



Allergic Reaction/ Anaphylaxis

History

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

Signs and Symptoms

- Itching or hives
- Coughing / wheezing or respiratory distress
- Chest or throat constriction
- Difficulty swallowing
- Hypotension or shock
- Edema
- N/V

Differential

- Urticaria (rash only)
- Anaphylaxis (systemic effect)
- Shock (vascular effect)
- Angioedema (drug induced)
- Aspiration / Airway obstruction
- Vasovagal event
- Asthma or COPD
- CHF

Assess Symptom Severity / Suspected Exposure to Allergen

MILD
Skin Only

Diphenhydramine
25 - 50 mg PO

IV or IO Access Protocol UP 6
if indicated

Diphenhydramine
25 - 50 mg
PO / IV / IM / IO

Histamine (H2) Blocker
if available

Monitor and Reassess
Monitor for Worsening
Signs and Symptoms

MODERATE / SEVERE

2 + Body Systems +/- Hypotension

Diphenhydramine
25 - 50 mg PO

Epinephrine 1:1000 IM
0.3 - 0.5 mg
Repeat every 5 minutes
if no improvement

Albuterol Nebulizer
2.5 - 5 mg
Repeat as needed x 3
if indicated

Epinephrine 1:1000
0.3 - 0.5 mg IM
Repeat every 5 minutes
if no improvement

Diphenhydramine
50 mg IV / IM / IO
if not given PO (See Pearls)

Airway Protocol(s) AR 1 - 4
if indicated

Hypotension/ Shock
Protocol AM 5
if indicated

May substitute Epinephrine 1:1000 IM
with the following:
Epinephrine nasal spray 2mg IN
May repeat in 5 minutes x 1 in other nostril

IV or IO Access Protocol UP 6

Albuterol Nebulizer
2.5 - 5 mg
+/- Ipratropium 0.5 mg (DuoNeb)
Repeat as needed x 3
if indicated

Pepcid 40mg IV/IO x 1

Normal Saline Bolus
500 mL IV / IO
Repeat as needed
Maximum 2 Liters

Decadron 10mg IV / IO / IM x1

Consider TXA 1 gm IV/IO for severe
Angioedema only

No improvement with IM Epinephrine
Epinephrine 1:10K 0.5 mg IV / IO
Repeat every 3-5 minutes

**Notify Destination or
Contact Medical Control**



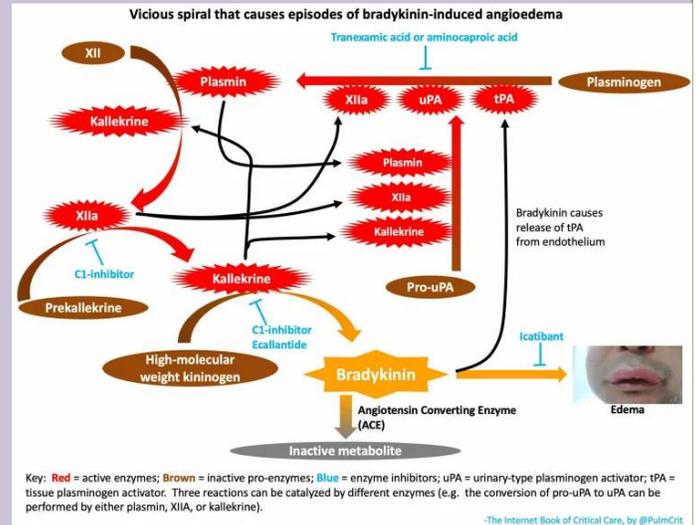
Allergic Reaction/ Anaphylaxis

Anaphylaxis usually has offending agents or known allergies/reactions. Hives / wheezing / itching

Angioedema may have no trigger / facial swelling with no hives / wheezing. May be due to ACE Inhibitor blood pressure medications - most common is Lisinopril or anything ending in **pril.

Hereditary angioedema brought on by stress or is spontaneous.

Facial swelling only - if moderate to severe symptoms give Antihistamines / Steroids - Epi, If not helpful. TXA only true treatment in the field.



Pearls

- **Recommended Exam: Mental Status, Skin, Heart, Lungs, Abdominal**
- **Anaphylaxis is an acute and potentially lethal multisystem allergic reaction.**
- **Epinephrine and administration:**
Drug of choice and the **FIRST** drug that should be administered in acute anaphylaxis (Moderate / Severe Symptoms.) IM Epinephrine should be administered in priority before or during attempts at IV or IO access.
- **Diphenhydramine and steroid administration:**
Diphenhydramine/ steroids have no proven benefit in Moderate/ Severe anaphylaxis.
Diphenhydramine/ steroids should NOT delay initial or repeat Epinephrine administration.
In Moderate and Severe anaphylaxis, Diphenhydramine may decrease mental status.
Diphenhydramine should NOT be given to a patient with decreased mental status and/ or a hypotensive patient as this may cause nausea, vomiting, and/ or worsening mental status.
- **Anaphylaxis unresponsive to repeat doses of IM epinephrine may require IV epinephrine administration by IV push or epinephrine infusion.**
- **Symptom Severity Classification:**
Mild symptoms:
Flushing, hives, itching, erythema with normal blood pressure and perfusion.
Moderate symptoms:
Flushing, hives, itching, erythema plus respiratory (wheezing, dyspnea, hypoxia) or gastrointestinal symptoms (nausea, vomiting, abdominal pain) with normal blood pressure and perfusion.
Severe symptoms:
Flushing, hives, itching, erythema plus respiratory (wheezing, dyspnea, hypoxia) or gastrointestinal symptoms (nausea, vomiting, abdominal pain) with hypotension/ poor perfusion or isolated hypotension.
- **Allergic reactions may occur with only respiratory and gastrointestinal symptoms and have no rash/ skin involvement.**
- **Angioedema** is seen in moderate to severe reactions and is swelling involving the face, lips or airway structures. This can also be seen in patients taking blood pressure medications like Prinivil / Zestril (lisinopril)-typically end in -il.
- **Hereditary Angioedema** involves swelling of the face, lips, airway structures, extremities, and may cause moderate to severe abdominal pain. Some patients are prescribed specific medications to aid in reversal of swelling.
Paramedic may assist or administer this medication per patient/ package instructions.
- **Patients with moderate and severe reactions should receive a 12 lead ECG and should be continually monitored, but this should NOT delay administration of epinephrine.**
- **EMR/ EMT:**
The use of Epinephrine IM is limited to the treatment of anaphylaxis and may be given only by autoinjector, unless manual draw-up is approved by the Agency Medical Director and the NC office of EMS.
Administration of diphenhydramine is limited to the oral route only.
- **EMT administration of beta-agonist is not limited to only patients currently prescribed the medication, and has been approved by Dr Koontz and the NC office of EMS.**
- Dr Koontz does not require contact of medical control prior to EMT/ EMR administering any medication(s).
- The shorter the onset from exposure to symptoms the more severe the reaction.



Diabetic; Adult

History

- Past medical history
- Medications
- Recent blood glucose check
- Last meal

Signs and Symptoms

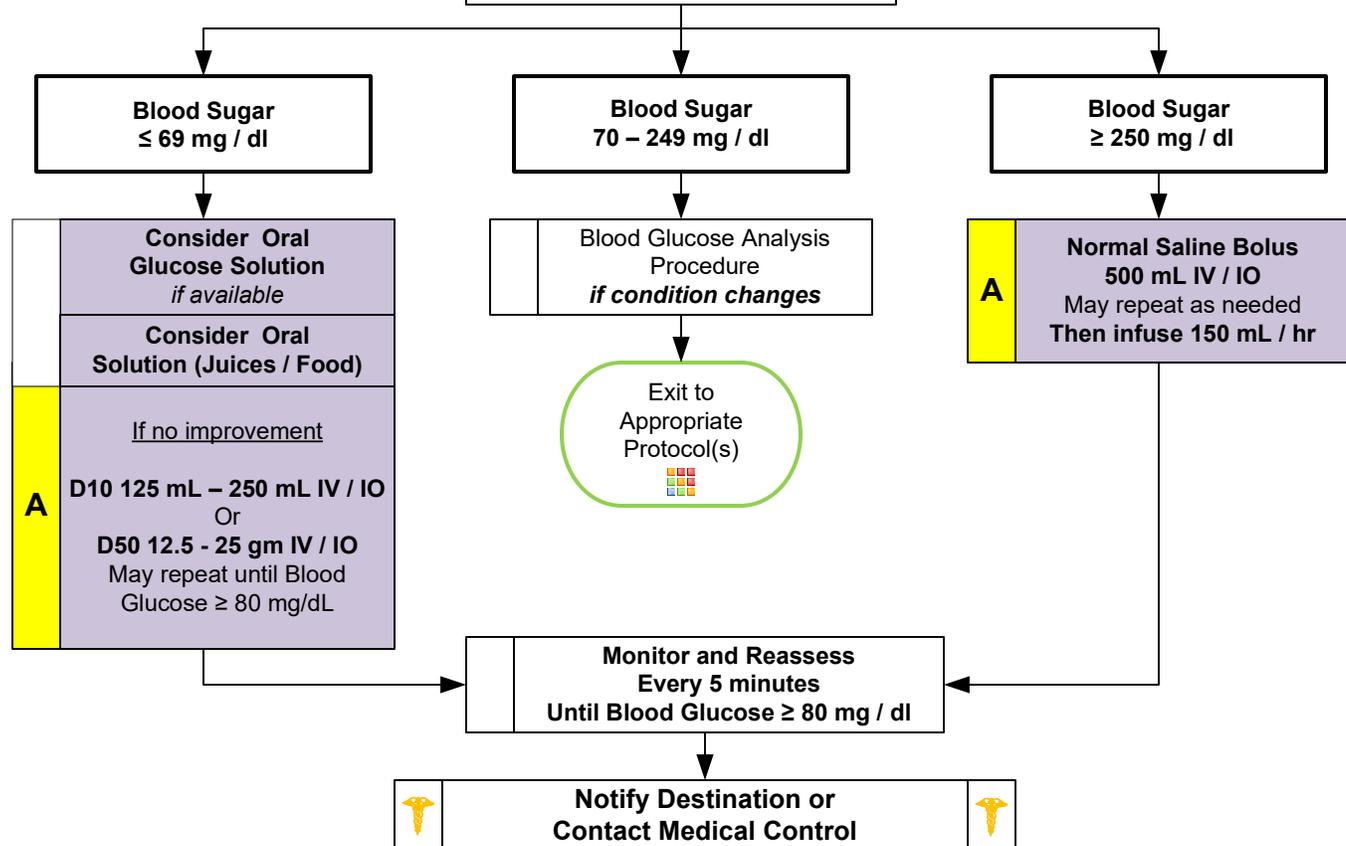
- Altered mental status
- Combative / irritable
- Diaphoresis
- Seizures
- Abdominal pain
- Nausea / vomiting
- Weakness
- Dehydration
- Deep / rapid breathing

Differential

- Alcohol / drug use
- Toxic ingestion
- Trauma; head injury
- Seizure
- CVA
- Altered baseline mental status

	Blood Glucose Analysis Procedure
B	12 Lead ECG Procedure <i>if indicated</i>
	IV or IO Access Protocol UP 6
P	Cardiac Monitor
	Altered Mental Status Protocol UP 4 <i>if indicated</i>
	Hypotension/ Shock Protocol AM 5 <i>if indicated</i>
	Suspected Stroke Protocol AM 7 <i>if indicated</i>
	Seizure Protocol UP 13 <i>if indicated</i>

B	<p>Blood Glucose ≤ 69 mg / dl and symptomatic No venous access Glucagon 1 – 2 mg IM Repeat in 15 minutes if needed</p>
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Diabetic; Adult

Encourage patients to eat, assist in getting or preparing food for immediate consumption

Pearls

- **Recommended exam: Mental Status, Skin, Respirations and effort, Neuro.**
- **Patients with prolonged hypoglycemia or those who are malnourished may not respond to glucagon.**
- **Do not administer oral glucose to patients who are not able to swallow or protect their airway.**
- **Quality control checks should be maintained per manufacturers recommendation for all glucometers.**
- **Patient's refusing transport to medical facility after treatment of hypoglycemia:**
 - Blood sugar must be ≥ 80 , patient has ability to eat and availability of food with responders on scene.
 - Patient must have known history of diabetes and not taking any oral diabetic agents.
 - Patient returns to normal mental status and has a normal neurological exam with no new neurological deficits.
 - Must demonstrate capacity to make informed health care decisions. See Universal Patient Care Protocol UP-1.
 - Otherwise contact medical control.
- **Hypoglycemia with Oral Agents:**
 - Patient's taking oral diabetic medications should be encouraged to allow transportation to a medical facility.
 - They are at risk of recurrent hypoglycemia that can be delayed for hours and require close monitoring even after normal blood glucose is established.
 - Not all oral agents have prolonged action so Contact Medical Control or NC Poison Control Center for advice.
 - Patient's who meet criteria to refuse care should be instructed to contact their physician immediately and consume a meal.
- **Hypoglycemia with Insulin Agents:**
 - Many forms of insulin now exist. Longer acting insulin places the patient at risk of recurrent hypoglycemia even after a normal blood glucose is established.
 - Not all insulins have prolonged action so Contact Medical Control for advice.
 - Patient's who meet criteria to refuse care should be instructed to contact their physician immediately and consume a meal.
- **Congestive Heart Failure patients who have Blood Glucose > 250:**
 - Limit fluid boluses unless patient has signs of volume depletion such as, dehydration, poor perfusion, hypotension, and/ or shock.
- In extreme circumstances with no IV / IO access and no response to glucagon, D50 can be administered rectally, Contact Medical Control for advice.



