

Chapter 3

Adult Trauma Care

Standard Trauma Care Procedures

Rationale:

Traumatic Injuries require prompt care and handling. Always suspect cervical injury. Note the mechanism of injury and other conditions that may affect patient care. **Remember the Golden Hour.**

General Adult Trauma Care

Level 1

- 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 injuries.
- 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.
- 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 2

- Provide ALS support (ECG, IV, Advanced Airway).
- Initiate 2 large bore IV lines of normal saline if indicated. Use blood tubing if available.
- Control bleeding with tourniquet if indicated and available.

Level 3

- None

Abdominal Trauma

Rationale:

Abdominal trauma may be blunt or penetrating. In either case the end goal is eliminating the time on scene while performing treatment meant to maintain homeostasis.

Assessment Checklist

- Shock
- Hemorrhage
- Penetrating Injury
- Blunt Injury

Adult Care

Level 1

- Standard Trauma Care protocols
- Oxygen and airway control
- Consider use of occlusive dressing for open wounds.
- Trendelenburg position as warranted (systolic blood pressure <100 with shock symptomology).
- Stabilize any impaled objects.
- Check blood glucose level.

Level 2

- IV/IO Normal Saline (initiate 2 lines for severe trauma or suspected internal hemorrhage).
- If glucose check is less than 60mg/dl, administer D50 25 Gm IV/IO Or D10 25G in 100ml or 250ml IV/IO, if glucose is < 60 mg / dl.
- Fluid administration determined by blood pressure response; begin with 250 cc fluid challenge; TKO IV/IO lines once peripheral pulses returned.
- Consider administration of Morphine Sulfate 2 MG every 5 minutes up to maximum of 10 mg IV/IO, may be administered IM if no IV/IO available 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.
- Administer Ondansetron (Zofran) 4mg IV or ODT, may repeat x 1 dose in 2-5 minutes, if needed.

Level 3

- None

Animal Bites and Stings

Rationale:

Treatment will depend on several factors including, the type of animal involved, size of bite, number of bites, whether or not envenomation occurred, possible patient sensitivity, and type of bite. The rescuer should note evidence of any allergic reaction. Refer to the anaphylaxis protocol as needed. Gather as much information on the animal as possible.

Assessment Checklist

- Animal bites
- Snake bites
- Jellyfish stings
- Insect bites or stings
- Dyspnea
- Edema in airway
- Muscle spasms or seizure
- Hypotension or shock

Adult Care

Level 1

- 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 if available. Saline if not available. Exception--Portuguese man--war stings should have ice applied to help reduce swelling and pain.

Level 2

- Establish IV.
- Monitor ECG.
- Treat specific signs and symptoms as needed by applicable protocol

Level 3

- None

Burns

Rationale:

Burn management requires aggressive care for inhalation injuries or large area burns (> 15% of BSA). Prolonged treatment in the field is not justified.

Assessment Checklist

- Thermal burns
- Chemical Burns
- Electrical burns
- Airway burns
- CO exposure

Adult Care

Level 1

- Extinguish active burning and move the victim to safe area.
- Suction airway as needed.
- Monitor oxygen saturation.
- Administer oxygen by appropriate device. 100% FM nonrebreather if CO toxicity suspected.
- Cover with burn sheets and irrigate the skin with copious sterile fluids unless BSA > 15%.
- 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.
- Flush chemical burns with copious amounts of water for a minimum of 15 minutes.

Level 2

- Establish IV.
- If burns are > 15% (2nd or 3rd degree) BSA begin fluid resuscitation at rate of 500ml per hour. If transport times are greater than two hours use the Parkland Formula.
- Monitor ECG.
- Evaluate the need for advanced airway.
- For hypovolemia, follow the Traumatic Shock Protocol.
- Administer 5mg morphine sulfate IV or IM PRN for isolated burns that meet Trauma Alert. May repeat times one if needed 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. Criteria (2nd or 3rd degree > 15% BSA).

