Abdominal Trauma

Pediatric Trauma

Medical Director: Benjamin Oei, M.D.

Austin County
EMS Protocol & Guideline

Version:	1.0
Date:	04/2019

Overview: Trauma to the abdomen requires a thorough and careful assessment for any immediate life threatening injuries. Rapid transport to an appropriate level facility is necessary due to limited resolution in the field. Thorough assessments should frequently be performed for early identification of any potential life threats that may not immediately be evident.

Definition: Any patient who experienced an insult to the abdomen with the potential of causing obvious or suspected injury to the structures within the abdominal cavity.

Refer to the HandTevy Book

EMT

- **Immediately** control any significant bleeding
- Place patient on the **Cardiac Monitor**
- **CPR** (manual), AED as appropriate to patients presentation
- **Oxygen** administration as appropriate to the patients presentation
- **Airway Adjuncts** (Supraglottic Airway, NPA,OPA), EtCO2 monitoring appropriate to patient presentation
- Evaluate **MOI**
- **Identify** index of suspicion

Penetrating Trauma

- **Stabilize** the object in place, **NEVER** remove an object unless it is impeding airway management or CPR

Evisceration

- **Handle** all exposed organs as little as possible, if you must move the exposed organs do so using clean gloves, **Cover** the exposed organs in sterile gauze or a sterile sheet and soak with sterile saline. (It is vital to the organ that they remain moist and covered)

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

Suspected Internal Bleeding- Pt must meet criteria

- **TXA** (Tranexamic Acid) - 15 mg/kg (Max 1g) mixed into 100cc NS – give over 10 mins.

Paramedic

Mild to Moderate Pain

- **Fentanyl** 0.5 mcg/kg IV/IO/IN, **Repeat** 0.25 mcg/kg PRN, **Max** total dose 100 mcg
- **Morphine** 0.05-0.1 mg/kg IV/IO, may **Repeat** half initial dose PRN, **Max** total dose 10 mg

Severe Pain

- **Ketamine** 0.1 mg/kg IV/IO **OR** 0.5 mg/kg IM, may **Repeat** one time PRN

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

ETC02 <30 & >50
SPO2 < 92%

PEARLS

- The major contributing factor in mortality from abdominal trauma is hemorrhage because of the large number of blood vessels and organs packed into the abdominal area. These patients are at an increased risk of significant hemorrhage even with a seemingly small wound, because blood can pool in the pelvis and retroperitoneum. Each of these areas can hold well over 1 L of fluid without exhibiting external signs. Because of this, any early visible contusions should be taken as a late sign of severe internal bleeding.
- It is important to understand the anatomy of the abdomen and how it corresponds with the various quadrants. It will help you provide a better report, even though you aren't going to be able to determine the exact location or extent of the bleeding.
- The abdomen consists of two types of organs, hollow and solid. Hollow organs are reservoirs of bodily fluids or conduits for excretion of body waste. Injuries to these organs can result in spillage of bacteria, partially digested food, and other waste products. Besides hemorrhage, there is also a great risk of peritoneal infection.
- Solid organs, such as the kidney and spleen, are organs of filtration, which means they're dense and contain massive amounts of blood vessels. The biggest risk in injuries to these solid organs is hemorrhage, and the only course of treatment is surgical intervention. This is why rapid transport is paramount.

Amputation Injuries
Pediatric Trauma

Medical Director: Benjamin Oei, M.D.

Austin County EMS Protocol & Guideline	
Version:	1.0
Date:	04/2019

Overview: The primary goal of trauma care remains as: airway stabilization, breathing protection, circulation support and cervical spine stabilization. Work to rapidly identify severe life-threatening conditions, including the potential for severe internal bleeding, throughout the care of the patient experiencing major trauma. This is a critical step in determining appropriate transport destinations, including bypassing the local hospital for a level 1 or 2 trauma center.

Definition: Any patient who experienced an extrinsic event which led to an injury or possibility of injury.