Dialysis/ Renal Failure

History

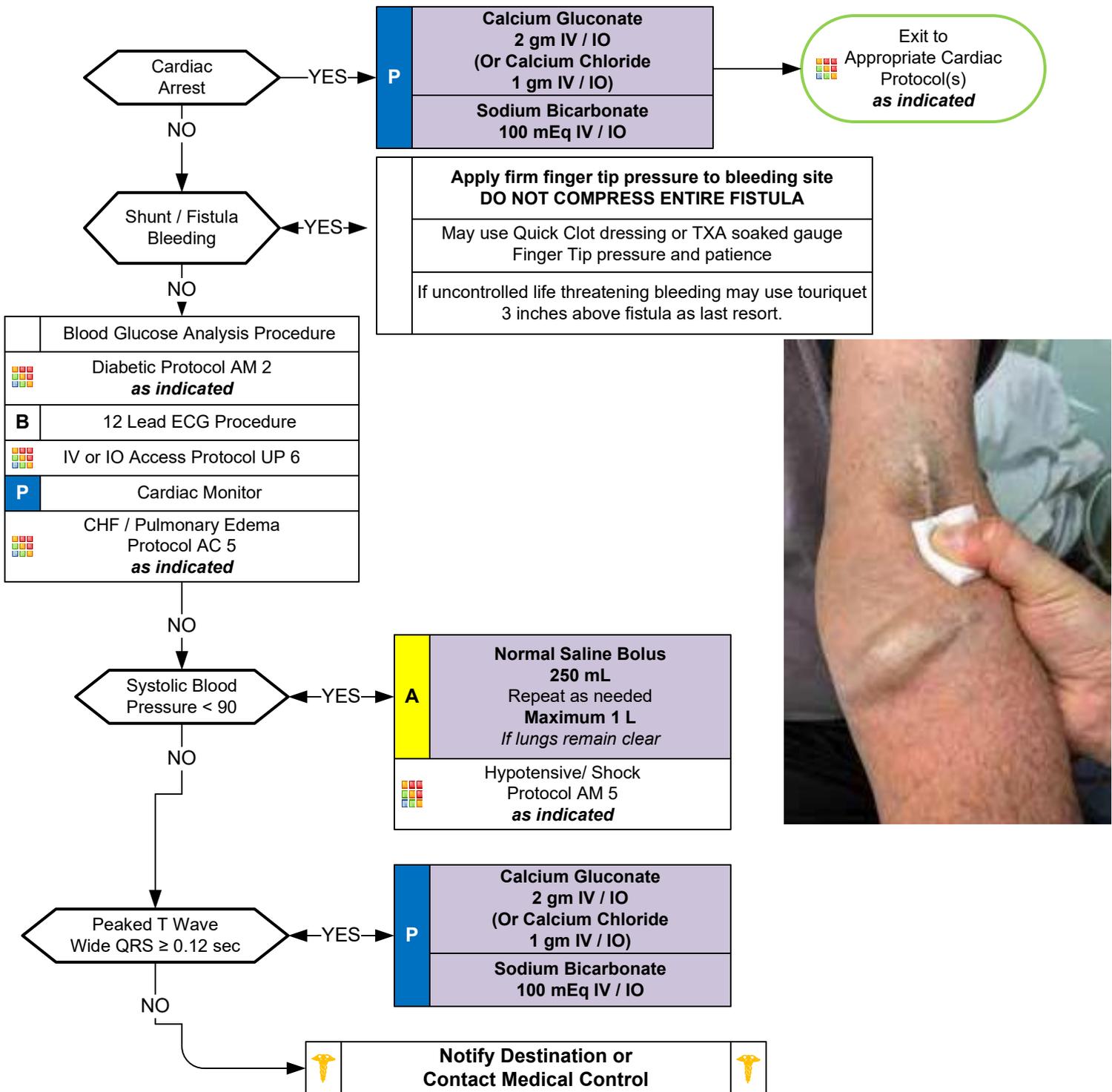
- Peritoneal or Hemodialysis
- Anemia
- Catheter access noted
- Shunt access noted
- Hyperkalemia

Signs and Symptoms

- Hypotension
- Bleeding
- Fever
- Electrolyte imbalance
- Nausea and / or vomiting
- Altered Mental Status
- Seizure
- Arrhythmia

Differential

- Congestive heart failure
- Pericarditis
- Diabetic emergency
- Sepsis
- Cardiac tamponade





Dialysis/ Renal Failure

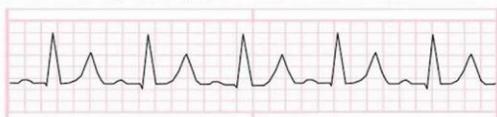
Serum potassium levels

A. normal (3.5 - 5.5 mEq/L)



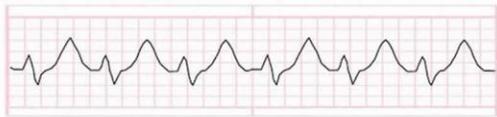
- Normal intervals and complexes

B. about (7.0 mEq/L)



- Peaked T waves (usually the earliest sign of hyperkalaemia)
- P wave widens and flattens, PR segment lengthens, P waves disappear

C. (8.0 - 9.0 mEq/L)



- Prolonged QRS interval with bizarre morphology and development of sine wave
- Can cause any kind of conduction blocks

D. (>10 mEq/L)



- Sine wave (a pre-terminal rhythm). Wide, bizarre QRS. causes: Asystole, VF, PEA with bizarre wide complex rhythm

Emergent ER/ICU Dialysis Capable Hospitals (Ability for 24/7 emergent dialysis)

1. CEMC - 24/72. ECU - 24/7 – Novant 24/7

Other local hospitals have routine dialysis beds – OMH, Carteret

- Very limited availability
- No CVVH or Emergent

Scotts Hill – no dialysis resources

If suspected High K with EKG changes then transport to CEMC / ECU / Novant

Pearls

- **Recommended exam: Mental status. Neurological. Lungs. Heart. Skin.**
- **Preferably transport to a medical facility capable of providing dialysis treatment.**
- **Do not take Blood Pressure or start IV / IO in extremity which has a shunt/ fistula in place.**
- **Access of shunt indicated in the dead or near-dead patient only with no IV or IO access.**
- **If hemorrhage cannot be controlled with firm, uninterrupted direct pressure, application of tourniquet with uncontrolled dialysis fistula bleeding is indicated.**
- **Hemodialysis:**
Process which removes waste from the blood stream and occurs about three times each week.
Some patients do perform hemodialysis at home.
- **Peritoneal dialysis:**
If patient complains of fever, abdominal pain, and/ or back pain, bring the Peritoneal Dialysis fluid bag, which has drained from the abdomen, to the hospital.

Complications of Dialysis Treatment:

Hypotension:

Typically responds to small fluid bolus of 250 mL Normal Saline.
May result in angina, AMS, seizure or arrhythmia.

Filtration and decreased blood levels of some medications like some seizure medications:

Disequilibrium syndrome:

Shift of metabolic waste and electrolytes causing weakness, dizziness, nausea and/ or vomiting and seizures.

Equipment malfunction:

- Air embolism.
- Bleeding.
- Electrolyte imbalance.
- Fever.

- **Fever:**
Consider sepsis in a dialysis patient with any catheter extending outside the body.
- Always consider Hyperkalemia in all dialysis or renal failure patients.
- Sodium Bicarbonate and Calcium Chloride/ Gluconate should not be mixed. Ideally give in separate lines.
- Renal dialysis patients have numerous medical problems typically. Hypertension and cardiac disease are prevalent.



Hypertension

History

- Documented Hypertension
- Related diseases: Diabetes; CVA; Renal Failure; Cardiac Problems
- Medications for Hypertension
- Compliance with Hypertensive Medications
- Erectile Dysfunction medications
- Pregnancy

Signs and Symptoms

One of these

- Systolic BP 220 or greater
- Diastolic BP 120 or greater

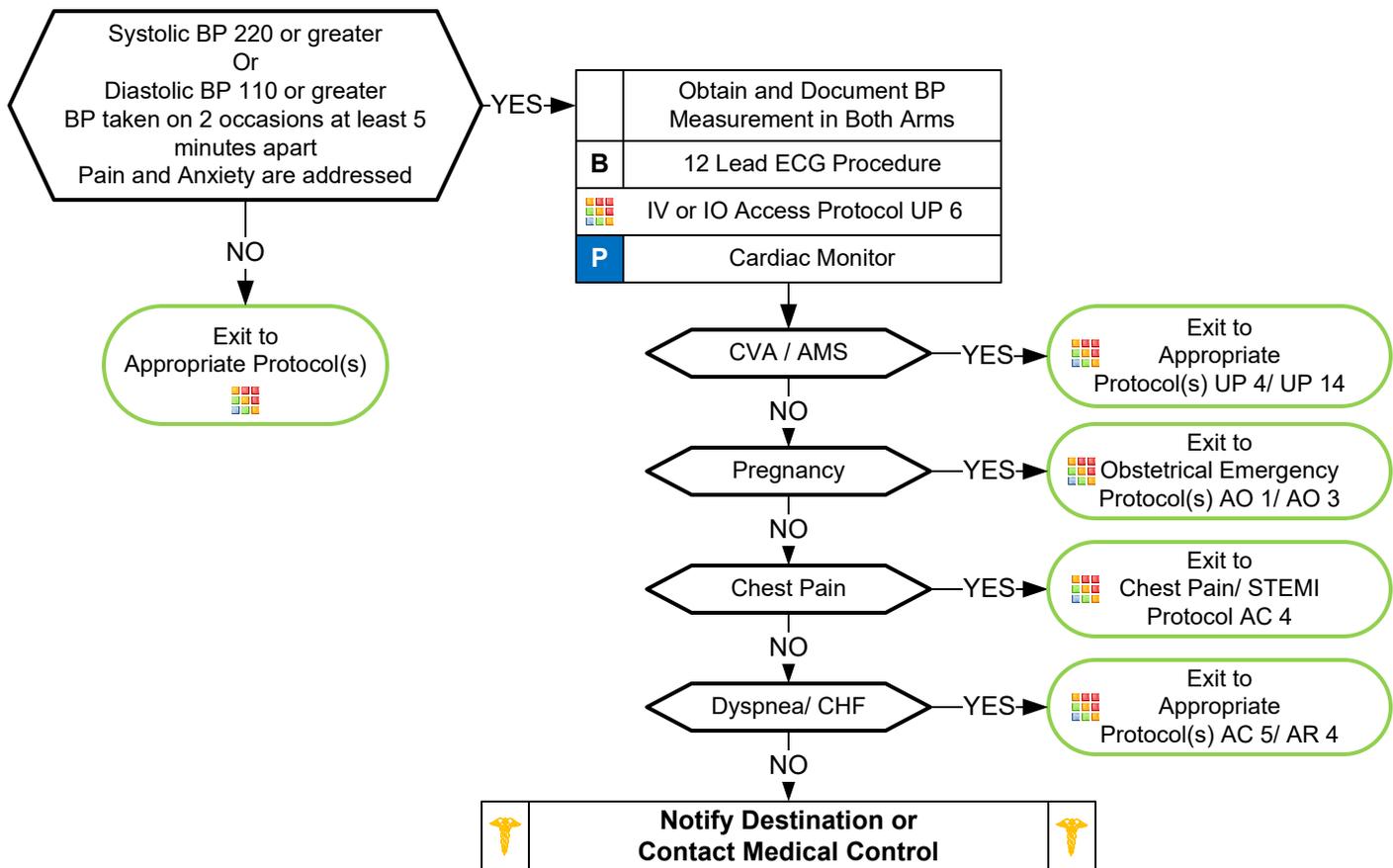
AND at least one of these

- Headache
- Chest Pain
- Dyspnea
- Altered Mental Status
- Seizure

Differential

- Hypertensive encephalopathy
- Primary CNS Injury
Cushing's Response with Bradycardia and Hypertension
- Myocardial Infarction
- Aortic Dissection / Aneurysm
- Pre-eclampsia / Eclampsia

Hypertension is not uncommon especially in an emergency setting. Hypertension is usually transient and in response to stress and/ or pain. A hypertensive emergency is based on blood pressure along with symptoms which suggest an organ is suffering damage such as MI, CVA or renal failure. This is very difficult to determine in the pre-hospital setting in most cases. Aggressive treatment of hypertension can result in harm. Most patients, even with significant elevation in blood pressure, need only supportive care. Specific complaints such as chest pain, dyspnea, pulmonary edema or altered mental status should be treated based on specific protocols and consultation with Medical Control..



Pearls

- **Recommended Exam: Mental Status, Skin, Neck, Lung, Heart, Abdomen, Back, Extremities, Neuro**
- Elevated blood pressure is based on two to three sets of vital signs.
- Symptomatic hypertension is typically revealed through end organ dysfunction to the cardiac, CNS, or renal systems.
- All symptomatic patients with hypertension should be transported with their head elevated at 30 degrees.
- Ensure appropriate size blood pressure cuff utilized for body habitus.



Hypotension / Shock

History

- Blood loss - vaginal or gastrointestinal bleeding, AAA, ectopic
- Fluid loss - vomiting, diarrhea, fever
- Infection
- Cardiac ischemia (MI, CHF)
- Medications
- Allergic reaction
- Pregnancy
- History of poor oral intake

Signs and Symptoms

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

Differential

- Ectopic pregnancy
- Dysrhythmias
- Pulmonary embolus
- Tension pneumothorax
- Medication effect / overdose
- Vasovagal
- Physiologic (pregnancy)
- Sepsis

	Blood Glucose Analysis Procedure
B	12 Lead ECG Procedure
	IV or IO Access Protocol UP 6
P	Cardiac Monitor
	Airway Protocol(s) <i>if indicated</i>
	Diabetic Protocol AM 2 <i>if indicated</i>

Blood Product Indicators

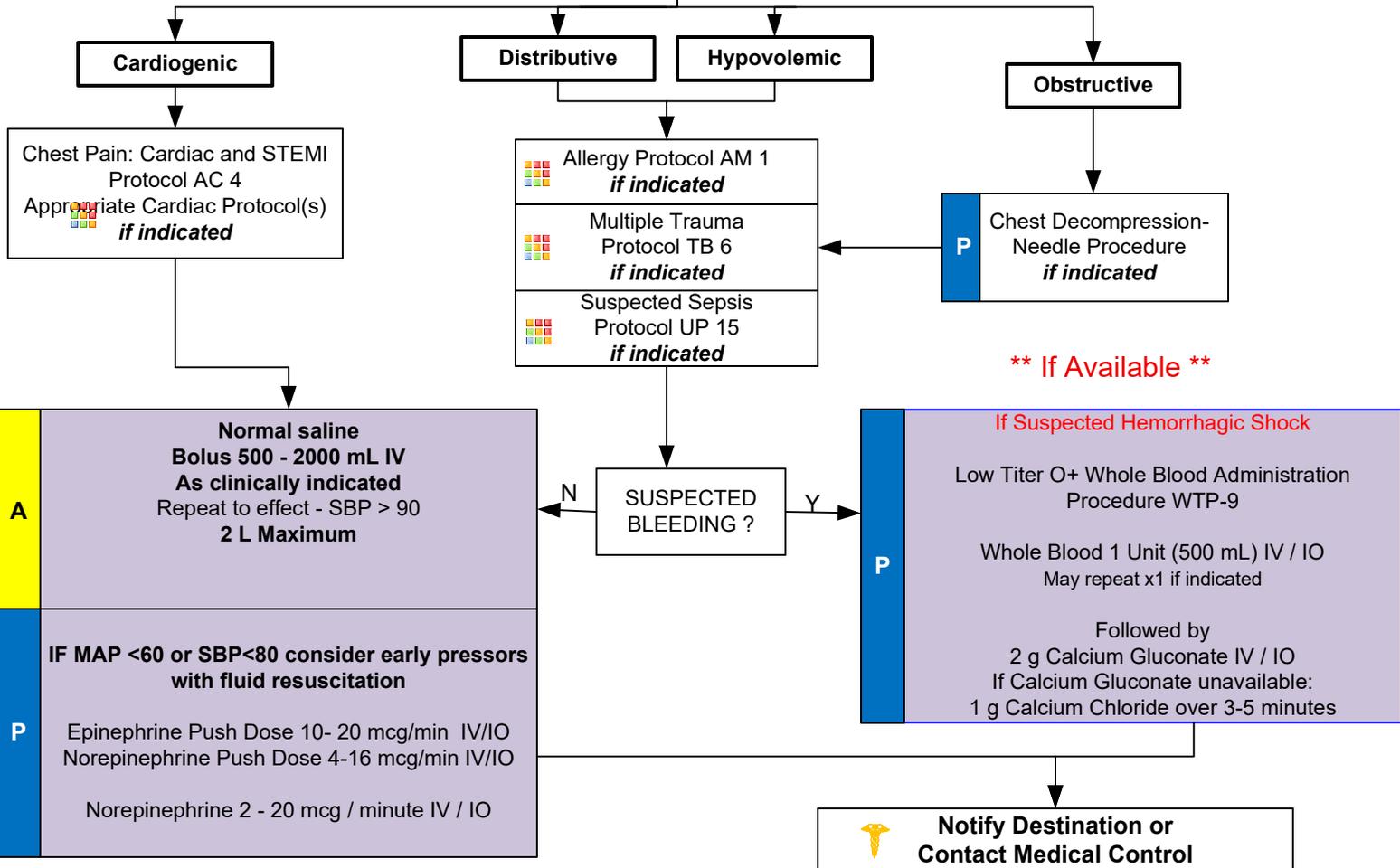
Visual evidence of large volume blood loss and/or

Adult
SBP ≤ 70 or SBP ≤ 90 + HR >110

Age > 65
SBP ≤ 90 + HR >110

Peds:
SBP ≤ 70 + (2 x Age)

History and Exam Suggest Type of Shock



**** If Available ****



Notify Destination or Contact Medical Control



Hypotension / Shock

If Available Whole blood transfusion requires 20 gauge or larger IV / IO access, and agency-approved blood tubing and warmer.
Refer to Low Titer O+ Whole Blood Procedure WTP – 9.
May repeat x1 if no improvement after 500ml of whole blood.