Level 3

- None

Chest Injury

Rationale:

Trauma to the chest is deceptive. Any chest wall injury associated with breathing difficulty should be considered serious. Chest injury patients may deteriorate rapidly. Multiple physical exams are advised.

Assessment Checklist

- Occult hemorrhage and Shock
- Flail chest
- Tension pneumothorax
- Hemothorax
- Sucking chest wounds
- Pericardial tamponade
- Myocardial contusion

Adult Care

Level 1

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

Level 2

- Establish two IV lines.
- Monitor ECG.
- Evaluate the need for advanced airway.
- Perform a pleural decompression as needed.
- Consider administration of Morphine Sulfate 2 MG every 5 minutes up to maximum of 10 mg IV/IO, may be administered IM if no IV/IO available 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.) for pain control.
- Administer Ondansetron (Zofran) 4mg IV or ODT, may repeat x 1 dose in 2-5 minutes, if needed.

Level 3

- None

Dive Injuries / Barotrauma

Rationale:

Barotrauma is caused by changes in atmospheric pressure. It is most commonly associated with the use of SCUBA (Self-Contained Underwater Breathing Apparatus). SCUBA emergencies can occur at any depth. A patient who takes a breath of compressed air 15 feet or deeper underwater may be a victim of barotrauma.

Assessment Checklist

- Decompression sickness (“Bends”)
- Air embolism
- Pneumothorax
- Pneumomediastinum
- Subcutaneous emphysema
- Air squeeze (unequal pressures in a body cavity area such as the ear drum or sinuses).

Adult Care

Level 1

- Administer 100% oxygen using NRB.
- Place the patient in a supine/left lateral Trendelenburg position if possible.
- Have the legal authority in charge (police, Florida Fish and Wildlife, U.S. Coast Guard, etc.) secure all of the victim’s dive gear.
- Note time of the event, rate of descent and ascent, depth of dive, and other information reported by the patient or dive partners.

Level 2

- Establish IV.
- Monitor ECG.
- Perform pleural decompression as needed.
- Transport to the closest emergency department.

Level 3

- None

Electrical Injuries

Rationale:

Lightning or electrical exposure, with single or multiple victims, either from AC or DC current. Lightning is a massive DC shock most often leading to asystole as a dysrhythmia. In a mass casualty lightning incident, attend to victims in full arrest first. If the victim did not arrest initially, it is likely they will survive.

Assessment Checklist

- Airway
- Cardiac Arrest
- Seizure
- Dysrhythmia, Ventricular fibrillation and Asystole are the most common
- Secondary trauma from fall
- Burns
- Electrical entry and exit wounds
- Hypotension or Shock

Adult Care

Level 1

- Administer oxygen by appropriate device.
- Assess distal pulses.
- AED
- CPR
- 12 lead EKG.
- Assess for other physical injuries.
- Burn wound care and dressings.

Level 2

- ACLS with early dysrhythmia intervention.
- Establish IV NSS bolus if necessary.
- Administer 5mg morphine sulfate PRN IV or IM. May repeat dosage times one. 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 3

- None

Fractures

Rationale:

Proper handling of open fractures reduces the risk of infection. Long bone fractures should be treated as major trauma. Be alert to the mechanisms of injury to assist recognition of fractures.

Assessment Checklist

- Closed fracture
- Open fracture
- Dislocation
- Shock
- Embolism
- Hemorrhage

Adult Care

Level 1

- Administer oxygen by appropriate device.
- Assess distal pulses.
- Align and immobilize. Make only one 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 mid shaft 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 2

- Establish IV for major fractures.
- Administer 5mg morphine sulfate PRN IV or IM. May repeat dosage times one.
- OR Fentanyl (if available) PRN for pain management up to 1 mcg/kg IV/IO/IM or 1-2 mcg/kg IN if unable to establish and IV/IO, titrate to effect.
- Monitor, pulse oximetry.

Level 3

- None

Gunshot Wounds/Penetrating Injuries

Rationale:

In all cases of penetrating injuries a high degree of suspicion should be maintained regarding the potential of severe hidden internal injuries and bleeding.

