



# Abdominal Pain

## Pediatric Medical

Medical Director: Benjamin Oei, M.D.

Austin County

EMS Protocol & Guideline

Version:

1.0

Date:

04/2019

**Overview:** Nausea, vomiting and diarrhea have numerous causes ranging from food and waterborne diseases, viruses, bacteria, to medication side effects and parasites. No matter the cause, volume depletion can happen quickly in the pediatric patient. Be aware that signs and symptoms commonly associated with gastroenteritis can also herald more serious abdominal emergencies, such as appendicitis or bowel obstructions.

**Definition:** Collectively, nausea, vomiting and diarrhea are termed gastroenteritis. Gastroenteritis is an inflammation of the GI tract that presents as vomiting and diarrhea in the pediatric patient. The diagnosis of gastroenteritis requires exclusion of more serious causes, and this determination is not possible in the field.

### Refer to the HandTevy Book

#### EMT

- Place patient on the **Cardiac Monitor**
- Obtain **12 Lead EKG**
- **CPR**, AED as appropriate to patient presentation
- **Oxygen** administration as appropriate to the patient presentation
- Obtain **BGL**

#### AEMT

- Establish **IV** or **IO** access with **normal saline** at **20 ml/kg** (without the presence of pulmonary edema), **10 ml/kg** for **Infants**, Re-Bolus PRN

#### Nausea and Vomiting

- **Ondansetron** 0.1 mg/kg Slow IVP, **Max** dose 4 mg
- **Diphenhydramine** 1-2mg/kg IV/IM, **Max** single dose 50 mg

#### Paramedic

#### Pain Management

- **Morphine** 0.05-0.1 mg/kg Slow IVP or IM, may repeat PRN at **HALF** of the initial dose, **MAX** dose 10 mg
- **Fentanyl** 0.5-1 mcg/kg slow IVP/IN, titrated to pain relief and anxiety PRN to **MAX** of 100 mcg
- **Ketamine** 0.5-1 mg/kg IV – if opioids are not managing pain – may repeat every 10 mins.

Dangerous Toxic Vital Signs			
AGE	PULSE	RR	SBP
<2m	180	50	60
2m-2y	160	40	70
2y-7y	140	20	90
>8y	110	20	90
<b>ETCO<sub>2</sub> &lt;30 &amp; &gt;50</b>			
<b>SPO<sub>2</sub> &lt; 92%</b>			

#### PEARLS

- Goal of treating abdominal pain is to reduce the pain level to a tolerable/comfortable level and/or to facilitate assessment in presence of significant pain.
- Collectively, nausea, vomiting and diarrhea are termed gastroenteritis. Gastroenteritis is an inflammation of the GI tract that presents as vomiting and diarrhea in the pediatric patient. The diagnosis of gastroenteritis requires exclusion of more serious causes, and this determination is not possible in the field.
- Zofran typically has a better efficacy for patients pre-vomiting, and Phenergan typically has a better efficacy for patients who are or have been actively vomiting, however, if known which treatment is more appropriate for the individual patient, these can be utilized interchangeably.
- Zofran and Phenergan can be administered to the same patient. Ensure enough time has elapsed to allow the first administered medication to reach therapeutic effects.
- Phenergan should only be used in the pediatric patients for prolonged vomiting. Phenergan typically causes a decrease in the ability to assess CNS/cognitive functions. It is imperative that the medic accurately and fully assess the patient's neurologic status prior to administering Phenergan to ensure good, comprehensive assessment and report for the receiving staff.
- Glucose level and temperature should be assessed on all patients complaining of N/V and/or diarrhea



# Allergic Reaction - Anaphylaxis

## Pediatric Medical

Medical Director: Benjamin Oei, M.D.

Austin County

EMS Protocol & Guideline

Version:

1.0

Date:

04/2019

**Overview:** Allergic reactions can be a direct threat to the patient's life. Anticipation of the severity is based on the time of onset and trending the progression of symptoms. This is key in identifying the appropriate therapy and preventing a crisis.

**Definition:** Allergic Reactions typically present with itching, swelling, urticaria, wheezing, and hypotension. These symptoms can be isolated or systemic and in any combination or single symptom presentation.

### Refer to the HandTevy Book

#### EMT

- Place patient on the **Cardiac Monitor**
- Obtain **12 Lead EKG**
- **CPR**, AED as appropriate to patient presentation
- **Oxygen** administration as appropriate to the patient presentation
- **Airway Adjuncts** (Supraglottic Airway, OPA, NPA.), EtCO<sub>2</sub> monitoring appropriate to patient presentation
- Obtain **BGL**
- **Albuterol** 2.5 mg Nebulized, repeat **PRN**

#### Moderate Reaction

- **Epinephrine** 1:1000 - 0.15 mg IM, may **Repeat** once in 5 mins if needed

#### AEMT

#### Minor Reaction

- **Diphenhydramine** 1-2 mg/kg IV/IM (25 mg **Max** single dose), may repeat **Once, Max** total dose 50 mg
- **Dexamethasone** 2-4mg Nebulizer if wheezing is present

#### Moderate Reaction

- Establish **IV** or **IO** access with **normal saline** at **20 ml/kg** (without the presence of pulmonary edema), **10 ml/kg** for **Infants**, Re-Bolus PRN
- **Intubation** if appropriate to patient presentation

#### Paramedic

#### Moderate Reaction (in addition to Minor Reaction)

- **Dexamethasone** 2-4 mg IV if wheezing is present
  - **Methylprednisolone** 1-2 mg/kg **SLOW** IV/IM (**Max** 125 mg) if Dexamethasone is unavailable

#### Severe Reaction (in addition to Moderate Reaction)

- **Epinephrine** 0.01 mg/kg 1:1000 IM or SQ may **Repeat** every 5-10 minutes PRN, **Max** single dose 0.3 mg
- **Terbutaline** 0.25 mg IM or SQ for patient not responding to Epinephrine

Dangerous Toxic Vital Signs			
AGE	PULSE	RR	SBP
<2m	180	50	60
2m-2y	160	40	70
2y-7y	140	20	90
>8y	110	20	90
<b>ETC02 &lt;30 &amp; &gt;50</b>			
<b>SPO2 &lt; 92%</b>			

#### PEARLS

- IV administration of Epinephrine should be reserved for the unconscious patient with hemodynamic compromise.
- In the event of a swollen airway and presented with a "Can't oxygenate, can't ventilation, can't intubate", surgical cric is the primary airway management option.
- IM administration of Epinephrine can be in the deltoid or the lateral thigh, however, the **Lateral thigh** does have a significantly faster rate of absorption into the blood stream. Studies have shown a difference of 5 minutes up to 10 minutes before blood serum levels start reaching a therapeutic level.
- Atypical presentations of allergic reactions can be obscure and difficult to identify especially in the absence of hives. A good, thorough physical and oral examination of the patient is essential.



# Apparent Life Threatening Events

## Pediatric Medical

Medical Director: Benjamin Oei, M.D.

Austin County

EMS Protocol & Guideline

Version:

1.0

Date:

04/2019

**Overview:** Apparent Life Threatening Events (ALTE) can easily be dismissed by guardians and caregivers since after the event, the patient returns to a ‘normal’ state and lacks signs and/or symptoms. Diligence in thorough assessment of the events is key to identifying the presence of an ALTE. ALTE should be viewed as a manifestation of other conditions, rather than as a diagnosis in of itself.

**Definition:** Sudden event that is frightening to the observer and characterized by a combination of apnea (respiratory pause > 15 seconds), decreased mental status, color change (pallor or cyanosis), alteration in muscle tone (rigidity or limpness), or choking.

### Refer to the HandTevy Book

#### EMT

- Place patient on the **Cardiac Monitor**
- Obtain **12 Lead EKG**
- **CPR**, AED as appropriate to patient presentation
- **Oxygen** administration as appropriate to the patient presentation
- **Airway Adjuncts** (Supraglottic Airway, OPA, NPA), EtCO<sub>2</sub> monitoring appropriate to patient presentation
- Obtain **BGL**
- **SPO<sub>2</sub>** monitoring
- **Rectal Temperature**

#### AEMT

- Establish **IV** or **IO** access with **normal saline** at **20 ml/kg** (without the presence of pulmonary edema), **10 ml/kg** for **Infants**, Re-Bolus PRN
- **Intubation** as appropriate to patient presentation

#### Paramedic

- **RSI protocol as needed to obtain airway**

Dangerous Toxic Vital Signs			
AGE	PULSE	RR	SBP
<2m	180	50	60
2m-2y	160	40	70
2y-7y	140	20	90
>8y	110	20	90
<b>ETCO<sub>2</sub> &lt;30 &amp; &gt;50</b>			
<b>SPO<sub>2</sub> &lt; 92%</b>			

#### PEARLS

- A probable cause for an ALTE can be found in 50% of patients, leaving the remaining 50% with an unexplained ALTE
- Witnesses should be thoroughly questioned about the details of the ALTE
- The majority of children will have a normal presentation.
- Most commonly occurs in children between the ages of 2-3 months, but have been seen up to 1 year
- If the guardian(s) express their continued desire to refuse transport the patient, then facilitating scheduling an appointment with the pediatrician or identifying a clinic for the patient to be taken to the same day (or within reason) should be done by the crew before leaving the scene. **Obtain an Against Medical Advice Refusal.**
- Identify patient need to be transported for further evaluation. Presence of an ALTE signifies a high risk of SIDS/Sudden cardiac arrest.
- Utilize supervisory staff in difficult situations.