Remember Push Dose Pressors effects are temporary – if more than 2 doses are needed switch to the Norepi or Epi drips

Norepinephrine: Place 4 mg Norepinephrine in 250 mL NS (16 mcg / mL concentration).
Administer via IV Pump at 8 – 38 mL/Hour. If using 60 drop set this equals 8 – 38 drips per minute.

	Infusion	Push-dose syringe
EPINEPHRINE	Preparation:	Preparation:
	<input type="checkbox"/> Add 4 mg epinephrine 1:1,000 to 250 mL bag of Normal Saline Yields Epinephrine concentration of 16 mcg / mL <input type="checkbox"/> Label the bag	<input type="checkbox"/> Draw up 9 mL Normal Saline in 10 cc syringe <input type="checkbox"/> Add the 1 mL epinephrine 1:10,000 Yields Epinephrine concentration of 10 mcg / mL <input type="checkbox"/> Label the syringe
	Administration: (1 – 10 mcg / min epinephrine)	Administration:
	IV Infusion Pump: 4 – 38 mL / Hour 60 gtts / mL tubing: 4 – 40 drips per minute	Push-Dose Epinephrine <input type="checkbox"/> Administer 1 mL (10 mcg epinephrine)

Agencies may utilize other forms/concentrations if approved by the Dr Koontz

Pearls

Recommended Exam: Mental Status, Skin, Heart, Lungs, Abdomen, Back, Extremities, Neuro

Hypotension is defined as a systolic blood pressure less than 90. This is not always reliable and should be interpreted in context and consider patient's typical BP if known.

Shock may be present with a normal blood pressure initially or even elevated blood pressure.

Shock is often present with normal vital signs and may develop insidiously. Tachycardia may be the first and only sign.

Consider all possible causes of shock and treat per appropriate protocol.

Hypovolemic Shock:

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

Cardiogenic Shock:

Heart failure: MI, Cardiomyopathy, Myocardial contusion, Ruptured ventricular / septum / valve / toxins.

Distributive Shock:

Sepsis/ Anaphylactic/ Neurogenic/ Toxins

Hallmark is warm, dry, pink skin with normal capillary refill time and typically alert.

Obstructive Shock:

Pericardial tamponade. Pulmonary embolus. Tension pneumothorax.

Signs may include hypotension with distended neck veins, tachycardia, unilateral decreased breath sounds or muffled heart sounds.

Acute Adrenal Insufficiency or Congenital Adrenal Hyperplasia:

Body cannot produce enough steroids (glucocorticoids/ mineralocorticoids.)

May have primary or secondary adrenal disease, congenital adrenal hyperplasia, or more commonly have stopped a steroid like prednisone. Injury or illness may precipitate.

Usually hypotensive with nausea, vomiting, dehydration and/ or abdominal pain.

Adults patients:

Methylprednisolone 125 mg IM / IV / IO or

Hydrocortisone 100mg IM / IV / IO

Use steroid agent specific to your drug list. Dexamethasone 10 mg IM / IV / IO can be used if only alternative

Pediatric patients:

Methylprednisolone 2 mg/kg IM / IV / IO (Maximum 125 mg) or

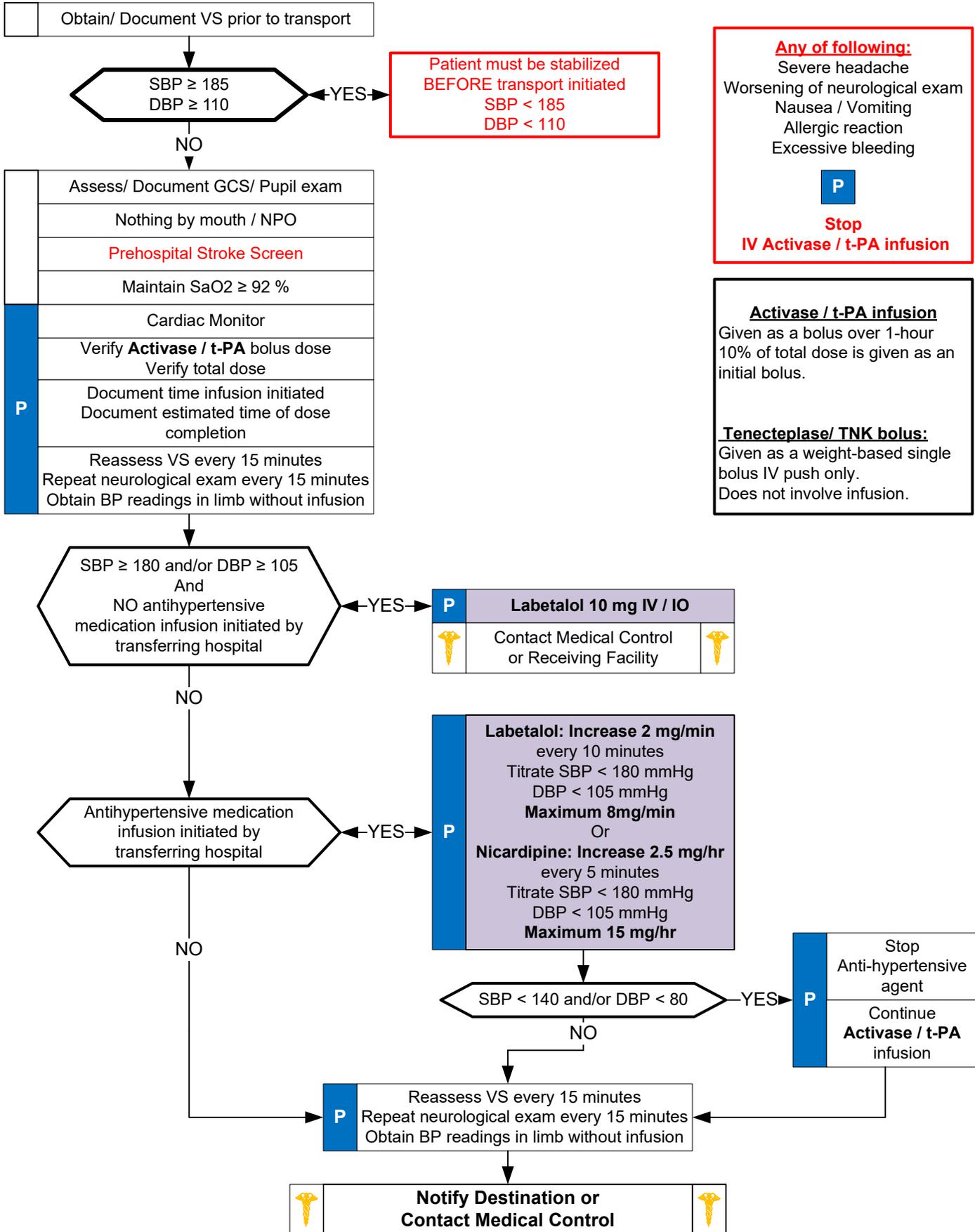
Hydrocortisone 2mg/kg IM / IV / IO (Maximum 100mg)

Use steroid agent specific to your drug list. Dexamethasone 5 mg IM / IV / IO can be used if only alternative

May administer prescribed steroid carried by patient IM / IV / IO. Patient may have Hydrocortisone (Cortef or Solu - Cortef). Administer 2 mg/kg up to 100 mg IV or dose specified by patient's physician.



Suspected Stroke: Activase/ t-PA (Optional)





Suspected Stroke: Activase / t-PA (Optional)

Pearls

- **Recommended Exam: Mental Status, HEENT, Heart, Lungs, Abdomen, Extremities, Neuro**
- **This protocol is optional. Agencies may develop their own in conjunction with their regional stroke center(s) guidance.**
- **This protocol is intended for interfacility transfer patients only. Medication must be started at initial treating hospital.**
- **Items in Red Text are key performance measures used in protocol compliance.**
- **The Reperfusion Checklist should be completed for any suspected stroke patient.**
- **Time of Onset or Last Seen Normal:**
 - **One of the most important items the pre-hospital provider can obtain, of which all treatment decisions are based.**
 - **Be very precise in gathering data to establish the time of onset and report as an actual time (i.e. 13:47 NOT "about 45 minutes ago.")**
 - **Without this information patient may not be able to receive thrombolytics at facility.**
 - **Wake up stroke: Time starts when patient last awake or symptom free.**
- **Time of Symptom Discovery:**
 - **Time when symptoms of stroke are first noticed by patient, bystanders, witnesses, or family/ caregivers.**
- The differential listed on the Altered Mental Status Protocol should also be considered.
- Be alert for airway problems (swallowing difficulty, vomiting/aspiration).
- Hypoglycemia can present as a localized neurologic deficit, especially in the elderly.
- **Infusion Pump Alarm / No Flow:**
 - Remove drip chamber from Activase / t-PA bag.
 - Spike Activase/ t-PA drip chamber to NS bag.
 - Restart infusion to complete medication remaining in IV tubing.
- **Medication dosing safety:**
 - When IV **Activase/ t-PA** dose administration will continue en route, verify estimated time of completion.
 - Verify with sending hospital that excess **Activase/ t-PA** has been withdrawn from the bottle and wasted.
 - This ensures the bottle will be empty when the full dose is finished. *For example, if the total dose is 70 mg, then 30 cc should be withdrawn and wasted since a 100 mg bottle of **Activase/ t-PA** contains 100 mL of fluid when reconstituted.*
 - Sending hospital should apply a label to **Activase/ t-PA** bottle with the number of mL of fluid that should be in the bottle in case of pump failure during transit.
- **Allergy Anaphylaxis:**
 - **Activase/ t-PA**, is structurally identical to endogenous t-PA and therefore should not induce allergy, single cases of acute hypersensitivity reactions have been reported.
 - **Angioedema:**
 - Rapid swelling (edema) of the dermis, subcutaneous tissue, mucosa and submucosal tissues. Typically involves the face, lips, tongue and neck.
 - Almost always self limiting but may progress to interfere with airway / breathing so close monitoring is warranted.
 - Utilize the Allergy / Anaphylaxis Protocol as indicated and also for angioedema. Infusion should be stopped.
 - Give all medications related to the Allergy/ Anaphylaxis Protocol by IV route only as patient should remain NPO.



Crashing Medical Patient

History

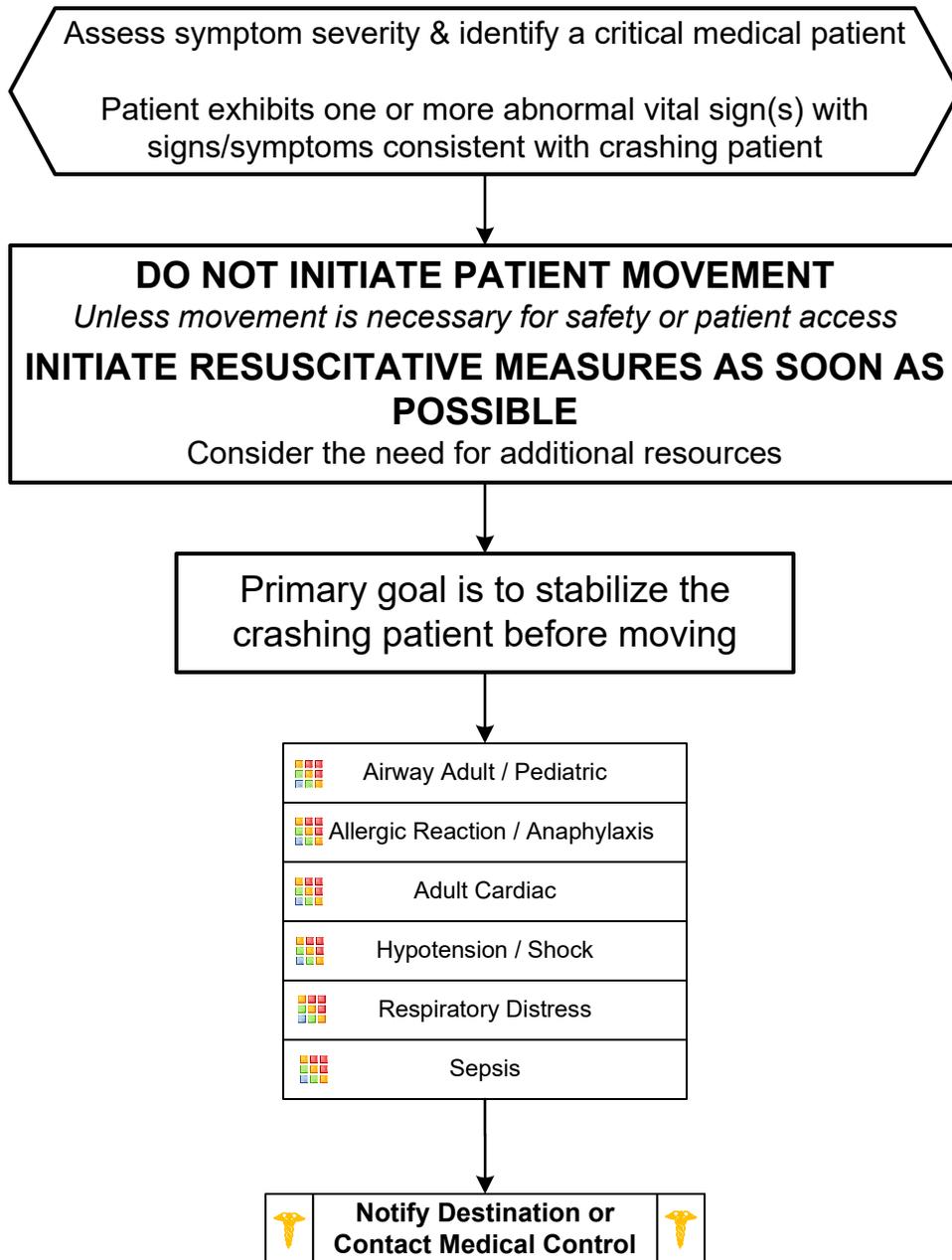
- Blood loss - vaginal or gastrointestinal bleeding, AAA, ectopic
- Fluid loss - vomiting, diarrhea, fever
- Infection
- Cardiac ischemia (MI, CHF)
- Medications
- Allergic reaction
- Pregnancy
- History of poor oral intake

Signs and Symptoms

- Tachycardia out of proportion to temp
- Hypoxia (SpO2 < 90%)
- Bradypnea or tachypnea
- Respiratory distress requiring NIPPV
- SBP < 90
- AMS
- Delayed capillary refill > 2 sec
- Hypotension for age
- Cool / mottled or flushed/ruddy skin
- Tarry stool / GI bleed

Differential

- Ectopic pregnancy
- Dysrhythmias
- Pulmonary embolus
- Tension pneumothorax
- Medication effect / overdose
- Vasovagal
- Physiologic (pregnancy)
- Sepsis





Crashing Medical Patient

Pearls

- This protocol pertains to critical *medical* patients. The mainstay of treatment for critical **trauma** patients is still safe rapid transport.
- The idea of rapid transport for “definitive care” in a paramedic system is a misnomer- the initial resuscitative measures provided by the emergency department are identical to those initial resuscitative measures provided by a paramedic.
- Identification of a critical patient should occur as soon as possible upon patient contact *prior* to initiation of movement to the ambulance. A full set of vital signs must be obtained as soon as possible upon patient contact (preferably within 5 minutes).
- Ensure all resuscitative equipment is brought to the patient side and available at initial evaluation (i.e. bring equipment to patient side).
- For hypotensive patients, *clinically meaningful access* is required- large-bore proximal IV, or IO access.
- In hypotensive patients where IV access fails, transition to IO access rapidly.