EMT

- **Control** Bleeding
- 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)EtCO2 monitoring appropriate to patient presentation
- Obtain **BGL**
- **Evaluate MOI**
- **Tourniquet** Place 2 inches above the amputation, **2nd** tourniquet may be placed PRN proximal if possible
- **iTClamp** Approximate edges of the wound 1-2 cm and pinch laceration together, **Additional iTClamp** PRN
- **DO NOT Soak** amputated parts in fluid (water/saline, etc.) Cover with west gauze/towels.

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

Severe Bleeding- Pt must meet criteria

- **TXA** (Tranexamic Acid) - 15 mg/kg (Max 1g) mixed into 100cc NS – give over 10 mins

Paramedic

Mild to Moderate Pain

- **Fentanyl** 0.5 mcg/kg IV/IO/IN, **Repeat** 0.25 mcg/kg PRN, **Max** total dose 100 mcg
- **Morphine** 0.05-0.1 mg/kg IV/IO, may **Repeat** half initial dose PRN, **Max** total dose 10 mg

Severe Pain

- **Ketamine** 0.1 mg/kg IV/IO **OR** 0.5 mg/kg IM, may **Repeat** one time PRN

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

ETC02 <30 & >50
SPO2 < 92%

PEARLS

- **Do NOT**: ◊ Soak amputated part in fluid (water/saline/etc.) ◊ Cover with wet gauze/towels ◊ Place directly on ice (causing frost bite)
- Amputated parts should be (when possible): ◊ Rinsed with Normal Saline ◊ Place in plastic bag ◊ Transported with the patient, or immediately upon discovery if patient is already transported.
- Surgical reattachment technology is advancing rapidly. Assumptions of what is viable to be reattached should generally be assumed as "possible".
- Amputated tooth should be transported in milk if possible; otherwise, keeping the tooth in moist in gauze is acceptable.
- Emergency transport is indicated for injuries to vascular compromise & amputation; time is particularly critical in these cases. Consider Air Medical
- Uncontrolled

Burns
Pediatric Trauma

Medical Director: Benjamin Oei, M.D.

Austin County
EMS Protocol & Guideline

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Date:	04/2019

Overview: Burns are classified as Superficial, Partial Thickness and Full Thickness. The greatest threats to the burn patient are typically heat loss, fluid loss and infection. Immediate recognition, treatment and prevention of these have a direct impact on improving patient outcomes.

Definition: A burn is considered any insult to the skin/body that is Thermal, Electrical, Radiological or Chemical in origin. This insult causes a breakdown of the integrity of the skin.

EMT

- **Immediately STOP** the burning process (if still active)
- **Remove** any restrictive clothing and accessories
- Place patient on the **Cardiac Monitor**
- **CPR** (manual), AED as appropriate to patient presentation
- **Oxygen** administration as appropriate to the patient presentation
- **Airway Adjuncts** (Supraglottic Airway, OPA, NPA), EtCO2 monitoring appropriate to patients presentation
- Obtain **BGL**
- **Evaluate MOI** and **Burn % (SEE RULE of 9'S CHART)**

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 patients condition

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** Neonates 0.05-0.1 mg/kg IV/IM/IO/SQ, repeat PRN at half of the initial dose, **Max** dose 0.1mg/kg ******Infants, Children and adolescents 0.1 mg/kg IV/IO/IM, may repeat PRN to **Max** total dose 10 mg
- **Fentanyl** 0.5 mcg/kg IV/IN, repeat PRN, **Max** total dose 1 mcg/kg or 100 mcg
- **Ketamine** 0.1 mg/kg IV/IO, 0.5 mg/kg IM, may repeat **ONCE**

Thermal Burns

- **Superficial**
  - **Wet Dressings**: May use room temp. fluids and gauze/sheet (sterile if possible) to provide pain relief and protect the burn site.
- **Partial Thickness / Full Thickness**
  - **Dry Dressings:** Cover the entire burn area to help protect from further injury and to maintain cleanliness.
  - **See Pain Management Procedure**

