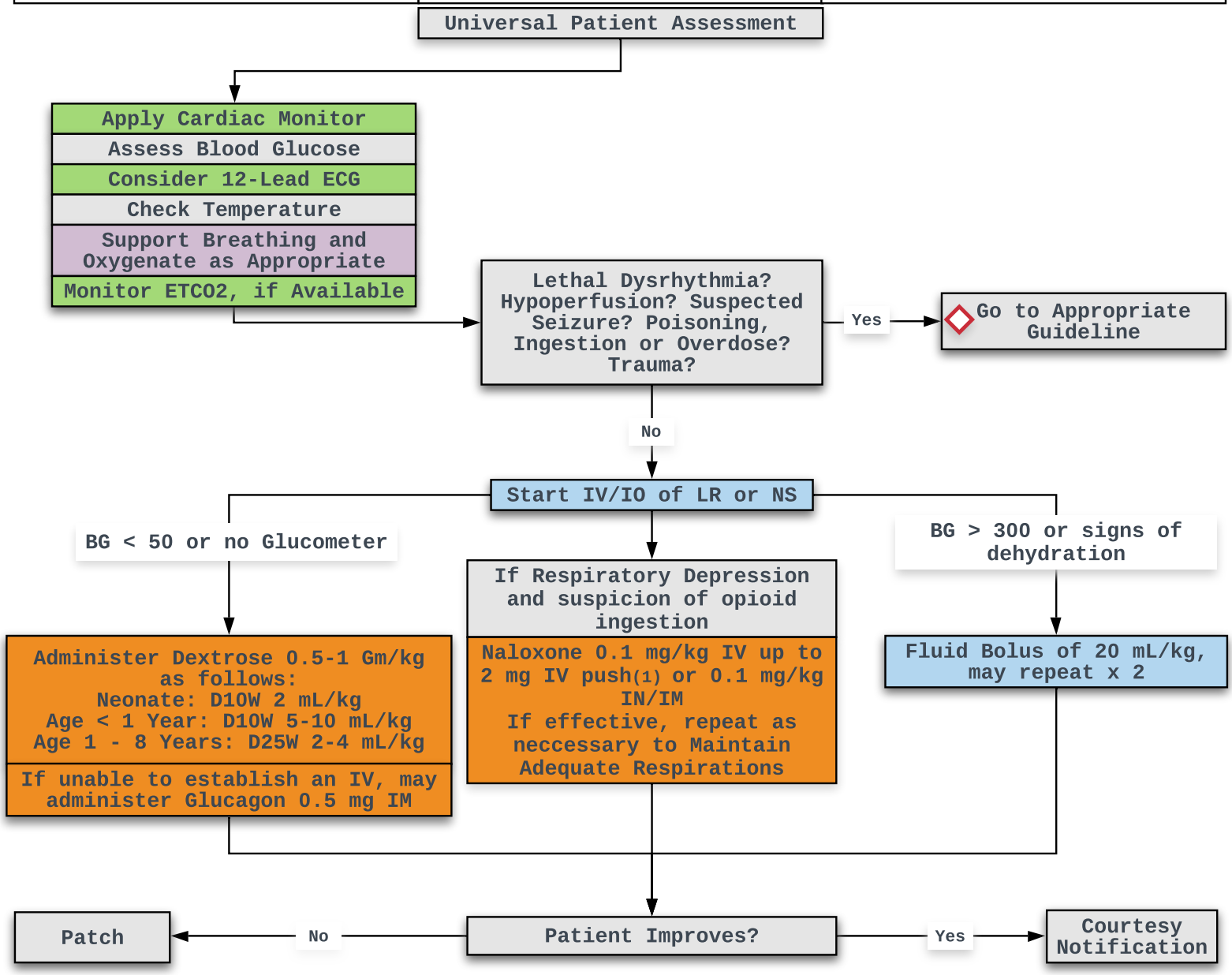
EMS Provider Judgement

Yes → Contact medical control and consider transport to trauma center or a specific resource hospital

No → Transport to appropriate Trauma Center or Emergency Department

Pediatric **Altered Level of Consciousness**

History	Signs/Symptoms	Differential
• Sudden or Gradual Onset • Congenital Disease • Diabetes • Seizures • Recent Illness • Ingestion/Poisoning • Nausea/Vomiting/Diarrhea	• Changed Respiratory Rate/Pattern • Hypotension • Hypertension • Increased/Decreased Heart Rate • Poor Skin Signs • Poor Oral Intake	• Alcohol • Epilepsy or Seizure • Infection • Overdose • Uremia • Trauma • Insulin • Poisoning or Psychiatric • Stroke



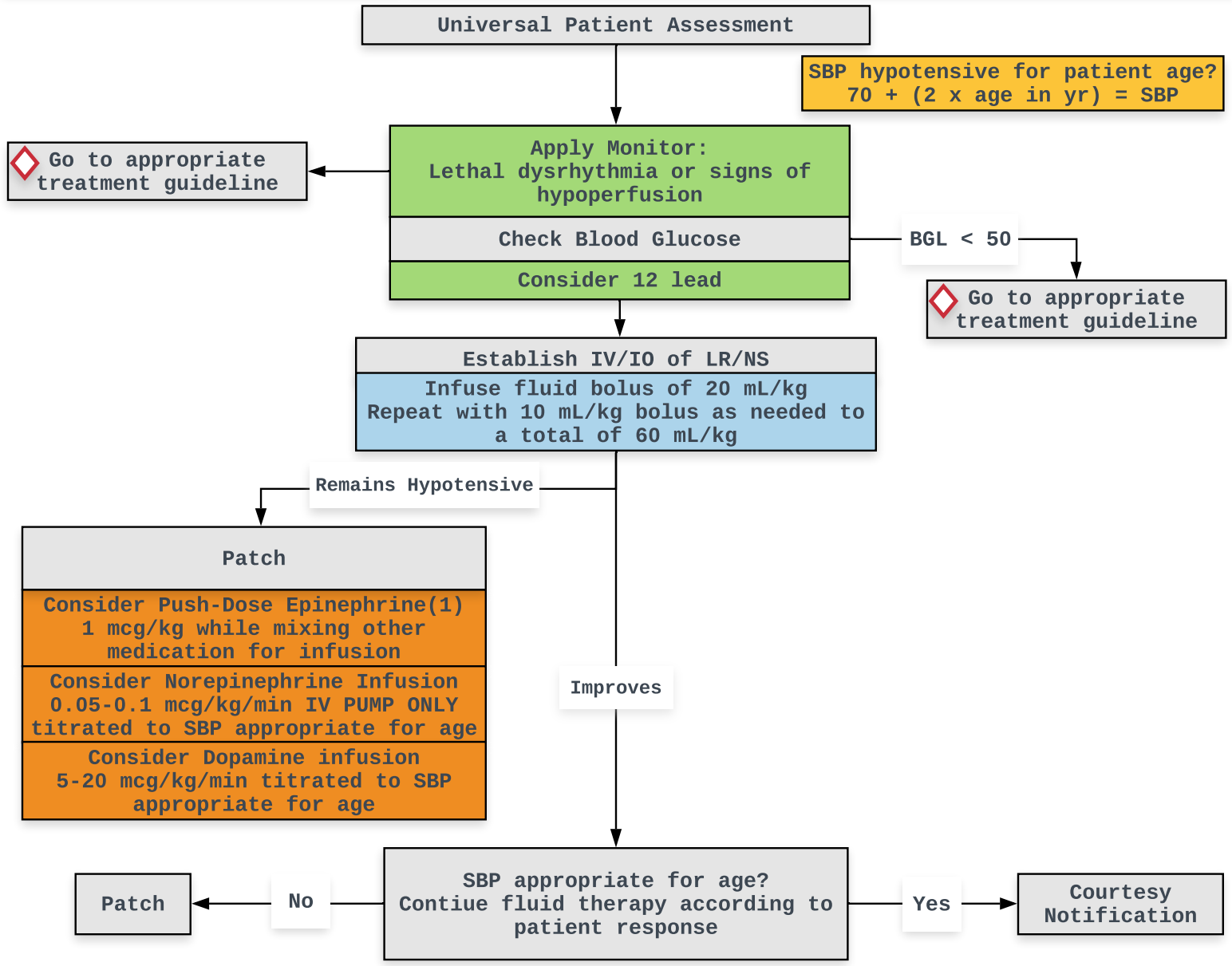
(1) Do not routinely administer Naloxone to Neonates, regardless of respiratory status.

Pearls:

- Suspect and look for trauma when another cause is not known or easily found
- Signs of dehydration in children can be subtle; look for dry mucous membranes, lack of tears, sunken fontanels (under 18 mo), poor limb temperature transition, reports of fewer diapers used/low urine output
- Most children with any altered level of consciousness should have venous access established and will require careful monitoring
- Consider normal respiratory rate for age group when assessing for respiratory depression

Pediatric **Hypotension, Non-Traumatic**

History	Signs/Symptoms	Differential
• Blood loss • Fluid loss • Infection • Congenital Issue • Medications • Pregnant or Recently Pregnant • Allergic reaction	• Restlessness, confusion • Weakness, dizziness • Weak, rapid pulse, or absent peripheral pulses • Pale, cool, clammy skin • Delayed cap refill • Emesis, Diarrhea • SBP inappropriate for age	• Shock • Sepsis • DKA • Pregnancy-Related Issue • Dysrhythmia • Heart Failure • Tension pneumothorax • Congenital Issue



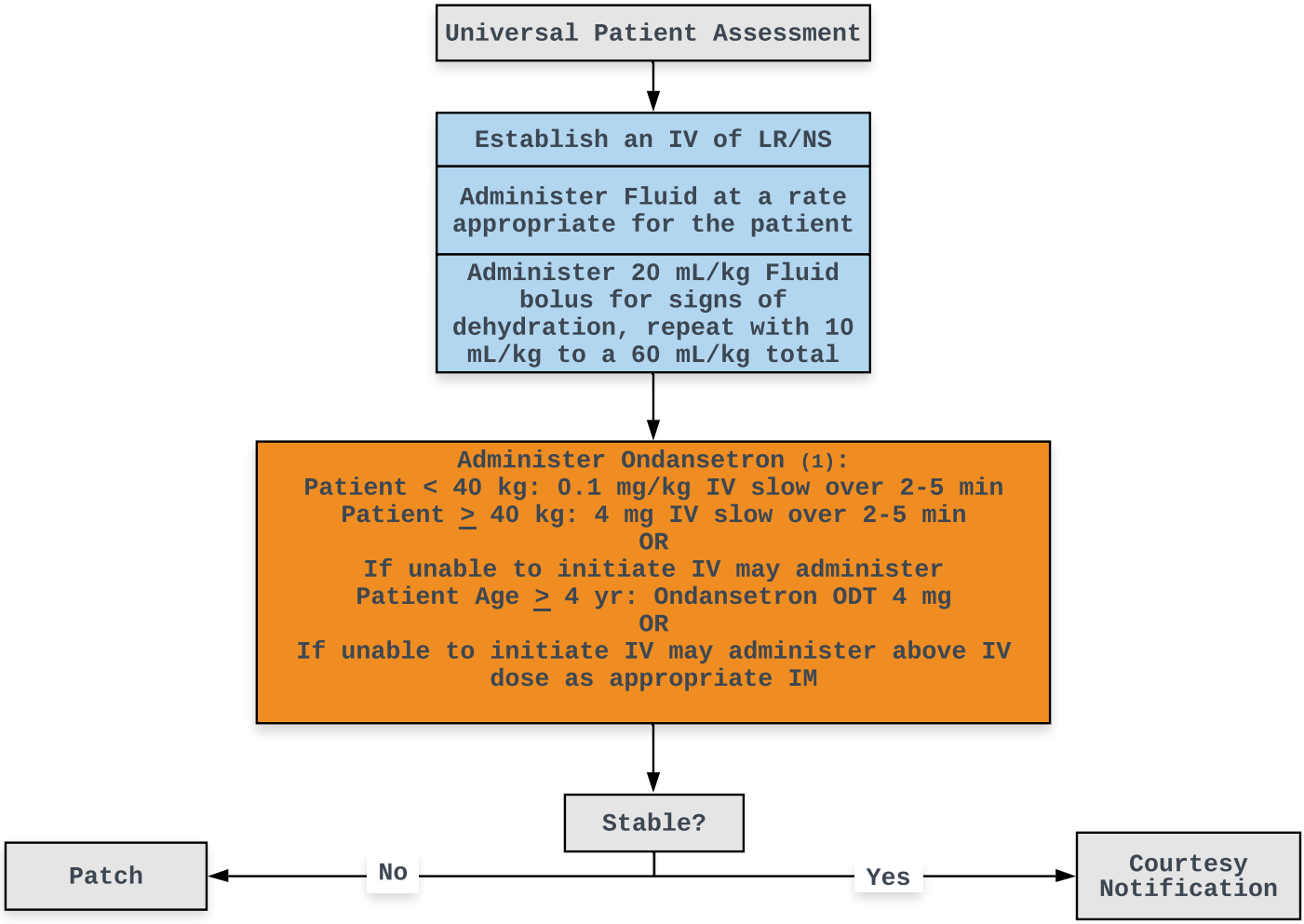
(1) If patient is **≥ 10 kg**: use adult push dose epinephrine mix to a max single dose of 10 mcg
If patient is **< 10 kg**: Dilute 1 dose of weight-based Epinephrine 0.01 mg/kg (0.1 mg/mL) in NS to make 10 mL = 1 mcg/kg/mL and administer a 1 mL bolus.