GCS 15 DOES NOT EQUAL STABILITY.

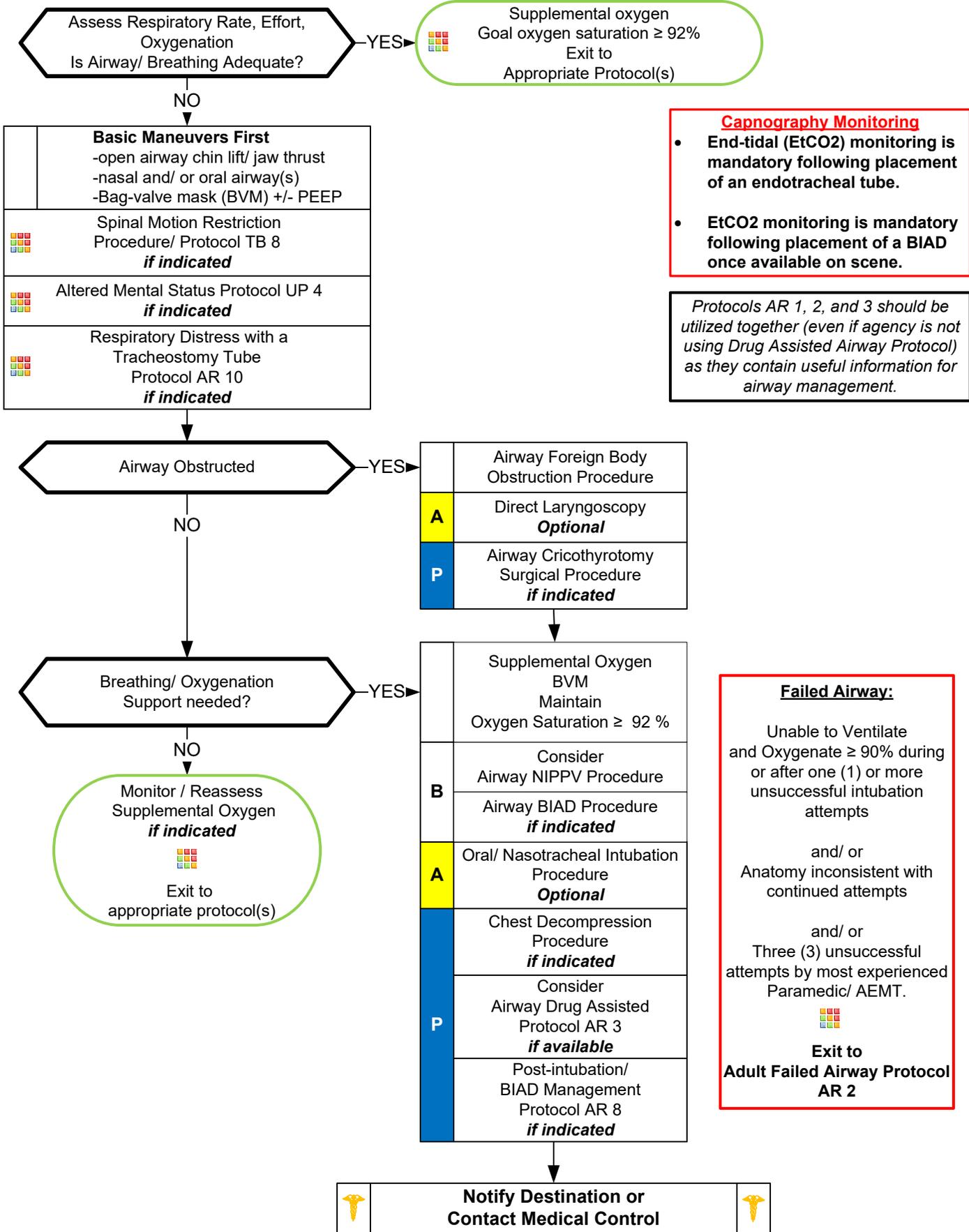
HYPOTENSION REQUIRES TREATMENT REGARDLESS OF MENTAL STATUS.

IO ACCESS DOES NOT REQUIRE ALTERED MENTAL STATUS AND SHOULD BE CONSIDERED IN ALERT PATIENTS REQUIRING EMERGENT ACCESS IN WHICH IV ACCESS CANNOT BE OBTAINED.

- For patients requiring a prolonged extrication time to the ambulance (i.e. down multiple flights of stairs), pre-determined stopping points should be established to allow for patient reassessment (i.e. confirming pulse, reassessing vital signs, and titrating pressors) at least every 5 minutes. **EXTRICATION TAKES MORE TIME THAN ESTIMATED.**
- The only exception for safe rapid movement of a critical medical patient is for instances where the patient requires intervention not available to the EMS crew:
 - Hypoxia or respiratory distress refractory to EMS measures and requiring RSI or other advanced airway procedure.
 - Patient requiring hemodynamic or airway interventions not in scope of practice of responding crew and safe rapid transport is needed to facilitate ED transport or rendezvous with more advanced clinicians.
 - Suspected hemorrhagic shock requiring safe rapid transport for administration of blood products (if not available to crew) or surgical intervention (i.e. unstable GI bleed, unstable vaginal hemorrhage, or suspected aortic catastrophe).
 - EMS resuscitative measures have failed to result in clinical improvement (i.e. unable to pace a patient requiring safe emergent transport for transvenous pacing, hypotension refractory to vasopressors and fluids).



Adult Airway





Adult Airway

Pearls

- See Pearls section of protocols AR 2 and 3.
- For the purposes of this protocol a secure airway is when the patient is receiving appropriate oxygenation and ventilation.
- If an effective airway is being maintained by BVM with continuous pulse oximetry values of $\geq 90\%$, it is acceptable to continue with basic airway measures.
- Ventilation rate should be 10 - 12 per minute to maintain a EtCO₂ of 35 – 45 and avoid hyperventilation.
- **Anticipating the Difficult Airway and Airway Assessment**
 - Difficult BVM Ventilation (ROMAN):** Radiation treatment/ Restriction; Obese/ Obstruction/ OB – 2d and 3d trimesters/ Obstructive sleep apnea; Mask seal difficulty (hair, secretions, trauma); Age ≥ 55 ; No teeth.
 - Difficult Laryngoscopy (LEON):** Look externally for anatomical problems; Evaluate 3-3-2 (Mouth opening should equal 3 of patient's finger's width, mental area to neck should equal 3 of patient's finger's width, base of chin to thyroid prominence should equal 2 of patient's finger's width); Obese, obstruction, OB – 2d and 3d trimesters; Neck mobility limited.
 - Difficulty BIAD (RODS):** Radiation treatment/ Restriction; Obese/ Obstruction/ OB – 2d and 3d trimesters/ Obstructive sleep apnea; Distorted or disrupted airway; Short thyromental distance/ Small mandible.
 - Difficulty Cricothyrotomy / Surgical Airway (SMART):** Surgery scars; Mass or hematoma, Access or anatomical problems; Radiation treatment to face, neck, or chest; Tumor.
- Complete an Airway Evaluation Form with any BIAD or Intubation procedure where medications are used to facilitate.
- **Nasotracheal intubation:**
 - Procedure requires spontaneous breathing and may require considerable time, exposing patient to critical desaturation.
 - Contraindicated in combative, anatomically disrupted or distorted airways, increased ICP, severe facial trauma, basal skull fracture, and head injury. Orotracheal route is preferred.
- Intubation attempt defined as laryngoscope blade passing the teeth or endotracheal tube passed into the nostril.
- If First intubation attempt fails, make an adjustment and try again: (Consider change of provider in addition to equipment).
- AEMT and Paramedics should consider using a BIAD if oral-tracheal intubation is unsuccessful.
- During intubation attempts use External Laryngeal Manipulation to improve view of glottis.
- Gastric tube placement should be considered in all intubated patients if available or time allows.
- It is important to secure the endotracheal tube well to better maintain ETT placement. Manual stabilization of endotracheal tube should be used during all patient moves / transfers.
- **DOPE:** Displaced tracheostomy tube / ETT, Obstructed tracheostomy tube / ETT, Pneumothorax and Equipment failure.



Adult, Failed Airway

Definition of Failed Airway:
 Unable to Ventilate and Oxygenate $\geq 90\%$ during or after one (1) or more unsuccessful intubation attempts
 and/ or
 Anatomy inconsistent with continued attempts
 and/ or
 Three (3) unsuccessful attempts by most experienced Paramedic/AEMT.
Each attempt should include change in approach or equipment
 NO MORE THAN THREE (3) ATTEMPTS TOTAL

- Capnography Monitoring**
- End-tidal (EtCO₂) monitoring is mandatory following placement of an endotracheal tube.
 - EtCO₂ monitoring is mandatory following placement of a BIAD once available on scene.

Protocols AR 1, 2, and 3 should be utilized together (even if agency is not using Drug Assisted Airway as they contain useful information for airway management.

Failed Airway

Call for additional resources if available

BVM
 Adjunctive Airway NPA/ OPA
 Maintains
 Oxygen Saturation $\geq 92\%$

Continue BVM
 Supplemental Oxygen

 Exit to
 Appropriate Protocol(s)

NO

B	Attempt Airway Blind Insertion Airway Device Procedure
A	Airway Video Laryngoscopy Device Procedure <i>if available</i> Optional
P	Airway Cricothyrotomy Surgical Procedure
	Supplemental oxygen BVM with Airway Adjuncts Maintain Oxygen Saturation $\geq 92\%$
	Post-intubation BIAD Management Protocol AR 8

Notify Destination or Contact Medical Control



Adult, Failed Airway

**** FAILED AIRWAY + Unable to Ventilated / Oxygenate = Transport to closest hospital.**
On radio/phone report, clearly state, this is a FAILED UNSTABLE AIRWAY – we are unable to ventilate or oxygenate.

This supersedes all destination protocols !! – Dr Koontz

Pearls

- **For the purposes of this protocol a secure airway is when the patient is receiving appropriate oxygenation and ventilation.**
- **If an effective airway is being maintained by BVM with continuous pulse oximetry values of $\geq 90\%$, it is acceptable to continue with basic airway measures.**
- **Ventilation rate should be 10 - 12 per minute to maintain a EtCO₂ of 35-45 and avoid hyperventilation.**
- **Anticipating the Difficult Airway and Airway Assessment**
 - Difficult BVM Ventilation (ROMAN):** Radiation treatment/ Restriction; **Obese/ Obstruction/ OB** – 2d and 3d trimesters/ Obstructive sleep apnea; **Mask seal difficulty** (hair, secretions, trauma); **Age ≥ 55 ; No teeth.**
 - Difficult Laryngoscopy (LEON):** Look externally for anatomical problems; Evaluate 3-3-2 (Mouth opening should equal 3 of patients finger's width, mental area to neck should equal 3 of patient's finger's width, base of chin to thyroid prominence should equal 2 of patients finger's width); **Obese, obstruction, OB** – 2d and 3d trimesters; **Neck mobility limited.**
 - Difficulty BIAD (RODS):** Radiation treatment/ Restriction; **Obese/ Obstruction/ OB** – 2d and 3d trimesters/ Obstructive sleep apnea; **Distorted or disrupted airway; Short thyromental distance/ Small mandible.**
 - Difficulty Cricothyrotomy / Surgical Airway (SMART):** Surgery scars; **Mass or hematoma, Access or anatomical problems; Radiation treatment to face, neck, or chest; Tumor**
- **Complete an Airway Evaluation Form with any BIAD or Intubation procedure where medications are used to facilitate.**
- **Nasotracheal intubation:**
 - Procedure requires spontaneous breathing and may require considerable time, exposing patient to critical desaturation.**
 - Contraindicated in combative, anatomically disrupted or distorted airways, increased ICP, severe facial trauma, basal skull fracture, and head injury. Orotracheal route is preferred.**
- **Intubation attempt defined as laryngoscope blade passing the teeth or endotracheal tube passed into the nostril.**
- **If First intubation attempt fails, make an adjustment and try again: (Consider change of provider in addition to equipment)**
- **AEMT and Paramedics should consider using a BIAD if oral-tracheal intubation is unsuccessful.**
- **During intubation attempts use External Laryngeal Manipulation to improve view of glottis.**
- **Gastric tube placement should be considered in all intubated patients if available or time allows.**
- **It is important to secure the endotracheal tube well to better maintain ETT placement. Manual stabilization of endotracheal tube should be used during all patient moves/ transfers.**
- **DOPE: Displaced tracheostomy tube/ ETT, Obstructed tracheostomy tube/ ETT, Pneumothorax and Equipment failure.**



Airway, Drug Assisted

Indications for Drug Assisted Airway
 Failure to protect the airway
 and/or
 Unable to oxygenate
 and/or
 Unable to ventilate
 and/or
 Impending airway compromise

Capnography Monitoring

- End-tidal (EtCO₂) monitoring is mandatory following placement of an endotracheal tube.
- EtCO₂ monitoring is mandatory following placement of a BIAD once available on scene.

Protocols AR 1, 2, 3, 5, and 6 should be utilized together (even if agency is not using Drug Assisted Airway Protocol) as they contain useful information for airway management.

Preoxygenate 100% O₂
 IV or IO Access Protocol UP 6
2 points of access
P Assemble Airway Equipment
 Suction equipment
 Alternative Airway Device

Hypoxic Or
 Hypotensive Or
 Dangerously Combative?

YES → DSI → **P**

Ketamine 2 mg/kg IV / IO
No IV or IO Access:
Ketamine 4 mg/kg IM
Maximum 400 mg
Pediatric: See Pearls
2 mg/kg IM
Maximum 400 mg
Correct Hypoxia and/ or Hypotension
 Age Appropriate Airway Protocol(s) AR 1, 2, 5, 6, as indicated
 Hypotension/ Shock Protocol AM 5/ PM 3 as indicated

P **Etomidate 0.3 mg/kg IV / IO**
Or
Ketamine 2 mg/kg IV / IO
May repeat x 1
Succinylcholine 2 mg/kg IV / IO
Or
Rocuronium 1 mg/kg IV / IO
(if Succinylcholine contraindicated)
May repeat x 1
Intubate trachea
Placement Verified
Continuous Waveform Capnography

Consider Restraints Physical Procedure
P Consider Gastric Tube Insertion Procedure

Awakening or Moving after intubation

NO → Exit to Appropriate Protocol(s)

YES → Exit to Post-intubation/ BIAD Management Protocol AR 8

Hypoxia corrected
 Hypotension corrected
 Dangerously Combative condition corrected
Patient still requires intubation

NO → Exit to Appropriate Protocol(s)

Procedure will remove patient's protective airway reflexes and ability to breath.
 You must be sure of your ability to intubate before beginning this procedure.
 Must have two (2) Paramedics on scene

Red Text
 Key performance indicators used to evaluate protocol compliance.
 A NCOEMS Airway Evaluation Form must be completed for every patient who receives Drug Assisted Airway.



Airway, Drug Assisted

DAI / RSI Contraindications:

1. Evaluation of patient determines intubation would not be successful – High Degree Difficult Airway Bull-Neck; severe facial trauma causing altered anatomy
2. Predicted inability to adequately manage the airway with a BVM.
3. Complete Upper Airway Obstruction
3. Patient must be 12 years of age or greater, OR longer than Broslow Tape

Providers may choose their Sedation & Paralytic agents based on scenario. Order of meds in protocol boxes may not be the preferred order.

Midazolam may be used for DSI if Ketamine is unavailable or contraindicated.