# Asystole / PEA

## Pediatric Medical

Medical Director: Benjamin Oei, M.D.

Austin County

EMS Protocol & Guideline

Version:

1.0

Date:

04/2019

**Overview:** Pulseless Electrical Activity (PEA) is primarily caused H's and T's that are treatable in the field. Identifying the treatable cause; supporting the priority of Rate, Rhythm and Blood pressure; in conjunction with good effective CPR/Resuscitation efforts is key.

**Definition:** PEA is an organized electrical rhythm that the healthcare professional would anticipate the production of a pulse, but no pulse is easily palpable primarily at the carotid

### Refer to the HandTevy Book

#### EMT

- **CPR, AED**
- **Airway Adjuncts** (Supraglottic Airway, OPA, NPA.), EtCO<sub>2</sub> monitoring
- Obtain **BGL**

#### AEMT

- Establish **IV or IO** access with **normal saline** at **20 ml/kg** (without the presence of pulmonary edema), **10 ml/kg** for **Infants**, Re-Bolus PRN

#### Vasopressor

- **Epinephrine 1:10,000** - 0.01 mg/kg IVP/IO, every 3-5 minutes for the duration of the arrest or until ROSC is achieved
- ETT with EtCO<sub>2</sub> monitoring - **IGEL** should be used first line in older children see PEARLS below

#### Paramedic

#### PEA

- **Atropine** 0.02 mg/kg IV/IO (if rate is less than age appropriate rates), repeat every 3-5 min to a **MAX of 1 mg**

#### Metabolic

- **Calcium Chloride** 20 mg/kg IV/IO, may repeat **ONE** time in 10 min if known renal PT or if hyperkalemia is suspected,
  - max dose of 1,000 mg
- **Sodium Bicarbonate** 1 mEq/kg IV/IO, may repeat 0.5 mEq/kg every 10 minutes **ONLY** if tube placement is confirmed and adequate ventilations is being performed

#### ROSC infusions

- **Epinephrine 1:10,000 Infusion** - 0.1-1 mg/kg of 1: 10,000 in 100 ml of NS. Titrate to maintain BP  
**Or**  
**Dopamine** 5 to 20 mcg/kg/min titrated to maintain systolic BP of  $70 + 2 \times \text{age}$
- **Normal saline** 20 ml/kg (without the presence of pulmonary edema), 10 ml/kg for infants

Dangerous Toxic Vital Signs			
AGE	PULSE	RR	SBP
<2m	180	50	60
2m-2y	160	40	70
2y-7y	140	20	90
>8y	110	20	90
<b>ETCO<sub>2</sub> &lt;30 &amp; &gt;50</b>			
<b>SPO<sub>2</sub> &lt; 92%</b>			

#### **PEARLS**

- Treatable causes may include the 6 H's and 6 T's
  - Hypovolemia, Hypoxia, Hydrogen ion (acidosis), Hypo-/Hyper-electrolytes, Hypo-/Hyper-glycemia, Hypo-/Hyper-thermia, Tablets (overdose), Trauma, Tamponade (cardiac), Tension pneumothorax, Thrombosis (heart), Thrombosis (lungs)
- Initial airway management maybe performed with BVM ventilation and airway adjuncts as primary intervention as long as chest rise, compliance and EtCO<sub>2</sub> are noted.
- In older children who are (41"-51" and/or 25kg-35kg), insertion of the **IGEL** should be utilized during the initial stages of resuscitation. The IGEL shall only be placed by trained providers (EMT-B to Paramedic) who are proficient in its use. Proper placement should be confirmed with EtCO<sub>2</sub> monitoring, bi-lateral breath sounds and adequate chest rise and fall. Once **ROSC** is achieved IGEL shall be replaced with an ET tube.
- If arrest is causes by asphyxia, then ET tube becomes priority. Use **BLUE** box for proper sizing.
- In cases where resuscitation is prolonged, ET tube should replace the IGEL prior to transporting.
- Epinephrine is preferred in pediatric patients as first line infusion presser.



# Acute Coronary Syndrome

## Pediatric Medical

Medical Director: Benjamin Oei, M.D.

Austin County

EMS Protocol & Guideline

Version:

1.0

Date:

04/2019

**Overview:** Acute Coronary Syndrome (ACS) cannot be dismissed by the patient and/or medic. Compared with adults, cardiac emergencies are infrequent in children and clinical presentation is often quite variable. Early recognition and thorough assessment of frank and obscure signs and symptoms will help guide the medic to a good, comprehensive care plan.

**Definition:** ACS is any patient, **without discrimination of age**, history, etc., presenting with chest pain, peri-chest pain, and/or other frank or obscure signs and symptoms associated with cardiac indicating inadequate tissue perfusion of the myocardium

### Refer to the HandTevy Book

#### EMT

- Place patient on Cardiac Monitor
- Obtain **12 Lead EKG**, transmit if EKG reads \*\*\***Acute MI**\*\*\*, perform right side 12 lead by moving V-4 to right mid-clavicular 5<sup>th</sup> intercostal space
- Administer **Aspirin** 10mg/kg PO – if appropriate for patient age
- Airway/Oxygen appropriate for pts condition, if SPO<sub>2</sub> less than 94% on pulse ox administer 4 LPM via NC

#### AEMT

- Establish IV or IO access with **normal saline at 20 ml/kg** (without the presence of pulmonary edema), **10 ml/kg for Infants**, Re-Bolus PRN

### Nausea and Vomiting

- **Ondansetron** 0.1 mg/kg Slow IVP, **Max** dose 4 mg
- **Diphenhydramine** 1-2 mg/kg IV/IM, **Max** single dose 50 mg

#### Paramedic

### Pain Control

- **Morphine** 0.05-0.1 mg/kg Slow IVP or IM, may repeat PRN at **HALF** of the initial dose, **MAX** dose 10 mg
- **Fentanyl** 0.5-1 mcg/kg slow IVP/IN, titrated to pain relief and anxiety PRN to **MAX** of 100 mcg
- **Ketamine** 0.5-1 mg/kg IV – if opioids are not managing pain – may repeat every 10 mins.

Dangerous
Toxic Vital Signs
AGE      PULSE      RR      SBP
<2m      180      50      60
2m-2y      160      40      70
2y-7y      140      20      90
>8y      110      20      90
ETCO <sub>2</sub> <30 & >50
SPO <sub>2</sub> < 92%

### PEARLS

- May withhold advanced treatment if cardiac ischemia is not suspected based on history, examination and EKG findings.
- Acute Coronary Syndrome may present atypically (without chest pain), especially in female and/or diabetic patients. Other presentations that may require a 12 lead include: dizziness, palpitations, SOB, nausea & vomiting, ABD pain, acid indigestion/heart burn, upper extremity/neck/jaw pain, back or shoulder pain, weakness, general malaise, syncope or near syncope.
- Oral anticoagulant therapy (i.e. daily Warfarin, Xarelto, ASA, etc.) is not a contraindication to Aspirin administration.
- A developing Left Bundle Branch Block, should be treated like an STEMI and makes the patient a candidate for cardiac catheterization and/or thrombolytic therapy.
- If a patient has recurring symptoms, the time of onset is considered to be when the symptoms became constant.



# Bradycardia

## Pediatric Medical

Medical Director: Benjamin Oei, M.D.