Pearls:

- Patch immediately for any child < 1 month old presenting with shock
- Consider all possible causes of shock and treat per appropriate guideline
- Patients should always have adequate intravascular fluid load prior to using vasopressors
- Patch early on for patients who have known congenital issues that are suspected to be contributing to the hypotension
- For patients < 2 months of age, assess blood pressures in both upper and lower extremities
- A low or declining ETCO2 is a sign of poor perfusion
- Repeat vital signs and lung auscultation before/after fluid administration

Pediatric **Nausea/Vomiting**

History	Signs/Symptoms	Differential
• Duration of problem • Time of last meal • Ability to hold down food or fluids • Past medical/ surgical Hx • Medications • Menstrual history/ Pregnancy • Bloody emesis or diarrhea • Congenital long QT syndrome	• Fever • Pain • Abdominal rigidity • Rebound pain • Guarding • Abdominal distension • Diarrhea • Hematemesis	• CNS (increased pressure, HA, CVA) • Drugs (NSAIDs, Abx,chemotherapy) • GI or renal disorders • DKA • Gynecological disease • Infection • Medication/ substance abuse • Pregnancy



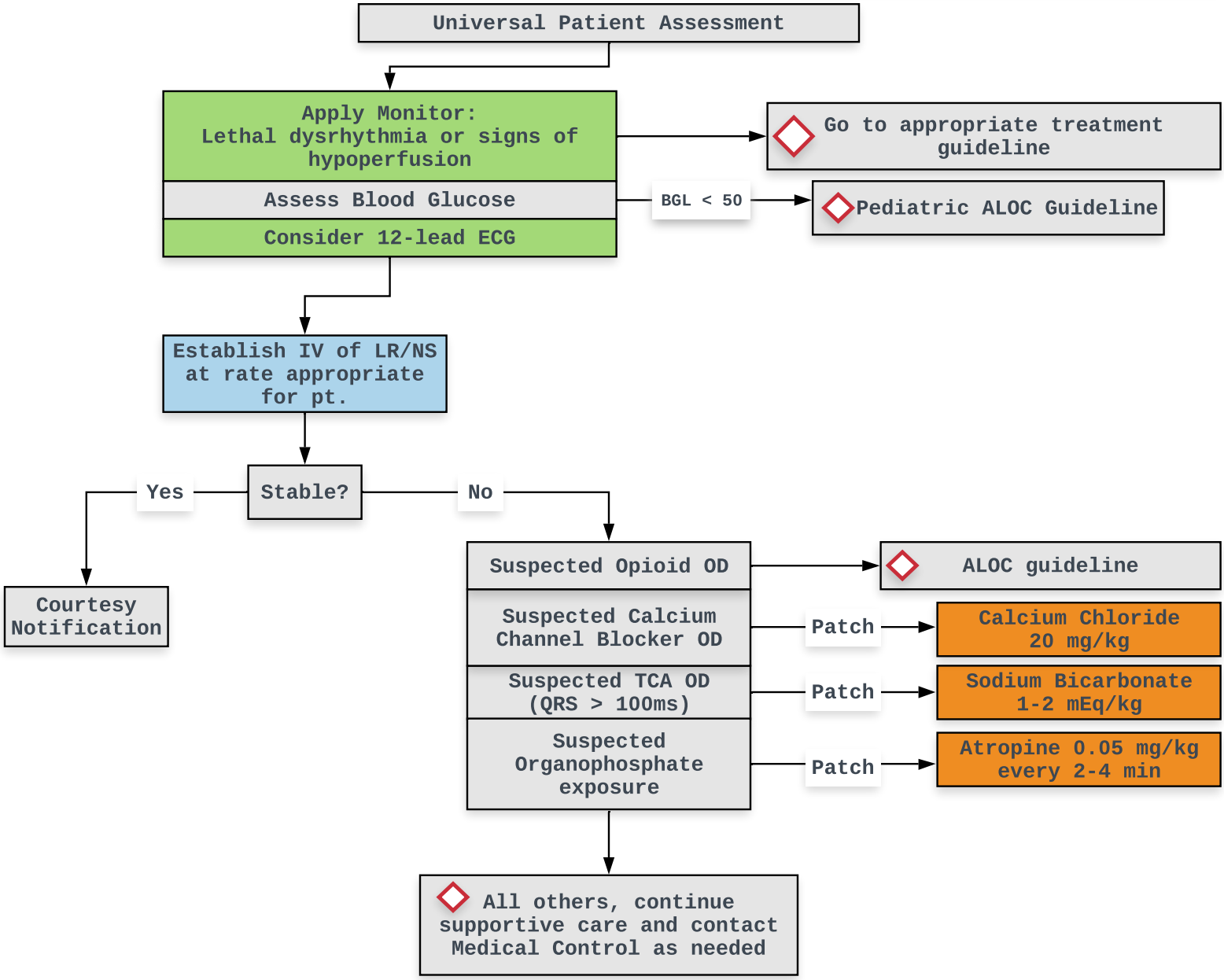
(1) Patients who have had severe enough vomiting to warrant medication should have venous access established and hydration status corrected along with medication administration. ODT and IM administration should be used when IV access is not possible.

Pearls:

- Intractable vomiting may occur in the pregnant female patient. In these cases, refer to the Adult Nausea/Vomiting Guideline **AND** Patch if the Pediatric Guideline is inadequate.
- Signs of poor hydration include dry mucous membranes (mouth, lips, eyes), sunken fontanels, tachycardia, dizziness, poor skin turgor
- DKA may present with nausea/vomiting as a primary complaint
- Use Ondansetron with caution in patients with history of long QT syndrome.

Pediatric **Poisoning/ Overdose**

History	Signs/Symptoms	Differential
• Exposure or suspected exposure to a possibly toxic substance • Reason (accidental, intentional) • Substance ingested, route, quantity	• Mental status changes • Hypo- or hypertension • Irregular respiratory rate/pattern • Seizures • Irregular heart rate/rhythms	• TCA • Acetaminophen • Depressants • Stimulants • Anticholinergics • Cardiac medications • Organophosphates



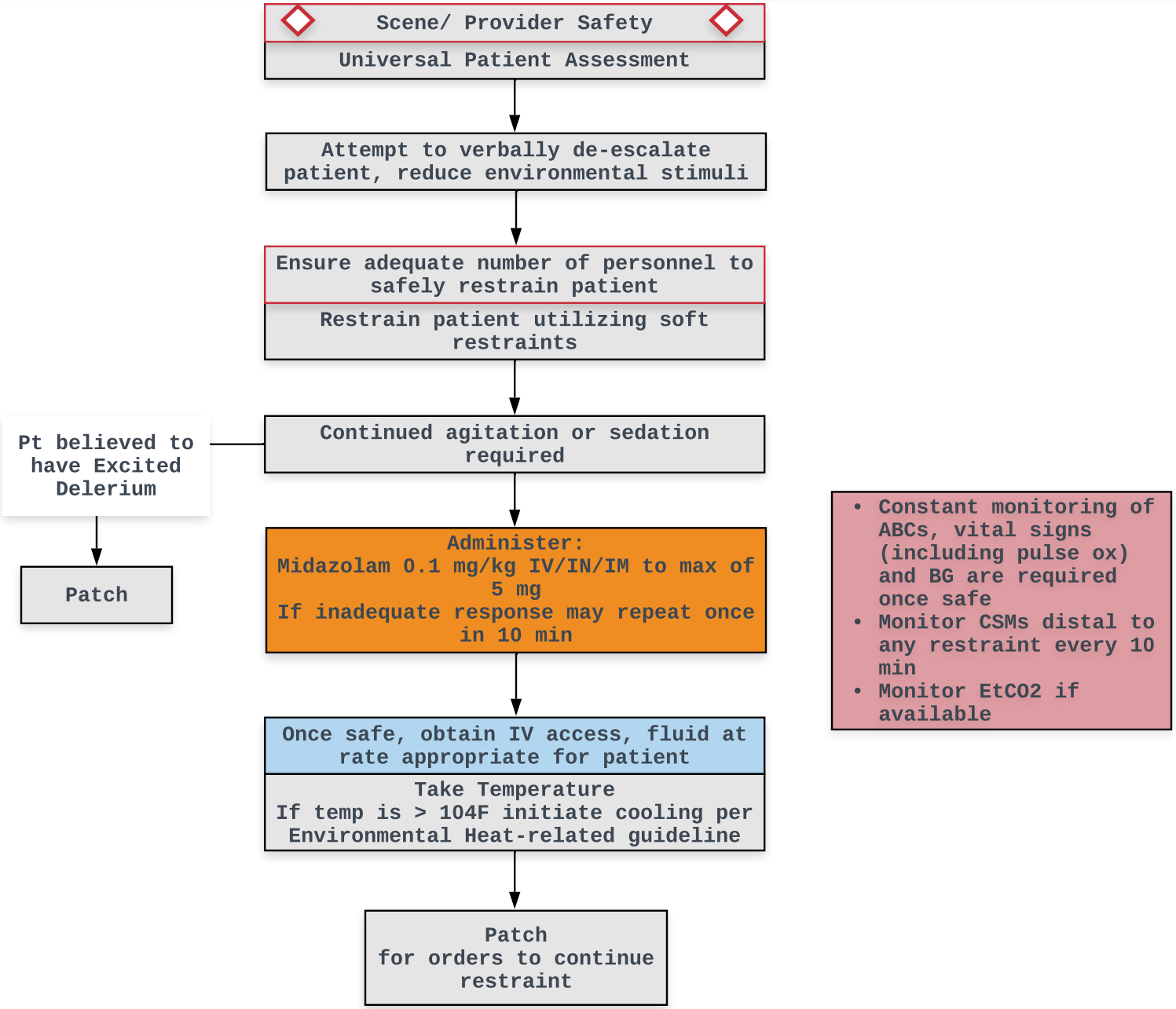
(1) Naloxone is not recommended for routine use in neonates. In any patient, only administer enough Naloxone to produce an adequate respiratory rate and tidal volume.

Pearls:

- Patients suspected or known to have ingested substances with a suicidal intent may not refuse transport
- Bring bottles/ containers if possible. Inspect scene and document carefully
- **TCA**: Sz, dysrhythmias, hypotension, ALOC/coma, rapid progress from alert to death
- **Depressants**: decreased HR, decreased BP, decreased RR, decreased temp, non-specific pupils
- **Stimulants**: increased HR,increased BP, increased temp, dilated pupils, Seizure
- **Anticholinergic**: increased HR, increased temp, dilated pupils, mental status changes
- **Insecticides**: increased or decreased HR, increased secretions, N/V/D, pinpoint pupils
- DECON patients appropriately and ensure providers have appropriate PPE

Pediatric **Violent/ Agitated**

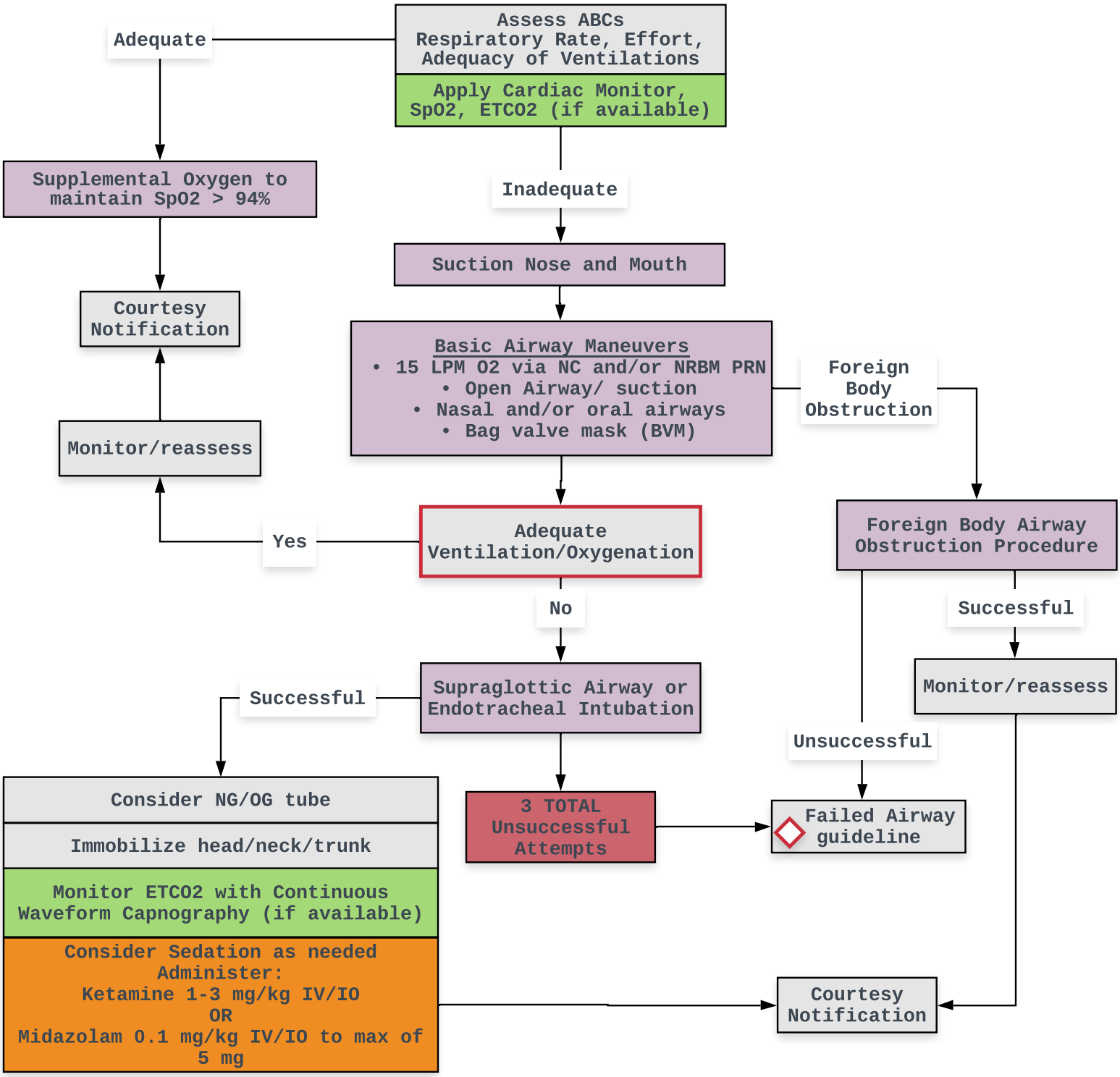
History	Signs/Symptoms	Differential
• Situational crisis • Psychiatric illness • Injury to self or others • Medical tag alert • Substance abuse/ OD • Diabetes • Seizures	• Anxiety, agitation, confusion • Affect change, hallucinations • Delusional thoughts, bizarre behavior • Combative/ violent • Expression of SI or HI	• See ALOC differential • Hypoxia • ETOH intoxication • Toxin/ substance abuse • Medicaion effect/ OD • Withdrawl syndromes • Depression • Mental health disorder



Pearls:

- The least restrictive method should be used to keep patient and staff safe while continuing evaluation
- If patient is in police custody and handcuffs have been applied it is preferable that a police officer also accompany the patient. EMS providers must, at a minimum, have the handcuff key in their possession during transport
- Patients shall be positioned in a manner that does not compromise airway or breathing. No patient will be restrained prone or "hog-tied". No patient shall be placed between backboards or gurneys.