****Consider Ketamine for extreme burns**

Electrical Burns

- **Identify** the nature of the electrical source (AC / DC), the voltage, and the amount of current (amperage)
- **Locate and bandage** contact points (may be multiple) appropriately
- **Cardiac monitor AND 12-Lead:** refer to appropriate protocol for any dysrhythmias
- **See Pain Management Procedure**

Chemical Burns

- **Identify** chemical and refer to **poison control** or **ERG** for specific treatment, decontamination and safety measures
- **Dry Chemical:** Brush off dry powder then flush with water for 15 minutes
- **Wet Chemical:** DO NOT DELAY IRRIGATION. Flush for no less than 15 minutes.
- **See Pain Management Procedure**

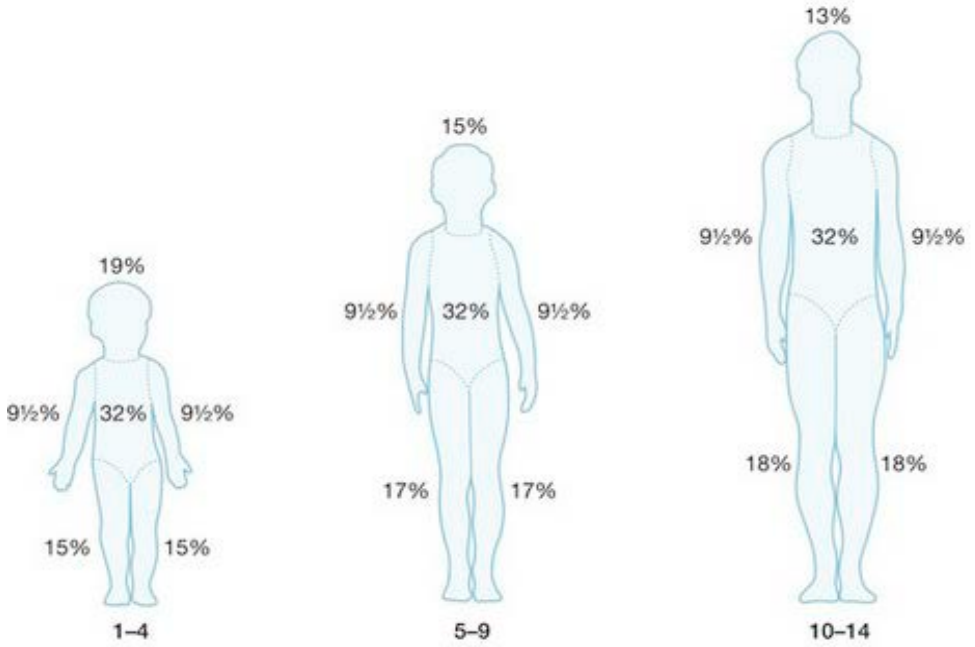
Critical Burns

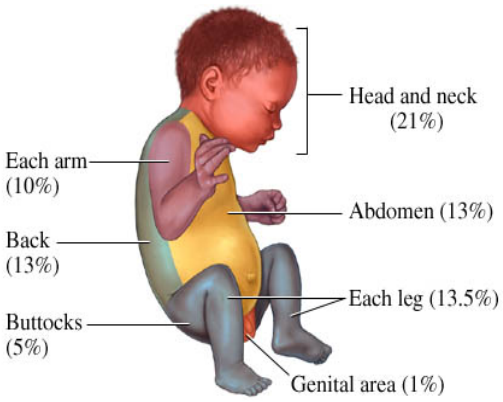
- 2º > 30% BSA
- 3º > 10% BSA
- Respiratory injury, facial burn
- Associated injuries, electrical or deep chemical burns, underlying PMH (cardiac, DM), age < 10 or > 50 yrs.