Austin County

EMS Protocol & Guideline

Version:

1.0

Date:

04/2019

**Overview:** Bradycardia in the pediatric patient almost always reflects hypoxia, rather than a primary cardiac problem. It is a prearrest rhythm, and the prognosis is ominous if left untreated

**Definition:** Bradycardia is an organized cardiac rhythm that is calculated based upon perfusing contractions (creates a pulse) that is less than 60 b/min; sustained or intermittent

### Refer to the HandTevy Book

#### EMT

- Place patient on the **Cardiac Monitor**; place Defib pads on patient if needed
- Obtain **12 Lead EKG**
- Place patient on **Oxygen** as indicated for patient status; prepare to **Ventilate** the patient as needed
- Obtain **BGL**

#### AEMT

- Establish **IV** or **IO** access with **normal saline** at **20 ml/kg** (without the presence of pulmonary edema), **10 ml/kg** for **Infants**, Re-Bolus PRN

#### Paramedic

##### Rate Control

- **Epinephrine 1:10,000** 0.01 mg/kg IV/IO
- **Atropine** 0.02 mg/kg IV/IO, may repeat every 3-5 minutes, **Max** dose 0.5mg for Child, **Max** dose 1mg for an adolescent
- **Transcutaneous Pacing** (see Transcutaneous procedure)

##### Sedation

- **Ketamine** 0.5-1.5mg/kg **IV** over 1 min, May repeat initial dose after 10 min.
  - 2-4 mg/kg **IM** x1, May give 2-4 mg/kg 10 min after initial dose if necessary
  - 3-9 mg/kg **IN** once

##### **Pediatric Bradycardic Rates**

Infant	100 bpm
Toddler	95 bpm
Preschooler	80 bpm
School aged	70 bpm
Adolescent	60 bpm

##### Infusion

- **Epinephrine 1:10,000 Infusion** - 0.1-0.2 mg/kg of 1:10,000 in 100 ml of NS-titrate to maintain BP  
Or
- **Dopamine 5 to 20 mcg/kg/min** titrated to maintain systolic BP of  $70 + 2 \times \text{age}$

### PEARLS

- Children with a heart rate below the normal range for their age should be carefully evaluated for signs of respiratory failure or shock.
- If the child is asymptomatic, no treatment is required. Slow heart rates are common in athletic teenagers.
- End organ compromise is easiest identified in the pre-hospital setting by altered and/or declining mental status including unconsciousness.
- Any patient who presents with a complaint/symptom associated with bradycardia should be considered for treatment.
- In rare situations, chest compressions for bradycardia are necessary. If the heart rate is below 60 bpm and the child shows signs of poor systemic perfusion **after** oxygenation and assisted ventilation, **begin chest compressions**.
- When the child has a known reason for cholinergic mediated bradycardia, such as congenital heart block, give atropine first and monitor the response.
- Before administering vasopressor drugs, always assess for mechanical problems with oxygen delivery and ventilation.



# Cardiogenic Shock

## Pediatric Medical

Medical Director: Benjamin Oei, M.D.

Austin County

EMS Protocol & Guideline

Version:

1.0

Date:

04/2019

**Overview:** Cardiogenic is abnormal in children and is rarely diagnosed in the prehospital setting unless the child has a known cardiac history. The most likely cause is either congenital heart disease or cardio myopathy from myocarditis. Other causes include SVT, bradycardia, over dose of calcium channel blockers or  $\beta$ -blockers.

**Definition:** Any patient that is presenting with the inability to maintain an adequate blood pressure and/or rate, ultimately resulting in inadequate cardiac output. Inadequate output causes a V/Q (ventilation/perfusion) mismatch and inadequate tissue perfusion = Shock.

### Refer to the HandTevy Book

#### EMT

- Place patient on the **Cardiac Monitor**
- Obtain **12 Lead EKG**
- **CPR, AED** as appropriate to patient presentation
- **Oxygen** administration as appropriate to the patient presentation
- **Airway Adjuncts** (Supraglottic Airway, OPA, NPA), EtCO<sub>2</sub> monitoring appropriate to patient presentation
- Obtain **BGL**

#### AEMT

- Establish **IV** or **IO** access with **normal saline at 20 ml/kg** (without the presence of pulmonary edema), **10 ml/kg for Infants**, Re-Bolus PRN

#### Paramedic

- **Normal saline at 20 ml/kg** (without the presence of pulmonary edema), **10 ml/kg for Infants**, Re-Bolus PRN

#### Vasopressors

- **Epinephrine Infusion** - 0.1-1 mg/kg of 1: 10,000 in 100 ml of NS. Titrate to maintain BP  
Or
- **Dopamine 5 to 20 mcg/kg/min** titrated to maintain systolic BP of  $70 + 2 \times \text{age}$

Dangerous Toxic Vital Signs			
AGE	PULSE	RR	SBP
<2m	180	50	60
2m-2y	160	40	70
2y-7y	140	20	90
>8y	110	20	90
ETCO <sub>2</sub> <30 & >50			
SPO <sub>2</sub> < 92%			

#### PEARLS

- A history from the caregiver usually reveals that the child has had nonspecific symptoms, such as loss of appetite, poor feeding, lethargy, irritability and inappropriate sweating over a period of days. This is true in children with myocarditis and congenital heart disease.
- There is often a history of congenital heart disease or the presence of a midline chest scar from heart surgery.



# Congestive Heart Failure

## Pediatric Medical

Medical Director: Benjamin Oei, M.D.

Austin County

EMS Protocol & Guideline

Version:

1.0

Date:

04/2019

**Overview:** Congestive Heart Failure (CHF) in pediatrics is rare and often occurs due to congenital defects. Neonates and infants younger than age 2 months are most likely to present with CHF related to structural heart disease. In older children, CHF may be caused by left-sided obstructive disease, myocardial dysfunction, hypertension, renal failure, or, more rarely, arrhythmias or myocardial ischemia. The management of CHF in pediatrics is difficult and often presents with co-morbidities that complicate the physiologic challenges in the time of complaint/crisis and also complicate the treatment modalities. Ensuring a thorough assessment to identify the severity of the occurrence, the rapidness of progression, and anticipated progression based on history will help the medic dictate the treatment modalities.

**Definition:** Any patient presenting with signs and symptoms of impaired blood flow through the heart including but not limited to: pulmonary edema, pedal edema, sacral edema, shortness of breath and especially suspected in patients with known history, current hypertensive status and/or 12 lead changes/suspected MI.

### Refer to the HandTevy Book

#### EMT

- Place patient on the **Cardiac Monitor**
- Obtain **12 Lead EKG**
- **CPR, AED** as appropriate to patient presentation
- **Oxygen** administration as appropriate to the patient presentation, prepare to **Ventilate** (Place PEEP on the BVM)
- **Airway Adjuncts** (Supraglottic Airway, OPA, NPA), EtCO<sub>2</sub> monitoring appropriate to patient presentation
- Obtain **BGL**

#### AEMT

- Establish **IV** or **IO** access

#### Airway Control

- **CPAP** if not contraindicated by age/size of patient
- **RSI** see **Airway Management Procedure**

#### Paramedic

#### Volume Control

- **Nitroglycerine** 0.4mg Sublingual

#### Vasopressors

- **Epinephrine Infusion** 0.1-1 mg/kg of 1: 10,000 in 100 ml of NS. Titrate to maintain BP  
Or
- **Dopamine 5 to 20 mcg/kg/min** titrated to maintain systolic BP of  $70 + 2 \times \text{age}$

Dangerous Toxic Vital Signs			
AGE	PULSE	RR	SBP
<2m	180	50	60
2m-2y	160	40	70
2y-7y	140	20	90
>8y	110	20	90
<b>ETC02 &lt;30 &amp; &gt;50</b>			
<b>SPO2 &lt; 92%</b>			

#### PEARLS

- In patients with known congenital heart defects, the parents may have in their possession a “user guide” type book that is assembled by their doctor in relation to their condition, complications they may experience and treatments as well.
- It is important to maintain oxygen perfusion without aggressive high concentrations of oxygen, as this may actually worsen the patient’s condition by altering the pulmonary circulation and vascular resistance.
- If albuterol is administered due to other indications (such as wheezing) and the patient condition deteriorates, immediate stop albuterol and re-evaluate the patient’s Differential Diagnosis.
- In the instance where Nitrates and CPAP are contraindicated due to age and/or patient condition, immediately initiate transport.
- Palpation for an enlarged liver will aid in confirming CHF.



# Diabetic Emergency

## Pediatric Medical

Medical Director: Benjamin Oei, M.D.

Austin County

EMS Protocol & Guideline

Version:

1.0

Date:

04/2019

**Overview:** Younger children are more likely to have type I diabetes, which is insulin dependent. There is however an increasing prevalence of type 2 diabetes in childhood. These children may be on oral hypoglycemic agents in lieu of insulin. Regardless of the type, signs and symptoms are the same and can range from mild to severe and can be an immediate life threat.

**Definition:** Hypoglycemia is defined as a serum glucose concentration of less than 40 mg/dL in a newly born infant and less than 60 mg/dL in a child. Hyperglycemia is defined as a serum glucose concentration greater than 240 mg/dL.

### Refer to the HandTevy Book

#### EMT

- Place patient on the **Cardiac Monitor**
- Obtain **12 Lead EKG**
- **CPR**, AED as appropriate to patient presentation
- **Oxygen** administration as appropriate to the patient presentation
- **Airway Adjuncts** (Supraglottic Airway, OPA, NPA), EtCO<sub>2</sub> monitoring appropriate to patient presentation
- Obtain **BGL**
- **Oral Glucose** 15-25 grams PO (Orange juice or palatable form of glucose, if patient has an intact gag reflex and is able to manage the substance)
- **Glucagon** 0.5 ml IM if <20kg, 1ml IM if >20kg
- Consult OLMC if < 1 year old

#### AEMT

- Establish **IV** or **IO** access with **normal saline** at **20 ml/kg** (without the presence of pulmonary edema), **10 ml/kg** for **Infants**, Re-Bolus PRN
- **Dextrose 25% or 50%**- 0.5-1 g/kg slow IVP, May be repeated once as needed

#### Paramedic

Dangerous Toxic Vital Signs			
AGE	PULSE	RR	SBP
<2m	180	50	60
2m-2y	160	40	70
2y-7y	140	20	90
>8y	110	20	90
ETCO <sub>2</sub> <30 & >50			
SPO <sub>2</sub> < 92%			

#### PEARLS

- Ensure accurate BGL reading prior to and post administration of glucose and/or glucagon considering the absorption rate of the administered glucose.
- Glucagon may take 15-20 minutes to reach a therapeutic effect post administration; allow for the medication to take effect unless an immediate threat to ABC develops.
- Patients in DKA benefit from delivery of high concentrations of oxygen (NRB) and aggressive fluid administration. 18g IV is adequate to achieve this goal, but success over size.
- Constantly assess for pulmonary edema/fluid overload to ensure appropriate volume of fluid administration.