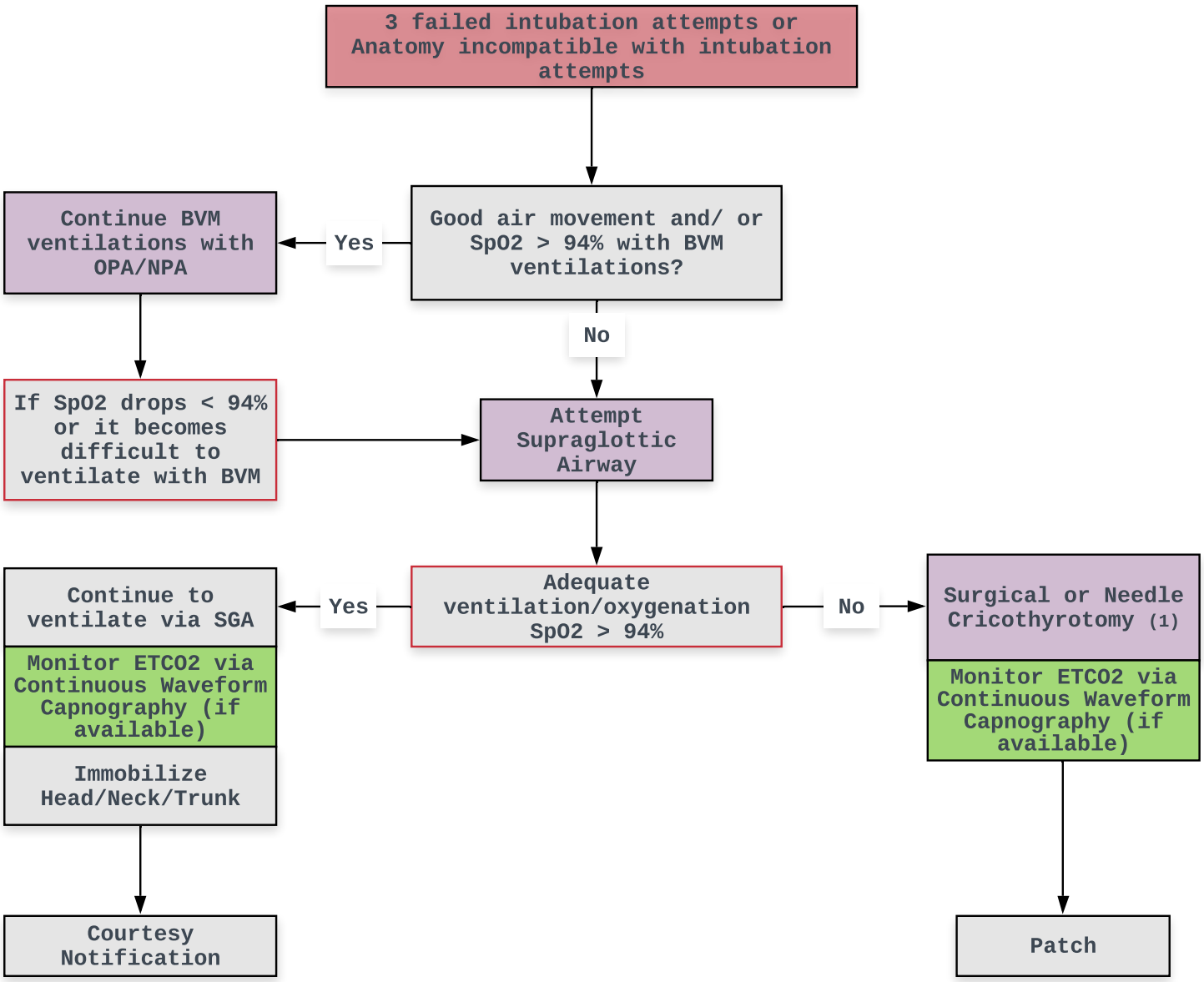
Pediatric **Airway Management**



Pearls

- Little maneuvers can have big impacts: **positioning is KEY**.
- Repositioning the head and use of an OPA and/or NPA should be attempted any time adequate chest rise is not achieved
- Use a 2-person BVM technique whenever possible to ensure the best BVM ventilation
- Infants are obligate nose-breathers, and their relatively small nares are **easily occluded**; suction PRN
- Respiratory Rate > 60 is abnormal for a child of any age
- Slow respiratory rate may be indicative of impending respiratory failure
- Allow the child to remain in a position of comfort
- Consider an NG/OG tube in any child who has received > 2 min BVM ventilations, regardless of ETT/SGA
- Waveform Capnography is the gold standard for confirmation of placement of an advanced airway and should be monitored along with SpO2, chest rise with ventilation, and breath sounds
- If using a cuffed endotracheal tube, use only enough air to prevent leaks
- Immobilization of the intubated pediatric patient can assist with preventing tube dislodgement during movement

Pediatric **Failed Airway**



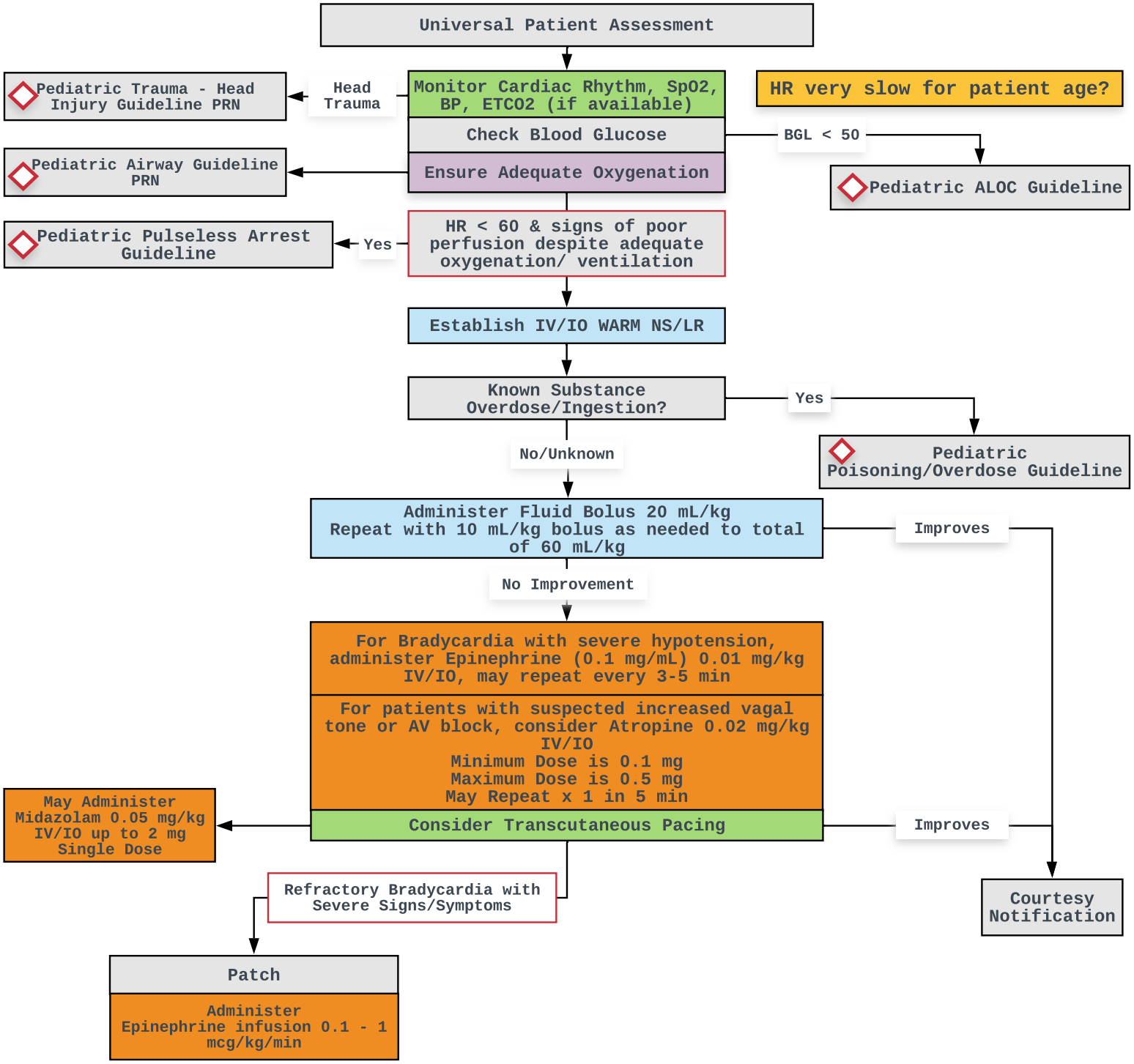
(1) Surgical Cricothyrotomy may be used on patients greater than or equal to 8 years old. Use a Needle Cricothyrotomy on patients less than 8 years old.

Pearls

- Prolonged or aggressive attempts at intubation may cause airway trauma and swelling that make future intubation attempts futile.
- Intubation of a child should be attempted by the most experienced operator whenever possible
- If a Supraglottic airway has been attempted **once** and fails, and the patient cannot be adequately ventilated with a BVM, it is not necessary to attempt a Supraglottic Airway a second time before proceeding with the Guideline
- Supraglottic airways may not be appropriate for patients with airway swelling/edema; Cricothyrotomy should be considered earlier in these instances
- Immobilization of the head, neck with cervical collar and trunk with towel rolls may assist in maintaining airway patency once an advanced airway is established
- Continuous waveform capnography should be monitored whenever it is available
- Consider insertion of an NG/OG tube if possible, whenever an advanced airway is placed
- Needle Cricothyrotomy is not a definitive airway and provides a small route for oxygenation only. Prompt transport of patients requiring this procedure is of utmost importance.
- Patch early, whenever possible, for patients who may potentially require a surgical airway (progressive swelling)

Pediatric **Bradycardia, Unstable**

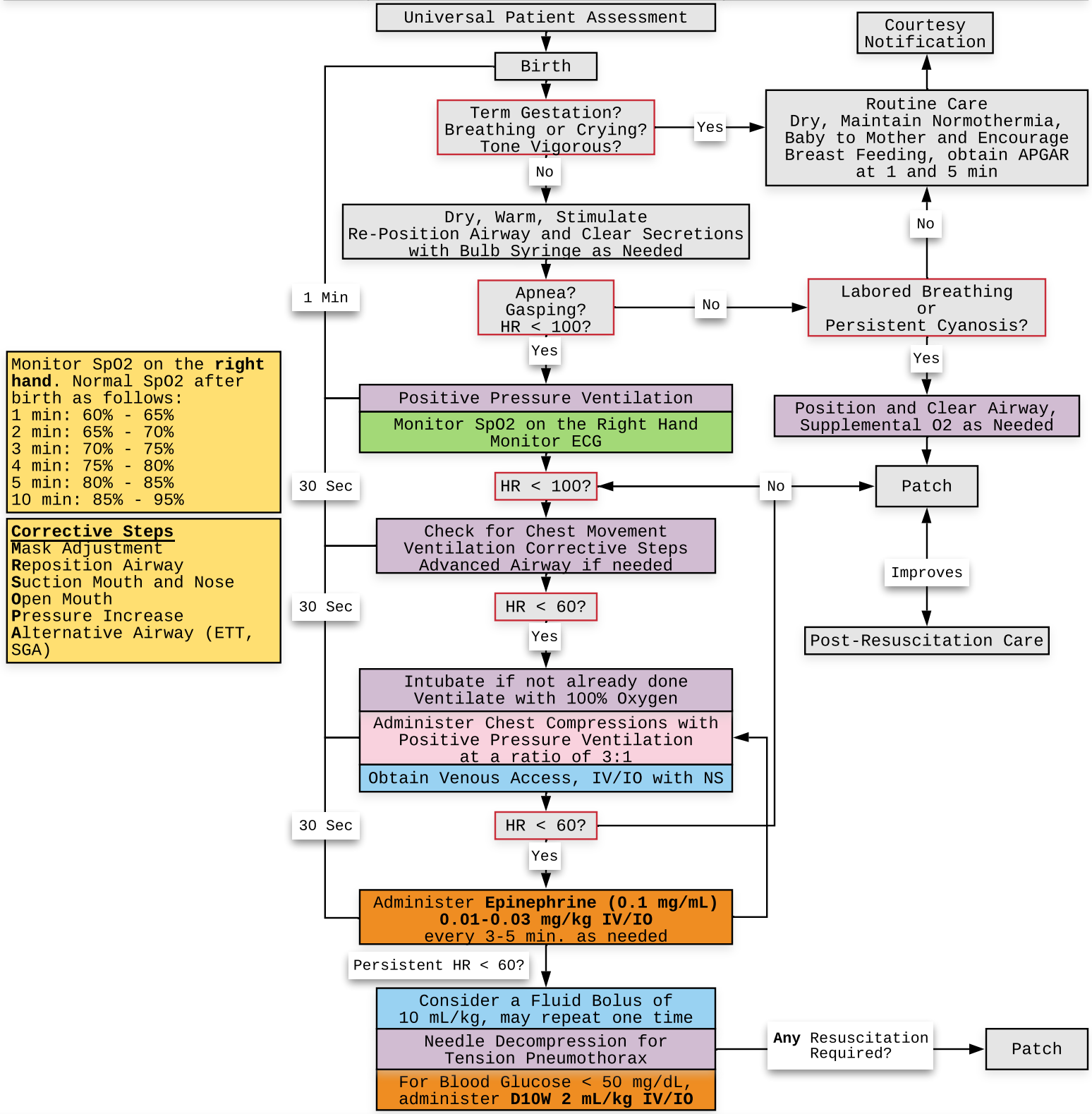
History	Signs/Symptoms	Differential
• Trauma • Recent Illness • Hypoxia • Diabetes • Medication Use • Toxic Ingestion • Cold Exposure	• Pale, cool skin • Mottling • Hypotension • Sunken or Bulging Fontanels • Hypoxia • Heart Rate > 60, but Significantly below normal for age, condition, and history	• Increased ICP • Dehydration • Respiratory Compromise • Poisoning/Overdose • Severe Hypothermia • Drowning



Pearls:
- A low or declining ETCO2 is a sign of poor perfusion and should be monitored whenever possible
- Bradycardia in a child is a sign of impending cardiac arrest
- The most common cause of Bradycardia in children is hypoxemia
- Most children will respond well to Epinephrine. Atropine may be used in cases of increased vagal tone or primary AV block.
- Ingestion of certain medications or poisons may cause bradycardia requiring treatment from this Guideline as well as the Poisoning/Overdose Guideline. Patch early in these instances

Neonatal **Resuscitation**

History	Signs/Symptoms	Differential
• Gestational Age < 36 or > 41 weeks • No Prenatal Care • Narcotic Admin./Use within 4 Hours • Preeclampsia or Eclampsia • Meconium Staining	• Apnea • Inadequate Respirations • Pulselessness • Bradycardia (HR < 100)	• Respiratory Failure • Birth Defect • Drug Exposure • Fetal Distress



Monitor SpO2 on the **right hand**. Normal SpO2 after birth as follows:
1 min: 60% - 65%
2 min: 65% - 70%
3 min: 70% - 75%
4 min: 75% - 80%
5 min: 80% - 85%
10 min: 85% - 95%

Corrective Steps
Mask Adjustment
Reposition Airway
Suction Mouth and Nose
Open Mouth
Pressure Increase
Alternative Airway (ETT, SGA)

Pearls
- **The most important and effective action in neonatal resuscitation is ventilation.**
- Neonatal respiratory rates vary between about 40-60 breaths/minute. When providing PPV, give breaths just large enough to make the chest rise, at a rate of about 40/min.
- Once the patient is intubated, chest compressions and ventilations should be asynchronous.
- Avoid placing the baby in Trendelenberg position.
- Babies requiring PPV, or who are pre-term or have meconium staining develop pneumothoraces more easily.
- Begin PPV with Room Air, and add oxygen if the baby does not improve.