Midazolam 2.5 mg IV / IO

May repeat every 3 to 5 minutes as needed

Maximum 10 mg

** Do not use if BP <90 Systolic**

Ketamine and/or Paralytic use in pediatrics has to be approved by the Medical Director – via DIRECT ONLINE MEDICAL CONTROL Dr Koontz – 814-332-0340

Pearls

- **Agencies must maintain a separate Performance Improvement Program specific to Drug Assisted Airway.**
- **This procedure requires at least 2 Paramedics. See Pearls section of protocols AR 1 and 2.**
- **For the purposes of this protocol, a secure airway is when the patient is receiving appropriate oxygenation and ventilation.**
- **If an effective airway is being maintained by BVM with continuous pulse oximetry values of $\geq 90\%$, it is acceptable to continue with basic airway measures.**
- **Ventilation rate:**
30 for Neonates, 25 for Toddlers, 20 for School Age, and for Adolescents the normal Adult rate of 10 - 12 per minute. Maintain EtCO₂ between 35 - 45 and avoid hyperventilation.
- **Hypoxia and/ or Hypotension:**
Increased risk of cardiac arrest when a sedative with paralytic medications are administered while hypoxic and/ or hypotensive. Resuscitation and correction of hypoxia and/ or hypotension are paramount prior to use of these combined agents. Ketamine administration allows time for appropriate resuscitation of hypoxia and/or hypotension while managing the airway.
- **Ketamine for airway intervention and/ or sedation purposes:**
Ketamine may be used for sedation once a Pediatric Medication/ Skill Resuscitation System product, ≤ 15 years of age, or ≤ 49 kg) with DIRECT ONLINE MEDICAL ORDER by the system MEDICAL DIRECTOR only. Agencies using Ketamine in the pediatric population must also be using in their adult population.
- **KETAMINE:**
Ketamine may be used with or without a paralytic agent in conjunction with either an OPA, NPA, BIAD or endotracheal tube. (BIAD is preferred over endotracheal tube until hypoxia and/ or hypotension are corrected). Ketamine may be used during the resuscitation of hypoxia or hypotension in conjunction with airway management. Once hypoxia and hypotension are corrected, use of a sedative and paralytic can proceed if indicated. Ketamine may be used in the dangerously combative patient requiring airway management IM. IV/ IO should be established as soon as possible. Ketamine may be used for sedation once a BIAD or endotracheal tube are established and confirmed. Agencies using Ketamine must follow Standards Policy: Medial Policy Section Ketamine Program Requirements. Medical Policy 2.
- Intubation attempt defined as laryngoscope blade passing the teeth or endotracheal tube passed into the nostril.
- If First intubation attempt fails, make an adjustment and try again: (Consider change of provider in addition to equipment)
- **NC EMS Airway Evaluation Form:**
Fully complete and have receiving healthcare provider sign confirming BIAD or endotracheal tube placement. Complete online in region specific *ReadyOp* and upload completed form. Complete when Ketamine, Etomidate, Succinylcholine and/ or Rocuronium or used to facilitate use of a BIAD and/ or endotracheal intubation.
- Paramedics/ AEMT should consider using a BIAD if endotracheal intubation is unsuccessful.
- Drug Assisted Airway is not recommended in an urban setting (short transport) when able to maintain oxygen saturation $\geq 90\%$.
- **DOPE:** Displaced tracheostomy tube/ ETT, Obstructed tracheostomy tube/ ETT, Pneumothorax and Equipment failure.



Adult COPD/ Asthma Respiratory Distress

History

- Asthma; COPD -- chronic bronchitis, emphysema, congestive heart failure
- Home treatment (oxygen, nebulizer)
- Medications (theophylline, steroids, inhalers)
- Toxic exposure, smoke inhalation

Signs and Symptoms

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

Differential

- Asthma
- Anaphylaxis
- Aspiration
- COPD (Emphysema, Bronchitis)
- Pleural effusion
- Pneumonia
- Pulmonary embolus
- Pneumothorax
- Cardiac (MI or CHF)
- Pericardial tamponade
- Hyperventilation
- Inhaled toxin (Carbon monoxide, etc.)

	Adult Airway Protocol(s) as indicated
	Adult Allergic Reaction/ Anaphylaxis Protocol AM 1 as indicated
B	12 Lead ECG Procedure
	IV or IO Access Protocol UP 6
P	Cardiac Monitor

WHEEZING

Following Assessment

STRIDOR

B	Albuterol Nebulizer 2.5 – 5 mg Repeat as needed x 3
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B	Albuterol Nebulizer 2.5 – 5 mg Repeat as needed x 3
A	Epinephrine Nebulizer 1 mg (1:1000) / 2 mL NS May repeat x 1

	Adult Airway Protocol(s) as indicated
B	Airway NIPPV Procedure
A	Albuterol Nebulizer 2.5 – 5 mg +/- Ipratropium 0.5 mg (DuoNeb) Repeat as needed x 3 if indicated
	Terbutaline 0.25mg IM/SQ May repeat x 1 in 15 minutes
	Dexamethasone 10 mg IV / IO / IM
	Magnesium Sulfate 2g IV / IO Infuse over 10 – 20 minutes

A	Epi 1:1000 0.3mg IM x 1 Consider For Pending Resp Arrest Reserve for critical patients
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	Notify Destination or Contact Medical Control	
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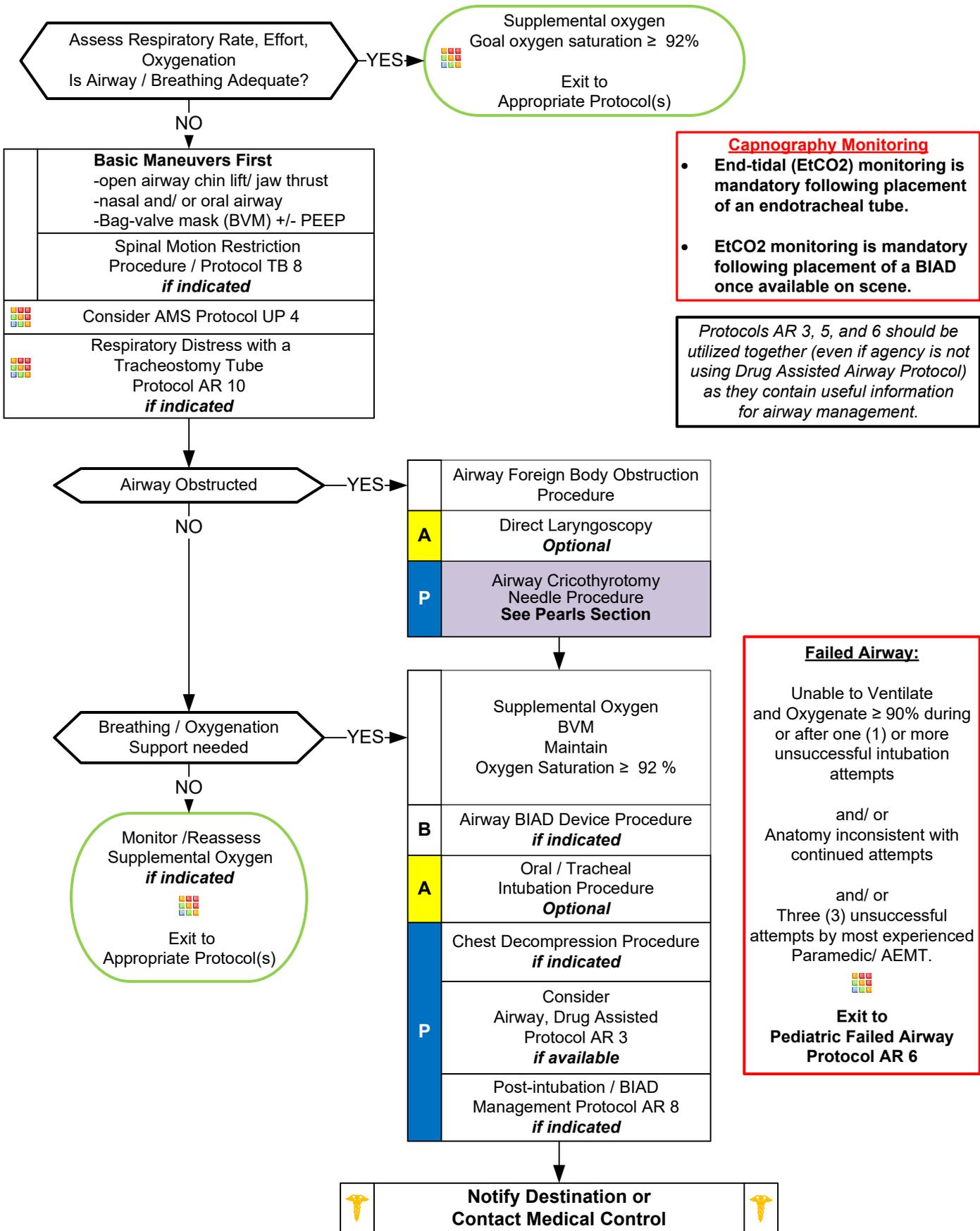
Adult COPD/ Asthma Respiratory Distress

Pearls

- **Recommended Exam: Mental Status, HEENT, Skin, Neck, Heart, Lungs, Abdomen, Extremities, Neuro**
- **Items in Red Text are key performance measures used to evaluate protocol compliance and care.**
- **This protocol includes all patients with respiratory distress, COPD, Asthma, Reactive Airway Disease, or bronchospasm.**
- **Patients may also have wheezing and respiratory distress with viral upper respiratory tract infections and pneumonia.**
- Pulse oximetry should be monitored continuously and consider End-tidal CO₂ monitoring if available.
- **Combination nebulizers containing albuterol and ipratropium (DuoNeb):**
 - Patients may require more than 3 nebulizer treatments, treatments should continue until improvement.
 - Following 3 combination nebulizers (DuoNeb), it is preferable to continue albuterol solely with subsequent treatments as there is no proven benefit to continual use of ipratropium.
- **Epinephrine:**
 - If allergic reaction or anaphylaxis is suspected, give immediately and repeat until improvement.
 - If allergic reaction is not suspected, administer with failure to improve and/ or impending respiratory failure.
- Consider Magnesium Sulfate with no improvement and/ or impending respiratory failure. Likely more effective with asthmatic exacerbation and less so with COPD exacerbation.
- **Non-Invasive Positive Pressure Ventilation (NIPPV: CPAP or Bi-Level/ BiPap):**
 - May be used with COPD, Asthma, Allergic reactions, and/ or CHF.
 - Consider early in treatment course.
 - Consider removal if SBP remains < 100 mmHg and not responding to other treatments.
- In patients using levalbuterol (Xopenex) you may use DUONeb for the first treatment then use levalbuterol from the patient's supply or agency's supply for repeat nebulizers .
- A silent chest in respiratory distress is a pre-respiratory arrest sign.
- **EMR/ EMT:**
 - The use of Epinephrine IM is limited to the treatment of anaphylaxis & maybe given by autoinjector/ Manual draw up
 - Manual draw-up has been approved by the medical director and OEMS
 - Administration of diphenhydramine is limited to the oral route only.
- EMT administration of beta-agonist is approved from EMS Supply or Patient's own prescription
- Dr Koontz does not require contact of medical control prior to EMT/ EMR administering any medication(s).



Pediatric Airway





Pediatric Airway

Pearls

This protocol is for use in patients who FIT within a Pediatric Medication/ Skill Resuscitation System Product.

- **For the purposes of this protocol, a secure airway is when the patient is receiving appropriate oxygenation and ventilation.**
- **If an effective airway is being maintained by BVM with continuous pulse oximetry values of $\geq 90\%$, it is acceptable to continue with basic airway measures.**
- **Ventilation rate:**
30 for Neonates, 25 for Toddlers, 20 for School Age, and for Adolescents the normal Adult rate of 10 - 12 per minute. Maintain EtCO₂ between 35 - 45 and avoid hyperventilation.
- **Ketamine for airway intervention and/ or sedation purposes:**
Ketamine may be used in pediatric patients (fit within a Pediatric Medication/Skill Resuscitation System product, ≤ 15 years of age, or ≤ 49 kg) with **DIRECT ONLINE MEDICAL ORDER** by the system **MEDICAL DIRECTOR** only.
Agencies using Ketamine in the pediatric population must also be using in their adult population.
- **KETAMINE:**
Ketamine may be used with or without a paralytic agent in conjunction with either an OPA, NPA, BIAD or endotracheal tube. BIAD is preferred over endotracheal tube until hypoxia and/ or hypotension are corrected.
Ketamine may be used during the resuscitation of hypoxia or hypotension in conjunction with airway management. Once hypoxia and hypotension are corrected, use of a sedative and paralytic can proceed if indicated.
Ketamine may be used in the dangerously combative patient requiring airway management IM. IV/ IO should be established as soon as possible.
Ketamine may be used for sedation once a BIAD or endotracheal tube are established and confirmed.
Agencies using Ketamine must follow Standards Policy: Medial Policy Section Ketamine Program Requirements. Medical Policy 2.
- **Intubation:**
Attempt defined as laryngoscope blade passing the teeth or endotracheal tube passed into the nostril.
Use of a stylet is recommended in all pediatric intubations.
Endotracheal tube: Depth = 3 x the diameter of the ETT. Estimated Size = 16 + age (years) / 4. Term newborn = 3.5 mm.
If First intubation attempt fails, make an adjustment and try again: (Consider change of provider in addition to equipment)
- **NC EMS Airway Evaluation Form:**
Fully complete and have receiving healthcare provider sign confirming BIAD or endotracheal tube placement.
Complete online in region specific *ReadyOp* and upload completed form.
Complete when Ketamine, Etomidate, Succinylcholine and/ or Rocuronium or used to facilitate use of a BIAD and/ or endotracheal intubation. Paramedics/ AEMT should consider using a BIAD if endotracheal intubation is unsuccessful.
- Secure the endotracheal tube well and consider c-collar in pediatric patients (even in absence of trauma) to better maintain ETT placement.
Manual stabilization of endotracheal tube should be used during all patient moves / transfers.
- **Airway Cricothyrotomy Percutaneous Needle Procedure:**
Indicated as a lifesaving / last resort procedure in pediatric patients < 10 years of age.
Very little evidence to support it's use and safety.
A variety of alternative pediatric airway devices now available make the use of this procedure rare.
Agencies who utilize this procedure must develop a written procedure, establish a training program, maintain equipment and submit procedure and training plan to the State Medical Director/ Regional EMS Office.
 ≥ 10 years: Surgical cricothyrotomy or commercial kits based on agency preference recommended.
- **DOPE:** Displaced tracheostomy tube/ ETT, Obstructed tracheostomy tube/ ETT, Pneumothorax and Equipment failure.