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

ETC02 <30 & >50
SPO2 < 92%





PEARLS

- Burns requiring a burn facility are as follows:
  - Partial thickness burns > 10% BSA
  - Burns that involve the face, hands, feet, genitalia, perineum, or major joints
  - Circumferential burns of any extremity
  - Third degree burns in any age group
  - Burn injury patients with pre-existing medical disorders that could complicate management, prolong recovery, or affect mortality
  - Any patient with burns and concomitant trauma (such as fractures)
- Continually evaluate and prevent Hypothermia. This will be difficult as your patients will find relief with the coolness which will mask the presence of hypothermia.
- Place bandages between 2 areas of skin that have been burned to keep from touching.
- For the purpose of determining Total Body Surface Area (TBSA) of a burn, include only partial and full thickness burns. Report the observation of other superficial (1st degree) burns, but do not include those burns in your TBSA estimate.
- Early intubation is required when the patient experiences significant inhalation injuries; laryngoedema is likely to develop.
- Circumferential burns to the extremities are dangerous due to potential vascular compromise secondary to soft tissue swelling.
- Never administer IM injections to a burn patient. Consider intranasal fentanyl for pain if IV access cannot be obtained.
- Timing is critical when burns occur from a wet chemical and should be flushed within the first minute with copious amounts of water.
- When flushing normal saline or sterile water is preferred. However, if sterile fluids are not available, DO NOT delay irrigation, use tap water. Other water sources may also be used based on availability. Flush the area as soon as possible with the cleanest readily-

Compartment Syndrome
Pediatric Trauma

Medical Director: Benjamin Oei, M.D.

Austin County EMS Protocol & Guideline	
Version:	1.0
Date:	04/2019

Overview: Compartment syndrome develops over extended times where circulation is tamponade off, often due to crush injuries, circumferential burns and/or pinned victims. Presentation and symptoms for these patients are unique.

Definition: Acute or non-acute impairment of circulation to an extremity. This impairment of circulation results in significant buildup of lactic acid.

- **Acute release** (i.e. crush/pinned injury) of this acid causes vasodilation, cardiac arrhythmias and bronchial spasms. The primary goal for this patient is to minimize and negate the acid release out of the compartment.

Non-acute presentation (post-burns/post-crush injury/post long bone Fx) where symptoms manifest over 12 hours to days post injury with deep tissue injury involvement that results in restriction of outward swelling. This is a surgical emergency. Common identifying complaint indicating potential compartment syndrome is "pain out of proportion with the injury".

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), EtCO2 monitoring appropriate to patient presentation
- Obtain **BGL**
- **Identify** Source/Cause

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 for aggressive renal protective fluid administration

Paramedic

ACUTE Prolonged Limb/ Pelvis Pinning

- **Extremity** release when possible, **APPLY** tourniquet before or as soon as possible after release to minimize acid release
- **Pelvis** involved or point of circulation impairment is too high for tourniquet
    - **Sodium Bicarbonate** 1 mEq/kg IV/IO
    - **Lidocaine** 1 mg/kg for aggressive treatment and/or prophylaxis of cardiac arrhythmias
    -

Non-Acute Post Injury presentation

- Thorough assessment and identification is KEY
- Notify receiving hospital of "Compartment Syndrome"
- Pain Management as appropriate to patients presentation **(See Pain Management Protocol)**

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

ETC02 <30 & >50
SPO2 < 92%

PEARLS

- **Acute**: Potential of compartment syndrome typically does not exist until 45 min or greater time is sustained for impairing circulation to the extremity/compartment. Severity of the acidosis is directly related to % of circulation impaired and duration.