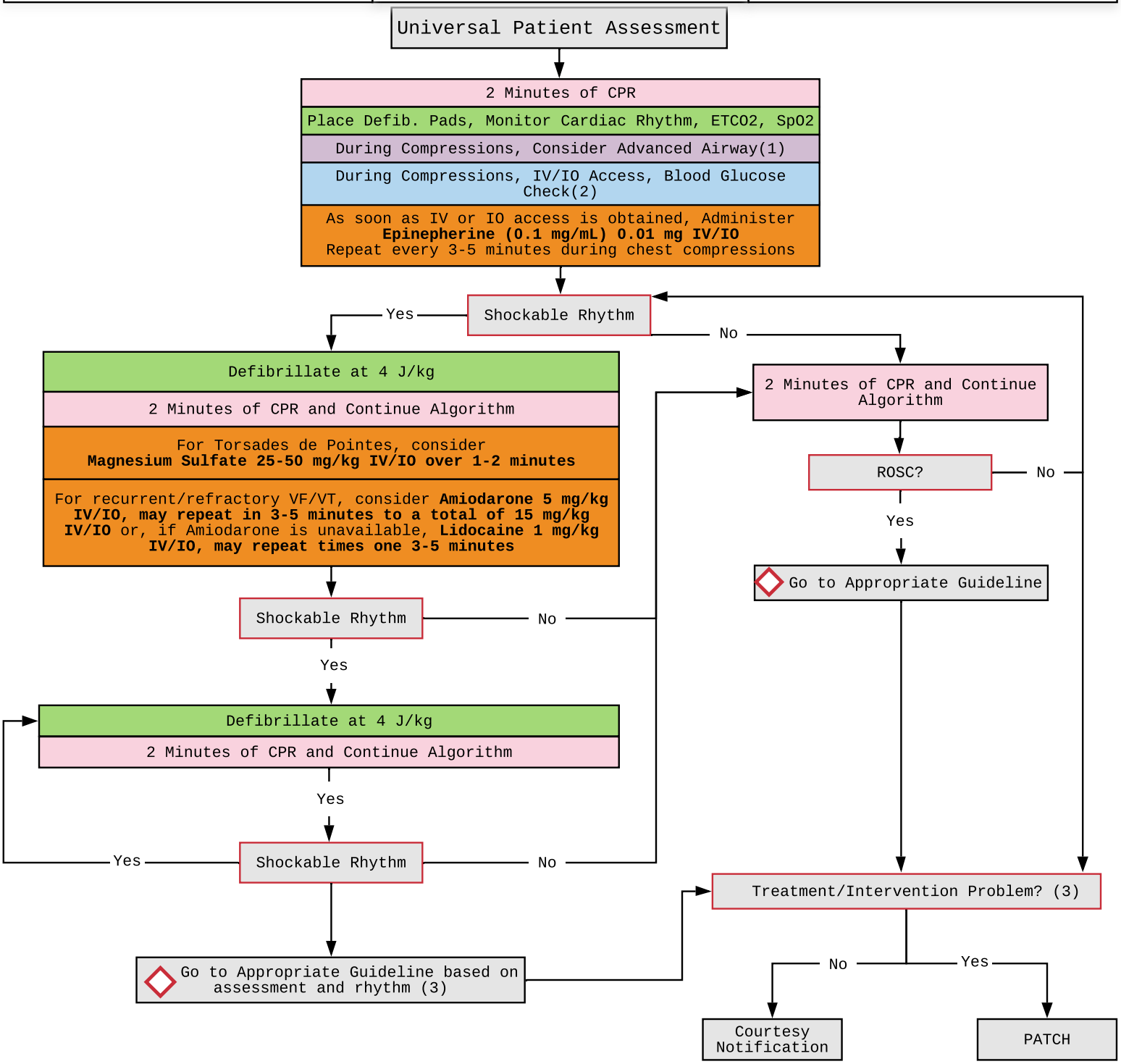
Pediatric **Pulseless Arrest - Medical**

History
- Hypoxic Event
- CHD
- Recent Illness
- Headache
- Dizziness, Syncope
- Drug Use

Signs/Symptoms
- Pulseless
- Apneic

without
- Rigor Mortis
- Dependent Lividity
- Decapitation
- Transection of Thorax or Abdomen
- Incineration
- Decomposition

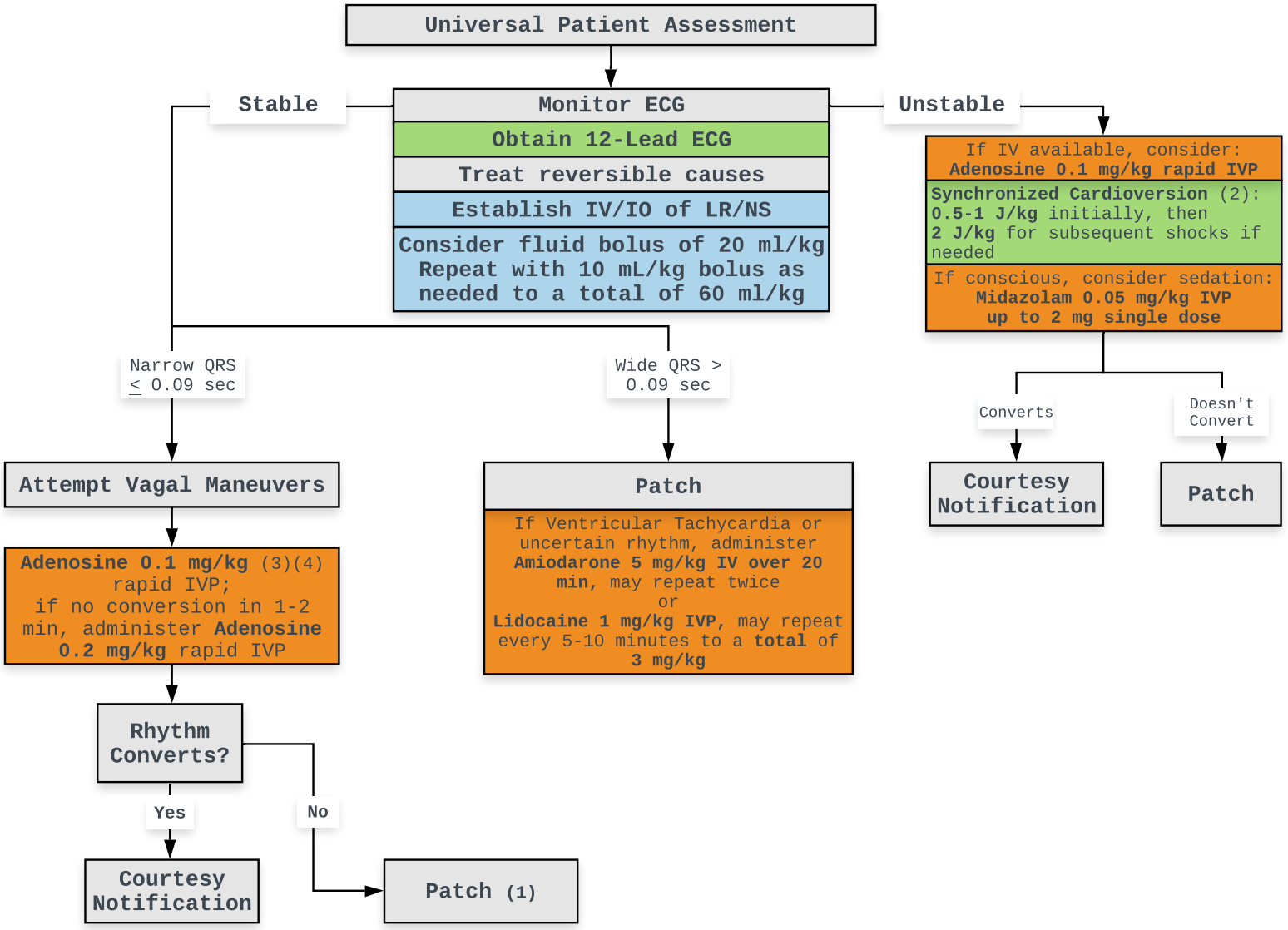
Differential
- Hypoxemia
- Hypovolemia
- Hydrogen Ions
- Hyper/Hypokalemia
- Hypothermia
- Hypoglycemia
- Toxins
- Tamponade
- Tension Pneumothorax
- Thrombosis
- Thromboembolism
- Trauma



(1)Consider and treat reversible causes early, administer Dextrose or Naloxone per appropriate Guideline as applicable, PATCH for NaHCO3 and/or CaCl for suspected Hyperkalemia or suspected Overdose.
(2)Once an advanced airway is placed, compressions and breaths should be asynchronous, monitor ETCO2 continuously.
(3)If patient remains asystolic or other agonal rhythm after definitive airway management, initial medications, no reversible causes are identified or reversible causes are treated, and transport has not been initiated, consider termination of resuscitative efforts by order of a physician.
(4) Consider escalating defibrilation at up to 10 J/kg for refactory Ventricular Fibrillation
- Medications should be administered after Rhythm Checks, during CPR
- Limit interruptions in Chest Compressions to brief rhythm checks and defibrillations (less than 10-15 seconds)
- The most common cause of cardiac arrests in children is respiratory arrest, hence the emphasis on airway and breathing. It is not appropriate to do compression-only CPR on children.
- When possible, no single provider should do more than 2 minutes of consecutive chest compressions

Pediatric **Tachycardia with Pulses**

History	Signs/Symptoms	Differential
• Medications: diet pills, thyroid supplements, decongestants • Diet: caffeine • Recent Illness • Hx of SVT, A-Fib, or WPW • Feeling of palpitations or heart racing • Poor feeding • Sudden onset	HR > 180/min (Children) or HR > 220/min (Infants) with: • Dizziness, CP, SOB • Syncope/Near Syncope • ALOC • Hypotension • Poor skin signs • Irritability (infants)	• Heart disease: WPW • Sick Sinus Syndrome • Accessory pathway • Electrolyte Imbalance • Fever • Hypoxia • PE • Thyroid Storm



Pearls:
- **If at any time patient becomes unstable, proceed to "Unstable" side**
- (1) Contact Medical Control for any and all unusual circumstances
- (2) Do not delay synchronized cardioversion for IV access or 12-Lead ECG for an unstable patient
- (3) Contact Medical Control and consider reducing the Adenosine dosage for patients on Dipyridamole or Carbamezapine as these can potentiate the effects of Adenosine
- (4)Do not exceed adult dosages.
- SVT is the most common extreme tachycardia seen in children
- If delays in synchronization occur, rhythm is polymorphic VT, or pulses are lost, go immediately to Defibrillation at 4 J/kg for subsequent defibrillations

Pediatric **Allergic Reaction / Anaphylaxis**

History	Signs/Symptoms	Differential
• Rapid Onset of Symptoms • Exposure to Allergen	• Wheezing • Changes in Skin Signs • Urticaria • Dysphagia • Stridor • Abdominal Muscle Use • Retractions • Angioedema • Nausea/ vomiting/ diarrhea	• Croup • Epiglottitis • Other URI • Foreign Body Obstruction • Abscess • Bacterial Traceitis • Infectious Mononucleosis • Trauma

Universal Patient Assessment

Apply Cardiac Monitor

Monitor RR, HR, BP, SpO2, ETCO2 (if available)

Severe Respiratory distress, airway swelling and/or hypotension

Epinephrine (1 mg/mL) 0.01 mg/kg IM up to 0.3 mg, may repeat every 10 - 15 min PRN

◇ **Pediatric Airway Guideline PRN**

Moderate Symptoms
Multiple symptoms with mild or absent respiratory distress

Mild Symptoms
No Respiratory Distess

Diphenhydramine 1 mg/kg IV/IM/IO up to 25 mg

Monitor Patient

Establish IV/IO Access

Administer LR/NS at rate appropriate for patient

For Hypotension, infuse LR/NS bolus of 20 mL/kg
Repeat with 10 mL/kg bolus as needed to a total of 60 mL/kg

Diphenhydramine 1 mg/kg IV/IM/IO up to 25 mg

Methylprednisolone 2 mg/kg IV/IO up to 125 mg

For Bronchospasm, Administer Albuterol 2.5 mg/3mL NS via SVN, may repeat PRN

Unstable/Worsens → **Patch**

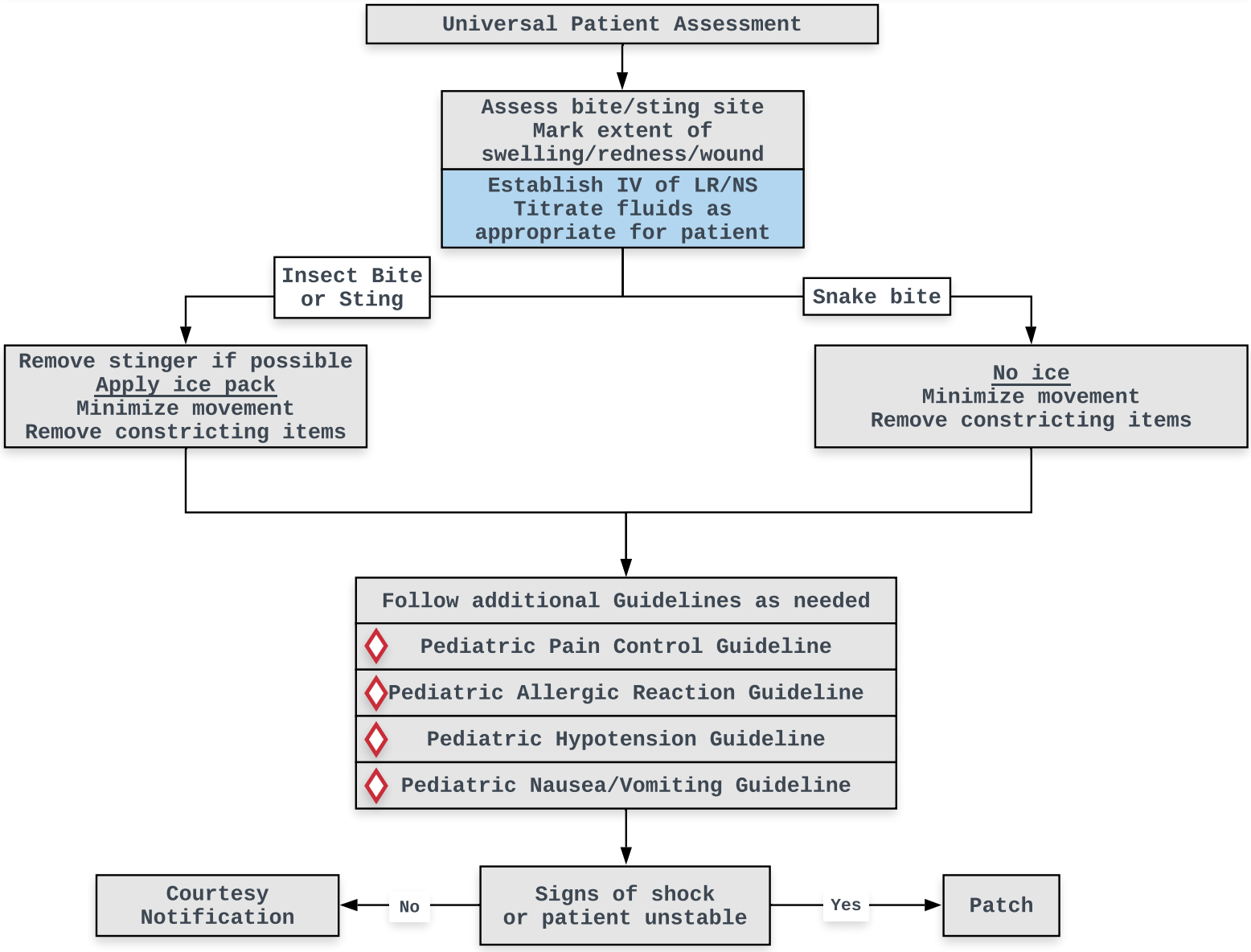
If hypotension persists:
Administer Epinephrine infusion 0.1 - 1 mcg/kg/min IV/IO titrate to effect