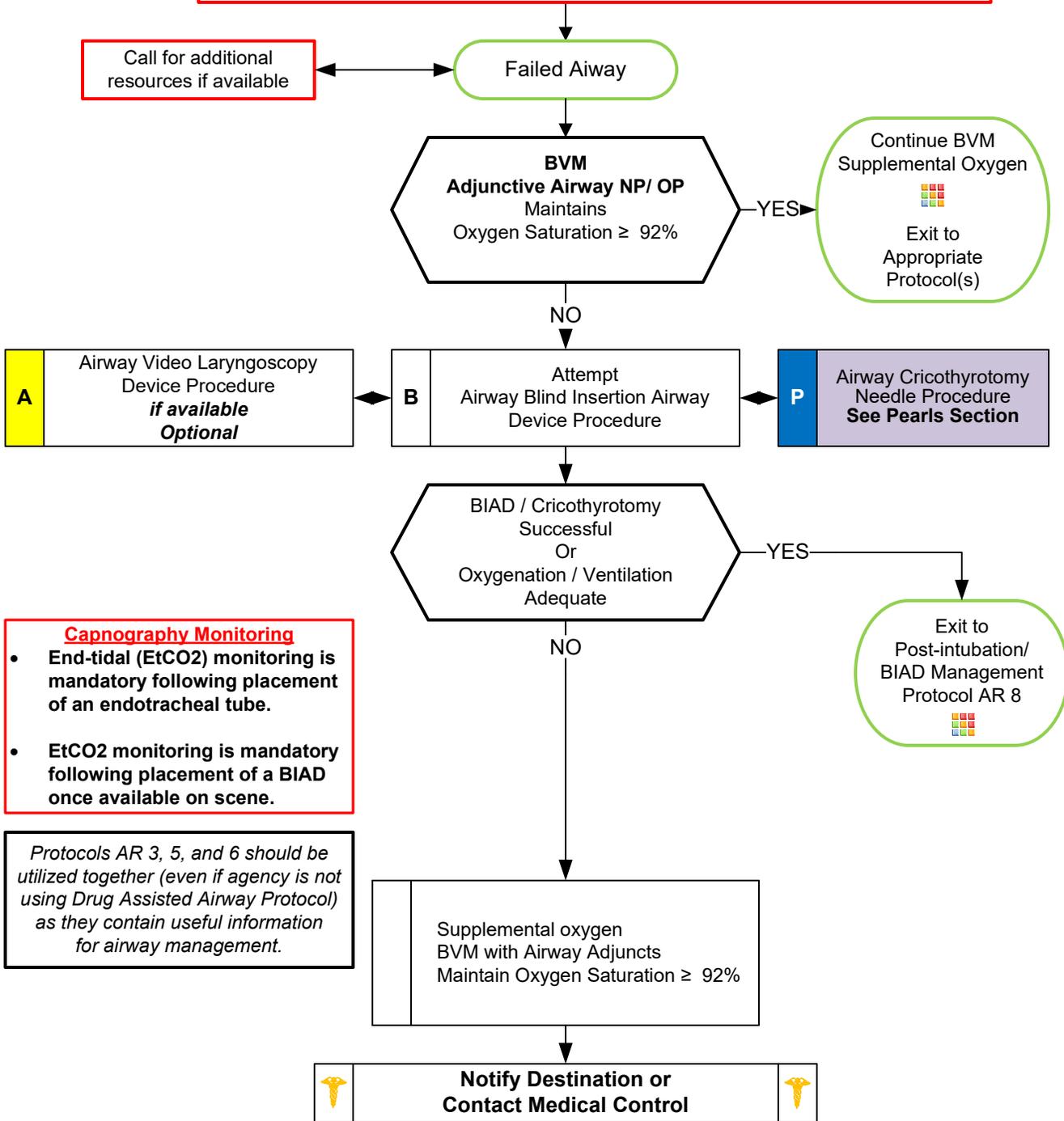


Pediatric Failed Airway

Definition of Failed Airway:

- Unable to Ventilate and Oxygenate $\geq 90\%$ during or after one (1) or more unsuccessful intubation attempts.
 - Anatomy inconsistent with continued attempts.
 - Three (3) unsuccessful attempts by most experienced Paramedic/ AEMT.
- Each attempt should include change in approach or equipment*

NO MORE THAN THREE (3) ATTEMPTS TOTAL



Capnography Monitoring

- End-tidal (EtCO₂) monitoring is mandatory following placement of an endotracheal tube.
- EtCO₂ monitoring is mandatory following placement of a BIAD once available on scene.

Protocols AR 3, 5, and 6 should be utilized together (even if agency is not using Drug Assisted Airway Protocol) as they contain useful information for airway management.



Pediatric Failed Airway

**** FAILED AIRWAY + Unable to Ventilated / Oxygenate = Transport to closest hospital.**
On radio/phone report, clearly state, this is a FAILED UNSTABLE AIRWAY – we are unable to ventilate or oxygenate.

This supersedes all destination protocols !! – Dr Koontz

Pearls

This protocol is for use in patients who FIT within a Pediatric Medication/ Skill Resuscitation System Product.

- **For the purposes of this protocol, a secure airway is when the patient is receiving appropriate oxygenation and ventilation.**
- **If an effective airway is being maintained by BVM with continuous pulse oximetry values of $\geq 90\%$, it is acceptable to continue with basic airway measures.**
- **Ventilation rate:**
30 for Neonates, 25 for Toddlers, 20 for School Age, and for Adolescents the normal Adult rate of 10 - 12 per minute. Maintain EtCO₂ between 35 - 45 and avoid hyperventilation.
- **Ketamine for airway intervention and/ or sedation purposes:**
Ketamine may be used in pediatric patients (fit within a Pediatric Medication/Skill Resuscitation System product, ≤ 15 years of age, or ≤ 49 kg) with DIRECT ONLINE MEDICAL ORDER by the system MEDICAL DIRECTOR or ASSISTANT MEDICAL DIRECTOR only.
Agencies using Ketamine in the pediatric population must also be using in their adult population.
- **KETAMINE:**
Ketamine may be used with or without a paralytic agent in conjunction with either an OPA, NPA, BIAD or endotracheal tube. BIAD is preferred over endotracheal tube until hypoxia and/ or hypotension are corrected.
Ketamine may be used during the resuscitation of hypoxia or hypotension in conjunction with airway management. Once hypoxia and hypotension are corrected, use of a sedative and paralytic can proceed if indicated.
Ketamine may be used in the dangerously combative patient requiring airway management IM. IV/ IO should be established as soon as possible.
Ketamine may be used for sedation once a BIAD or endotracheal tube are established and confirmed.
Agencies using Ketamine must follow Standards Policy: Medial Policy Section Ketamine Program Requirements. Medical Policy 2.
- **Intubation:**
Attempt defined as laryngoscope blade passing the teeth or endotracheal tube passed into the nostril.
Use of a stylet is recommended in all pediatric intubations.
Endotracheal tube: Depth = 3 x the diameter of the ETT. Estimated Size = 16 + age (years) / 4. Term newborn = 3.5 mm.
If First intubation attempt fails, make an adjustment and try again: (Consider change of provider in addition to equipment)
- **NC EMS Airway Evaluation Form:**
Fully complete and have receiving healthcare provider sign confirming BIAD or endotracheal tube placement.
Complete online in region specific *ReadyOp* and upload completed form.
Complete when Ketamine, Etomidate, Succinylcholine and/ or Rocuronium or used to facilitate use of a BIAD and/ or endotracheal intubation. Paramedics/ AEMT should consider using a BIAD if endotracheal intubation is unsuccessful.
- **Secure the endotracheal tube well and consider c-collar in pediatric patients (even in absence of trauma) to better maintain ETT placement.**
Manual stabilization of endotracheal tube should be used during all patient moves / transfers.
- **Airway Cricothyrotomy Percutaneous Needle Procedure:**
Indicated as a lifesaving / last resort procedure in pediatric patients < 10 years of age.
Very little evidence to support it's use and safety.
A variety of alternative pediatric airway devices now available make the use of this procedure rare.
Agencies who utilize this procedure must develop a written procedure, establish a training program, maintain equipment and submit procedure and training plan to the State Medical Director/ Regional EMS Office.
 ≥ 10 years: Surgical cricothyrotomy or commercial kits based on agency preference recommended.
- **DOPE: Displaced tracheostomy tube/ ETT, Obstructed tracheostomy tube/ ETT, Pneumothorax and Equipment failure.**



Pediatric Asthma Respiratory Distress

History

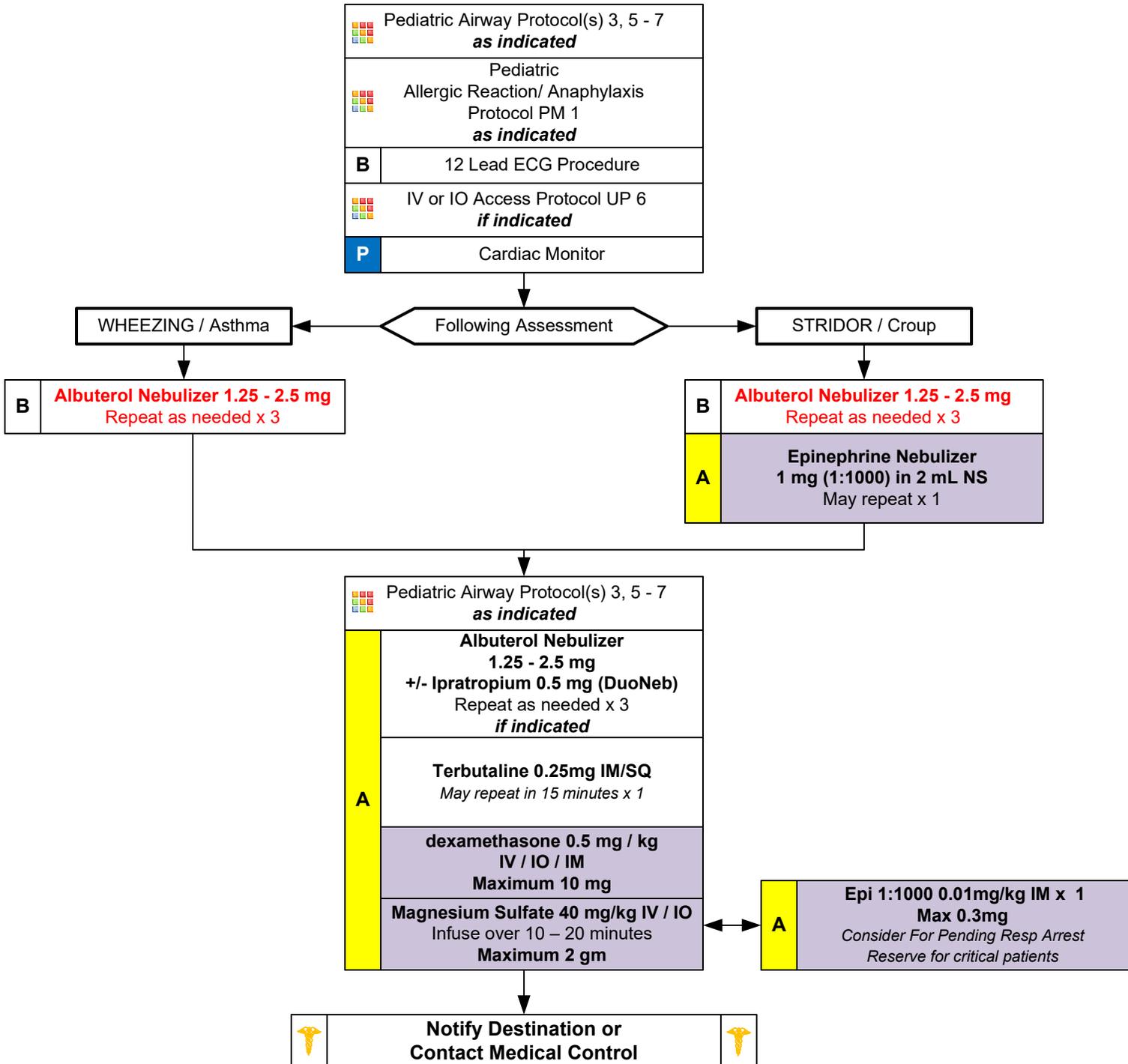
- Time of onset
- Possibility of foreign body
- Past Medical History
- Medications
- Fever / Illness
- Sick Contacts
- History of trauma
- History / possibility of choking
- Ingestion / OD
- Congenital heart disease

Signs and Symptoms

- Wheezing / Stridor / Crackles / Rales
- Nasal Flaring / Retractions / Grunting
- Increased Heart Rate
- AMS
- Anxiety
- Attentiveness / Distractability
- Cyanosis
- Poor feeding
- JVD / Frothy Sputum
- Hypotension

Differential

- Asthma / Reactive Airway Disease
- Aspiration
- Foreign body
- Upper or lower airway infection
- Congenital heart disease
- OD / Toxic ingestion / CHF
- Anaphylaxis
- Trauma





Pediatric Asthma Respiratory Distress

- **Pearls**

- **Recommended Exam: Mental Status, HEENT, Skin, Neck, Heart, Lungs, Abdomen, Extremities, Neuro**
- **Items in Red Text are key performance measures used to evaluate protocol compliance and care.**
- **This protocol includes all patients with respiratory distress, Asthma, Reactive Airway Disease, croup, or bronchospasm.**
- **Patients may also have wheezing and respiratory distress with viral upper respiratory tract infections and pneumonia.**
- **Pulse oximetry should be monitored continuously and consider End-tidal CO2 monitoring if available.**
- **Combination nebulizers containing albuterol and ipratropium (DuoNeb):**
- **Patients may require more than 3 nebulizer treatments, treatments should continue until improvement.**
- **Following 3 combination nebulizers (DuoNeb), it is preferable to continue albuterol solely with subsequent treatments as there is no proven benefit to continual use of ipratropium.**
- **Epinephrine:**
- **If allergic reaction or anaphylaxis is suspected, give immediately and repeat until improvement.**
- **If allergic reaction is not suspected, administer with no improvement and/ or impending respiratory failure.**
- **Consider Magnesium Sulfate with impending respiratory failure and/ or no improvement.**
- **Consider IV access when Pulse oximetry remains $\leq 92\%$ after first beta-agonist nebulizer treatment.**
- **Do not force a child into a position, allow them to assume position of comfort, typically the tripod position.**
- **Bronchiolitis is a viral infection typically affecting infants which results in wheezing which may not respond to beta-agonists. Consider Epinephrine nebulizer if patient < 18 months and not responding to initial beta-agonist treatment.**
- **Croup typically affects children < 2 years of age. It is viral, possible fever, gradual onset, no drooling is noted.**
- **Epiglottitis typically affects children > 2 years of age. It is bacterial, with fever, rapid onset, possible stridor, patient wants to sit up to keep airway open, drooling is common. Airway manipulation may worsen the condition.**
- **In patients using levalbuterol (Xopenex) you may use Albuterol for the first treatment then use the patient's supply for repeat nebulizers or agency's supply.**
- **A silent chest in respiratory distress is a pre-respiratory arrest sign.**
- **EMR/ EMT:**
- **The use of Epinephrine IM is limited to the treatment of anaphylaxis & maybe given by autoinjector / Manual draw-up has been approved by the medical director and OEMS**
- **Administration of diphenhydramine is limited to the oral route only.**
- **EMT administration of beta-agonist is approved from EMS Supply or Patient's own prescription**
- **Dr Koontz does not require contact of medical control prior to EMT/ EMR administering any medication(s).**