# Drowning / Near Drowning

## Pediatric Medical

Medical Director: Benjamin Oei, M.D.

Austin County

EMS Protocol & Guideline

Version:

1.0

Date:

04/2019

**Overview:** Submersion in water, regardless of its depth, can result in a drowning or near drowning incident. When approaching and assessing these patients consider: possible history of trauma (diving board), duration of immersion, temperature of water (hypothermia), and the degree of water contamination.

**Definition:** Drowning: cardiopulmonary arrest as a result from submersion in and inhalation of water.

Near Drowning: survival after suffocation caused by submersion in water or other fluid. **Refer to the HandTevy Book**

### EMT

- Immediately **Remove** patient from the water
- Spinal Immobilization
- **Remove** wet clothing and dry/warm patient
- Place patient on the **Cardiac Monitor**
- Obtain **12 Lead EKG**
- **CPR**, AED as appropriate to patient presentation
- **Oxygen** administration as appropriate to the patient presentation
- **Airway Adjuncts** (Supraglottic Airway, OPA, NPA), EtCO<sub>2</sub> monitoring appropriate to patient presentation
- Obtain **BGL**
- **Evaluate and Identify** possible injuries

#### Conscious near Drowning with Diffuse Crackles

- USE CPAP or BVM with PEEP Attached as appropriate to patient presentation

#### Drowning

- Follow the appropriate **CPR** protocol

### AEMT

- Establish **IV** or **IO** access with **normal saline** at **20 ml/kg** (without the presence of pulmonary edema), **10 ml/kg** for **Infants**, Re-Bolus PRN
- **Intubate** as appropriate to patient presentation

### Paramedic

Dangerous Toxic Vital Signs			
AGE	PULSE	RR	SBP
<2m	180	50	60
2m-2y	160	40	70
2y-7y	140	20	90
>8y	110	20	90
<b>ETC02 &lt;30 &amp; &gt;50</b>			
<b>SPO2 &lt; 92%</b>			

#### PEARLS

- Ensure scene safety. Drowning is a leading cause of death among would-be rescuers. Allow appropriately-trained and certified rescuers to remove victims from areas of danger whenever possible.
- External rewarming should be utilized on all near drowning and drowning patients in cases of submersion in cold water.
- Resuscitate all patients who have been submerged in cold water (less than 70 degrees F) unless there are signs clearly incompatible with life. Cold water drownings require the patient to be rewarmed to an internal temperature between 86 and 93 degrees F. This is essential before discontinuing resuscitative measures. Patients have been revived as long as an hour after cold water submersion because of the multifactorial influences the hypothermic state entails (mammalian diving reflex).
  - Blood shunts to the heart and brain
  - Heart rate lowers
  - Metabolism drastically decreases, conserving energy and oxygen
- Take note of fluid patient was submersed in with consideration that salt water pools have become more popular, and that young children can drown in buckets that may contain chemicals or other fluids.
- Transport should be encouraged to all patients who have had a near drowning incident, even if they are asymptomatic. Observation is required for these patients in order to identify and treat “dry drowning” or “delayed drowning” that may develop after the incident. These can occur because:
  - Small amount of water can remain in the lungs and causes edema 1-24 hours after the incident
  - Inhaled pool water can cause chemical pneumonitis
  - Salt water is hypertonic to the ion concentration in lung cells, so water from the bloodstream enters the lungs to compensate for the concentration difference causing edema



# Envenomation / Bites

## Pediatric Medical

Medical Director: Benjamin Oei, M.D.

Austin County

EMS Protocol & Guideline

Version:

1.0

Date:

04/2019

**Overview:** There are many animals that can injure patients with bites and/or stings. Our region is home to only two venomous spiders, the Black Widow and Brown Recluse, and four venomous snakes, Copperheads, Cottonmouths, Rattlesnakes, and the Coral Snake. Be familiar with these animals for easy recognition. NEVER transport a live animal in the unit to the hospital. You may take a picture of the animal within reason and with safety as number one priority.



**Definition:** Bites can pose a serious threat in terms of trauma as well as infection from introduction of bacteria into the wound from the mouth; this is especially true in cases of human bites. Envenomation is the process of venom being injected into the patient by means of a bite and/or sting. Proper identification of the animal is key in cases of envenomation for appropriate definitive treatment.

### Refer to the HandTevy Book

#### EMT

- **Immediately** stop any significant bleeding
- Place patient on the **Cardiac Monitor**
- Obtain **12 Lead EKG**
- **CPR**, AED as appropriate to patient presentation
- **Oxygen** administration as appropriate to the patient presentation
- **Airway Adjuncts** (Supraglottic Airway, OPA, NPA), EtCO<sub>2</sub> monitoring appropriate to patient presentation
- Obtain **BGL**
- **Identify** type of bite/sting

#### AEMT

- Establish **IV** or **IO** access with **normal saline** at **20 ml/kg** (without the presence of pulmonary edema), **10 ml/kg** for **Infants**, Re-Bolus PRN

#### Paramedic

##### Muscle Spasms

- **Midazolam 0.5 – 2 mg IV or 5 mg - Max dose of 5 mg**

##### Snake Bite

- Immobilize the injured extremity
- Elevate wound location to a neutral position if able
- Remove any constricting clothing/bands/jewelry
- **DO NOT apply ICE**
- Mark margin of swelling, redness and time
  - If significant swelling continues, trend by marking off subsequent margins with corresponding time.
- If snake has been identified, notify the hospital

##### Insect Sting/Spider Bite

- Immobilize the injured extremity
- Elevate the wound to a neutral position if able
- Apply ice packs (maximum of 20 minutes)
- Remove any constricting clothing/bands/jewelry
- If Anaphylaxis: See **Allergic Reaction** protocol

##### Dog/Cat/Human Bite

- Irrigate wound
- Bandage appropriate to patient
- Immobilize

Dangerous Toxic Vital Signs			
AGE	PULSE	RR	SBP
<2m	180	50	60
2m-2y	160	40	70
2y-7y	140	20	90
>8y	110	20	90
ETC0 <sub>2</sub> <30 & >50			
SPO <sub>2</sub> < 92%			

#### PEARLS

- Always inquire about any known environmental allergies, especially in cases of insect bites/stings.
- Be aware that with snakes some reflexes can remain intact after death for a period of time. This can result in a bite even after it has been killed.
- A honey bee can sting only once because the stinger and attached venom sac is ripped away from the bee's body (see photo below). The venom then continues to pump through the stinger into the wound. This is why it is important to remove the stinger as quickly as possible to decrease the amount of venom injected. To properly remove a bee stinger, use a straight edge, such as that of a credit card, and scrape the stinger out.



# Environmental Exposure

## Pediatric Medical

Medical Director: Benjamin Oei, M.D.

Austin County

EMS Protocol & Guideline

Version:

1.0

Date:

04/2019

**Overview** Children with heat and cold related emergencies can vary greatly in their presentation making signs and symptoms not as clear cut as in adults. A child with heat exhaustion or hypothermia may present with AMS. Regardless of the type of heat or cold related emergency, it is very important that it is recognized and treatment implemented.

**Definition:** Heat related emergencies involve 2 separate and distinct processes leading to 3 main heat related emergencies; heat cramps, heat exhaustion, and heat stroke. Heat cramps and heat exhaustion are caused by a combination of fluid deficit and electrolyte imbalance. Heat stroke is a result of a resetting of the heat-regulating mechanism in the hypothalamus of the brain. There are two types of cold related emergencies frostbite and hypothermia. Frostbite is an injury caused by freezing of the skin and underlying tissue. First your skin becomes very cold and red, then numb, hard and pale. Hypothermia is the lowering of the body's core temperature to a point at which the body function becomes impaired. It ranges from mild to severe. Rapid recognition is essential to effective management. Reassess vital signs frequently to evaluate the patient's response to treatment.