Assessment Checklist

- Shock
- Hemorrhage
- Tension Pneumothorax

Adult Care

Level 1

- Standard Trauma Care protocols
- Oxygen and airway control
- Consider use of occlusive dressing for open wounds.
- Trendelenburg position as warranted (systolic blood pressure <100 with shock symptomology).
- Stabilize any suspected fractured sites.
- Check blood glucose level as indicated.

Level 2

- IV/IO Normal Saline (initiate 2 lines for severe trauma or suspected internal hemorrhage).
- If glucose check is less than 60mg/dl, administer D50 25 Gm IV/IO Or D10 25G in 100ml or 250ml IV/IO, if glucose is < 60 mg / dl.
- Fluid administration determined by blood pressure response; begin with 250 cc fluid challenge; TKO IV/IO lines once peripheral pulses returned.
- Consider administration of Morphine Sulfate 2 MG every 5 minutes up to maximum of 10 mg IV/IO, may be administered IM if no IV/IO available 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.
- Administer Ondansetron (Zofran) 4mg IV or ODT, may repeat x 1 dose in 2-5 minutes, if needed.
- Pleural chest decompression as indicated.

Level 3

- None

Head Injuries/Spinal Cord Injuries (Neurogenic Shock)

All head injuries should be considered critical until a thorough assessment determines otherwise. The patient's airway should closely be monitored at all times for patency.

Level I

- Standard Trauma Care Procedures
- Oxygen and Airway Control (Goal = oxygen saturation level of 95%)
- Trendelenburg position as warranted (systolic blood pressure of < 100 with shock symptomology)
- If not in shock patient should be positioned on stretcher with head elevated.
- Check blood glucose level as indicated

Level II

- IV/IO Normal Saline (Initiate (2) IV/IO lines for severe trauma or suspected internal hemorrhage)
- BGL; administer Dextrose 50% 25 Gm. IV/IO if blood glucose is < 60 mg/dl
- Fluid administration determined by blood pressure response; begin with 250 cc fluid challenge; TKO IV/IO lines once peripheral pulses return
- Aggressive advanced airway intervention as warranted. (Potential RSI)
- Levophed drip – 8 to 30 mcg/min titrated to desired effects after 20 cc/kg fluid administration completed (Concentration is 4 mg/250 ml = 16 mcg/ml; start drip at 30 gtt/min and titrate)
- Only with physician's orders, administer Dopamine 5-20mcg/kg/min for Neurogenic Shock after volume replacement. Titrate Dopamine to maintain a SBP >90mmHg. For infants and toddlers Titrate to maintain SBP >70mmHg
- Atropine 0.5 mg IV/IO for symptomatic Bradycardia (with associated hypotension). May repeat 0.5 mg for total 1mg.

Level III

- None

Ophthalmic Injuries

Rationale:

Eye injuries have a high potential for permanent impairment. Injuries to the eye may also cause a related injury to the central nervous system. Psychological support is essential especially when the eyes are covered. Always consider cervical spine injuries with any 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

Adult Care

Level 1

- Quickly assess gross visual acuity.
- If the eye is chemically burned, thoroughly irrigate the 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 if patient has no cervical spine injuries.
- Dim interior lights during transport.

Level 2

- Apply Tetracaine (if available) 2 drops to the affected eye for pain control. If Tetracaine is administered patient MUST seek further medical attention.

Level 3

- None

Soft Tissue Injuries

Rationale:

Soft tissue injuries may be either blunt; closed or open. The goal is to locate blunt injury locations by way of a thorough assessment and appropriately treat open injuries in order to control bleeding while keeping the patient comfortable.

Adult Care

Level 1

- Standard Trauma Care protocols
- Oxygen and airway control
- Apply direct pressure with sterile bandages to open wounds; may also apply cold packs and elevate for comfort and further bleeding control.
- Consider application of tourniquet if other bleeding control methods are ineffective; date and time of application should be clearly marked on patient.
- Stabilize any impaled objects.
- Any amputated body parts should be transported with patient.
- Check blood glucose level.