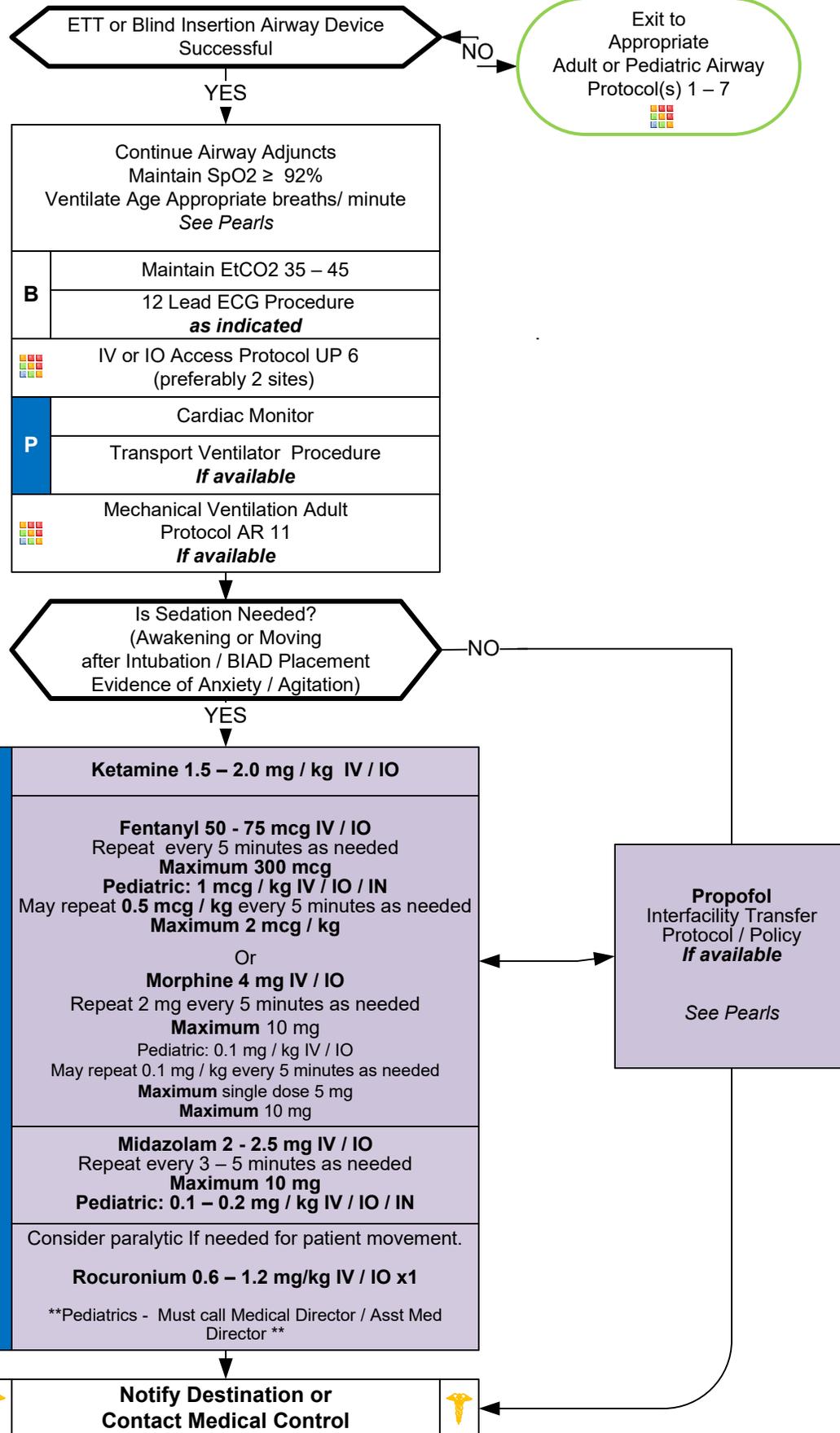


Post-intubation/ BIAD Management

Capnography Monitoring

- End-tidal (EtCO₂) monitoring is mandatory following placement of an endotracheal tube.
- EtCO₂ monitoring is mandatory following placement of a BIAD once available on scene.

Protocols AR 1, 2, 3, 5, and 6 should be utilized together (even if agency is not using Drug Assisted Airway Protocol) as they contain useful information for airway management.





Post-intubation/ BIAD Management

Alternative Medications – Service Specific

Dilaudid 1 mg IV / IO

Repeat **0.5 mg** every 5 minutes as needed

Maximum 4 mg

Pediatric: 0.02 mg / kg IV / IO

May repeat **0.01 mg / kg** every 5 minutes as needed

Maximum single dose 1 mg

Maximum Total Dose 4 mg

Pearls

- **Recommended Exam: Mental Status, HEENT, Heart, Lungs, Neuro**
- **Patients requiring advanced airways and ventilation commonly experience pain and anxiety.**
- **Unrelieved pain can lead to increased catecholamine release, ischemia, immunosuppression, and prolonged hospitalization.**
- **Ventilated patients cannot communicate pain/ anxiety and providers are poor at recognizing pain/ anxiety.**
- **Vital signs such as tachycardia and/ or hypertension can provide clues to inadequate sedation, however they are not always reliable indicators of a patient's lack of adequate sedation.**
- **Sedation strategy:**
 - Pain is the primary reason patients experience agitation and must be addressed first.
 - Opioids and/ or Ketamine are the first line agents, alone or in combination.
 - Benzodiazepines may be utilized if patient is not responding to adequate opioid and/ or Ketamine doses.
 - Paralysis is considered a last resort, only when patients are not responding to opioids, Ketamine, or benzodiazepines.
 - Patients that have received paralytics may be experiencing pain with no obvious signs or symptoms.
 - Consider sedation early after giving paralytics, especially in patients receiving Rocuronium.
- **Ventilation rate:**
 - Guidelines: 30 for Neonates, 25 for Toddlers, 20 for School Age, and for Adolescents the normal Adult rate of 10 – 12 per minute.
 - Maintain EtCO₂ between 35 - 45 and avoid hyperventilation.
- Ventilator/ Ventilation strategies will need to be tailored to individual patient presentations. Medical director can indicate different strategies above.
- **Propofol:**
 - Use restricted to agencies approved by the OEMS State Medical Director.
 - Agencies must submit a use policy and education plan to the OEMS.
 - Infusion must be supplied and initiated by a medical facility and may be used only during interfacility transfer.
 - Paramedic may titrate infusion to maintain appropriate sedation but cannot initiate or bolus the medication.
- In general, ventilation with BVM should cause chest rise. With mechanical ventilation a reasonable tidal volume should be about 6 - 8 mL/kg and peak pressures should be < 30 cmH₂O. Plateau Pressures should be < 30 cmH₂O.
- Head of bed should be maintained at least 10 – 20 degrees of elevation when possible, to decrease aspiration risk.
- With abrupt clinical deterioration, if mechanically ventilated, disconnect from ventilator to assess lung compliance.
- **DOPE: Displaced tracheostomy tube/ ETT, Obstructed tracheostomy tube/ ETT, Pneumothorax and Equipment failure.**



Ventilator Emergencies

History

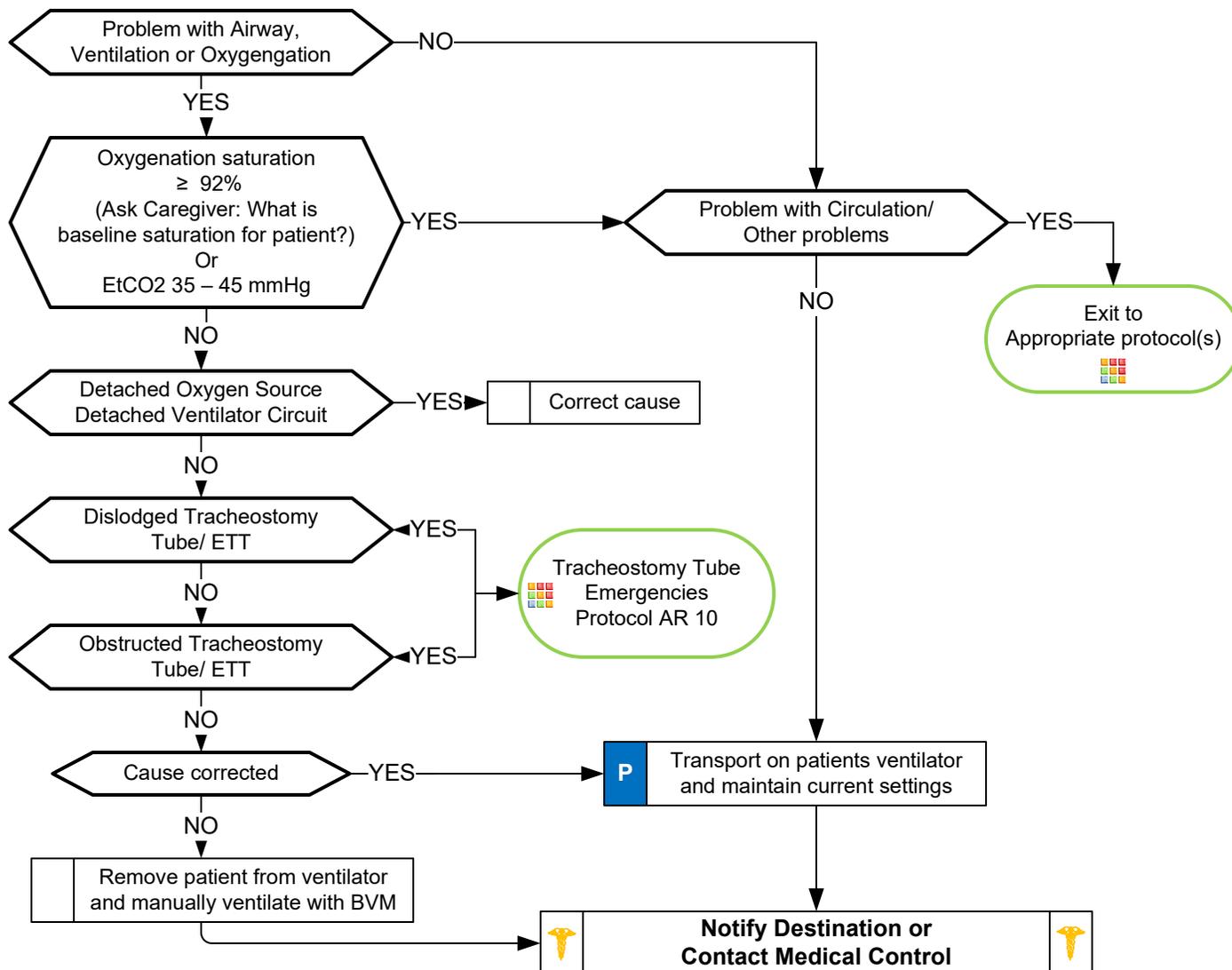
- Birth defect (tracheal atresia, tracheomalacia, craniofacial abnormalities)
- Surgical complications (damage to phrenic nerve)
- Trauma (post-traumatic brain or spinal cord injury)
- Medical condition (bronchopulmonary dysplasia, muscular dystrophy)

Signs and Symptoms

- Transport requiring maintenance of a mechanical ventilator
- Power or equipment failure at residence

Differential

- Disruption of oxygen source
- Dislodged or obstructed tracheostomy tube
- Detached or disrupted ventilator circuit
- Cardiac arrest
- Increased oxygen requirement / demand
- Ventilator failure



Pearls

- **Always talk to family/ caregivers as they have specific knowledge and skills.**
- **If using the patient's ventilator bring caregiver knowledgeable in ventilator operation during transport.**
- **Take patient's ventilator to hospital even if not functioning properly.**
- Always use patient's equipment if available and functioning properly.
- Continuous pulse oximetry and End Tidal CO₂ monitoring must be utilized during assessment and transport.
- Unable to correct ventilator problem: Remove patient from ventilator and manually ventilate using BVM.
- Typical alarms:
 - Low Pressure/ Apnea: Loose or disconnected circuit, leak in circuit or around tracheostomy site.
 - Low Power: Internal battery depleted.
 - High Pressure: Plugged/ obstructed airway or circuit.
- **DOPE: Displaced tracheostomy tube/ ETT, Obstructed tracheostomy tube/ ETT, Pneumothorax and Equipment failure.**



Tracheostomy Tube Emergencies

History

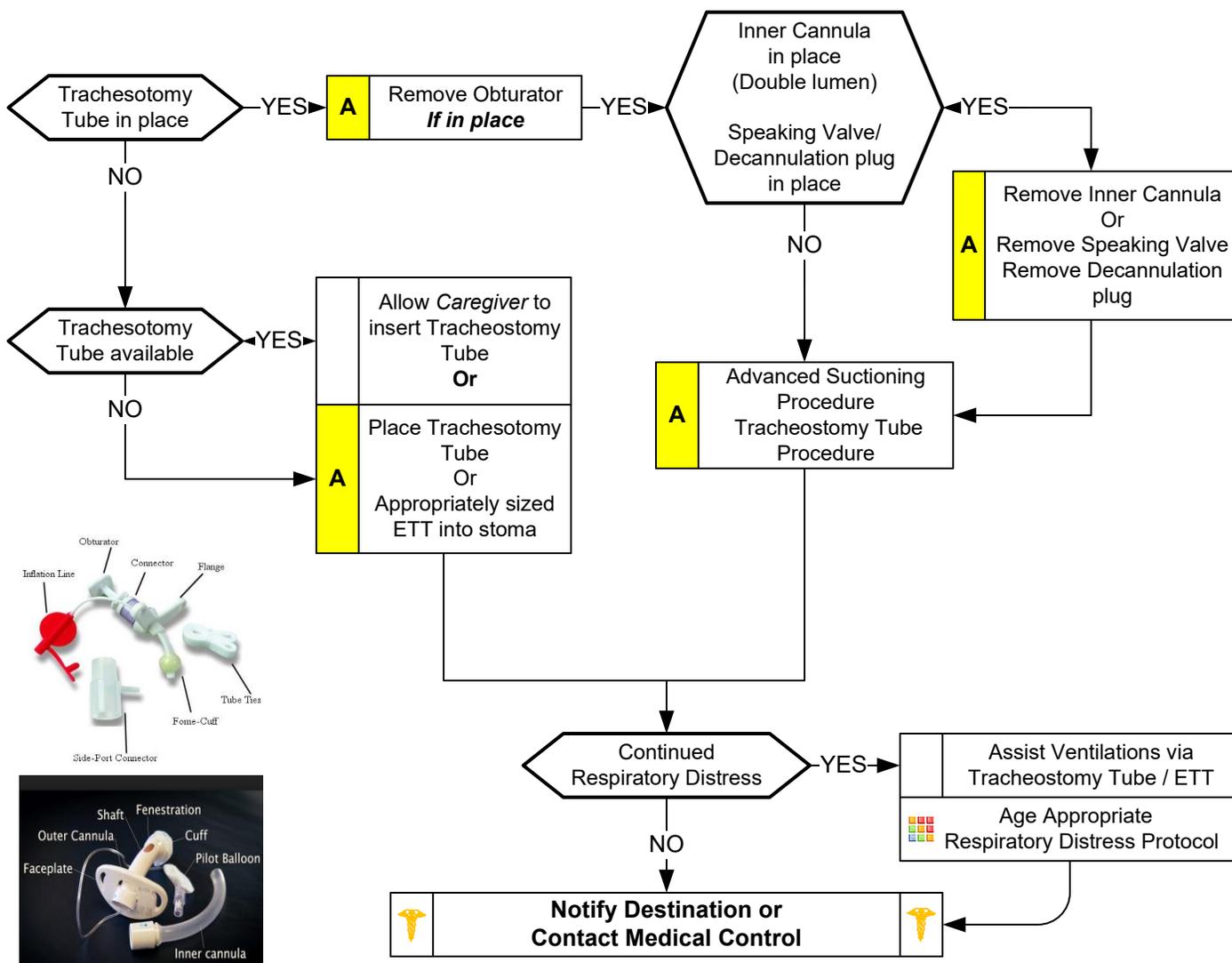
- Birth defect (tracheal atresia, tracheomalacia, craniofacial abnormalities)
- Surgical complications (accidental damage to phrenic nerve)
- Trauma (post-traumatic brain or spinal cord injury)
- Medical condition (bronchial or pulmonary dysplasia, muscular dystrophy)

Signs and Symptoms

- Nasal flaring
- Chest wall retractions (with or without abnormal breath sounds)
- Attempts to cough
- Copious secretions noted coming out of the tube
- Faint breath sounds on both sides of chest despite significant respiratory effort
- AMS
- Cyanosis

Differential

- Allergic reaction
- Asthma
- Aspiration
- Septicemia
- Foreign body
- Infection
- Congenital heart disease
- Medication or toxin
- Trauma