### Refer to the HandTevy Book

#### EMT

- Place patient on the **Cardiac Monitor**
- Obtain **12 Lead EKG**
- **CPR, AED** as appropriate to patient presentation
- **Oxygen** administration as appropriate to the patient presentation
- **Airway Adjuncts** (Supraglottic Airway, OPA, NPA), EtCO<sub>2</sub> monitoring appropriate to patient presentation
- Obtain Oral/Rectal **Temperature**
- Remove patient from the environment
- **Heat Exposure/ Hyperthermia** Remove clothing/ diaper, pour cool fluids over patient, promote convection and evaporation if possible with the ambulance AC, apply ice/cold packs to axilla, groin and neck. Administer PO fluids to patient suffering from heat cramps without distress
- **Cold Exposure/ Hypothermia** Remove clothing/ diaper, Cover with dry blankets and sheets (especially infants head not face), turn heat on in the back of the ambulance to promote convectional heating

#### AEMT

- Establish **IV** or **IO** access with **normal saline** at **20 ml/kg** (without the presence of pulmonary edema), **10 ml/kg** for **Infants**, Re-Bolus PRN, use chilled or heated fluid as indicated
- **Ondansetron** 0.1mg/kg slow IV for severe nausea and vomiting, **Max** 4 mg
- **Diphenhydramine** 1-2mg/kg IV/IM, **Max** single dose 50 mg
- **Intubation** if appropriate to the patient condition

#### Paramedic

- **Diazepam** 0.25 mg/kg Slow IVP or PR for severe muscle cramping or uncontrolled shivering, **Max** dose 5 mg

Dangerous Toxic Vital Signs			
AGE	PULSE	RR	
SBP			
<2m	180	50	60
2m-2y	160	40	70
2y-7y	140	20	90
>8y	110	20	90
<b>ETC02 &lt;30 &amp; &gt;50</b>			
<b>SPO2 &lt; 92%</b>			

#### PEARLS

- Oral fluids are acceptable in patients presenting with heat cramps.
- With increase in body temperature the basal metabolic rate is also increased. With an increased metabolic rate, hypoglycemia is common; because of this a blood glucose level reading should be obtained.
- Cool the patient adequately without causing the patient to shiver. The muscle movement from shivering will only further increase the patient's temperature.
- Assess for hyper-hydration which presents with very similar symptoms as heat exhaustion. If hyper-hydration exists, DO NOT administer IV fluid bolus other than flush or TKO.
- Degrees of Heat Exposure :



# Narrow Complex Tachycardia

## Pediatric: Cardiac

Medical Director: Benjamin Oei, M.D.

Austin County

EMS Protocol & Guideline

Version:

1.0

Date:

04/2019

**Overview:** Supraventricular Tachycardia (SVT) can be threatening to the patient with associated hypotension 2<sup>nd</sup> to decreased prefill time resulting in poor cardiac output. Sustained SVT will eventually exhaust the myocardium of oxygen, glucose and ultimately ATP resulting in a higher instance of Ventricular Fibrillation (V-Fib).

**Definition:** Symptomatic patient's with an organized cardiac rhythm that is narrow in origin (< 120ms). Primarily has a positive axis unless normal variant (up to -30 degrees) or left ventricular hypertrophy is present.

### Refer to the HandTevy Book

#### EMT

- Place patient on the **Cardiac Monitor**
- Obtain **12 Lead EKG**
- CPR**, AED as appropriate to patient presentation
- Oxygen** administration as appropriate to the patient presentation, prepare to **Ventilate**
- Airway Adjuncts** (Supraglottic Airway, OPA, NPA.), EtCO<sub>2</sub> monitoring to patient presentation
- Obtain **BGL**
- Obtain **Core Temperature**
- Try to **Identify the Cause** of the tachycardia

#### AEMT

- Vagal Maneuvers** as appropriate to patient condition

#### Fluid Challenge

- Establish **IV** or **IO** access with **normal saline** at **20 ml/kg** (without the presence of pulmonary edema), **10 ml/kg** for **Infants**, Re-Bolus PRN, observe closely for fluid overload especially patient with heart failure

#### Paramedic

##### Adenosine

- 0.1 mg/kg Rapid IVP (preferred)/ IO push **Max 6mg** first dose
- 0.2 mg/kg Rapid IVP (preferred)/ IO push **Max 12 mg** second dose
- Do Not Administer** if Pt has an identified or history of WPW (Delta Wave)

##### Amiodarone (if unable to determine ventricular, atrial or WPW in origin

- 5 mg/kg in 100cc NS over 10 minutes, **MAX** dose 150 mg

##### Synchronized Cardioversion

- 0.5 J/kg synchronized cardioversion if no change 1 J/kg synchronized cardioversion if no change 2 J/kg synchronized cardio version

##### Sedation

- Ketamine** 0.5-1.5mg/kg **IV** over 1 min, May repeat initial dose after 10 min.
  - 2-4 mg/kg **IM** x1, May give 2-4 mg/kg 10 min after initial dose if necessary
  - 3-9 mg/kg **IN** once



Dangerous Toxic Vital Signs			
AGE	PULSE	RR	SBP
<2m	180	50	60
2m-2y	160	40	70
2y-7y	140	20	90
>8y	110	20	90
<b>ETC02 &lt;30 &amp; &gt;50</b>			
<b>SPO2 &lt; 92%</b>			

#### PEARLS

- Unlike adults, primary cardiac rhythm disturbances are rare in children. Physical Exam is essential to identifying the underlying pathophysiological causes and selecting the appropriate treatments that are most likely to be successful.
- Although children can develop sinus tachycardia greater than 220 BPM do a careful evaluation for hypovolemia and hypoxia and other treatable causes, and then treat the identified causes.
- Sick (or Unstable) patients are categorized as patients with altered mental status 2<sup>nd</sup> to hypoperfusion or unconscious.
- Profound hypotension and/or bradycardia 2<sup>nd</sup> to calcium channel blocker (Diltiazem) should be treated with Calcium Chloride 20mg/kg IV/IO.
- Continuous close monitoring of the patient's BP, HR, RR and SPO<sub>2</sub> are key in trending patient's condition along with physical and cognitive findings. Have resuscitative drugs and defibrillator within reach.
- Caution should be used when administering Adenosine in children on Carbamazepine (Tegretol) as this can result in a prolonged heart block.
- Patients with Wolf Parkinson White (WPW) or suspected WPW should be treated with Amiodarone (see protocol). DO NOT treat WPW with an AV Nodal blocker (i.e. Adenosine, Diltiazem, etc), this can exacerbate the syndrome and/or lead to ventricular dysrhythmias



# Overdose / Poisoning

## Pediatric Medical

Medical Director: Benjamin Oei, M.D.

Austin County

EMS Protocol & Guideline

Version:

1.0

Date:

04/2019

**Overview:** The most common patient is a toddler who unintentionally ingests a single agent in a small quantity. The second most common patient is the adolescent who uses recreational drugs or is making a suicide attempt. Early recognition and treatment of the substance involved in the overdose/poisoning improves patient's morbidity and mortality. Ensuring an objective approach in assessing and treating the patient will help guide the medic.

**Definition:** Any patient presenting with effects/side effects after being exposed (by any route) to a substance that is approaching or beyond the body's physiologic ability to compensate. All symptomatic patients should be treated.

\*\*\*\*\***(1-800-222-1222) Poison Control\*\*\*\*\***

### EMT

- Place patient on the **Cardiac Monitor**
- Obtain **12 Lead EKG**
- **CPR, AED** as appropriate to patient presentation
- **Oxygen** administration as appropriate to the patient presentation
- **Airway Adjuncts** (Supraglottic Airway, OPA, NPA), EtCO<sub>2</sub> monitoring appropriate to patient presentation
- Obtain **BGL**
- Monitor **SPO<sub>2</sub>**

### AEMT

- Establish **IV** or **IO** access with **normal saline** at **20 ml/kg** (without the presence of pulmonary edema), **10 ml/kg** for **Infants**, Re-Bolus PRN
- **Intubation** if appropriate to the patients presentation

### Paramedic

#### Organophosphate

- **Atropine:** 0.02 mg/kg IV/IO - May repeat every 5 minutes to maintain HR > 100 & clear lung sounds
- **Consider CPAP:** (see procedure)

*\*\*Large total dose may be needed to support ABC's until definitive antidote can be administer*

#### Phenothiazine OD / Dystonic Reaction

- **Diphenhydramine:** 1-2 mg/kg IV/IO; may repeat x1 **OR** Max Dose 50 mg IV/IO

*\*\*Typically presents with back pain/spasm, but can also include a "crawling out of skin" / severe anxiety*

#### Beta Blocker Overdose

- Glucagon .05mg IV repeat PRN, for symptomatic beta blocker overdose with bradycardia and / or hypotension.
- Epinephrine Infusion to maintain blood pressure with confirmed beta blocker overdose 0.1-1 mcg/kg/min

#### IF REFRACOTRY

- **Atropine:** 0.02mg IV/IO; max of 3mg

#### Calcium Channel Blocker Overdose

- **Calcium Chloride Infusion** 20 mg/kg IV/IO over 10 minutes - May repeat every 20 minutes PRN - **Max Dose of 10 Grams**

*Pacing is anticipated to not be effective; CPR only is the preferred perfusion method in*

#### Opiate Overdose

- **Naloxone** 0.01 mg/kg SLOW IV/IM/IN prn with narcotic overdose and patient is experiencing respiratory depression, titrated to respiratory effort **Max dose 2 mg**

*\*\*Do not administer if airway is controlled. \*\*Do not administer if suspected that RSI/Restraint will be needed post administration.*

## Cocaine OD / Suspected Stimulant OD

- **Diazepam:** 0.1 mg/kg IV/IO - Repeat every 5 minutes PRN - **Max** of 20 mg
- **Normal Saline:** 20ml/kg

## REFRACTORY SIGN & SYMPTOM

- **Midazolam:** 0.1 mg/kg IV/IO/IN/IM - Repeat every 5 minutes PRN
  - **Max** of 6 mg < 5 y/o
  - **Max** of 10 mg >5 y/o
  - Maintain SBP of >100 mmHg

\*\*Treat only if associated sign/symptoms such as anxiety, tremors, restlessness, tachycardia, etc.