Reference: EKG Changes in a Hyperkalemic Patient (normal: 3.5 - 5.0 mEq/L)
5.5 - 6.0 mEq/L - Mild condition: peaked T waves
6.1 - 7.0 mEq/L - Moderate condition: prolonged PR interval, flattening of P waves, segment elevation or depression, QRS widening
7.0 mEq/L and greater - Severe condition: loss of P waves, AV blocks, bundle branch blocks, PVCs

- **Non-Acute:** Signs/Symptoms experienced by the patient include what is commonly referred to as the "Five P's" pain, pallor, paresthesia, poikilothermic (cold skin), and pulselessness. Physical findings include a tense or tight feeling to the skin surrounding an extremity.
- Patient's presenting with non-acute compartment syndrome have a high risk of losing the effected extremity.

Drowning / Near Drowning
Pediatric Trauma

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.

EMT

- Immediately **Remove** patient from the water
- **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.), EtCO2 monitoring appropriate to patient presentation
- Obtain **BGL**
- **Evaluate and Identify** possible injuries

Conscious near Drowning with Diffuse Crackles

- **USE** CPAP **or** BVM with PEEP attachment 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

Drowning

- **Follow** the appropriate **CPR** protocol

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

ETC02 <30 & >50
SPO2 < 92%

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), EtCO2 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

ETC02 <30 & >50

SPO2 < 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.

Eye Emergencies
Pediatric Trauma

Medical Director: Benjamin Oei, M.D.

Austin County
EMS Protocol & Guideline

Version:	1.0
Date:	04/2019

Overview: Eye emergencies need to be assessed carefully for immediate threat to sight, potential threat to sight and not threatening to sight. Any immediate or potential threats to sight require a level 1 trauma facility.

Definition: Any patient presenting with a complaint of acute deterioration of vision either medical or traumatic in origin.

Refer to the HandTevy Book

EMT

- Place patient on the **Cardiac Monitor**
- **CPR**, AED as appropriate to patient presentation
- **Oxygen** administration as appropriate to the patient presentation
- **Airway Adjuncts** (Supraglottic Airway, OPA, NPA), EtCO2 monitoring appropriate to patient presentation
- Obtain **BGL**
- **Visual Acuity** test

Minor Trauma

- **Irrigation** and **Bandage** PRN to patient condition
- **Tetracaine 0.5%** 1-2 drops, may repeat PRN, **Max** 3 doses

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

Chemical

- **Contact Poison Control/Chemtrec** Irrigation and Bandage PRN to patient condition
- **Tetracaine 0.5%** 1-2 drops

Severe Trauma (Open Globe)

- **Bandage** dress wound / stabilize object appropriately, cover both eyes
- **Treat Pain** (See Pain Management Protocol)
- **Transport to LEVEL 1 Trauma Center**

PEARLS

- Establishing a baseline of vision status is important in trending for the crew and hospital staff to help identify patient's vision status and developing a care plan.
- Orbital fractures raise concern of globe or nerve injury and need repeated assessments of visual status.
- Normal visual acuity can be present even with severe eye injury.
- If the eye should become dislodged from the socket, cover with a saline moistened gauze. Cover the unaffected eye and elevate the head of the bed by 30 degrees.
- In an object is impaled in the eye, do not remove it. Stabilize the object and cover the unaffected eye. Elevate the head of the bed by 30 degrees.
- Remove contact lenses whenever possible.
- Only opiate-based analgesics should be used for pain management. Avoid use of Ketorolac or other NSAIDs due to their platelet-inhibiting properties.
- Do all possible to prevent the patient from vomiting due to the increase in intraocular pressure. Consider the use of Ondansetron or Benadryl.

Fractures
Pediatric Trauma

Medical Director: Benjamin Oei, M.D.

Austin County
EMS Protocol & Guideline

Version:	1.0
Date:	04/2019

Overview: The primary goal of trauma care remains as: airway stabilization, breathing protection, circulation support and cervical spine stabilization. Work to rapidly identify severe life-threatening conditions, including the potential for severe internal bleeding, throughout the care of the patient experiencing major trauma. This is a critical step in determining appropriate transport destinations, including bypassing the local hospital for a level 1 or 2 trauma center.

