

Chapter 6

Pediatric Trauma Care

Standard Trauma Care Procedures

Rationale:

Traumatic injuries require prompt care and transportation. Always suspect cervical injury. Note the mechanism of injury and any other condition that may affect patient care. Any chest, abdominal and all head injuries that result in a change or loss of consciousness should receive an emergency department evaluation. Remember the Golden Hour-ideally scene time should remain under 10 minutes.

Pediatric Care

Level I

- Give a size up of the scene and consider early notification of the need for air transport or additional help.
- Assess the scene for hazards and mechanisms of injury.
- Wear appropriate Personal Protective Equipment (PPE).
- Provide Basic Life Support (including cervical immobilization).
- Perform a primary survey and provide emergency treatment.
- Administer oxygen by appropriate device.
- Perform a secondary survey enroute to the hospital.
- Inflate MAST for immobilizing lower extremity fractures (i.e. bilateral femur and/or pelvis) if available.
- Monitor oxygen saturation if indicated.
- Initiate transport according to Trauma Transport Protocols, preferably within 10 minutes of extrication.

Level II

- Provide ALS support (ECG, IV, Advanced airway).
- Establish an ALS airway if needed with ET tube (1 attempt only) or King Airway (>12kg or 25lbs).
- Confirm airway placement with capnography and 2 other documented methods.
- Initiate 2 large-bore IV lines of normal saline if indicated and time available.

Animal Bites and Stings

Rationale:

Treatment of this injury will depend on the type of animal. Other factors may include site of bite, number of bites, possible envenomation, patient sensitivity, and time of bite. Allergic reaction is an important consideration to be evaluated. Refer to the anaphylaxis protocol as needed. Gather as much information on the animal as possible.

Assessment Checklist

- Snake bite – poisonous or nonpoisonous
- Insect sting
- Jellyfish sting
- Dog or other animal bite
- Allergic reaction
- Anaphylactic shock
- Hypotension or shock

Pediatric Care

Level I

- Irrigate and cleanse wound.
- Assess degree of bite / sting marks, outline edematous, erythematous, and ecchymotic areas with a pen, noting the time.
- Administer oxygen by appropriate device.
- Immobilize and elevate any extremities bitten by a snake.
- Keep patient supine and calm.
- Remove stingers if present, taking care to avoid compressing the site.
- Identify animal if possible.
- For marine stings, use vinegar to flush site. Exception, only Portuguese man-of-war stings should only be flushed with fresh water or saline
- Do NOT apply ice or cold packs to snake bites or marine stings. Exception, only Portuguese man-of-war stings should have ice applied to help reduce swelling and pain

Level II

- Establish vascular access if indicated.
- Monitor ECG.
- Evaluate the need for advanced airway with RSI if indicated including Etomidate IV 0.15-0.3 mg/kg, Atropine IV 0.02 mg/kg (if under age 5), and Succinylcholine IV 1-2 mg/kg (if available).
- If intubated, sedate with Versed IV 0.05mg/kg (max dose 2 mg)
- Confirm airway placement with capnography and 2 other documented methods.

Level III

- None

Burns

Rationale:

Major (or inhalation) burns require aggressive care. Prolonged treatment in the field is not justified.

Assessment Checklist

- Thermal burns
- Chemical burns
- Electrical burns
- Airway burns

Pediatric Care

Level I

- Extinguish active burning and move the victim to safe area.
- Suction airway as needed.
- Assess oxygen saturation.
- Administer oxygen by appropriate device.
- Cover with burn sheets and irrigate the skin with copious sterile fluids unless BSA > 10%.
- Take precautions to control hypothermia for victims of extensive burns.
- Avoid the use of water on dry chemical burns, until the chemical is brushed off.

Level II

- Establish IV/IO.
- Burns exceeding 10% (2nd or 3rd degree) BSA begin fluid resuscitation: < 5 yrs. at 150 ml per hour, 5 to 15 yrs. at 250 ml per hour for the first two hours. If transport time is longer than two hour use the Parkland Formula.
- Monitor ECG.
Evaluate the need for advanced airway (preferably ET tube considering potential for sub-glottic swelling) with RSI if indicated including Etomidate IV 0.15-0.3 mg/kg, Atropine IV 0.02 mg/kg (if under age 5), and Succinylcholine IV 1-2 mg/kg (if available).
- If intubated, sedate with Versed IV 0.05mg/kg (max dose 2 mg)
- Confirm airway placement with capnography and 2 other documented methods.
- Flush chemical burns with copious amounts of water for 15 minutes.
- Morphine IV/IO 0.1 mg/kg (max dose 5 mg) for burns exceeding 10% (2nd or 3rd degree) BSA OR Fentanyl (if available) PRN up to 1 mcg/kg IV/IO/IM or 1-2 mcg/kg IN if unable to establish IV/IO, titrate to effect.
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Level III

- Administer pain medications as ordered.

Chest Injury

Rationale:

Thoracic trauma can be deceptive. Any thoracic trauma with associated dyspnea should be considered serious. Chest injury patients may deteriorate rapidly. Frequent assessments are advised.

Assessment Checklist

- Respiratory arrest
- Rib Fracture
- Flail chest
- Tension pneumothorax
- Hemothorax
- Open pneumothorax (sucking chest wound)
- Rapid respiratory decompensation
- Occult hemorrhage
- Exsanguination
- Related cervical or head injury
- Pericardial tamponade
- Subcutaneous emphysema
- Cardiac Contusion

Pediatric Care

Level I

- Monitor oxygen saturation.
- Administer oxygen by appropriate device.
- Seal sucking chest wounds on three sides.
- Stabilize flail segments utilizing bulky dressings.