\*\*Associated Chest Pain – treat according to ACS Protocol

## Tricyclic Antidepressant Overdose

- **Sodium Bicarbonate** 1-2 mEq/kg SLOW IV for confirmed tricyclic overdose with correlating hypercapnia; intubation with hyperventilation should be considered
- **Sodium Bicarbonate** Infusion 50 mEq in 1000 ml NaCl with confirmed tricyclic overdose
- **Epinephrine** Infusion to maintain BP 0.1-1 mcg/kg/min

\*\*Watch for elongating QRS and QT duration. This is a late sign and must be treated aggressively when identified.

## PEARL

- Contact Poison Control (1-800-222-1222) for all poisoning of substance. This will help guide the medic to anticipated presentation and prepare for intervening treatments.
- New compounds are being developed every day in the legal and illegal drug market. Utilization of good patient assessment and scene size up are essential in identifying appropriate treatment. **Poison control can be considered viable medical consultation** in instances that Overdose/poisoning that are not included in the above protocol can be treated according to the recommendation.



# Pain Management

## Pedi Medical

Medical Director: Benjamin Oei, M.D.

Austin County

EMS Protocol & Guideline

Version:

1.0

Date:

04/2019

**Overview:** Patients experiencing pain directly benefit with early, appropriate administration of pain management. Comprehensive assessment of the patient is essential not only to identify differential diagnosis, but also to identify which treatment modality is best suited for the patient. The goal is to provide pain management to a comfort level appropriate for the patient and situation.

**Definition:** Patients with any amount of pain may be considered for application of the Pain Management protocol. Patients presenting with, but not limited to: Musculoskeletal injury, Multi-system Trauma, kidney stones, cardiac related conditions, external pacing / cardioversions, chronic illness / disease (i.t. cancer, sickle cell crisis), and any other acute injury or illness with obvious signs of acute pain

### EMT

- Place patient on the **Cardiac Monitor**
- Obtain **12 Lead EKG**
- **CPR & AED** as appropriate to patient presentation
- **Oxygen** administration as appropriate to the patient presentation
- **Airway Adjuncts** (Supraglottic Airway, OPA, NPA), EtCO<sub>2</sub> monitoring appropriate to patient presentation
- Obtain **BGL**
- Monitor **SPO<sub>2</sub>**
- **Cold Packs** as needed

### AEMT

- Establish IV of Normal Saline
- Nausea and Vomiting**
- **Ondansetron** 0.15 mg/kg IV – may repeat PRN
  - **Diphenhydramine** 1-2 mg IV/IM – not to exceed **Max** dose 50 mg

### Paramedic

#### Mild to Moderate Pain

- **Ketorolac** 0.5mg/kg IV max dose of 15mg or 1mg/kg IM- max dose of 30mg

#### Moderate to Severe Pain

- **Morphine** - **Neonate to age 5** - **0.05-0.1mg/kg IV/IO/IM**; repeat PRN at half initial dose - **Max Total** dose 2 mgs  
**Ages 5-13** - **0.05 – 0.01mg/kg IV/IO/IM**; repeat PRN at half dose – **Max total** dose of 5 mgs
- **Fentanyl** 0.5 mcg/kg IV/IO/IN; repeat PRN at 0.25 mcg/kg - **Max total dose** 1mcg/kg or 100mcgs

#### Severe Pain

- **Ketamine** 0.1mg/kg IV/IO **OR** 0.5 mg/kg IM/IN: may repeat once as needed

*\*\*Ketamine is primarily reserved for patient's experiencing extreme pain associated with burns, multi-system trauma, and other extreme pain*

### PEARLS

- **Severe ETOH / Drug Intoxication – Relative contraindication.** A patient who is intoxicated does not mean the patient is not experiencing pain that is appropriate to treat. Good assessment prior to administration is required and caution with depressing CNS.
- **Pregnancy – Relative contraindication.** Must discuss with patient the risks. If elected, administer minimal dose necessary to achieve an acceptable level of comfort for the patient. Non-recurrent, Severe, Acute situations are acceptable situations for pain management.
- **Abdominal Pain** can be treated with the goal to reduce the patient's pain to a tolerable level. Patients with significant pain associated with known or unknown etiology of abdominal pain can be treated, especially in extreme cases where severity of pain hinders patient assessment. Rule out all possible causes of abdominal pain; documentation MUST support differential diagnosis when treating for a probable cause/source of abdominal pain.
- If known/anticipated common side effects of generalized itching, nausea, vomiting, etc.; a smaller dose of **Benadryl** may be given prior to pain control to minimize effects.
- **Fentanyl** may be administered to patients that are allergic to **Morphine**, however, remain prepared for a possible allergic reaction.
- Do not administer **Ketorolac** to patients with suspected internal bleeding
- Intubation equipment and **Naloxone** must be readily available when administering pain medications
- All treatment options above may be utilized in conjunction with one another. Ensuring maintenance and considerations for anticipated responses must be considered when selecting treatments.
- Sedation Score MUST be assessed and documented a minimum of: 1 time prior to administration and 1 time post each administration. Any patients with a decreased score (i.e. 3 or lower on SAS scale) MUST have continuous ETCO<sub>2</sub> monitoring. Routine monitoring with pain management is acceptable.



# Respiratory Distress

## Pediatric Medical

Medical Director: Benjamin Oei, M.D.

**Austin County**

EMS Protocol & Guideline

Version:

1.0

Date:

04/2019

**Overview:** Any pediatric patient presenting with signs and symptoms of respiratory distress may be suffering for any of the following. Asthma, RSV, Wheezing, Croup and Epiglottitis. All present differently, but can be very dangerous to the patient. Asthma is swelling of the bronchi, causes wheezing, chest tightness and can trigger coughing. Croup is an upper airway disease that is a result of swelling to the larynx, trachea and bronchi. Presents with a barking cough. Epiglottitis is the swelling of the epiglottis swells, blocking the flow of air into the lungs. Potentially life threatening. RSV common and highly contagious virus that infects the respiratory tract of most children before their second birthday.

**Definition:** Any patient presenting with complaint/symptom associated with shortness of breath (SOB) and/or hypoxia. Signs and symptoms include, but not limited to; decreased tidal volume and minute volume, wheezing, absent lung sounds and decreased mental status to unconsciousness.

### Refer to the HandTevy Book

#### EMT

- Place patient on the **Cardiac Monitor**
- Obtain **12 Lead EKG**
- **CPR**, AED as appropriate to patient presentation
- **Oxygen** administration as appropriate to the patient presentation
- **Airway Adjuncts** (Supraglottic Airway, OPA, NPA), EtCO<sub>2</sub> monitoring with EtCO<sub>2</sub> NC as appropriate to patient presentation
- Monitor **SPO<sub>2</sub>**
- Obtain **PO/PR Temperature**, **DO NOT** agitate patient with respiratory distress to obtain a temperature

#### AEMT

- Establish **IV** or **IO** access as appropriate to patients presentation
- **Normal Saline** fluid challenge up to 20 ml/kg, repeat as needed. For severe or sustained symptoms
- **Intubate** as appropriate to patients presentation (**Most skilled person should intubate PT, as one shot maybe all you get**)

#### Initial Treatment

- **Albuterol** 2.5 mg/3ml, repeat as needed
- **Ipratropium Bromide** (Asthma ONLY) 500mcg/3ml, repeat PRN
- **Humidified Oxygen** 3ml Normal Saline into nebulizer
- **Dexamethasone** 2-4mgs Nebulizer if wheezing is present
- **Epinephrine** 0.01 mg/kg IM 1:1,000

#### Paramedic

##### Severe or Sustained Symptoms

- **Dexamethasone** 1mg/kg IV
  - **Methylprednisolone** 2-3 mg/kg **SLOW** IV/IO (**Max** 125 mg) – If Dexamethasone is unavailable
- **Epinephrine** 0.01 mg/kg IM or SQ 1:1,000

##### Moderate to Severe:

- **Magnesium Sulfate** 40/mg/kg (**max 2g**) in 100 mL Normal Saline administered over 10
- **Ketamine** 0.5 -1 mg/kg IV

##### Airway Management

- **RSI** (See Airway Management Procedure)

Dangerous Toxic Vital Signs			
AGE	PULSE	RR	SBP
<2m	180	50	60
2m-2y	160	40	70
2y-7y	140	20	90
>8y	110	20	90
<b>ETC0<sub>2</sub> &lt;30 &amp; &gt;50</b>			
<b>SPO<sub>2</sub> &lt; 92%</b>			

#### PEARLS

- In children, work of breathing is a more accurate indicator of oxygenation and ventilation than respiratory rate or breath sounds on auscultation.
- The most common cause of upper airway obstruction is croup; the specific treatment for croup is nebulized epinephrine.
- Children may express stranger anxieties and be resistant to assessment and treatments. To prevent added stress on the child through assessment and treatment use a guardian as an example to procedures as well as to assist with treating the child.
- Albuterol is preferred initial treatment, however, in significant presentations, Epinephrine may be utilized as an initial treatment
- Monitor all patients carefully for signs of tachycardia, hypertension, or chest pain, especially those patients with history of Congestive Heart Failure (CHF) and Coronary Artery Disease (CAD)
- Nebulization should be continued post intubation with BVM and nebulizer attachment
- RSI Should only be utilized if the patient is unable to maintain airway, oxygenation and/or if the patient's anticipated progression is respiratory failure.
- Possible indicators for RSI are patients who are unable to maintain head in the erect position, patient reports they are tired; patient has been intubated 1 or more times in the past, inability to raise SPO<sub>2</sub>, and/or decreasing SPO<sub>2</sub> despite effective efforts to oxygenate.