Definition: Any patient who experienced an extrinsic event which led to an injury or possibility of injury.

Refer to the HandTevy Book

EMT

- Place patient on the **Cardiac Monitor**
- Obtain **12 Lead EKGCPR** (manual), AED as appropriate to patient presentation
- **Oxygen** administration as appropriate to the patient presentation
- **Airway Adjuncts** (Supraglottic Airway, OPA, NPA.), EtCO2 monitoring appropriate to patient presentation
- Obtain **BGL**
- **Splint** Using the appropriate device, PMS Pre and Post splinting, place grossly deformed extremities into anatomical positon

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

Mild to Moderate Pain

- **Morphine** 0.05-0.1 mg/kg IV/IO, may **Repeat** half initial dose PRN, **Max** total dose 10 mg
- **Fentanyl** 0.5 mcg/kg IV/IO/IN, **Repeat** 0.25 mcg/kg PRN, **Max** total dose 100 mcg

Severe Pain

- **Ketamine** 0.1 mg/kg IV/IO **OR** 0.5 mg/kg IM, may **Repeat** one time PRN

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

ETC02 <30 & >50
SPO2 < 92%

PEARLS

- Consider treating pain prior to splinting the extremity or moving the patient
- If no pulse or circulation noted reduce the fracture till pulse and circulation are regained

Head Injuries
Pediatric Trauma

Medical Director: Benjamin Oei, M.D.

Austin County EMS Protocol & Guideline	
Version:	1.0
Date:	04/2019

Overview: Head injuries are significant in any patient, even minor head injuries with the focus on the effects of single and aggregate TBI's. Good, thorough evaluation of the patient's neurologic and cognitive status is imperative. More severe head injuries with potential swelling and/or intracranial bleeding require acute-specialized care from a level 1.

Definition: Any patient who experienced an insult directly to the head or as a secondary injury with the potential of causing an injury to the structures of the head/brain.

Refer to the HandTevy Book

EMT

- Place patient on the **Cardiac Monitor**
- Evaluate **Pupils**
- **CPR** AED as appropriate to patient presentation
- **Oxygen** administration as appropriate to the patient presentation
- **Airway Adjuncts** (Supraglottic Airway, OPA, NPA), EtCO2 monitoring appropriate to patient presentation
- Obtain **BGL**
- **Hypertensive** elevate patient head to 20-45 degrees

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 for **Hypotension**
- **Intubate** as appropriate to patients presentation **(consider possible ICP during intubation)**

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

Airway Management

- **RSI Procedure (if needed)** maintain intubated patients EtCO2 at 35-40 mm/Hg

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

ETC02 <30 & >50
SPO2 < 92%

PEARLS

- If intubation is necessary, action must be taken to reduce the stimulation associated with intubation.
- Head Injury patients with increasing ICP can become combative. RSI facilitates reducing the patient exertion and rapidness of rising ICP.
- Remove helmet, using appropriate technique, for airway management if clinically indicated.
- Any change in patient condition refer to appropriate protocol

Thoracic Trauma
Pediatric Trauma

Medical Director: Benjamin Oei, M.D.

Austin County
EMS Protocol & Guideline

Version:	1.0
Date:	04/2019

Overview: Trauma to the chest requires a thorough and careful assessment for any immediate life threatening injuries. Rapid transport to an appropriate level facility is necessary due to limited resolution in the field. Thorough assessments should frequently be performed in order to early identify any potential life threats that may not immediately be evident.

Definition: Any patient who experienced an insult to the chest with the potential of causing obvious or suspected injury to the structures within the chest cavity.