Stable/Improves → **Courtesy Notification**

Pearls
- IV access is not needed in order to begin meaningful treatment
- In cases of stings, scrape stingers out of the patient
- Patients developing angioedema usually benefit from earlier Epinephrine administration

Pediatric **Bites & Envenomation**

History	Signs/Symptoms	Differential
• Type of bite/sting • Description of animal involved • Time, location, size of bite/sting • Domestic vs. wild • Previous reaction to bite/sting • Immunocompromised patient	• Pain, soft tissue swelling, redness, rash • Blood oozing from the bite wound • Evidence of infection • SOB, wheezing • Allergic reaction, hives, itching • Hypotension or shock	• Animal/human bite • Snake/spider bite • Insect sting/bite • Infection risk • Rabies risk • Tetanus risk

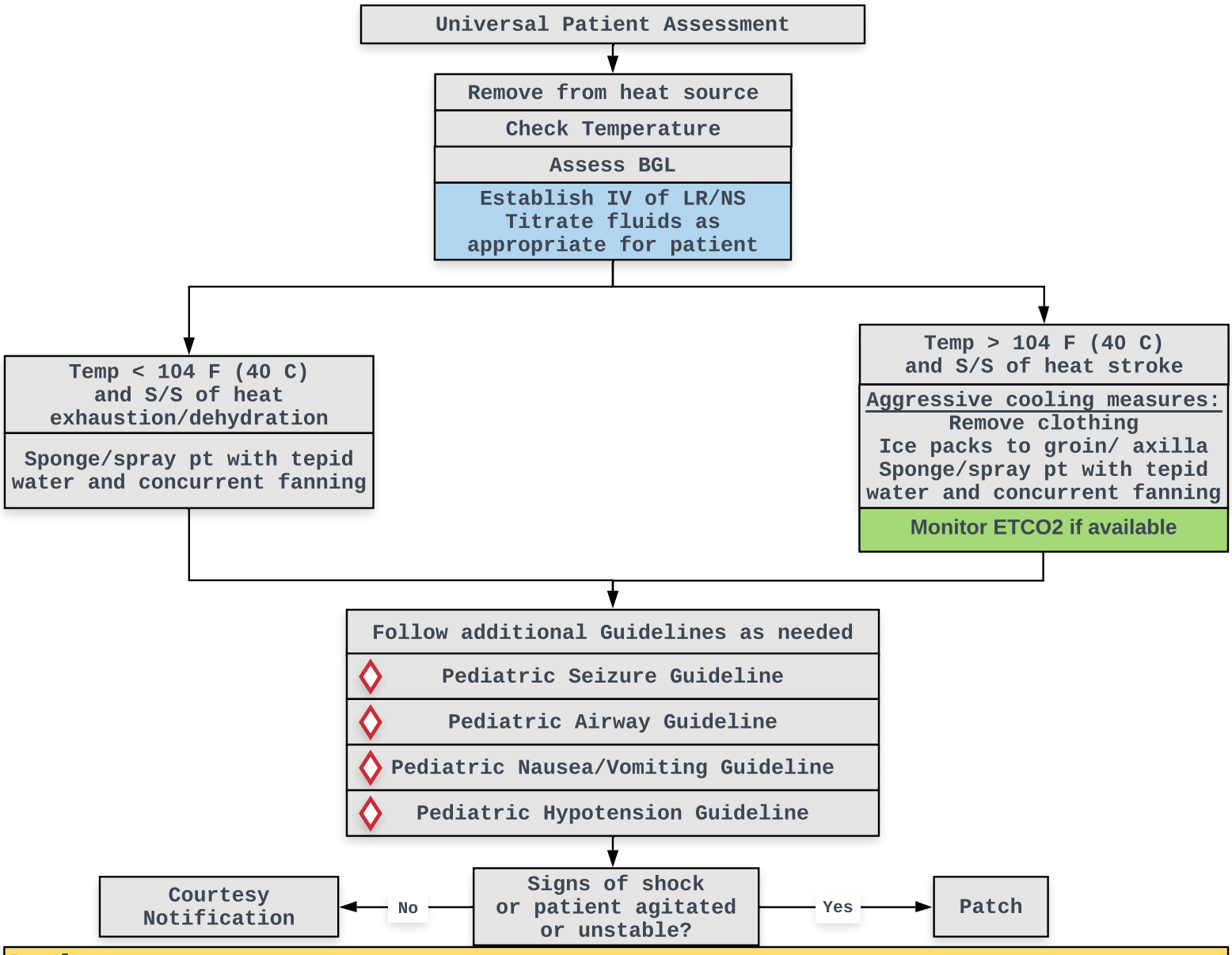


Pearls:

- **DO NOT attempt to kill or capture animal**
- Venomous snakes in this area are generally of the pit viper family: rattlesnake, copperhead
- Black widow spider bites have minimal pain initially but may develop muscular pain and severe abdominal pain
- Evidence of infection: swelling, redness, drainage, fever, red streaks proximal to wound
- Re-mark swelling progression every 15 minutes

Pediatric **Environmental - Heat Related**

History	Signs/Symptoms	Differential
• Recent Illness • Past medical history • Medications • Exposure to environment • Exposure to heat • Extreme exertion • Drug use • Muscle cramping/ fatigue	• ALOC • Hot, dry or sweaty skin • Mental status changes • Seizures • Hypotension or shock	• Fever • Dehydration • Medications • Hyperthyroidism (storm) • Excited Delirium • Heat cramps • Heat exhaustion • Heat stroke

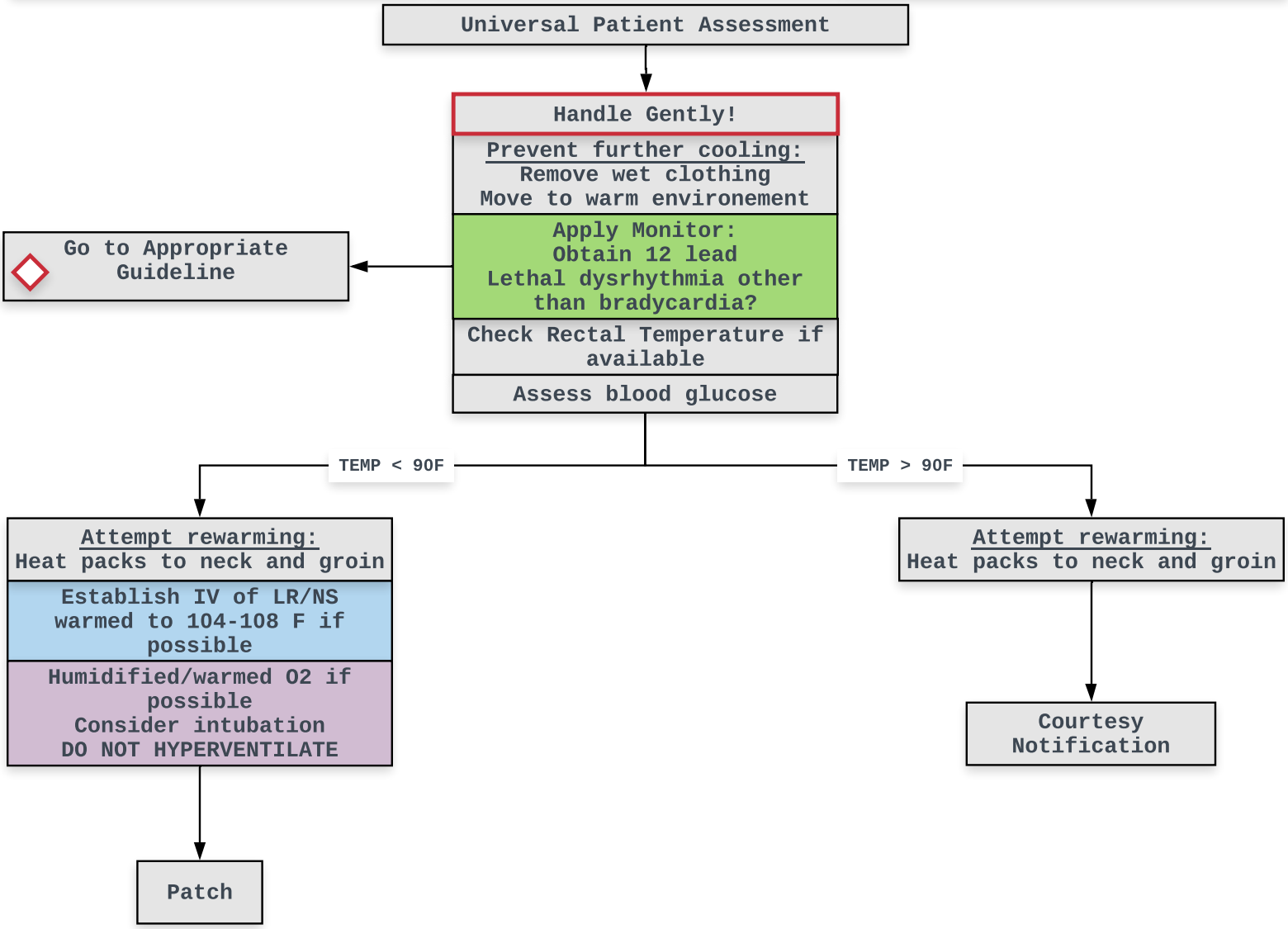


Pearls:

- Do not cool below 102 F
- Do not over cool and cause shivering and reoccuring heat buildup. If patient is shivering contact Medical Control to administer Midazolam
- If the patient is agitated, contact Medical Control to administer Midazolam or Ketamine
- Extremes of age are more prone to heat emergencies
- Drugs may contribute to hyperthermia: TCA, anticholinergics, ETOH, cocaine, amphetamines
- **Heat Cramps:** benign muscle cramping secondary to dehyrdation and not associated with elevated temperature
- **Heat Exhaustion:** dehydration, salt depletion, dizziness, fever, HA, cramping, N/V. VS: tachycardia, hypotension, and elevated temperature
- **Heat Stroke:** hyperthermia and ALOC or SZ with temperature > 104 F

Pediatric **Environmental - Hypothermia**

History	Signs/Symptoms	Differential
• Past medical history • Medications • Exposure to environment • Exposure to extreme cold • Extreme of age • Drug use: ETOH, barbiturates • Length of exposure	• Cold, clammy skin • Shivering • Mental status changes • Extremity pain or sensory abnormality • Bradycardia • Hypotension or shock • ALOC	• Metabolic disorder • Toxins • Environmental exposure • Hypoglycemia • Shock

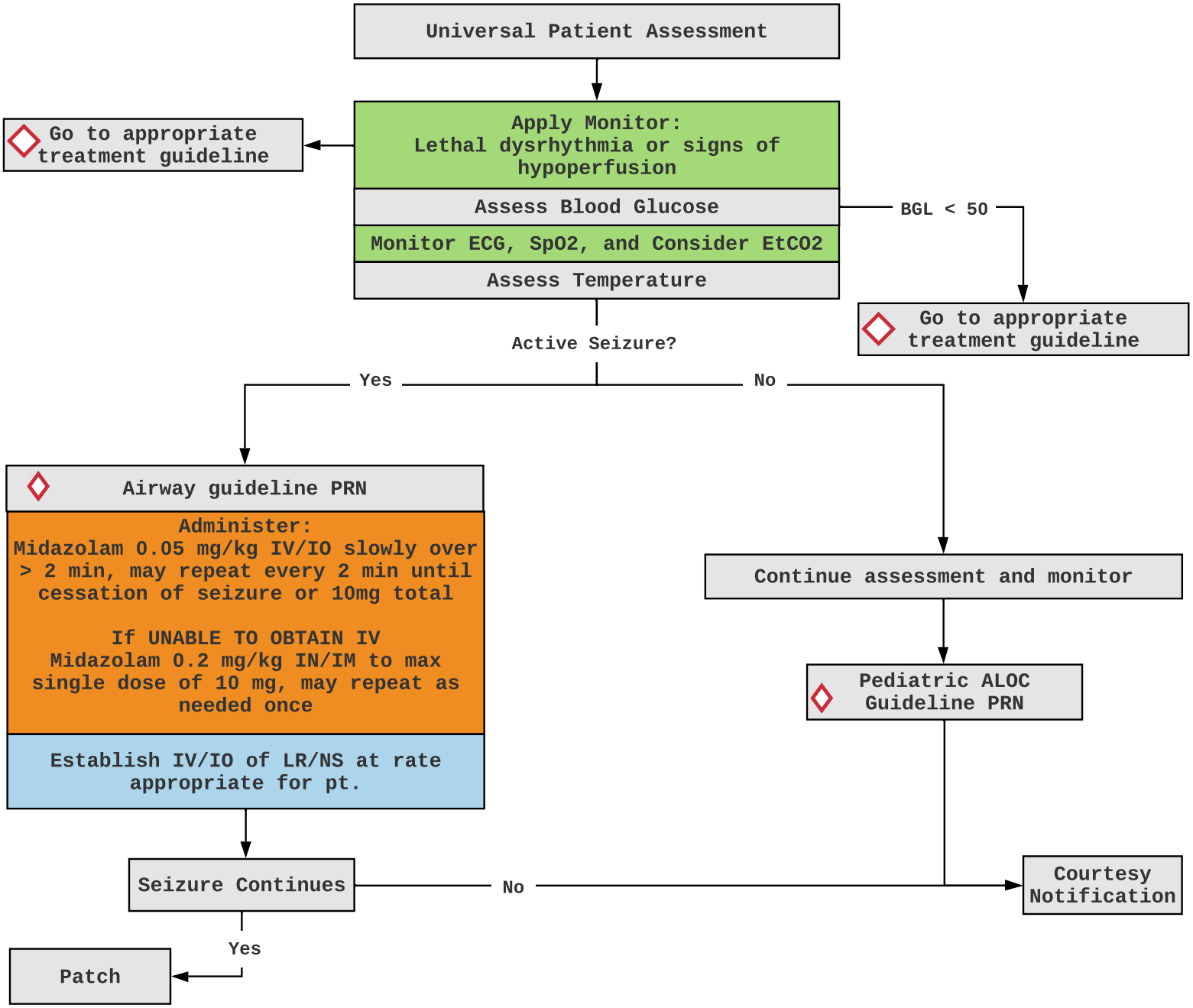


Pearls:

- Extremes of age are more prone to cold emergencies
- Temperatures < 93 F (34 C), shivering may diminish; at < 89 F (31 C) shivering may stop
- If temperature is unable to be measured, treat patient based on suspected temperature
- Hypothermia may produce profound bradycardia. Do not treat HR unless profound hypotension unresponsive to fluids/rewarming efforts
- Assess rectal temperature with hypothermia thermometer if available

Pediatric **Seizure**

History	Signs / Symptoms	Differential
• Fever • Epilepsy • Tumor/Cancer • Diabetes • Trauma	• Tonic or Clonic Movements • Rhythmic or bicycling motions in young children • Loss of Consciousness • Increased Temperature • Decreased Blood Glucose	• Trauma • Respiratory Illness • CVA • Epileptic Seizure • Diabetic Seizure / Hypoglycemia • Hypoxia • Hypotension • Chronic Condition/Illness

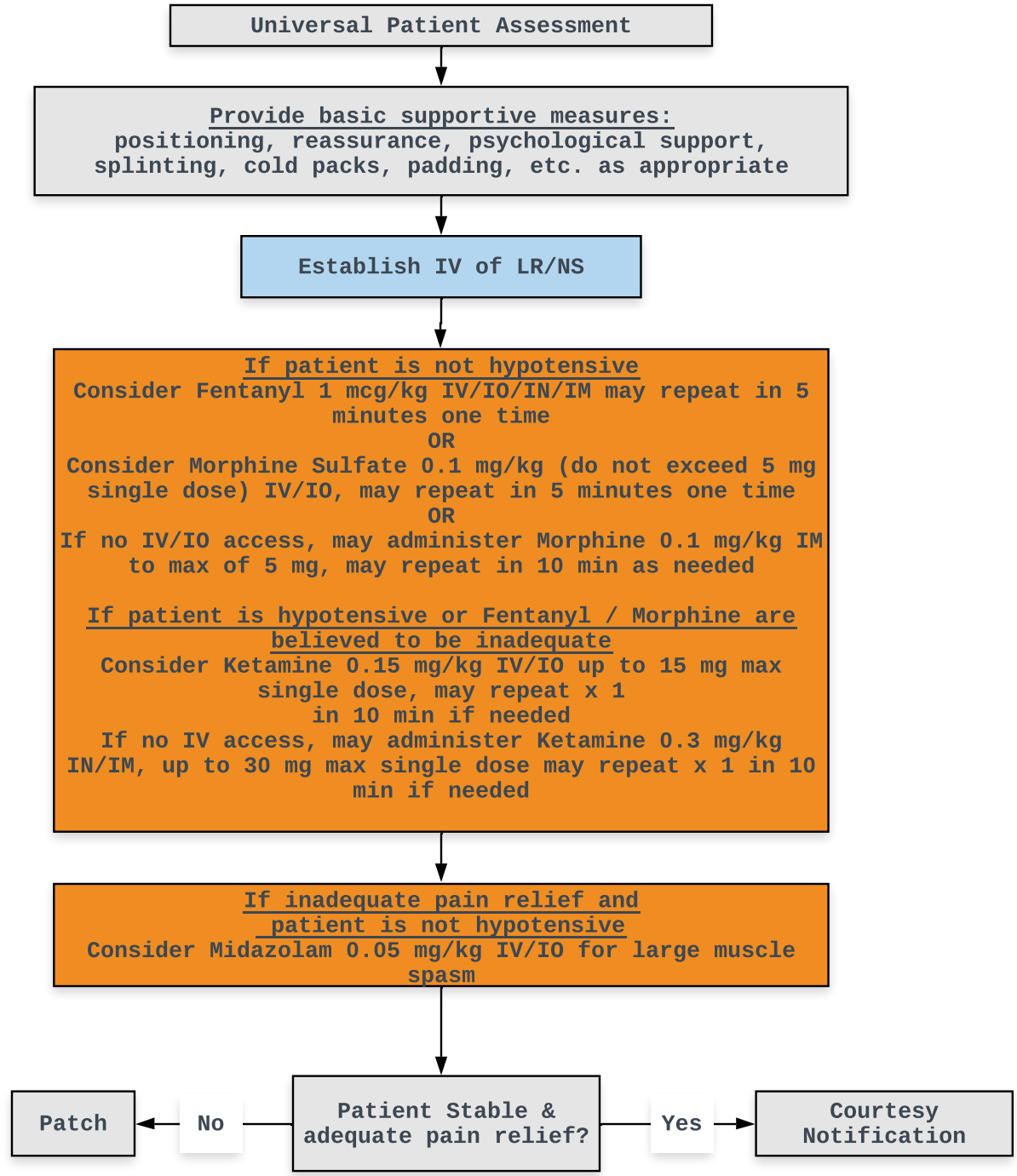


Pearls:

- Status epilepticus is defined as two or more consecutive seizures without a period of conciousness or recovery in between, or any seizure lasting longer than 5 minutes.
- Generalized seizures are associated with loss of consciousness, incontinence, and tongue trauma
- Focal seizures effect only a part of the body and are not usually associated with loss of consciousness
- Seizures become more difficult to control when they are prolonged; it is important to treat these patients
- Be prepared to assist ventilations, especially if Midazolam is used

Pediatric **Pain Management**

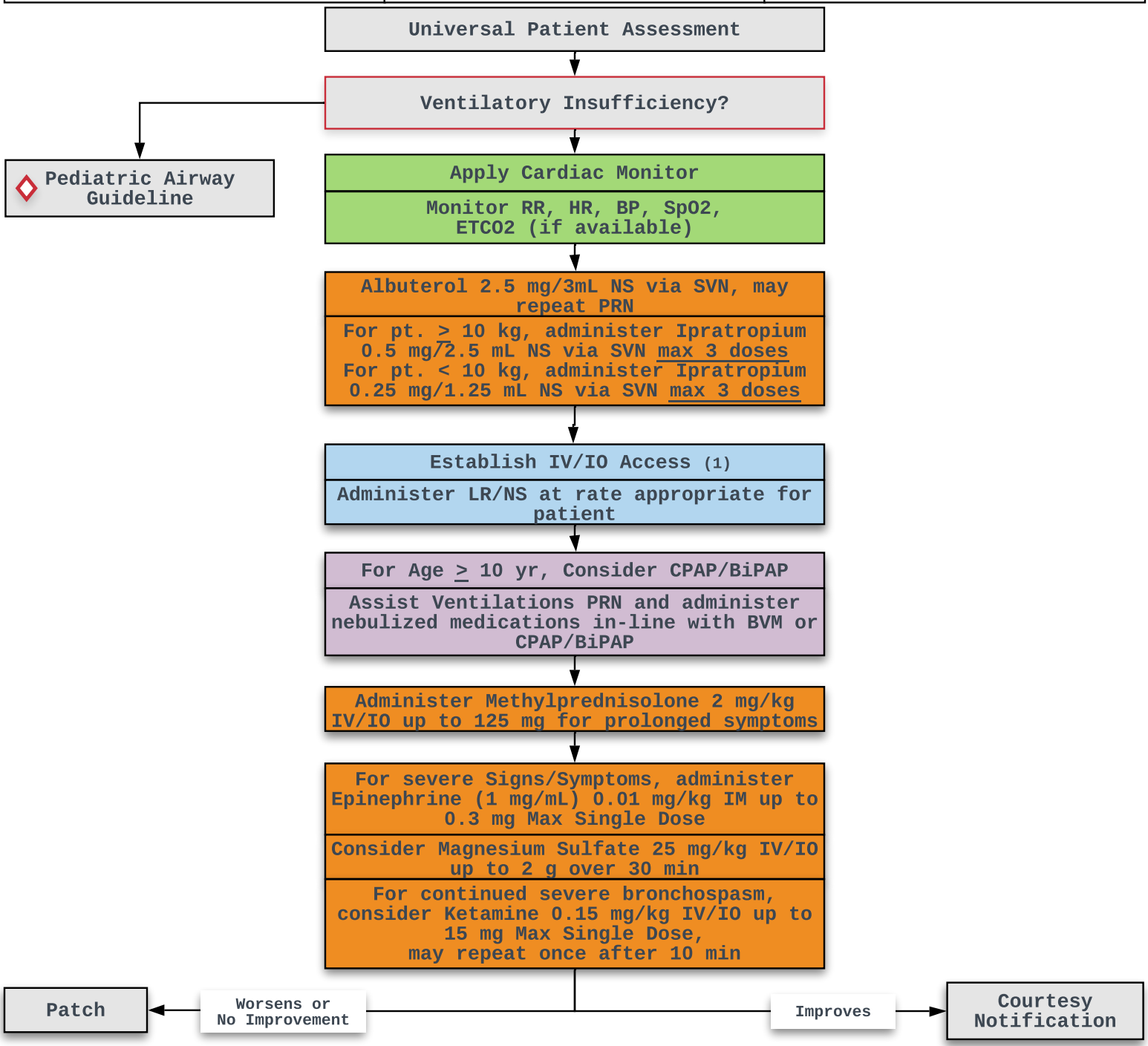
History	Signs/Symptoms	Differential
• OPQRST • Severity • Past Medical History • Medications • Drug allergies • Medications taken prior to arrival	• Severity (pain scale) • Quality • Radiation • Relation to movement, respiration • Increased with palpation of area	• Musculoskeletal • Visceral (abdominal) • Pleural/ Respiratory • Neurogenic



Pearls:
- For IN administration, draw up Ketamine dose then NS to achieve a volume of 0.5 mL and administer IN dose via MAD device per manufacturer's recommendations
- Pain severity should be documented pre- and post-medication delivery and at disposition
- Monitor closely for oversedation, be prepared to assist ventilations if Midazolam is used
- Consider ETCO2 monitoring, if possible, on patients receiving pain management

Pediatric **Respiratory Insufficiency, Lower Airway Symptoms**

History	Signs/Symptoms	Differential
• Asthma • Bronchitis • Recent Respiratory Illness • Exposure to Irritants • Stress • Congenital Heart Disease • Cystic Fibrosis • Cancer • Pre-term Birth	• Wheezing • Diminished Breath Sounds • Increased Mucous Production • Tachypnea • Accessory Muscle Use • Changes in Skin Signs (Pale, Cyanotic, Mottled	• Asthma • Pneumonia • Bronchiolitis • Infection • Exacerbation of Chronic Condition • Airway Burns

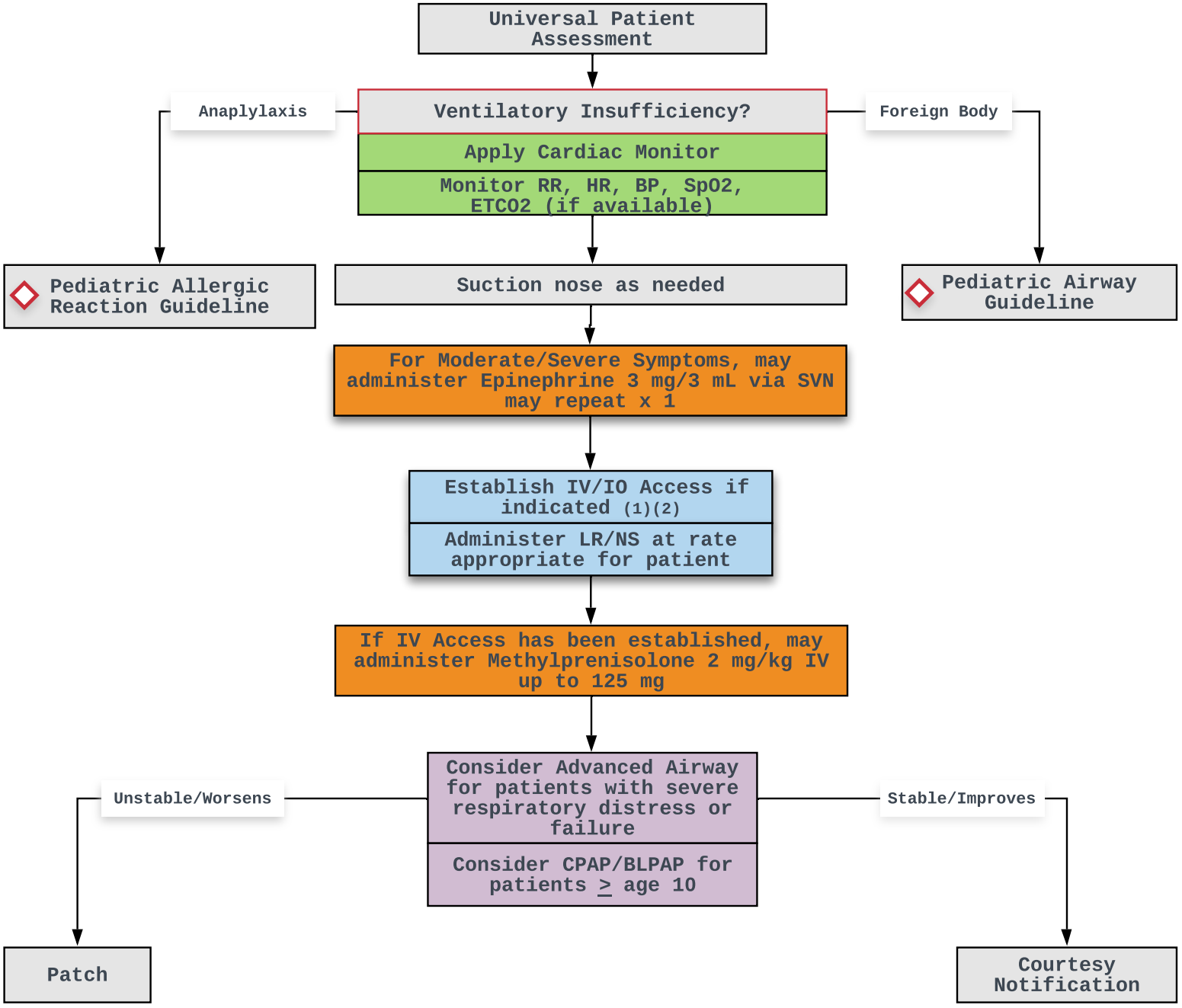


Mix 25 mg/kg Magnesium Sulfate in 50 mL NS or D5W and administer at 100 mL/hr (100 gtts/min).
(1) IV/IO Access may be deferred depending on patient condition and clinical presentation. Emergency treatment with medications should begin prior to IV attempts.
Pearls:

- A silent chest is an ominous sign
- Wheezing may present after treatment begins and can be a sign of improvement
- Patients should be allowed to assume a position of comfort to facilitate breathing
- CPAP can benefit several etiologies. Begin with PEEP of 3-5 and titrate to patient improvement
- Patch early for patients with known complex chronic conditions
- Monitor all patients closely for fatigue, respiratory failure or apnea