# Seizures

## Pediatric Medical

Medical Director: Benjamin Oei, M.D.

Austin County

EMS Protocol & Guideline

Version:

1.0

Date:

04/2019

**Overview:** The primary initial focus for patients presenting with seizures is to support patient's oxygenation. If the patient's seizure is status (witnessed or continued from PTA), then pharmacological interventions are appropriate.

**Definition:** Seizure is any neurological instance that there is uncontrolled firing within the brain often causing involuntary muscular twitching and tone. Seizures may also present as absent or focal, but these routinely are transient and do not require treatment.

### Refer to the HandTevy Book

#### EMT

- Place patient on the **Cardiac Monitor**
- Obtain **12 Lead EKG**
- **CPR** (manual), AED as appropriate to patient presentation
- **Oxygen** administration as appropriate to the patient presentation
- **Airway Adjuncts** (Supraglottic Airway, OPA, NPA), EtCO<sub>2</sub> monitoring with EtCO<sub>2</sub> NC as appropriate to patient presentation
- Obtain **BGL**
- Identify Source/Cause

**Febrile Seizures** for temperatures over 100 orally and 101 rectally

- **Acetaminophen** 15mg/kg PO

#### AEMT

- Establish **IV** or **IO** access with **normal saline** at **20 ml/kg** (without the presence of pulmonary edema), **10 ml/kg** for **Infants**, Re-Bolus PRN

**Hypoglycemia** Blood glucose less than 60 mg/dL and patient is symptomatic

- **Dextrose 50%** 1 gram/kg for children over the age of one year old
  - Consult OLMC if < 1 year old

#### Paramedic

##### Initial Treatment

- **Diazepam** 0.2 mg/kg IV/IO  
OR  
**Ativan** 0.05 – 0.1 mg/kg –IV or IM - May repeat in 10 mins at 0.05 mg/kg  
Max dose of 4 mg
- **Midazolam** 0.2 mg/kg IV/IO

##### Dangerous Toxic Vital Signs

AGE	PULSE	RR	SBP
<2m	180	50	60
2m-2y	160	40	70
2y-7y	140	20	90
>8y	110	20	90

**ETCO<sub>2</sub> <30 & >50**  
**SPO<sub>2</sub> < 92%**

##### Refractory

- **Midazolam** 0.2 mg/kg IN or 0.1 mg/kg IV/IO/IM, repeat PRN, **Max** dose 0.4 mg/kg
- **Maintain airway and oxygenate**
- **RSI** (see Airway Management Procedure)

#### PEARLS

- Non-status seizures usually do not require medication
- Midazolam may be used first if known that Midazolam has a higher success in resolving seizures for a specific patient.
- Seizures suspected to be caused by CVA – see CVA protocol
- Prolonged status seizure may cause depletion in patient's BGL. Reevaluation of BGL is warranted.
- Febrile seizures are common in children younger than 6 years of age. However, the child still requires evaluation by a physician for diagnosis as well as continued monitoring enroute to the hospital.



# Sepsis

## Pediatric Medical

Medical Director: Benjamin Oei, M.D.

Austin County

EMS Protocol & Guideline

Version:

1.0

Date:

04/2019

**Overview:** A septic child may look ill and have ashen color, pallor and/or cyanosis. He or she may be irritable or lethargic, febrile, normothermic or hypothermic. Most have tachycardia and tachypnea. In late stages the child may hypoventilate with poor perfusion, bradycardia and hypotension. Parents usually report the child has been fussy, lethargic, anorectic, and perhaps sleeping more than usual.

**Definition:** Sepsis is defined as bacteremia with evidence of systemic invasive infection.

### Refer to the HandTevy Book

#### EMT

- Place patient on the **Cardiac Monitor**
- Obtain **12 Lead EKG**
- **CPR**, AED as appropriate to patient presentation
- **Oxygen** administration as appropriate to the patient presentation
- **Airway Adjuncts** (Supraglottic Airway, OPA, NPA), EtCO<sub>2</sub> monitoring appropriate to patient presentation
- Obtain **BGL**
- **SPO<sub>2</sub>** monitoring
- **Rectal Temperature**
- **Acetaminophen** 15mg/kg PO or rectal - with the presence of fever

#### AEMT

- Establish **IV** or **IO** access with **normal saline at 20 ml/kg** (without the presence of pulmonary edema), **10 ml/kg for Infants**, Re-Bolus PRN
- **Intubation** as appropriate to patient presentation

#### Paramedic

Dangerous Toxic Vital Signs				
AGE	PULSE	RR	SBP	
<2m	180	50	60	
2m-2y	160	40	70	
2y-7y	140	20	90	
>8y	110	20	90	
<b>ETCO<sub>2</sub> &lt;30 &amp; &gt;50</b>				
<b>SPO<sub>2</sub> &lt; 92%</b>				

### PEARLS

- Suspected or known infectious process and temperature abnormality and a heart rate greater than normal for age
- Mental status abnormality ( anxiety, restlessness, agitation, irritability, inappropriate crying, drowsiness, lethargy, obtundation)
- Perfusion abnormality ( mottled or cool extremities, capillary refill time < 1 sec or > 3 sec, warm extremities, bounding pulse, SBP <70 + 2X age in years)
- High risk conditions(<56 days of life, BMT or solid organ X-plant, immune compromise, asplenia, sickle cell disease, malignancy)
- ETCO<sub>2</sub> < 25 mmHG
- For newborns the lower the limit for SBP < 60, for children 1 month to 1 year the lower limit for SBP is < 70
- Petechial rash
- Bulging fontanelle
- Early (compensated shock): tachypnea and tachycardia
- Late (decompensated shock): bradypnea and bradycardia
- SaO<sub>2</sub> <90% on room air
- Dry mucus membranes, sunken eyes, and decreased urine output



# Stroke / CVA

## Pediatric Medical

Medical Director: Benjamin Oei, M.D.

Austin County

EMS Protocol & Guideline

Version:

1.0

Date:

04/2019

**Overview:** Stroke is relatively rare in children, but can lead to significant morbidity and mortality. Understanding that children with a stroke present differently than adults and often present with unique risk factors will optimize outcomes in children. Clinical presentation will vary based on the child's age, and children will have risk factors for stroke that are less common than in adults. Early recognition of pediatric stroke should lead to more rapid neurological consultation, imaging, treatment, and improved outcomes.

**Definition:** Stroke is a neurological injury caused by the occlusion or rupture of cerebral blood vessels. Stroke can be ischemic, hemorrhagic, or both. Ischemic stroke is more frequently caused by arterial occlusion, but it may also be caused by venous occlusion of cerebral veins or sinuses. Hemorrhagic stroke is the result of bleeding from a ruptured cerebral artery or from bleeding into the site of an acute ischemic stroke.

### Refer to the HandTevy Book

#### EMT

- Place patient on the **Cardiac Monitor**
- Obtain **12 Lead EKG**
- **CPR**, AED as appropriate to patient presentation
- **Oxygen** administration as appropriate to the patient presentation, only for SPO<sub>2</sub> less than 94%
- **Airway Adjuncts** (Supraglottic Airway, OPA, NPA), EtCO<sub>2</sub> monitoring appropriate to patient presentation
- Obtain **BGL**
- **Elevate** patient head to semi-fowlers position

#### AEMT

- Establish **IV** or **IO** access
- \*\*\*\*\*Contact Medical Control\*\*\*\*\*

#### Paramedic

##### Transport

- **Immediate transport** to Appropriate Stroke Center (See Below)
- **Air Medical:** Consider for prolonged transport times and/or window of intervening opportunity.