Level 2

- IV/IO Normal Saline (initiate 2 lines for severe trauma or suspected internal hemorrhage).
- If glucose check is less than 60mg/dl, administer D50 25 Gm IV/IO Or D10 25G in 100ml or 250ml IV/IO, if glucose is < 60 mg / dl.
- Fluid administration determined by blood pressure response; begin with 250 cc fluid challenge; TKO IV/IO lines once peripheral pulses returned.
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- Administer Ondansetron (Zofran) 4mg IV or ODT, may repeat x 1 dose in 2-5 minutes, if needed.

Level 3

- 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
- Adult Care level Direct Pressure, Elevation, Pressure Points, Tourniquet (only as a last resort).
- Related trauma
- Ulcers or other internal bleeding

Adult Care

Level 1

- Control bleeding if possible, through Direct Pressure, Elevation, Pressure Points, and Tourniquet (only as last resort).
- Administer oxygen by appropriate device.
- Monitor oxygen saturation.
- Vital signs every 5 minutes.
- If the patient is hypotensive, place in Trendelenburg position.

Level 2

- Evaluate the need for advanced airway.
- Initiate 2 large bore IV's of normal saline pressure infused with blood tubing if available. Do not delay transport to establish IV lines.
- Repeat 250 ml boluses up to 2 liters as indicated to maintain a systolic BP > 90 mm / Hg.
- Monitor ECG.

Level 3

- Administer a dopamine infusion if fluid boluses fail to maintain adequate pressure

Less – Than Lethal Weapons (Pepper Spray & Tear Gas)

Rationale:

As Police agencies look for alternate methods of controlling and placing people into their custody they have begun using “Less – Than Lethal” weapons to do so. It is only a matter of time before EMS Providers are asked to respond to such situations. This protocol will deal with the three (3) most common types of Less – Than Lethal weapons that are currently in use by Law enforcement personnel.

Pepper Spray & Tear Gas

Level 1

- Ensure *no* cross contamination occurs to Rescuer or equipment.
- Ensure good ABC’s.
- Assess for any underlying medical problems that can cause patient to become irrational and follow appropriate protocol if needed.
- Look for and treat any secondary trauma.
- Flush eyes and face to get rid of gross contaminants (especially important with foam-based sprays).
- Having patient place their face in front of an air conditioner, or fan vent on high will speed recovery time if no underlying trauma would prevent this.
- Use of recovery wipes and neutralizing solutions are allowed if you follow manufacturer’s directions. These will cut recovery time down.

Level 2

- None

Level 3

- None

Less – Than Lethal Weapons (Taser & Bean Bag Related Injuries)

Taser – Related Injuries

Level 1

- Ensure that the scene is safe and has been cleared by law enforcement.
- Assess for adequate ABC's.
- Consider oxygen administration and oxygen saturation levels.
- Assess for any secondary trauma.
- Assess for underlying medical conditions that may have caused patient to act irrational.
- Check a blood glucose level.
- If probes have not been removed prior to EMS arrival, *do not* remove. Bandage in place as you would with any impaled object. There may be some redness around the area of the probe from a very mild burn.
- If law enforcement has removed probes, ensure that they are treated as a biohazard.
- Have officer eject cartridge from taser for transport if probes are still in place.
- These patients are to be transported per protocol to the nearest appropriate receiving facility.
- These patients are considered incompetent to sign refusal for transport.

Level 2

- Establish IV access.
- Monitor ECG.
- If patient has seizure activity go directly to protocol for seizure disorder.
- If patient has chest pain or any arrhythmia's go directly to the appropriate protocol.

Level 3

- None

Note

The probes used by Tasers are straightened #8 fishing hooks. They are designed to penetrate only ¼ inch. The taser can also be used at close range as a stun gun. If this is the case the same protocol still applies.

Bean – Bag Injuries

Refer to Standard Trauma Care Protocol