Refer to the HandTevy Book

EMT

- **Immediately** stop significant bleeding
- Place patient on the **Cardiac Monitor**
- Evaluate **MOI**
- **CPR**, AED as appropriate to patient presentation
- **Oxygen** administration as appropriate to the patient presentation
- **Airway Adjuncts** (IGEL, OPA, NPA, ETC.), EtCO2 monitoring appropriate to patient presentation
- Obtain **BGL**

Open Chest Wound

- **Apply** an **Occlusive dressing** monitor the patient closely for development of a tension pneumothorax

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

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

Open Chest Wound

- **Needle Chest Decompression Procedure** for a Tension Pneumothorax

Flail Segment

- **Large Flail** segment with respiratory distress, provide positive pressure distress, **RSI** if appropriate to PT

Penetrating Chest Wound

- **Stabilize** the object in place, **Never** remove an object unless it is impeding airway management or CPR
- **Monitor** closely for development of a tension pneumothorax

Mild to Severe Pain

- **Morphine** 0.05-0.1 mg/kg IV/IO, may **Repeat** half initial dose PRN, **Max** total dose 10 mg
- **Fentanyl** 0.5 mcg/kg IV/IO/IN, **Repeat** 0.25 mcg/kg PRN, **Max** total dose 100 mcg

Severe Pain

- **Ketamine** 0.1 mg/kg IV/IO **OR** 0.5 mg/kg IM, may **Repeat** one time PRN

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

ETC02 <30 & >50
SPO2 < 92%

PEARLS

- Although rarely dangerous in and of itself, subcutaneous emphysema is often one of the first signs of pneumothorax in the unresponsive patient.
- Tracheal deviation is a late finding and should NOT be used to eliminate the possibility of a tension pneumothorax. Should these findings be present, the chest must be decompressed immediately to prevent circulatory collapse.
- A simple closed pneumothorax requires no immediate treatment and is often not discovered in the prehospital setting.
- Vascular injuries can occur in penetrating chest trauma leading to a hemothorax, even with only minor vascular injuries. Each pleural space can hold about 1/3 of the total blood volume. Out-of-hospital treatment of a hemothorax is limited, therefore rapid transport and early surgical intervention is the definitive management.

Traumatic Cardiac Arrest

Pediatric Trauma

Medical Director: Benjamin Oei, M.D.

Austin County EMS Protocol & Guideline	
Version:	1.0
Date:	04/2019

Overview: To provide guidelines for terminating resuscitation, or withholding resuscitative efforts, for patients that have suffered a cardiac arrest due to traumatic injury.

- This procedure is reserved for those patients 18 years of age or older.
- This procedure is also reserved for those patients that are not hypothermic

Definition: Any patient who experienced cardiac arrest 2nd to trauma, treatable causes have been addressed and ruled out, and/or anticipation of viability is absent.

Refer to the HandTevy Book

EMT

- **Immediately** Stop any significant bleeding
- Place patient on the **Cardiac Monitor**
- **CPR** , AED as appropriate to patient presentation
- **Oxygen** administration as appropriate to the patient presentation
- **Airway Adjuncts** (Supraglottic Airway, OPA, NPA.), EtCO2 monitoring appropriate to patient presentation
- Obtain **BGL**
- **Evaluate MOI**

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 patients presentation

CPR

- **See Appropriate** Cardiac arrest **Protocol**

Paramedic

- **Periocardiosentesis**

Traumatic Arrest Considerations

1) **Blunt, or penetrating traumatic cardiac arrest: Resuscitation may be terminated or withheld if the patient presents with all the following:**
   - i) **Apneic and Pulseless**
   - ii) **No pupillary reflexes**
   - iii) **No organized ECG activity / Asystole**
   - iv) **Primary treatable causes have been addressed without response (tension pneumothorax, volume depleted, external hemorrhage)**
2) **Consider termination of resuscitation in those patients receiving resuscitative efforts from first responders when the above criteria are found.**
3) **Consider traumatic cardiac arrest patients with transport time of greater than 15 minutes to be non-salvageable.**

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

ETC02 <30 & >50
SPO2 < 92%

PEARLS

- Patients presenting with injuries incompatible with life occasionally will present with a persistent organized rhythm especially in younger patients. Resuscitation may be terminated or withheld in these cases.