##### Hospital Notification

- Patient Name
- Patient Age with DOB
- Patient Social Security Number
- Time of Onset
- Deficits & neurological findings
- Vital Signs
- Any anticoagulant therapy

##### Dangerous

##### Toxic Vital Signs

AGE	PULSE	RR	SBP
<2m	180	50	60
2m-2y	160	40	70
2y-7y	140	20	90
>8y	110	20	90
<b>ETC02 &lt;30 &amp; &gt;50</b>			
<b>SPO2 &lt; 92%</b>			

#### PEARLS

- If intubation is necessary action must be taken to reduce the stimulation associated with laryngoscopy
- Use **only** the amount of **Oxygen** required to achieve adequate oxygenation
- Consider utilization of Air Medical services for rapid transport for outlying/extended transport situations.
- Consider administering ½ dose post intubation non-depolarizing paralytics to reduce duration of paralization to allow for neuro assessment by the ED Physician
- Do not administer aspirin
- Treat Hypoglycemia and Seizures according to protocol

#### TRANSPORT PEARLS

- **Indications for COMPREHENSIVE Stroke Center or a Stroke Center (Level 1 Stroke Alert):**
  - Patients suspected to be experiencing a *hemorrhagic stroke* (acute onset of severe deficits and/or gaze shift)
  - Younger patients (or less than 80 years old with no significant co-morbidities)
  - Patients whose symptom onset cannot be determined (i.e. during sleep) or symptoms >3 hours in duration
  - Any stroke presentation with unresolving neuro deficits where mechanical thrombectomy (neurosurgery) may be needed
    - ❖ The following hospitals are COMPREHENSIVE Stroke Centers:
      - St Luke's Medical Center
      - Methodist Medical Center
      - Ben Taub Medical Center
      - Memorial Hermann Medical Center
- **The following patients <types> would benefit from rapid transport to a PRIMARY Stroke Center (Level 2 Stroke Alert):**
  - Patients with onset of neurological signs/symptoms NO GREATER than 3 hours
  - Patients that meet criteria to receive thrombolytics for ischemic stroke



# Ventricular Ectopy/Wide Complex

## Pediatric Medical

Medical Director: Benjamin Oei, M.D.

Austin County

EMS Protocol & Guideline

Version:

1.0

Date:

04/2019

**Overview:** Ventricular ectopy is usually Asymptomatic and non-lethal to the patient. Assessing the patient for being symptomatic, assessing for perfusing/non-perfusing beats, and ensuring rare instances such as R-on-T phenomenon does not exist will help the medic decide a treatment modality.

**Definition:** A patient presenting with ECG tracing with regular or irregular occurrences of complexes described as wide and bizarre. Morphology of these complexes may or may not be uniform.

### Refer to the HandTevy Book

#### EMT

- Place patient on the **Cardiac Monitor**
- Obtain **12 Lead EKG**
- **CPR**, AED as appropriate to patient presentation
- **Oxygen** administration as appropriate to the patient presentation, prepare to **Ventilate**
- **Airway Adjuncts** (Supraglottic Airway, OPA, NPA.), EtCO<sub>2</sub> monitoring appropriate to patient presentation
- **Identify** source or Cause
- Obtain **BGL**

#### AEMT

- Establish **IV** or **IO** access with **normal saline** at **20 ml/kg** (without the presence of pulmonary edema), **10 ml/kg** for **Infants**, Re-Bolus PRN

#### Paramedic

##### Anti-Arrhythmic

- **Amiodarone** 5mg/kg in 100ml NS administered over 10 minutes
- **Lidocaine** 1 mg/kg IVP/IO, repeat **two** times at 1 mg/kg IVP/IO every 10 minutes, **MAX** dose 3 mg/kg
- **Lidocaine Continuous Infusion** after loading dose, 1mg/kg in 100 ml NS



Dangerous Toxic Vital Signs			
AGE	PULSE	RR	SBP
<2m	180	50	60
2m-2y	160	40	70
2y-7y	140	20	90
>8y	110	20	90
<b>ETC02 &lt;30 &amp; &gt;50</b>			
<b>SPO2 &lt; 92%</b>			

#### PEARLS

- The most common cause of PVC's in the pediatric patient is an irritated myocardium 2<sup>nd</sup> to hypoxia. Aggressive oxygenation therapies often resolve PVC's without the need for anti-arrhythmic treatment.
- Treat PVC's **only** if patient is **symptomatic**: i.e., R-on-T phenomena, multifocal PVC's, couplets, or runs of ventricular tachycardia, combined with chest pain, shortness of breath, altered mental status, and/or hypotension. R-on-T is illustrated below. Anticipate V-Fib/V-Tach and prepare for Defibrillation if needed while treating using above treatment modality.



# V-Fib / Pulseless V-Tach

## Pediatric Medical

Medical Director: Benjamin Oei, M.D.

**Austin County**

EMS Protocol & Guideline

Version:

1.0

Date:

04/2019

**Overview:** Ventricular Fibrillation (V-Fib) and pulseless ventricular Tachycardia (V-Tach) are rhythms typically generated by an irritated myocardium. Identifying, treating and ultimately stabilizing the myocardium is key to obtaining a sustained ROSC. Ensuring a good focus on 100% CPR while effectively incorporating analyzing rhythms/shocking and managing the patient's airway directly have an impact on the patient's ultimate outcome.

**Definition:** Erratic wide complex rhythm or regular wide complex (V-Tach) without a pulse with a negative axis deviation and typically a rate no higher than 150 b/min.

### Refer to the HandTevy Book

#### EMT

- **CPR & AED (SHOCK if advised)**
- **Airway Adjuncts** (Supraglottic Airway, OPA, NPA), EtCO<sub>2</sub> monitoring with EtCO<sub>2</sub> NC
- Obtain **BGL**

#### AEMT

- Establish **IV** or **IO** access with **normal saline** at **20 ml/kg** (without the presence of pulmonary edema), **10 ml/kg** for **Infants**, Re-Bolus PRN

#### Vasopressor

- **Epinephrine 1:10,000** - 0.01 mg/kg IVP/IO, every 3-5 minutes for the duration of the arrest or until ROSC is achieved
- **ETT with EtCO<sub>2</sub> monitoring, IGEL** should be used first line in older children see PEARLS below

#### Paramedic

- **Shock at 4j/kg**

#### Anti-Arrhythmic

- **Amiodarone** 5mg/kg IV/IO, may repeat **TWO** times every 5-10 min 5 mg/kg, **Max** dose 15 mg/kg, if **Conversion** 5 mg/kg in 100 ml NS over 10-20 minutes.

- **Lidocaine** 1 mg/kg IV/IO, may repeat **TWO** times every 5-10 min, **Max** dose 3 mg/kg, if **Conversion** 20-50 mcg/kg/min infusion.

#### Metabolic

- **Calcium Chloride** 20 mg/kg IV/IO, may repeat **ONE** time in 10 min if known renal PT or if hyperkalemia is suspected,
  - max dose of 1,000 mg
- **Sodium Bicarbonate** 1 mEq/kg IV/IO, may repeat 0.5 mEq/kg every 10 minutes **ONLY** if tube placement is confirmed and adequate ventilations is being performed

#### ROSC infusion

- **Epinephrine Infusion** 0.1-1 mg/kg. - 1mg of 1:10,000 in 100 ml of NS. Titrate to maintain BP  
Or
- **Dopamine 5 to 20 mcg/kg/min** titrated to maintain systolic BP of 70 + 2 x age

Dangerous Toxic Vital Signs			
AGE	PULSE	RR	SBP
<2m	180	50	60
2m-2y	160	40	70
2y-7y	140	20	90
>8y	110	20	90
<b>ETCO<sub>2</sub> &lt;30 &amp; &gt;50</b>			
<b>SPO<sub>2</sub> &lt; 92%</b>			

#### PEARLS

- **Amiodarone** when administered with anti-arrhythmics like **Lidocaine** it's been shown to precipitate torsades- de-pointes and/or hypotension. However, if the PT remains refractory to Amiodarone, Lidocaine should be administered.
- If unable to determine if rhythm is **V-Fib** or **Asystole**-treat as **Asystole**.
- Treatable causes may include the 6 H's and 6 T's
  - Hypovolemia, Hypoxia, Hydrogen ion (acidosis), Hypo-/Hyper-electrolytes, Hypo-/Hyper-glycemia, Hypo-/Hyper-thermia, Tablets (overdose), Trauma, Tamponade (cardiac), Tension pneumothorax, Thrombosis (heart), Thrombosis (lungs)
- Initial airway management maybe performed with BVM ventilation and airway adjuncts as primary intervention as long as chest rise, compliance and EtCO<sub>2</sub> are noted.
- In older children who are (41"-51" and/or 25kg-35kg), insertion of the **IGEL** should be utilized during the initial stages of resuscitation. The IGEL shall only be placed by trained providers (EMT-B to Paramedic) who are proficient in its use. Proper placement should be confirmed with EtCO<sub>2</sub> monitoring, bi-lateral breath sounds and adequate chest rise and fall. Once **ROSC** is achieved IGEL shall be replaced with an ET tube.
- In cases where resuscitation is prolonged, ET tube should replace the IGEL prior to transporting.
- Epinephrine is preferred in pediatric patients as first line infusion presser.