Pediatric **Respiratory Insufficiency, Upper Airway Symptoms**

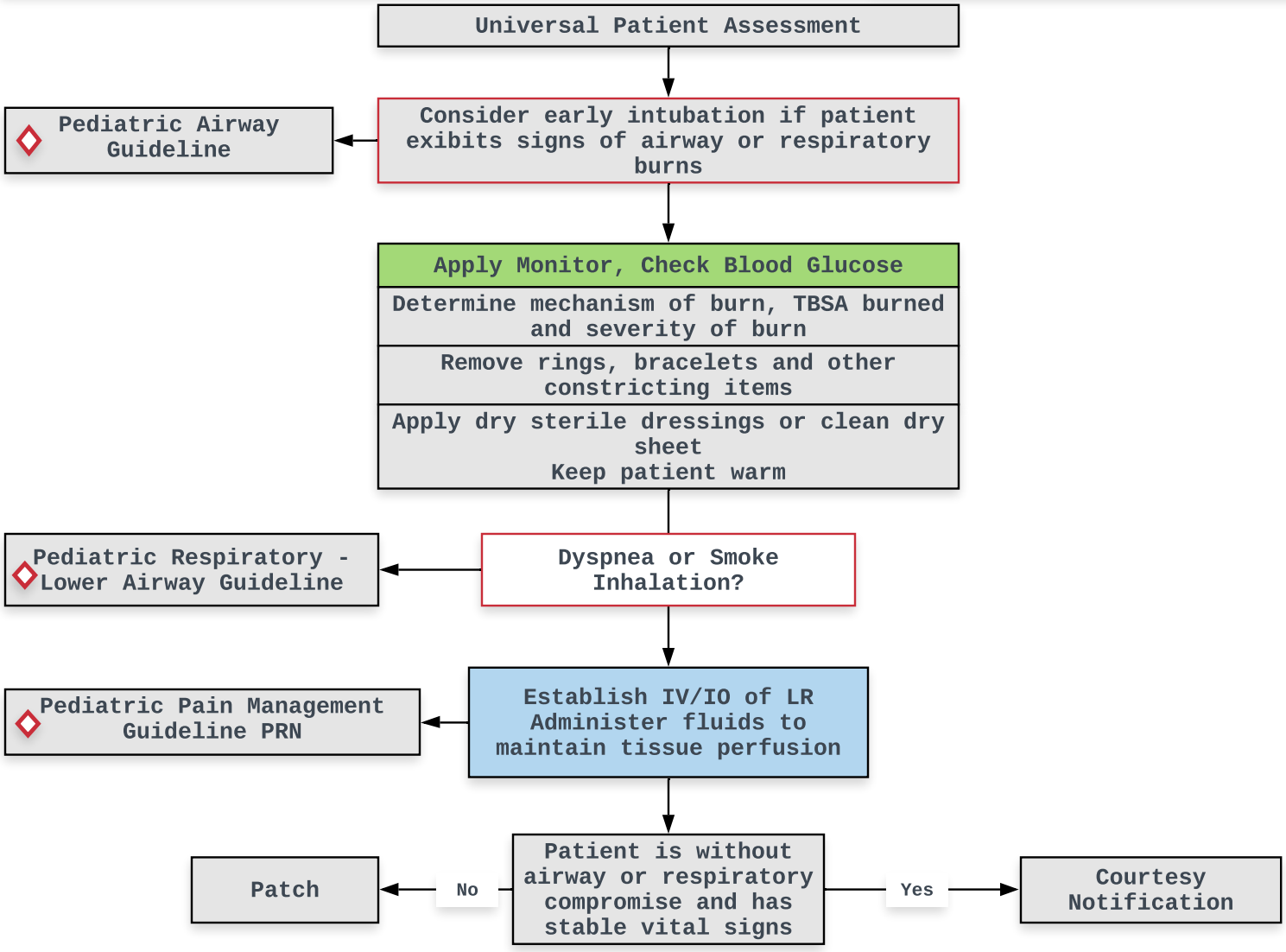
History	Signs/Symptoms	Differential
• Upper Respiratory Symptoms • Barking Cough • Fever • Rapid Onset of Symptoms • Gradual Onset of Symptoms	• Barking Cough • Drooling • Fever • Dysphagia • Stridor • Abdominal Muscle Use • Retractions	• Croup • Epiglottitis • Other URI • Foreign Body Obstruction • Abscess • Angioedema • Bacterial Tracheitis • Infectious Mononucleosis • Trauma



(1) If epiglottitis is suspected, venous access should be deferred unless the patient is in extremis and requires an immediate advanced airway
(2) Children with croup symptoms who are able to take oral fluids do not require venous access
Pearls
- Allow the child to maintain a position of comfort. Performing some treatments on scene while allowing the parent to hold the child may facilitate better outcomes
- Nebulized epinepherine is useful in reducing airway swelling of several etiologies
- Patch early, if possible, for patients with rapidly deteriorating condition

Pediatric **Trauma - Burns**

History	Signs/Symptoms	Differential
• Type of exposure (heat, gas, chemical, lightning/electricity) • Inhalation injury • Time of injury • Past medical history and medications • Trauma • LOC	• Burns, pain, swelling • Dizziness • LOC • Hypotension/ shock (late) • Airway compromise/ distress, singed facial or nasal hair, hoarseness/ wheezing, cough	• Superficial: red and painful • Partial thickness: blistering • Full thickness: painless and charred or leathery skin • Chemical, thermal, electrical, radiation • Non-accidental trauma

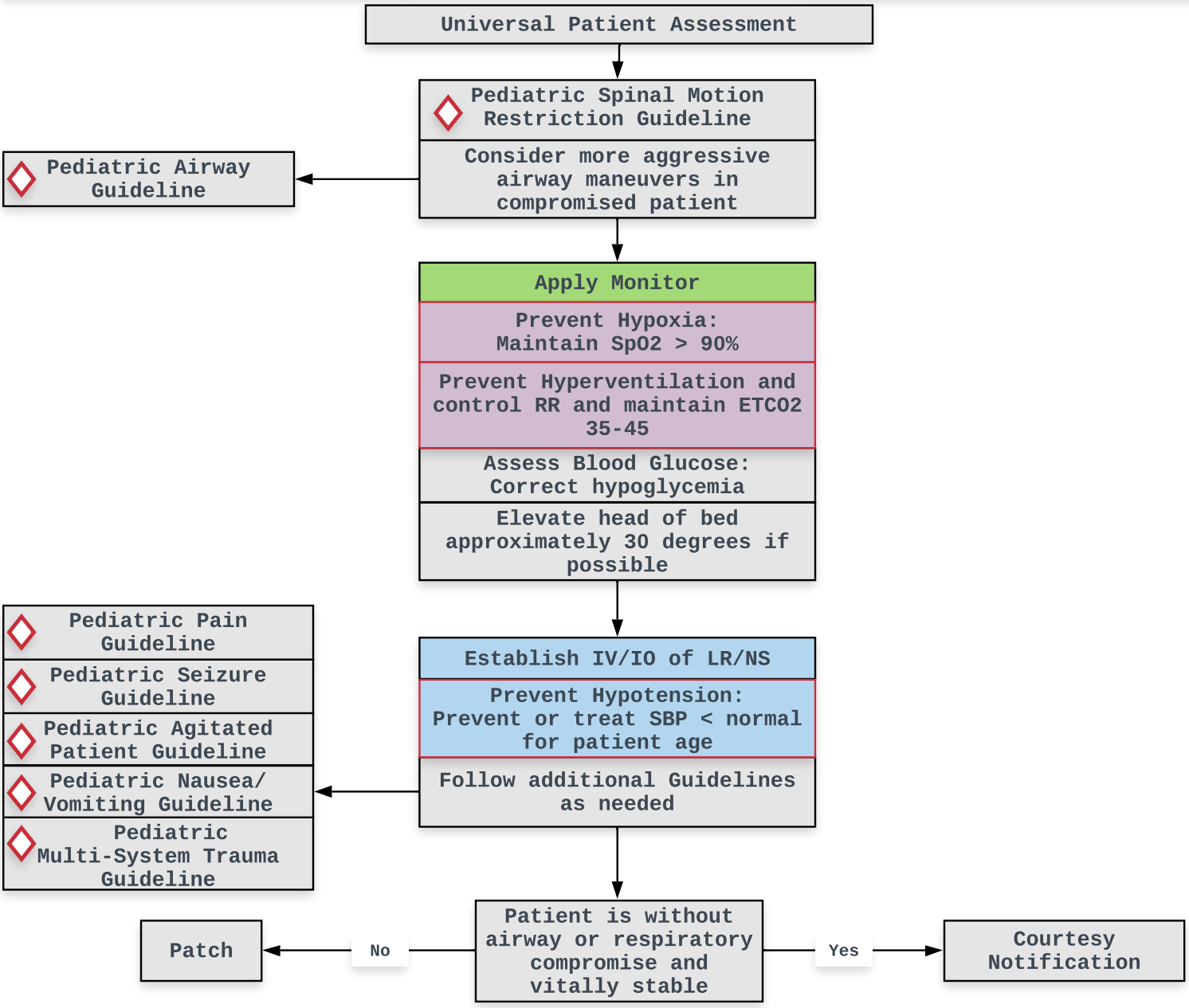


Pearls:

- Stop the burning. Appropriately decontaminate any patient exposed to chemicals or radiation.
- Burn patients are prone to hypothermia
- Remove any clothing or foreign objects associated with the burned area whenever possible.
- Flush chemical burns for 20 min
- Observe urine output during longer transports

Pediatric **Trauma - Head Injury with ALOC**

History	Signs/Symptoms	Differential
• Mechanism: Blunt/penetrating • Loss of conciousness • Bleeding • SAMPLE • Evidence of trauma • Helmet use or damage to helmet	• Pain, swelling, bleeding • Altered mental status • Respiratory distress/ failure • Vomiting • Pupillary abnormalities • CSF leaking from ears or nose	• Skull fracture • Alcohol intoxication • Spinal injury • Brain injury/ bleed

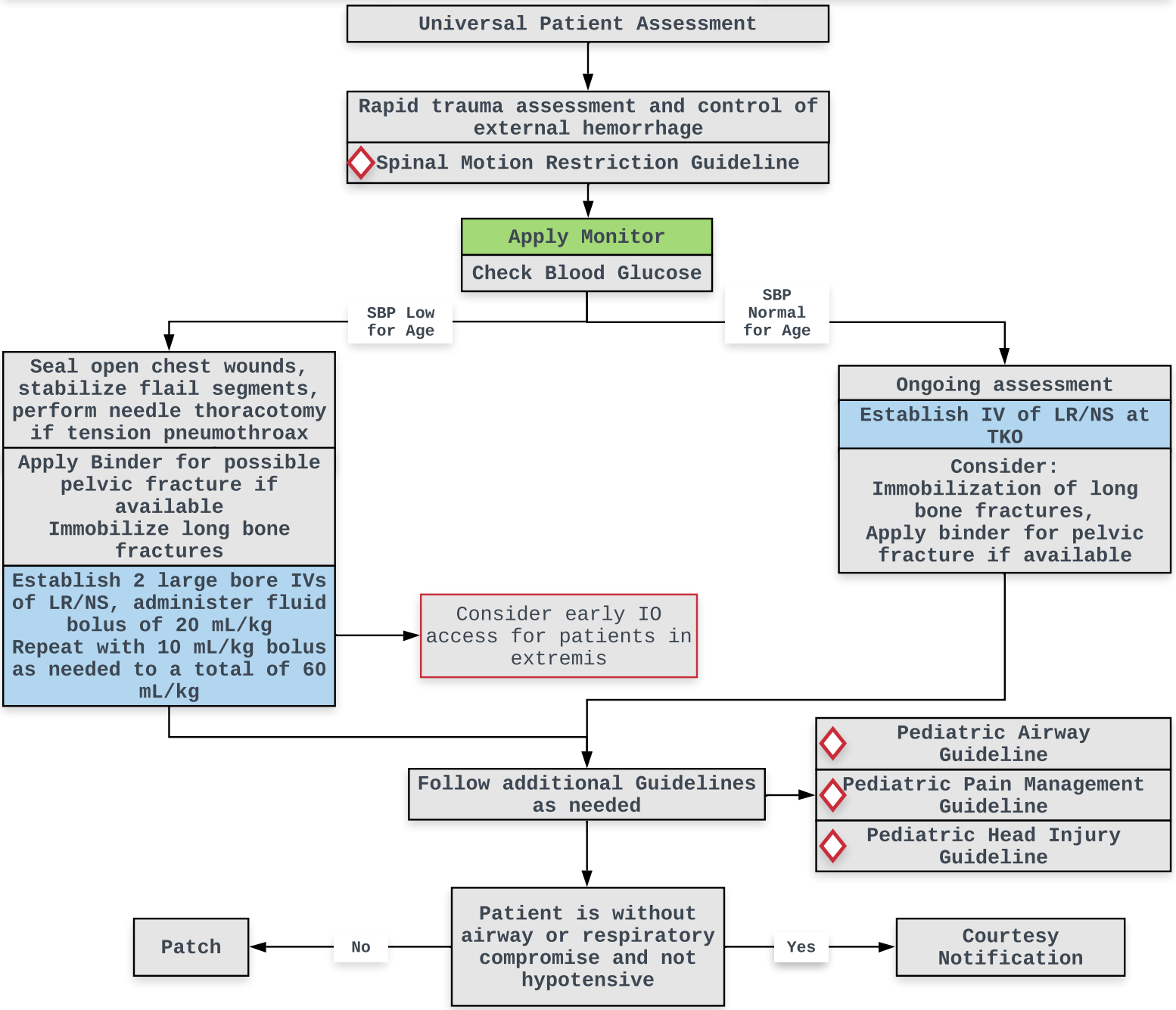


Pearls:
Prevent "H Bombs" -Hypoxia, Hyperventilation, Hypotension, Hypoglycemia

- If hypotensive, consider spinal shock or additional occult injury as source
- Consider early IO for patients in extremis
- Nasal intubation should be last resort as it increases ICP
- Suction as nessessary but note prolonged suctioning increases ICP
- ICP increases with many maneuvers; supine or trendelenberg position (avoid), prolonged intubation attempts, positive pressure ventilation, unnecessary noise, pain, and many others. Attempt to mitigate or avoid these issues as time/situation permits.
- Estimate normal blood pressure: 90 + (2 x age in yr) = SBP

Pediatric **Trauma - Multi-System**

History	Signs/Symptoms	Differential (life threatening)
• Mechanism of injury • Damage to structure or vehicle • Others injured or dead • Speed and details of MVC • Restraints / protective equipment	• Pain, swelling, bleeding • Altered mental status • Respiratory distress/ failure • Cardiac Arrest	• Chest: Tension pneumothorax, Flail chest, pericardial tamponade, open chest wound, hemothorax • Intra-abdominal bleeding • Pelvis/ femur fracture • Spine fractures/ cord injury • HEENT (airway obstruction)