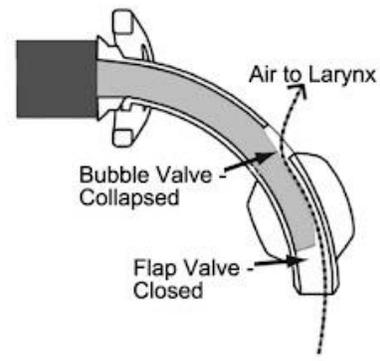
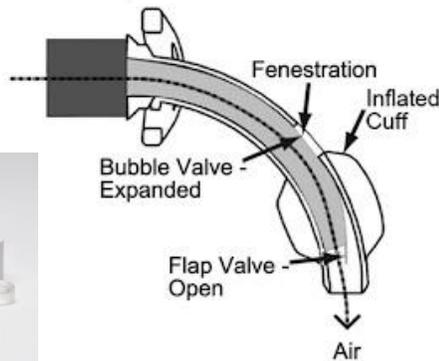
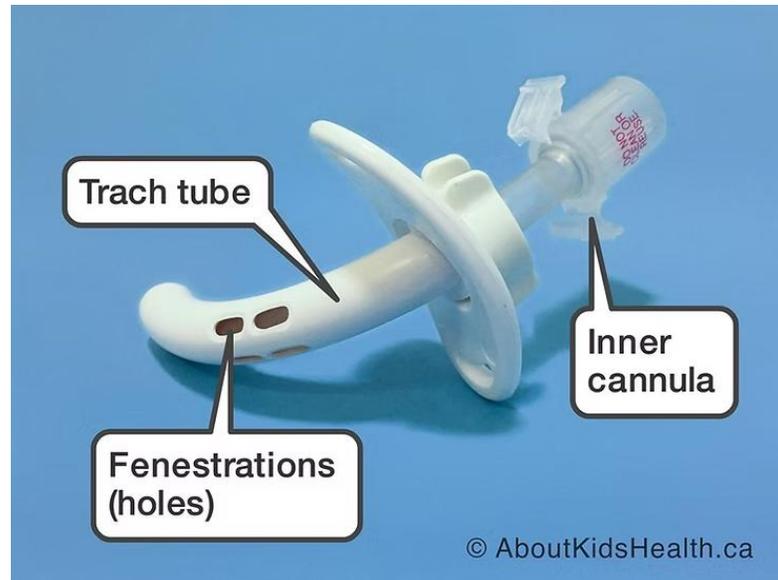
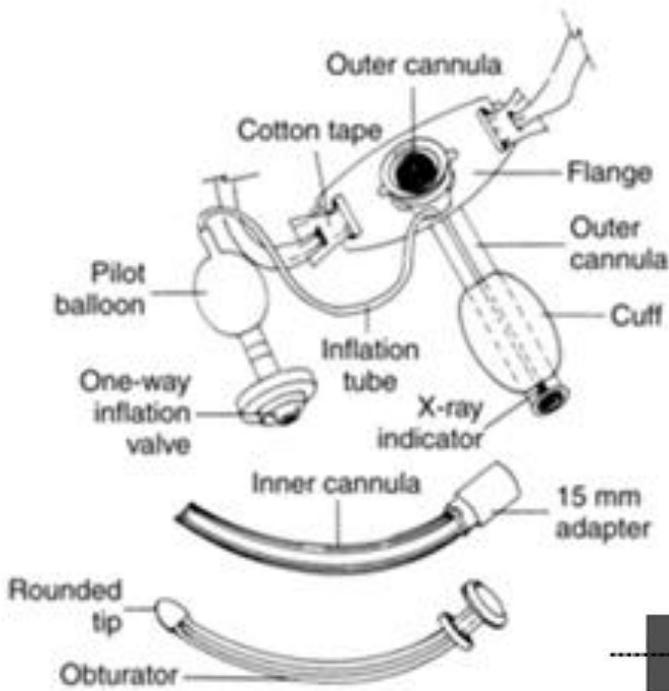


Pearls

- Always talk to family/ caregivers as they have specific knowledge and skills.
- Important to ask if patient has undergone laryngectomy. This does not allow mouth/ nasal ventilation by covering stoma.
- Use patients equipment if available and functioning properly.
- Estimate suction catheter size by doubling the inner tracheostomy tube diameter and rounding down.
- Suction depth: Ask family/ caregiver. No more than 3 to 6 cm typically. Instill 2 – 3 mL of NS before suctioning.
- Do not suction more than 10 seconds each attempt and pre-oxygenate before and between attempts.
- DO NOT force suction catheter. If unable to pass, then tracheostomy tube should be changed.
- Always deflate tracheal tube cuff before removal. Continual pulse oximetry and EtCO2 monitoring if available.
- **DOPE:** Displaced tracheostomy tube/ ETT, **O**bststructed tracheostomy tube/ ETT, **P**neumothorax and **E**quipment failure.



Tracheostomy Tube Emergencies



CAN I VENTILATE THIS TRACHEOSTOMY?





Mechanical Ventilation; Adult

History

- Multiple etiologies leading to need for advanced airway control
- Requires ventilation support
- Height and underlying lung conditions

Signs and Symptoms

- Loss of consciousness or AMS with inability to protect airway
- Difficult oxygenation and/or ventilation

Differential

- ROSC
- Trauma
- Stroke
- Seizure
- Shock (see Shock Protocol)
- Toxicological

Age Appropriate
 ■■■ Airway Protocol(s) AR 1, 2, 3, 5, 6
if indicated

■ ■ ■ Post-intubation/BIAD Management
 Protocol AR 8
if indicated

History of COPD or Asthma?

Alarming Ventilator and unsure how to troubleshoot

- Immediately disconnect patient and use BVM.
- Once oxygenation and ventilation stabilized, restart ventilator set-up procedure.

Home Ventilator Inter-facility Transfer with Ventilator

- Set initial parameters to home or facility settings
- Titrate to oxygenation, work of breathing, SpO₂, and EtCO₂.
- Use home ventilator if functioning properly.

MODE:
Volume – Assist Control

FiO₂: 100%

PEEP: 5 cmH₂O

TIDAL VOLUME (V_t):
8 mL/kg
Follow PBW and V_t on page 3

BPM: RESPIRATORY RATE:
18 BPM

FLOW RATE:
60 mL/min
(preset)

Check Plateau Pressure
Press Manual Breath P Pressure button
Goal Pressure < 30 cm/H₂O

Decrease Tidal Volume
1 mL/kg increments
Until ≤ 29 cm/H₂O
(DO NOT DECREASE < 4 mL/kg)

MODE:
Volume – Assist Control

FiO₂: 100%

PEEP: 5 cmH₂O

TIDAL VOLUME:
8 mL/kg
Follow PBW and V_t on page 3

BPM: RESPIRATORY RATE:
12 BPM

FLOW RATE:
60 mL/min
(preset)

I:E Ratio
Increase to 1:4 or 1:5

Check Plateau Pressure
Press Manual Breath P Pressure button
Goal Pressure < 30 cm/H₂O

Decrease Tidal Volume
1 mL/kg increments
Until ≤ 29 cm/H₂O
(DO NOT DECREASE < 4 mL/kg)

After 10 minutes
Decrease FiO₂ down to 50%
Then adjust PEEP and FiO₂
Goal SpO₂ 92 – 98%

Step 1: PEEP =10 FiO₂ =50%

Step 2: PEEP =10 FiO₂ =60%

Step 3: PEEP =10 FiO₂ =70%

Step 4: PEEP =12 FiO₂ =70%

Step 5: PEEP =14 FiO₂ =70%

Check Peak Inspiratory Pressure (PIP)
Goal V_t is 8 mL/kg

ADJUST PIP Alarm Settings

- Up until full exhalation achieved on 8 mL/kg Tidal Volume

Notify Destination or Contact Medical Control



Mechanical Ventilation; Adult

If home ventilator patient is being transported non-emergency, family may manage ventilator - Only an EMT-B (basic) crew is needed for the non-emergency transport**
Does not apply to emergency or critical care transport !! **

If home ventilator patient, crew may utilize patient's home ventilator. If respiratory emergency – BVM + Suction + Meds per protocol = if stable may use home vent, if crew or family/caregiver familiar may adjust settings – if not familiar, use own ventilator or BVM to hospital.

Pearls

- **Recommended Exam: Mental Status, Skin, HEENT, Heart, Lungs, Abdomen, Back, Extremities, Neuro**
- **Mechanical ventilation may be used in any patient ≥ 1 year old.**
- **MODE:**
 - In all adult patients use Volume – Assist Control.
 - This mode requires adequate sedation as it can be uncomfortable in a patient who is awakening.
- **TIDAL VOLUME:**
 - Tidal volume is very important in preventing lung injury and calculated by height and predicted body weight, or ideal body weight, and NOT actual body weight.
 - Follow Tidal Volume by Height Table on page 3.
 - Follow Tidal Volume by Height Table on page 3 when adjusting Peak Inspiratory Pressure alarms to allow full exhalation.
 - High Tidal Volumes are well known to cause alveolar damage and lung injury.
- **FLOW RATE:**
 - A normal breath (non-mechanical ventilation) has highest flow and volume at the beginning and both decrease as inspiration comes to an end.
 - Setting Flow Rate at 60 L/minute allows patient to take full breath without air hunger toward end of inspiration. This is more comfortable for the patient.
 - If patient looks like they are trying to take in more volume initially, the Flow Rate can be increased by increments of 5 as needed to improve patient comfort.
- **FiO₂ and PEEP Adjustments:**
 - Seems intuitive that when SpO₂ is less than desired the FiO₂ should be increased.
 - When FiO₂ is $\geq 50\%$ and SpO₂ remains low, this indicates a shunt, and PEEP must be used in conjunction with FiO₂ to correct the shunt and increase oxygenation.
 - Follow PEEP adjustment recommendations on page 1.
- **EtCO₂:**
 - EtCO₂ and arterial CO₂ do not always correlate well in patients with lung disease or during serious illness or injury.
 - Use caution in adjusting respiratory rate to reach a goal of 35 – 45 mmHg. Most intubated patients do not need tight control in this range.
 - Patients with suspected head injury do need EtCO₂ with a target of 35 – 45 mmHg.
 - Allowing patients with COPD and asthma exacerbations to have higher EtCO₂ outside the 35 – 45 mmHg range is acceptable. Lower ventilation rates allow more time for exhalation and prevents auto-PEEP and/ or air trapping.
- **DOPE:** Displaced tracheostomy tube / ETT, Obstructed tracheostomy tube / ETT, Pneumothorax and Equipment failure.



Mechanical Ventilation; Adult (Optional)

TIDAL VOLUME INITIAL SETTINGS By HEIGHT

FEMALE Height / Predicted body weight / Vt

MALE Height / Predicted body weight / Vt

HEIGHT	PBW	4 ml	5 ml	6 ml	7 ml	8 ml
4' 0" (48)	17.9	72	90	107	125	143
4' 1" (49)	20.2	81	101	121	141	162
4' 2" (50)	22.5	90	113	135	158	180
4' 3" (51)	24.8	99	124	149	174	198
4' 4" (52)	27.1	108	136	163	190	217
4' 5" (53)	29.4	118	147	176	206	235
4' 6" (54)	31.7	127	159	190	222	254
4' 7" (55)	34	136	170	204	238	272
4' 8" (56)	36.3	145	182	218	254	290
4' 9" (57)	38.6	154	193	232	270	309
4' 10" (58)	40.9	164	205	245	286	327
4' 11" (59)	43.2	173	216	259	302	346
5' 0" (60)	45.5	182	228	273	319	364
5' 1" (61)	47.8	191	239	287	335	382
5' 2" (62)	50.1	200	251	301	351	401
5' 3" (63)	52.4	210	262	314	367	419
5' 4" (64)	54.7	219	274	328	383	438
5' 5" (65)	57	228	285	342	399	456
5' 6" (66)	59.3	237	297	356	415	474
5' 7" (67)	61.6	246	308	370	431	493
5' 8" (68)	63.9	256	320	383	447	511
5' 9" (69)	66.2	265	331	397	463	530
5' 10" (70)	68.5	274	343	411	480	548
5' 11" (71)	70.8	283	354	425	496	566
6' 0" (72)	73.1	292	366	439	512	585
6' 1" (73)	75.4	302	377	452	528	603
6' 2" (74)	77.7	311	389	466	544	622
6' 3" (75)	80	320	400	480	560	640
6' 4" (76)	82.3	329	412	494	576	658
6' 5" (77)	84.6	338	423	508	592	677
6' 6" (78)	86.9	348	435	521	608	695
6' 7" (79)	89.2	357	446	535	624	714
6' 8" (80)	91.5	366	458	549	641	732
6' 9" (81)	93.8	375	469	563	657	750
6' 10" (82)	96.1	384	481	577	673	769
6' 11" (83)	98.4	394	492	590	689	787
7' 0" (84)	100.7	403	504	604	705	806

HEIGHT	PBW	4 ml	5 ml	6 ml	7 ml	8 ml
4' 0" (48)	22.4	90	112	134	157	179
4' 1" (49)	24.7	99	124	148	173	198
4' 2" (50)	27	108	135	162	189	216
4' 3" (51)	29.3	117	147	176	205	234
4' 4" (52)	31.6	126	158	190	221	253
4' 5" (53)	33.9	136	170	203	237	271
4' 6" (54)	36.2	145	181	217	253	290
4' 7" (55)	38.5	154	193	231	270	308
4' 8" (56)	40.8	163	204	245	286	326
4' 9" (57)	43.1	172	216	259	302	345
4' 10" (58)	45.4	182	227	272	318	363
4' 11" (59)	47.7	191	239	286	334	382
5' 0" (60)	50	200	250	300	350	400
5' 1" (61)	52.3	209	262	314	366	418
5' 2" (62)	54.6	218	273	328	382	437
5' 3" (63)	56.9	228	285	341	398	455
5' 4" (64)	59.2	237	296	355	414	474
5' 5" (65)	61.5	246	308	369	431	492
5' 6" (66)	63.8	255	319	383	447	510
5' 7" (67)	66.1	264	331	397	463	529
5' 8" (68)	68.4	274	342	410	479	547
5' 9" (69)	70.7	283	354	424	495	566
5' 10" (70)	73	292	365	438	511	584
5' 11" (71)	75.3	301	377	452	527	602
6' 0" (72)	77.6	310	388	466	543	621
6' 1" (73)	79.9	320	400	479	559	639
6' 2" (74)	82.2	329	411	493	575	658
6' 3" (75)	84.5	338	423	507	592	676
6' 4" (76)	86.8	347	434	521	608	694
6' 5" (77)	89.1	356	446	535	624	713
6' 6" (78)	91.4	366	457	548	640	731
6' 7" (79)	93.7	375	469	562	656	750
6' 8" (80)	96	384	480	576	672	768
6' 9" (81)	98.3	393	492	590	688	786
6' 10" (82)	100.6	402	503	604	704	805
6' 11" (83)	102.9	412	515	617	720	823
7' 0" (84)	105.2	421	526	631	736	842

TROUBLESHOOTING Hypoxia or Deterioration DOPEs	
D	Dislodged ETT or cuff leak
O	Obstruction of ETT or circuit
P	Pneumothorax, Pneumonia, Pulmonary embolism or edema, Plug (mucous)
E	Equipment problem
S	Stacked breaths, air trapping, or auto-PEEP

RESPONSE to Hypoxia or Deterioration DOTT	
D	Disconnect ventilator, squeeze chest if auto-PEEP, Decompress if pneumothorax
O	Oxygen 100% FiO2, BVM and check compliance
T	Tube position and function, check EtCO2
T	Tweak ventilator settings or equipment

Pressure Alarm Troubleshooting	Problem Location	Consider
High PIP + High Plateau > 30	Alveoli	Compliance problem: Pneumothorax, Pneumonia Pulmonary Edema or Embolism, CHF
High PIP + Normal Plateau < 30	Airway problem	Airway, ventilator, or circuit problem: DOPE, Right Main stem intubation, Air trapping or auto-PEEP, Mucous plug, Patient out of synchrony with ventilator