Level II

- Establish IV/IO.
- Monitor ECG.
- Evaluate the need for advanced airway with RSI if indicated including Etomidate IV 0.15-0.3 mg/kg, Atropine IV 0.02 mg/kg (if under age 5), and Succinylcholine IV 1-2 mg/kg (if available).
- If intubated, sedate with Versed IV 0.05mg/kg (max dose 2 mg)
- Confirm airway placement with capnography and 2 other documented methods.
- Perform a pleural decompression as needed.

Level III

- None

Fractures

Rationale:

Treat small bone fractures as simple injuries. Long bone fractures or multiple small bone fractures should be treated as major trauma. Evaluate the mechanisms of injury to guide assessment of possible child abuse.

Assessment Checklist

- Closed fracture
- Open fracture
- Related head or spine injury
- Child abuse
- Internal injury or hemorrhage
- Seizure activity related to a fall

Pediatric Care

Level I

- Administer oxygen by appropriate device.
- Assess distal pulses.
- Align and immobilize. Make only 1 attempt at this if vascular compromise exists.
- Immobilize joint fractures in position found. Exception to this rule will be fracture or dislocation of the knee that has diminished or absent distal pulses.
- Irrigate open fractures thoroughly with saline then cover with dressing.
- Apply a traction splint to femur fractures.
- Apply a cold pack or ice to the site.
- Inflate MAST for immobilizing lower extremity fractures (i.e. bilateral femur and/or pelvis), (if available).

Level II

- Establish IV/IO access if indicated
- Morphine IV/IO 0.1 mg/kg (max 5mg) OR Fentanyl (if available) PRN up to 1 mcg/kg IV/IO/IM or 1-2 mcg/kg IN if unable to establish IV/IO, titrate to effect.

Level III

- Administer pain medications as ordered.

Head Injuries

Rationale:

Significant head injury may be difficult to assess. It is best to treat for a head injury if at all suspected. Evaluate the patient for a possible trauma alert based on related injuries. If patient is hypotensive, look for injuries elsewhere.

Assessment Checklist

- Altered or obtunded mental status
- Internal bleed or hematoma
- Inappropriate affect (abnormal behavior)
- Skull fracture (open or closed)
- Respiratory compromise or abnormal respiratory patterns
- Related cervical, facial, eye, and airway injuries

Pediatric Care

Level I

- Administer oxygen by appropriate device.
- Elevate the head of the backboard 15-30 degrees if normotensive.
- Evaluate need for law enforcement / restraints.
- Patients who must be restrained should be placed SUPINE on the stretcher, and a person must dedicated to monitor the patient's airway.
- Check blood glucose.

Level II

- Establish IV/IO.
- Monitor ECG.
- Evaluate the need for advanced airway with RSI if indicated including Etomidate IV 0.15-0.3 mg/kg, Atropine IV 0.02 mg/kg (if under age 5), and Succinylcholine IV 1-2 mg/kg (if available).
- If intubated, sedate with Versed IV 0.05mg/kg (max dose 2 mg)
- Confirm airway placement with capnography and 2 other documented methods.
- If glucose < 60 mg / dl, follow Hypoglycemia Protocol.

Level III

- None

Ophthalmic Injuries

Rationale:

Eye injuries must be treated very seriously due to the potential for permanent impairment and the proximity to the central nervous system. Psychological support is essential especially when the eyes are to be covered. Always consider cervical spine injury related to an eye injury.

Assessment Checklist

- Impaled object
- Bleeding or loss of aqueous / vitreous humor
- Deformity of the orbital socket
- Visible objects in eye
- Chemical, thermal, or bright-light (such as welding) burns to the eye

Pediatric Care

Level I

- Quickly assess gross visual acuity.
- If the eye is chemically burned, thoroughly irrigate affected eye(s) as soon as possible with normal saline.
- If the eye is penetrated, do NOT remove impaled object.
- Protect injury by applying eye shield and bandage over eye(s) avoiding pressure on the eye itself.
- Cover other eye to reduce eye movement in the unaffected eye.
- Keep patient from bending or straining.
- If eye or orbit receives blunt trauma and blood is noted in anterior chamber (hyphema), transport with head elevated at least 60 degrees, only if no cervical spine injury.
- Dim interior lights during transport.

Level II

- Administer 2 gtt's Tetracaine (if available) per affected eye. If administered, patient MUST seek further medical treatment.

Level III

- None

Traumatic Shock

Rationale:

The patient's "**Golden Hour**" begins at the time of injury. This concept should guide rapid recognition, treatment, and transportation to a trauma center.

Assessment Checklist

- Hemorrhage (including occult)
- Orthostatic hypotension
- Neurogenic shock
- Anaphylactic shock
- Related trauma
- Ulcers or other internal bleeding

Pediatric Care

Level I

- Administer oxygen by appropriate device.
- Monitor oxygen saturation.
- Monitor vital signs every 5 minutes.
- If the patient is hypotensive, place in Trendelenburg position.
- Control the bleeding with direct pressure, elevation.

Level II

- Establish IV/IO. Do not delay transport to establish IV lines.
- Monitor ECG.
- Evaluate the need for advance airway with RSI if indicated including Etomidate IV 0.15-0.3 mg/kg, Atropine IV 0.02 mg/kg (if under age 5), and Succinylcholine IV 1-2 mg/kg (if available).
- If intubated, sedate with Versed IV 0.05mg/kg (max dose 2 mg)
- Confirm airway placement with capnography and 2 other documented methods.
- If the patient is hypotensive, administer a fluid bolus of normal saline 20 ml / kg.
- Repeat the saline bolus if signs of shock or hypotension persist.

Level III

- Administer Dopamine 5-20 mcg / kg / min for neurogenic shock after volume replacement. Titrate dopamine to maintain a systolic BP > 90 mm / Hg.