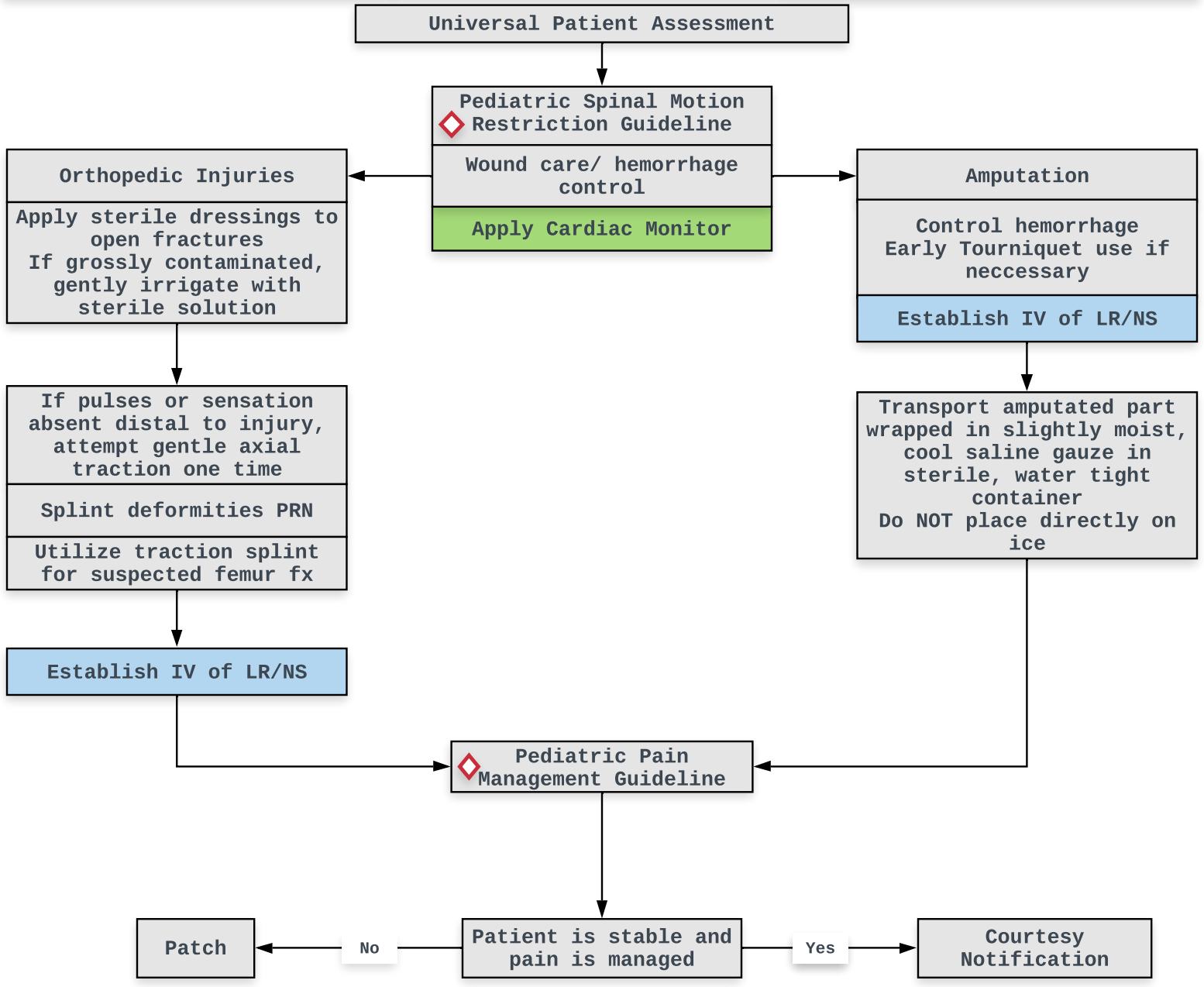


Pearls:

- Consider chest decompression with signs of shock and diminished/ absent breath soudns. If patient arrests, perform bilateral needle decompression
- Minimize scene time and perform interventions enroute when possible
- For severe bleeding from an extremity not rapidly controlled with direct pressure, consider early tourniquet use
- Keep patient warm
- Caution should be used in the administration of fluids greater than 60 mL/kg.
- Estimate normal blood pressure: 90 + (2 x age in yr) = SBP

Pediatric **Trauma - Musculoskeletal Injury**

History	Signs/Symptoms	Differential
• Type of injury • Mechanism: crush/ penetration/ amputation • Open vs closed wound/ fracture • Wound contamination	• Pain, swelling, bleeding • Deformity • Altered sensation/ motor function • Diminished pulse/ capillary refill • Decreased extremity temperature	• Deformity • Contusion • Abrasion • Puncture/ Penetration • Burn • Tenderness • Laceration • Swelling

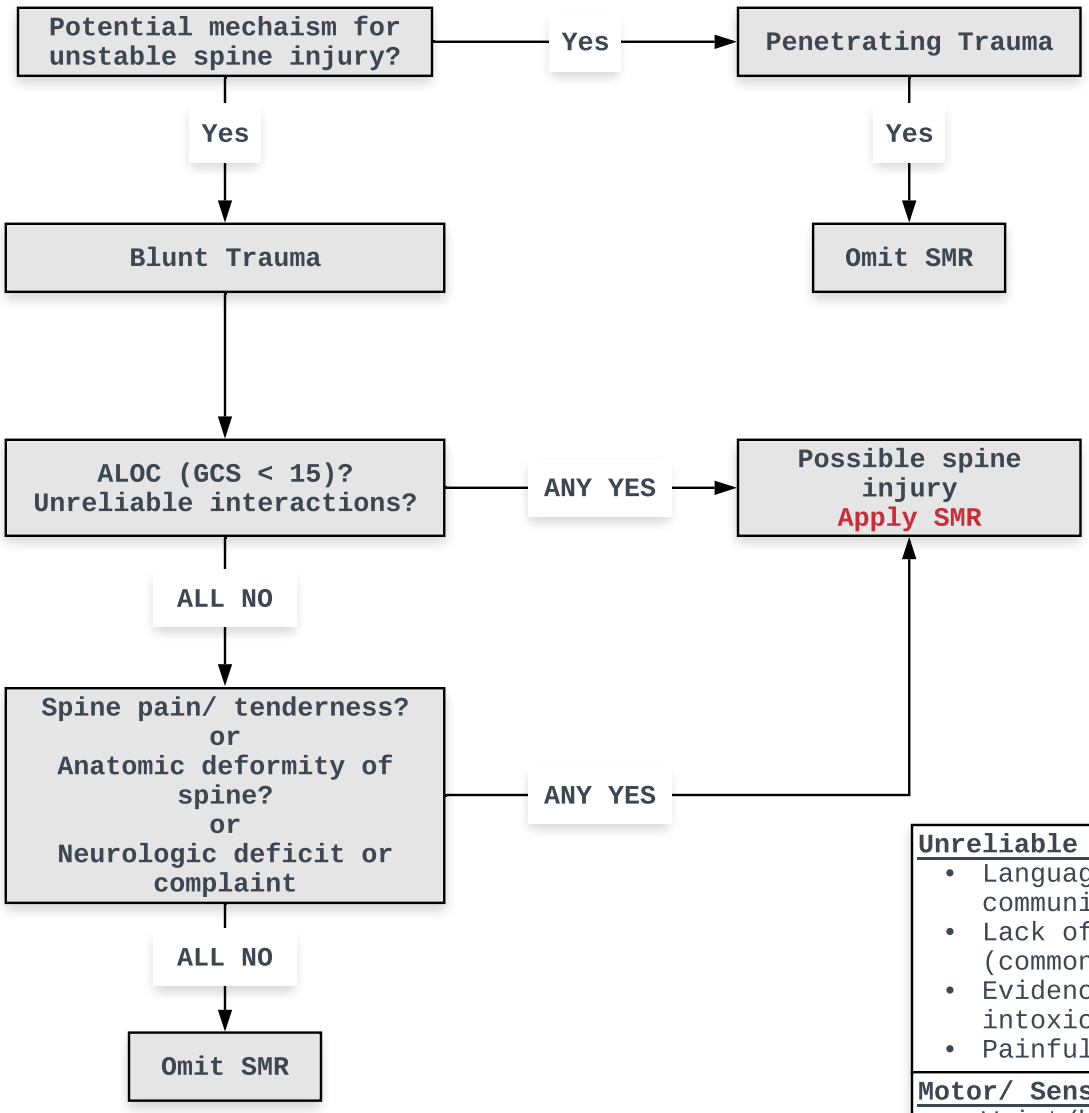


Pearls:
- Assess neurovascular status before and after splinting
- Don't apply traction splint if suspicion of hip or knee joint injury on affected side
- Splint the joint above and below bone injuries and the bones above and below joint injuries
- Urgently transport any injury with vascular compromise

Pediatric **Spinal Motion Restriction Age ≤ 14**

High-Risk
- Trauma triage criteria based on mechanism - consideration may be given for lower levels of mechanism
- Axial loads/ diving injuries
- Sudden acceleration/ deceleration, lateral bending forces to neck, torso
- Violent impact to head, neck, torso, pelvis
- Numbness, tingling, parasthesias

IF ANY OF THE ABOVE, STRONGLY CONSIDER SMR



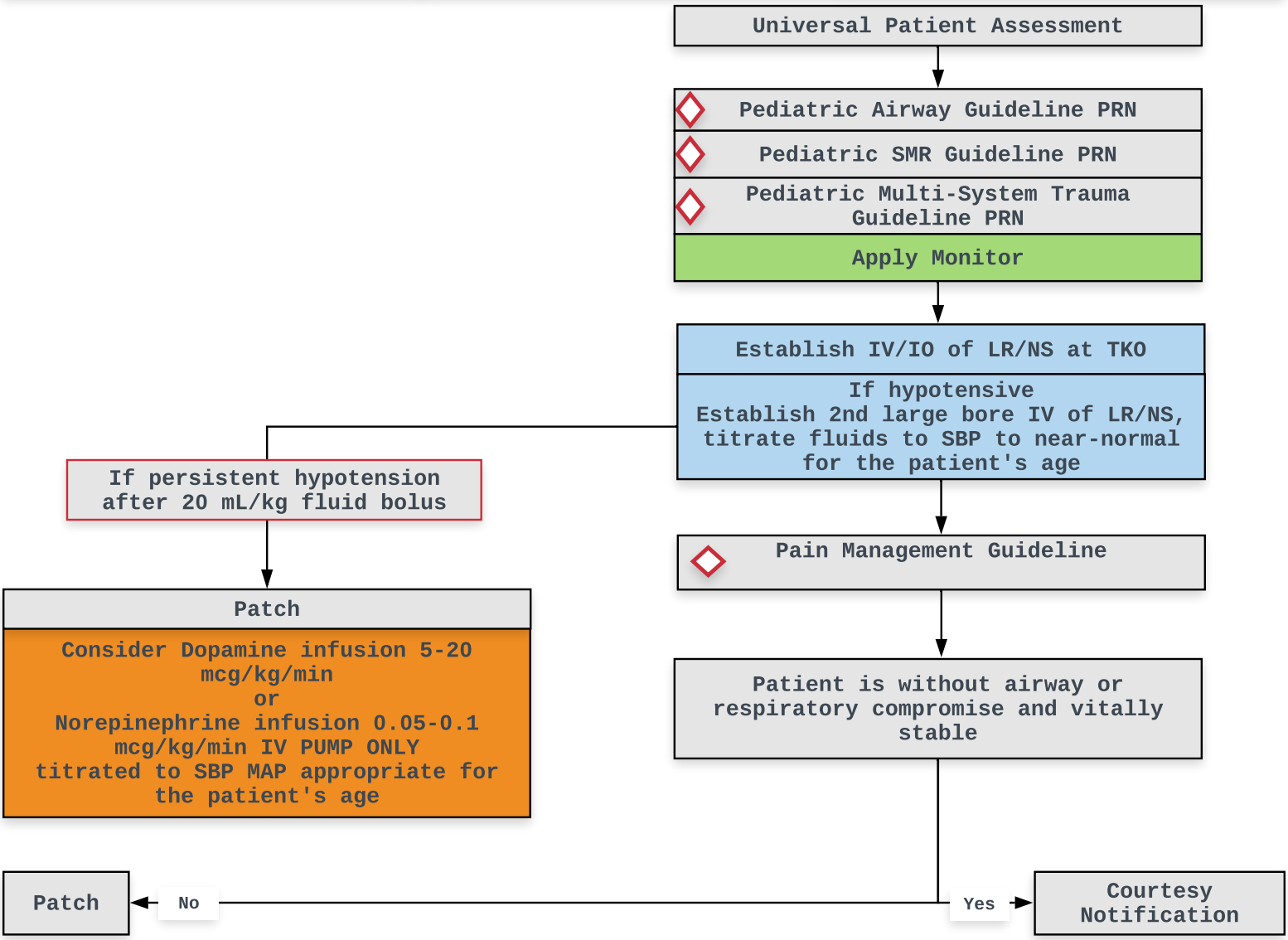
Unreliable Patient Interactions
- Language Barriers, inability to communicate
- Lack of cooperation during exam (common in smaller children)
- Evidence of drug/alcohol intoxication
- Painful **distracting** injuries

Motor/ Sensory Exam
- Wrist/hand extension bilaterally
- Foot plantar flexion bilaterally
- foot dorsiflexion bilaterally
- gross sensation in all extremities
- Assess for parathesias

Pearls:
- The decision NOT to implement spinal immobilization is the responsibility of all providers
- In the very old or young a normal exam may not be sufficient to rule out spinal injury
- Consider the use of a soft collar for SMR when possible
- It is acceptable to use the patient's car seat and add a collar and extra padding to limit movement as long as this does not interfere with other life-saving procedures.

Pediatric **Trauma - Spinal Injury**

History	Signs/Symptoms	Differential
• Motor vehicle accident • Fall • Assault • Sports Injury • Penetrating Trauma (GSW) • Tumor or Cancer	• Flushed skin below line of demarcation • Loss of Motor Control • Severe pain/pressure in the head, neck, or back • Paresthesias • Loss of Fine Motor Control • Numbness or diminished sensation, including heat/cold • Slow-Normal or Bradycardic Heart Rate • Hypotension • Unable to protect airway • Incontinence or Urinary/Bowel Retention	• Aortic artery dissection • Spinal cord infection • Tumor • Vertebral fracture with Impingement • Complete Transection of the Spinal Cord • Spinal Abscess • Central Cord Syndrome • Anterior Cord Syndrome • Brown-Sequard Syndrome • Transient Spinal Injury



Pearls:

- Be suspicious of severe Spinal Cord Injury and the onset of Neurogenic Shock in any patient who sustains trauma that should present with tachycardia, but is bradycardic instead.
- Palpation of the spinal column is important, however it is very difficult to feel step-offs in most patients. Presence of pain or tenderness to a specific area of the spine coupled with any other symptoms should be highly suspicious for serious injury until proven otherwise.
- Injuries from penetrating trauma are usually stable, but still may require precautions
- Small Children presenting with an inability or apparent unwillingness to move should be suspected to have any injury until proven otherwise